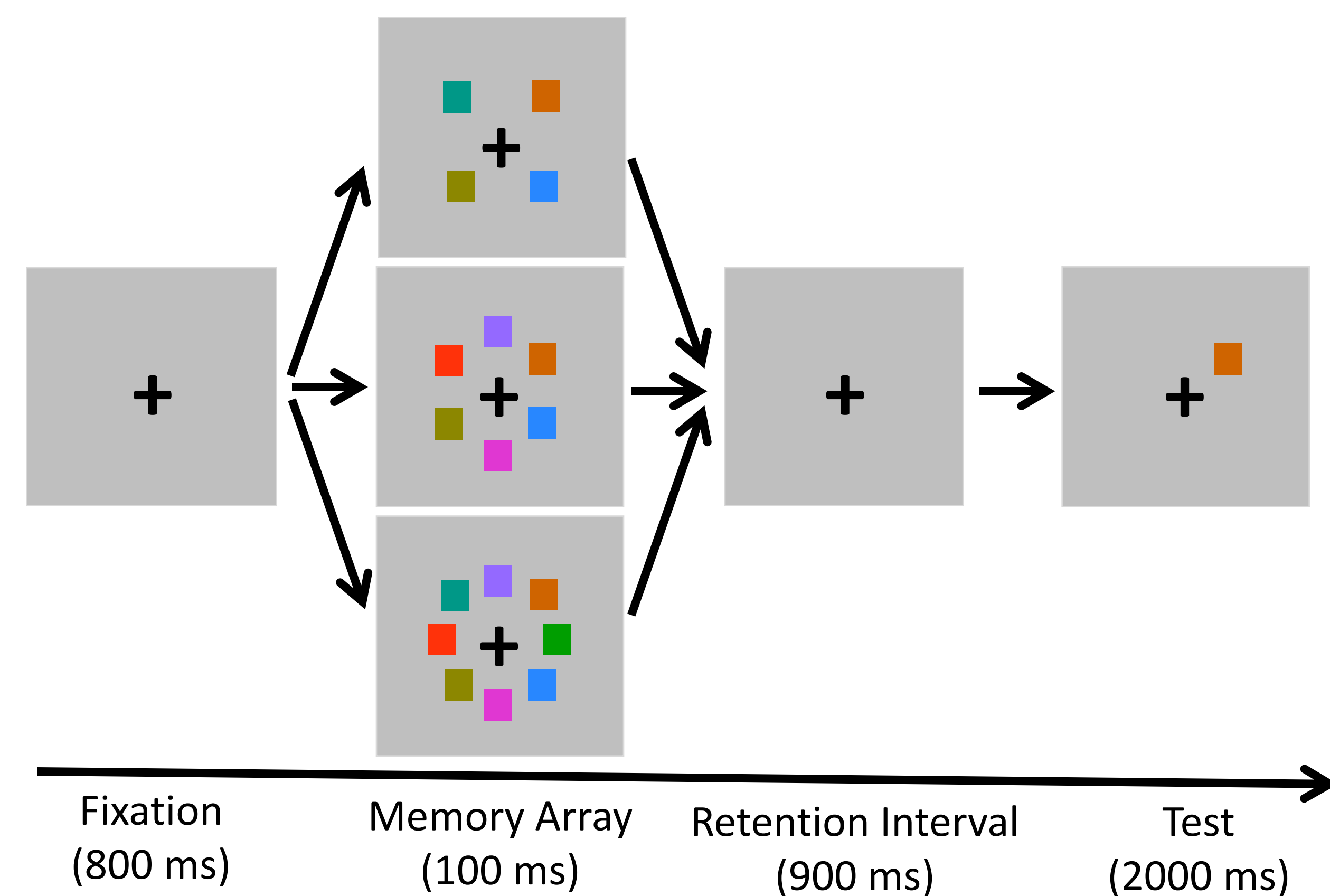


## Introduction

Visual working memory (VWM) allows us temporarily hold images in our minds and manipulate them. As an example, you can remember a face you just saw, or try to imagine how a room would look with a different arrangement of furniture. Previous studies have shown that individuals with low VWM capacity (able to remember only a few visual items) are much more susceptible to distraction than high VWM individuals (e.g., Poole & Kane, 2009). Recently, Lien, Ruthruff and Naylor (2014) reported that frequently switching between search strategies weakened attentional set leaving attention more vulnerable to capture by irrelevant objects. In the present study we examined whether there were individual differences underlying capture by assessing visual working memory capacity.

