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Autobiographical Memory Task in Assessing Dementia

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Abstract

Objective—To appraise the relationship of a task assessing memory for recent autobiographical events and those of two commonly used brief memory tasks with the results of a clinical assessment for dementia.

Design, Setting, and Participants—We compared correlations between a task assessing recall of recent autobiographical events and two frequently-used brief clinical memory measures with dementia ratings by clinicians. Participants were enrolled in Washington University Alzheimer’s Disease Research Center studies, were aged 60 years or above, and took part in assessments between May 2002 and August 2005 (N=425).

Main Outcome Measures—Nonparametric, rank-based Spearman correlations, adjusted for age and education, between the Clinical Dementia Rating Sum of Boxes (CDR-SB) and scores on the autobiographical recall query and two clinical memory tasks taken from the Mini-Mental State Exam and the Short Blessed Test.

Results—The autobiographical recall task and each of the other brief clinical measures correlated significantly with the CDR-SB ($p < .0001$). The autobiographical recall task had a significantly higher correlation ($p < .0001$) with the CDR-SB than the two commonly-used clinical memory measures.

Conclusions—Clinicians may find autobiographical memories an important indicator of clinical memory function and the autobiographical query a useful tool when assessing for dementia.

Introduction

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

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in assessing the presence of dementing disorders, most commonly Alzheimer's disease (AD), and 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 regarding how these types of brief memory tasks and standardized episodic memory tasks (e.g. recall of a story, word pairs, or lists presented in the office) compare to 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, yet there are also distinct areas activated for each.^{6,8-11}

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 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 recall 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, assessing memory for events that occurred over the most recent week and most recent month, in their semi-structured interview when assessing for dementia. Although thought to have good face validity, no formal testing of the psychometric properties of the task has been completed. As a first step toward that effort, we examined the correlations between the ratings on the autobiographical memory measures and those of the other memory tasks with the final determination of dementia. We also examined the interrater reliability between the clinician and tape reviewer when rating recall of autobiographical events for a subsample of participants. In addition, we have included correlations of the full MMSE and SBT as well as three independently administered standardized psychometric tests measuring episodic memory to the results of the assessment for dementia.

Methods

Data were obtained from participants enrolled in longitudinal studies at the Washington University Alzheimer's Disease Research Center (WU ADRC) who took part in assessments conducted between May 2002 and August 2005. In the history of longitudinal studies at the WU ADRC, evolution of our diagnostic methods and measures has occurred, including in April 2002 and again in September 2005 when the Uniform Data Set¹³ was adopted.

Clinical assessment

Details regarding recruitment, enrollment, and clinical assessment in these longitudinal studies have been published.¹⁴ Briefly, experienced clinicians conduct semi-structured interviews of the participant and a knowledgeable collateral source (CS), 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 test are not available to the clinician when making his or her final dementia rating and diagnosis.

The interviews assess the participant's ability to function in each of six 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);¹⁵ based on the domain scores; CDR scoring and dementia diagnosis are completed independent of results from a psychometric test battery administered separately, typically two weeks after the clinical assessment. Absence of dementia is indicated by a CDR of 0, and very mild, mild, moderate, and severe dementia is represented by CDR 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 domains¹⁶ with a range from 0–18 (from no to maximal impairment).

For participants receiving a CDR of 0.5 or above, a clinical diagnosis is assigned in accordance with standard criteria.¹³ The clinical diagnostic criteria for dementia of the Alzheimer type (DAT) have been validated¹⁴⁻¹⁷ and are appropriate even for those diagnosed with DAT at the CDR 0.5 level¹⁸ who elsewhere may be considered to have mild cognitive impairment (MCI).¹⁹ Some CDR 0.5 individuals are not diagnosed with DAT, either because they are believed to have a non-AD etiology for 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 CS 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.” Examples of such events that can be offered include voting in an election, attending religious activities, participating in a family celebration, hosting visitors, making a notable purchase (e.g., a new appliance), visiting a physician, and dining with friends. When later separately interviewing the participant, the clinician probes for the participant’s recall of the recent events reported by the CS with broad, open-ended questions. Using the CS’s report as the “criterion standard” for both the 1-week and 1-month events, the clinician rates the participant’s recall for each of the events as Largely Correct (1 point), Partially Correct (0.5 points), or Largely Incorrect (0 points). The assignment of partially correct is used when a participant requires prompting in order to produce details of the event as well as when the details provided are partially incorrect. The scores for the two tasks are then summed, yielding a range of 5 possible scores, from 0 (largely incorrect recall for both tasks) to 2 (largely correct recall for both tasks).

