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Differences in self-awareness of functional deficits between amnesic single- and multi-domain mild cognitive impairment

Kayla A. Steward, M.A.^a, Tyler P. Bull, B.S.^a, and Virginia G. Wadley, Ph.D.^b

^aDepartment of Psychology, University of Alabama at Birmingham, Birmingham, AL, USA

^bDepartment of Medicine, University of Alabama at Birmingham, Birmingham, AL, USA

Abstract

Introduction: Prior research examining self-awareness of deficits in those with Mild Cognitive Impairment (MCI) has been inconsistent, suggesting that preservation of insight at this disease stage may be conditional on the domain(s) examined as well as individual characteristics. The current study is the first to examine differences in objective performance and self-awareness of difficulties between older adults with amnesic single- (MCI-ASD) and multi-domain MCI (MCI-AMD) across six instrumental activities of daily living (IADLs).

Methods: Seventy-five individuals (mean age=73.9 years, range 55–88 years; 56% female) with MCI-ASD (n=30) and MCI-AMD (n=45) were recruited primarily from a hospital-based memory disorders clinic. Participants were administered self-report and objective measures assessing six functional domains: Financial Management, Driving, Telephone Use, Nutrition Evaluation, Grocery Shopping, and Medication Management. Self-awareness discrepancy scores were calculated for each of these IADLs and participants were classified as either ‘overestimating ability’ or ‘accurately/under-estimating ability.’

Results: Individuals with MCI-AMD performed significantly worse on objective measures of Financial Management, Driving, and Nutrition Evaluation in comparison to those with MCI-ASD. Across MCI subtypes, participants were most likely to lack awareness of their difficulties in Nutrition Evaluation (31%), Financial Management (25%), and Driving (23%) domains. Individuals with MCI-AMD were significantly more likely than those with MCI-ASD to overestimate performance on Driving and Telephone Use domains. A similar trend was found for Financial Management and Nutrition Evaluation domains.

Conclusion: In comparison to those with MCI-ASD, individuals with MCI-AMD are more likely to have impairment in their everyday function and to lack awareness into their IADL difficulties. When possible, clinicians should obtain objective measures in combination with detailed informant reports of functional abilities in order to evaluate capacity to independently engage in various daily activities. Finally, level of self-awareness varies across IADL domains, providing further evidence that insight is not a unitary construct.

Corresponding Author: Kayla A. Steward, M.A., Department of Psychology, University of Alabama at Birmingham, Campbell Hall 415, 1530 3rd Ave S., Birmingham, AL, 35294, Phone: (832) 891-3162, ksteward@uab.edu.

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Keywords

Mild cognitive impairment; Alzheimer's disease; self-awareness; anosognosia; instrumental activities of daily living

Introduction

Mild cognitive impairment (MCI) is often conceptualized as the intermediate stage between healthy aging and dementia. Individuals diagnosed with either amnesic single-domain MCI (MCI-ASD) or amnesic multi-domain MCI (MCI-AMD) are at increased risk of progressing to clinically apparent Alzheimer's disease (AD) (Petersen, 2004). The mild cognitive deficits within these populations (Libon et al., 2010; Saunders and Summers, 2011) may interfere with their ability to efficiently and accurately complete a variety of instrumental activities of daily living (IADLs), including managing financial assets, driving, grocery shopping, meal preparation/cooking, housekeeping, medication management, and telephone/computer use (Jekel et al., 2015; Lassen-Greene et al., 2017). Additionally, those with MCI-AMD are generally more impaired on functional tasks than those with MCI-ASD (Aretouli and Brandt, 2010; Gold, 2012; Seelye, Schmitter-Edgecombe, Cook, & Crandall, 2013).

