Financial Capacity in Older Adults
With MCI and Dementia

Daniel Marson, J.D., Ph.D.
Professor of Neurology
Director, Alzheimer’s Disease Center
Department of Neurology
University of Alabama at Birmingham
dmarson@uab.edu

13th Annual Update on Dementia Conference
Alzheimer’s Association, Mountain View, CA
May 18, 2011

Outline

- Capacity Assessment in an Aging Society
- Capacity/Competency Concepts
- Functional Change in Dementia
- Functional Change in MCI
- Financial Capacity
- New Approaches to Assessing Financial Capacity in MCI and Dementia
- A Neuroscience of Financial Capacity?

Definitions—Oxford Universal Dictionary

- **Capacity** ~1480 (selected definitions)
  - Mental receiving power; ability to take in impressions, ideas, knowledge. 1485
  - Active power of mind, talent. 1485
  - The power, ability, or faculty for anything in particular. 1647
  - Law. Legal qualification. 1480

Disclosure

- **Financial Capacity Instrument (FCI)**
- **Semi-Structured Clinical Interview for Financial Capacity (SCIFC)**
  - Owned by UAB Research Foundation
  - Inventor Dr. Marson
  - No royalty income
  - No relationships with pharmaceutical companies

Capacity Assessment in an Aging Society

Definitions—Oxford Universal Dictionary

- **Competent** ~1483 (selected definitions)
  - Law. Legally qualified or sufficient. 1483

- **Competence** ~1594 (selected definitions)
  - Sufficiency of qualification, capacity. 1700
  - Especially law—legal capacity. 1708
“As our society ages, clinical assessment of higher order functional capacities has become increasingly important. In areas like financial capacity, medical decision making capacity, medication compliance, and driving, society has a strong interest in accurately discriminating intact from impaired functioning.”

Marson et al. (2000) Archives of Neurology, 57: 877-844

Capacity vs. Competency

- Capacity–Incapacity:
  - denotes a clinical status determined by clinician
  - clinical judgment is “evidence” of legal competency
  - clinical judgment does not alter legal competency status
  - clinical judgment does not permit transfer of authority for decision making to another (exception: DPAs)
Capacity vs. Competency

- **Legal Competency--Incompetency:**
  - denotes a legal status determined by a judge
  - judgment based on clinical/lay evidence, case/statutory law, principles of justice, and other non-clinical factors
  - judgment of “incompetency” alters legal status by removing rights of self determination for specific matter
  - judgment of “incompetency” requires transfer of decisional authority to a court appointed proxy: guardian/conservator

Civil Capacities/Competencies

- Treatment consent capacity: make medical decisions
- Research consent capacity: research participation
- Financial capacity: manage financial affairs
- Testamentary capacity: make a will
- Driving capacity: operate a motor vehicle
- Voting capacity: capacity to cast a ballot in election
- Capacity to live independently: global

Capacity: A Medical-Legal Construct

- Capacity/competency is a hypothesized condition that cannot be directly observed or measured
- There is no “capacimeter”
- No “blood test” available
- Only behavioral signs/indications observable, measurable

Legal Presumption of Competency

- normal adult achieving age of majority presumed under law to be competent
- in court proceeding, burden of proof lies with party alleging a person is incompetent

Diagnosis Does Not Constitute Incompetency

- What does a diagnosis of vascular dementia tell you about a person’s capacity to drive a car?
- Diagnosis relevant to issue of driving capacity
- But not determinative of driving capacity issue
- Key Inquiry: Have to examine actual performance--functional abilities constituent to driving

Cognitive Impairment Does Not Constitute Incompetency

- What does a MMSE score of 22 tell you about a person’s capacity to consent to medical treatment?
- Cognitive impairment relevant to issue consent capacity
- But not by itself determinative of consent capacity
- Key Inquiry: Have to examine actual performance--functional abilities constituent to consent capacity
Competing Ethical Principles
Underlying Capacity Issues

AUTONOMY versus PROTECTION

- To what extent should we **support older person’s autonomy** (find her capable to act independently)?
- To what extent should we **protect an impaired older person** (and ourselves) from risks/dangers caused by her failing capacities (find her incapable and restrict autonomy)?
- Tension informs all competency assessments and protective actions
- Competency loss entails substantial loss of civil liberty

