



Published in final edited form as:

Am J Geriatr Psychiatry. 2008 August ; 16(8): 650–659. doi:10.1097/JGP.0b013e31817e8a9d.

AWARENESS OF DEFICITS IN FINANCIAL ABILITIES IN PATIENTS WITH MILD COGNITIVE IMPAIRMENT: GOING BEYOND SELF-INFORMANT DISCREPANCY

Ozioma C. Okonkwo, MA¹, Virginia G. Wadley, PhD^{1,2}, H. Randall Griffith, PhD^{3,4}, Katherine Belue, BS^{3,4}, Sara Lanza, BS^{3,4}, Edward Y. Zamrini, MD⁶, Lindy E. Harrell, MD, PhD^{3,4,5}, John C. Brockington, MD^{3,4}, David Clark, MD^{3,4,5}, Rema Raman, PhD⁷, and Daniel C. Marson, JD, PhD^{3,4}

¹Department of Psychology, University of Alabama at Birmingham (UAB), Birmingham, AL

²Department of Medicine, UAB, Birmingham, AL

³Department of Neurology, UAB, Birmingham, AL

⁴Alzheimer's Disease Research Center, UAB, Birmingham, AL

⁵Veterans Administration Medical Center, Birmingham, AL

⁶Department of Neurology, University of Utah Health Sciences, Salt Lake City, UT

⁷Department of Family and Preventive Medicine and Neurosciences, University of California San Diego, San Diego, CA

Abstract

OBJECTIVE—Self and informant reports of functional abilities are weighted heavily in diagnostic decision making regarding mild cognitive impairment (MCI). However, it is unclear whether patients with MCI are fully aware and provide reliable estimates of their functional status. In this study, we used three different approaches to examine accuracy of self report of financial abilities among patients with MCI.

DESIGN—Cross-sectional, case-comparison group study.

SETTING—University medical center.

PARTICIPANTS—Seventy-four patients with MCI and their informants, and 73 cognitively healthy older adults and their informants.

MEASUREMENTS—We compared MCI patients' report of their financial abilities to their performance on an objective measure of financial capacity. We also compared informant reports of patients' abilities to patients' objective test performance, and informant reports to patients' self report.

RESULTS—We found that the discrepancy between self report and objective performance was higher among MCI patients compared to the cognitively healthy older adults on the financial domains of Checkbook Management, Bank Statement Management, and Bill Payment, and on overall financial capacity. We also found that MCI patients with poorer global cognition overestimated their financial abilities whereas those with higher depressive symptoms

underestimated their financial abilities. Overall, MCI patients were better at estimating their financial abilities than their informants.

CONCLUSIONS—Patients with MCI are not fully aware of deficits in their financial abilities. Both cognitive impairment and depression impact MCI patients' self-reported functioning. In addition, MCI informants misestimate patients' financial abilities. This raises concerns about the widespread use of informant report as the gold standard against which to evaluate patient self-report of functioning.

Keywords

financial capacity; awareness; anosognosia; report-based measures; objective testing; MCI; AD

INTRODUCTION

Amnesic mild cognitive impairment (MCI) has become widely accepted as the diagnostic classification for individuals in the transitional stage between normal aging and Alzheimer's disease (AD). Although current MCI diagnostic criteria require essentially intact functional activities (1), numerous studies have consistently shown that individuals with MCI actually demonstrate declines in everyday functional abilities (2–4). A question that has not been satisfactorily addressed relates to the degree of awareness MCI patients have concerning their functional deficits. This is a significant knowledge gap as self report of functional deficits is weighted heavily in clinical decision making regarding MCI diagnosis and conversion to dementia (5, 6).

The few studies that have examined awareness of functional deficits in MCI have produced mixed findings (7–9). Initial studies found that MCI patients lacked awareness of functional changes (7, 8) whereas a more recent study found that MCI patients retain such awareness (9). In addition, these studies were limited by the use of informant report as the sole criterion for evaluating patients' self report. Several studies have shown that caregivers' reports are not always objective or accurate (10–12). Currently there is a need for additional approaches to investigating the issue of awareness of functional deficits in MCI.

In the present study, we addressed this issue by examining accuracy of self report of functional abilities in MCI via three different approaches, and by using financial capacity as our paradigmatic functional ability. Our principal approach involved a comparison between MCI patients' self report of financial abilities and their performance on an objective test measure of financial capacity. By using objective performance as the criterion against which to evaluate self report, we obviated the methodological difficulties inherent in the use of informant report. A second approach entailed comparing informant reports of MCI patients' financial abilities to the patients' actual performance on the objective test measure. This analysis was carried out to determine whether informants provide reliable estimates of MCI patients' actual financial abilities. The third approach involved a comparison, within each patient/informant dyad, between the patient's self report of financial abilities and the informant's report of the patient's abilities. This "conventional" approach was undertaken to permit comparison between our study and other prior studies that have examined awareness of deficits in MCI. The three sets of analyses described above were also performed within a comparison group of cognitively healthy adults to better understand if misestimation of financial abilities is specific to MCI or represents a more global phenomenon in aging.