The degree of IADL difficulties is often determined using patient self-report. However, there is evidence that older adults with cognitive impairment may lack sufficient self-awareness of their everyday functioning--leading to under-reporting of their difficulties. Unawareness of deficits, also termed 'anosognosia' and 'lack of insight,' is a complex phenomenon found in 50–80% of individuals with AD (Leicht, Berwig, & Gertz, 2010; Reed, Jagust, & Coulter, 1993; Starkstein, Jorge, Mizrahi, & Robinson, 2006; Vogel, Hasselbalch, Gade, Ziebell, & Waldemar, 2005; Vogel et al., 2004) and 10–60% of those with MCI (Starkstein, et al., 2006; Tabert et al., 2002; Vogel, et al., 2005; Vogel, et al., 2004). The majority of research on this topic has focused on awareness of cognitive and/or behavioral problems rather than difficulties with everyday function. Moreover, most research has assessed self-awareness by comparing patient to informant report. This can be problematic given the number of factors shown to influence informant ratings, such as relationship type and duration, living status (e.g., whether they live with the patient or not), and the informant's caregiver burden, mood, and cognitive status (Jorm et al., 1994; Ready, Ott, & Grace, 2004; Zanetti, Geroldi, Frisoni, Bianchetti, & Trabucchi, 1999).

The limited research examining self-awareness of IADL performance suggests that individuals with MCI and very mild AD overestimate their functional abilities when compared to informant reports (Albert et al., 1999; Farias, Mungas, & Jagust, 2005; Ford et al., 2014; Maki, Amari, Yamaguchi, Nakaaki, & Yamaguchi, 2012; Starkstein, et al., 2006; Wadley, Harrell, & Marson, 2003) or performance-based measures (Ohman, Nygard, & Kottorp, 2011; Okonkwo et al., 2009; Okonkwo et al., 2008). Moreover, prior research suggests that self-awareness of functional abilities may be domain-specific. Financial capacity (e.g., checkbook management, bill payment, bank statement management, and overall financial capacity) and driving performance appear to be particularly prone to

overestimation (Albert, et al., 1999; Ohman, et al., 2011; Okonkwo, et al., 2009; Okonkwo, et al., 2008; Starkstein, et al., 2006; Wadley, et al., 2003). In contrast, others have found that older adults with MCI are able to rate their functional performance at the same level of accuracy as cognitively healthy controls (Farias, et al., 2005; Ford, et al., 2014; Maki, et al., 2012). Further examination of this construct is important given that poor awareness of deficits in MCI is predictive of future progression to AD (Spalletta et al., 2014; Tabert, et al., 2002) and may also lead to under-reporting of functional difficulties to medical providers, which could delay diagnosis, treatment, and tailored interventions.

One reason for inconsistency in the MCI literature may be that the majority of studies collapsed MCI subtypes during analyses. To the author's knowledge, only two studies have assessed differences in self-awareness of deficits amongst MCI-ASD and MCI-AMD subtypes. In one study, MCI-AMD patients were slightly more likely to meet criteria for anosognosia than those with MCI-ASD (Spalletta, Girardi, Caltagirone, & Orfei, 2012). However, another study found no differences between MCI subtypes in their self-awareness of cognitive or behavioral problems (Orfei et al., 2010). Of note, neither of these studies specifically examined differences in awareness of functional difficulties. It has been previously hypothesized that those with MCI-AMD may be more prone to anosognosia given the broader neuropsychological impairment of this group (Piras, Piras, Orfei, Caltagirone, & Spalletta, 2016).

The current study examined differences in self-awareness across single- and multi-domain amnesic MCI subtypes by comparing the participants' self report to their objective performance on six functional domains (Financial Management, Driving, Telephone Use, Nutrition Evaluation, Grocery Shopping, and Medication Management). We hypothesized that overall functional performance and self-awareness of performance would be more impaired in individuals classified as MCI-AMD in comparison to the MCI-ASD group. Moreover, we hypothesized that self-awareness would be most impaired for estimating driving and financial abilities in comparison to other functional domains.

Methods

Participants

Participants with a working-diagnosis of MCI within the past year were recruited from the University of Alabama at Birmingham (UAB) Departments of Neurology and Medicine for a randomized controlled trial investigating the efficacy of a processing speed intervention (Applying Programs to Preserve Skills—APPS). All participants were considered broadly independent with their basic activities of daily living (e.g., feeding, bathing, toileting, grooming) by their referring provider. Individuals with other neurological illness, clinical stroke within last two years, traumatic brain injury, brain tumor, or significant psychiatric conditions other than depression were excluded from participation.