Functional Change in Dementia

Pathological Time-line for AD

Activities of Daily Living

- Activities of daily living (ADLs) are “the things we normally do in daily living including any daily activity we perform for self-care (such as feeding ourselves, bathing, dressing, grooming), work, homemaking, and leisure.”
- Bathing
- Grooming
- Dressing and undressing
- Eating
- Transferring from bed to chair, and back
- Voluntarily control of urinary and fecal discharge
- Using the toilet
- Walking (not bedridden)

Instrumental Activities of Daily Living

- Instrumental activities of daily living are more complex activities that are not essential to self-care, but that enable the individual to live independently within a community
- Light housework
- Preparing meals and cleanup
- Shopping for groceries or clothes
- Using the telephone
- Using transportation (community mobility)
- Taking medications
- Health management and maintenance
- Managing money

IADLs As Early Functional Markers in Dementia Research

- IADLs are cognitively complex activities vulnerable to cognitive aging, MCI, and dementia
- IADLs show impairment in preclinical and early clinical stages of dementia
- Are diagnostically important markers for research on progression in MCI and conversion to dementia
Functional Change and Dementia Diagnosis

- DSM-IV-TR (2000): Diagnostic Criteria for Dementia of the AD Type

A. Development of multiple cognitive deficits manifested by both
(1) memory impairment (impaired ability to learn new information or
to recall previously learned information), and
(2) one (or more) of the following cognitive disturbances:

(a) aphasia (language disturbance)
(b) apraxia (impaired ability to carry out motor activities despite intact motor
function)
(c) agnosia (failure to recognize or identify objects despite intact sensory
function)
(d) disturbance in executive functioning (i.e., planning, organizing,
sequencing, abstracting)

B. The cognitive deficits in Criteria A1 and A2 each:
- cause significant impairment in social or occupational functioning
  “going to school, shopping, dressing, bathing, handling finances,...”
- and represent a significant decline from a previous level of functioning.

Functional Change in Dementia

Mrs. Ethel C 69 year old white female
MMSE = 22/30 DRS = 120/144 Diagnosis = mild AD

- Premorbid: “Ethel handled the family bank account for most of our married life with little help from me—and balanced the checkbook.”

- Current: “Approximately 2 years back she could no longer handle the family bank account—this happened very quickly—she failed to make deposits and enter the checks she had written—she now has no worry about finances.”

Functional Change in MCI

Functional change an integral aspect to understanding MCI and progression to dementia

- Original Mayo (Petersen) criteria:
  (1) subjective/family complaints of memory loss;
  (2) objective impairment on formal memory testing;
  (3) normal overall cognition;
  (4) generally preserved activities of daily living; and
  (5) no dementia by NINCDS-ADRDA or DSM-IV criteria.
**Functional Change and MCI**

- MCI not well defined functionally
- “No guidelines have been given as to what constitutes activities of daily life restriction in MCI” Ritchie et al (2001)
- What degree of functional change consistent with MCI?
- Key diagnostic issue since functional changes are a (the?) primary determinant of clinical progression to dementia

**Evidence of Functional Impairment in MCI**

- Touchon/Ritchie (1999):
  - Telephone use, dental hygiene, dressing 2 years prior to AD dx
  - Small lapses, carelessness, slowing
- Daly/Albert (2000):
  - Changes in financial skills, driving, hobbies, personal care associated with MCI and conversion to AD
- Tabert (2002):
  - Discrepancy between MCI patient and informant ADL report predictive of conversion in 2 year period; role of anosognosia
- Griffith (2003):
  - MCI patients show mild but distinct impairments in financial skills

**Summary**

- Functional change is critical to diagnosing dementia
- Functional change is critical to diagnosing MCI and identifying progression to dementia
- Functional change is phenomenologically central to patient’s and family members’ experience of dementia
- Functional change causes enormous patient disability and burden to caregivers

