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RBANS analysis of verbal memory in multiple sclerosis

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Abstract

Patients with neurodegenerative diseases that cause mainly subcortical pathology often exhibit impairment when required to recall lists of unrelated words, but their memories are supposedly improved by test procedures that promote retrieval such as recognition or improve the organization of the to-be-remembered materials. Difficulties with floor effects on free recall and ceiling effects on recognition and other methodological concerns raise doubts about the validity of existing studies that tested these ideas. Using the verbal memory subtests of the RBANS, we [Arch. Clin. Neuropsychol. 18 (2003) 509] expressed each patient's performances on Story Memory, List Learning, Story Recall, List Recall, and List Recognition as *Z* scores relative to his or her age group. Then, the *Z* scores were subtracted pairwise to test hypotheses about the nature of memory in Parkinson's disease (PD). Contrary to expectation, patients with PD did not show better immediate or delayed recall of stories relative to lists and they did not show better recognition than recall.

In the present investigation, the same methodology was used to study verbal memory in multiple sclerosis, a disease that primarily affects subcortical structures. In contrast to previous results for patients with PD, the patients with MS exhibited better recall of stories than of lists and better List Recognition than Recall. Differences in the pathology of entorhinal regions in PD and MS may contribute to the differing patterns of memory impairment of these patients. The results emphasize that most patients with MS with memory impairments have deficits that are relatively mild and potentially remediable.

Keywords: RBANS analysis; Verbal memory; Multiple sclerosis

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1. Introduction

The memory disturbances that accompany Parkinson's disease (PD) and multiple sclerosis (MS) appear to differ qualitatively as well as quantitatively from those associated with Alzheimer's disease (AD) and temporal lobe amnesia. Manipulations of the test format that promote encoding or facilitate retrieval are reported to improve memory by patients with PD or MS, but the same procedures are much less effective for patients with AD or amnesia (Cummings, 1990). These observations support the view that retrieval failure is the major cause of memory impairment in PD (Weingartner, Burns, Diebel, & DeWitt, 1984) and MS (Rao, Leo, & Aubin-Faubert, 1989). Other findings, however, are inconsistent with the idea that defective retrieval is the main factor in the memory disturbances of patients with PD or MS. Impairments in recognition as well as recall have been noted in a number of studies of patients with PD or MS (Beatty, Staton, Weir, Monson, & Whitaker, 1989; Carroll, Gates, & Johnson, 1984; Sullivan & Sagar, 1989).

Devising a valid way of comparing performances on memory tests using different formats is not simple. Free recall measures may be vulnerable to floor effects while recognition tests may be insensitive because of ceiling effects. Recently, we compared performance by patients with PD or AD on the verbal memory components of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS; Randolph, 1998). We (Beatty et al., 2003) utilized the excellent norms for this test to calculate *Z* scores for each subject on each of the relevant subtests. Then, the *Z* scores were subtracted pairwise to test specific hypotheses about memory and other cognitive functions. Both patient groups performed more poorly on tests that required motor skill or cognitive speed and this was true for all cognitive domains (Language, Visuospatial/Construction and Attention) examined. Thus, PD patients exhibited the expected mental slowing observed in many other studies (Beatty et al., 1989; Cummings, 1990). In contrast to prediction, the patients with PD did not learn or remember stories better than unrelated word lists and they also did not perform better on recognition than on recall tests for memory for word lists. This finding raises questions about the validity of the retrieval failure explanation of impaired memory in PD. In the present study, the performance of patients with MS examined using the same battery of measures and analyses from the RBANS employed in the earlier study of patients with AD or PD (Beatty et al., 2003). Based on neuropsychological studies of the average performance of large groups of patients, cognitive deficits in MS fit in the typical pattern of subcortical disease (Rao, 1986).

2. Method

2.1. Participants

The participants were 58 patients (27 M, 31 F) with clinically definite MS. Fifty of the patients (20 M, 30 F) attained scores of at least 27 on the MMSE (the lower limit of healthy controls from central Oklahoma; Folstein, Folstein, & McHugh, 1975). The remaining MS patients (7 M, 1 F) scored between 22 and 26 on the MMSE. The proportion of men was significantly higher in the low MMSE-MS group than in the MS group of normal mental