# Subjective Word-Finding Difficulty Reduces Engagement in Social Leisure Activities in Alzheimer's Disease

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## Abstract

**Objectives**—To assess the influence of subjective word-finding difficulty on Alzheimer's disease (AD) patients' likelihood of engaging in social leisure activities.

**Design**—Analysis of data collected from the second cohort of the Multicenter Study of Predictors of Disease Course in Alzheimer's disease.

**Setting**—Four study sites in the U.S. and France.

**Participants**—Individuals diagnosed with mild to moderate AD (N = 236)

**Measurements**—On separate questionnaires, patients were asked to 1) report whether had trouble finding the right word when speaking (subjective word-finding difficulty), and 2) rate their frequency and enjoyment of both social and nonsocial leisure activities. Objective language measures included object naming and verbal fluency. Measures of dependence, depression, cognitive status, age, sex, and education were also included as covariates in regression analyses.

**Results**—Over half (52%) of the sample reported word-finding difficulty, and subjective complaints were correlated with poorer verbal fluency scores. Subjective word-finding difficulty was uniquely related to social activity measures. Endorsers of word-finding difficulty reported reduced frequency and enjoyment of social leisure activities, controlling for covariates. In contrast, engagement in nonsocial activities was associated with higher age and depression scores,

but was not related to word-finding complaints. These results were corroborated by the caregivers' reports, and occurred above and beyond the effect of objective word-finding ability.

**Conclusion**—AD patients who are aware of increasing word-finding failures are less likely to participate in and enjoy socially-oriented leisure activities. This finding may have significant implications for clinical and health outcomes in AD. A failure to evaluate subjective language complaints could result in social withdrawal symptoms, thereby threatening the patient's quality of life as well as increasing caregiver burden. Importantly, reduced social interaction may ultimately exacerbate language symptoms over time.

### Keywords

subjective language complaints; Alzheimer's disease; leisure activities

## INTRODUCTION

Word-finding difficulty is one of the most ubiquitous and distressing cognitive problems reported in older adulthood.[1–4] These experiences often present as tip-of-the-tongue (TOT) states, where a speaker is momentarily unable to retrieve the lexical representation of a word, despite a frustrating feeling that the word is known and just beyond reach.[5] Perhaps due to the social salience of word retrieval, researchers have alluded to a connection between impaired word-finding and reduced communicative confidence in late life.[6–9] In turn, reduced confidence could constrain older adults' desire to engage in socially-oriented activities.[8]

The frequency of word-finding failures is even higher in dementia than in normal aging.[10–13] Because of its pervasiveness, word-finding difficulty may be among the most functionally- and socially-debilitative symptoms associated with dementia.[14] However, the consequences of *subjective* (i.e., self-reported) word-finding difficulty on the well-being of individuals with dementia have not been formally examined. In the current study, we investigated the prevalence of subjective word-finding difficulty among 236 individuals with mild-to-moderate Alzheimer's disease (AD). We then assessed whether subjective word-finding complaints predicted patients' participation in and enjoyment of social versus nonsocial leisure activities, independent of disease severity, depression, and demographic variables.

A number of studies suggest that subjective cognitive complaints foreshadow subsequent cognitive decline[15, 16], and are correlated with AD biomarkers and neuropathology.[17–21] These studies have primarily focused on memory complaints, or have instead examined summed totals of cognitive complaints without dissociating the impact of specific cognitive domains. As a result, little is known about the frequency with which particular types of language complaints are endorsed after AD diagnosis, or how patients' perceptions regarding their language declines influence disease outcomes.

Of particular interest is whether subjective language complaints influence social aspects of patient quality of life, which is one of the most important factors to consider following a dementia diagnosis.[22] Although several factors are considered essential components of

quality of life[23], the positive effect of stimulating leisure activities on quality of life and cognitive status is well documented.[24, 25] Moreover, behavioral intervention studies have demonstrated a beneficial effect of meaningful activities on the emotional well-being of patients and caregivers.[26, 27] As such, identifying the cognitive, behavioral, and psychosocial factors that predict engagement in leisure activities may have important consequences for a number of health outcomes relevant for healthy aging and dementia.