## VWM Measures

First, VWM capacity was measured for each participant with a change-detection task (see below). Either 4, 6, or 8 colored squares (the “setsize,” randomly selected on each trial) were shown for 100 ms. After a retention interval of 900 ms, participants were asked whether a colored square was the same as the one that appeared in that location earlier. We measured hit and false alarm rates.



**Hit :** Correctly identified the same-color square as “same”  
**False Alarm:** Incorrectly identified a different-color square as “same”

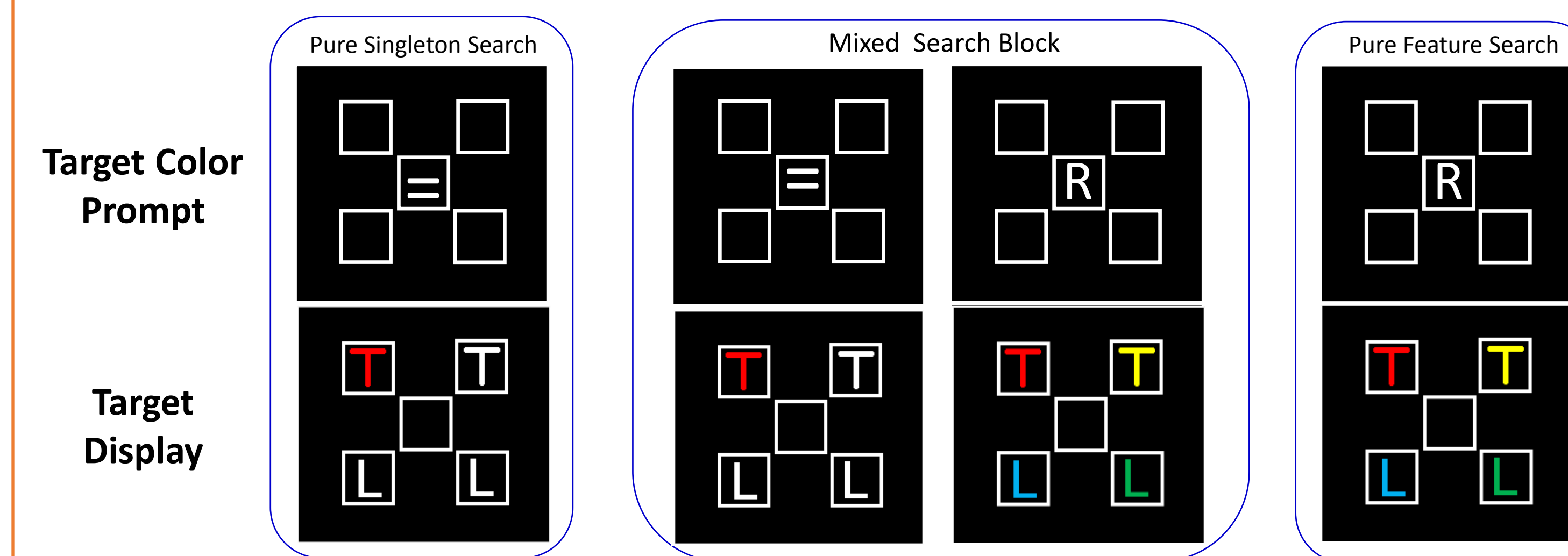
**K-Value:** Followed Cowan (2001), we calculated K values as an index of VWM span and then classified each participant as high or low.

