Autobiographical Memory Task in Assessing Dementia

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Background: Since 1979, our clinicians have used an autobiographical memory task testing for events that occurred over the most recent week and most recent month in their semistructured interview when assessing for dementia.

Objective: To examine correlations between scores on the autobiographical memory task and on 2 other commonly used brief memory tasks with results of a clinical assessment for dementia.

Design: Correlation study.

Setting: Academic research.

Participants: Participants were enrolled in Washington University Alzheimer Disease Research Center studies, were 60 years or older, and participated in assessments between May 29, 2002, and August 15, 2005 (N=425).

Main Outcome Measures: Nonparametric Spearman rank correlations, adjusted for age and education status, between the Clinical Dementia Rating sum of boxes (CDR-SB) and scores on the autobiographical memory task and on 2 clinical brief memory tasks obtained from the Mini-Mental State Examination and the Short Blessed Test.

Results: Scores on the autobiographical memory task and on each of the other 2 memory tasks correlated significantly with the CDR-SB (P < .001). Scores on the autobiographical memory task had a significantly higher correlation with results of the CDR-SB than the other 2 memory tasks (P < .001).

Conclusion: Clinicians may find the autobiographical memory task an important indicator of memory function and the autobiographical query a useful tool when assessing for dementia.

Arch Neurol. 2010;67(7):862-866.

Episodic memory can be defined as the deliberate retrieval of information obtained at a specific place and time; it involves awareness of self and a sense of moving through time.1,2 Deficits in episodic memory are considered one of the most sensitive and useful diagnostic indicators in assessing the presence of dementing disorders, most commonly Alzheimer disease, particularly in early symptomatic stages.3-5

Tasks involving recall of items or phrases presented by a clinician in the office are a frequently used method of assessing memory deficits. There has been discussion about how these types of brief memory tasks and standardized episodic memory tasks (eg, recall of a story, word pairs, or lists presented in the office) compare with the recall of actual life events, which are typically encoded with greater levels of temporal, emotional, and sensory information.6-8 Common areas of the brain are activated during both types of recall, but there are also distinct areas activated for each.9-11

Given the differences in encoding, retrieval, and brain activation between “autobiographical” memory tasks and frequently used episodic memory tasks,10-12 we compared the correlations of results on these different memory tasks with the outcome of the assessment for dementia in which they were used. An open question is whether the use of an autobiographical memory task can provide research clinicians with a meaningful representation of memory function during assessment for dementia.

Since 1979, our clinicians have used an autobiographical memory task testing memory for events that occurred over the most recent week and most recent month in their semistructured interview when assessing for dementia. Although thought to have good face validity, no formal testing of the psychometric properties of the autobiographical memory task has been completed, to our knowledge. As a first step toward that effort, we examined correlations between scores on the autobiographical memory task and on 2 other commonly
used brief memory tasks with results of a clinical assessment for dementia. We also evaluated interrater reliability between the examining clinician and an independent reviewer of the assessment when rating recall of autobiographical events for a subsample of participants. In addition, we studied correlations of scores on the full Mini-Mental State Examination (MMSE) and the Short Blessed Test (SBT) and on 3 independently administered standardized psychometric tests measuring episodic memory with results of the clinical assessment for dementia.

**METHODS**

Data were obtained from participants enrolled in longitudinal studies at Washington University Alzheimer Disease Research Center, St Louis, Missouri, who participated in assessments conducted between May 29, 2002, and August 13, 2003. In the history of longitudinal studies at the center, changes in our diagnostic methods and measures were made in April 2002 and again in September 2003, when the Uniform Data Set was adopted.

**CLINICAL ASSESSMENT**

Details regarding recruitment, enrollment, and clinical assessment in these longitudinal investigations have been published. Briefly, experienced clinicians conduct semistructured interviews of the participant and a knowledgeable collateral source and complete a general physical and neurologic examination of the participant. Other items from the MMSE and the SBT are interspersed throughout the participant interview such that the total scores for each task are unavailable to the clinician when making his or her final dementia rating and diagnosis.