Information provided by a collateral source when evaluating for dementia is a widely used technique that was incorporated by the National Alzheimer’s Coordinating Center in the development of the Uniform Data Set.¹³ At our center, two collateral sources are requested for each individual when seen for evaluation. In the event that a CS is considered unreliable due to inadequate contact with the participant, questionable cognitive functioning, or for other reasons, the second collateral source is contacted for participation in the clinical assessment.²⁰

The autobiographical recall task was compared with two clinical memory tasks taken from the Mini-Mental State Exam²¹ and the Short Blessed Test.²² The autobiographical recall task appears before the other items within the clinical assessment packet. In the MMSE 3-item recall task, participants are asked to repeat the names of three objects and to recall the objects a few minutes later after answering a number of unrelated questions. One point is assigned for each item not recalled. Thus, scores range from 0 (all three items recalled correctly) to 3 (no items recalled correctly). The SBT task entails asking the participant to repeat a 5-item name and address, and to recall the name and address a few minutes later. Performance on the task is scored as the number of errors in recall, and ranges from 0 to 5.

As the MMSE and SBT are administered in their entirety during the course of the clinical assessment and because these measures are frequently used in the assessment for dementia by many clinicians, we also correlated the scores from the full (30-point) MMSE and (28-point) SBT with the CDR sum of boxes scores in this sample.

Comparison of CDR-SB with psychometric test performance

A few weeks after the clinical assessment, a 1.5 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.^{18,23}

The CDR-SB rating of dementia severity was correlated with scores from three tests within this battery used to measure episodic memory: Wechsler Memory Scale.²⁴ Logical Memory, immediate and delayed auditory recall for two paragraph-long stories; WMS Associate Memory, an auditory word pair associates test; and Buschke Free and Cued Selective Reminding Test (FCSRT),⁴ Free Recall, a list learning task with visual and auditory cues. The magnitude of these correlations were likewise individually compared with the magnitude of the correlation between the autobiographical memory task and the CDR-SB.

Inclusion criteria

Inclusion criteria were (1) age 60 years or above at the time of clinical assessment, (2) a CDR of 0 with a clinical diagnosis of no dementia, a CDR of 0.5 with a diagnosis of DAT or a CDR of 1 and a diagnosis of DAT. For participants who had one or more assessments across the study period, data from the first assessment within that time 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 rated DAT two years in a row. This DVD is then independently viewed by a second clinician who scores the recorded assessment as if conducting the interview. Previous studies done at our center have shown good to excellent interrater reliability for the overall CDR rating.²⁵ For this study, a subset of the participants who were DVD reviewed was examined to compare the ratings of the reviewer on the recall for the one week and one month events with those of the clinician who interviewed the participant.

Statistical analyses

Nonparametric Spearman correlation coefficients, calculated using Fisher's z transformation and partialling out the effects of age and years of education, assessed the magnitude of the correlations between the CDR-SB and each of the clinical memory tasks and the full MMSE and SBT. Differences between the rank-based correlation coefficients were tested.²⁶ Because some nondemented participants would likely obtain the highest scores possible on the memory tasks (i.e., ceiling effects), the analyses were repeated after restricting the sample to participants with very mild (CDR 0.5) and mild (CDR 1) DAT.

Weighted kappa values were used to calculate the agreement between the ratings given by the clinician and tape reviewer for one-week and one-month recall of the events, for taped autobiographical memory tasks from a sample of 15% percent of participants within each CDR level (CDR 0, CDR 0.5, and CDR 1).

