Neuropsychological Correlates of Performance Based Functional Status in Elder Adult Protective Services Referrals for Capacity Assessments

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Capacity Assessments

Regional Offices
1 Lubbock
2 Abilene
3 Arlington
4 Tyler
5 Beaumont
6 Houston
7 Austin
8 San Antonio
9 Midland
10 El Paso
11 Edinburg
Questions to Answer for APS

- Does the APS client have a psychiatric diagnosis?
- Does the client have decision making capacity?
- What level of care do they need?
- Do they need to be emergently removed from their home?
Texas Legal Definition of Incapacity in Guardianship

An incapacitated person is an adult who, because of a physical or mental condition, is substantially unable to provide food, clothing, or shelter for himself or herself, to care for the individual’s own physical health, or to manage the individual’s own financial affairs.
Texas Legal Definition of Incapacity in Guardianship

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Scientific Dilemmas?

- Is cognition associated with functional ability?

- What cognition(s) are essential to functional and decisional capacity?

- How reliable is IADL self report? Proxy report?

- What is the best way to measure functional status in these cases?
Which Cognitive Functions are most Essential to Decisional Capacity?

- Memory and Learning
- Complex Attention
- Language
- Perceptual-Motor
- Social Cognition
- Mathematical Ability
- Executive Function
Executive Function

- One’s ability to plan, organize, sequence, monitor, and inhibit complex goal directed behaviors.

- That set of cognitive processes that allow one to act independent of the environment instead of displaying behaviors mediated by the environment.

- When executive processes deteriorate, people become dependent on habits and routine.
Prefrontal Circuits
Executive Screens

- Verbal Fluency Task
  - FAS - >10 words in 1 minute

- Verbal Trailmaking Task
  - Past “5E”
Stroop Color

Stroop Number

red  blue  green  red  blue

green  blue  green  red  green

Stroop Interference

red  blue  green  blue  green

red  blue  red  green  red

The Executive Interview

25 item multitask assessment

- 0 = correct response
- 1 = partial error
- 2 = complete error

Scoring Range Approximations:

- Young adults: 0-7
- Elderly retirees: 8-14
- Assisted Living: 15-22
- Nursing Home: 23-30
- Locked Units: >30
CLOX: An Executive Clock Drawing Task

CLOX: An Executive Clock Drawing Task
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STEP 1: Turn this form over on a light colored surface so that the circle below is visible. Have the subject draw a clock on the back. Instruct him or her to “Draw me a clock that says 10:15. Set the hands and numbers on the face so that a child could read them.” Repet the instructions until they are clearly understood. Once the subject begins to draw, no further assistance is allowed. Rate this clock in the CLOX 1 column.

STEP 2: Return to this side and let the subject observe you draw a clock in the circle below. Place 12, 3, 6, and 9 first, then fill in the rest of the numbers. Set the hands again to “10:15”. Make the hands into arrows. Make the hour hand shorter. Instruct the subject to copy your clock in the lower right corner. Rate this clock in the CLOX 2 column.

<table>
<thead>
<tr>
<th>ORGANIZATIONAL ELEMENTS</th>
<th>POINT VALUE</th>
<th>CLOX 1</th>
<th>CLOX 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the figure resemble a clock?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Circular face present?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dimensions = 1 inch?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>All numbers inside the perimeter?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Are V-shaped or 5 marks?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>12, 3, 6, 9 present?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Spacing intact? (Symmetry on other side of 12 and 6 o'clock?)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Only Arabic numerals?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Only numbers, 1 — 12 among the numerals present?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lettered 1 — 12 intact? (No distortions or eliminations)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Only two hands present? (Ignore section [right] marks)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>All hands represented as arrows?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hour hand between 1 and 2 o'clock?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Minute hand obviously longer than the hour hand?</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>None of the Following:</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1) hands point to 4 or 5 o'clock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) “12” present?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Any other numbers (e.g., “9,00”)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Any arrow or line present?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Intrusions from “hand” or “face” present?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Any letters, words, or pictures?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Any intrusions from circles below?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL:
Instructions: CLOX 1

1) Place the blank (back) side of the CLOX form in front of the subject.