AD patients' reduced participation in enjoyable activities has been linked with depressive affect, cognitive decline, dependence, and personality change.[28, 29] To date, the association between a patient's subjective cognitive problems and their likelihood of engaging in pleasant leisure activities has not been examined. Given the distress attached to word-finding problems, it is intuitive that self-perceived problems in the ability to retrieve words may selectively relate to socially-oriented activities (e.g., getting together with friends, attending church groups), as opposed to leisure activities that can be performed without social interaction (e.g., doing crafts, gardening).

The goal of the present study was to examine the relationship between self-reported word-finding difficulty and AD patients' participation in and enjoyment of various leisure activities. We hypothesized that subjective word-finding difficulty would relate to measures of social activity engagement above and beyond other explanatory variables. Presumably, this relationship would stem from patients' declining confidence in their ability to have successful conversations, resulting in an avoidance of leisure activities that require social interaction. However, it is possible that endorsers of word-finding difficulty might possess certain personality or cognitive characteristics that render them less likely to participate in any type activity. To assess the specificity of the relationship between perceived word-finding difficulty and social activities, the same independent variables were used to predict engagement in nonsocial activities. We hypothesized that nonsocial activity engagement would be related to indices of disease severity, age, and/or depression, but would not be related to subjective word-finding difficulty due to the lack of expressive language demands.

## METHOD

### Participants

The sample included participants recruited in the second wave of the Multicenter Study of Predictors of Disease Course in Alzheimer's Disease, a longitudinal study examining biological and lifestyle markers of AD progression. The full cohort included patients diagnosed with probable AD according to the National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association (NINDS-ADRDA) criteria. Study recruitment occurred at four different study sites, including Columbia University (*N*=102), Johns Hopkins University (*N*= 63), Massachusetts General Hospital (*N*= 63), and Hôpital de la Salpêtriére in Paris, France (*N*= 38). Details regarding this study's procedures and participants have previously been published.[30] In brief, participants were recruited from memory clinics at each of the study sites. The diagnosis of probable AD occurred within the clinic setting, and was based on a full neuropsychological exam plus additional neurological and medical evaluations. Exclusion criteria included stroke, history of alcohol dependence, recent or extensive

electroconvulsive treatments, and clinical evidence of schizophrenia prior to the onset of cognitive decline. In the Predictors study, participants were evaluated every 6 months for up to 5 years, and research measures were obtained during home visits performed by trained research assistants. At each visit, information was gathered about cognitive function, dependence, various psychiatric and neurological symptoms, as well as medical treatments, medications, living conditions, and other lifestyle factors.

The current study is restricted to baseline data from patients' initial visit. Participants were required to have mild to early-moderate dementia at the initial visit, as defined by a score 16 on the Folstein Mini-Mental State Examination (MMSE) [31]. Further, twenty-two participants from the cohort were removed from the current study because they were missing the main independent variable (subjective word-finding difficulty). These participants did not differ from the current sample in terms of their global cognitive status, levels of depression or dependence, or in terms of their demographic characteristics. Demographic characteristics of the 236 participants included in the analyses are shown in Table 1.

### Measures

**Leisure activity scores—**Estimates of the patients' participation in various leisure activities were derived from a modified version of the Pleasant Events Schedule-AD.[32] The full (53-item) PES-AD and its shortened version have been shown to have strong psychometric validity, as well as high agreement between the full scale and shortened versions.[28] The scale includes versions for both the patient and the caregiver (who answered the questions about the patient's activities), and consists of items regarding the patient's participation in 15 different leisure activities. For each activity, the respondent was asked to indicate how often the patient participated in the activity within the past month (0= None, 1= Few, 2= Often), and whether the patient enjoyed this activity (0=No, 1= Yes).

Social and nonsocial activity composite scores were extracted from the full questionnaire. Items were included in the social composite if the activity invoked expressive communication. All items that lacked communicatory demands were included in the nonsocial composite. One item was added to both composite scores because the description of the activity contained a social component (i.e., playing games or cards) as well as a nonsocial component (i.e., doing crosswords or puzzles). This procedure resulted in a 6-item social composite and a 10-item nonsocial composite (see Table 2). Separate sum scores for frequency and enjoyment were computed for both composites. Possible scores for social activities were 0–12 for frequency and 0–6 for enjoyment. For nonsocial activities, possible scores were 0–20for frequency and 0–10 for enjoyment. Higher scores correspond to greater participation or enjoyment.