Procedure

This study used both verbal and written consent for undergoing all study procedures, as well as completing a consent interview at the beginning of the initial visit using the Competency

Assessment Checklist for Research Informed Consent (Daniel Marson, J.D., Ph.D, University of Alabama at Birmingham, V.2 October 2002; MCI Study version 1 July 2004). Only baseline (pre-intervention) data from this ongoing trial were used for this analysis. The UAB Institutional Review Board approved all procedures.

During the first baseline visit, participants underwent comprehensive neuropsychological testing and completed questionnaires regarding their health history, depressive symptoms (Center for Epidemiologic Studies Depression Scale [CES-D](Radloff, 1977)), current functional status, and sociodemographics. Current medications were obtained primarily via medical records. This information was used by a panel of study investigators consisting of neuropsychologists, geropsychologists, and a neurologist to determine current diagnosis using previously published criteria for MCI (Winblad et al., 2004). In general, participants were considered impaired in a specific cognitive domain if two or more neuropsychological tests in that domain fell more than 1.5 SD below expected performance based on demographically-adjusted normative data. Individuals diagnosed as having amnesic single- (n=30) or multi-domain (n=45) MCI were included in this analysis.

Participants completed their second baseline visit an average of 52 days from their initial visit (SD=20 days). During this visit, participants completed self-report and objective measures of functional status, including an on-road driving evaluation if they were a current driver. In general, self-report measures were administered prior to objective assessment of the functional domains so that actual performance did not bias subjective ratings.

Measures

Objective functional measures—The Financial Capacity Instrument-Short Form (FCI-SF) (Gerstenecker et al., 2016) is a standardized psychometric instrument composed of 37 items developed specifically to detect impairment of financial abilities in earlier phases of AD. The FCI-SF provides a Total Score ranging from 0–74 (higher is better). Raw scores were transformed into age- and education-adjusted standardized scores (Gerstenecker, et al., 2016). Those whose performance fell more than one standard deviation below expected performance based on normative data were classified as having difficulty with this domain. Otherwise, participants were considered to have no difficulty.

Participants who identified as current drivers and possessed a valid driver's license were given a 45–60 min. on-road driving evaluation around Birmingham, AL using a standardized protocol and route (non-highway, fair-weather only) in collaboration with the UAB Driving Assessment Clinic (Wadley et al., 2009). Participants drove an instrumented vehicle with dual brakes under the supervision and evaluation of a Certified Driving Rehabilitation Specialist (CDRS), who is also a licensed occupational therapist (OTR/L), as well as a back seat rater. The raters were masked to the participants' cognitive performance and diagnostic classification. Both the backseat rater and the CDRS rated the participants' overall driving performance using a 5-point Likert scale (higher is better). Given strong inter-rater reliability ($\kappa=.858$, $p<.001$) (McHugh, 2012), these two scores were averaged to create the participants' Overall Driving Performance Composite score. For this analysis, those with an average score of 4 or higher were classified as having no difficulty on this domain. All others were considered to have difficulty.

The Timed Instrumental Activities of Daily Living (TIADL) (Owsley, McGwin, Sloane, Stalvey, & Wells, 2001; Owsley, Sloane, McGwin, & Ball, 2002) is a standardized measure that examines both accuracy and speed of performance on several domains of everyday functioning using a 3- or 4-point Likert scale for each item. The TIADL Financial Abilities domain (1 item) was excluded from these analyses as we objectively assessed this domain using the FCI-SF. The following TIADL domains were used for the current study: Telephone Use (1 item), Nutrition Evaluation (3 items), Grocery Shopping (1 item), and Medication Management (2 items). For each of these four domains, if the participant completed all items within that domain within the allotted time limit and without error, they were considered to have no difficulty. Otherwise, they were classified as having difficulty in that domain.

Self-reported functional measures—The Past and Present Financial Capacity Form (PPFCF) (Wadley, et al., 2003) was designed to parallel the FCI and asks participants to rate their financial abilities using 4-point Likert scales. The PPFCF includes an item that asks participants whether they are able to manage all of their money and financial affairs at the present time, which corresponds to the FCI total score. Those who answered ‘Yes, without help’ (the highest rating) were classified as having no difficulty. Otherwise they were classified as having difficulty with the domain.