Daniel Marson, J.D., Ph.D.
Financial Capacity

“everyday use of money will be highly correlated with general success in independent living”
Melton et al. (1987) Psychological Evaluations for the Courts, p. 249

An Important Construct
- economic: maintaining household and financial independence
- psychological: critical to self-perception of independence
- clinical: marker of MCI and early dementia?
- legal: financial competency and conservatorship, elder abuse/undue influence

A Challenging Construct to Measure
- Multidimensional:
  - Declarative knowledge: concepts and numeracy
  - Procedural knowledge: completing a check, paying bills, judgment
- Taps wide range of abilities:
  - Simple money skills
  - Bill payment
  - Managing checkbook and bank statement
  - Fraud awareness/detection
  - Investment strategies
- Financial experience varies widely across persons

Daniel Marson, J.D., Ph.D.
A Poorly Understood Construct

- Little known empirically about financial capacity
- Surprising lack of conceptual models and research
- Prior conceptual formulations very sparse:
  - "money management skills"
  - "financial management"
- A need for conceptual models, instruments, research

Defining Financial Capacity:
Two Key Perspectives

- **Performance Perspective:**
  - FC as the ability to carry out financial activities
  - Handle money, understand concepts, pay bills, etc.
  - Emphasizes role of performance.
- **Best Interest Perspective:**
  - FC as ability to identify and protect financial self-interest
  - Emphasizes role of judgment.

"the capacity to manage money and financial assets in ways that meet a person’s needs and which are consistent with his/her values and self-interest”

D. Marson  October, 2007

Conceptual Model of Financial Capacity

Conceptual Model of FC

Clinically informed

Focus on functional abilities relevant to FC

Three levels:
- **Tasks**—specific financial abilities
- **Domains**—broad financial activities that each have clinical relevance to independence (e.g., managing checkbook)
- **Global**—overall financial capacity

Financial Tasks

- Naming coins/currency
- Coin/currency relationships
- Count coins/currency
- Understanding concepts
- Applying concepts
- Conduct cash transactions
- Making change for vending
- Tipping in a restaurant
- Understanding checkbook
- Using checkbook/ register
- Understanding bank statement
- Using a bank statement
- Awareness of mail fraud
- Awareness of telephone fraud
- Prioritizing bills
- Preparing bills for mailing
- Making investment decision
Financial Domains

- Domain 1 Basic Monetary Skills
- Domain 2 Financial Conceptual Knowledge
- Domain 3 Cash Transactions
- Domain 4 Checkbook Management
- Domain 5 Bank Statement Management
- Domain 6 Financial Judgment
- Domain 7 Bill Payment
- Domain 8 Knowledge of Personal Assets/Estate
- Domain 9 Investment Decision Making

Tasks by Domain

- Domain 1 Basic Monetary Skills
  - Task 1a Naming coins/currency
  - Task 1b Coins/currency relationships
  - Task 1c Counting coins/currency

- Domain 2 Financial Conceptual Knowledge
  - Task 2a Define financial concepts
  - Task 2b Apply financial concepts

- Domain 3 Cash Transactions
  - Task 3a 1 item grocery purchase
  - Task 3b 3 item grocery purchase
  - Task 3c Change/vending machine
  - Task 3d Tipping

- Domain 4 Checkbook Management
  - Task 4a Understand checkbook/register
  - Task 4b Use checkbook/register

- Domain 5 Bank Statement Management
  - Task 5a Understand bank statement
  - Task 5b Use bank statement

- Domain 6 Financial Judgment
  - Task 6a Detect mail fraud risk
  - Task 6c Identify telephone fraud

- Domain 7 Bill Payment
  - Task 7a Understand bills
  - Task 7b Prioritize bills
  - Task 7c Prepare bills for mailing

- Domain 8 Knowledge of Personal Assets/Estate
- Domain 9 Investment Decision Making

Methods of Assessing Financial Capacity
Methods for Evaluating Financial Capacity

- Assessment of premorbid financial capacity
  - Patient and collateral report

- Assessment of current financial capacity:
  - Patient and collateral report
  - Psychometric assessment
  - Clinical interview