The chief hypothesis of this study was that discrepancy between self report and objective test performance would be greater for patients with MCI relative to the cognitively healthy older adults, reflecting reduced awareness of deficits in financial skills in MCI patients. A

secondary hypothesis was that discrepancy between informant report and objective test performance would be greater for MCI informants than comparison group informants.

METHODS

Participants

Seventy-three healthy older adults and 74 patients with MCI participated in this study, as part of a larger study of functional change in MCI. All participants were diagnostically characterized in the UAB Alzheimer's Disease Research Center (ADRC) diagnostic consensus conference by a team of neurologists, neuropsychologists, and nursing staff. The comparison group consisted of healthy older adults who underwent neurological, neuropsychological, and neuroradiological evaluations to ensure the absence of medical and psychiatric conditions that could compromise cognition. Their Mini-Mental Status Examination (MMSE) (13) scores ranged from 27 to 30 and their Dementia Rating Scale, 2nd edition (DRS-2) (14) Total scores ranged from 133 to 144.

MCI participants were either patients who presented for clinical evaluation at the UAB Memory Disorders Clinic (a tertiary care neurology outpatient clinic), or volunteers recruited from the community into the ADRC. They were also well characterized based upon neurological evaluation, neuroradiological evaluation, and neuropsychological testing. Diagnosis of MCI was made in the ADRC consensus conference using Petersen/Mayo criteria (6) clinically operationalized as follows: (1) memory complaint by patient and/or collateral source, as reported in interview with our clinical neurologists, (2) objective memory impairment on neuropsychological testing, operationalized as one or more memory test scores falling beyond 1.5 SD below older adult norms; (3) overall preserved general cognitive function, as reflected in a majority of other cognitive test scores falling above 1.5 SD below older adult norms; (4) generally intact functional activities, as measured by clinical interview information, CDR score, and collateral source ratings on a functional capacity form developed at the UAB ADRC (Forsyth Functional Capacity Form); and (5) an absence of a dementia diagnosis. The MCI participants were all of the amnesic subtype. Their MMSE scores ranged from 24 to 30 and their DRS-2 Total scores ranged from 120 to 142. MCI and comparison group participants were equated on age, education, race, and gender.

Informed consent was obtained from all participants as part of this UAB Institutional Review Board-approved research.

Informants

Each study participant came to the evaluation with an informant whom the participant identified as appropriately knowledgeable concerning the participant's cognitive and functional abilities. Informants for the comparison group consisted of spouses ($n = 37$), children ($n = 19$), and other individuals (relative, friend/companion, $n = 17$). MCI informants were spouses ($n = 42$), children ($n = 17$), and others (relative, friend/companion, $n = 15$). The distribution of informant types did not differ across both groups [$\chi^2(2) = 1.004, p = .605$]. On average, comparison group informants spent 60.88 ($SD = 40.83$) hours per week with the healthy older adults and MCI informants spent 65.42 ($SD = 42.53$) hours per week with MCI patients. Time spent with participants did not differ across groups (Mann-Whitney, $z = -0.78, p = .436$).

Financial Capacity

Conceptual Model—Our research group has previously developed a conceptual model of the financial capacity construct with three levels: specific financial abilities (tasks), broader

financial activities (domains), and overall financial capacity (global). Detailed description of this conceptual model has been presented elsewhere (2, 15, 16). Table 1 presents a schematic of the model.

Self/Informant Report Measure—Using the above conceptual model, parallel self and informant report measures of current financial capacity (the Current Financial Capacity Form, CFCF) (15) were developed. The CFCF elicits task-, domain-, and global-level judgments about an individual's present financial abilities from both the individual and an informant. Ratings on each CFCF variable are done on a 3-point scale corresponding to three capacity levels — *can do without help* (2), *can do but need help* (1), *cannot do even with help* (0).

Objective Assessment Measure—The Financial Capacity Instrument (FCI) is a standardized, performance-based, psychometric instrument for assessing the financial abilities of older adults (2, 15, 16). It was developed using the conceptual model of the financial capacity construct outlined above. The FCI assesses an individual's performance across 20 specific financial tasks. Performance scores on these tasks are summed to yield 9 domain scores, which are in turn summed to yield a global financial capacity score.

Prior Financial Experience—Because present financial capacity could vary as a function of prior financial experience, we also screened for prior experience on all financial skills being assessed. For each analysis performed, we excluded any participant who was either self- or informant-identified as having no prior experience with that financial skill.

In the present paper only domain- and global-level CFCF and FCI analyses were performed in order to limit multiple comparisons.

Data Analyses

Group differences in age, education, MMSE scores, DRS-2 Total scores, CDR—sum of boxes, and Geriatric Depression Scale (GDS) (17) scores were analyzed with either one-way analysis of variance or Mann-Whitney tests. Differences in gender, racial, and CDR—global distributions across groups were examined using either χ^2 analyses or Fisher's exact tests.