The interviews assess a participant’s ability to function in each of the following 6 individually scored cognitive domains (or boxes): memory, orientation, judgment and problem solving, community affairs, home and hobbies, and personal care. An algorithm is used to assign a Clinical Dementia Rating (CDR) based on the domain scores; CDR scoring and dementia diagnosis are completed independent of results from a psychometric test battery administered separately, typically 2 weeks after the clinical assessment. Absence of dementia is indicated by a CDR of 0, and very mild, mild, moderate, and severe cases of dementia are represented by CDRs of 0.5, 1, 2, and 3, respectively. The CDR sum of boxes (CDR-SB), used as the measure of dementia severity in this study, is a summation of the scores from the individual domains, ranging from 0 (none) to 18 (maximal impairment).

For participants with a CDR of 0.5 or higher, a clinical diagnosis is assigned in accord with standard criteria. The clinical diagnostic criteria for dementia of the Alzheimer type (DAT) have been validated and are appropriate even for those diagnosed as having DAT at the 0.5 CDR level, who elsewhere may be considered to have mild cognitive impairment. Some individuals with a CDR of 0.5 are not diagnosed as having DAT because they are believed to have a non–Alzheimer disease etiology of their impairment or because the origin of their cognitive changes is uncertain.

In the autobiographical memory task, while the participant is absent, the clinician asks the collateral source to describe details of recent events in which the participant engaged (1) within the past week and (2) within the past month. The clinician may say, for instance, “In order to evaluate your husband’s memory, I would like you to describe a recent event in which both of you participated, something that is not part of the everyday routine.”

**COMPARISON OF CDR-SB WITH PSYCHOMETRIC TEST PERFORMANCE**

A few weeks after the clinical assessment, a 1 1/2-hour psychometric battery is independently administered to the participant by a trained psychometrician. This battery includes measures of episodic and semantic memory, speeded tasks of attention, and visual-perceptual-motor and spatial abilities.

The CDR-SB rating of dementia severity was correlated with scores from the following 3 tests within this battery used to measure episodic memory: (1) Wechsler Memory Scale logical memory (immediate and delayed auditory recall for 2-paragraph stories), (2) Wechsler Memory Scale associate learning (an auditory word-pair associates test), and (3) Free and Cued Selective Reminding Test free recall (a list-learning task with visual and auditory cues). The magnitude of these correlations was likewise individually compared with the magnitude of the correlation between the autobiographical memory task and the CDR-SB.

**INCLUSION CRITERIA**

Inclusion criteria were (1) 60 years or older at the time of clinical assessment, (2) a CDR of 0 with no clinical diagnosis of dementia, a CDR of 0.5 with a diagnosis of DAT, or a CDR of 1 with a diagnosis of dementia, a CDR of 0.5 with a diagnosis of DAT, or a CDR of 1.
with a diagnosis of DAT. For participants who had 1 or more assessments across the study period, data from the first assessment within that period were used. To ensure interrater reliability, clinical assessments are recorded on DVD at the initial evaluation and every other year after that until the participant is diagnosed as having DAT in 2 consecutive years. This DVD is then independently viewed by a second clinician, who scores the recorded assessment as if conducting the interview. Previous investigations performed at our center have shown good to excellent interrater reliability for the overall CDR rating.\(^2\)\(^3\)

For this study, a subset of the participants with DVD recordings was examined to compare the ratings of the reviewer on the recall for the 1-week and 1-month events with those of the clinician who interviewed the participant.

### Statistical Analysis

Nonparametric Spearman rank correlation coefficients, calculated using Fisher z transformation and partialing out the effects of age and years of education, assessed the magnitude of the correlations between results of the CDR-SB and scores on each of the clinical memory tasks and the full MMSE and SBT.

Differences between the rank-based correlation coefficients were tested.\(^2\)\(^6\) Because some participants without dementia would likely obtain the highest scores possible on the memory tasks (ie, ceiling effects), the analyses were repeated after restricting the sample to participants with very mild (CDR of 0.5) and mild (CDR of 1) DAT.