$$K = \text{setsize} \times (\text{Hit Rate} - \text{False Alarm Rate})$$

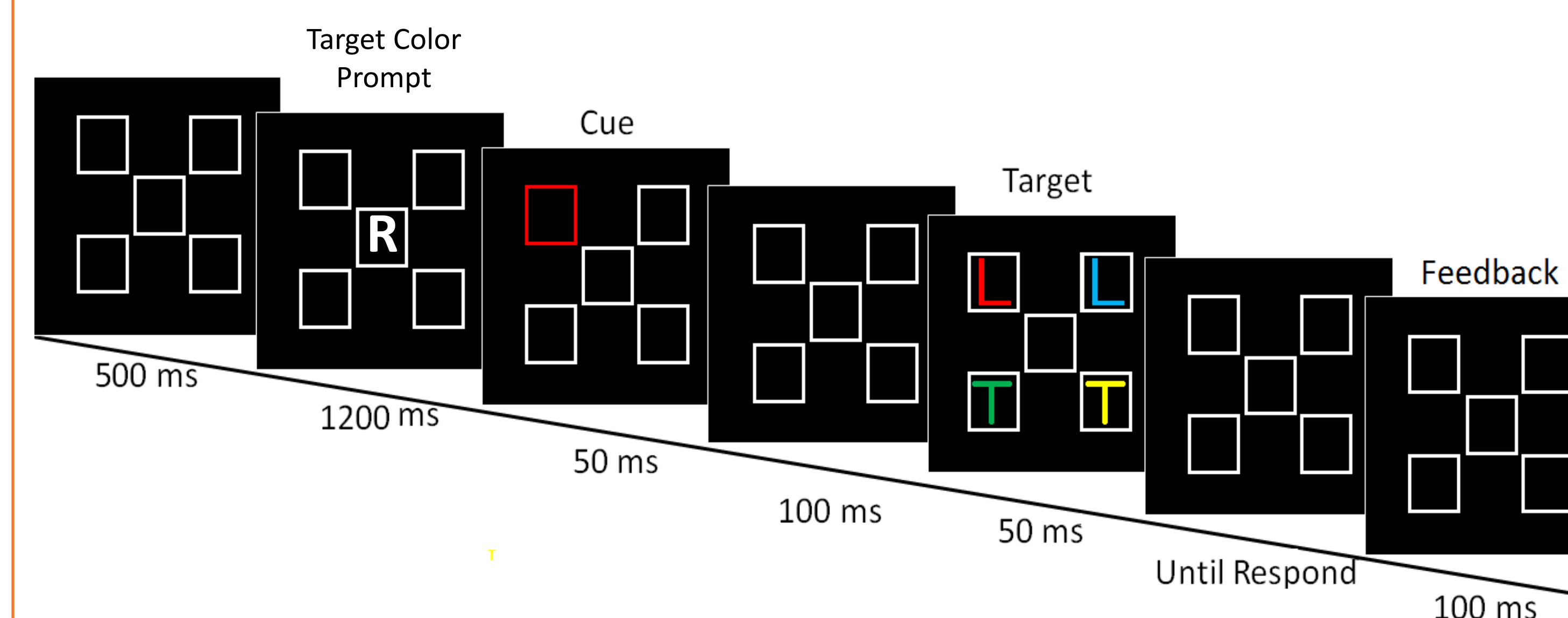
**High VWM Group:** K value > median value

**Low VWM Group:** K value < median value

**Test Phase:** Each participant performed either singleton search (looking for an unique object) or feature search (looking for a specific color target) in pure blocks or mixed blocks.



## Event Sequence



**Capture:** Capture by an irrelevant cue was assessed by measuring the *cue validity effect*: the difference in response time (RT) when the target appeared in the same location as the cue (valid trials) versus when it appeared in a different location (invalid trials).