To examine the accuracy of self report of financial ability, participants' objective performance test scores on the FCI were first transformed into capacity outcome categories. A *can do without help* outcome was defined as a score greater than 1.5 SD below the comparison group mean on that FCI variable; a *can do but need help* outcome was defined as a score falling at or below 1.5 SD but greater than 2.5 SD below the comparison group mean on that FCI variable; and a *cannot do even with help* outcome was defined as a score falling at or below 2.5 SD below the comparison group mean on that FCI variable. This psychometric approach to assigning capacity outcomes has been successfully employed in prior capacity studies (4, 16). Next, for each FCI variable, we calculated a Discrepancy Index (DI) defined as "self rating minus objective performance outcome" (7–9). The DI scores ranged from –2 to +2. They were zero when a participant accurately estimated his/her financial ability relative to his/her objective test outcome; positive when he/she overestimated his/her ability relative to his/her objective outcome; and negative when he/she underestimated his/her ability relative to his/her objective outcome. Group differences on the DI scores were tested using Cochran-Mantel-Haenszel row mean scores analyses.

A similar procedure was employed for the analyses of informant reports of participants' financial abilities. That is, for each FCI variable, DI scores were computed as "informant's rating minus participant's objective performance outcome" (7–9). These DI scores also ranged from –2 to +2. They were zero when the informant accurately estimated the

participant's ability relative to the participant's objective outcome; positive when the informant overestimated the participant's ability relative to the participant's objective outcome; and negative when informant underestimated the participant's ability relative to the participant's objective outcome. Group differences on the DI scores were also tested using Cochran-Mantel-Haenszel row mean scores analyses.

Within each participant/informant dyad, we also computed DI scores as "self rating minus informant rating" (7–9). Again, these DI scores ranged from –2 to +2. They were zero when a participant and his/her informant rated the participant's ability alike; positive when a participant rated his/her ability higher than the informant did; and negative when a participant rated his/her ability lower than the informant did. Group differences on the DI scores were tested using Cochran-Mantel-Haenszel row mean scores analyses.

All analyses were performed using SAS 9.1 (SAS Institute Inc., Cary, NC). Only findings with a 2-tailed p value $\leq .05$ were considered significant.

RESULTS

Demographic and clinical variables

Table 2 shows the result of group comparisons on demographic and clinical variables. As expected, patients with MCI differed significantly from the comparison group on all measures of global mental status and dementia staging — MMSE, DRS-2 Total Score, CDR–global ratings, and CDR–sum of boxes scores. The two groups did not differ from each other in age, years of education, or in gender or racial distributions. Although patients with MCI reported significantly greater depressive symptoms compared to the cognitively healthy older adults, their mean GDS score (7.68) was below the clinical cutoff for mild depression (11.00) (17).

Self report versus objective test performance

The discrepancy between self report on the CFCF and objective outcome on the FCI was significantly greater for patients with MCI compared to healthy older adults on the domains of Checkbook Management, Bank Statement Management, Bill Payment, and on the global financial ability variable. For instance, on Bank Statement Management, only 5.6% of healthy older adults versus 31.1% of MCI patients overestimated their abilities; 93.1% of healthy older adults versus 62.2% of MCI patients accurately estimated their abilities; and 1.4% of healthy older adults versus 6.8% of MCI patients underestimated their abilities. The two groups did not differ on the other six domains. These findings are presented in Table 3.

Further analyses conducted within the MCI group revealed that patients who overestimated their global financial ability had significantly lower MMSE scores (mean = 26.58, SD = 2.11) compared to those who were accurate [mean = 28.67, SD = 1.21; $t(59) = -4.51$, $p = .001$] or those who underestimated their abilities [mean = 28.92, SD = 1.50; $t(23) = -4.07$, $p = .001$]. Those who accurately estimated their abilities and those who underestimated their abilities did not differ in MMSE scores [$t(60) = -0.56$, $p = .579$].

Interestingly, MCI patients who underestimated their global financial abilities reported significantly higher depressive symptoms (mean = 11.92, SD = 7.09) compared to those who were accurate [mean = 6.76, SD = 4.71; $t(60) = 3.23$, $p = .002$] or those who overestimated their abilities (mean = 6.83, SD = 4.83; $t(23) = 2.48$, $p = .016$). Those who were accurate and those who overestimated their abilities did not differ in reported depressive symptoms [$t(59) = 0.05$, $p = .962$].

Informant report versus participants' objective test performance

The discrepancy between informant rating on the CFCF and participants' objective outcome on the FCI was significantly greater for MCI informants compared to comparison group informants on Checkbook Management, Bank Statement Management, Financial Judgment, Bill Payment, and on the global financial ability variable. For instance, on Bank Statement Management, 3.0% of comparison group informants versus 31.9% of MCI informants overestimated participants' abilities; 95.5% of comparison group informants versus 60.9% of MCI informants accurately estimated participants' abilities; and 1.5% of comparison group informants versus 7.2% of MCI informants underestimated participants' abilities. Comparison group informants and MCI informants did not differ on the other five domains. These results are presented in Table 3.