Those who self-identified as current drivers completed the Mobility/Driving Habits for Current Drivers Questionnaire (Owsley, Stalvey, Wells, & Sloane, 1999). This measure includes an item that asks participants to rate the overall quality of their driving performance using a 5-point Likert scale that parallels the on-road driving evaluation’s Overall Driving Performance Composite score. A dichotomized ‘difficulty classification’ score was calculated in the same manner as for the objective driving assessment.

The MILES Self-Report Questionnaire (Okonkwo, et al., 2009) asks participants to rate the difficulty of performing various tasks necessary for independent living using a 4-point Likert scale. Four items on this questionnaire were designed to parallel the Medication Management, Grocery Shopping, Nutrition Evaluation, and Telephone Use domains objectively assessed by the TIADL. Participants who responded that the task is ‘Not difficult’ were classified as having no difficulty with that domain. Otherwise they were classified as having difficulty with the domain.

Similar methods for dichotomizing difficulty on these objective and self-report measures have been published previously as a data reduction strategy and to ease comparison amongst objective and subjective measures (Okonkwo, et al., 2009; Okonkwo, et al., 2008).

Statistical analyses

All statistical analyses were performed using SPSS Statistics v25 (IBM Corp., Armonk, NY). Statistical significance was defined as $p < .05$. For each of the six functional domains (Financial Management, Driving, Telephone Use, Nutrition Evaluation, Grocery Shopping, and Medication Management), the dichotomized subjective difficulty score was subtracted from the dichotomized objective difficulty score. A discrepancy score of 0 indicates accurate estimation of ability in the given domain. A value of -1 indicates an underestimation of

ability and a value of +1 indicates an overestimation of ability in the domain (i.e., poor awareness of difficulties). As the current analyses were focused on evaluating whether MCI subtype was associated with poor self-awareness of deficits, participants were classified as either overestimating performance (the group of primary interest) or accurately/under-estimating performance for each instrumental activity.

Group differences (MCI-ASD vs. MCI-AMD) in demographic and clinical variables were assessed using independent samples t-tests or chi-square tests. Group differences (MCI-ASD vs. MCI-AMD) in objective functional impairment (impaired vs. not impaired) were assessed using logistic regression models with age and education entered as covariates. We did not formally compare groups on raw scores as these scores violated normality assumptions and non-parametric statistics are unable to handle important demographic covariates. To determine whether MCI subtype predicts self-awareness classification for each functional domain (overestimated performance vs. accurately/under-estimated performance), we used binomial logistic regression models controlling for age, gender, and depressive symptomology (CES-D total score).

Results

Demographic and sample characteristics

Table 1 displays differences in demographic and clinical characteristics between participants with MCI-ASD and MCI-AMD. Groups did not differ by age, gender, race, education, depressive symptoms, percentage who live alone, or percentage taking medications for memory loss. Individuals with MCI-AMD performed significantly worse than the MCI-ASD group on the Dementia Rating Scale-2 (DRS-2), a measure of global cognition, which was expected given that this measure was used as part of the diagnostic neuropsychological battery. Given the collinearity between DRS-2 score and MCI subtype, we did not include the DRS-2 as a covariate in subsequent analyses. Far visual acuity ranged from Snellen scores of 20/16 to 20/55 ($M = 20/23$, $SD = 7.34$).

Objective performance across functional domains

With regard to objective tests of functional performance, two individuals did not complete the TIADL Medication Management items and one participant was not a current driver. Thus, they were excluded from analyses in those domains. Across all MCI participants, the following percentages were deemed to have difficulty with each domain: Nutrition Evaluation (37%), Financial Management (36%), Driving (27%), Telephone Use (23%), Grocery Shopping (13%), and Medication Management (12%). Table 2 displays the percentage impaired by MCI subtype as well as raw scores of objective functional measures. After controlling for age and educational level, individuals with MCI-AMD were significantly more likely to demonstrate objective impairment on the FCI-SF task ($Wald = 7.240$, $df = 1$, $p = .007$, $OR = 4.95$), the on-road driving evaluation ($Wald = 4.550$, $df = 1$, $p = .033$, $OR = 4.50$), and the TIADL Nutrition Evaluation task ($Wald = 4.647$, $df = 1$, $p = .031$, $OR = 3.86$) in comparison to those with MCI-ASD. The two subtypes did not differ in their performance on the TIADL Telephone Use, Grocery Shopping, or Medication Management tasks (all $p > .05$).

