Executive function in self-neglecting adult protective services (APS) referrals compared with elder psychiatric outpatients.

Jason E. Schillerstrom, MD
The University of Texas Health Science Center at San Antonio (UTHSCSA)
schillerstr@uthscsa.edu

Disclosure

- UTHSCSA has a financial contract with Texas APS Region 8 to provide decisional capacity evaluations.

- Dr. Donald Royall holds the copyright to the EXIT25 and CLOX and is the presenter’s immediate supervisor, mentor, and life long friend.
UTHSCSA Capacity Assessments

Region 8 Leadership:
Jo Ann Tobias-Molina
Sonia Samples
Lisa Loya
Colleen Phillips

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
UTHSCSA Capacity Assessments

- Clinical Interview
- Neuropsychological Screening
- Performance Based Functional Status Assessment
- Observation of Living Space
- Risk Assessment
Which Cognitive Functions are most Essential to Decisional Capacity?

- Memory
- Orientation
- Language
- Math
- Visuospatial
- Executive Function
Executive Function

- DSM IV Definition: the ability to think abstractly and to plan, initiate, sequence, monitor and stop complex behavior.

- That set of cognitive processes that allow one to act independent of the environment instead of displaying behaviors mediated by the environment.
Executive Function is Relevant to Decision Making Capacity

- Executive function is associated with frontal systems.

- Frontal lesions affect planning, hypothesis testing, judgment and insight.

- Frontal impairment can be demonstrated in many medical /psychiatric disorders.
Loss of Executive Control Affects Many Functional Domains

- Cooking
- Driving
- Medications
- Finances
- Shopping
The objectives of this study were:

- to determine the prevalence of cognitive impairments in APS referrals to UTHSCSA for decision making capacity consultations.

- to compare cognitive performance between APS referrals and patients seen in UTHSCSA geriatric psychiatry outpatient clinics.
We hypothesized:

- The prevalence of executive function impairment would be greater than that observed for other cognitive domains.
- APS clients would have worse executive function impairment than geri-psych outpatients.
- Self-neglectors would have worse impairment than those referred for other reasons.
- Squalor dwellers would have the worst impairment.
Comparison Groups

1. Clinic Patients → APS Clients

2. Exploitation → Self Neglect

3. Squalor Dwelling → Non-Squalor Dwelling
Methods

- Retrospective medical record review
- Demographic data
- Neuropsychological Test Scores
## Methods

<table>
<thead>
<tr>
<th>Test</th>
<th>Cognitive Domain</th>
<th>Range</th>
<th>Cut-point</th>
</tr>
</thead>
<tbody>
<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>≤10</td>
</tr>
<tr>
<td>CLOX2</td>
<td>Visuospatial function</td>
<td>0-15</td>
<td>≤12</td>
</tr>
<tr>
<td>GDS</td>
<td>Depression</td>
<td>0-15</td>
<td>&gt;5</td>
</tr>
</tbody>
</table>
### Results

<table>
<thead>
<tr>
<th></th>
<th>APS Clients (n=76)</th>
<th>Geriatric Psychiatry Outpatients (n=61)</th>
<th>F/χ² (df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>77.0 (10.3)</td>
<td>73.2 (7.3)</td>
<td>5.67 (1,135)</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>4%</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>24%</td>
<td>23%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>72%</td>
<td>70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-8th grade</td>
<td>26%</td>
<td>2%</td>
<td>12.5 (2)</td>
<td>0.002</td>
</tr>
<tr>
<td>9-12th grade</td>
<td>33%</td>
<td>35%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12th grade</td>
<td>41%</td>
<td>63%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# Results

## 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/χ²</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></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>

Results

- 49% of APS subjects passed the MMSE of which:
  - 55% failed CLOX1
  - 83% failed EXIT25

- No client who passed CLOX1 or the EXIT25 failed the MMSE.

- Mean depression score was relatively low.
Results

- Subjects referred for self-neglect performed worse on every cognitive measure than those referred for other reasons:
Results

- There were no differences in cognitive performance between squalor dwelling (n=27) and non-squalor dwelling (n=28) self-neglectors.
Limitations

- Our APS sample does not represent all APS clients.
- Our neuropsychological battery consists only of screening instruments.
- The completion of neuropsychological testing ranged from 82% for the GDS to 65% for the EXIT25.
Conclusions

- Cognitive screens sensitive to executive function evidence more impairment than screens sensitive to other cognitive domains.

- Elders suffering self-neglect have worse cognitive performance than victims of exploitation.

