Instrumental Activities of Daily Living Performance and Role Satisfaction in People With and Without Mild Cognitive Impairment: A Pilot Project

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MeSH TERMS
- activities of daily living
- cognition disorders
- observation
- personal satisfaction
- role
- self report

OBJECTIVE. We investigated differences in observed performance of instrumental activities of daily living (IADLs) and self-reported satisfaction with social role performance between people with amnestic mild cognitive impairment (a-MCI) and age- and gender-matched control participants.

METHOD. We measured observed performance of 14 IADLs using the Independence, Safety, and Adequacy domains of the Performance Assessment of Self-Care Skills (PASS) and the Patient-Reported Outcomes Measurement Information Systems (PROMIS) to examine satisfaction with social role performance.

RESULTS. Total PASS scores were significantly lower in participants with a-MCI (median = 40.6) than in control participants (median = 44.2; $p = .006$). Adequacy scores were also significantly lower. No significant differences were found between groups on the PROMIS measures.

CONCLUSION. IADL differences between groups were related more to errors in adequacy than to safety and independence. Occupational therapy practitioners can play a key role in the diagnosis and treatment of subtle IADL deficits in people with MCI.

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Mild cognitive impairment (MCI) is a transition state between normal aging and dementia (Petersen et al., 1999). Alarmingly, the prevalence of MCI in community-dwelling adults age ≥60 yr is reported to be 11%–17% and increasing (Mariani, Monastero, & Mecocci, 2007). Currently, MCI is divided into two broad categories: (1) amnestic MCI (a-MCI), which involves primarily memory loss, and nonamnestic MCI, which involves minimal memory loss (Albert et al., 2011). *Amnestic MCI* is defined clinically as memory loss without other prominent cognitive changes and without significant functional impairment (Albert et al., 2011). A diagnosis of a-MCI appears to hold the highest risk of conversion to Alzheimer's disease (AD), with approximately 10%–15% of affected people converting per year (Mitchell & Shiri-Feshki, 2009; Petersen, 2003; Petrella, Sheldon, Prince, Calhoun, & Doraiswamy, 2011). Because MCI is a clinical diagnosis in which biomarkers and neuroimaging are primarily used to rule out other conditions that cause cognitive impairment, precision of the qualitative, diagnostic criteria is critical for early diagnosis and treatment (Albert et al., 2011; Winblad et al., 2004).

However, the diagnostic criteria for MCI have been criticized for lack of sensitivity, particularly as related to functional independence criteria (Chang et al., 2011; Gold, 2012; Winblad et al., 2004; Yeh et al., 2011). Several studies have indicated that people with MCI have "subtle" problems with a variety of *instrumental activities of daily living* (IADLs), defined as complex activities that

support management of the home or care for others (American Occupational Therapy Association [AOTA], 2014; Bombin et al., 2012; Brown, Devanand, Liu, & Caccappolo, 2011; De Vriendt et al., 2013). Subtle errors are difficult to quantify for diagnostic criteria, especially when trying to distinguish subtle errors from the minimal IADL impairment that occurs in people with mild AD (De Vriendt et al., 2013). Moreover, the subtle errors identified in MCI may be difficult to distinguish from the subtle IADL errors seen in age-related memory loss and typical aging (Brown et al., 2011; De Vriendt et al., 2013).

Further contributing to problems with the diagnostic criteria, characterizations of IADL problems are limited by scope and by the tools used to measure IADL impairment (Sacco et al., 2012). Recent studies have looked at IADLs using tools that measure the prevalence of deficits within IADL tasks or that use gross indexes to characterize IADL deficits, such as *no problems* to *severe problems* (Bombin et al., 2012; De Vriendt et al., 2013). These tools lack the sensitivity to characterize types of error that could strengthen the functional independence criteria for MCI. Finally, many previous studies have relied on self-report or proxy report of IADL performance instead of direct observation to characterize MCI-related IADL deficits in people with MCI (Bombin et al., 2012; Brown et al., 2011; De Vriendt et al., 2013; Yeh et al., 2011). Self-report can be biased in people with MCI, who may have diminishing self-awareness (Öhman, Nygård, & Kottorp, 2011), and proxy reports may be biased by lack of awareness of emerging problems or the emotional burden of caregiving (Desai, Grossberg, & Sheth, 2004).