$$\text{Cue Validity Effect} = \text{Invalid} - \text{Valid}$$

## Predictions

**High Working Memory Capacity:** Should show better attentional control and little to no capture by irrelevant cues.

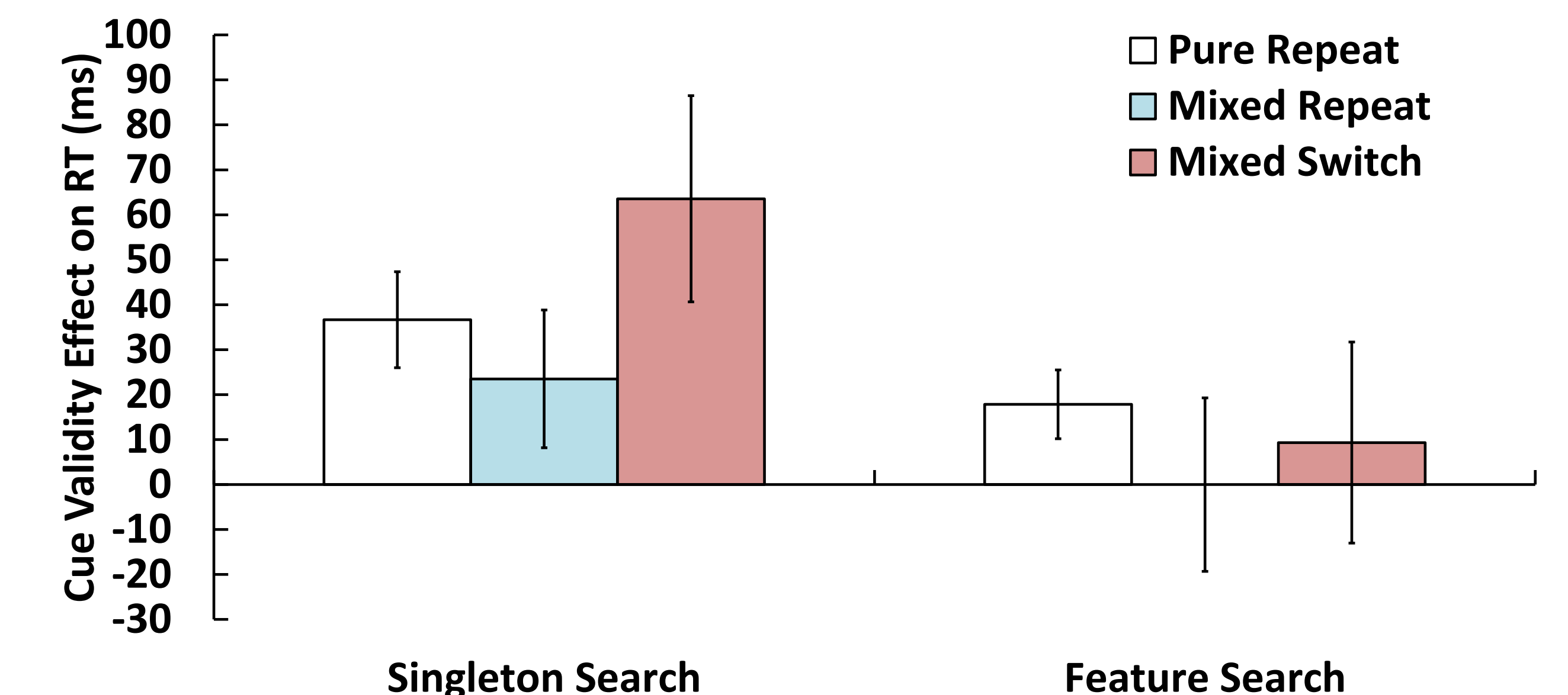
**Low Working Memory Capacity:** Should show worse attentional control and more capture by irrelevant cues.