### Word-finding ability

**Subjective word-finding difficulty:** In a separate questionnaire, patients and caregivers were asked to indicate whether the patient has "trouble finding the right word when talking" (0=No, 1= Yes). Approximately 52% of patients endorsed word-finding difficulty, and 48% of caregivers indicated that their patients experienced trouble with word finding. Details regarding agreement between patient and caregiver reports are described below. The

patient's perception of word-finding difficulty is the primary independent variable used in this study.

**Objective Word-Finding Ability:** The patients' objective word-finding ability was assessed with three different measures: a 30-item version of the Boston Naming Test[33] (an assessment of visual confrontation naming), letter fluency[34] (where participants are asked to generate as many words beginning with the letter C, F, or L within 60 seconds), and category fluency[34] (where participants were asked to generate as many animals as they could think of within 60 seconds).

**Covariates**—A number of additional variables were considered as potential covariates for regression models predicting leisure activities (see Table 1 for descriptive statistics). Demographic variables included age (continuous), gender (0=male, 1=female), and education (number of years of formal education completed).

**Dependence:** A 13-item Dependence Scale[35] was completed by caregivers to assess the patients' level of reliance on care. Items addressed concerns associated with mild impairment (e.g., Does the patient need help to remember appointments, etc.?) to severe impairment (e.g., Does the patient need to be tube fed?). For two questions pertaining to mild impairment, the caregiver was asked to indicate how often the patient required aid, 0 (Never), 1 (Occasionally), or 2 (Frequently). For all other questions they responded with a simple 0 (No) or 1 (Yes). A patient's dependence score represented the sum of all 13 items. Possible scores were 0–16, with higher scores corresponding to greater dependence.

**Global Cognition:** Global cognitive function was assessed with the modified mini-mental state (mMMS), which includes all items from the MMSE, plus supplementary items used to assess digit span, attention/calculation, semantic knowledge, language, and visual spatial construction. Psychometric properties of the mMMS have been published previously.[36] The maximum score is 57, with higher scores indicating better cognition.

**Depression:** The 7-item depression subscale of the Brief Symptom Inventory[37] was used to evaluate patient's level of depression. Using a 5-point Likert scale, the patient was asked to indicate how frequently he/she was bothered by various symptoms of depressed mood. A patient's depression score was the summed frequency of all items (0–35), with higher scores indicating worse depression.

### Statistical Analyses

All primary variables of interest (subjective word-finding difficulty and leisure activity estimates) were measured via patient self-report. As such, we first wanted to assess the extent to which the patients' reports mapped onto caregiver reports. The relationship between patient and caregiver reports of the patients' word-finding difficulty was evaluated using the Phi Coefficient, a measure of association between two binary variables. Bivariate correlations were conducted to examine the relationship between patient and caregiver reports of the patient's frequency and enjoyment of social and nonsocial activities, and

paired sample *t*-tests were used to characterize discrepancies between the two reporting sources.

Multiple linear regressions were used to examine the effect of subjective word finding on four outcome variables reported by the patient: social activity frequency, social activity enjoyment, nonsocial activity frequency, nonsocial activity enjoyment. Covariates were included in regression models if they were found to be significantly related to *either* leisure activities or word-finding ratings in preliminary univariate analyses (*p*<.05). Bivariate correlations were conducted to measure the association between continuous variables (e.g., leisure activity measures, age, education, depression, and dependence), point biserial correlations were used to measure the association between the dichotomous word-finding variable and the continuous covariates, and the Phi coefficient was used to measure the association between two dichotomous variables (subjective word-finding and gender). As a confirmatory procedure, the same regression model was tested with caregiver reports of social activity substituted as the outcome measure. A Steiger's Z test was performed to test whether the univariate correlation between subjective word-finding difficulty and social leisure activity was significantly greater than the correlation between subjective word-finding difficulty and nonsocial activity. Finally, the relationship between subjective word-finding rating and objective word-finding ability was examined using partial correlations. Significant correlates were entered into a regression model with subjective word-finding difficulty to assess the relative contributions of objective and subjective language difficulty on social leisure activities.