Performance of IADLs is of special importance for older adults who are trying to age in place (Ciro, 2014; Öhman et al., 2011). Occupation-based assessments completed through clinical observation can more precisely define deficits in IADL subtasks than can gross measures of activity of daily living (ADL) ability that rely on self- or proxy report (Ciro, 2014). In particular, the Performance Assessment of Self-Care Skills (PASS) can distinguish among errors in Independence (cueing to initiate and complete), Safety, and Adequacy (quality) of IADL performance (Rogers et al., 2003, 2010; Rogers, Holm, Beach, Schulz, & Starz, 2001). Of additional importance is the person's satisfaction with how he or she performs in life roles, which is a different construct from ADL performance and can help guide the occupational therapy process (AOTA, 2014). Satisfaction with role performance includes how a person considers his or her performance in the context of socially constructed roles such as spouse, worker, or friend (AOTA, 2014).

We could find little information regarding how people with MCI gauge their performance and their satisfaction with performance in meaningful life roles and the extent of their capacity for accurately judging their role performance (De Vriendt et al., 2012). Therefore, we designed a study to examine differences in observed IADL performance and self-reported performance and satisfaction with performance in life roles between people with a-MCI and healthy age- and gender-matched control participants. First, we used the PASS to describe observed errors in participants' IADL performance in the domains of Independence, Safety, and Adequacy and then examined differences between the two groups. We hypothesized that people with a-MCI would have significantly lower total PASS scores (reflecting worse performance) than control participants and higher numbers of observed errors in Adequacy than in Independence and Safety. Second, we examined whether self-reported social role performance and level of satisfaction with role performance would differ between the groups. We hypothesized that people with a-MCI would report significantly more limitations in role performance and less satisfaction with their role performance than control participants.

Method

Study Design

We used a cross-sectional study design to examine observed IADLs and self-reported satisfaction with role performance in two groups, people with a-MCI and gender- and age-matched control participants. The first author (Carrie A. Ciro) recruited participants, obtained informed consent, and conducted the study and thus was not blind to group designation. The study was approved by the University of Oklahoma Health Sciences Center (OUHSC) institutional review board.

Participants

From July 2011 through June 2012, participants with a diagnosis of a-MCI based on established criteria (Petersen et al., 1999) were recruited through the memory loss clinics at OUHSC and the Veterans Affairs Medical Center in Oklahoma City. Inclusion criteria for a-MCI participants were as follows: were community-dwelling adults age ≥50, could provide consent themselves, could read English, were able to ambulate with or without assistance across the room, obtained a Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) score of >24 and a Clinical Dementia Rating (CDR; Morris, 1993) of 0 or 0.5 (indicating no or

questionable dementia), had a physician diagnosis of a-MCI, and reported current or previous independence in IADLs. Healthy control participants were recruited through announcements sent out within the University of Oklahoma; they were gender and age matched (within 5 yr) to a-MCI participants. Inclusion criteria for control participants were the same as for a-MCI participants except for a score of ≥27 on the MMSE and current independence in IADLs. Exclusion criteria for all participants included aphasia, legal blindness, MMSE score of <24, active delirium, traumatic brain injury, stroke, and dementia.

We anticipated recruiting 20 participants, with 10 in each group. Of the 13 people with a-MCI referred, 6 refused and 7 agreed to participate. Our funding prevented us from continuing past 1 yr so we were left with fewer a-MCI and control participants than anticipated.