Self-awareness of functional abilities

One participant did not complete the self-report item for the Grocery Shopping domain and four did not complete the self-report item for the Nutrition domain. Thus, they were excluded from self-awareness analyses in those domains. Table 3 depicts the percentage of each MCI subtype who under-, accurately-, or over-estimated performance for each of the six functional domains. Across the full sample, the domains in which participants were most likely to lack awareness of their deficits were Nutrition Evaluation (31%), Financial Management (25%), and Driving (23%). A third of our sample retained appropriate insight into abilities on all instrumental activities performed. In comparison, the following percentages demonstrated impaired self-awareness of deficits on: one IADL (41.3%), two IADLs (10.7%), three IADLs (8%), four IADLs (4%), and five IADLs (2.7%). No participants demonstrated impaired self-awareness of deficits on all six functional domains.

Table 4 presents results from the binomial logistic regression models examining the relationship between MCI subtype and level of self-awareness across all six functional domains. After controlling for age, gender, and depressive symptomology, individuals with MCI-AMD were 7.85 times more likely to overestimate their abilities on the Driving domain ($p=.013$) and 5.56 times more likely to overestimate their abilities on the Telephone Use domain ($p=.044$) when compared to the MCI-ASD group. Similar, but non-significant, trends were found for the effect of MCI subtype on self-awareness in Financial Management ($p=.073$) and Nutrition Evaluation ($p=.062$) domains. Of note, neither gender nor depressive symptoms significantly predicted level of self-awareness for any of the functional domains. Increasing age was associated with an increased likelihood of exhibiting poor self-awareness only on the Nutrition Evaluation domain.

Discussion

The present study examined differences in self-awareness of IADL difficulties between older adults with amnesic single- and multi-domain MCI by analyzing the discrepancy between self-report and objective performance. Moreover, we examined whether there was domain-specificity in awareness of difficulties by examining level of insight across six separate functional domains.

Results suggest that a substantial minority of older adults with amnesic MCI is not able to accurately manage their finances, evaluate nutritional information on cans of food, look up telephone numbers, or perform an extended on-road local drive. In contrast, almost all of these individuals can conduct tasks necessary for grocery shopping and managing medications. In comparison to those with amnesic single-domain MCI, those with amnesic multi-domain MCI are at higher risk for making financial, driving, and nutrition evaluation errors in their everyday life when independently completing these activities. This finding suggests that these IADLs are particularly cognitively complex and require preserved cognition for domains other than just memory. Other studies have reported similar findings (Aretouli and Brandt, 2010; Gold, 2012; Jekel, et al., 2015; Seelye, et al., 2013).

Importantly, accurate self-appraisal of functional status ranged from 55% to 80% across the six IADL and a third of our sample had fully intact awareness of deficits across all IADLs.

These results suggest that the majority of those with MCI can adequately assess their current abilities. However, approximately a quarter over-estimate their nutrition evaluation, financial management, and driving capabilities. This rate of poor self-awareness is slightly lower than previous reports, which found that 23–51% of older adults with amnesic MCI lack self-awareness of functional abilities (Okonkwo, et al., 2009). Contrary to hypotheses, this study found that a considerable number of those with MCI actually under-estimate certain IADL abilities, especially their grocery shopping and financial management skills. There is evidence that individuals with MCI who are in an early disease stage and/or who have higher levels of depression are sometimes prone to reporting more difficulties than objectively exist (Okonkwo, et al., 2008; Roberts, Clare, & Woods, 2009). However, the current study did not find a relationship between depressive symptoms and level of self-awareness.