## RESULTS

### Relationship between Patient and Caregiver Reports

Reports of word-finding difficulty supplied by the patients were significantly correlated with the caregivers' reports (*r* =.36, *p*<.001), suggesting that patients were relatively accurate in assessing their own language ability. Further, all indices of social and non-social activity (frequency and enjoyment) showed significant correlations between the patient and caregiver reports (*p*s<.001), with the strength of relationships falling in the moderate to large range. Descriptive statistics for the patient and caregiver reports and the correlation coefficients describing their relationship are shown in Table 3. Patients reported their frequency, *t* (227) = 3.0, *p*=.003, and enjoyment, *t* (220) = 4.2, *p*<.001, of social activities significantly higher than that of their caregivers. Similarly, patient-reported frequency, *t* (219) = 4.5, *p*<.001, and enjoyment, *t* (204) = 5.5, *p*<.001, of nonsocial activities were also significantly higher than the caregiver reports. Hence, while patients rated their participation in leisure activities more frequently and more positively than their caregivers, reporting bias did not differentially affect one type of activity more than the other.

### Predictors of Leisure Activities

Subjective word-finding difficulty was correlated higher depression scores(*r* =.19, *p*=.001), but not with any other covariate measures. With the exception of gender, all covariates were significantly correlated with one or more of the leisure activity measures (*p*<.05). As such, each regression model included word-finding ratings, age, education, dependence, mMMS,

and depression as predictors. Additionally, study site was entered as a nuisance covariate in each model in order to avoid potential differences in measurement procedures or the meaning of constructs (e.g., social activity) across study locations.

### Patient- reported activity engagement

<u>Social Activities:</u> The overall model predicting patients' frequency of social leisure activities was significant, $F (7,217) = 5.72$, $p< .001$. Subjective word-finding difficulty, dependence, and depression emerged as significant independent predictors of patient-reported social activity frequency ($p$s .031). The full model of social activity enjoyment was also significant, $F (7, 213) = 6.21$, $p< .001$. Subjective word-finding difficulty along with dependence and depression each accounted for a unique proportion of variance ($p$s .031). Results from these analyses are shown in Table 4.

<u>Nonsocial Activities:</u> The full model of patient-reported nonsocial activity frequency was significant, $F (7, 212) = 5.16$, $p< .001$, but only age emerged as a significant independent predictor ($p= <.001$). Both age and depression were predictors of self-reported nonsocial activity enjoyment, $F (7, 206) = 3.35$, $p= .002$. Results from regression models of nonsocial outcomes are shown in Table 5.

<u>Comparing social to nonsocial activity:</u> Results from the regression analyses revealed a selective effect of subjective word-finding difficulty on patients' frequency and enjoyment of social activities. To confirm that the strength of association between subjective word-finding difficulty and social leisure activity was reliably different from its relationship with nonsocial activity, a Steiger's Z test was used to compare the magnitudes of the correlation coefficients. Composite social and nonsocial activity scores were computed, which included the sum of the frequency and enjoyment measures. As expected, the correlation between subjective word finding and the social activity composite ($r= -.16$) was significantly larger than its correlation with the nonsocial activity composite ($r= .01$), Steiger's $Z = 2.14$, $p = .02$.

**Caregiver- reported social activity engagement**—The same predictor variables were used in a regression model testing the caregivers' ratings of the patient's participation in social leisure activities. The overall model estimating caregiver reports of patients' frequency of social activities was significant, $F (7, 212) = 6.65$, $p< .001$, $r^2= .18$. Consistent with the above findings, patient-reported word-finding difficulty was a unique predictor of social activity participation as reported by the caregiver ($b= -.6$, $SE B = 0.25$, $beta = -.15$, $p =.02$). Additionally, mMMS($b=.05$, $SE B = .02$, $beta = .15$, $p =.026$) and dependence ($b=-.19$, $SE B = .06$, $beta = -.22$, $p <.001$) ratings were also uniquely related to the caregivers' estimates of patients' social activity.