Inclusion and Descriptive Measures

A sociodemographic profile was administered to collect demographic, social, and historical data. To rule out dementia, neurologists administered the MMSE, commonly used to detect and stage dementia in research (Littbrand, Lundin-Olsson, Gustafson, & Rosendahl, 2009). An MMSE cutpoint of 24 yields a sensitivity of 66% and a specificity of 99% for detecting dementia (O'Bryant et al., 2008). An MMSE score of ≥27 is considered normal (Mungas, 1991).

We also used the CDR scale to qualitatively confirm MCI (Morris, 1997). The CDR uses a 5-point scale (0 = *no dementia,* 0.5 = *questionable dementia,* 1 = *mild dementia,* 2 = *moderate dementia,* and 3 = *severe dementia*) to rate performance in memory, orientation, judgment, problem solving, community affairs, home and hobbies, and personal care. Information for scoring can be obtained from the person or a proxy who knows the person intimately. The CDR is highly correlated with other tests of dementia and has high interrater reliability (r = .89; Morris, 1997).

Inclusion criteria included current or previous (before MCI) independence in IADLs. Through a brief interview, we elicited IADL performance using the Lawton–Brody IADL Scale, which is intended for use with older adults in community settings (Lawton & Brody, 1969). It consists of eight areas of function: phone use, shopping, food preparation, housekeeping, laundry, mode of transportation, medication management, and finance management. A continuous summary score is derived from scoring each task separately, with 0 indicating *supported or poor function* and 1 indicating *independent function.* The total score ranges from 0 indicating dependence to 8 indicating complete independence. Interrater reliability is high (r = .85; Lawton & Brody, 1969).

Outcome Measures

The PASS is a performance-based, criterion-referenced, observational tool designed to examine functional status and change (Rogers et al., 2001). It consists of 26 core tasks, 14 of which are IADL tasks with a cognitive focus and were chosen for this study:

1. Obtaining critical information from visual media (reading a mock newspaper article and answering questions)
2. Obtaining critical information from audio media (listening to a tape recording that simulates radio or television announcements and answering questions)
3. Performing home repairs (identifying why a flashlight does not work and problem solving that the battery is dead)
4. Playing bingo
5. Paying two bills by check (using bill statements to write out checks accurately)
6. Balancing a checkbook ledger (adding a deposit and subtracting the two paid bills)
7. Mailing bills (addressing the envelopes and applying stamps)
8. Using a land line telephone (locating a number for a pharmacy in a phone book, dialing the number, and gathering information from the pharmacy about open hours)
9. Managing medication (sorting medications by time of delivery)
10. Shopping (purchasing precise items on a grocery list using real money)
11. Ascertaining home safety (visually finding safety errors such as a crumpled rug on the floor and problem solving how to fix them)
12. Using a stove (preparing a can of soup)
13. Using an oven (baking muffins)
14. Using sharps (cutting an apple into eight pieces).

The PASS is unique in observation-based assessment because it allows the rater to detect subtle errors by assessing three areas of function in each step of a task. The three areas of function are Independence, Safety, and Adequacy. *Independence* in the task reflects the amount and type of cuing assistance the rater provides to help the person initiate and complete the task. Cuing is scaffolded on the basis of client performance, progressing from verbal cues (supportive, nondirective, directive), gestural cues, environmental rearrangement, demonstration, and physical cues (guidance, support, or total assistance).

Safety reflects observations of safe and unsafe moves and immediate risks to safety; several tasks pose no immediate risks (e.g., mailing bills). *Adequacy* reflects both the quality of the work (acceptable, marginal, and unacceptable) and the process of performance (precision in following steps without extra or redundant steps). Each scoring domain receives a continuous score of 0–3:

- 0 indicates total assistance, high safety risk, or unacceptable performance in quality and process
- 1 indicates the need for physical assistance and verbal cues, need for supervision for safety, marginal compliance with standards for quality, or lack of precision in following steps
- 2 indicates lack of need for physical assistance to perform the task but need for occasional verbal cues or environmental supports to complete the task successfully, no physical assistance for safety, room for improvement on quality, or occasional lack of precision of effort in completing the task
- 3 indicates total independence with no cues needed to initiate and complete the task, safe completion of the task, or compliance with all quality and process standards.

