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Self- and Informant-Reported Memory Complaints: Frequency and Severity in Cognitively Intact Individuals and those with Mild Cognitive Impairment and Neurodegenerative Dementias

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Abstract

Background: Subjective memory complaints (SMCs) are incorporated into the diagnosis of mild cognitive impairment (MCI) and neurodegenerative dementias; however, the relative frequency of SMCs in cognitively intact older adults and those with different types of dementia is poorly understood. Similarly, the concordance between self- versus informant-reported SMCs has not been compared across different diagnostic groups.

Objective: This study aimed to evaluate the frequency of self-reported (Objective 1) and informant-reported (Objective 2) SMCs in cognitively intact adults or those diagnosed with MCI or a neurodegenerative dementia. Agreement between participant and informant complaints was also evaluated (Objective 3).

Methods: Baseline evaluation data were drawn from 488 participants (M_{age} = 70.49 years; M_{edu} = 15.62 years) diagnosed as cognitively intact, non-amnestic MCI, amnestic single domain MCI, amnestic multi-domain MCI, possible/probable Alzheimer's disease, dementia with Lewy bodies, or frontotemporal dementia. Participants and their informants completed the Memory Assessment Clinic Questionnaire.

Results: One-way ANCOVAs controlling for age, education, and depression revealed no group differences in severity of self-reported SMCs. In contrast, informant memory ratings followed the expected clinical pattern, with comparable and most impaired ratings given to participants with any dementia diagnosis, followed by those with any MCI diagnosis, followed by cognitively intact participants. There was inconsistent agreement between self- and informant-reported SMC ratings in any of the impaired groups.

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Conclusions: Given greater diagnostic specificity and internal consistency of informant report, clinicians should weigh this information more heavily than self-report in the diagnostic process.

Keywords

Dementia; memory; metacognition; meta-memory

INTRODUCTION

Subjective memory complaints (SMCs), or the self- or informant-reported ratings of how well one's memory is functioning, are a common source of referrals for neuropsychological testing. Estimates of SMCs vary from approximately 33% [1] to 71% [2] of healthy, independent, community-dwelling older adults, and up to 81% of individuals with mild Alzheimer's disease (AD) [3]. SMCs are most prevalent in middle-aged adults (45–54 years) and in late older-adulthood (75+ years), with relatively fewer complaints in early older-adulthood [4]. SMCs from either a patient or informant are now integrated into the diagnostic criteria for many cognitive disorders. For example, the most recent iteration of the diagnostic criteria for mild cognitive impairment (MCI) due to AD [5] or AD itself [6] include concern regarding a change in cognition must be expressed by the patient, a familiar informant, or a skilled clinician, in addition to other symptoms or markers.

Despite the important role of subjective report in neuropsychological assessment, no study to date has systematically compared the frequency of self- or informant-rated SMCs in healthy older adults and those with MCI, AD, or another neurodegenerative dementia. This study directly evaluates whether these phenotypically distinct groups rate themselves, or are rated differently by their informants, on a range of common memory problems.

The role of SMCs in the diagnosis of mild cognitive impairment and AD is contested

Several studies have reinforced the role of SMCs in the diagnosis of MCI and AD, particularly, by elucidating an increased risk for progression to AD among cognitively intact individuals with complaints [7–9]. Self-reported cognitive concerns appear to share a relationship with various biomarkers commonly associated with the AD neuropathological cascade, including cerebrospinal fluid amyloid-β1–42, total tau, and phosphorylated tau [10], hypometabolism in the precuneus bilaterally [11], smaller entorhinal cortex volume [12]—a site of early amyloid and tau deposition in AD [13], white matter integrity that falls between that of normal controls and those with amnestic MCI (aMCI)/AD on diffuse tensor imaging [12, 14], and elevated neuritic amyloid plaques in the neocortex and medial temporal lobe at autopsy [15].

Conversely, several lines of evidence argue against the use of SMCs as a marker of underlying MCI or AD. First, cross-sectional and longitudinal studies demonstrate that SMCs are more strongly related to neuroticism or mood symptoms than actual cognitive performance [16–18], particularly in those with mild SMCs [19]. Second, SMCs may be present in only 38.2% of individuals with MCI and 42.8% of individuals with dementia [7] and may be more common in younger adults with affective disorders [20], suggesting that the symptom of subjective cognitive problems is neither necessary nor sufficient for a

memory disorder diagnosis. Third, the sparse literature on the frequency of SMCs in other neurodegenerative dementias has prevented researchers from understanding whether SMCs are truly reported at higher frequency in MCI or AD, but not the early stages of other dementias. To our knowledge, there is currently only one published study on the prevalence of SMCs in different dementias. Results from the Leukoaraiosis and Disability Study (LADIS) indicate that SMCs predicted AD and AD with vascular overlay, but not vascular dementia, even after accounting for depressive symptoms, severity of white matter changes, medial temporal lobe atrophy, and global cognitive status at baseline [21].

In sum, the current literature is limited in that the prevalence of SMCs in cognitively intact older adults versus those with MCI or a neurodegenerative dementia remains unknown. Objective 1 therefore compares the presence and severity of self-reported everyday memory problems in older adults who are cognitively intact to those diagnosed with MCI or one of the major neurodegenerative dementias.

Differential validity of self- versus informant-reported complaints in different diagnostic groups is unknown

Although both self- and informant-rated cognitive concerns are considered during a clinical evaluation, few studies have systematically compared the accuracy of self-report as compared to informant-report in individuals within different diagnostic groups. In a study of MCI patients, Fyock and Hampstead [22] found that self-reported SMCs shared no relationship with objective memory performance but, interestingly, were related to amygdalar volume. In contrast, informant-rated memory abilities were significantly associated with delayed memory performance on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and both amygdalar and hippocampal volume. Informant-reported complaints, but not self-reported complaints, have also been associated with a faster rate of cognitive decline in individuals with a genetic predisposition to, and family history of, AD [23]. Neither informant-rated nor self-rated complaints alone predict longitudinal cognitive performance in those with MCI; however, a mutual complaint (agreed upon by both the patient and informant) was associated with faster decline in global cognition, verbal episodic memory, language, and processing speed [24]. Given the early evidence that informant ratings may better represent functional or cognitive changes in dementia compared to self-report, it is possible that informant-rated SMCs will differ among diagnostic groups in both frequency and severity. Therefore, Objective 2 evaluates the frequency and severity of informant-rated memory problems in individuals who are cognitively intact or diagnosed with MCI or a neurodegenerative dementia. Furthermore, Objective 3 directly compares self-and informant-reported memory complaints to determine internal consistency (informant-informant and self-self) and cross-rater agreement.

Current study summary

The current study aims to fill the aforementioned knowledge gaps on the role of SMCs in the diagnosis of cognitive impairment and neurodegenerative dementias. The frequency of self- (Objective 1) or informant- (Objective 2) reported memory complaints, controlling for mood symptoms, was evaluated in a large dataset that includes older adults who are cognitively intact or diagnosed with MCI or a neurodegenerative dementia. Moreover, Objective 3

evaluated the concurrence of self- and informant-reported memory ratings as a function of clinical phenotype.

