Working Memory Capacity and Context-Processing Views of Cognitive Control

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ABSTRACT

We compared the performance of individuals that were high and low in working memory capacity on a version of the AX continuous performance test. The results suggested that high and low spans show similar levels of performance across trial types, in contrast to predictions from a strict context-processing view.

METHOD

Participants
Two groups of 30 high and 27 low spans were obtained using the upper and lower quartiles of performance on the Automated Operation Span task.

Procedure
AX-CPT: Targets were defined as the letter X following after the letter A. Participants were instructed to press one button for targets and another button for nontargets (all other letter combinations). Target (A—X) trials occurred 70%, and each nontarget (A—nonX, nonA—X, nonA—nonX) trial type occurred 10%. The delay between the letters varied equally between 1000 ms (SHORT) and 5000 ms (LONG). Participants received 8 blocks of 20 trials. All trial types were randomly intermixed in each block.

RESULTS

The performance of high and low spans did not differentiate as would be expected from the view that low spans suffer from impaired context updating or maintenance (Fig.2).

Overall, the error results (Fig.3) replicated previous results with healthy, young adults (viz., an increase in A—nonX errors), indicative of intact context-processing. The RT results (Fig.4) corroborate the error findings: high and low spans were BOTH slowest on A—nonX trials. The results did not show the predicted pattern of low spans showing an impairment on nonA—X trials, or a deficit on those trials that worsened with delay.

CONCLUSIONS

• Low spans did not exhibit the tendencies of impaired context-processing as compared to schizophrenics and older adults (poor performance on nonA—X trials).
• Instead, the error results were suggestive of low spans’ inability to stop a primed response short A—nonX trials, even when prepotency must be learned (compared to Stroop, antisaccade).
• Follow-up work is being conducted on the different task manipulations (discrete vs. continuous presentation; blocked vs. intermixed intervals; short vs. long blocks of trials) to examine what role these play in determining the processes necessary for task success (Fig.5).

REFERENCES

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