In partial agreement with our hypothesis, older adults with MCI-AMD have more impaired insight than those with MCI-ASD, but only for their driving and telephone use abilities. Otherwise, the two MCI subtypes retain equal levels of self-awareness for current IADL performance. Given that the majority of those with amnesic MCI were able to accurately appraise their abilities, and the relative lack of differences in self-awareness between single- and multi-domain subtypes, retaining accurate insight may be more conditional on the overall level of global impairment and/or performance on specific cognitive domains. We plan to investigate specific neuropsychological and neuroanatomical predictors of poor insight in those with MCI for each of these IADL domains in future studies. This work may help to elucidate the mechanisms underlying anosognosia and aid in understanding the substantial variability both within and between functional domains. In addition, future work should examine whether the minority of those who demonstrate impaired self-awareness of functional abilities are more likely to develop AD (or if they may develop AD at a more rapid rate) compared to those whose insight is intact.

The extent to which individuals with MCI perceive their functional difficulties influences their decision to ask for assistance during activities, to modify their approach to certain tasks, or to discontinue the activity (Cosentino et al., 2015). If patients continue to engage in IADLs even though they are no longer capable of independently managing the cognitive complexity of such tasks, they may place themselves in potentially dangerous situations. For example, these individuals may be at risk for financial exploitation, driving collisions, or eating medically contraindicated foods. Therefore, medical providers and clinicians should be particularly vigilant to IADL difficulties within an amnesic MCI population, and especially in those in which memory is not the only affected cognitive domain. If possible, clinicians should obtain objective measures in combination with detailed informant reports of functional abilities in order to make decisions around capacity to continue independently engaging in various daily activities. Identifying individuals who may be susceptible to anosognosia and knowing which functional domains are most likely to be over-estimated is also important for treatment planning. Those with good awareness of their functional difficulties will likely be more open to interventions incorporating assistive technology, compensatory strategies, and increased aid from other individuals. On the contrary, those with poor awareness of their deficits will likely be more aversive to these interventions and might benefit more from adaptations to the environment to improve patient safety and

quality of life (e.g., restricting access to items such as car keys or credit cards) (Gitlin, 2001; van Hoof, Kort, van Waarde, & Blom, 2010).

Although this study contributes to and builds upon the current literature on self-awareness in individuals with MCI, there are some limitations that warrant discussion. First, our sample was relatively homogeneous, consisting primarily of clinic-referred, well-educated, Caucasian adults from higher socioeconomic backgrounds. This may limit the generalizability to other populations, who may have lower cognitive reserve or less prior experience with these functional domains (e.g., with managing finances/investments or owning a vehicle). Another limitation is that our objective measures may not perfectly reflect everyday life. For example, participants were evaluated in the presence of experienced examiner under controlled conditions. In addition, several of the tasks incorporated a timed component, which could have unfairly penalized those who have experienced cognitive slowing but not a decline in accuracy (and therefore self-assessment may have been more accurate than it appears). Moreover, we observed a ceiling effect on a few tasks (e.g., TIADL Grocery Shopping and Medication Management tasks) and this restricted range limited our ability to assess impairment in these domains. In terms of our conceptualization of awareness, we chose to analyze this construct as a categorical rather than continuous variable. This categorical classification, which is commonly used in the literature (Ford, et al., 2014; Marshall et al., 2004; Nobili et al., 2010; Okonkwo, et al., 2009), allowed us to compare subjective reports with objective task performance while also allowing us to easily compare rates of impaired awareness across functional domains in which different psychometric instruments were used. However, we must acknowledge that this methodology greatly simplifies the individual variability in the level of self-awareness and may at times be confounded by the underlying level of functional impairment. Finally, the current study did not employ a control group, so we were unable to determine whether the levels of objective difficulty and self-awareness seen in our sample differed from cognitively intact older adults. For more information on this topic, the reader is directed to prior work from our lab, which evaluated differences in self-awareness on a variety of IADL domains between older adults with and without amnesic MCI and found that those with MCI are more prone to overestimation of financial abilities compared to healthy older adults (Okonkwo, et al., 2009).