Self and Collateral Report

- Observational reports of current financial skills
- Accessible, ecologically sensitive, valuable IADL data source
- Research applications:
  - Cahn-Weiner et al. JINS 2007: Cognitive and neuroimaging predictors
- Disadvantages:
  - Biases in both patient and caregiver IADL reports
  - Anosognosia, denial, limited contact and knowledge
  - Report based information often global and vague—limited detail
- Wadley et al. JAGS 2003:
  - AD patients overrate their financial abilities
  - Caregiver ratings of AD patient financial capacity unstable over 1 month

Psychometric Assessment

- Direct assessment of performance in a controlled setting
- Standardized, objective scoring, norm referenced
- Finely grained measurement versus vague informant report
- Verify patient and family report of financial abilities
- Useful clinical addition to traditional NP test battery
- Disadvantages:
  - May lack ecological validity—difficult to replicate community setting in clinic
  - Requires trained administrator and are time consuming
  - Tests of financial capacity not commonly available

Financial Capacity Instrument (FCI-9)

- Standardized measure with scoring system and norms
- Directly tests performance on:
  - 18 financial tasks
  - 9 financial domains
  - Global (overall) financial capacity
- Needs a trained administrator
- Takes about an hour to administer to dementia patients

FCI Video:

Domain 7—Bill Payment

Task 7a: Understanding Bills
Task 7b: Prioritizing Bills
Task 7c: Preparation of Bills for Payment

FCI Study Sample

<table>
<thead>
<tr>
<th></th>
<th>Controls</th>
<th>MCI</th>
<th>Mild AD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>26</td>
<td>30</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>66.2 (7.7)</td>
<td>67.6 (8.9)</td>
<td>73.4 (8.4)</td>
<td>.05</td>
</tr>
<tr>
<td>Educ</td>
<td>14.5 (2.4)</td>
<td>14.6 (2.3)</td>
<td>14.6 (2.7)</td>
<td>ns</td>
</tr>
<tr>
<td>Race</td>
<td>73% W</td>
<td>77% W</td>
<td>94% W</td>
<td>ns</td>
</tr>
<tr>
<td>Gender</td>
<td>69% F</td>
<td>57% F</td>
<td>60% F</td>
<td>ns</td>
</tr>
<tr>
<td>MMSE</td>
<td>29.2 (1.1)</td>
<td>28.5 (1.2)</td>
<td>24.0 (2.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>DRS</td>
<td>137.1 (4.6)</td>
<td>130.9 (5.7)</td>
<td>113.9 (10.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CDR sum box</td>
<td>0.0 (0.1)</td>
<td>1.0 (0.8)</td>
<td>5.1 (1.3)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Raw Score/Time Dissociation

- MCI patients can perform many financial tasks about as well as controls

- But it often takes MCI patients significantly longer to complete these tasks

- Tasks are no longer as automatic and routine

- At some point increasing task time = impairment

Cognitive Models of Financial Capacity
Cognitive Predictor Models for FCI Total Score (Domains 1-7) Across Groups

<table>
<thead>
<tr>
<th></th>
<th>Variance Accounted For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>N = 65</td>
</tr>
<tr>
<td>aMCI</td>
<td>N = 113</td>
</tr>
<tr>
<td>Mild AD</td>
<td>N = 43</td>
</tr>
</tbody>
</table>

Clinical Interview Assessment
- Potentially very useful approach
- Combine clinical interview + direct testing of skills
- Interview both patient and caregiver
- Allows for clinical judgment
- Categorical judgments: capable, marginally capable, incapable

Disadvantages:
- Requires trained clinician
- Time intensive for the clinician (~25 minutes)
- Clinical subjectivity in evaluating performance

Semi-Structured Clinical Interview for Financial Capacity (SCIFC)
- 25-30 minute clinical interview
- Based on conceptual model
- Semi-structured: preserves clinical autonomy
- Interview format with some props:
  - Includes interview of collateral sources
- Assesses 8 domains and global financial capacity
- Judgment rating for each domain and global:
  - capable
  - marginally capable
  - incapable

Who Is Mr. X?
74 years old
Caucasian
Married
9 years of education
Retired
Last occupation:
  architectural design construction supervisor

