

Optimizing Memory Task Ratio and Disentangling Precision and Guidance

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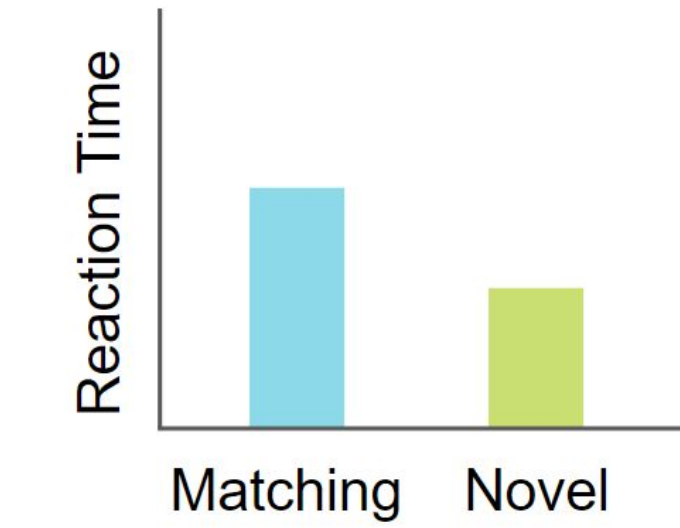
Background

Items in working memory guide external attention to stimuli that match the memory content.



To measure such memory-driven attentional guidance, studies typically employ a **search task** while participants keep a memory item in working memory for a later test.

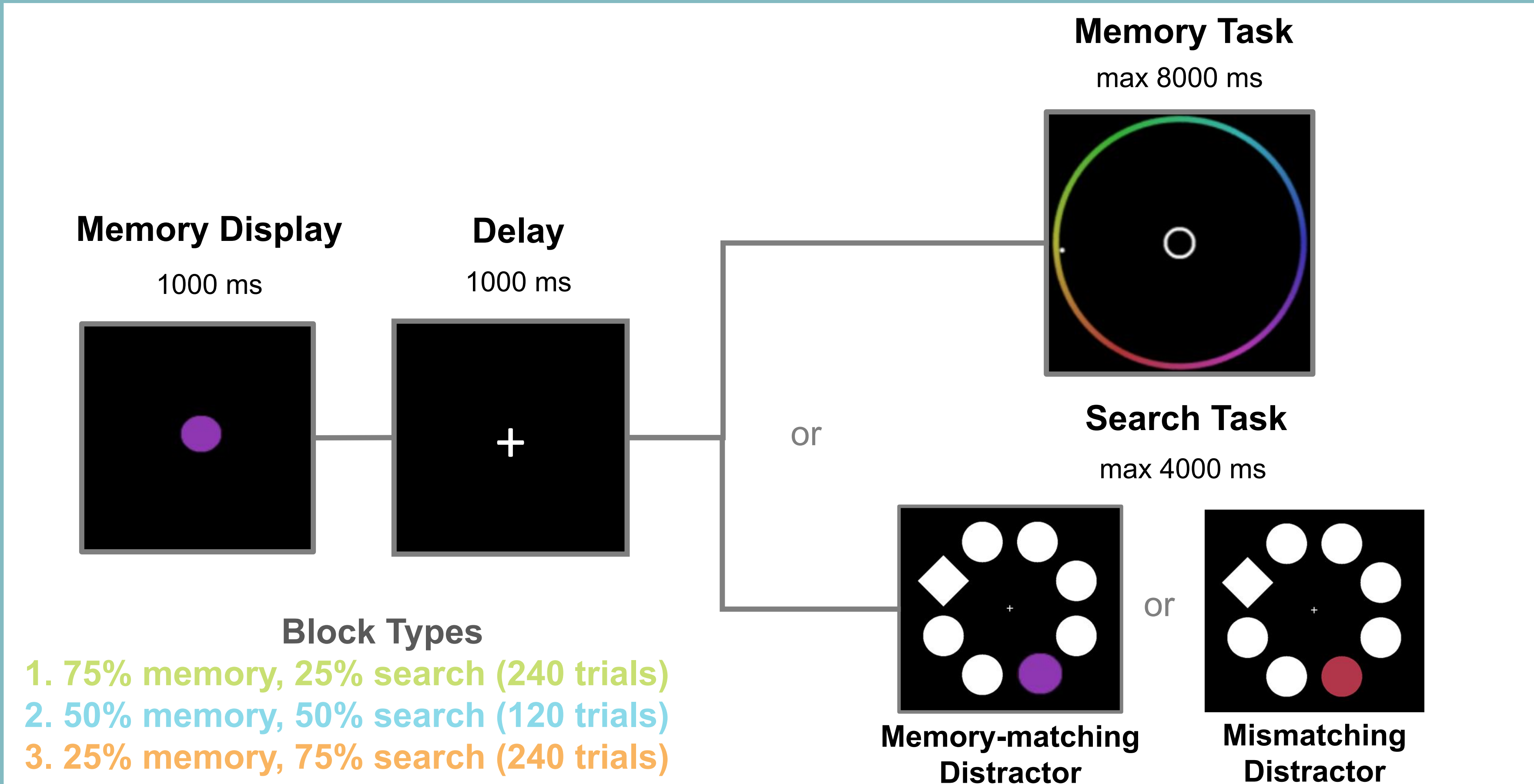
Slower reaction time (RT) when the memory item is a distractor is taken as evidence for involuntary **memory-guided attention**.



