A USER’S GUIDE TO PSYCHOLOGICAL & NEUROPSYCHOLOGICAL TESTING

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WHY REFER?

• Differential diagnosis.

• Understand how this particular condition is impacting this specific individual at this point in time.

• Establish neurocognitive profile to be used for treatment planning.

• Baseline data for later comparison.

• Evaluation of treatment effectiveness and tracking progress over time.
WHAT TO EXPECT

• Depends on the question and type of evaluation.
• Provide all relevant records BEFORE you go in.
• Clinical interview 60-90 minutes. Keep no secrets.
• Completion of rating forms.
• Cognitive screening versus comprehensive evaluation.
PREPARING FOR TESTING

• Good nights rest, good breakfast
• Inquire re: whether to medications or not
• Bring glasses, hearing aids, etc. and list of all medications
• Plan for the length of the evaluation
• Know the timeline of important events and names/addresses of other providers (PCP, psychiatrist, counselor, etc.)
• Discuss confidentiality and who is the identified client
PSYCHOMETRICS AND NEUROPSYCHOLOGY

• Psychometrics refers to the measurement of psychological functions
• Use psychometric tests to infer underlying brain function
• Inferences are only as valid and reliable as are the instruments we use and the knowledge of the user in how to apply them
EVALUATING INDIVIDUAL CLIENTS

- Determine reason/need for evaluation
- Determine premorbid and predisposing variables
- Generate hypotheses and determine methodology
- Assess current neuropsychological functioning
- Identify risk within environmental context
- Predict functional outcomes
- Provide recommendations for management
- Follow-up
COLLECTING & REVIEWING RECORDS

• The background/context is essential
• The more I know ahead of time the better I plan and the more I can help
• Sources and types of records
  • Family
  • Medical
  • Developmental
  • Psychiatric/mental health
  • Academic
  • Vocational
  • Legal
  • Socioeconomic/environmental
• PRIOR TESTING SHOULD ALWAYS BE INCLUDED
HISTORY

• Difference between testing and evaluation is the history, clinical interview, and interpretation

• You cannot know the present nor predict the future w/o knowing the past

• Look for history of concerns
  • When first evident?
  • How have the problems manifested over time?
  • What efforts have been made to understand and/or treat the problem?

• Always consider context and function of behavior
CONFIDENTIALITY ISSUES

- **HIPAA**
  - Within a system
  - Outside information
  - Does not always apply if insurance not used

- **FERPA**
  - Federal law that applies to academic records

- **Tarasoff**
  - Duty to warn

- **Sticky issues**
  - Working as part of a team may affect confidentiality.
  - Confidentiality issues vary by setting and agreements.
MAIN PRINCIPLES OF PSYCHOMETRICS

• Reliability

• Validity

• Standardization

• Freedom from bias
MEASUREMENTS AND ERROR

• In reality, there is no perfect accuracy — always sources of error
  • True ability + error = observed score

• Two sources of error
  • Random
  • systematic
RELIABILITY VS VALIDITY

**RELIABILITY**
- Definition – do I get the same results each time?
- Does my approach yield consistent results?

**VALIDITY**
- Am I measuring what I think I am measuring?
AM I HITTING THE TARGET?
MEASURING RELIABILITY

• Reliabilities are coefficients that vary between 1 (perfect accuracy) and 0 (all error)

• In truth, no way to eliminate all error, so \( r \) is never \( = 1 \)

• Allows comparison among measures

• Assigning confidence to test result
RELIABILITIES IN PRACTICE

- Individual ability tests 0.92
- Group ability tests 0.85
- Personality scales 0.75
- Essays 0.66
- Creativity tests 0.50
- Projective tests 0.30
FORMS OF VALIDITY

• A test cannot be more valid than it is reliable

• Construct validity – the construct being measured is clearly defined

• Content validity – the content of the test adequately and accurately captures construct
FORMS OF VALIDITY

• Criterion-related validity – extent to which a test predicts some established criterion
  — Concurrent validity – predicts a current ability
  — Predictive validity – predicts future ability

