

"Memory compression" effects in visual working memory are contingent on explicit long-term memory

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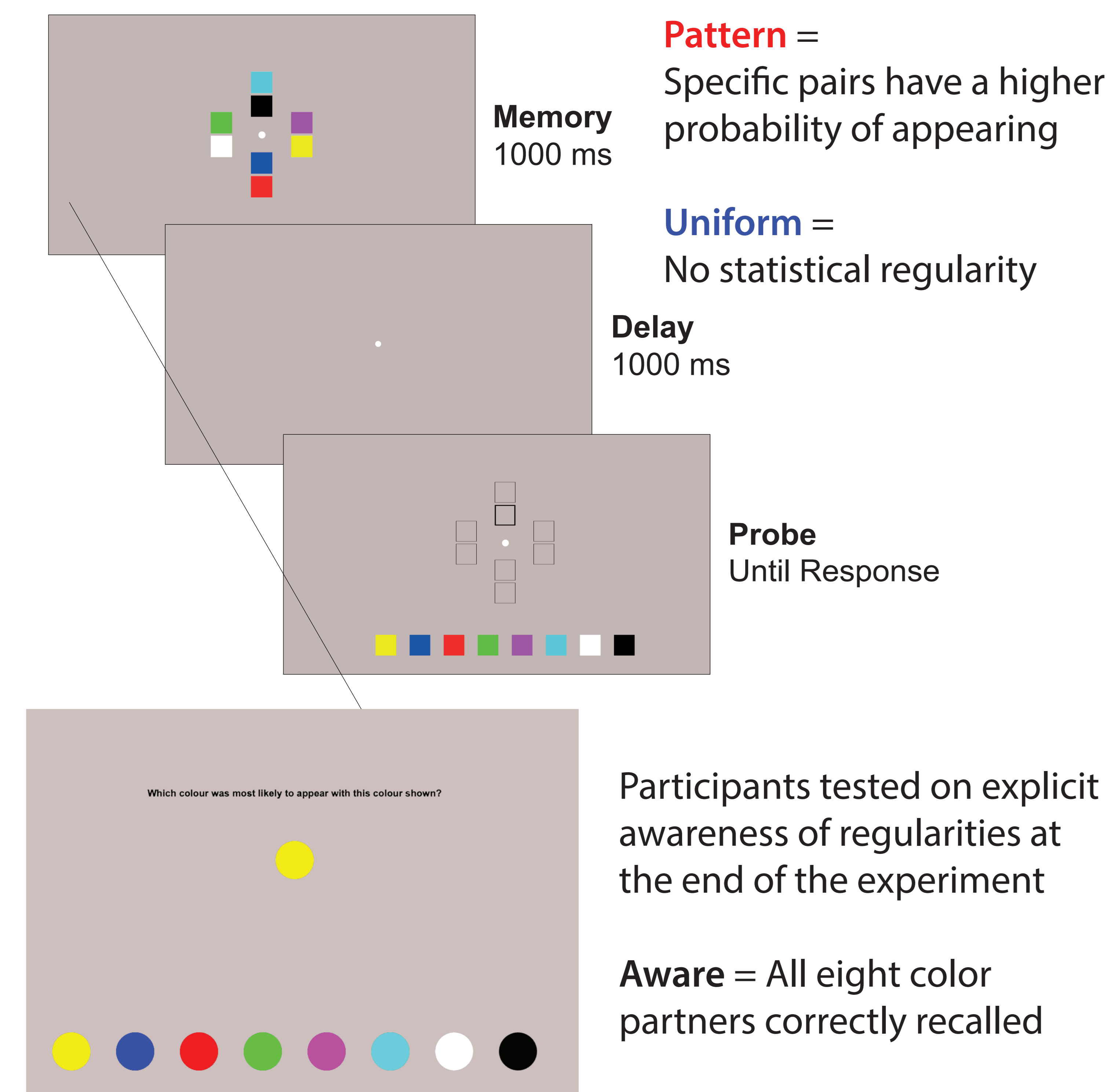
Visual working memory (VWM) is typically limited to about 3-4 objects' worth of information. Brady *et al.* (2009) found including statistical regularities in displays enabled observers to circumvent this limit and store **twice the amount of information**.

