Working Memory Capacity Influences Strategic Choice on a Cognitive Control Task

Lauren L. Richmond¹, Thomas S. Redick², Todd Braver³

¹ Temple University, ² Indiana University-Purdue University Columbus, ³ Washington University in St. Louis

Background

- WMC has been shown to influence abilities in a number of domains including fluid intelligence, reasoning and reading comprehension (Engle, 2010).
- There is some suggestive evidence that people with high WMC exhibit proactive control, whereas low WMC people exhibit primarily reactive control.

![Illustrations of proactive and reactive control. Reprinted from Braver, 2012.]

- The AX-CPT paradigm involves attending to both a cue and a target to determine the appropriate response.

![AX-CPT illustration; target sequence]

![Hierarchical regressions were conducted. First, BY performance was entered into the model as a control variable. Next, WMC was entered into the model.]

![Operation span and symmetry span task schematic.]

- Participants completed one cognitive control task (AX-CPT), and two complex WMC tasks (Operation Span and Symmetry Span; Unsworth, Heitz, Schrock & Engle, 2005). Order of administration was randomized.

![Frequency AX AY BX BY]

![R2 change AX AY BX]

- Hierarchical regressions were conducted. First, BY performance was entered into the model as a control variable. Next, WMC was entered into the model.

![Experiment 1]

- The higher one’s WMC, the greater likelihood of using proactive control (higher accuracy on AX and BX trials, longer RTs on AX trials).

![Experiment 2]

- Higher WMC influences one’s ability to do well on AX trials whether the A-cue is predictive of an X target or not (i.e. high WMC still confers an overall advantage in this task).

Conclusion

- Low WMC is associated with reduced levels of proactive control.
- WMC may not only modulate abilities in other cognitive domains by directly facilitating a given process, but may also support the optimal strategy choice and approach given task constraints and goals.
- In a task such as the AX-CPT, high WMC can confer benefits as well as costs.

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