Results

Four hundred twenty-five participants met inclusion criteria (Table 1). Each of the memory tasks was significantly correlated with the CDR-SB ($p < .0001$; Table 2), and the autobiographical memory task correlated better with the CDR-SB than each of the other memory tasks ($p < .0001$). Similar results were found when the sample was restricted to participants with CDR 0.5 and CDR 1 only ($N=158$, Table 2). As in the previous analyses, each memory task correlated significantly with CDR-SB ($p < .0001$), but the autobiographical memory task correlated more highly with the CDR-SB than each of the other tasks ($p < .013$). The autobiographical memory task correlated more highly with the CDR-SB than the full

MMSE ($p < .0001$) and the full SBT ($p = .033$) in the entire participant sample (Table 2). In the sample restricted to participants with CDR 0.5 and CDR 1, there was a higher correlation between the CDR-SB and the autobiographical memory task than between the CDR-SB and full MMSE ($p < .0001$); however, no significant difference was observed between the correlations of the autobiographical memory task and SBT with the CDR-SB ($p = .199$; Table 2).

Weighted kappa values reflecting interrater reliability between the clinician and tape reviewer were .78 (95% CE = .61–.94) for one week and .81 (95% CI = .65–.97) for one-month recall. Using the guidelines of Fleiss,²⁷ these weighted kappa values indicate excellent interrater agreement for both recall types.

Comment

The autobiographical recall task had a higher rank-based correlation with the CDR-SB than the two clinical memory tasks from the MMSE and the SBT, suggesting that clinicians may find the autobiographical recall task at least as informative 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 neurological assessment and the structured interviews with the participant and CS to determine the final CDR rating in each domain, and ultimately, the global CDR score. Therefore, the information from the two brief memory tasks and the autobiographical recall task are all used in the clinical assessment process so that a positive relationship between each of the three tasks and the outcome of that assessment is to be expected. However, the correlation of the autobiographical task with the CDR-SB was significantly higher than the correlations of the other two brief memory tasks. The full MMSE and SBT correlations with the CDR-SB were lower than the correlation with the autobiographical task in the entire participant sample. This result was surprising, since the MMSE and SBT include measurement of other dementia symptoms (e.g., orientation), and would have been expected to correlate more closely with the dementia severity rating. The three 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 task.

Cognitive researchers have raised questions about the comparability of laboratory measures to assess the type of memory that takes place in actual life events.^{7,12} In the clinical setting, episodic memory measures are administered within a brief period, typically in a manner that is emotionally neutral. 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.¹² 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.^{6,10,28} Some researchers have suggested that laboratory episodic memory and autobiographical memory may be seen as positions on a spectrum of complexity of memory for specific events.²⁸ 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 for recent events measure is that it takes more time to administer than the brief clinical measures taken from the MMSE and Short Blessed tests. It also requires the availability of a collateral source who can recount events in which the participant was involved within the last week and within the last month, and that are adequately rich in detail. The autobiographical 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, our results suggest that recall of recent autobiographical events may be a useful tool in the assessment of clinical memory function when evaluating for dementia.

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Table 1

Demographics (N = 425).

	N/Mean	%/SD
CDR		
0	267	62.8%
0.5	109	25.7%
1	49	11.5%
Age, y	76.0	8.1
Women	250	58.8%
Minority race	52	12.2%
Education, y	14.5	3.1

Table 2

Spearman correlations with the Clinical Dementia Rating-Sum of Boxes adjusted for age and education.

	CDR 0, 0.5, 1 (N = 425)				CDR 0.5 and 1 (N = 158)			
	Point estimate	Lower 95% CI	Upper 95% CI	Point estimate	Lower 95% CI	Upper 95% CI	Upper 95% CI	
Autobiographical Recall Task	-.72	-.67	-.76	-.61	-.50	-.70		
SBT John Brown Phrase	.58	.51	.64	.44	.30	.56		
MMSE 3-item Recall	.52	.45	.59	.43	.29	.55		
Full SBT	.65	.59	.70	.53	.41	.63		
Full MMSE	-.55	-.48	-.61	-.58	-.46	-.67		
Episodic memory measures								
WMS Logical Memory	-.53	-.46	-.59	-.41	-.27	-.53		
WMS Associate Memory	-.58	-.52	-.64	-.41	-.27	-.53		
SRT Free Recall	-.60	-.53	-.65	-.51	-.39	-.62		

Abbreviations: SBT = Short Blessed Test, MMSE = Mini Mental State Examination, WMS = Wechsler Memory Scale, SRT = Selective Reminding Test