This was proposed to be a result of *visual statistical learning*, a process by which observers learn subtle statistical relationships **implicitly**. This enables "compression" of the VWM representations, expanding the number of items that can be concurrently maintained.

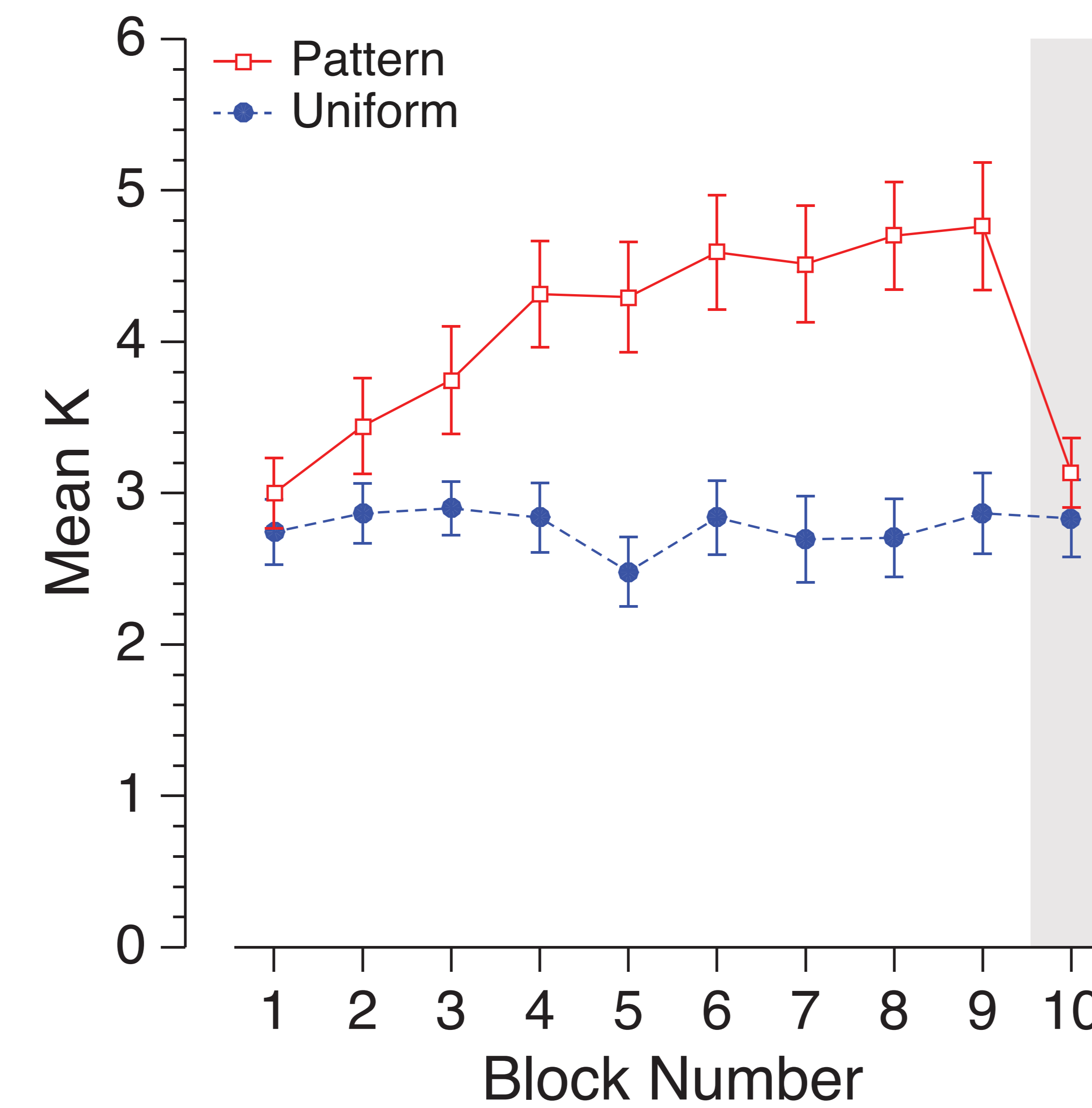
However, previous studies (Logie *et al.*, 2009; Olson & Jiang, 2004) have found no improvement in change detection with repeated displays.