Self report versus informant report

Table 3 also details the results of the analyses that examined the discrepancy between self and informant report on the CFCF. Self-informant discrepancy was significantly greater for MCI/MCI informant dyads compared to healthy older adult/healthy older adult informant dyads on Financial Conceptual Knowledge, Checkbook Management, Bank Statement Management, Financial Judgment, Bill Payment, and Knowledge of Personal Assets. For instance, on Bank Statement Management, 1.5% of healthy older adults versus 10.1% of MCI patients rated themselves higher than their informant did; 98.5% of healthy older adult dyads versus 85.5% of MCI dyads were concordant; and 0% of healthy older adults versus 4.3% of MCI patients rated themselves lower than their informant did. The healthy older adult and MCI dyads did not differ on the other three domains, or on global financial capacity.

DISCUSSION

The validity of the information obtained from clinical assessment of functional abilities when the assessment is report-based is dependent on the accuracy of the report. Therefore, investigating the accuracy of self and informant reports of functional abilities is a critical scientific and clinical undertaking. Our three-pronged approach to examining accuracy of self and informant reports in MCI presents a unique vantage point, as prior investigations in MCI have only compared self report to informant report (7–9). In addition, our approach offers an objective criterion (i.e., actual test performance) against which to separately validate self and informant reports.

With respect to self report, we found that relative to the comparison group, patients with MCI overestimated their abilities on Checkbook Management, Bank Statement Management, and Bill Payment (see Table 3). These financial domains share two important features – they are fairly complex relative to other domains and they are routine parts of financial management. Our finding, therefore, suggests that when patients with MCI are asked to rate their present ability on relatively complex financial tasks that have long been part of their repertoire, they may tend to erroneously reference their prior ability levels as veritable indices of their present ability, resulting in an overestimation of present abilities for some patients. On the other hand, if they are asked to rate their present ability on financial tasks that are only occasionally exercised in everyday life, they may tend to exercise greater caution, leading to an underestimation of present abilities for some MCI patients as was the case on Investment Decision Making. Regarding global financial capacity, there was evidence of both underestimation and overestimation of abilities among patients with MCI relative to healthy older adults. Overall, mean self report accuracy across all financial capacity variables was 88.1% (SD = 6.9%; range = 72.1% to 93.1%) for comparison group participants and 73.8% (SD = 9.7%; range = 62.2% to 90.3%) for MCI patients.

Further analyses of global financial capacity within the MCI group revealed that patients with greater cognitive impairment were more susceptible to overestimation biases whereas those with more depressive symptoms were prone to underestimation biases. Prior studies have found associations between cognitive impairment and overestimation of abilities among patients with MCI (8) and also in AD (18–20). Given the narrow range of MMSE scores (24 – 30) among our MCI patients, it appears that even relatively *minor* cognitive difficulties potentially pose significant obstacles to accurate perception of functional abilities within this patient population.

Exaggeration of deficits is prevalent among depressed persons (21–24). In the context of MCI, this might reflect elevated sensitivity to both perceived and actual decline from prior functional status (21–23). Because a misdiagnosis of AD may occur for patients with MCI who, due to their depression, exaggerate impairments in functional status, it will be important for clinicians to routinely assess and treat depression in MCI. Such treatment may also ameliorate the adverse effects that untreated depression could have on cognitive (25) and functional (26) abilities, overall quality of life (27), and caregiver adjustment (28).

With respect to informant report analyses, we found that compared to comparison group informants, MCI informants demonstrated lower accuracy in their estimation of MCI patients' financial skills on Checkbook Management, Bank Statement Management, Financial Judgment, Bill Payment, and global financial capacity. Overall, mean informant accuracy across all financial capacity variables was 88.6% (SD = 5.5%; range = 79.0% to 95.5%) for comparison group informants and 72.1% (SD = 9.8%; range = 60.9% to 86.1%) for MCI informants. With the exception of Knowledge of Personal Assets (Domain 8) and Investment Decision Making (Domain 9), the estimation errors made by MCI informants primarily involved overestimation of MCI patients' abilities rather than underestimation. Such overestimation of MCI patients' financial abilities by their informants is an important clinical finding (10, 29), and has potential implications for the MCI diagnostic process, as informant report of patient functioning is accorded considerable weight during MCI case determination (1).

We also found that agreement between self and informant ratings on the CFCF was lower among MCI dyads relative to healthy older adult dyads on Financial Conceptual Knowledge, Checkbook Management, Bank Statement management, Financial Judgment, Bill Payment, and Knowledge of Personal Assets. Overall, mean self-informant agreement across all financial capacity variables was 94.5% (SD = 10.3%, range = 67.2% to 100%) within healthy older adult dyads and 85.9% (SD = 9.5; range = 65.0% to 100%) within MCI dyads. In general, MCI patients tended to assign themselves higher functional ratings than did their informants.

Further examination of the self-informant discrepancy findings highlighted a concern previously raised regarding the routine adoption of informant report as the yardstick against which to appraise accuracy of patient report in dementia (11, 12, 29–31). In prior studies of awareness of deficits in patients with MCI (7, 8) or AD (11, 32), patients who assigned themselves higher functional ratings vis-à-vis their informants' ratings were assumed to have overestimated their abilities, and to be lacking in awareness. However, this theoretical assumption was not substantiated in the present study. We found that with the exception of Financial Conceptual Knowledge (Domain 2) and Investment Decision Making (Domain 9), MCI patients' estimations of their own abilities were more congruent with objective test outcome than were their informants' estimates. This suggests that disagreement between MCI patients and their informants does not necessarily signal unawareness of deficits by patients.