However, different studies employ different task ratios across trials; potentially misleading the comparisons of memory-guided attention across studies.

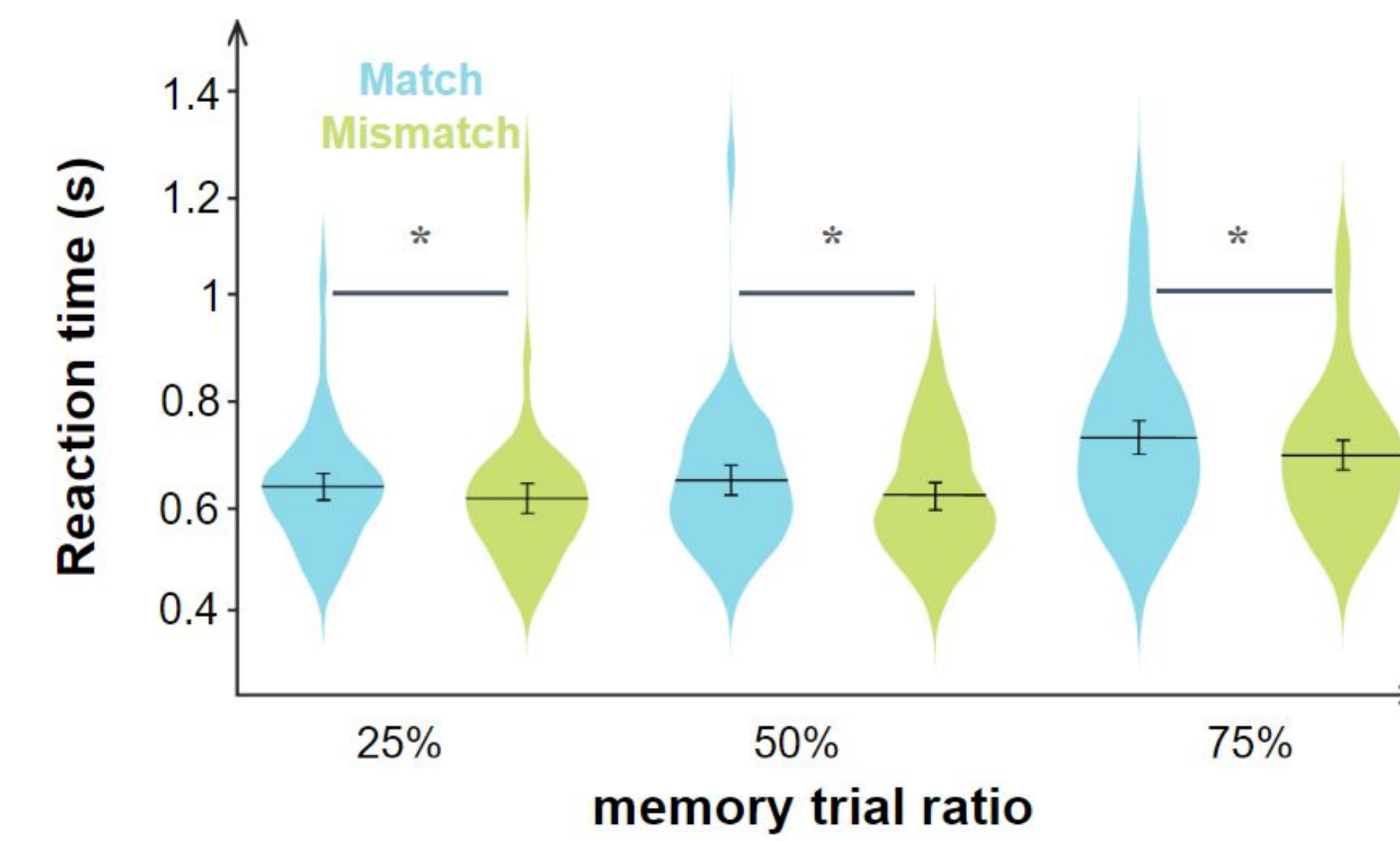
We manipulated the ratio of memory vs. search trials to assess its impact on involuntary memory-guided attention.