METHODS

Participants

Data were drawn from participants undergoing baseline evaluations as part of the University of Michigan Memory and Aging Project (UM-MAP), a longitudinal observational study of normal and pathological aging that provides annual medical, neurological, and neuropsychological evaluations of older adults across the dementia spectrum. Participants were recruited from the communities surrounding Michigan Medicine, the Neurology Cognitive Disorders Clinic, the Neuropsychology Clinic, and the University Health Research website. They were included if they were community dwelling and able to identify an informant who knew them well (e.g., spouse, child, sibling, or close friend/family member). Impaired participants also had a Durable Power of Attorney for research. At their initial visit, each participant completed the National Alzheimer's Coordinating Center (NACC) Uniform Data Set (UDS) cognitive battery as well as neurological and other physical examination procedures and interview. Informants underwent interview and questionnaires to ensure that they were cognitively intact.

Diagnosis was assigned during a consensus conference that included neurologists, neuropsychologists, and other disciplines as appropriate (e.g., nurses, geriatricians, radiologists). Primary sources of information used for diagnosis included the standard Universal Data Set – Versions 2 and 3 procedures, including interview forms, self- and informant-report questionnaires, and test performance on the UDS-2 or UDS-3 cognitive battery. Of note, the measure used to directly assess SMCs in this study (the Memory Assessment Clinic Questionnaire) was available for viewing during consensus meetings as part of the broader study procedures, but was not used as a primary source of information for diagnostic decisions. Rather, complaints were noted on Form B4: Clinical Dementia Rating and B9: Clinician Judgment of Symptoms.

Diagnosis followed criteria from the National Alzheimer's Coordinating Center (NACC; https://www.alz.washington.edu/WEB/researcher_home.html; UDS Form D1: Clinician Diagnosis). During the conference, the team first determined whether the participant's cognition was normal (global Clinical Dementia Rating of zero, and age- and education-corrected neuropsychological test performance in the normal range, here defined as not greater than one standard deviation below the mean) versus impaired. For impaired participants, clinicians then determined whether he/she met criteria for all-cause dementia, defined as demonstrating cognitive or behavioral symptoms that interfere with daily functioning, represent a decline from previous levels of functioning, and are not explained by delirium or major psychiatric disorder, as well as objective impairment in at least one of the cognitive domains (learning and memory, executive functioning, visuospatial functioning, language, or personality/behavior). For individuals meeting these criteria, a separate distinction was made regarding most likely type of dementia syndrome: Amnestic multidomain dementia syndrome such as AD, primary visual presentation or posterior cortical atrophy syndrome [25], primary progressive aphasia syndrome [26], behavioral

variant frontotemporal dementia syndrome [27], Lewy Body dementia syndrome [28], or non-amnestic multidomain syndrome, not otherwise specified [29].

For participants who scored in the impaired range on testing, but did not meet criteria for dementia, clinicians diagnosed MCI based on a change in cognition (based on self, informant, or clinician report), objective impairment in one or more cognitive domains, and preserved functional abilities. Further distinction was provided regarding subtype (amnestic versus non-amnestic, single versus multiple domain). These criteria parallel the MCI criteria published by the 2011 NIA-AA workgroup on MCI and AD [5].

Finally, clinicians provided a determination of the presumed etiologic diagnoses for each impaired participant (whether MCI or demented), which could include both primary and other contributing diagnoses. Diagnoses of Alzheimer's disease (AD) [6], dementia with Lewy bodies (DLB) [28, 30], and frontotemporal lobar degeneration [27] given to participants included in this study were made in accordance with corresponding clinical diagnostic criteria.

Study methods were approved by the University of Michigan – Medical School institutional review board and all participants and informants provided informed consent or assent (as appropriate) at the time of enrollment.

The sample consisted of 488 participants (M_{age} = 73.23, SD_{age} = 7.57) whose primary diagnosis was cognitively intact (healthy older adults (HOA); n = 186), non-amnestic MCI (n = 24), amnestic single domain MCI (aMCI-SD; n = 46), amnestic multi-domain MCI (aMCI-MD; n = 71), AD (n = 129), DLB (n = 16), or frontotemporal dementia (FTD; n = 16). Sample characteristics are summarized in Table 1.

One-way ANOVA with Tukey HSD *post-hoc* comparisons revealed a significant age effect ($F_{(6,481)}$ = 7.195, p < 0.001), such that individuals in the aMCI-SD, aMCI-MD, and AD groups tended to be older than HOAs or those with naMCI, DLB, or FTD. Similarly, there was a significant difference in education level between groups ($F_{(6,481)}$ = 2.554, p = 0.019), such that individuals in the HOA group were more educated than the FTD group. One-way ANOVA also revealed group differences in Geriatric Depression Scale (GDS) score ($F_{(6,480)}$ = 11.34, p < 0.001), such that individuals with DLB, FTD, and, to a lesser extent, naMCI reported significantly higher depressive symptoms than other groups. Given these group differences, age, education, and GDS score were included as covariates in later group comparison analyses.

Measures

Subjective memory complaints were assessed using the MAC-Q: Self-Report Version [31]. The MAC-Q asks individuals to rate their current memory on five everyday tasks, as compared to high school or college. These specific items include remembering the name of a recent acquaintance (Name Recall), recalling regularly used telephone numbers or zip codes (Phone/Zip Recall), recalling where objects were left around the home or office (Object Location Recall), remembering details of a recently read newspaper or magazine article (Fact Recall), and remembering grocery list items (Grocery Recall). Respondents are also

asked to rate their memory in general (General Memory). Options are provided on an anchored, five-point, Likert-style scale that ranges from "much better now" (= 1) to "much poorer now" (= 5) and includes a neutral option ("About the same" = 3). A total score is calculated by summing across test items; possible scores therefore range from 6 to 30, with higher scores meaning greater perceived memory decline. The scale was designed to provide a brief measurement of the presence and severity of common memory complaints with psychometric properties generally equivalent to longer measures of subjective memory functioning [31]. It has demonstrated adequate concurrent validity (r = 0.41), internal consistency (Cronbach's α = 0.57) and test-retest reliability (r = 0.67) [31].

For the purpose of the UM-MAP project, the MAC-Q was also adapted into an Informant Version (MAC-F), in which the same items and response format as above were reworded so the informant rated the participant relative to high school, college, or the earliest date at which the informant was close with the patient. As with the MAC-Q, the MAC-F results in a score ranging from 6 to 30, with higher scores indicating greater perceived impairment.

Data analysis

To assess Objectives 1 and 2, frequency distributions and descriptive statistics were calculated for each MAC item within each diagnostic group, based on self-report (Table 2) and informant report (Table 3). The average severity rating for each MAC item was also compared across groups using analysis of covariance (ANCOVA) with *post-hoc* tests, including age, education and geriatric depression score as covariates. A Bonferroni correction for familywise error was applied, given the number of comparisons completed.

To assess Objective 3, bivariate Pearson's r correlations between and among self- and informant-reported MAC ratings were calculated to determine shared variance in these ratings. These comparisons were completed separately in subsamples (HOAs, all MCI groups, and each of the dementia groups separately) in order to better evaluate the role of anosagnosia in rater disagreement. A False Discovery Rate correction was applied to account for the number of comparisons conducted.

RESULTS

Objective 1: Self-reported frequency and severity of everyday memory complaints do not differ among cognitively intact individuals and those with MCI or a neurodegenerative dementia

Frequency distributions for each MAC-Q item within each diagnostic group (Table 2) revealed very little variability between diagnostic groups in self-reported severity of memory problems. Across all diagnostic groups, the largest proportion of individuals in each group rated their memory as "about the same", and approximately one-quarter to one-third rated their memory as "somewhat poorer" for each of the MAC-Q items. Few individuals rated their memory as "much better", "somewhat better", or "much poorer". Group comparisons using ANCOVA (Table 2) revealed that, after controlling for demographic factors and self-reported depression, there were no differences in self-rating between diagnostic groups for any specific MAC Item (all $p > 0.05$). The ANCOVA for MAC-Q global memory rating was

significant ($F = 2.26$, $p = 0.038$). Although *post-hoc* statistics indicated that healthy older adults rated themselves higher (more impaired) than those in the AD and DLB groups, these comparisons did not survive after adjusting for multiple comparisons. Comparison of the raw and covariate-adjusted means (Table 2) indicated that age, education, and depression scores had relatively little effect on average ratings across all diagnostic groups.