We also found that, with the exception of Investment Decision Making, the agreement between MCI patients and their informants was higher than the agreement between either patients' or informants' reports and the patients' objective test outcome. Indeed, within the MCI group, mean self-informant agreement (85.9%) was approximately 12% points higher than mean self-objective agreement (73.8%), and approximately 14% points higher than mean informant-objective agreement (72.1%). This suggests that concordance between MCI patients and their informants may not be presumed to necessarily indicate awareness of deficits by patients. Some functional changes might escape the attention of both patients and their informants (30). In sum, it appears that neither patient-informant agreement nor disagreement is necessarily indicative of level of awareness. Objective assessment approaches, therefore, stand to make unique contributions to the clinical evaluation of functional status and awareness of deficits in patients with MCI.

The primary conclusion from this study is that patients with MCI do not appear to be fully aware of the functional deficits they experience with regards to financial abilities. This is a significant finding because the older adult who is experiencing difficulties with managing financial affairs, but is not fully aware of this decline, might fail to request appropriate assistance or accept such assistance when offered. This exposes the individual to heightened risk of financial exploitation, unintentional self-impoverishment, and in some cases ultimately conservatorship proceedings and loss of financial autonomy (15, 33). A secondary conclusion is that some informants misestimate functional skills in MCI patients, which has implications for diagnostic decision-making in MCI. Potential reasons for this misestimation include the relatively subtle nature of functional deficits in MCI (2, 4), the variability in cognitive and functional performance that often occurs in MCI (34, 35), and report bias (both minimization and magnification) among informants (10, 12, 29).

Thirdly, this study also underscores the value of objective functional testing in the identification of persons with MCI (36, 37). The observed discrepancies between self or informant reports and objective test outcome among MCI patients suggest that supplementing report-based measures with psychometrically-sound objective measures of functional status has the potential to enhance the identification of older adults who have begun to experience more functional decline than is accounted for by age, and may therefore have MCI or even early dementia.

The findings from this study are subject to certain caveats. Although self-objective discrepancies were significantly higher among MCI patients relative to healthy older adults on three FCI domains and on the global financial ability measure, the concordance between self rating and objective outcome among MCI patients was as high as 90.3% on some domains. This suggests that misestimation of abilities may neither be presumed to occur for every MCI patient nor across all functional domains, and highlights the importance of the multi-domain, structured assessment provided by instruments such as the FCI (38). In addition, neither healthy older adults nor their informants attained a 100% concordance with objective test outcome on any FCI domain. This indicates that reporting bias may not be entirely specific to MCI but may represent a more general phenomenon that worsens in the context of putative dementia. We also note that the generalizability of our findings to non-amnesic MCI subtypes is uncertain as our study only included amnesic MCI patients. Similarly, because our MCI patients are relatively young and well educated, our findings may not be applicable to older and less educated MCI patients. Finally, some researchers have criticized the use of objective test measures as the criterion against which to validate self report. They argued that such measures often may not assess the same constructs that are being tapped by self report (12, 31). However, in the present study, the report-based measures and the objective test measure were based on the same conceptual model of financial capacity, thereby strengthening isomorphism between them (31).

Acknowledgments

This research was supported by grants 1R01 AG021927 (Marson, PI) and 1P50 AG16582 (Alzheimer's Disease Research Center) (Marson, PI) from the National Institute on Aging. The authors thank the staff of the Neuropsychology Laboratory in the Department of Neurology for their assistance with data collection.