Here, we examined whether this "compression" effect entails an increase in the number of individuated VWM representations, or is better explained by the acquisition of explicit long term memories.

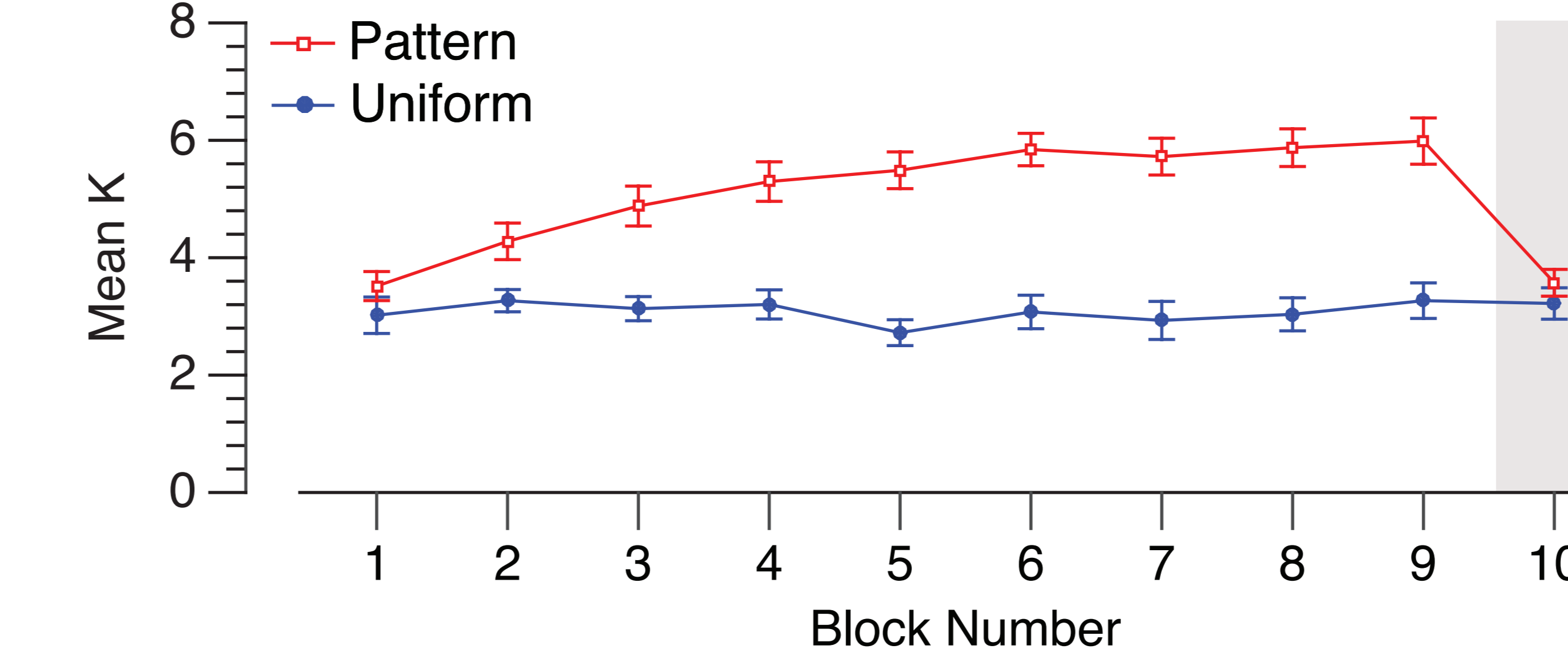
Method



