MicroCog: Assessment of Cognitive Functioning (Powell et. al., 1993)

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Introduction

- Not affiliated with Pearson Assessment
- Consultant for CPEP
  - Interpret MicroCog screens for CPEP, as one aspect of assessment of physicians referred for competency evaluations
  - Complete full neuropsychological evaluations for CPEP, when one is requested as a part of a referral
  - Conducted research using MicroCog

Overview

- Essentials
  - Neuropsychological screens – What are they used for?
  - Norms – What is important to know.
    - Age
    - Education
  - Neuropsychological screen versus full neuropsychological evaluation

Overview

- Introduction to the MicroCog
  - Original design
  - Structure of assessment
  - Norms
  - Interpretation
  - Limitations
  - Future

Essentials

How are neuropsychological screens used?

- Neuropsychological Screens
  - More efficient than full neuropsychological evaluation
    - Less expensive
    - Less time to administer and interpret
  - Used as a measure to determine if further assessment is recommended

Norms - Age

- Neuropsychological abilities decline with age
- For example, with age comes decline in
  - processing speed
  - the ability to sustain concentration over long periods of time
  - visual spatial abilities
  - the ability to learn novel material in a short amount of time
  - the ability to multi-task

(Goldstein, 2000; Powell & Whitla, 1994)

Norms - Age

- In general, a 60 year old physician would be much slower than a 30 year old physician on many novel cognitive tasks

- When assessing for cognitive deficits age-corrections are used to account for this decline

What this Means for Physicians

- Age normed assessment means an examinee's scores are compared to a (normative) group of people in their same age group.

- So if there is a difficulty question, it is highly likely to have been difficult for the group of people in their age group

Norms - Education

- Individuals with a high level of education generally perform better than individuals with lower level of education (Leckliter & Matarazzo, 1989)

- Education corrected norms are used to account for difference in performance

How are neuropsychological screens used?

- Neuro-cognitive screens are only designed to determine if further assessment is recommended

- Not used to determine fit for practice

- Very similar to how physicians use medical screens
    - Mammogram – Ultrasound – Biopsy – then Cancer diagnosis

Common Physician Concern

- This screen cannot tell you about how I am as a clinician
- There are no medical questions
- Overall, physicians have learned to be academically sophisticated due to so much education
- On neuropsychological tests, specifically the MicroCog, there is nothing to study

Full Neuropsychological Evaluation

- Expensive and time consuming
- Extensive testing and data collection
- Ecological validity increased with collateral information
  - Work performance issues?
  - Specific clinical performance issues?
  - Historical functioning?

MicroCog: Assessment of Cognitive Functioning

Powell et. al., 1993

Original Purpose

- Risk Management Foundation of Harvard Medical Institutions funded development

- Computer administered neuropsychological screen

- Designed to screen physicians for subtle changes in cognitive functioning

Original MicroCog

- Extremely high ceilings

- Sensitivity and specificity rates above 80% for mild cognitive impairment (Green et al., 1994)

- Physician Norms Available

MicroCog History

- Pearson Assessment
  - Bought the instrument and made minor changes
  - Normed on general population

Structure of MicroCog

Structure

- Computer administered, 45 – 60 minutes
- It is recommended that a proctor be available to answer questions and record observations
- Instructions are integrated into the computer program
- Examinees use a keyboard with a number pad
- 18 subtests

Five Domains Assessed

- Attention and Mental Control
  - Assesses various aspects of attention, such as immediate attention span, vigilance, concentration, and perseverance
- Memory
  - Measures immediate and delayed recognition memory
- Reasoning and Calculation
  - Assesses abstraction and reasoning

Five Domains

- Spatial Processing
  - Assesses both novel and familiar visual spatial processing and memory
- Reaction Time
  - Measures simple reaction time in both auditory and visual modalities

Global Scores

- Overall Processing Speed score

- Overall Accuracy score

- Two Global Cognitive Functioning scores
  - General Cognitive Functioning
    - equal weight to speed and accuracy of processing
  - General Cognitive Proficiency
    - combines both speed and accuracy, but gives greater weight to the accuracy

Norms

- <u>Age Norms</u>
  - 18 to 89 placed in nine age groups
  - 18-24, 25-34, 35-44, 45-54, 55-64, 65-69, 70-74, 75-79, and 80-89
- <u>Education Norms</u>
  - Less than high school, high school, and greater than high school
- <u>Physician Norms</u>
  - Not available through Pearson Assessment
  - Accessible through research

What to do about norms??

- Should physicians be compared to the greater than high school education group?
    - 22+ years of education
    - Increases likelihood of false negatives?
    - Decreases likelihood of false positives?
    - Many neuropsychological tests have educational corrections up to 20 years

Summary and Domain Scores

Summary Index Table

Age and Education Corrected Norms (Age: 45 - 54, Education: > High School)					
	Sum	**Scaled Score**	**%ile**	**95% Conf. Interval**	**Qualitative Description**
Level 3 - Indexes					
General Cognitive Functioning (GCF)	229	119	90	112-126	Above Average
General Cognitive Proficiency (GCP)	107	105	63	99-111	Average
Level 2 - Indexes					
Information Processing Speed (IPS)	102	102	55	95-109	Average
Information Processing Accuracy (IPA)	127	104	61	97-111	Average

Five Domains

Summary Index Table

Age and Education Corrected Norms (Age: 45 - 54, Education: > High School)	Sum	Scaled Score	%ile	95% Conf. Interval	Qualitative Description
Level 1 - Indexes					
Attention/Mental Control (Attn)	69	98	45	87-109	Average
Reasoning/ Calculation (Reas)	56	94	34	83-105	Average
Memory (Mem)	74	118	88	108-128	Above Average
Spatial Processing (Spat)	44	107	68	97-117	Average
Reaction Time (RT)	67	107	68	101-113	Average

Subtests

Interpretation of MicroCog

- Neuropsychologists interpret the MicroCog

- Usually three level of recommendations
  - No referral for neuropsychological evaluation
  - Gray area
  - Referral for neuropsychological evaluation

Interpretation

- No cutoff score used
  - Instead neuropsychologists evaluate patterns of impairment and level of impairment
  - One low subtest score with mild impairment very different from a very low domain score
- Also consider specialization
  - Slow processing speed for emergency physician?
  - Poor attention for anesthesiologist?
  - Poor visual spatial processing for surgeons?

Interpretation

- Change perception that taking the MicroCog directly leads to determination of fitness to work as a physician

  - If there are concerns, further assessment is recommended, with an increased ecological validity through clinical assessment and gathering of collateral information

Limitations of MicroCog

- Extensive physician norms not available

- Very limited auditory processing

- No alternate forms

- Pearson no longer provides updates for new operating systems

Future of MicroCog

- Currently, very good neurocognitive screen for physicians
- In future address issues
  - Improve physician norms
    - Partner with military?
    - Multi-site data collection?
  - Develop alternate forms
  - Update software for newer operating systems
  - Education to help improve current perceptions

Question?
Thank you…

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