Objective 2: Informant-reported frequency and severity of everyday memory complaints differ across healthy and impaired diagnostic groups

As in Objective 1, frequency distributions were calculated for each MAC-F item within each diagnostic group (Table 3). These analyses were followed by one-way ANCOVAs (Table 3) and *post-hoc* Tukey HSD tests (Table 4) to determine whether significant group differences existed in mean memory rating for each MAC-F item.

There were significant group differences in memory for Name Recall ($F = 35.590$, $p < 0.001$). *Post hoc* comparisons revealed that informant-reported Name Recall ability followed a step-wise decline that mirrored clinical diagnosis. Specifically, informant ratings of Name Recall were significantly lower (less impaired) in cognitively intact older adults compared to those with aMCI-SD or aMCI-MD, but similar to those in naMCI, suggesting that the naMCI diagnosis may represent an intermediate between a cognitively healthy designation and aMCI. In turn, informant ratings of those with aMCI or naMCI were similar to each other and to those provided by informants in the DLB group, but lower than those in the AD or FTD. Ratings for the dementia groups were statistically similar.

Informant ratings for Phone/Zip Recall were also significantly different between diagnostic groups ($F = 46.058$, $p < 0.001$). *Post-hoc* comparisons followed the stepwise clinical pattern with cognitively intact adult ratings lower (less impaired) than those in any MCI group, and ratings in any MCI group lower (less impaired) than in any dementia group.

Informant ratings for Object Location Recall also differed by diagnostic group ($F = 31.172$, $p < 0.001$). Informant ratings of the cognitively intact group were similar to ratings for the naMCI group, but lower than ratings for all other groups. naMCI ratings were similar to other MCI groups (again suggesting that naMCI ratings are intermediate between cognitively intact and aMCI) but lower than any dementia group. Interestingly, informant ratings in the aMCI-SD group were similar to those in the naMCI, aMCI-MD, DLB, and FTD groups, but significantly lower than the AD group. Ratings in the aMCI-MD group were similar to those in the naMCI, aMCI-SD, and FTD groups, but significantly lower than AD or DLB informant ratings. Informant ratings were similar in all dementia groups.

In terms of Fact Recall, informant ratings were significantly different between diagnostic groups ($F = 38.266$, $p < 0.001$). Informant ratings for cognitively intact older adults were significantly lower than ratings for individuals with aMCI-MD or any dementia group. Informant ratings for naMCI participants were equivalent to the aMCI groups, and lower than participants with dementia. Informant ratings in either aMCI group were similar, and lower than AD or FTD ratings. No group differences in informant ratings existed among individuals with AD, DLB, or FTD.

Informant ratings for Grocery Recall similarly demonstrated significant group differences ($F = 31.998$, $p < 0.001$), such that informant ratings for cognitively intact older adults were lower than all groups with the exception of naMCI participants. Ratings of individuals in the naMCI group were similar to both aMCI groups and the FTD group, but significantly lower than ratings for individuals with AD or DLB. Informant ratings of individuals in the two aMCI groups were similar to each other and to ratings for the DLB and FTD groups, but significantly lower than ratings for individuals with AD. Informant ratings were not statistically different in all three dementia groups.

Finally, informants also provided significantly different global memory ratings for their participants ($F = 20.746$, $p < 0.001$). No differences existed between cognitively intact and naMCI or aMCI-SD informant ratings; however, informant ratings of cognitively intact older adults were significantly lower than individuals with aMCI-MD, AD, DLB, or FTD. Informant ratings for all three MCI groups were similar to each other and ratings for DLB and FTD groups, but significantly lower (less impaired) than ratings for individuals in the AD group. There were no informant rating differences between neurodegenerative dementia groups.

Objective 3: There is inconsistent agreement between self- and informant-reported memory ratings, and greater within-rater agreement than across-rater agreement

The concordance between self- and informant-reported memory complaints was evaluated for HOAs (Table 5), the combined MCI groups (Table 6), and each of dementia groups (AD: Table 7; DLB: Table 8; FTD: Table 9). Correlations among items on the MAC-Q represent consistency in self-rated memory complaints. Conversely, correlations among items on the MAC-F represent consistency in informant rated memory complaints. Correlations between items on the MAC-Q and MAC-F indicate agreement between participants and their respective informants.

For HOAs, all correlations across MAC items within rater (self-self or informant-informant) were significant. The amount of shared variance between self-rated MAC-Q items ranged from 23.9% (Name Recall versus Phone Number/Zip Recall) to 50.4% (Name Recall versus General Memory Rating). The amount of shared variance between informant-rated MAC-F items was relatively comparable, ranging from 28.1% (Object Location Recall versus Fact Recall) to 50.1% (Grocery Recall versus General Memory Rating). This finding suggests relatively similar inter-item consistency within raters for healthy participants and their informants. Similarly, all inter-rater (self-informant) item correlations were significant, though slightly lower in strength than correlations within rater; shared variance ranged from 9.2% (Self-rated Fact Recall versus Informant-rated Object Location Recall) to 35.0% (Self-Rated General Memory Rating versus Informant-rated Name Recall). The shared variance between self- and informant-rated General Memory functioning was 39.3%, the highest of the inter-rater correlations.

MCI participants' self-ratings on MAC-Q items appeared relatively less consistent than those of HOAs. Correlations among MAC-Q self-reported items resulted in shared variance ranging from 7.4% (Name Recall versus Grocery Recall) to 35.8% (Phone Recall or Object Recall versus General Memory Rating). Correlations among informant-reported MAC-F

items demonstrated relatively higher consistency; shared variance ranged from 25.0% (Object Location Recall versus General Memory Rating) to 45.3% (Phone/Zip Recall versus Grocery Recall). In contrast to findings from the HOA sample, inter-rater (self-informant) agreement was poorer for MCI participants and their informants. With the exception of the General Memory ratings, which shared significant bivariate correlations with most individual items, no self-reported item was consistently related to informant ratings. Amount of shared variance in significant inter-item correlations was much smaller, ranging from 4.5% (Self-Reported Name Recall versus Informant Reported Name Recall) to 19.1% (Self-Reported Grocery Recall versus Informant-Reported General Memory Rating).

In the AD sample, all correlations between self-reported MAC-Q items were significant, ranging in shared variance from 18.9% (Phone/Zip Recall versus Object Location Recall) to 46.0% (Fact Recall versus Grocery Recall). Similarly, all correlations between informant-rated MAC-F items were signifi-cant, ranging in shared variance from 12.7% (Object Recall versus Grocery Recall) to 48.6% (Name Recall versus General Memory Rating). In contrast, none of the cross-rater correlations were significant, suggesting that participants with AD and their informants may be drawing on different information to rate memory functioning.

In contrast, most within-rater inter-item correlations were not significant for both participants with DLB and their respective informants. Within self-ratings, shared variance for significant correlations ranged from 54.5% (Object Location Recall versus Fact Recall) to 84.5% (Object Location Recall versus General Memory Rating). Within informant ratings, shared variance for significant correlations ranged from 53.7% (Phone/Zip Recall versus Object Location Recall) to 99.8% (Object Location Recall versus General Memory Rating). There were no significant correlations between self- and informant-rated MAC items.