Despite these limitations, there are several strengths to the current study. To the authors' knowledge, this is one of the largest studies to date examining objective functional impairment, including an on-road driving evaluation, in older adults with well-defined, consensus-diagnosed MCI. Moreover, it is the first study to examine differences in self-awareness of difficulties on a number of IADLs between individuals with amnesic single- and multi-domain MCI. Furthermore, self-awareness was assessed using a self-report versus objective performance methodology in which self-report measures were specifically designed to parallel each of the objective measures. This methodology is rarely employed in the self-awareness literature, especially when evaluating IADLs, and it is currently considered to be the gold standard of insight assessment. We expect that the results of this study will add considerably to the current body of literature assessing self-awareness of function in older adults with amnesic single- and multi-domain MCI.

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Table 1.

Demographic and clinical characteristics of study participants.

Variable	Sample range	MCI-ASD (n=30)	MCI-AMD (n=45)	t/ χ^2
Age (y)	54–88	72.0±6.8	75.2±7.3	–1.914
Gender (male)		13 (43.3)	20 (44.4)	.009
Race (white)		24 (80.0)	42 (93.3)	3.030
Education (y)	8–20	16.5±2.2	15.3±3.1	1.813
DRS-2 Total *	111–140	133.5±3.8	127.6±7.7	3.876 [†]
CES-D [‡]	0–32	8.7±6.0	10.3±7.9	–.917
Lives Alone		8 (26.7)	9 (20.0)	.456
Takes Memory Meds.		15 (50.0)	28 (62.2)	5.189

NOTE. Values are mean ± SD or n (%).

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; DRS-2, Dementia Rating Scale-2; MCI-ASD, Mild Cognitive Impairment – Amnesic Single Domain; MCI-AMD, Mild Cognitive Impairment – Amnesic Multi-Domain.

* DRS-2 Total Score range = 0–144, with higher scores indicating better global cognitive performance.

[†] CES-D Total Score range = 0–60, with higher scores indicating more depressive symptoms.[‡] $p < .01$

Table 2.

Differences in objective functional impairment between MCI subtypes.

Objective measure	Test range	Sample range	MCI-ASD (n=30)	MCI-AMD (n=45)	<i>p</i> [*]
FCI-SF Total	0–74	16–74	59.7±9.1	49.4±14.3	
% impaired			17%	49%	.007
Driving Performance Composite	1–5	2–5	4.4±0.8	3.7±1.0	
% impaired			10%	39%	.033
TIADL Telephone Use	1–3	1–3	1.2±0.5	1.5±0.8	
% impaired			13%	29%	.142
TIADL Nutrition Evaluation	3–12	3–9	3.1±0.4	4.2±1.5	
% impaired			17%	51%	.031
TIADL Grocery Shopping	1–3	1–2	1.1±0.3	1.2±0.4	
% impaired			7%	18%	.286
TIADL Medication Mgmt.	2–8	2–4	2.1±0.4	2.2±0.5	
% impaired			7%	16%	.390

NOTE. Values are mean ± SD. For FCI-SF and Driving Performance Composite, higher raw score is better. For TIADL items, lower raw score is better.

Abbreviations: FCI-SF, Financial Capacity Instrument – Short Form; MCI-ASD, Mild Cognitive Impairment – Amnesic Single Domain; MCI-AMD, Mild Cognitive Impairment – Amnesic Multi-Domain; TIADL, Timed Instrumental Activities of Daily Living.

* Significance of the effect of MCI subtype on predicting objective functional impairment (impaired vs. not impaired) after controlling for the effects of age and education.

Table 3.

Self-awareness classifications for each functional domain for individuals with MCI-ASD (n=30) and MCI-AMD (n=45).

