

Effects of Learned Spatial Probability are Suspended, but not Eliminated, During Parallel Search

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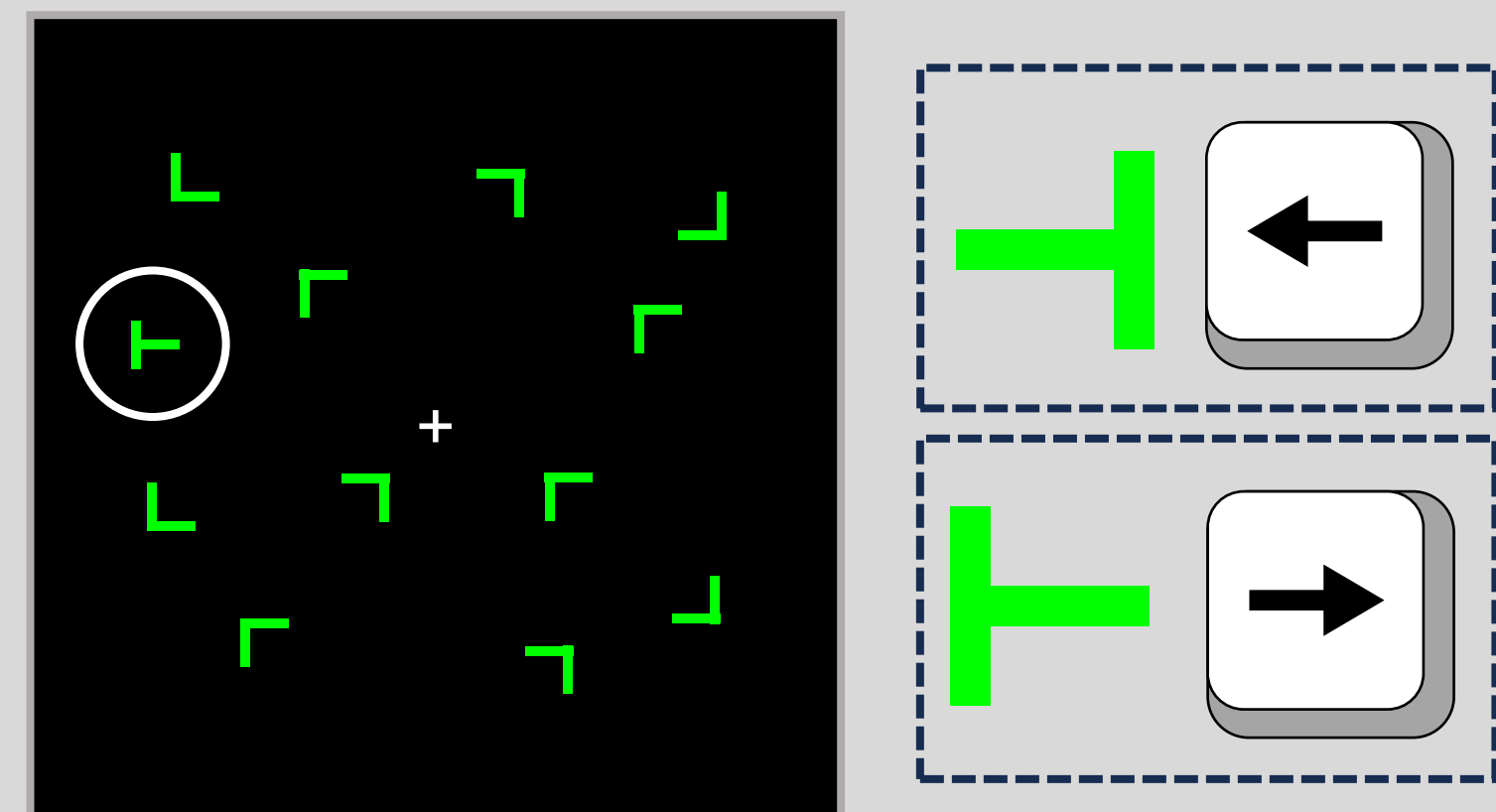
1. BACKGROUND

- Individuals implicitly learn to prioritize regions of space most likely to contain targets (i.e., learned spatial probability effect).¹
- This bias for the high-probability region can be observed well after the initial learning period.²
- However, persistence of this effect requires that both training and transfer contexts involve a serial form of search, as opposed to parallel search.³
- Here, we examine what happens to the spatial bias following exposure to parallel search; i.e., is the prior learning undone or is it simply suspended during parallel search?**