The FTD sample demonstrated the poorest within-and across-rater agreement in ratings. Despite a 99.6% shared variance for a single comparison (self-reported general memory functioning versus informant-reported name recall), none of the other within- or across-rater correlations were significant, increasing the likelihood that this single correlation was not representative of the agreement between raters.

DISCUSSION

Our study findings revealed limited variability across diagnostic groups in the frequency or severity of self-reported SMCs, but patterns of group differences on informant-reported SMCs that matched clinical presentations (healthy adults rated as less impaired than MCI groups, who were less impaired than dementia groups), highlighting the relative utility of this latter source of data. Agreement between self- and informant-reported SMCs was poor for all but the cognitively intact group, indicating that insight may not be preserved even in the prodromal stage of AD, MCI.

A lack of group differences in self-report suggests that this source of information may not be useful in distinguishing between healthy and impaired participants, or in selecting a particular diagnosis. Results from our study paralleled those of Thompson and colleagues,

who found that self-reported severity of memory problems was statistically equivalent across the normal, MCI (all types) and dementia (all types) groups, and that self- and informant-reported ratings were not significantly associated [32]. Informant severity ratings were higher in the Thompson et al. dementia group [32]; however, informant ratings did not distinguish MCI from normal participants. In the paper's discussion, the authors posited that the mixed dementia and MCI subtypes within groups may have contributed to the lack of group differences in self-reported memory problems; however, given our study findings, this hypothesis was not supported.

This project's findings also inform the larger literature on insight in even cognitively healthy individuals. Anosognosia is a recognized part of many dementias [3], but current MCI and AD criteria rely on the premise that insight is sufficiently preserved in the early stages of AD to allow for accurate and meaningful self-ratings. The above assumption should have resulted in a gradient of worsening self-reported memory from normal to MCI to AD participants [33]; however, our findings revealed that older adults, regardless of memory disorder diagnosis, perceive their memory to be "about the same" as it was in their teens and early twenties. These findings parallel a study by Edmonds et al. [34], who examined self-reported memory complaints of pre-defined MCI subtypes drawn from a larger cohort of patients diagnosed with MCI based on Alzheimer's Disease Neuroimaging Initiative (ADNI) criteria. Although no relationship between SMCs and objective memory functioning was found, cluster-derived 'normal' MCI participants (those whose cerebrospinal fluid biomarkers and neuropsychological performance was statistically equivalent to healthy controls) tended to overestimate the severity of memory impairment, while amnestic and mixed MCI participants tended to underestimate impairment severity. As in the current study, these conclusions demonstrate a risk for misdiagnosis when relying on self-report of even cognitively healthy adults.

In contrast to self-report, informant-rated memory complaints clearly exhibited the expected group differences in the presence and severity of everyday memory failures in this study. Individuals with AD (or, less frequently, FTD), were reliably rated as more impaired than other groups. Participants diagnosed with any subtype of MCI were generally rated similarly in terms of memory impairment, such that their memory problems were less severe than those with a neurodegenerative dementia, but more severe than cognitively intact controls. These findings complement the literature pointing to the relative predictive validity of informant ratings as compared to self-ratings of cognitive functioning [35–37]. Furthermore, as found in previous studies [31], the item-by-item concordance between self-and informant-reported SMCs declined with diagnosis severity, with inter-rater agreement high in only the cognitively intact group. Collectively, this literature supports not only the importance of gathering collateral information during clinical evaluations for MCI and AD specifically, but greater weighing of this information in comparison to self-report.

This study also informs the larger literature investigating the influence of mood on accuracy of metacognitive judgments. Many studies have highlighted the negative influence of state or trait negative affect on accuracy of metacognitive judgments and the importance of contextualizing SMCs within these personal factors [38]; however, even after accounting for depressive symptoms in this sample, accuracy continued to be poor. It is possible that using

a depression screen such as the GDS-15 could have limited detection of subtler depressive symptoms, anxiety symptoms, or trait level neuroticism that impact self-perception and self-report [38]; therefore, future studies should use a broader mood and personality assessment. Nonetheless, this study's findings demonstrate that, even after accounting for mild depressive symptoms, self-reported memory functioning may not be accurate. Interestingly, it appeared that depression in the participant had a larger impact on informant ratings of memory than in self-reported ratings, suggesting that informants as well as patients themselves may conflate mood-related and "organic" cognitive symptoms. A shortcoming of the current study is that informant mood or caregiver stress, which may similarly impact ratings of a patient's cognitive functioning [39], was not assessed.

There were several limitations of the current study. First, without longitudinal data, it is impossible to ascertain whether individuals in the cognitively intact groups remained cognitively intact or converted clinically, which may have accounted for the lack of group differences found. A longitudinal approach would also allow researchers to examine the association between onset and trajectory of insight and objec tive cognitive decline. We plan to directly address such possibilities in the future given the longitudinal nature of UM-MAP. Second, some of our group sizes were relatively small, which led to unequal group sizes that may have reduced our power; however, ANCOVA is robust to unequal sample sizes, particularly when the assumption of homogeneity of variance is preserved, as it was in this study. Third, a selection bias could have impacted the diagnostic groups in particular, since many of the patients were recruited from clinics whereas controls came from the community. Fourth, while the multidisciplinary consensus diagnosis is a relative strength of this study, future studies should endeavor to use biomarkers (not widely available in this sample) to enhance homogeneity of subgroups. Fifth, studies should also expand the age range of participants to include those who are middle-aged, as several studies support that metacognition may peak at this time[40].

Finally, the optimal method for evaluating SMCs can be debated. We relied on the MAC-Q for its parsimonious and empirically supported ability to evaluate SMCs. Although it could be argued that the six items may be insufficient to capture all possible manifestations of memory impairment, earlier studies used the full MAC (which includes 21 items related to perceived functioning and 24 that evaluate the frequency of memory lapses), and found a similar pattern of results (i.e., informants were more accurate than patients) [22]. Thus, the number of items does not appear to be responsible for the current findings. The longer comparison point (high school versus current functioning) is both a strength and a weakness of this measure. It is drastic enough to pull for changes from peak functioning, rather than milder changes that may have occurred over the past six months that may be more difficult to notice or quantify. This approach may be especially appropriate for the initial visit since "true" baseline data are not typically available. However, the comparator duration could introduce interference from other neurological, cognitive, or psychological events that may have influenced memory functioning but that are unrelated to any recent declines. This comparator duration may also have been challenging for informant rating, since few informants likely knew their associated participant in high school. We attempted to mitigate this concern by instructing them to reference the earliest possible timeframe as a comparison point—a difference that could explain the more accurate informant report. Additionally, the

consensus panel was not nec essarily blind to the MAC scores from participants or informants when making diagnostic decisions; however, this measure was, at best, a tertiary source of information. Furthermore, being un-blinded to the outcome measure would presumably increase, rather than decrease, group differences, making the finding of limited variability in self-reported SMCs across diagnostic groups more powerful. Nonetheless, integration of more novel methods of evaluation SMCs, including Feeling of Knowing or Judgment of Learning tasks drawn from the cognitive literature [40], may better capture nuanced aspects of metamemory, including acute, task-specific memory ratings versus broad, global memory ratings.

