



# Attention Span, Verbal Memory, and Spatial Memory as Variables in Neuropsychological Test Performance



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## Objective

We investigated (a) the role of attention span, verbal, and spatial memory in performance on widely used neuropsychological tests, and; (b) the impact of anxiety and depression levels on attention span and verbal and spatial memory.



## Methods and Participants

579 referrals to a memory disorders clinic, 60% women, 84% white non-Hispanic, average age  $59.8 \pm 15.7$  and education  $14.9 \pm 2.9$  years. They were referred to help diagnose their symptoms of forgetfulness, distractibility, and/or word finding difficulties. We used a comprehensive battery (HRNES-R), and protocols were screened for performance invalidity using Reliable Digit Span and Digit Span scaled score.

## Conclusions

- (1) After controlling for “incomplete effort”, attention span and spatial memory were significantly related to performance on widely used neuropsychological tests that tap multiple cognitive domains. The relation of verbal memory in performance on other tests, while statistically significant, was less predictive.
- (2) MMPI-2 levels of anxiety and depression had no relation to performance on attention span, verbal memory, and spatial memory tests. MMPI-2 and other tests of emotional status, while predictive of cognitive *efficiency* in daily living, are largely unrelated to cognitive *capacity*.

## Results

Ten measures of attention and memory were factor analyzed (PCA/Varimax) yielding three factors: Spatial Recall (SR), Verbal Recall (VR), and Attention Span (AS ). Attention and Spatial Recall were respectively predictive of performance on Category Test ( $rs=.37, .41$ ), Trails B (.32, .48), TPT-Total Time (.35, .53), Coding (.31, .29), Block Design (.31, .37) and the Average Impairment Scale (AIS) (.45, .68), all  $ps < .001$ . In contrast, Verbal Recall was less predictive across all measures.

Levels of anxiety (MMPI-2 ANX) and depression (DEP) were not predictive of Attention ( $rs=-.01, .00$ ), Spatial Recall (.02, .02), or Verbal Recall (.03, .02).

## Measures

01

The **Test of Premorbid Functioning (TOPF)** is a reading measure used to predict longstanding intelligence.

02

The **Minnesota Multiphasic Personality Inventory-2 (MMPI-2)** consists of 567 true/false statements that assess personality and emotional functioning.

03

**Halstead Russell Neuropsychological Evaluation System, Revised (HRNES-R)** is a comprehensive battery of tests that measure neurobehavioral and cognitive abilities.