For each step in a task, PASS scoring allows for a person to score, for example, 3 in one domain, such as Independence, and 1 in another, such as Adequacy.

The PASS has been examined with healthy adults and in adults with a variety of diagnoses, including MCI, depression, bipolar disorder, heart transplant, arthritis, stroke, congestive heart failure, dementia, and macular degeneration (Gildengers et al., 2012, 2013; Rodakowski et al., 2014; Rogers & Holm, 2000; Rogers et al., 2001, 2010; Skidmore, Rogers, Chandler, & Holm, 2006a, 2006b). Test–retest reliability has been reported for Independence (r = .92), Safety (89% agreement), and Adequacy (r = .82; Holm & Rogers, 2008). Interobserver reliability has been established for the first author (Ciro), who delivered the PASS after receiving training with the developers of this assessment, with ≥93% agreement on scores for all tasks.

To examine role performance and satisfaction with role performance, we chose the Patient-Reported Outcomes Measurement Information Systems (PROMIS). PROMIS was developed by National Institutes of Health work groups charged with developing and validating a computer-adapted testing (CAT) system to standardize question banks for measuring patient-reported outcomes in medical research (Cella et al., 2007). PROMIS is a CAT system that selects questions on the basis of a person's responses to previously administered questions. The system selects highly informative questions so that researchers can estimate scores representing a person's standing on a domain (e.g., physical or emotional functioning, social health) with the minimal number of questions and without a loss in measurement precision. The underlying (latent) construct is estimated from the responses people give to the items in a scale. The items were calibrated using an item response theory model. Scores that have a mean of 50 and standard deviation of 10 in a reference (e.g., general) population are generated for each participant and can be analyzed as a continuous variable.

We chose two specific item banks within the domain of social health—(1) Role Performance and (2) Satisfaction With Role Performance—for measurement in this study. Participants were asked the extent to which they were limited in role performance (1 = *never,* 2 = *rarely,* 3 = *sometimes,* 4 = *often,* and 5 = *always*) and the extent to which they were satisfied with their role performance (1 = *very much,* 2 = *quite a bit,* 3 = *somewhat,* 4 = *a little bit,* and 5 = *not at all*). Ciro was formally trained in the theory and methodology for running a trial using the PROMIS tools.

Procedure

All tests were administered within 4 wk of participants' visit to the referring neurologist. Testing occurred in the Occupational Performance Laboratory, an 880-square-foot lab built to look like an apartment with a working kitchen, bathroom, and office. Participants randomly chose the sequence of assessment by blindly choosing one of two pieces of paper that read "computer assessment" or "performance assessment." Assessment time ranged from 2 to 3 hr, and spouses were allowed to accompany as desired. All PASS subtasks were delivered in the same order. The PROMIS assessment was completed on a 24-in. computer monitor in a lab setting. Cues for moving through the online tests were offered as needed. Rest breaks were provided when judged necessary or on request.

Data Analysis

Simple descriptive statistics were used to describe sample characteristics and PASS domain scores. Differences between samples within sociodemographic categories were tested using χ^2 or Fisher's exact test for categorical data and the Wilcoxon–Mann–Whitney test for continuous data. Median PASS and PROMIS score differences were analyzed using Wilcoxon–Mann–Whitney rank sum tests. In a post hoc analysis, pairwise correlations between the domains of Independence, Safety, and Adequacy for

each of the IADL core tasks were examined using Pearson's correlation coefficient. A priori we determined that the probability for meeting statistical significance was $p < .05$. Analyses were completed using SAS Version 9.3 (SAS Institute, Cary, NC).