Despite these limitations, the current study represents a novel approach with important clinical implications. Most past studies have investigated concordance between subjective and objective cognitive functioning, or between self- and informant-reported complaints, in broadly-defined ‘impaired’ or ‘intact’ samples or a specific clinical subgroup. In contrast, this project is novel in its evaluation of frequency and severity of complaints in consensus-diagnosed samples, using updated criteria. Given that self-reported memory complaints may lack specificity for memory problems characteristic of any specific etiology or diagnosis, this study calls into question the equal weighting of self-and informant complaints in current diagnostic criteria for AD and other dementias. Instead, it highlights the importance of weighing collateral information more heavily in clinical decision making across the continuum of AD stages, from cognitively intact to AD, and when differentiating between neurodegenerative dementia subtypes.

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Table 1

Descriptive statistics for total sample (n = 488)

	M	***SD***	**Min.**	**Max**
Age	70.49	8.86	51	93
Education	15.62	2.80	8	20
	n	**%**		
Sex				
Male	209	42.8		
Female	279	57.2		
Race				
White	370	75.8		
Black	114	23.4		
Asian	3	0.6		
Other	1	0.2		
Diagnosis				
Healthy Older	186	38.1		
Adult				
Non-Amnestic MCI - single domain/multi domain	24	4.9		
Amnestic MCI - single domain or memory only	46	9.4		
Amnestic MCI - multiple domain	71	14.5		
Possible or Probable AD	129	26.4		
DLB	16	3.3		
FTD	16	3.3		

Table 2

Frequency (% diagnostic group) and average severity of self-reported everyday memory complaints stratified by diagnostic group

	Frequency of Rating (% Diagnostic Group)					*M*	*SD*	Adj. *M*	*F*	df	*p*
	Much Better (1)	**Somewhat Better (2)**	**About the Same (3)**	**Somewhat Poorer (4)**	**Much Poorer (5)**						
Item 1: Remembering the name of a person just introduced to you.											
HOA	2.1	7.6	53.5	34.1	2.7	3.28	0.733	3.32	1.844	6	0.089
naMCI	8.3	0.0	62.5	25.0	4.2	3.17	0.868	3.10			
aMCI-SD	6.7	0.0	66.7	24.4	2.2	3.16	0.767	3.15			
aMCI-MD	0.0	2.9	51.4	40.0	5.7	3.49	0.654	3.47			
AD	5.4	6.2	52.7	31.8	3.9	3.22	0.841	3.2			
DLB	6.2	6.2	56.3	31.3	0.0	3.13	0.806	2.99			
FTD	6.7	0.0	60.0	33.3	0.0	3.2	0.775	3.14			
Item 2: Recalling telephone numbers or zip codes that you use on a daily or weekly basis.											
HOA	6.0	6.5	65.9	17.8	3.8	3.07	0.794	3.11	1.679	6	0.124
naMCI	4.2	0.0	87.4	4.2	4.2	3.04	0.624	3			
aMCI-SD	4.4	4.4	77.9	13.3	0.0	3.00	0.603	2.98			
aMCI-MD	2.8	5.6	77.5	9.9	4.2	3.07	0.662	3.05			
AD	7.0	7.0	68.9	15.5	1.6	2.98	0.755	2.96			
DLB	6.2	18.8	75.0	0.0	0.0	2.69	0.602	2.58			
FTD	6.7	26.7	53.3	13.3	0.0	2.73	0.799	2.76			
Item 3: Recalling where you put objects (such as keys) in your home or office.											
HOA	3.8	7.0	58.4	27.6	3.2	3.19	0.770	3.22	1.016	6	0.414
naMCI	4.1	0.0	66.7	29.2	0.0	3.21	0.658	3.18			
aMCI-SD	2.2	8.9	68.9	17.8	2.2	3.09	0.668	3.1			
aMCI-MD	0.0	10.0	52.8	32.9	4.3	3.31	0.713	3.31			
AD	7.8	7.8	58.8	20.9	4.7	3.07	0.886	3.06			
DLB	6.3	6.3	62.4	18.7	6.3	3.13	0.885	3.08			
FTD	0.0	13.3	46.7	40.0	0.0	3.27	0.704	3.22			
Item 4: Remembering specific facts from a newspaper or magazine article you just finished reading											
HOA	6.4	7.6	61.1	22.7	2.2	3.06	0.805	3.12	0.765	6	0.598
naMCI	4.2	0.0	83.3	12.5	0.0	3.04	0.550	2.98			

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	Frequency of Rating (% Diagnostic Group)					*M*	*SD*	Adj. *M*	*F*	df	*p*
	Much Better (1)	**Somewhat Better (2)**	**About the Same (3)**	**Somewhat Poorer (4)**	**Much Poorer (5)**						
aMCI-SD	6.7	6.7	62.2	24.4	0.0	3.04	0.767	3.03			
aMCI-MD	2.8	11.3	49.3	32.4	4.2	3.24	0.819	3.22			
AD	7.0	7.8	58.1	24.8	2.3	3.08	0.835	3.04			
DLB	6.2	12.5	56.3	25.0	0.0	3.00	0.816	2.92			
FTD	6.7	6.7	40.0	46.6	0.0	3.27	0.884	3.27			
Item 5: Remembering the item(s) you intend to buy when you arrive at the grocery store or pharmacy.											
HOA	3.2	7.6	56.8	28.6	3.8	3.22	0.773	3.25	1.851	6	0.088
naMCI	4.2	0.0	70.8	25.0	0.0	3.17	0.637	3.13			
aMCI-SD	4.4	15.6	66.7	13.3	0.0	2.89	0.682	2.89			
aMCI-MD	2.8	11.3	54.9	28.2	2.8	3.17	0.774	3.16			
AD	7.0	6.3	60.9	21.9	3.9	3.09	0.846	3.07			
DLB	6.2	12.5	62.5	18.8	0.0	2.94	0.772	2.90			
FTD	0.0	0.0	66.7	33.3	0.0	3.33	0.488	3.30			
Item 6: In general, how would you describe your memory as compared to how it was in high school?											
HOA	3.2	8.8	29.6	52.0	6.4	3.5	0.867	3.58	2.26	6	0.038 *
naMCI	5.9	0.0	52.9	35.3	5.9	3.35	0.862	3.22			
aMCI-SD	8.0	8.0	28.0	56.0	0.0	3.32	0.945	3.29			
aMCI-MD	0.0	12.5	25.0	56.3	6.2	3.56	0.796	3.52			
AD	3.1	14.1	40.6	40.6	1.6	3.23	0.831	3.19			
DLB	11.1	22.2	22.2	33.4	11.1	3.11	1.269	2.86			
FTD	0.0	0.0	40.0	6.00	0.0	3.6	0.548	3.55			

HOA, healthy older adults (cognitively intact); naMCI, non-amnestic mild cognitive impairment (MCI); aMCI-SD, amnestic MCI, single domain; aMCI-MD, amnestic MCI, multiple domain; AD, Alzheimer's disease; DLB, dementia with Lewy bodies; FTD, frontotemporal dementia. Adjusted mean refers to estimated means adjusted for covariates of age, education, and depression score.

* significant at $p < 0.05$.