• Face validity – extent to which test appears to measure what it claims
ASPECTS OF CONSTRUCT VALIDITY

• Convergence – similar measures of the same construct should correlate with each other despite methodology

• Divergence – measures with similar method (i.e. questionnaire) but measuring different constructs do not correlate with each other
STANDARDIZATION

• The concept of “Average”
  — Adolphe Quetelet (1835) “On Man and the Development of His Faculties” invented the science of Social Physics and the idea of the “average man”
  — Francis Galton’s (1888) “Co-relations and Their Measurements, Chiefly from Anthropometric Data” represented a systematic shift from the study of the average man to the study of differences from the average
NORMAL CURVE AND DEVIATION

- Standard Deviation (SD) – measure of deviation from the mean within a distribution of values
PERCENTILES

• Percentage of persons in the sample who scored below specific raw score
  — Typically higher is better
  — Intuitive
  — However, the distance between scores is not even
STANDARD SCORES

- Expresses distance from successive values evenly
- Allows comparison across individuals
- Allows comparison across different measures with similar distributions
NORMATIVE DATA

• **Norm** – representative cross section of the population for whom the test is designed

• **Random Sampling** – selecting at random persons from the whole population

• **Stratified random sampling** – classify target population on background variables and sampling a percentage at each stratum

• **DOES THE NORMATIVE REPRESENT THIS INDIVIDUAL?**
COMMON STRATIFIED NORMS

• **Age norms** – level of test performance for each separate age group in the normative sample
  • Expensive but preferred process, most accurate

• **Grade norms** – similar to age norms but depict level of performance at the specified grade level
  • Be VERY careful in interpretation since there is no true national curriculum hard to compare grade scores via national data.
COMMON STRATIFIED NORMS

• **Local norms** – local examinees vs. national sample
  • comparing subject to others in same designated location (such as state, county, school system, etc.)

• **Subgroup norms** – obtained from specified subgroup or population
  • Comparing subject to other students with ADHD for example
OTHER TYPES OF NORMS

• **Species-wide performance expectations** – e.g. motor function, speech, vision, perceptual discrimination
  - Typically interpreted in context of defective vs non-defective or qualitative
  - Not as useful in subtle dysfunction, diffuse lesions

• **Customary standards** – visual ideal of 20/20
EXPRESSING VARIABILITY OF SCORE

• SEM — standard error of the measurement
  — SEM = SD \sqrt{(1-r)}
  — SD is standard deviation of scores on test and r is the reliability coefficient

• Provides an estimate of where the “true” score lies

• Confidence interval is combination of SEM with the odds that are chosen
  — 68% confidence = +/- 1 population SD
  — 95% confidence = +/- 2 population SD
  — 99% confidence = +/- 3 population SD
CONFIDENCE INTERVALS

• The higher the confidence interval, the greater the range of score
• Depends directly on the reliability of the measure in question
• Depends on the normality of the measurement in the normative population
TEST BIAS

• **Bias** – test score has meaning or implication for a relevant and definable subgroup of test takers different from the remainder of test takers

• Demonstrated when the scale in question is relatively more difficult for one group vs. another group when general ability is constant
FORMS OF BIAS

• Predictive/criterion validity – test does not predict a relevant criterion equally for persons from different groups – i.e. regression lines differ

• Construct validity – test does not measure same construct in different groups – i.e. difference in factors obtained, rank order of item difficulty
“CULTURALLY FAIR” TESTS

• Cultural fairness determined often by face validity

• Even a “culturally fair” test can fail in minority subpopulations
  • Dependence on definition of “culture”
  • Translation of items – literal translations can fail because concepts nonsensical in the subpopulation in question
MEASUREMENT OF DEFICITS AND STRENGTHS

• Identify deficit vs own abilities or premorbid functioning:
  • Existing test scores compared to current test scores to identify discrepancy
  • Estimate premorbid function

• Identify deficits vs peer group
MEASUREMENT OF DEFICITS AND STRENGTHS

• Assess deficits
  • Identifying weakness or areas for intervention
  • Very important for “qualifying” for services