Weighted \(k\) values were used to calculate the agreement between the ratings given by the clinician and the independent reviewer for 1-week and 1-month recall of the events recorded from a sample comprising 15% of participants within each CDR level (0, 0.5, and 1).

### Results

Four hundred twenty-five participants met the inclusion criteria (Table 1). Scores on each memory task significantly correlated with the CDR-SB (\(P < .001\)) (Table 2), and the autobiographical memory task correlated better with the CDR-SB than each of the other memory tasks (\(P < .001\)), including the full MMSE and SBT as well as the psychometric tests. Similar results were found when the sample was restricted to participants with CDRs of 0.5 and 1 (\(n = 158\)). As in the previous analyses, scores on each memory task correlated significantly with CDR-SB (\(P < .001\)), and again the autobiographical memory task correlated better with the CDR-SB than each of the other memory tasks (\(P < .01\)). The autobiographical memory task correlated better with the CDR-SB than the full MMSE (\(P < .001\)) and the full SBT (\(P = .03\)) among the entire participant sample. In the sample restricted to participants with CDRs of 0.5 and 1, there was a higher correlation between the CDR-SB and the autobiographical memory task than between the CDR-SB and the full MMSE (\(P < .001\)); however, no significant difference was observed between the correlations of the autobiographical memory task vs the SBT with the CDR-SB (\(P = .20\)).

Weighted \(k\) values reflecting interrater reliability between the clinician and the tape reviewer were 0.78 (95% confidence interval, 0.61-0.94) for 1-week recall and 0.81 (0.65-0.97) for 1-month recall. Using guidelines by Fleiss,\(^2\)\(^7\) these weighted \(k\) values indicate excellent interrater agreement for both recall types.

### Comment

Scores on the autobiographical memory task had a higher rank-based correlation with results of the CDR-SB than the 2 clinical memory tasks from the MMSE and the SBT, suggesting that clinicians may find the autobiographical memory task at least as informative

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**Table 1. Demographics of the Study Participants**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value (N=425)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Dementia Rating, No. (%)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>267 (62.8)</td>
</tr>
<tr>
<td>0.5</td>
<td>109 (25.6)</td>
</tr>
<tr>
<td>1</td>
<td>49 (11.5)</td>
</tr>
<tr>
<td>Age, mean (SD), y</td>
<td>76.0 (8.1)</td>
</tr>
<tr>
<td>Female sex, No. (%)</td>
<td>250 (58.8)</td>
</tr>
<tr>
<td>Minority race/ethnicity, No. (%)</td>
<td>52 (12.2)</td>
</tr>
<tr>
<td>Education, mean (SD), y</td>
<td>14.5 (3.1)</td>
</tr>
</tbody>
</table>

*aPercentages may not total 100 due to rounding.

**Table 2. Nonparametric Spearman Rank Correlations, Adjusted for Age and Education, Between the Clinical Dementia Rating (CDR) and Other Measures**

<table>
<thead>
<tr>
<th>Variable</th>
<th>CDR 0, 0.5, and 1 (N=425)</th>
<th>CDR 0.5 and 1 (N=158)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Point Estimate</td>
<td>(95% Confidence Interval)</td>
</tr>
<tr>
<td>Autobiographical memory task</td>
<td>-0.72</td>
<td>-0.67 to -0.76</td>
</tr>
<tr>
<td>SBT John Brown phrase</td>
<td>0.58</td>
<td>0.51 to 0.64</td>
</tr>
<tr>
<td>MMSE 3-item recall task</td>
<td>0.52</td>
<td>0.45 to 0.50</td>
</tr>
<tr>
<td>Full SBT</td>
<td>0.65</td>
<td>0.59 to 0.70</td>
</tr>
<tr>
<td>Full MMSE</td>
<td>-0.55</td>
<td>-0.48 to -0.61</td>
</tr>
<tr>
<td>WMS logical memory</td>
<td>-0.53</td>
<td>-0.46 to -0.59</td>
</tr>
<tr>
<td>WMS associate memory</td>
<td>-0.58</td>
<td>-0.52 to -0.64</td>
</tr>
<tr>
<td>Free and Cued Selective Reminding Test free recall</td>
<td>-0.60</td>
<td>-0.53 to -0.65</td>
</tr>
</tbody>
</table>