REFERENCES

1. Petersen RC, Stevens JC, Ganguli M, et al. Practice parameter: Early detection of dementia: Mild cognitive impairment (an evidence-based review). Report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology*. 2001; 56:1133–1142. [PubMed: 11342677]
2. Griffith HR, Belue K, Sicola A, et al. Impaired financial abilities in mild cognitive impairment. *Neurology*. 2003; 60:449–457. [PubMed: 12578926]
3. Morris JC, Storandt M, Miller P, et al. Mild cognitive impairment represents early-stage Alzheimer disease. *Archives of Neurology*. 2001; 58:397–405. [PubMed: 11255443]
4. Okonkwo O, Griffith HR, Belue K, et al. Medical decision-making capacity in patients with mild cognitive impairment. *Neurology*. 2007; 69:1528–1535. [PubMed: 17923615]
5. Winblad B, Palmer K, Kivipelto M, et al. Mild cognitive impairment beyond controversies, towards a consensus: Report of the International Working Group on Mild Cognitive Impairment. *Journal of Internal Medicine*. 2004; 256:240–246. [PubMed: 15324367]
6. Petersen RC, Doody R, Kurz A, et al. Current concepts in mild cognitive impairment. *Archives of Neurology*. 2001; 58:1985–1992. [PubMed: 11735772]
7. Tabert MH, Albert SM, Borukhova-Milov L, et al. Functional deficits in patients with mild cognitive impairment: Prediction of AD. *Neurology*. 2002; 58:758–764. [PubMed: 11889240]
8. Albert SM, Michaels K, Padilla M, et al. Functional significance of mild cognitive impairment in elderly patients without a dementia diagnosis. *American Journal of Geriatric Psychiatry*. 1999; 7:213–220. [PubMed: 10438692]
9. Farias ST, Mungas D, Jagust W. Degree of discrepancy between self and other-reported everyday functioning by cognitive status: Dementia, mild cognitive impairment, and healthy elders. *International Journal of Geriatric Psychiatry*. 2005; 20:827–834. [PubMed: 16116577]
10. Argüelles S, Loewenstein DA, Eisdorfer C, et al. Caregivers' judgments of the functional abilities of the Alzheimer's disease patient: Impact of caregivers' depression and perceived burden. *Journal of Geriatric Psychiatry and Neurology*. 2001; 14:91–98. [PubMed: 11419574]
11. DeBettignies BH, Mahurin RK, Pirozzolo FL. Insight for impairment in independent living skills in Alzheimer's disease and multi-infarct dementia. *Journal of Clinical and Experimental Neuropsychology*. 1990; 12:355–363. [PubMed: 2341561]
12. Zanetti O, Geroldi C, Frisoni GB, et al. Contrasting results between caregiver's report and direct assessment of activities of daily living in patients affected by mild and very mild dementia: The contribution of the caregiver's personal characteristics. *Journal of the American Geriatrics Society*. 1999; 47:196–202. [PubMed: 9988291]
13. Folstein MF, Folstein SE, McHugh PR. Mini-mental state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975; 12:189–198. [PubMed: 1202204]
14. Jurica, PJ.; Leitten, CL.; Mattis, S. *Dementia Rating Scale*, 2nd. Lutz, FL: Psychological Assessment Resources; 2001.
15. Marson DC. Loss of financial competency in dementia: Conceptual and empirical approaches. *Aging, Neuropsychology and Cognition*. 2001; 8:164–181.
16. Marson DC, Sawrie SM, Snyder S, et al. Assessing financial capacity in patients with Alzheimer disease: A conceptual model and prototype instrument. *Archives of Neurology*. 2000; 27:877–884. [PubMed: 10867786]
17. Yesavage J. Geriatric depression scale. *Psychopharmacology Bulletin*. 1988; 24:709–713. [PubMed: 3249773]

18. Harwood DG, Sultzer DL, Wheatley MV. Impaired insight in Alzheimer disease: Association with cognitive deficits, psychiatric symptoms, and behavioral disturbances. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*. 2000; 13:83–88.
19. Sevush S. Relationship between denial of memory deficit and dementia severity in Alzheimer disease. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*. 1999; 12:88–94.
20. Vasterling JJ, Seltzer B, Foss JW, et al. Unawareness of deficit in Alzheimer's disease: Domain-specific differences and disease correlates. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*. 1995; 8:26–32.
21. Smith CA, Henderson VW, McCleary CA, et al. Anosognosia and Alzheimer's disease: The role of depressive symptoms in mediating impaired insight. *Journal of Clinical and Experimental Neuropsychology*. 2000; 22:437–444. [PubMed: 10923053]
22. Mullen R, Howard R, David A, et al. Insight in Alzheimer's disease. *International Journal of Geriatric Psychiatry*. 1996; 11:645–651.
23. O'Connor DW, Pollitt PA, Roth M, et al. Memory complaints and impairment in normal, depressed, and demented elderly persons identified in a community survey. *Archives of General Psychiatry*. 1990; 47:224–227. [PubMed: 2306164]
24. Migliorelli R, Teson A, Sabe L, et al. Anosognosia in Alzheimer's disease: A study of associated factors. *Journal of Neuropsychiatry and Clinical Neurosciences*. 1995; 7:338–344. [PubMed: 7580194]
25. Greenwald BS, Kramer-Ginsberg E, Marin DB, et al. Dementia with coexistent major depression. *American Journal of Psychiatry*. 1989; 146:1472–1478. [PubMed: 2817121]
26. Fitz AE, Teri L. Depression, cognition, and functional ability in patients with Alzheimer's disease. *Journal of the American Geriatrics Society*. 1994; 42:186–191. [PubMed: 8126334]
27. Burns A, Lewis G, Jacoby R, et al. Factors affecting survival in Alzheimer's disease. *Psychological Medicine*. 1991; 21:363–370. [PubMed: 1876641]
28. Rabins PV, Mace NL, Lucas MJ. The impact of dementia on the family. *JAMA*. 1982; 248:333–335. [PubMed: 7087127]
29. Loewenstein DA, Argüelles S, Bravo M, et al. Caregivers' judgments of the functional abilities of the Alzheimer's disease patient: A comparison of proxy reports and objective measures. *Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*. 2001; 56B:P78–P84.
30. Wadley VG, Harrell LE, Marson DC. Self- and informant report of financial abilities in patients with Alzheimer's disease: Reliable and valid? *Journal of the American Geriatrics Society*. 2003; 51:1621–1626. [PubMed: 14687393]
31. Clare L. Awareness in early-stage Alzheimer's disease: A review of methods and evidence. *British Journal of Clinical Psychology*. 2004; 43:177–196. [PubMed: 15169617]
32. Seltzer B, Vasterling JJ, Mathias CW, et al. Clinical and neuropsychological correlates of impaired awareness of deficits in Alzheimer disease and Parkinson disease: A comparative study. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*. 2001; 14:122–129.
33. Nerenberg, L. *Financial abuse of the elderly*. Washington, DC: National Center on Elder Abuse; 1996.
34. Ganguli M, Dodge HH, Shen C, et al. Mild cognitive impairment, amnesic type: An epidemiologic study. *Neurology*. 2004; 63:115–121. [PubMed: 15249620]
35. Larrieu S, Letenneur L, Orgogozo JM, et al. Incidence and outcome of mild cognitive impairment in a population-based prospective cohort. *Neurology*. 2002; 59:1594–1599. [PubMed: 12451203]
36. Petersen RC, Morris JC. Mild cognitive impairment as a clinical entity and treatment target. *Archives of Neurology*. 2005; 62:1160–1163. [PubMed: 16009779]
37. Small BJ, Gagnon E, Robinson B. Early identification of cognitive deficits: preclinical Alzheimer's disease and mild cognitive impairment. *Geriatrics*. 2007; 62:19–23. [PubMed: 17408315]
38. Gauthier S, Reisberg B, Zaudig M, et al. Mild cognitive impairment. *Lancet*. 2006; 367:1262–1270. [PubMed: 16631882]