2) State “Draw me a clock that says 1:45. Set the hands and numbers on the face so that a child could read them.”

3) Once the subject begins the task, no further assistance is allowed (i.e. no prompting or repeat instructions). State “Sir/Ma’am, it’s up to you” for each question.
Circular face present?

Age: 64 years
GDS: 5/15
MIS: 8
MMSE: 28
CLOX1: 5
CLOX2: 11
Only numerals 1-12 among the numerals present?

Age: 83 years
GDS: 2/15
MIS: 6
MMSE: 18
CLOX1: 7
CLOX2: 7
EXIT25: 36
Arrow pointing inward

Age: 85 years
GDS: 1/15
MIS: 2
MMSE: 15
CLOX1: 7
CLOX2: 12
EXIT25: 36
Intrusion from “face”
Intrusion from circle below

Age: 60 years
GDS: 1/15
MIS: 8
MMSE: 30
CLOX1: 6
CLOX2: 13
EXIT25: 26
Who has capacity?
7 years, 4 months

- MMSE: 25/30
- CLOX1: 6/15
- CLOX2: 11/15
- Verbal fluency (S): 2 words
- EXIT25: 14/50
10 years, 5 months

- MMSE: 27/30
- CLOX1: 12/15
- CLOX2: 13/15
- Verbal fluency (S): 14 words
- EXIT25: 8/50
# UTHSCSA Geri Psych Battery

<table>
<thead>
<tr>
<th>Test</th>
<th>Cognitive Domain</th>
<th>Range</th>
<th>Cut-point</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS</td>
<td>Memory</td>
<td>0-8</td>
<td>&lt;4</td>
</tr>
<tr>
<td>MMSE</td>
<td>General cognition</td>
<td>0-30</td>
<td>&lt;24</td>
</tr>
<tr>
<td>EXIT25</td>
<td>Executive function</td>
<td>0-50</td>
<td>&gt;15</td>
</tr>
<tr>
<td>CLOX1</td>
<td>Executive function</td>
<td>0-15</td>
<td>&lt;10</td>
</tr>
<tr>
<td>CLOX2</td>
<td>Visuospatial function</td>
<td>0-15</td>
<td>&lt;12</td>
</tr>
<tr>
<td>GDS</td>
<td>Depression</td>
<td>0-15</td>
<td>&gt;5</td>
</tr>
</tbody>
</table>
# APS Clients Compared to Geri-Psych Clinic Patients

## Psychometric performance of APS clients vs. geriatric psychiatry outpatients

<table>
<thead>
<tr>
<th></th>
<th>APS Clients (n=76)</th>
<th>Geropsych Clinic (N=61)</th>
<th>$F/\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MMSE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>22.1 (6.5)</td>
<td>23.3 (6.4)</td>
<td>0 (1.92)</td>
<td>ns</td>
</tr>
<tr>
<td>% fail</td>
<td>51%</td>
<td>52%</td>
<td>0.01</td>
<td>ns</td>
</tr>
<tr>
<td><strong>CLOX1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>7.4 (4.0)</td>
<td>9.3 (4.2)</td>
<td>4.79 (1.92)</td>
<td>0.03</td>
</tr>
<tr>
<td>% fail</td>
<td>75%</td>
<td>47%</td>
<td>9.34</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>CLOX2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>10.6 (3.2)</td>
<td>11.6 (3.8)</td>
<td>3.17 (1.91)</td>
<td>ns</td>
</tr>
<tr>
<td>% fail</td>
<td>64%</td>
<td>43%</td>
<td>4.64</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>EXIT25</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>24.3 (6.4)</td>
<td>17.3 (7.6)</td>
<td>15.7 (1.87)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% fail</td>
<td>89%</td>
<td>63%</td>
<td>10.11</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>GDS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mean</td>
<td>3.6 (3.2)</td>
<td>5.2 (3.9)</td>
<td>6.07 (1.112)</td>
<td>0.02</td>
</tr>
<tr>
<td>% fail</td>
<td>29%</td>
<td>51%</td>
<td>5.8</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Purpose of Study

- To determine the relationship between our multidimensional cognitive assessment and the performance based functional assessments we use when assessing decisional capacity.