Table 3

Frequency (% diagnostic group) and average severity of informant-reported everyday memory complaints stratified by diagnostic group

	Frequency of Rating (% Diagnostic Group)					*M*	*SD*	Adj. *M*	*F*	df	*p*
	Much Better (1)	**Somewhat Better (2)**	**About the Same (3)**	**Somewhat Poorer (4)**	**Much Poorer (5)**						
Item 1: Remembering the name of a person just introduced to you.											
HOA	2.8	3.4	64.2	27.4	2.2	3.23	0.677	3.27	35.590	6	<0.001*
naMCI	4.2	0.0	50.0	37.5	8.3	3.46	0.833	3.42			
aMCI-SD	0.0	4.5	34.1	40.9	20.5	3.77	0.831	3.74			
aMCI-MD	0.0	1.5	35.3	45.6	17.6	3.79	0.744	3.76			
AD	0.0	0.0	7.8	44.5	47.7	4.4	0.632	4.37			
DLB	0.0	0.0	12.5	37.5	50.0	4.63	0.500	4.34			
FTD	0.0	0.0	0.0	56.2	43.8	4.44	0.512	4.52			
Item 2: Recalling telephone numbers or zip codes that you use on a daily or weekly basis.											
HOA	2.8	3.4	67.0	25.1	1.7	3.20	0.654	3.23	46.058	6	<0.001*
naMCI	4.1	0.0	50.0	41.7	4.2	3.42	0.776	3.38			
aMCI-SD	0.0	2.3	47.7	34.1	15.9	3.64	0.780	3.61			
aMCI-MD	0.0	1.4	45.6	41.2	11.8	3.63	0.710	3.6			
AD	0.0	0.0	6.3	40.2	53.5	4.47	0.615	4.45			
DLB	0.0	0.0	0.0	37.5	62.5	4.63	0.500	4.53			
FTD	0.0	0.0	20.0	33.3	46.7	4.27	0.799	4.34			
Item 3: Recalling where you put objects (such as keys) in your home or office.											
HOA	1.7	3.9	55.3	33.5	5.6	3.37	0.726	3.41	31.172	6	<0.001*
naMCI	4.1	0.0	50.0	29.2	16.7	3.54	0.932	3.49			
aMCI-SD	0.0	4.6	22.7	47.7	25.0	3.93	0.818	3.91			
aMCI-MD	0.0	0.0	34.3	44.8	20.9	3.87	0.736	3.84			
AD	0.0	0.0	5.5	36.7	57.8	4.52	0.601	4.51			
DLB	0.0	0.0	0.0	37.5	62.5	4.63	0.500	4.5			
FTD	0.0	0.0	25.0	25.0	50.0	4.25	0.856	4.28			
Item 4: Remembering specific facts from a newspaper or magazine article you just finished reading											
HOA	2.2	5.6	71.5	19.0	1.7	3.12	0.624	3.16	38.266	6	<0.001*
naMCI	0.0	4.3	65.3	26.1	4.3	3.30	0.635	3.26			

	Frequency of Rating (% Diagnostic Group)					*M*	*SD*	Adj. *M*	*F*	df	*p*
	Much Better (1)	**Somewhat Better (2)**	**About the Same (3)**	**Somewhat Poorer (4)**	**Much Poorer (5)**						
aMCI-SD	0.0	6.7	45.5	36.4	11.4	3.52	0.792	2.5			
aMCI-MD	0.0	0.0	45.6	39.7	14.7	3.69	0.718	3.67			
AD	0.0	0.8	13.5	34.9	50.8	4.36	0.743	4.33			
DLB	0.0	0.0	12.5	62.5	25.0	4.13	0.619	4.06			
FTD	0.0	0.0	12.5	50.0	37.5	4.25	0.683	4.29			
Item 5: Remembering the item(s) you intend to buy when you arrive at the grocery store or pharmacy.											
HOA	1.7	1.7	66.9	27.5	2.2	3.27	0.616	3.30	31.998	6	<0.001 *
naMCI	4.2	0.0	45.8	41.7	8.3	3.5	0.834	3.47			
aMCI-SD	0.0	2.3	22.7	54.5	20.5	3.93	0.728	3.91			
aMCI-MD	0.0	1.5	39.7	44.1	14.7	3.72	0.73	3.70			
AD	0.0	0.0	11.1	38.9	50.0	4.39	0.681	4.38			
DLB	0.0	0.0	6.7	60.0	33.3	4.27	0.594	4.25			
FTD	0.0	0.0	31.3	37.4	31.3	4	0.816	4.06			
Item 6: In general, how would you describe your memory as compared to how it was in high school?											
HOA	3.5	5.3	49.6	38.9	2.7	3.32	0.771	3.38	20.746	6	<0.001 *
naMCI	0.0	5.6	22.1	66.7	5.6	3.72	0.669	3.63			
aMCI-SD	0.0	14.3	14.3	57.1	14.3	3.71	0.902	3.69			
aMCI-MD	0.0	0.0	27.3	50.0	22.7	3.95	0.714	3.91			
AD	0.0	0.0	0.0	27.5	72.5	4.73	0.451	4.69			
DLB	0.0	0.0	0.0	50.0	50.0	4.5	0.535	4.39			
FTD	0.0	0.0	0.0	50.0	50.0	4.5	0.577	4.56			

HOA, healthy older adults (cognitively intact); naMCI, non-amnestic mild cognitive impairment (MCI); aMCI-SD, amnestic MCI, single domain; aMCI-MD, amnestic MCI, multiple domain; AD, Alzheimer's disease; DLB, dementia with Lewy bodies; FTD, frontotemporal dementia. Adjusted mean refers to estimated means adjusted for covariates of age, education, and depression score.

* significant at $p < 0.05$.

Table 4

Results of ANCOVA with Tukey's HSD *post-hoc* comparisons: average informant ratings by diagnostic group

	Comparison Group	Mean Diff	*p*
Item 1: Remembering the name of a person just introduced to him/her			
HOA	naMCI	−0.151	0.999
	aMCI-SD	−0.470	0.002*
	aMCI-MD	−0.493	<0.001*
	AD	−1.105	<0.001*
	DLB	−1.073	<0.001*
	FTD	−1.255	<0.001*
naMCI	aMCI-SD	−0.319	0.999
	aMCI-MD	−0.343	0.785
	AD	−0.954	<0.001*
	DLB	−0.922	0.001*
	FTD	−1.104	<0.001*
MCI-SD	MCI-MD	−0.024	0.999
	AD	−0.635	<0.001*
	DLB	−0.603	0.096
	FTD	−0.785	0.003
MCI-MD	AD	−0.611	<0.001*
	DLB	−0.579	0.089
	FTD	−0.762	0.002*
AD	DLB	0.032	0.999
	FTD	−1.50	0.999
DLB	FTD	−0.182	0.999
Item 2: Recalling telephone numbers or zip codes that he/she uses on a daily or weekend basis.			
HOA	naMCI	−0.147	0.999
	aMCI-SD	−0.376	0.021*
	aMCI-MD	−0.371	0.003*
	AD	−1.222	<0.001*
	DLB	−1.295	<0.001*
	FTD	−1.108	<0.001*
naMCI	aMCI-SD	−0.229	0.999
	aMCI-MD	−0.224	0.999
	AD	−1.075	<0.001*
	DLB	−1.147	0.001*
	FTD	−0.961	<0.001*
MCI-SD	MCI-MD	0.005	0.999
	AD	−0.846	<0.001*