Table 1

Conceptual model of financial capacity

Domain and tasks	Task description
<i>Domain 1 Basic Monetary Skills</i>	
Task 1a Naming coins/currency	Identify specific coins and currency
Task 1b Coin/currency relationships	Indicate relative monetary values of coins/currency
Task 1c Counting coins/currency	Accurately count groups of coins and currency
<i>Domain 2 Financial Conceptual Knowledge</i>	
Task 2a Define financial concepts	Define a variety of simple financial concepts
Task 2b Apply financial concepts	Practical application/computation using concepts
<i>Domain 3 Cash Transactions</i>	
Task 3a 1 item grocery purchase	Enter into simulated 1 item transaction; verify change
Task 3b 3 item grocery purchase	Enter into simulated 3 item transaction; verify change
Task 3c Change/vending machine	Obtain change for vending machine use; verify change
Task 3d Tipping	Understand tipping convention; calculate/identify tips
<i>Domain 4 Checkbook Management</i>	
Task 4a Understand checkbook	Identify and explain parts of check and check register
Task 4b Use checkbook/register	Enter into simulated transaction; pay by check
<i>Domain 5 Bank Statement Management</i>	
Task 5a Understand bank statement	Identify and explain parts of a bank statement
Task 5b Use bank statement	Identify specific transactions on bank statement
<i>Domain 6 Financial Judgment</i>	
Task 6a Detect mail fraud risk	Detect and explain risks in mail fraud solicitation
Task 6b Detect telephone fraud risk	Detect and explain risks in telephone fraud solicitation
<i>Domain 7 Bill Payment</i>	
Task 7a Understand bills	Explain meaning and purpose of bills
Task 7b Prioritize bills	Identify overdue utility bill
Task 7c Prepare bills for mailing	Prepare simulated bills, checks, envelopes for mailing
<i>Domain 8 Knowledge of Personal Assets/Estate Arrangements*</i>	Indicate asset ownership, estate arrangements
<i>Domain 9 Investment Decision Making</i>	Understand options; determine returns; make decision
<i>Global Financial Capacity</i>	Overall functioning across tasks and domains

FCI = Financial Capacity Instrument

* Requires corroboration by informant

Table 2

Demographic and dementia staging characteristics of study participants

Variable	Comparison group, n = 73	MCI patients, n = 74	Test result
Age	66.44 (8.57)	68.32 (6.54)	F (1, 145) = 2.25, p = .135
Gender, n (%)			
Female	47 (64.40)	39 (52.70)	χ^2 (1) = 2.07, p = .151
Male	26 (35.60)	35 (47.30)	
Race, n (%)			
African American	11 (15.10)	14 (18.90)	Fisher's exact, p = .588
Asian American	0 (0.0)	1 (1.40)	
Caucasian	62 (81.90)	59 (79.70)	
Education	15.18 (2.40)	14.77 (3.04)	F (1, 145) = 0.82, p = .368
MMSE	29.46 (0.97)	28.38 (1.63)	Mann-Whitney, z = -5.10, p = .001
DRS-2 Total Score	138.92 (3.12)	132.59 (6.08)	Mann-Whitney, z = -6.61, p = .001
CDR – global, n (%) [†]			
0.0	68 (97.10)	6 (8.60)	χ^2 (1) = 110.19, p = .001
0.5	2 (2.90)	64 (91.40)	
CDR – sum of boxes [†]	0.14 (0.08)	1.24 (0.72)	Mann-Whitney, z = -10.32, p = .001
GDS	5.42 (5.40)	7.68 (5.43)	Mann-Whitney, z = -2.96, p = .003

MCI = mild cognitive impairment.