**Subjective vs. objective word-finding ability**—To examine the extent to which patients' complaints regarding word-finding difficulty mapped on to an actual decline in word retrieval, we examined the relationship between subjective word-finding reports and objective performance on naming, letter fluency, and category fluency tasks. Because only raw scores from the neuropsychological tests were available, the relationships were tested

via partial correlations adjusting for age, sex, and education. Endorsement of word-finding difficulty was associated with poorer performance on letter fluency ($r = -.18$, $p = .017$) and category fluency ($r = -.14$, $p = .054$), but was not associated with performance on the naming task ($r = -.06$, $p = .397$).

To assess the relative contributions of objective vs. subjective word-finding difficulty on social behavior, subjective word-finding reports, both fluency measures, and the demographic variables were entered into a regression equation predicting a social activity composite score (frequency + enjoyment). The model adequately predicted social activity, $F$ (6, 181) = 5.80, $p < .001$, $r^2 = .16$, and both subjective word-finding ratings ($b = -1.06$, $SE\ B = .44$, $beta = -.17$, $p = .018$) and letter fluency ($b = .06$, $SE\ B = .21$, $beta = .24$, $p = .005$) were independent predictors of social activity.

## DISCUSSION

Despite the frequency of word-finding difficulty in healthy aging and dementia, the effect of subjective language complaints on various late life outcomes has not been extensively examined. It is intuitive that failures of language expression, particularly in the ability to access known words and names, would weaken older adults' confidence in conversation[6–9], therefore diminishing their desire to seek out socially-stimulating experiences. In support of this hypothesis, these data are the first to demonstrate an independent effect of perceived word-finding problems on both the frequency and enjoyment of socially-oriented leisure activities among individuals with mild-to-moderate AD.

Multiple factors may contribute to the salience of subjective word-finding difficulty as a predictor of social leisure activities. First, while dementia is associated with reduced insight into behavioral and memory symptoms, recent evidence suggests that AD patients may provide accurate or underestimated assessments of their naming ability.[38] Therefore, patients with early AD may be "hyper-aware" of word retrieval difficulty despite lacking insight into memory decline. This idea was supported by the current data, where patient-reported word-finding difficulty was 1) strongly correlated with the caregiver reports, and 2) was associated with poorer performance on verbal fluency tasks. These findings are indicative of relatively preserved insight into word-finding deficits in AD, at least during the mild-moderate stage. The importance of awareness in influencing social behavior is further emphasized by the fact that subjective word-finding complaints were associated with reduced social engagement above and beyond the effect of objective word-finding ability. Additionally, AD patients may be especially disturbed by symptoms that restrict communication ability. One recent study demonstrated that patients with MCI and mild AD were most distressed about self-detected problems in cognitive skills needed for social interaction relative to other cognitive domains.[39] Overall, the high frequency of patients' self-reported word-finding difficulty, their intact or exaggerated awareness of word retrieval difficulty, and their heightened distress over symptoms that affect social interaction may all contribute to the relationship between subjective word-finding problems and likelihood of (dis)engaging in socially-oriented leisure activities.

It is important to note that the relationship between subjective word-finding difficulty and social activity cannot be accounted for by other related variables, including depression, dependence level, global cognitive ability, and age. Most strikingly, subjective word finding remained a significant predictor of social activity engagement even after controlling for patient depression, which was a correlate of both subjective word finding and social leisure activities. The link between subjective word-finding difficulty and depression converges with previous studies documenting an association between subjective cognitive complaints and depressive symptomology[40, 41], an association that has a number of potential explanations. For example, those who are depressed may over-endorse cognitive problems because they are more focused on negative aspects of life, independent of awareness of cognitive changes. Conversely, older adults may develop depression due to their accurate detection of genuine cognitive decline. Despite the empirical links between subjective cognition, depression, and leisure activities, our patients' perception of word-finding difficulty remained a unique predictor of social activity above and beyond what was explained by depression. Even more convincingly, the relationship between patients' subjective word-finding difficulty and social activity was corroborated by caregivers' reports of the patients' social activity. Hence, the relationship cannot be attributed to a negative self-report bias (e.g., patients who report word-finding complaints and high depressive symptoms thereby underreporting their social activity).

Further support for a unique relationship between expressive language concerns and social activity stems from the fact that subjective word-finding difficulty was *not* related to nonsocial activities. Instead, non-social activities were predicted by age and depression. These results suggest that the association between word-finding complaints and social activity participation is related to the specific cognitive demands of social activity (i.e., interacting with others) and the patients' insight regarding their communicative ability, as opposed to a general mood construct shared by both variables.