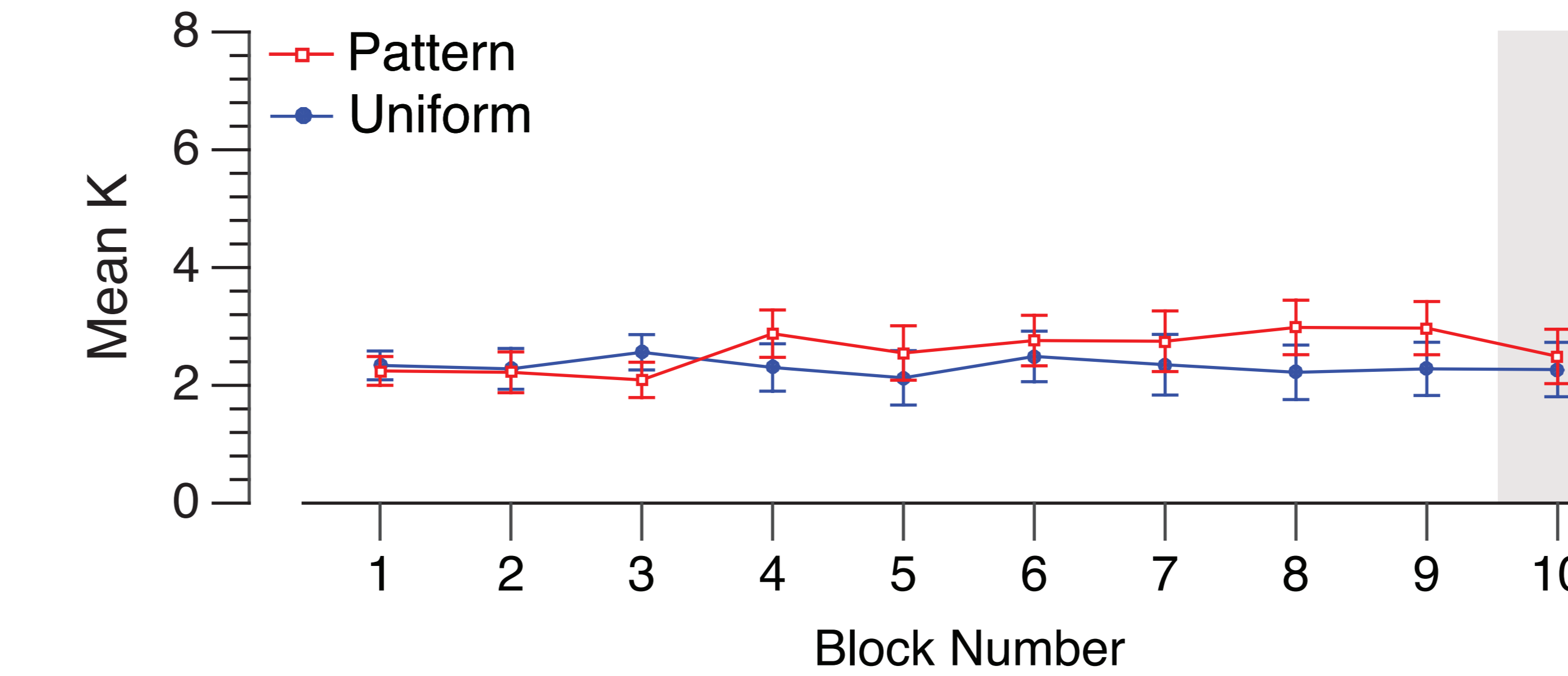
Experiment 1 - blocked conditions



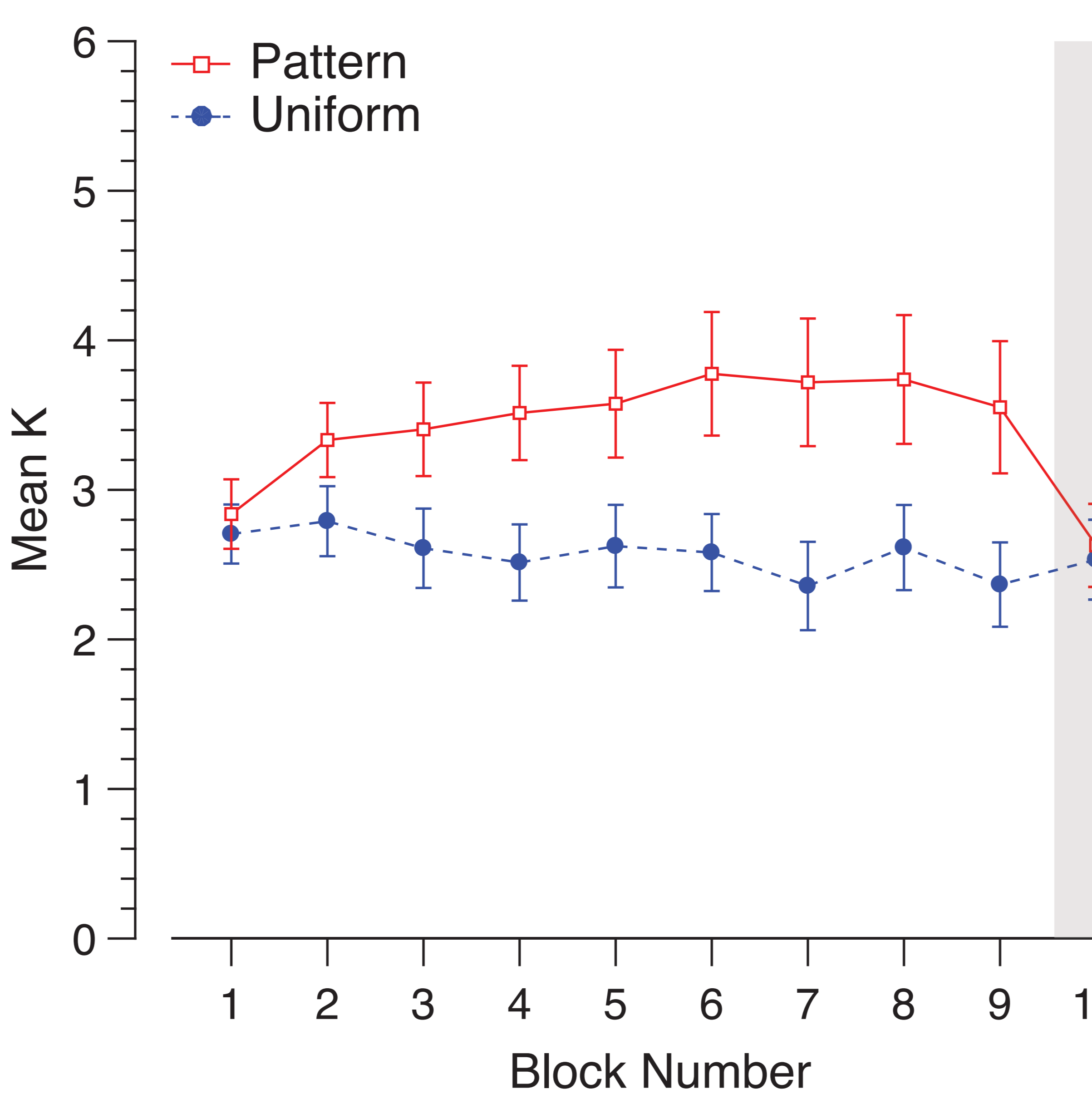
Aware (n = 19)