	Comparison Group	Mean Diff	*p*
	DLB	−0.919	<0.001 *
	FTD	−0.732	0.007 *
MCI-MD	AD	−0.851	<0.001 *
	DLB	−0.923	<0.001 *
	FTD	−0.737	0.003 *
AD	DLB	−0.073	0.999
	FTD	0.114	0.999
DLB	FTD	0.187	0.999
Item 3: Recalling where he/she put objects (such as keys) in his/her home or office.			
HOA	naMCI	−0.080	0.999
	aMCI-SD	−0.495	0.001 *
	aMCI-MD	−0.427	0.001 *
	AD	−1.094	<0.001 *
	DLB	−1.0–77	<0.001 *
	FTD	−0.864	<0.001 *
naMCI	aMCI-SD	−0.415	0.474
	aMCI-MD	−0.347	0.876
	AD	−1.103	<0.001 *
	DLB	−0.977	0.001 *
	FTD	−0.784	0.017 *
MCI-SD	MCI-MD	0.068	0.999
	AD	−0.599	<0.001 *
	DLB	−0.582	0.167
	FTD	−0.369	0.999
MCI-MD	AD	−0.667	<0.001 *
	DLB	−0.650	0.041 *
	FTD	−0.437	0.668
AD	DLB	0.017	0.999
	FTD	0.230	0.999
DLB	FTD	0.213	0.999
Item 4: Remembering specific facts from a newspaper or magazine article he/she just finished reading.			
	aMCI-SD	−0.333	0.098
	aMCI-MD	−0.503	<0.001 *
	AD	−1.169	<0.001 *
	DLB	−0.894	<0.001 *
	FTD	−1.127	<0.001 *
naMCI	aMCI-SD	−0.241	0.999
	aMCI-MD	−0.410	0.288

	Comparison Group	Mean Diff	*p*
	AD	−1.076	<0.001 *
	DLB	−0.802	0.011
	FTD	−1.034	0.001 *
MCI-SD	MCI-MD	−0.170	0.999
	AD	−0.835	<0.001 *
	DLB	−0.561	0.168
	FTD	−0.794	0.003 *
MCI-MD	AD	−0.665	<0.001 *
	DLB	−0.391	0.999
	FTD	−0.624	0.032 *
AD	DLB	0.274	0.999
	FTD	0.041	0.999
DLB	FTD	−0.233	0.999
Item 5: Remembering the item(s) he/she intends to buy when he/she arrives at the grocery store or pharmacy.			
HOA	naMCI	−0.177	0.999
	aMCI-SD	−0.612	<0.001 *
	aMCI-MD	−0.400	0.001 *
	AD	−1.080	<0.001 *
	DLB	−0.951	<0.001 *
	FTD	−0.764	0.001 *
naMCI	aMCI-SD	−0.435	0.251
	aMCI-MD	−0.224	0.999
	AD	−0.904	<0.001 *
	DLB	−0.774	0.017 *
	FTD	−0.588	0.171
MCI-SD	MCI-MD	0.212	0.999
	AD	−0.468	0.002 *
	DLB	−0.339	0.999
	FTD	−0.152	0.999
Item 6: In general, how would you describe your partner's memory as compared to how it was in high school			
MCI-MD	AD	−0.680	<0.001 *
	DLB	−0.551	0.147
	FTD	−0.364	0.999
AD	DLB	0.129	0.999
	FTD	0.316	0.999
DLB	FTD	0.187	0.999
HOA	naMCI	−0.257	0.999
	aMCI-SD	−0.312	0.999
	aMCI-MD	−0.537	0.001 *

	Comparison Group	Mean Diff	*p*
	AD	−1.309	<0.001 *
	DLB	−1.013	0.004 *
	FTD	−1.181	0.027 *
naMCI	aMCI-SD	−0.056	0.999
	aMCI-MD	−0.281	0.999
	AD	−1.052	<0.001 *
	DLB	−0.756	0.248
	FTD	−0.924	0.419
MCI-SD	MCI-MD	−0.225	0.999
	AD	−0.996	<0.001 *
	DLB	−0.700	0.394
	FTD	−0.869	0.580
MCI-MD	AD	−0.771	<0.001 *
	DLB	−0.475	0.999
	FTD	−0.644	0.999
AD	DLB	0.296	0.999
	FTD	0.128	0.999
DLB	FTD	−0.168	0.999

HOA, healthy older adults (cognitively intact); naMCI, nonamnestic mild cognitive impairment (MCI); aMCI-SD, amnestic MCI, single domain; aMCI-MD, amnestic MCI, multiple domain; AD, Alzheimer's disease; DLB, dementia with Lewy bodies; FTD, frontotemporal dementia.

* significant at $p < 0.05$.

Table 5

Correlations between MAC-Q and MAC-F Items for Healthy Older Adults

		Self-Report						Informant Report					
		Name	**Phone**	**Object**	**Facts**	**Grocery**	**General**	**Name**	**Phone**	**Object**	**Facts**	**Grocery**
Self-Report	Phone	**0.489** **<0.05** *										
	Object	**0.511** **<0.05** *	**0.538** **<0.05** *									
	Facts	**0.586** **<0.05** *	**0.537** **<0.05** *	**0.646** **<0.05** *								
	Grocery	**0.563** **<0.05** *	**0.541** **<0.05** *	**0.640** **<0.05** *	**0.614** **<0.05** *							
	General	**0.710** **<0.05** *	**0.517** **<0.05** *	**0.562** **<0.05** *	**0.686** **<0.05** *	**0.632** **<0.05** *						
Informant Report	Name	**0.537** **<0.05** *	**0.376** **<0.05** *	**0.409** **<0.05** *	**0.454** **<0.05** *	**0.437** **<0.05** *	**0.592** **<0.05** *					
	Phone	**0.482** **<0.05** *	**0.416** **<0.05** *	**0.378** **<0.05** *	**0.366** **<0.05** *	**0.467** **<0.05** *	**0.460** **<0.05** *	**0.697** **<0.05** *				
	Object	**0.466** **<0.05** *	**0.388** **<0.05** *	**0.357** **<0.05** *	**0.303** **<0.05** *	**0.459** **<0.05** *	**0.484** **<0.05** *	**0.624** **<0.05** *	**0.602** **<0.05** *			
	Facts	**0.476** **<0.05** *	**0.426** **<0.05** *	**0.422** **<0.05** *	**0.426** **<0.05** *	**0.477** **<0.05** *	**0.527** **<0.05** *	**0.691** **<0.05** *	**0.684** **<0.05** *	**0.530** **<0.05** *		
	Grocery	**0.397** **<0.05** *	**0.377** **<0.05** *	**0.356** **<0.05** *	**0.370** **<0.05** *	**0.475** **<0.05** *	**0.551** **<0.05** *	**0.540** **<0.05** *	**0.554** **<0.05** *	**0.558** **<0.05** *	**0.603** **<0.05** *	
	General	**0.634** **<0.05** *	**0.429** **<0.05** *	**0.457** **<0.05** *	**0.524** **<0.05** *	**0.569** **<0.05** *	**0.627** **<0.05** *	**0.684** **<0.05** *	**0.688** **<0.05** *	**0.684** **<0.05** *	**0.696** **<0.05** *	**0.708** **<0.05** *

Note.

* = significant after applying the false discovery rate (FDR) correction.