Results

Characteristics of group participants can be found in Table 1. All participants in the a-MCI group ($n = 7$) and the control group ($n = 5$) were White. No differences were detected between groups for age, education, gender, or self-reported Lawton–Brody IADL Scale scores. Significant differences were found between the two groups in mean MMSE scores.

In Table 2, we provide total and domain-specific (Independence, Safety, and Adequacy) PASS scores for each IADL task. The median (Mdn) PASS scores were significantly lower in the group with MCI (Mdn = 40.6) than in the control group (Mdn = 44.2; $p = .006$). In 9 of the 14 IADL tasks, the MCI group demonstrated significantly lower Adequacy scores than the control group. The MCI group also exhibited significantly lower Independence scores in 5 of the 14 tasks. In all 5 of the tasks in which Independence was impaired (playing bingo, balancing a check ledger, mailing bills, using the oven, and using the stove), Adequacy was also impaired. No significant differences were found in Safety scores between the two groups.

Because of the finding that participants with Independence errors also demonstrated Adequacy errors, we examined the relationships among Adequacy, Independence, and Safety within tasks and groups. Among the MCI group, Independence and Adequacy scores were significantly ($p < .05$) correlated for visual media ($r = 1.00$, $p < .0001$), audio media ($r = .99$, $p = .0003$), home repair ($r = .80$, $p = .03245$), telephone use ($r = .99$, $p = .0003$), home safety ($r = .99$, $p = .0002$), and sharp use ($r = .84$, $p = .01703$). Among the control group, Independence and Adequacy scores were significantly ($p < .05$) correlated for mailing bills ($r = 1.00$, $p < .0001$), medication management ($r = .91$, $p = .03421$), oven use ($r = 1.00$, $p < .0001$), and stove use ($r = 1.00$, $p < .0001$). Participants in both groups had identical scores (3) for Safety on all variables, with the exception of oven use, stove use, and sharp use in the MCI group; for these items, Safety did not appear to be significantly correlated with either Independence or Adequacy.

Total median scores for the PROMIS item bank for limitations in role performance in the MCI group (Mdn = 56.3; 25th, 75th quartile = 55.4, 59.8) were not significantly different from those of the control group (Mdn = 58; 25th, 75th quartile = 51.0, 59.1; $p = 1.0$). Additionally, no significant differences were found in satisfaction with role performance between participants with MCI (Mdn = 53.7; 25th, 75th quartile = 51.6, 58.7) and control participants (Mdn = 57.0; 25th, 75th quartile = 54.2, 60.2; $p = .37$).

Table 1. Sample Characteristics

Characteristic	Median (25th, 75th Percentile) a-MCI Group ($n = 7$)	Control Group ($n = 5$)	p
Age	76 (66, 85)	76 (65, 76)	.87[a]
MMSE score	27 (27, 28)	30 (29, 30)	.04[a]
Lawton–Brody IADL Scale score	8 (8, 8)	8 (8, 8)	.50[a]
	n	*n*	
Gender: female	3	3	.56[b]
Race and ethnicity: White	7	5	.28[b]
Education			.56[b]
High school	2	3	
Post–high school	5	2	

Note. a-MCI = amnestic mild cognitive impairment; IADL = instrumental activity of daily living; MMSE = Mini-Mental State Examination.
[a]Wilcoxon–Mann–Whitney rank-sum test. [b]χ^2 analysis.

Discussion

In this pilot study, we examined differences in the performance of 14 common IADL tasks by people with a-MCI and healthy age- and gender-matched controls. First, we determined that we could detect differences in performance using the PASS and that we could describe errors by people with a-MCI better than did the descriptions in previous research (Bombin, 2012; Brown, 2011; De Vriendt et al., 2013). A larger number of errors were detected in Adequacy scores, described as quality of performance and precision of effort (e.g., redundancy, missed steps), than in Independence or Safety scores. Finally, we found that people with a-MCI did not report significantly different levels of role performance or satisfaction with role performance than control participants, despite the error differences noted during observed IADL performance.