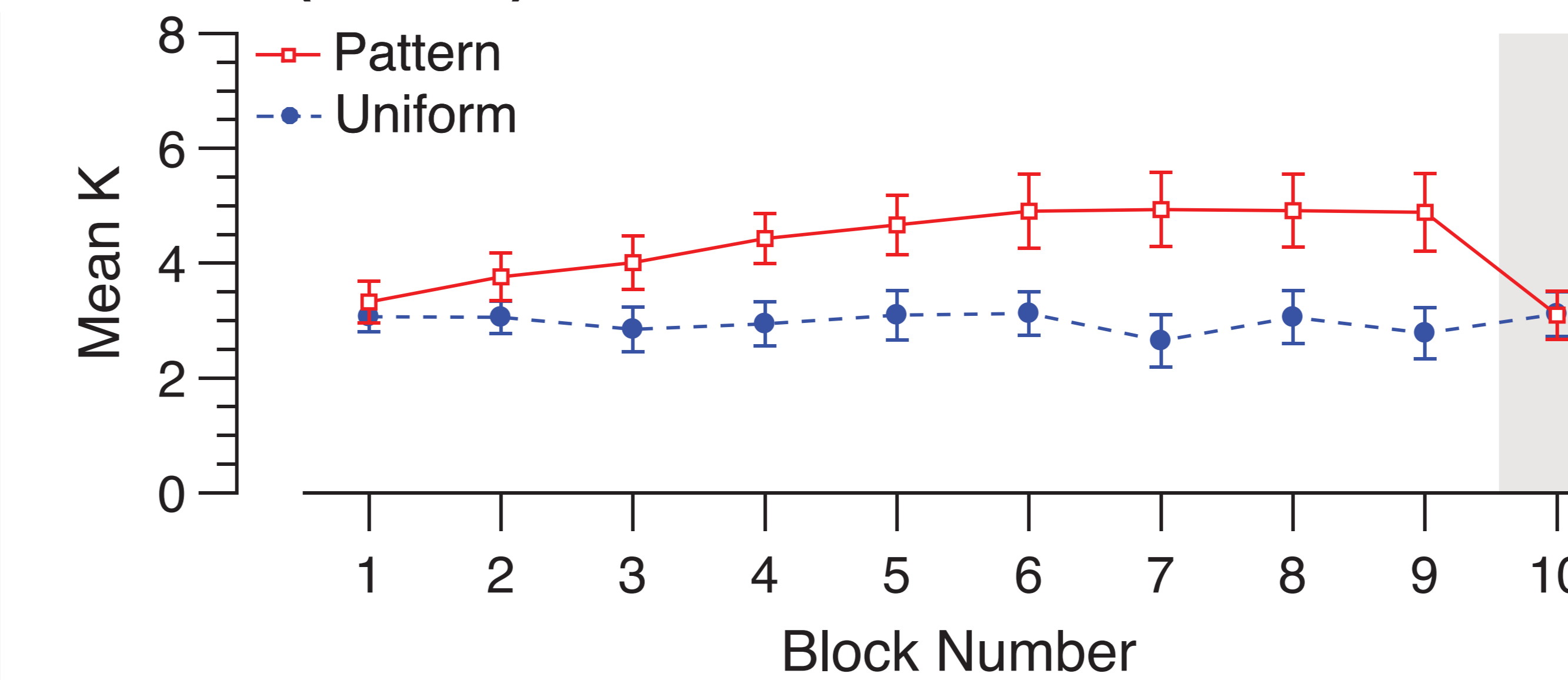
Unaware (n = 13)