- Squalor dwelling status is mediated by more than cognition.
Neuropsychological References


CLOX: An Executive Clock Drawing Task

CLOX: An Executive Clock Drawing Task

Copyright Royal, 1995

STEP 1: Turn the item over on a light colored surface so that the once blurry is visible. Have the subject draw a clock on the back. Instruct them to do so “Draw me a clock that says 1:45. Set the hands and numbers on the face so that a child could read them.” Repeat the instructions until they are clearly understood. Once the subject begins to draw, no further assistance is allowed. Rate this clock on 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, 6, 3, and 9 first, then fit in the rest of the numbers. Set the hands again to 1:45. Make the hands into zeroes. Make the hour hand shortest. Invite the subject to copy your clock in the lower right corner. Rate this clock on 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></td>
<td></td>
</tr>
<tr>
<td>Circles (size needed?)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elements &gt; 1 in?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All numbers inside perimeter?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No strokes or ticks?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12, 6, 3, &amp; 9 placed first?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing intact? (Symmetry on either side of 12 and 6/9?clock?)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only Arabic numerals?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only numbers 1 — 12 among the numerals present?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequence 1 — 12 intact? (no omissions or intertions)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only two hands present?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spruce: extra line marks?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All hands represent as minute?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most hand between 1 and 2 on clock?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minute hand obviously longer than the hour hand?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None of the Following: 1) hand drawn up to 4 or 8 on clock 2) ‘1:45’ present? 3) Any other rotations (e.g., ‘2:00’?) 4) Any arrow point inward? 5) Intervals from ‘hour’ or ‘face’ present? 6) Any letters, words, or pictures? 7) Any instructions from across below?</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL:
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.
Instructions: CLOX2

1) After the subject completes CLOX1, turn the CLOX form over to the page with writing (front side) and let the subject observe you draw a clock in the printed circle.

2) Place 12, 6, 3, and 9 first and fill in the rest of the numbers.

3) Set the hands to “1:45”.

4) Make the hands into arrows.

5) Make the hour hand shorter.

6) Invite the subject to copy the clock in the lower right corner.
CLOX2 Example
CLOX Instructions Pearls

- You must use the form for it to be interpretable.

- You must say the instructions exactly like they are meant to be said.

- Once the client starts drawing, your only response to questions asked is “It’s up to you”.

- Cognitive screening tasks inform decision making capacity evaluations. THEY DO NOT REPLACE THEM!!!
Does the figure resemble a clock?

Age: 81 years
GDS: 1/15
MIS: 7
MMSE: 25
CLOX1: 5
CLOX2: 5
EXIT25: 29
Circular face present?

Age: 64 years
GDS: 5/15
MIS: 8
MMSE: 28
CLOX1: 5
CLOX2: 11
Diameter greater than one inch?

- 75yr with Vascular Dementia
All numbers in the circle?

- 37yr with Mood d/o secondary to HIV
No sectoring or tic marks?
No sectoring or tic marks?

Age: 73 years
GDS: 2/15
MIS: 8
MMSE: 26
CLOX1: 4
CLOX2: 9
EXIT25: 30
12, 6, 3, & 9 placed first?

GDS: 4/15
MIS: 7
MMSE: 27
CLOX1: 11
CLOX2: 13
EXIT25: 27
Spacing intact?

Age: 88 years
CLOX1: 5
CLOX2: 8
Spacing intact?

Age: 84 years
GDS: 2/15
MIS: 4
MMSE: 25
CLOX1: 7
CLOX2: 9
EXIT25: 28
Only Arabic numerals?

Age: 86 years

CLOX1: 5
Only numerals 1-12 among the numerals present?

Age: 83 years
GDS: 2/15
MIS: 6
MMSE: 18
CLOX1: 7
CLOX2: 7
EXIT25: 36
Sequence 1-12 intact?

Age: 89 years  
GDS: 3/15  
MIS: 4  
MMSE: 27  
CLOX1: 12  
CLOX2: 14  
EXIT25: 20
Only two hands present?

Age:  65 years
MIS:  5
CLOX1:  4
All hands represented as arrows?

Age: 84 years
GDS: 1/15
MIS: 8
MMSE: 25
CLOX1: 11
CLOX2: 14
EXIT25: 23
Hour hand between 1 and 2 o’clock?

Age: 51 years
GDS: 9/15
MIS: 8
MMSE: 25
CLOX1: 12
CLOX2: 11
EXIT25: 20
Minute hand obviously longer than hour hand?

Age: 89 years
GDS: 7/15
MIS: 3
MMSE: 24
CLOX1: 6
CLOX2: 12
EXIT25: 35
None of the following

- Hand pointing to 4 or 5 o’clock
- “1:45” present
- Any other notations
- Any arrows point inward
- Intrusions from “hand” or “face” present
- Any letters, words, or pictures
- Any intrusions from circle below
Age: 85 years  
GDS: 1/15  
MIS: 2  
MMSE: 15  
CLOX1: 7  
CLOX2: 12  
EXIT25: 36
Age: 66 years
GDS: 4/15
MIS: 0
MMSE: 24
CLOX1: 2
CLOX2: 10
EXIT25: 32
Intrusion from “face”
Intrusion from circle below

Age: 60 years
GDS: 1/15
MIS: 8
MMSE: 30
CLOX1: 6
CLOX2: 13
EXIT25: 26
CLOX1

- ≤10/15 represents the lowest 5th percentile for young adults.

- CLOX 1 correlates well with the EXIT25 ($r = -0.83$).

- CLOX 1 is more sensitive to executive function than similar clock-drawing tasks relative to the EXIT25.
CLOX2

- ≤12/15 represents the lowest 5th percentile for young adults.

- CLOX2 correlates well with the Mini Mental State Exam ($r = 0.85$).
Questions???

- 38yr with HIV Dementia