Abbreviations: MMSE, Mini-Mental State Examination; SBT, Short Blessed Test; WMS, Wechsler Memory Scale.
as the brief clinical memory measures in assessing clinical memory function, a key factor in determining the final dementia rating. The clinician synthesizes all information from the neurologic assessment and the structured interviews with the participant and collateral source to determine the final rating in each CDR domain and, ultimately, the CDR global score. Therefore, the information from the 2 brief memory tasks and the autobiographical memory task is used in the clinical assessment process so that a positive relationship between each of the 3 tasks and the outcome of that assessment is to be expected. However, the correlation of the autobiographical memory task with the CDR-SB was significantly higher than the correlations of the other 2 brief memory tasks. The full MMSE and SBT correlations with the CDR-SB were lower than the correlation with the autobiographical memory task among the entire participant sample. This result was surprising, as the MMSE and SBT include measurement of other dementia symptoms (eg, orientation) and would have been expected to correlate more closely with the dementia severity rating. The 3 independently administered standard measures of episodic memory were not used by clinicians in generating dementia severity ratings and cannot be compared against the other measures in the same manner. However, the correlations of these test results with the CDR-SB do not exceed those of the autobiographical memory task.

Cognitive researchers have questioned the comparability of memory for laboratory measures with the type of memory that occurs in actual life events. In the clinical setting, episodic memory measures are administered within a brief period, typically in an emotionally neutral manner. Autobiographical memories involve a spatial element and a continuity of events preceding and following, are often encoded with sensory stimuli, and include differing degrees of emotional involvement and personal importance. Findings from imaging studies suggest that the retrieval of these types of memories requires a broader network of brain areas to be activated than episodic memories for standard tests. Some researchers have suggested that laboratory episodic memory and autobiographical memory may be seen as positions on a spectrum of complexity in memory for specific events. Although we did not directly test the ecological validity of the autobiographical memory task, our results suggest that clinicians may look to the complexity of autobiographical memories as an important indicator of clinical memory function when assessing for the presence and severity of dementia.

A limitation of the autobiographical memory task for recent events measure is that it takes more time to administer than the brief clinical measures obtained from the MMSE and SBT. It also requires the availability of a collateral source who can recount events in which the participant was involved within the past week and the past month and that are adequately rich in detail. The autobiographical memory task has been used at our center since 1979, and the degree to which clinicians at other research sites would value the autobiographical memory task is yet to be determined. Although more work is needed to establish the reliability and validity of our measures, the results herein suggest that recall of recent autobiographical events may be a useful tool in the assessment of clinical memory function when evaluating for dementia.

Accepted for Publication: October 30, 2009.

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Author Contributions: Dr Roe had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Maue Dreyfus, Roe, and Morris. Acquisition of data: Maue Dreyfus, Roe, and Morris. Analysis and interpretation of data: Maue Dreyfus, Roe, and Morris. Drafting of the manuscript: Maue Dreyfus and Roe. Critical revision of the manuscript for important intellectual content: Maue Dreyfus, Roe, and Morris. Statistical analysis: Roe. Obtained funding: Morris. Study supervision: Morris.

Financial Disclosure: None reported.

Funding/Support: This study was supported in part by the Charles and Joanne Knight Alzheimer Research Initiative of Washington University’s Alzheimer Disease Research Center and the Postdoctoral Program of 1UL1RR024992-01 from the National Center for Research Resources (Dr Roe), and by grants P50-AG05681, P01-AG03991, and P01-AG26276 from the National Institute on Aging (Dr Morris).

Additional Contributions: The Clinical Core of the Washington University Alzheimer Disease Research Center provided data, Monique Marie Williams, MD, and Mary Ann Coats, MSN, gave helpful comments, and Molly Lue Aeschleman, BA, and Jane Sundermann, BA, assisted in gathering data.

REFERENCES