SCIFC Video:
Mr. X
### SCIFC Study Sample at Baseline

<table>
<thead>
<tr>
<th></th>
<th>Controls</th>
<th>MCI</th>
<th>Mild AD</th>
<th>Mod AD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=75</td>
<td>N=58</td>
<td>N=97</td>
<td>N=31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>66.1 (7.7)</td>
<td>68.0 (8.3)</td>
<td>72.4 (8.4)</td>
<td>75.3 (8.4)</td>
<td>.0001</td>
</tr>
<tr>
<td>Educ</td>
<td>14.3 (1.6)</td>
<td>13.7 (2.0)</td>
<td>13.4 (2.1)</td>
<td>11.1 (3.7)</td>
<td>.0001</td>
</tr>
<tr>
<td>Gender (m/f)</td>
<td>24 / 51</td>
<td>18 / 40</td>
<td>52 / 45</td>
<td>10 / 21</td>
<td>.007</td>
</tr>
<tr>
<td>Race</td>
<td>65 W, 10AA</td>
<td>44 W, 14 AA</td>
<td>85 W, 12 AA</td>
<td>23 W, 8 AA</td>
<td>.12</td>
</tr>
<tr>
<td>MMSE</td>
<td>29.3 (1.0)</td>
<td>28.2 (1.9)</td>
<td>24.0 (3.1)</td>
<td>16.4 (4.2)</td>
<td>.0001</td>
</tr>
</tbody>
</table>

### Physician Collaborators

- Britt Anderson, M.D.  Neurology
- Patricia Goode, M.D.  Geriatric Medicine
- Cleveland Kinney, M.D.  Geriatric Psychiatry
- Anthony Nicholas, M.D.  Neurology
- Terri Steele, M.D.  Geriatric Psychiatry

### Physician Capacity Judgments

- Recruited 261 participants
- Study physicians made a total of 11,118 financial capacity judgments
- Each physician made an average of 2,224 judgments
- 627 ratings missing out of 11,745 possible: 94.7% completion rate
- Attests to effort/commitment of study physicians and staff

### Basic Monetary Skills:

#### Judgment Outcomes By Percentage and Group

- Control, MCI, mild AD differ from mod AD at p < .01 using GEE
- Control differ from MCI at p = .06
- Control, MCI differ from mild AD and mod AD at p < .01
- Mild AD differ from mod AD at p < .01

### Checkbook Management:

#### Judgment Outcomes By Percentage and Group

- All groups differ at p < .01 using GEE
- Control differ from MCI at p = .06
- Control, MCI differ from mild AD and mod AD at p < .01

### Bank Statement Management:

#### Judgment Outcomes By Percentage and Group

- All groups differ at p < .01 using GEE
Global Financial Capacity: Judgment Outcomes By Percentage and Group

All groups differ at p < .01 using GEE

Magnetic Resonance Imaging Volume of the Angular Gyri Predicts Financial Skill Deficits in People with Amnestic Mild Cognitive Impairment

OBJECTIVES: To better understand how logistic regression analysis can improve financial skill (FCS) in people with amnestic mild cognitive impairment (MCI) or Alzheimer’s disease (AD). We used magnetic resonance imaging (MRI) to examine the relationship between financial skill and the left angular gyrus (AG).

METHODS: Eighty people with MCI and 26 people with AD had CEO's decade-dated scores on a 17-item financial self-efficacy scale (FCS) and structural MRI of the brain. Inheritance and Group differences were compared using GEE statistical analysis.

RESULTS: MCI and AD patients demonstrated significantly lower FSI than the controls. Brain imaging revealed left AG volumes were significantly correlated with FSI. AG volume was also associated with impaired calculation abilities in AD. PET imaging has shown left AG metabolic abnormalities are associated with dyscalculia in AD and disruptions of the AG result in impaired calculation abilities in stroke, trauma, and developmental dyscalculia. AG also functionally related to language/metaphor comprehension.

CONCLUSIONS: Impaired financial abilities in amnestic MCI can be reversed by targeting the AG or its equivalents for intervention. The results suggest that intervention for AG is a promising strategy for improving financial abilities in people with MCI and AD.