Except for gender, race, and CDR – global, values are mean (SD).

MMSE = Mini-Mental Status Examination; DRS-2 = Dementia Rating Scale, 2nd edition; GDS = Geriatric Depression Scale.[†] indicates missing data for some participants

Table 3

Tests of group differences on the Discrepancy Index scores^f

Financial capacity variable	Self rating minus objective test outcome					p	Informant rating minus objective test outcome					p	Self rating minus informant rating					p
	-2	-1	0	1	2		-2	-1	0	1	2		-2	-1	0	1	2	
1. Basic Monetary Skills																		
Comparison group	0	0	87.7	9.6	2.7	.496	0	0	89.9	7.2	2.9	.179	0	0	100	0	0	---
MCI patients	0	0	79.5	8.2	12.3		0	0	78.9	9.9	11.3		0	0	100	0	0	
2. Financial Conceptual Knowledge																		
Comparison group	0	0	91.7	6.9	1.4	.063	0	1.5	91.0	6.0	1.5	.431	0	0	98.5	1.5	0	.027
MCI patients	1.4	4.1	82.2	8.2	4.1		1.4	1.4	85.7	5.7	5.7		0	8.7	89.9	0	1.4	
3. Cash Transactions																		
Comparison group	0	0	79.5	17.8	2.7	.369	0	0	79.4	16.2	4.4	.141	0	1.5	98.5	0	0	.152
MCI patients	0	1.4	67.6	14.9	16.2		0	2.9	64.3	15.7	17.1		0	2.9	92.9	4.3	0	
4. Checkbook Management																		
Comparison group	0	0	92.9	4.3	2.9	.020	0	1.5	92.5	3.0	3.0	.007	0	0	98.4	1.6	0	.021
MCI patients	0	5.6	78.9	5.6	9.9		2.9	5.8	75.4	8.7	7.2		0	3.0	87.9	7.6	1.5	
5. Bank Statement Management																		
Comparison group	0	1.4	93.1	5.6	0	.001	0	1.5	95.5	3.0	0	.001	0	0	98.5	1.5	0	.006
MCI patients	0	6.8	62.2	17.6	13.5		2.9	4.3	60.9	20.3	11.6		0	4.3	85.5	10.1	0	
6. Financial Judgment																		
Comparison group	0	0	90.3	8.3	1.4	.159	0	0	91.3	7.2	1.4	.020	0	0	100	0	0	.001
MCI patients	1.4	2.8	80.6	5.6	9.7		0	9.0	77.6	7.5	6.0		1.5	1.5	83.1	12.3	1.5	
7. Bill Payment																		
Comparison group	0	0	91.7	5.6	2.8	.005	0	3.0	88.1	6.0	3.0	.006	0	0	97.0	3.0	0	.018
MCI patients	0	0	68.5	11.0	20.5		0	8.7	63.8	11.6	15.9		0	0	85.3	14.7	0	
8. Knowledge of Personal Assets																		
Comparison group	0	0	92.5	6.0	1.5	.536	0	0	92.5	6.0	1.5	.095	0	0	100	0	0	.019
MCI patients	0	2.8	90.3	4.2	2.8		1.4	5.6	86.1	5.6	1.4		0	1.4	91.7	5.6	1.4	
9. Investment Decision Making																		
Comparison group	0	19.1	72.1	7.4	1.5	.519	0	12.9	79.0	8.1	0	.128	0	19.0	67.2	13.8	0	.959
MCI patients	0	20.3	65.6	12.5	1.6		1.5	23.9	67.2	3.0	4.5		0	13.3	65.0	21.7	0	

Financial capacity variable	Self rating minus objective test outcome					p	Informant rating minus objective test outcome					p	Self rating minus informant rating					
	-2	-1	0	1	2		-2	-1	0	1	2		-2	-1	0	1	2	p
Global Financial Capacity																		
Comparison group	0	5.5	89.0	5.5	0	.004	0	7.2	87.0	5.8	0	.005	0	5.8	87.0	7.2	0	.238
MCI patients	0	14.9	62.2	6.8	16.2		1.4	16.7	61.1	8.3	12.5		0	5.6	77.8	16.7	0	

Results were obtained from Cochran-Mantel-Haenszel row mean scores tests (Q_S) with $df = 1$

Discrepancy Index scores were computed respectively as (1) self rating minus objective test outcome, (2) informant rating minus participant's objective test outcome, and (3) self rating minus informant rating.

[†] Values are row percentages. These percentages do not always reflect the proportion of 73 healthy older adults/informants or 74 MCI patients/informants. Slight variations in sample size resulted from (i) exclusions due to lack of prior experience with the financial skills assessed [see Methods section] and/or (ii) incomplete report data by participants and/or informants. For example, on Global Financial Capacity, the self vs. objective analysis was performed with 73 comparison participants and 74 MCI patients whereas both informant vs. objective and self vs. informant analyses were performed with 69 comparison participants and 72 MCI patients. The results presented in this table were essentially unchanged when the analyses were repeated with only those participants who had complete data on all financial capacity variables.

MCI = mild cognitive impairment.