The present findings expand upon one recent study reporting an association between self-reported word-finding difficulty and older adults' living environment.[40] Specifically, Martins and colleagues found that word-finding complaints were more common among older adults who lived alone compared to those who lived with family or spouses. Although there are important methodological differences between the two studies (their participants were non demented elders, and their 'living environment' assessment is a less direct measure of social interaction than the leisure activity scale used here), two sources now support a relationship between social interaction and frequency of subjective word-finding complaints in older adulthood. However, the directionality of this association has two alternative explanations. Contrary to our theory that individuals with perceived word-finding problems actively avoid social situations, Martins and colleagues attributed their findings to a protective effect of social stimulation on *objective* word retrieval abilities. In other words, maintaining social interaction might reduce actual language problems in late life, resulting in fewer subjective complaints. There is evidence to suggest that measures of social engagement, such as social network size, mitigate the effects of aging and/or neurodegeneration on global cognitive function[40, 41], which may be true of the language domain as well.

Related to this hypothesis, Martins et al. found that word-finding complaints were related to some measures of objective language ability, most consistently category fluency, which was also marginally associated with household company. In the current sample, subjective word-finding complaints were associated with poorer performance on both verbal fluency measures, but were not linked to measures of global cognition or object naming. Hence, there is converging evidence that word-finding complaints in healthy older adults and patients with mild-moderate AD are related to poorer performance on some indices of actual word retrieval ability. However, the directionality of the relationship between social engagement and subjective word-finding complaints remains unclear. Future research should explore causal or longitudinal models in order to determine whether sustained social engagement indeed protects against objective language/subjective language decline, or whether perceived language decline precipitates social disengagement.

There were a number of methodological limitations of this study. First, neither the word-finding variable nor the leisure activity variables were measured with great precision. Eliciting word-finding complaints via yes/no response limits our ability to evaluate levels of complaint severity or degree of distress regarding these complaints. Further, both frequency and enjoyment of leisure activity measures also had restrictive response scales, and all measures relied on patient self-report, which has obvious limitations in a population with memory impairment. Nonetheless, the correspondence between patient and caregiver reports, as well as the relationship between the objective and subjective word-finding measures allows for some degree of confidence regarding the validity of the scales. We also did not formally evaluate differences in general difficulty between the social and non-social activities. It is possible that social activity engagement is a more sensitive early indicator of overall cognitive impairment, making it more likely to be linked to subjective cognitive complaints. However, social and nonsocial activity scores were similarly associated with measures of disease severity and cognitive status in the correlation analyses, and both regression models included these variables as covariates. Finally, while we argue that the association between social activity frequency and subjective word-finding difficulty is due to the patients' volitional withdrawal from social interaction, it may also be linked to the caregivers' desire to protect loved ones from social embarrassment. In other words, caregivers of patients with profound word-finding difficulty might discourage them from participating in socially-oriented activities. Though this possibility cannot be ruled out entirely, patients' word-finding ratings also predicted their self-rated *enjoyment* of leisure activities, a measure that presumably should not be biased by caregivers' actions.

## CONCLUSION

In summary, the present study suggests that subjective word-finding difficulty is an important predictor of social activity engagement in AD. These findings may have significant clinical and health implications for individuals with dementia. It is important that clinicians seriously consider subjective language complaints reported by both patient and caregiver. A failure to evaluate subjective language complaints could result in social withdrawal symptoms, thereby threatening the patient's quality of life as well as increasing caregiver burden. More importantly, reduced social interaction may ultimately exacerbate language symptoms over time. Emphasizing the extensiveness of word-finding complaints

in older adulthood and dementia may reduce patients' anxiety surrounding this distressing cognitive phenomenon.