Previous research has found that people with a-MCI have deficits in IADL categories such as finances, medication management, meal preparation, shopping, traveling away from home, and leisure skills (Brown et al., 2011; De Vriendt et al., 2013; Yeh et al., 2011). Using observation of performance measurements, we identified more specific IADL categories in which people with MCI performed more poorly than control participants, specifically stove, oven, and sharp use and bill mailing.

Table 2. Scores on the Performance Assessment of Self-Care Skills Cognitive IADL Tasks, by Group

	Control Group (n = 5)		a-MCI Group (n = 7)		
Task	Median (25th, 75th Percentile)	Mean (*SD*)	Median (25th, 75th Percentile)	Mean (*SD*)	p^a
Total score	44.2 (43.7, 44.5)	44.2 (0.7)	40.6 (39.0, 42.5)	40.6 (1.9)	.0058
Total average	2.95 (2.91, 2.97)	2.94 (0.04)	2.71 (2.60, 2.83)	2.71 (0.13)	.0058
Visual media use					
Independence	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	2.93 (0.19)	.4990
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	2.86 (0.38)	.4990
Audio media use					
Independence	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (2.50, 3.00)	2.79 (0.39)	.2612
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (2.00, 3.00)	2.43 (1.13)	.2612
Bingo playing					
Independence	3.00 (3.00, 3.00)	3.00 (0.00)	2.50 (2.50, 3.00)	2.57 (0.35)	.0263
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	2.00 (2.00, 3.00)	2.14 (0.69)	.0263
Home repair					
Independence	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (2.33, 3.00)	2.61 (0.63)	.1357
Safety	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	3.00 (0.00)	1.0000
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	2.00 (2.00, 3.00)	2.14 (0.69)	.0263
Check writing					
Independence	3.00 (2.92, 3.00)	2.97 (0.04)	2.80 (2.67, 3.00)	2.79 (0.19)	.1260
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	2.80 (0.45)	2.00 (2.00, 2.00)	2.14 (0.38)	1.0000
Checkbook balancing					
Independence	3.00 (2.88, 3.00)	2.95 (0.07)	2.50 (2.40, 2.75)	2.47 (0.51)	.0251
Safety	NA	NA	NA	NA	
Adequacy	2.00 (2.00, 3.00)	2.40 (0.55)	1.00 (1.00, 2.00)	1.43 (0.79)	.0466
Bill mailing					
Independence	3.00 (3.00, 3.00)	2.98 (0.04)	2.90 (2.60, 2.90)	2.79 (0.20)	.0103
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	2.80 (0.45)	2.00 (2.00, 2.00)	1.86 (0.38)	.0095
Telephone use					
Independence	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (2.60, 3.00)	2.84 (0.20)	.1357
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (1.00, 3.00)	2.29 (0.95)	.1345
Medication management					
Independence	2.83 (2.67, 3.00)	2.80 (0.22)	2.50 (2.00, 2.70)	2.41 (0.41)	.1001
Safety	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	3.00 (0.00)	1.0000
Adequacy	3.00 (2.00, 3.00)	2.60 (0.55)	1.00 (1.00, 2.00)	1.29 (0.49)	.0095
Shopping					
Independence	2.60 (2.40, 2.80)	2.64 (0.26)	2.60 (2.20, 2.60)	2.49 (0.32)	.5046
Safety	NA	NA	NA	NA	
Adequacy	2.00 (2.00, 3.00)	2.40 (0.55)	2.00 (1.00, 2.00)	1.57 (0.53)	.0440
Home safety					
Independence	3.00 (2.83, 3.00)	2.93 (0.09)	2.83 (2.80, 3.00)	2.85 (0.12)	.1689
Safety	NA	NA	NA	NA	
Adequacy	3.00 (3.00, 3.00)	2.80 (0.45)	2.00 (2.00, 3.00)	2.14 (0.69)	.1039
Oven use					
Independence	3.00 (2.89, 3.00)	2.96 (0.06)	2.70 (2.56, 2.78)	2.70 (0.19)	.0251
Safety	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	2.86 (0.38)	.4990
Adequacy	3.00 (2.00, 3.00)	2.60 (0.55)	1.00 (1.00, 2.00)	1.57 (0.79)	.0484
Stove use					
Independence	3.00 (3.00, 3.00)	2.98 (0.04)	2.82 (2.64, 2.90)	2.77 (0.15)	.0062
Safety	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (3.00, 3.00)	2.86 (0.38)	.4990
Adequacy	3.00 (3.00, 3.00)	2.80 (0.45)	2.00 (1.00, 2.00)	1.57 (0.53)	.0095