• Assess strengths
  • Looking at profiles of S&W allows for individualized treatment planning
  • Exploit strengths to compensate for weak areas
  • Recruit strengths to improve motivation by building on success
QUESTIONNAIRES/CHECKLISTS

- Uses and limitations
- Broad band
- Domain specific
- Disorder specific
- Supplements but does not replace interview
INFORMANT BASED MEASURES

• Behavior Rating Inventory of Executive Functioning (BRIEF-2)
• Comprehensive Executive Function Inventory (CEFI)
• BASC-III (CBCL, Conner’s, Vanderbilt, & other general behavioral rating forms)
• Be sure to get multiple informants from multiple sites (parents, teacher’s, etc.)
MEASURES OF EXECUTIVE FUNCTIONING (EF)

• What are we measuring?
• Essentially the component skills of goal directed behavior
• Think CEO plus an effective administrative assistant
DOMAINS OF ASSESSMENT

• Assessment requires a review of all pertinent neurocognitive systems
• Examples of relevant domains include:
  Intelligence
  Executive functions (Attention, Self-regulation, Flexibility, Problem-solving, Reasoning, Planning, Organization)
  Learning (acquisition)/Memory (retention, retrieval)
  Language (Expressive, receptive, confrontation naming, fluency, repetition, semantic, phonological, pragmatic, prosodic)
  Visuospatial/Visuomotor Construction
  Sensory/Motor
  Adaptive (Behavioral/social)
  Personality, Mental state
  Condition specific instruments
**DEFINING TERMS AND THEIR MEASUREMENT**

- Simple Inhibition: Go/no-go task
- Selective Attention/Discrimination: Responding to specific words or stimuli but not others (e.g. CPT, TEA-Ch Sky Search or Auditory Attention subtest from the NEPSY battery)
- Complex Inhibition: Interference control with a Stroop-like task
- Complex attention: Trail-making test
- Working memory: brief store of incoming information, characterized by rapid fading and prone to interference (telephone numbers)
- *be sure to look at efficiency across tasks*
SPECIFIC LAB MEASURES

• Delis-Kaplan Executive Function System (DKEFS)
  • Trails, Stroop, Verbal fluency
• Test of Everyday Attention for Children (TEA-Ch)
• Continuous Performance Tests (CPT-III, CATA, TOVA)
• Wisconsin Card Sorting Test (WCST)
• Rey-Osterrieth Complex Figure (ROCF)
• NEPSY-II Developmental EF
• CVLT and other memory measures
• Consider visuomotor, fine motor measures
COMPARISON STANDARDS FOR DEFICIT MEASUREMENT

- Normative
- Individual
- Direct
- Indirect
- Estimating premorbid ability
- Best performance method
- Neuropsychology organizes around established brain-behavior relationships
THE PROCESS

• Motivation
  • State and trait
  • Largely influenced by the examiner
  • Treat each pt as an n of 1

• Standard administration versus testing of limits

• Addressing special needs and populations

• Observation
  • Checklists
  • Notation
  • Improves with experience

• Documentation
TESTING

• Sampling behavior under specific performance demands.

• Document behavioral observations and impressions AS YOU GO. Create a usable, reviewable document.

• Tests provide formal documentation of *performance levels* (overall ability as well as specific strengths and weaknesses) and *problem-solving processes* in specific skill areas.

• The instruments are only as good as their psychometric/scientific foundations and the clinician that is employing them as tools.

• Test materials as tools of the trade- we have to protect their integrity
INTERPRETATION

- Tests are multifactorial and frequently not specific to single mental operations or even a single neurocognitive domain.
- The examiner must analyze each task with respect to the skills/processes it requires and attempt to identify the ones that account for THIS individual’s performance.
- Performance on seemingly different tasks may require one or more similar component mental processes.
- Your interpretation must account for ALL of the findings and bring coherence to the data.
UNDERSTANDING CONTEXT

• Knowledge regarding environmental influences on development is crucial

• Assessment must consider multiple contexts

• Rule out alternative explanations and determine risk

• Test data is collected within a context (i.e., the examiner-child dyad)
INTERPRETATION