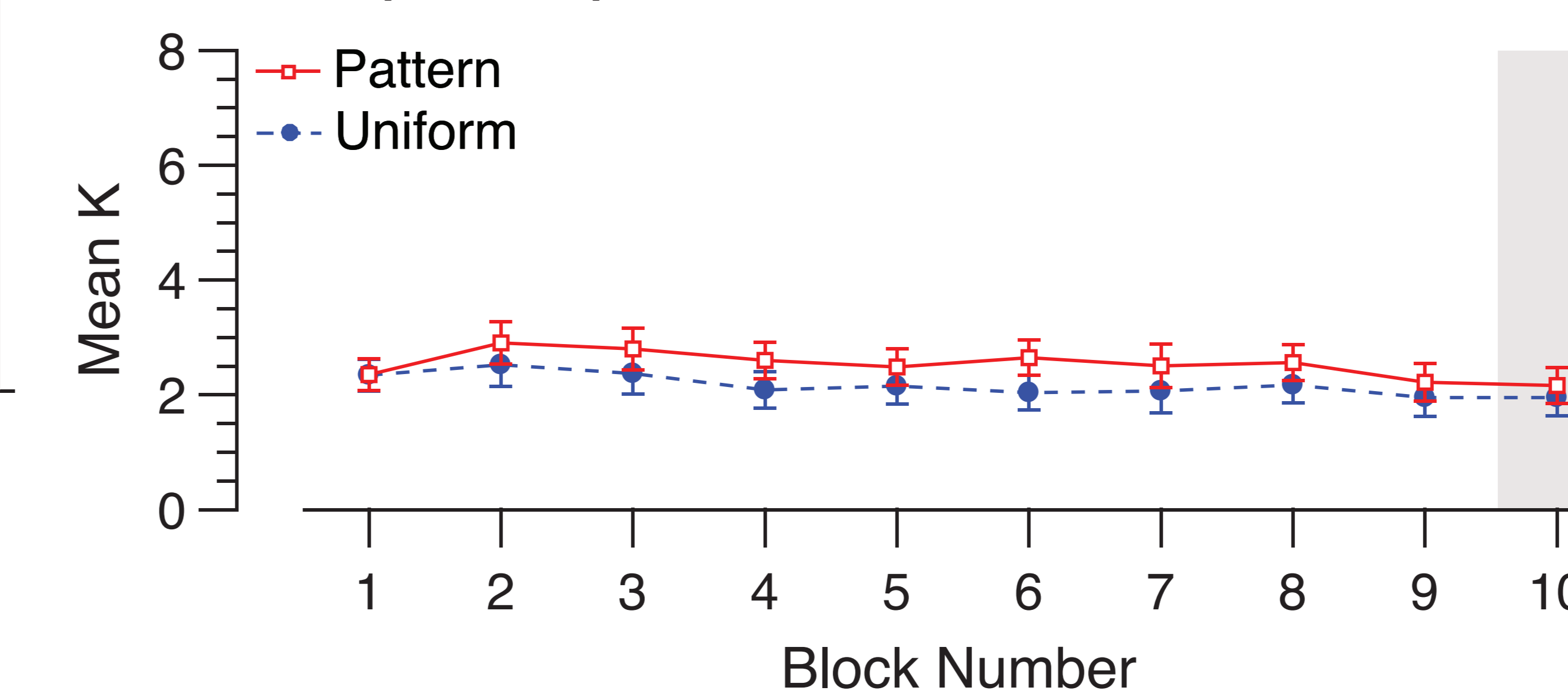
Experiment 2 - alternating conditions



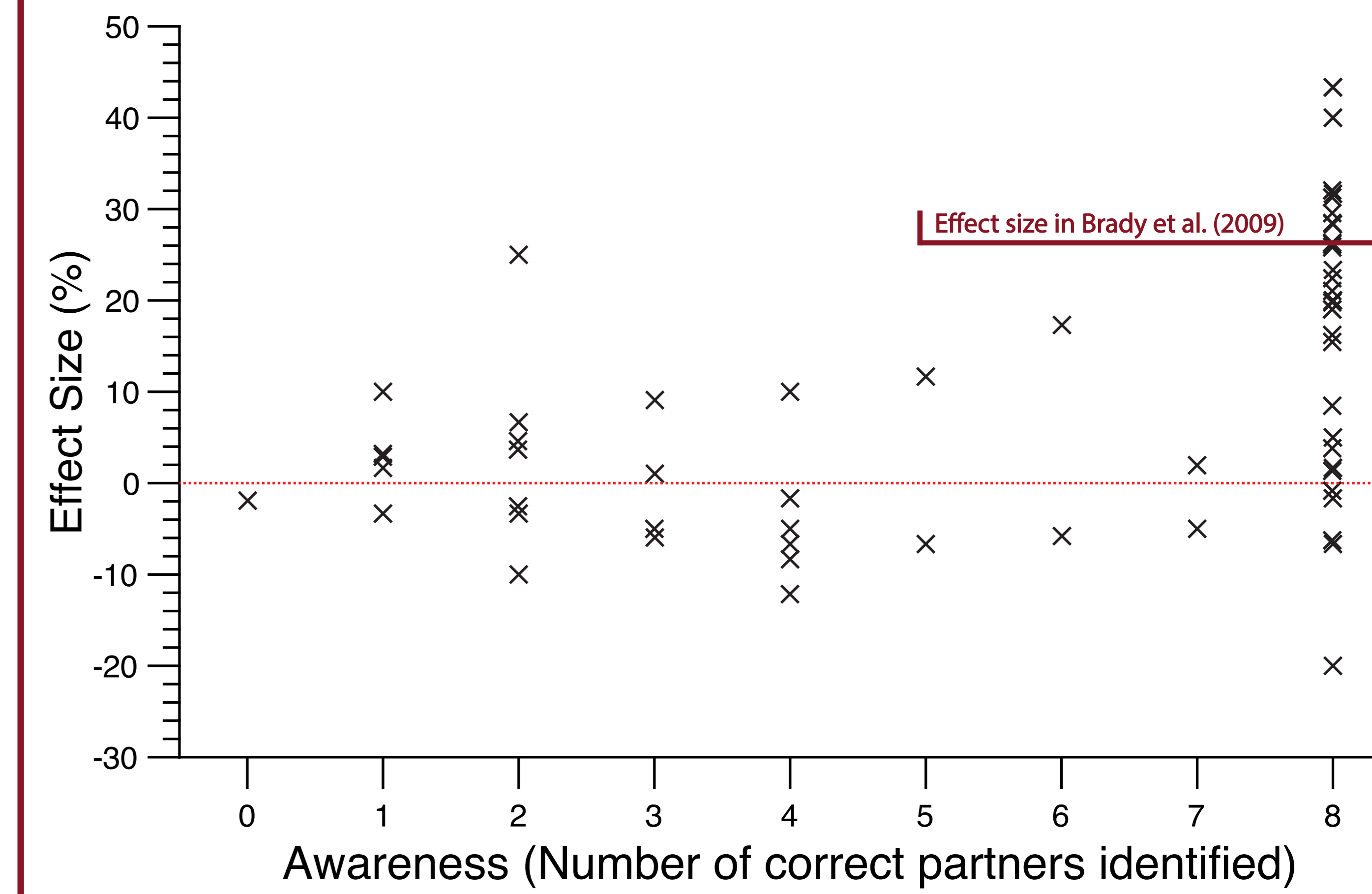
Aware (n = 16)



Unaware (n = 16)



Effect Size



Conclusions

Performance significantly improved in the patterned condition, but not the uniform condition. This effect was only observed among aware participants. Unaware observers showed no effect.

This effect appears to be best characterized as a collaboration between VWM and long-term memory rather than an increase in the number of items stored online (Huang and Awh, 2018).

Citation

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