(*Continued*)

Table 2. Scores on the Performance Assessment of Self-Care Skills Cognitive IADL Tasks, by Group (*cont.*)

	Control Group (n = 5)		a-MCI Group (n = 7)		
Task	Median (25th, 75th Percentile)	Mean (*SD*)	Median (25th, 75th Percentile)	Mean (*SD*)	p^a
Sharp use					
Independence	3.00 (3.00, 3.00)	2.95 (0.11)	2.75 (2.75, 3.00)	2.79 (0.17)	.1039
Safety	3.00 (3.00, 3.00)	3.00 (0.00)	3.00 (2.00, 3.00)	2.71 (0.49)	.2592
Adequacy	3.00 (3.00, 3.00)	3.00 (0.00)	2.00 (1.00, 3.00)	1.86 (0.90)	.0280

Note. a-MCI = amnestic mild cognitive impairment; IADL = instrumental activity of daily living; NA = not applicable for the task; *SD* = standard deviation.
[a]Wilcoxon–Mann–Whitney rank-sum test.

We also confirmed differences in IADLs previously measured through informant report (Bombin et al., 2012; Brown et al., 2011) such as shopping, medication management, checkbook balancing, and leisure activities.

Understanding potential areas of occupational performance dysfunction in clients with a-MCI can help occupational therapy practitioners direct evaluation and intervention toward the IADL skills most problematic for this population (De Vriendt et al., 2013). With this knowledge, occupational therapy is poised to advocate for an important role in differentiating cognitive diagnoses in older adults. Because MCI and dementia both have functional limitations as part of the diagnostic criteria, occupational therapy practitioners may be able to evaluate ADL and IADL performance as a functional marker to contribute to other diagnostic tools used to precisely define the diagnosis in settings such as primary care and neurology practices. In support of this, Rodakowski et al. (2014) found that eight cognitive IADL items from the PASS demonstrated 81% accuracy in discriminating between people with MCI and control participants. These projects contribute to our collective understanding of the importance of ADL and IADL function in differentiating levels of cognitive disability.

For the first time, we identified differences in performance on 14 IADLs between people with MCI and healthy control participants using a scale sensitive enough to describe the types of errors committed. Decreased quality and efficiency in performance were problematic in a variety of IADL tasks. These results are in line with qualitative research in which people with MCI identified difficulties such as being less careful in trimming the hedges (quality error), making the same leg twice when sewing a new pair of pants (process error), and being able to drive safely while talking (quality error; De Vriendt et al., 2013). In our study, tasks with the lowest Adequacy scores were medication management, checkbook balancing, oven and stove use, sharp use, bingo playing, shopping, and bill mailing. Of those tasks, Rodakowski et al. (2014) found shopping and checkbook balancing to best discriminate between people with MCI and healthy control participants. Arguably, maintaining these IADL skills is important for older adults who wish to age in place (Andel, Hyer, & Slack, 2007; Ciro, 2014; Smith, O'Brien, Ivnik, Kokmen, & Tangalos, 2001).

