



Processing Speed Deficits Are Predictive of Difficulties with Visuospatial Memory in M.S.



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Abstract

Objectives: To determine if processing speed is a reliable predictor of visuospatial memory in individuals with Multiple Sclerosis (MS).

Methods: Participants (N = 260) were recruited from an outpatient MS clinic at Holy Name Medical Center in Teaneck, NJ, to undergo neuropsychological evaluation. Participants were administered the Incapacity Status Scale (ISS), Brief Visuospatial Memory Test-Revised (BVM-T-R) and Symbol Digit Modality Test (SDMT) to assess disability status, visuospatial memory and processing speed, respectively. A hierarchical regression analysis was conducted to determine if processing speed significantly predicts visuospatial memory.

Results: Results of regression analysis indicated that processing speed scores on the SDMT significantly predict visuospatial memory as assessed by the BVM-T-R in individuals with MS. Processing speed accounts for 28.3 percent of the variation in visuospatial memory scores ($R^2 = 0.283$, $F(5,212) = 18.12$, $p < 0.0005$).

Conclusions: Processing speed is predictive of visuospatial memory in individuals with MS when controlling for age, gender, education, and disability status. The timed nature of the BVM-T-R requires quick acquisition of information, which later impacts visuospatial recall abilities. Therefore, deficits in processing speed, as assessed by the SDMT, are predictive of visuospatial memory impairments.

Background

Previous research indicates that cognitive changes are very common in individuals with MS and can be amongst its most disabling features. Speed of information processing underlies various cognitive domains and deficiencies in this area can affect other mental abilities. Slowness of mental processing is a chief complaint among the MS population, where deficits have been found to be prevalent. The literature suggests that visuospatial memory difficulties are present within the MS population as well.

Methods

Sample: Data was collected from 112 patients with confirmed MS diagnoses who had been referred for neuropsychological testing within the context of general MS care at the MS Center at Holy Name Medical Center in Teaneck, NJ.

Materials: The *Symbol Digit Modalities Test* was used to measure processing speed. The *Brief Visuospatial Memory Test- Revised* was used to assess visuospatial abilities. Age, gender, education, and disability status were controlled for. Disability status was assessed using the *Incapacity Status Scale (ISS)*. All of the instruments have been well validated in the MS population. Age, gender, and education were self-reported.

Statistical Analysis: Linear regression models were used to assess the predictive strength of total number of items correct on the SDMT on total number of items correct on the BVM-T-R. Age, gender, education, and severity of disability were accounted for.

Age (years)	Range = 18-79	M=45.9
Gender	Female: n=157 (72.7%)	Male: n=59 (27.3%)
Education	Range= 9-20	M=14.6

Results

Results indicated that processing speed, as measured by number of items correct on the SDMT is predictive of visuospatial memory, measured by total number of items correct on the BVM-T-R in MS. Age, gender, ISS, and years of education were controlled for. Processing speed accounts for 28.3 percent of the variation in visuospatial memory scores ($R^2 = 0.283$, $F(5,212) = 18.12$, $p < 0.0005$).

Conclusions and Limitations

- Processing speed is often compromised in patients with MS who have cognitive difficulties.
- Total score on SDMT is predictive of total recall score on the BVM-T-R, suggesting that processing speed predicts visuospatial memory.
- This is significant because processing speed impacts acquisition of information, thus impacting recall. The literature suggests processing speed impacts various areas of cognitive function.
- The present study shows that difficulties with processing speed impact visuospatial memory. If information is not properly acquired, recall will be challenging.
- The implications of this finding suggest that cognitive rehab addressing processing speed may be beneficial for improving visuospatial memory in MS.

References

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