Functional domain	Underestimated ability	Accurately estimated ability	Overestimated ability
Financial Management			
MCI-ASD	6 (20.0)	20 (66.7)	4 (13.3)
MCI-AMD	9 (20.0)	21 (46.7)	15 (33.3)
Driving			
MCI-ASD	2 (6.7)	26 (86.7)	2 (6.7)
MCI-AMD	5 (11.3)	24 (54.5)	15 (34.1)
Telephone Use			
MCI-ASD	0 (0.0)	28 (93.3)	2 (6.7)
MCI-AMD	3 (6.7)	32 (71.1)	10 (22.2)
Nutrition Evaluation			
MCI-ASD	2 (7.1)	22 (78.6)	4 (14.3)
MCI-AMD	2 (4.7)	22 (51.2)	19 (44.2)
Grocery Shopping			
MCI-ASD	7 (24.1)	20 (69.0)	2 (6.9)
MCI-AMD	14 (31.1)	25 (55.6)	6 (13.3)
Medication Management			
MCI-ASD	2 (6.9)	25 (86.2)	2 (6.9)
MCI-AMD	3 (6.8)	35 (79.5)	6 (13.6)

NOTE. Values are n (%). Due to missing objective or subjective data, the following participants from each MCI subtype were excluded from the following domains: Driving (MCI-AMD=1), Nutrition Evaluation (MCI-ASD=2, MCI-AMD=2), Grocery Shopping (MCI-ASD=1), and Medication Management (MCI-ASD=1, MCI-AMD=1).

Abbreviations: MCI-ASD, Mild Cognitive Impairment – Amnesic Single Domain; MCI-AMD, Mild Cognitive Impairment – Amnesic Multi-Domain.

Table 4.

Binomial logistic regression models predicting likelihood of displaying poor insight on six functional domains based on age, gender, depressive symptomology, and MCI subtype.

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>Odds Ratio</i>	95% CI for Odds Ratio	
							Lower	Upper
Driving								
Age	.03	.05	.37	1	.542	1.03	.94	1.12
Gender	.62	.62	.99	1	.319	1.85	.55	6.22
CES-D	-.07	.05	2.37	1	.123	.93	.85	1.02
MCI Subtype	2.06	.83	6.23	1	.013	7.85	1.56	39.59
Constant	-4.44	3.33	1.77	1	.183	.01		
Telephone Use								
Age	-.07	.05	1.93	1	.164	.94	.85	1.03
Gender	.18	.68	.07	1	.790	1.20	.32	4.53
CES-D	-.08	.05	2.11	1	.146	.92	.83	1.03
MCI Subtype	1.72	.85	4.06	1	.044	5.56	1.05	29.46
Constant	2.55	3.48	.54	1	.464	12.80		
Nutrition Evaluation								
Age	.15	.05	7.81	1	.005	1.16	1.05	1.29
Gender	-.53	.60	.80	1	.370	.59	.18	1.88
CES-D	.00	.04	.00	1	.951	1.00	.93	1.09
MCI Subtype	1.29	.69	3.49	1	.062	3.64	.94	14.13
Constant	-12.71	4.08	9.71	1	.002	.00		
Financial Mgmt.								
Age	.05	.04	1.29	1	.256	1.05	.97	1.15
Gender	.13	.57	.05	1	.817	1.14	.38	3.46
CES-D	-.07	.04	2.60	1	.107	.93	.85	1.02
MCI Subtype	1.16	.65	3.21	1	.073	3.20	.90	11.42
Constant	-5.01	3.26	2.36	1	.124	.01		
Medication Mgmt.								
Age	-.00	.06	.01	1	.942	1.00	.89	1.11
Gender	.27	.78	.12	1	.734	1.30	.28	6.03
CES-D	-.05	.06	.79	1	.374	.95	.84	1.07
MCI Subtype	.85	.88	.94	1	.334	2.35	.42	13.21
Constant	-2.06	4.07	.26	1	.612	.13		
Grocery Shopping								
Age	.03	.06	.23	1	.631	1.03	.91	1.16
Gender	1.93	1.11	3.05	1	.081	6.89	.79	60.12
CES-D	-.07	.06	1.34	1	.248	.93	.82	1.05
MCI Subtype	.68	.93	.53	1	.465	1.97	.32	12.21

	<i>B</i>	SE	Wald	<i>df</i>	<i>p</i>	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Constant	−5.55	4.63	1.44	1	.231	.00		

Note. For Gender variable, males serve as reference group; For MCI Subtype variable, MCI amnesic single-domain serves as reference group.

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; MCI, Mild Cognitive Impairment.