Use of a sensitive, performance-based tool like the PASS can help occupational therapy practitioners detect differences in errors so they can prescribe more precise evidence-based treatment interventions and modifications (Arbesman, Lieberman, & Metzler, 2014). For example, the PASS would be beneficial in evaluating a person with MCI who is able to cook a meal independently (i.e., requires no cues to initiate or complete) but does so with poor quality (food is dangerously undercooked) and decreased safety (stove is left on for several hours). Results can lead to specific strategies such as training in the use of a food thermometer and use of an automatic shutoff valve on the stove to address the client's identified deficits and facilitate improved occupational performance.

We also used the PROMIS to examine differences in self-reported social role performance and satisfaction with role performance between people with MCI and healthy control participants. Interestingly, we found no differences between the groups despite the significant differences in task quality and process observed by the examiner. Of note, people with MCI had some difficulty interpreting the qualitative scale used by PROMIS, and thus the examiner spent time highlighting the question-and-answer stems to differentiate between levels. For example, one question reads, "I can do everything for work that I want to do (include work at home)." Forced answers include *never, rarely, sometimes, often,* and *always*. Some participants with MCI questioned what was meant by "work," had difficulty using the forced responses to answer the question, and said the question was worded "awkwardly." Our finding of a lack of differences between the two groups could also be explained by previous research indicating that people with MCI have deficits in self-awareness and that lack of awareness is correlated with poorer performance in ADLs (Öhman et al., 2011). Self-awareness of deficits in people with MCI, however, appears to be better than in those with AD (Öhman et al., 2011), which may help

people with MCI be more open to treatment strategies that specifically target subtle performance deficits for improvement.

Limitations and Future Research

Our pilot study has limitations. First, the sample size was small and homogenous, which limits generalization of results to the larger population. Second, the examiner was aware of the diagnosis before testing, which may have biased observed performance results. However, formal training in the PASS and PROMIS tools strengthens the validity of the results. Third, we examined IADL skills one time using a cross-sectional design in a new environment without the contextual cues that older adults rely on for performance. This methodology may not have provided an accurate representation of their function at home, but it does reflect current clinical practice. We attempted to abate this effect by using a laboratory setting that simulates a home environment.

In the future, we hope to examine IADL performance in larger samples of people with MCI with broader sociodemographic variation. In addition, the development of cutpoint scores with high sensitivity and specificity for delineating between healthy control participants and people with all forms of MCI and dementia would be useful for clinicians and for refining the diagnostic criteria for MCI.

Implications for Occupational Therapy Practice

People with a-MCI present with subtle deficits in a variety of IADL tasks that can be detected using an occupation-based instrument such as the PASS. The results of this study have the following implications for occupational therapy practice:

- Occupational therapy practitioners could advocate to be part of teams that provide diagnoses for people with emerging (MCI) and frank (dementia) cognitive disorders in older adults and can make specific contributions in the evaluation of occupational performance.
- A performance-based ADL and IADL assessment such as the PASS may help occupational therapy practitioners both identify the specific underlying occupational performance dysfunction and direct treatment interventions to align with the performance deficit.
- Our pilot results indicate that errors in adequacy, which includes quality and process of performance, are more likely to be problematic in people with a-MCI than safety and independence issues. Therefore, evidence-based assessments and treatments could build on clients' strengths in independence and safety while seeking to compensate for errors in adequacy to facilitate maximal occupational performance.

Conclusion

This pilot study found significant differences in IADL function between people with MCI and healthy control participants as measured by the PASS. Errors made by people with MCI involved the quality and process of performance to a greater extent than safety and independence in completing the task. These findings, along with other research, support occupational therapy practitioners' use of sensitive IADL performance-based tools to inform collaboration with professionals who diagnose people with MCI and dementia and thus improve the preciseness of the diagnosis. Further, by specifically identifying errors in IADLs, practitioners can develop patient-centered and targeted treatment plans to address occupational performance dysfunction in older adults with cognitive disabilities. ▲

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