Experimental Procedure



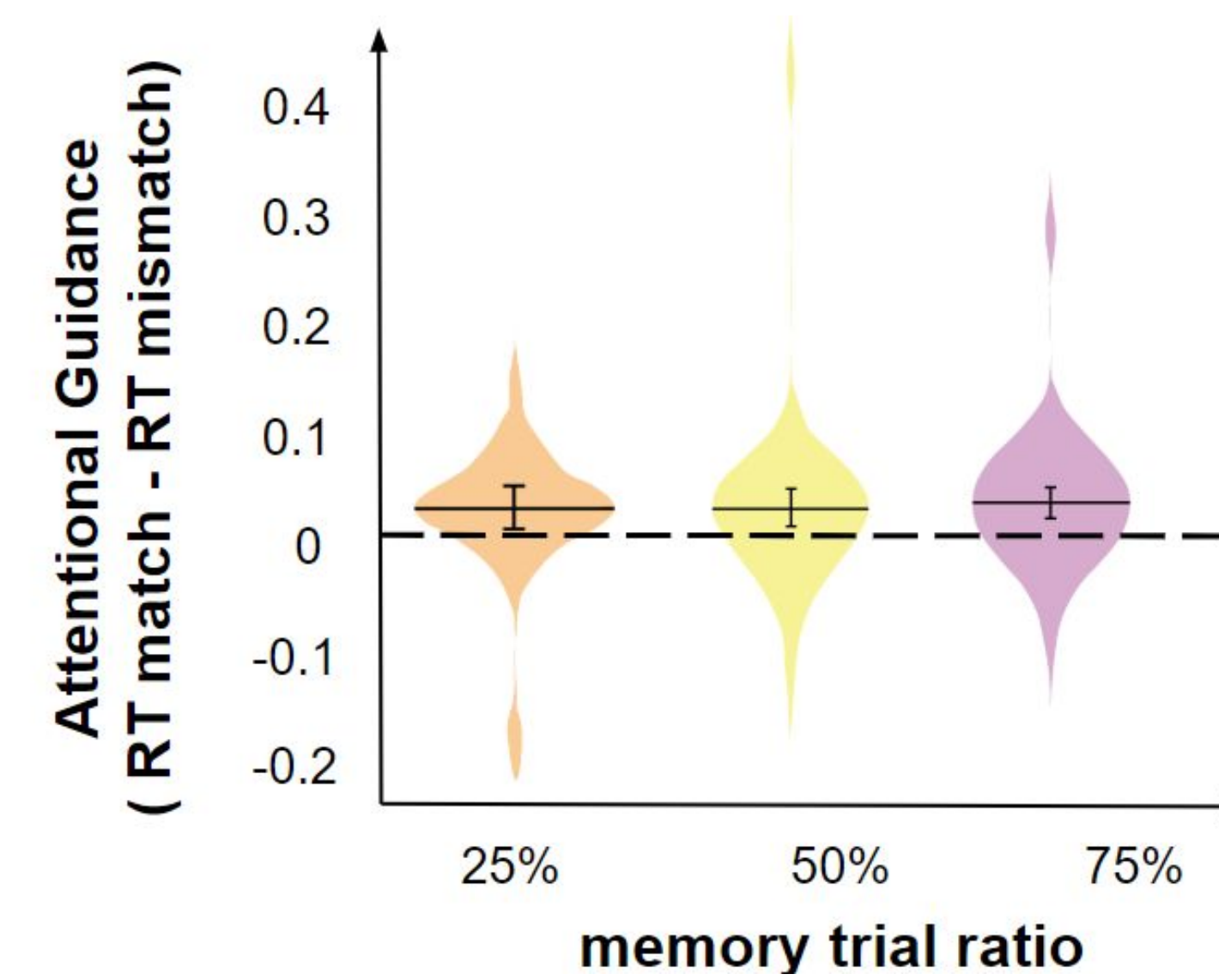
Results (N = 40)