• Interpret findings within context of ALL available information

• Findings reflect both brain functioning and context of the evaluation

• Failures in adaptation result from a clash between individual capacities and environmental demands/expectations
INTERPRETATION

• Level of Performance
  • Objective normative standard
  • Do NOT pathologize normal levels of functioning

• Pattern Analysis
  • Strengths and weaknesses
  • Individual comparison standard
  • Test score comparison (especially consider DOMAINS and Brain-Behavior

• Pathognomonic sign
  • Are there any specific signs that are indicative of brain dysfunction? Are they specific to certain conditions?
COMMON INTERPRETATION ERRORS

- Overgeneralization
- Absence of evidence
- Confirmatory bias
- Misuse of salient data can lead to both over and under interpretation
- Failure to consider “base rates”
- Effort/motivation
COMMUNICATING TEST FINDINGS

• Style Counts
• Did the psychologist effectively communicate results and recommendations?
• Did they answer the referral question
• Are the findings relevant and useful
• Come prepared to the feedback session
• Ask for anticipatory guidance
COLLABORATIVE TREATMENT PLANNING

• Review the purpose of the evaluation, solicit goals for the evaluation and feedback session from the team
• What are the team concerns?
• Identify goals for the student/client
• What are the obstacles to success?
• Review data within context of strengths and weaknesses
• Discuss moderators for success and risk factors
• INDIVIDUALIZE your recommendations to fit the clients specific neurocognitive profile. Data, not just diagnosis, driven
• Limit yourself to scientifically proven interventions
• If going beyond science, clearly state so.
• Recognize everyone’s expertise
CLARITY

• Avoid jargon
• Define terminology in lay terms
• Use standard scores only when helpful to the reader
• When scores are provided, include interpretive guidelines
• Provide specific behavioral descriptions
ACCURACY

• Define the degree of confidence in current findings
• Address the limitation of the data but do not become apologetic
• Stay within the confines of the findings
RELEVANCY

• Address all areas of concern
• The report should address the needs of the client AND the referral source
• Recommendations should be specific, realistic, and flow from the data
• Client centered treatment planning, appreciating values and unique needs
AROUSAL PROBLEMS

• Person focused
  • Medication (Amantadine and Provigil work by enhancing alertness thereby someone is awake to learn)
  • Improve sleep hygiene
  • Brief breaks or naps
  • Energizing diet

• Environment focused
  • Gradual school re-entry
  • More demanding classes in morning
  • Progressive increase in physical activity
  • Rest breaks during the day
ATTENTION/INITIATION PROBLEMS

• The individual
  • Stimulant medication
  • Task analysis
  • Stop and think
  • Rewards for task completion

• The environment
  • Preferential seating
  • Hands-on, participatory instruction
  • Monitoring and redirection
SLOWING

- The individual
  - Medications
  - Teach word-processing
  - Teach and reinforce efficient learning strategies

- The environment
  - Reduce pace of instruction and amount of work
  - Evaluate quality, not quantity
  - Limit homework
  - Allocate more time for activities
  - Permit peer note-taking
NONVERBAL/VISUOSPATIAL DEFICITS

• The individual
  • Teach to verbal strengths
  • Visual training

• The environment
  • Use familiar and readable materials and tasks
  • Use step-by-step approach, build on practice and review
  • Use models and demonstrations to concretize abstract concepts
MEMORY DEFICITS

• The individual
  • Mnemonic strategies
  • Medications rarely helpful unless secondary to attention deficits, depression, etc.

• The environment
  • Frequent repetition and review
  • Environmental aides
    • Homework assignment book
    • Activity schedules
    • Regular routines
  • Cueing
EXECUTIVE FUNCTION DEFICITS

• The individual
  • Instruction in study skills
  • Employ algorithms
  • Habit based training to establish routine and automaticity

• The environment
  • Structure and organize
    • Routine and predictability
  • Break tasks into manageable steps
  • Need for frequent feedback
    • Focus on process, not just outcome
EXPLOITING STRENGTHS

• Social
• Behavioral
• Cognitive
• Athletics
• Interests/hobbies
• Family resources
• School resources
• Community resources
QUESTIONS?