Angular Gyrus and Financial Capacity

Brain Region Correlations with FCS in aMCI Patients (n=33)

<table>
<thead>
<tr>
<th>AG</th>
<th>PC</th>
<th>HIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCS Total Score (D1-D7)</td>
<td>.57***</td>
<td>.35*</td>
</tr>
<tr>
<td>D1 Basic Money Skills</td>
<td>.48**</td>
<td>.52**</td>
</tr>
<tr>
<td>D2 Financial Concepts</td>
<td>.48**</td>
<td>.24</td>
</tr>
<tr>
<td>D3 Cash Transactions</td>
<td>.48**</td>
<td>.32</td>
</tr>
<tr>
<td>D4 Checkbook Mgmt</td>
<td>.41*</td>
<td>.32</td>
</tr>
<tr>
<td>D5 Bank Statement Mgmt</td>
<td>.54***</td>
<td>.27</td>
</tr>
<tr>
<td>D6 Financial Judgment</td>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>D7 Bill Payment</td>
<td>.26</td>
<td>.04</td>
</tr>
</tbody>
</table>

AG: angular gyrus; PC: posterior cingulate; HIP: hippocampus; *** p < .001, ** p < .01, * p < .05

Angular Gyrus (AG)

- Area of inferior parietal lobe involved in language and cognition, linked to default mode network
- AG implicated in calculation abilities impaired in AD
- PET imaging has shown left AG metabolic abnormalities are associated with dyscalculia in AD
- Left AG linked to impaired calculation in stroke, trauma, and developmental dyscalculia
- AG also functionally related to language/metaphor comprehension
Relationship between FCI Total Score and Angular Gyrus Volume in MCI (n=33)

![Graph showing the relationship between FCI Total Score and Angular Gyrus Volume with a correlation coefficient of r = .56, P < .01.]

Results of VBM Analysis of Financial Capacity Instrument Scores in Patients with Amnestic MCI

(A) The cluster with maxima at coordinates 54, 48, and 44 on the glass brain projection (P = .05 corrected) (the second cluster was not significant after correction).

(B) The maxima of the above coordinates projected onto T1 MRI scans in each dimension for comparison.

Error type examples from the Wide Range Achievement Test-3 Arithmetic problems.


Capacity--Brain Imaging Findings

- Angular gyrus (AG) volumes strongly and uniquely associated with FCI Total Score and other FC variables in patients with aMCI
- AG relationship to FCI Total Score specifically mediated by WRAT-3 Arithmetic score
- Results represent an initial step towards a neurological model of financial capacity in MCI/AD using cognition as a mediator
Looking Ahead

- Are we at the cusp of a neuroscience of capacity? Possibly.
- Will MRI imaging techniques someday help clinicians to identify persons at risk for decline in their financial abilities? Yes.
- Will MRI and other neuroscientific procedures be increasingly used to help decide legal questions of capacity? Probably.
- Will MRI and other neuroscientific procedures be used to decide legal questions of capacity entirely by themselves? No.

Collaborators

UAB Department of Neurology
- Roy Martin, Ph.D.
- Kristin Treibel, Psy. D.
- Ozed Okonkwo
- Richard Powers, M.D.
- Lindy Harrell, M.D., Ph.D.
- John Brockington, M.D.
- David Clark, M.D.
- Katherine Belue, B.S.
- Randall Griffith, Ph.D.
- Chris Stewart
- Luke Stokel

UAB Department of Biostats
- Alfred Bartolucci, Ph.D.

UAB Dept of Education
- Scott Snyder, Ph.D.

UAB Dept of Psychology
- Virginia Wadley, Ph.D.

USCD Department of Biostatistics
- Rema Raman, PhD
- Ron Thomas, PhD

NIH Support

Studies of Financial Capacity in Alzheimer's Disease (1R01 MH55247)

Alzheimer's Disease Research Center (1P50 AG16582)

A Longitudinal Study of Loss of Financial Capacity in Alzheimer's Disease (ADRC Project 2)

Functional Change in Mild Cognitive Impairment (1R01 AG021927)