Search Task



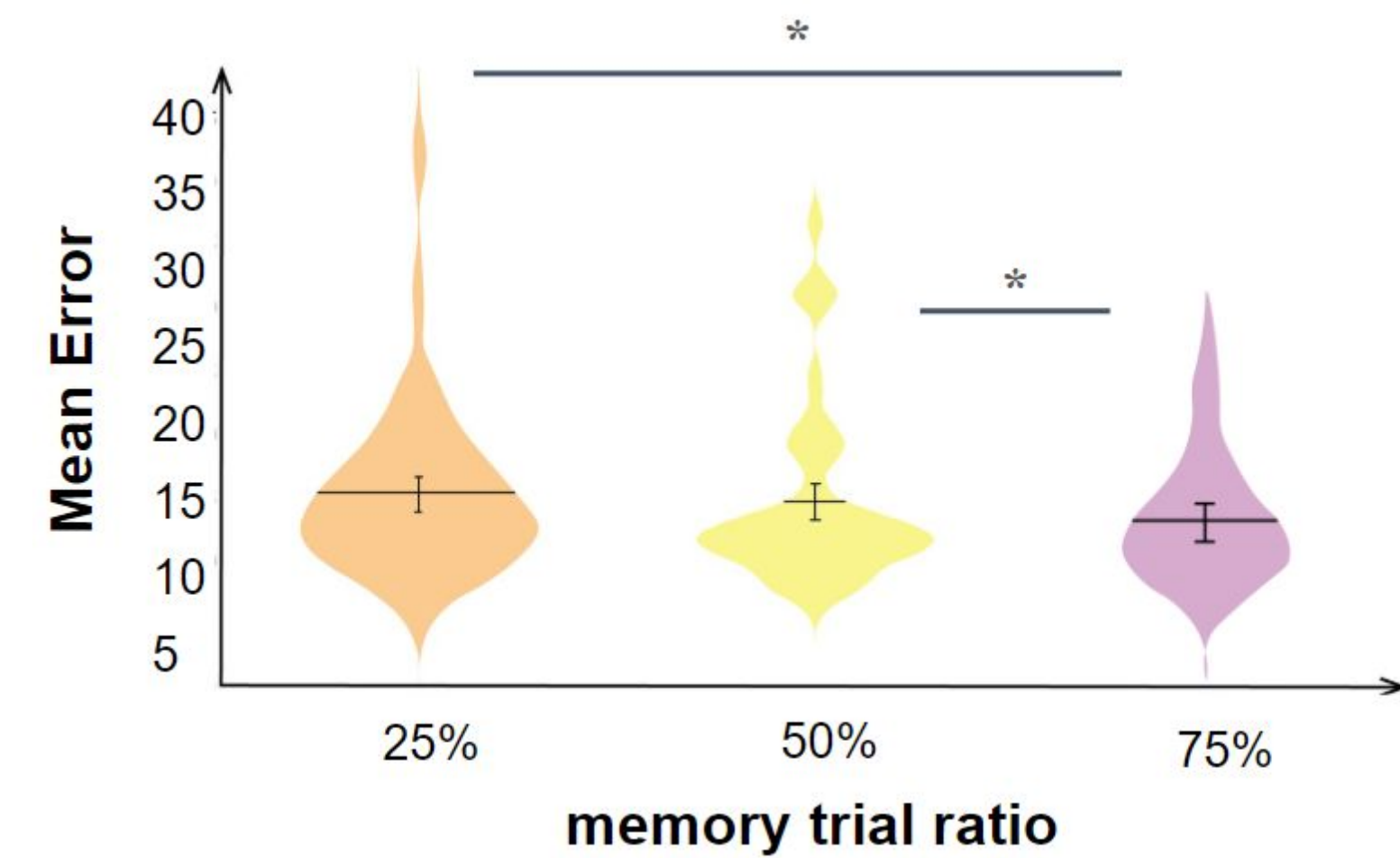
RT match > RT mismatch ($BF_{10} = 374$)
Memory-driven attentional guidance