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**Table 1**

Sample Characteristics

|  | **Mean** | *SD* | **Sample Range** | **Scale Range** |
|---|---|---|---|---|
| Age | 76.0 | 7.8 | 53–95 | |
| mMMS | 38.4 | 6.4 | 22–52 | 0–57 |
| %Female | 62.0 | - | - | |
| Education | 14.0 | 3.4 | 5–20 | |
| Ethnicity (%) | | | | |
| White | 92.6 | - | - | |
| Black | 6.2 | - | - | |
| Other | 0.8 | - | - | |
| Unknown | 0.4 | - | - | |
| Depression | 9.7 | 3.5 | 7–25 | 0–35 |
| Dependence | 5.2 | 2.2 | 0–12 | 0–16 |

*Note.* mMMS=Modified Mini-Mental State Exam.

**Table 2**

Items in the Social and Nonsocial Activity Composites

| Social Composite | Nonsocial Composite |
|---|---|
| Getting together with family and friends | 1. Being outside, going for walks, enjoying nature |
| Talking to family and friends on the phone | 2. Being with pets or animals, watching animals |
| Going to movies, museums, entertainment | 3. Listening to radio, tapes, or watching TV |
| Going to church, synagogue, religious events | 4. Playing games or cards, and/or doing crosswords, puzzles |
| Playing games or cards, and/or doing crosswords, puzzles | 5. Gardening, plant care, indoors or outdoors |
| Going shopping for groceries, clothes, etc. | 6. Completing a difficult task<br>7. Going for a ride in the car, train or bus<br>8. Reading or having stories read to him/her<br>9. Doing handiwork or crafts<br>10. Exercising, playing or watching sports |

**Table 3**

Patient and Caregiver Reports of Leisure Activities

| Measure | Patient Report M(SD) | Caregiver report M(SD) | Correlation (r) |
|---|---|---|---|
| Frequency of Social Activities (out of 12) | 6.4 (2.1) | 6.0 (1.9) | .51[***] |
| Enjoyment of Social Activities (out of 6) | 4.3 (1.2) | 4.0 (1.3) | .52[***] |
| Frequency of Nonsocial Activities (out of 20) | 11.0 (3.2) | 10.1 (3.0) | .53[***] |
| Enjoyment of Nonsocial Activities (out of 10) | 6.6 (1.8) | 5.9 (1.9) | .45[***] |

Note.

[***] $p<.001$

**Table 4**

Predictors of Patient-Reported Social Activity Measures

| Variable | Social Activity Frequency | | | Social Activity Enjoyment | | |
|---|---|---|---|---|---|---|
| | B | SE B | Beta | B | SE B | Beta |
| Word-finding rating | −0.6 | 0.28 | −0.14[*] | −0.41 | 0.16 | −0.16[*] |
| Education | 0.04 | 0.04 | 0.07 | 0.05 | 0.03 | 0.13 |
| Depression | −0.09 | 0.04 | −0.15[*] | −0.07 | 0.02 | −0.21[**] |
| Dependence | −0.24 | 0.06 | −0.26[**] | −.08 | .04 | −.15[*] |
| Age | .004 | .02 | .01 | .007 | .01 | .04 |
| mMMS | .03 | .02 | .08 | .02 | .01 | .09 |

Note. $r^2 = .16$ for social activity frequency; $r^2 = .17$ for social activity enjoyment. Study site was also entered as a covariate.

[*]
p<.05,

[**]
p<.01

**Table 5**

Predictors of Patient-Reported Nonsocial Activity Measures

| Variable | Nonsocial Activity Frequency | | | Nonsocial Activity Enjoyment | | |
|---|---|---|---|---|---|---|
| | B | SE B | Beta | B | SE B | Beta |
| Word-finding rating | −0.4 | 0.41 | −0.06 | 0.004 | 0.24 | 0.001 |
| Education | 0.07 | 0.07 | 0.08 | 0.06 | 0.04 | 0.10 |
| Depression | −0.09 | 0.06 | −0.10 | −0.08 | 0.04 | −0.14* |
| Dependence | −0.09 | 0.10 | −0.07 | −0.01 | 0.06 | −0.01 |
| mMMS | 0.05 | 0.04 | 0.10 | 0.02 | 0.02 | 0.08 |
| Age | −0.10 | 0.03 | −0.24** | −0.04 | 0.02 | −0.17* |

Note. Note. $r^2 = .15$ for nonsocial activity frequency; $r^2 = .10$ for nonsocial

activity enjoyment. Study site was also entered as a covariate.

*
  $p<.05$,

**
  $p<.01$