Table 6

Correlations between MAC-Q and MAC-F Items for Individuals with Mild Cognitive Impairment (all subtypes)

		Self-Report						Informant Report				
		Name	**Phone**	**Object**	**Facts**	**Grocery**	**General**	**Name**	**Phone**	**Object**	**Facts**	**Grocery**
Self-Report	Phone	**0.491** **<0.05** *										
	Object	**0.379** **<0.05** *	**0.489** **<0.05** *									
	Facts	**0.438** **<0.05** *	**0.418** **<0.05** *	**0.545** **<0.05** *								
	Grocery	**0.272** **<0.05** *	**0.413** **<0.05** *	**0.536** **<0.05** *	**0.560** **<0.05** *							
	General	**0.706** **<0.05** *	**0.598** **<0.05** *	**0.598** **<0.05** *	**0.595** **<0.05** *	**0.550** **<0.05** *						
Informant Report	Name	**0.211** **<0.05** *	0.108 0.213	0.200 0.020	0.098 0.258	0.194 0.024	**0.298** **<0.05** *					
	Phone	0.117 0.180	0.125 0.148	**0.232** **<0.05** *	**0.223** **<0.05** *	0.201 0.019	**0.423** **<0.05** *	**0.603** **<0.05** *				
	Object	0.150 0.084	0.156 0.072	0.189 0.029	0.166 0.055	**0.213** **<0.05** *	**0.323** **<0.05** *	**0.520** **<0.05** *	**0.596** **<0.05** *			
	Facts	0.159 0.067	0.145 0.095	**0.214** **<0.05** *	0.163 0.060	**0.222** **<0.05** *	**0.309** **<0.05** *	**0.585** **<0.05** *	**0.506** **<0.05** *	**0.570** **<0.05** *		
	Grocery	0.081 0.354	0.111 0.198	0.137 0.115	0.124 0.152	0.133 0.123	0.252 0.018	**0.601** **<0.05** *	**0.673** **<0.05** *	**0.660** **<0.05** *	**0.617** **<0.05** *	
	General	**0.411** **<0.05** *	0.257 0.019	**0.271** **<0.05** *	**0.273** **<0.05** *	**0.437** **<0.05** *	**0.418** **<0.05** *	**0.621** **<0.05** *	**0.535** **<0.05** *	**0.500** **<0.05** *	**0.533** **<0.05** *	**0.506** **<0.05** *

Note.

* = significant after applying the false discovery rate (FDR) correction.

Table 7

Correlations between MAC-Q and MAC-F items for Individuals with AD

		Self-Report						Informant Report				
		Name	**Phone**	**Object**	**Facts**	**Grocery**	**General**	**Name**	**Phone**	**Object**	**Facts**	**Grocery**
Self-Report	Phone	**0.476** **<0.05** *										
	Object	**0.524** **<0.05** *	**0.435** **<0.05** *									
	Facts	**0.587** **<0.05** *	**0.548** **<0.05** *	**0.563** **<0.05** *								
	Grocery	**0.665** **<0.05** *	**0.549** **<0.05** *	**0.651** **<0.05** *	**0.678** **<0.05** *							
	General	**0.456** **<0.05** *	**0.484** **<0.05** *	**0.541** **<0.05** *	**0.569** **<0.05** *	**0.627** **<0.05** *						
Informant Report	Name	−0.091 0.306	−0.079 0.375	0.011 0.898	0.021 0.813	−0.020 0.825	−0.003 0.979					
	Phone	−0.113 0.207	−0.001 0.992	−0.100 0.264	0.028 0.751	−0.158 0.077	0.028 0.832	**0.487** **<0.05** *				
	Object	005 0.952	−0.059 0.506	0.012 0.893	−0.11 0.901	0.004 0.961	−0.147 0.250	**0.296** **<0.05** *	**0.360** **<0.05** *			
	Facts	−0.057 0.525	−0.073 0.416	0.135 0.131	0.045 0.615	−0.008 0.934	0.115 0.371	**0.578** **<0.05** *	**0.432** **<0.05** *	**0.365** **<0.05** *		
	Grocery	−0.024 0.792	0.044 0.623	0.096 0.286	0.010 0.908	0.013 0.882	0.062 0.629	**0.494** **<0.05** *	**0.342** **<0.05** *	**0.357** **<0.05** *	**0.572** **<0.05** *	
	General	−0.027 0.852	0.266 0.059	0.134 0.349	0.030 0.837	0.129 0.372	0.108 0.453	**0.697** **<0.05** *	**0.581** **<0.05** *	**0.542** **<0.05** *	**0.518** **<0.05** *	**0.437** **<0.05** *

Note.

* = significant after applying the false discovery rate (FDR) correction.

Table 8

Correlations between MAC-Q and MAC-F Items for Individuals with DLB

		Self-Report						Informant Report				
		Name	**Phone**	**Object**	**Facts**	**Grocery**	**General**	**Name**	**Phone**	**Object**	**Facts**	**Grocery**
Self-Report	Phone	0.223 0.406										
	Object	0.444 0.085	0.579 0.019									
	Facts	0.506 0.045	**0.814** **<0.05** *	**0.738** **<0.05** *								
	Grocery	0.442 0.087	**0.816** **<0.05** *	**0.890** **<0.05** *	**0.846** **<0.05** *							
	General	0.492 0.178	0.602 0.086	**0.919** **<0.05** *	0.758 0.018	**0.861** **<0.05** *						
Informant Report	Name	−0.086 0.751	0.443 0.086	0.550 0.027	0.454 0.077	0.526 0.036	0.446 0.228					
	Phone	−0.372 0.156	0.249 0.352	0.113 0.677	0.163 0.546	0.108 0.691	0.270 0.482	0.603 0.013				
	Object	−0.041 0.879	0.471 0.066	0.414 0.111	0.490 0.054	0.453 0.078	0.478 0.194	**0.788** **<0.05** *	**0.733** **<0.05** *			
	Facts	−0.033 0.902	0.469 0.067	0.578 0.019	0.528 0.036	0.575 0.020	0.706 0.034	0.637 8.00E-3	0.377 0.150	0.377 0.150		
	Grocery	−0.341 0.213	0.065 0.818	0.372 0.172	0.040 0.887	0.248 0.372	0.632 0.092	0.277 0.317	0.380 0.163	0.380 0.163	0.351 0.199	
	General	0.001 0.999	0.539 0.168	0.671 0.069	0.500 0.207	0.674 0.067	0.612 0.107	**0.905** **<0.05** *	0.775 0.024	**0.999** **<0.05** *	0.756 0.030	0.730 0.062

Note.

* = significant after applying the false discovery rate (FDR) correction.

Table 9

Correlations between MAC-Q and MAC-F Items for Individuals with FTD

		Self-Report						Informant Report				
		Name	**Phone**	**Object**	**Facts**	**Grocery**	**General**	**Name**	**Phone**	**Object**	**Facts**	**Grocery**
Self-Report	Phone	0.323 0.240										
	Object	0.157 0.576	0.390 0.151									
	Facts	0.543 0.037	0.614 0.015	0.452 0.091								
	Grocery	0.189 0.500	−0.122 0.664	0.139 0.622	−0.055 0.845							
	General	−0.167 0.789	−0.408 0.495	0.001 0.999	−0.373 0.537	N/A N/A						
Informant Report	Name	0.107 0.704	0.150 0.593	0.419 0.120	0.177 0.527	−0.094 0.738	**0.999** **<0.05** *					
	Phone	0.043 0.885	−0.248 0.392	0.019 0.949	−0.177 0.546	−0.014 0.963	0.645 0.239	0.196 0.483				
	Object	−0.339 0.217	0.256 0.358	0.331 0.227	0.066 0.815	−0.120 0.671	0.218 0.724	0.342 0.195	0.436 0.104			
	Facts	−0.105 0.710	0.136 0.630	0.567 0.027	0.337 0.219	−0.069 0.806	−0.327 0.591	0.429 0.098	0.246 0.377	0.684 0.003		
	Grocery	0.092 0.743	0.030 0.916	0.347 0.205	0.378 0.165	−0.061 0.829	0.612 0.272	0.319 0.229	0.306 0.267	0.572 0.021	0.598 0.014	
	General	−0.577 0.423	N/A N/A	0.577 0.423	0.001 0.999	N/A N/A	0.001 0.999	0.001 0.999	−0.577 0.423	0.707 0.293	0.905 0.095	0.577 0.423

Note.

* = significant after applying the false discovery rate (FDR) correction.