Search Task (Guidance Comparison)



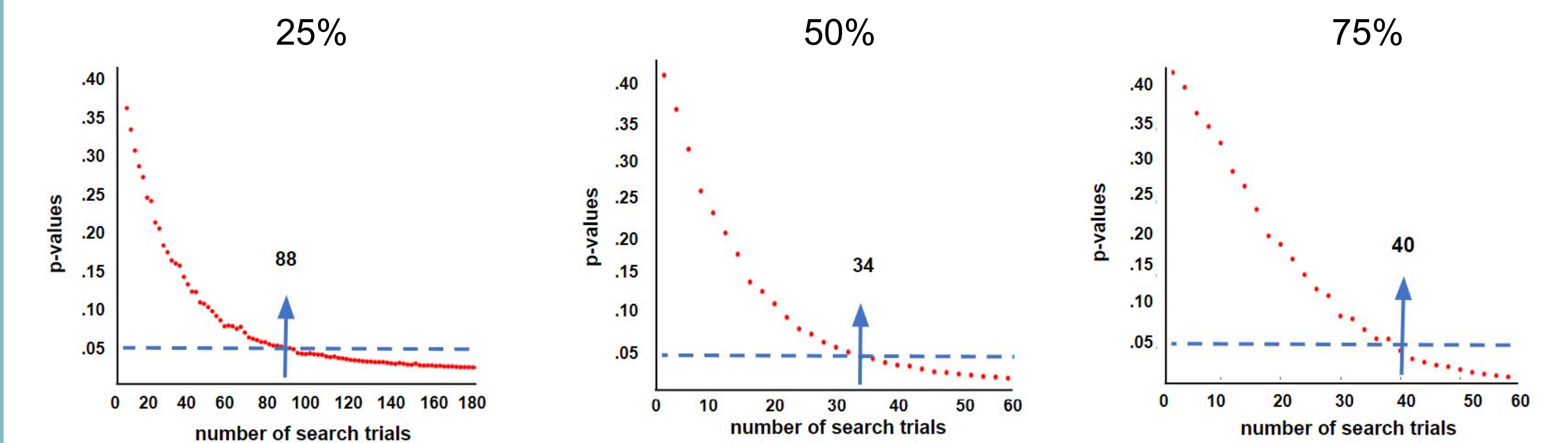
Equal guidance across task ratios ($BF_{10} = 0.106$)