- We hypothesized that executive measures would contribute the most independent variance to functional tasks.
Methods

- Retrospective medical record review for one year.

- N=73 cases.

- Multivariable linear regression analyses.
Results – Description of Sample

- Age: 80.2 years
- 41% male
- 75% non-Hispanic white; 18% Hispanic
- Education: 45% 9-12 yrs of education; 33% 13-16 yrs of education
Results – Neuropsych Performance

**TABLE 1** Mean Neuropsychological Performance of APS Referrals for Decisional Capacity Assessments

<table>
<thead>
<tr>
<th>Cognitive Battery&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Cognitive Domain</th>
<th>Range</th>
<th>Failing Threshold</th>
<th>Number of Clients Tested</th>
<th>Mean (SD)</th>
<th>Percent Failing</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXIT25</td>
<td>executive function</td>
<td>0–50</td>
<td>≥15</td>
<td>55</td>
<td>25.9 (6.2)</td>
<td>96%</td>
</tr>
<tr>
<td>MIS</td>
<td>memory</td>
<td>0–8</td>
<td>≤4</td>
<td>62</td>
<td>4.2 (2.7)</td>
<td>52%</td>
</tr>
<tr>
<td>MMSE</td>
<td>general cognition</td>
<td>0–30</td>
<td>≤24</td>
<td>62</td>
<td>22.4 (5.4)</td>
<td>61%</td>
</tr>
<tr>
<td>CLOX1</td>
<td>executive function</td>
<td>0–15</td>
<td>≤10</td>
<td>63</td>
<td>7.3 (3.3)</td>
<td>76%</td>
</tr>
<tr>
<td>CLOX2</td>
<td>visuospatial ability</td>
<td>0–15</td>
<td>≤12</td>
<td>64</td>
<td>10.6 (2.7)</td>
<td>67%</td>
</tr>
<tr>
<td>GDS</td>
<td>depression</td>
<td>0–15</td>
<td>≥5</td>
<td>62</td>
<td>3.4 (3.1)</td>
<td>28%</td>
</tr>
</tbody>
</table>

Correlation

$\rho = 0.4$, $p < 0.05$
Correlation / Linear Regression

- Executive Measure
- Memory Measure
- Visuospatial Measure
- General Cognitive Measure
- Depression Measure

$r = 0.4, p < 0.05$
$R^2 = 0.16, p < 0.05$
# Cognitive Correlates of Money Management

<table>
<thead>
<tr>
<th>Screening Measures</th>
<th>$r$</th>
<th>$p$</th>
<th>$R^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXIT25</td>
<td>0.69</td>
<td>&lt;0.001</td>
<td>0.34</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MIS</td>
<td>-0.25</td>
<td>0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMSE</td>
<td>-0.41</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOX1</td>
<td>-0.45</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOX2</td>
<td>-0.40</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td>-0.15</td>
<td>0.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Cognitive Correlates of Telephone Ability

<table>
<thead>
<tr>
<th>Screening Measures</th>
<th>$r$</th>
<th>$p$</th>
<th>$R^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXIT25</td>
<td>0.61</td>
<td>&lt;0.001</td>
<td>0.37</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MIS</td>
<td>-0.41</td>
<td>0.014</td>
<td>0.09</td>
<td>0.02</td>
</tr>
<tr>
<td>MMSE</td>
<td>-0.55</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOX1</td>
<td>-0.28</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOX2</td>
<td>-0.27</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td>0.07</td>
<td>0.68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Limitations

- Sample does not represent all APS clients.
- Limited neuropsychological assessment.
- Limited functional status assessment.
- Neuropsychological assessment not performed blind to functional assessment.
- Missing data.
Conclusions

- The prevalence of executive impairment is high, higher than memory or general cognitive impairment.
- Clinicians who do not use executive measures may be missing a significant portion of clients with cognitive deficits.
- Executive function contributed the most variance to money management and telephone use abilities.
**Recommendations**

- Executive measures such as the EXIT25 should be used to inform decisional capacity assessments.
- Specialists should not overvalue orientation and memory when considering clients’ abilities to attend to self-care abilities.
- Neuropsychological assessments should inform the capacity assessment, NOT replace it.
QUESTIONS????