## References:

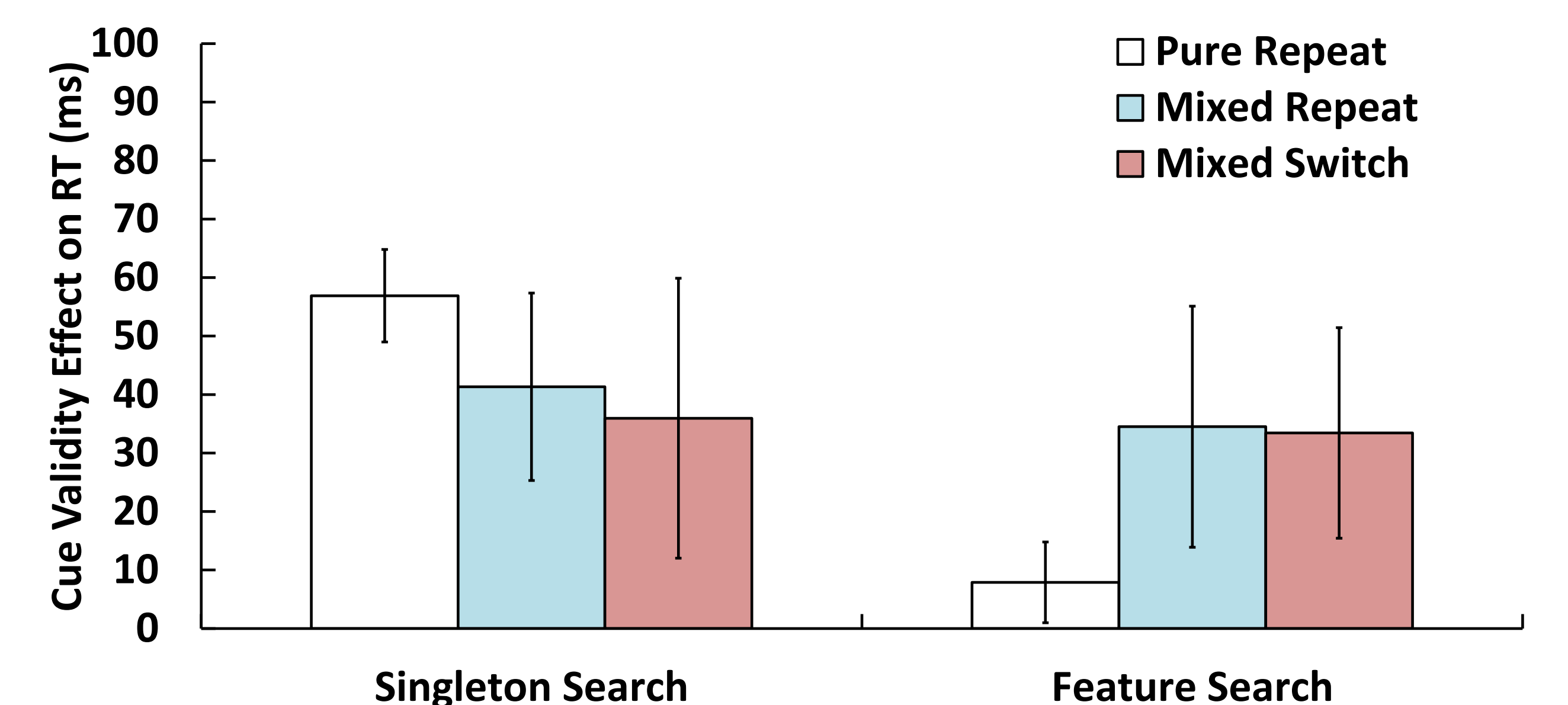
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## Results and Discussion

### High VWM Group (N=18)



### Low VWM Group (N=18)



Our results are consistent with Lien et al. (2014) – singleton search produced large cue validity effects regardless of the block type and transition type (repeat/switch),  $t(35) \geq 2.97$ ,  $p < .01$ . However, the feature search produced a small cue validity effect only for the pure condition,  $t(35) = 2.51$ ,  $p < .05$ . These findings suggest that switching between different search strategies does not necessarily weaken attentional control setting.

Although there was a trend for larger validity effects for the low VWM group than the high VWM in both singleton and feature search conditions, the difference was not significant,  $|t_s|(34) \leq 1.53$ ,  $p \geq .14$ . These findings suggest that low VWM individuals are no more susceptible to be captured by distractors than high VWM individuals.

Overall, the present study suggests that VWM may not be the primary determinant of attention capture, contrary to some previous studies (e.g., Poole & Kane, 2009).