Memory Task



Memory performance:
75% < 50% ($BF_{10} = 6.558$)
and 25% ($BF_{10} = 92.798$)

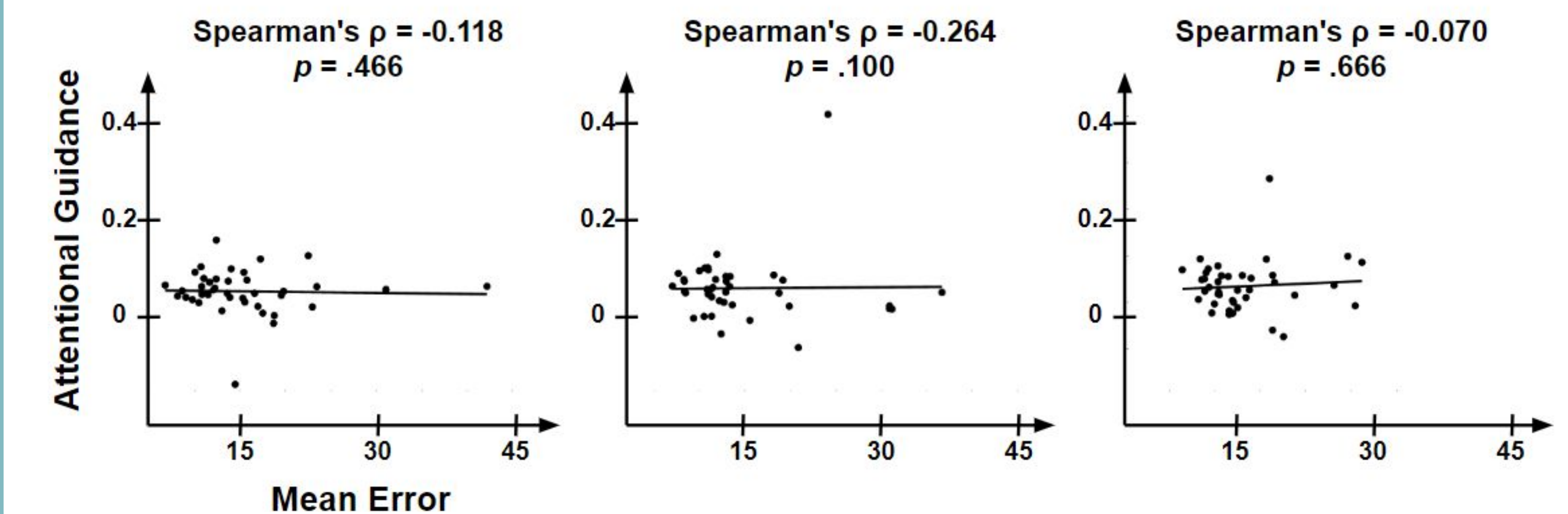
How many trials we need to find a guidance effect?



Trial numbers needed to obtain attentional guidance at $p \leq .05$:

Memory Ratio	Search Trials	Memory Trials	Total Trials
25%	40	120	160
50%	34	34	68
75%	88	25	118

memory error - attentional guidance correlations



Conclusions

- To obtain a memory-driven attentional guidance effect:
- the 50% task ratio is **the most trial-efficient** condition to
 - at least **34 search trials** are needed

Precision but **not** guidance differed between conditions, suggesting that precision **alone** cannot explain guidance.