2. GENERAL METHOD

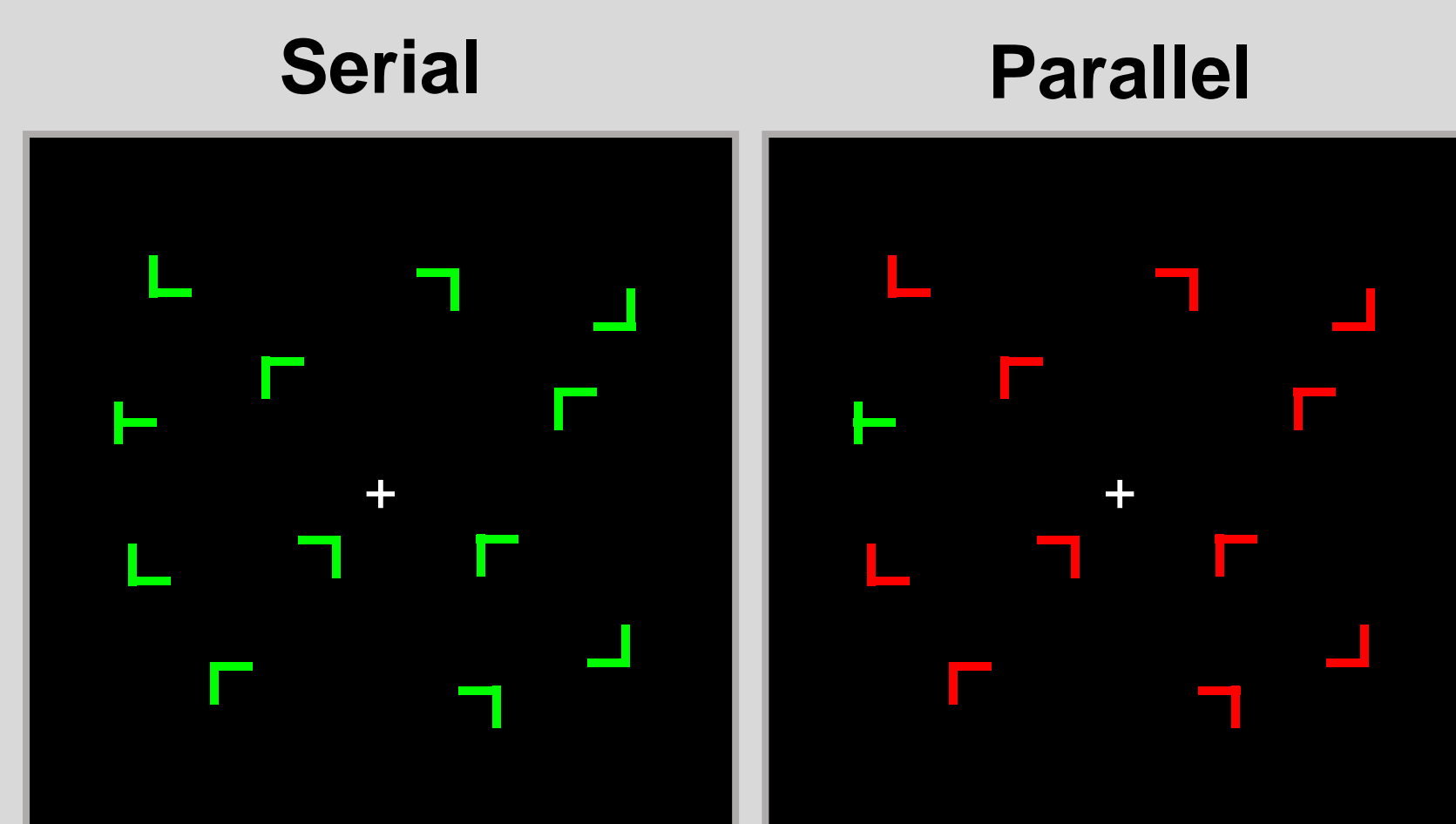
A) Search Task

Number of Blocks = 24; Trials/Block = 48



Participants performed a “T” among “L’s” visual search task, responding to the direction of the target “T”.

C) Search-Type



Serial search: targets and nontargets were all the same color (e.g., green).

Parallel search: the target “popped-out” as it was a different color than the nontarget items.

B) Spatial Probability/Phase

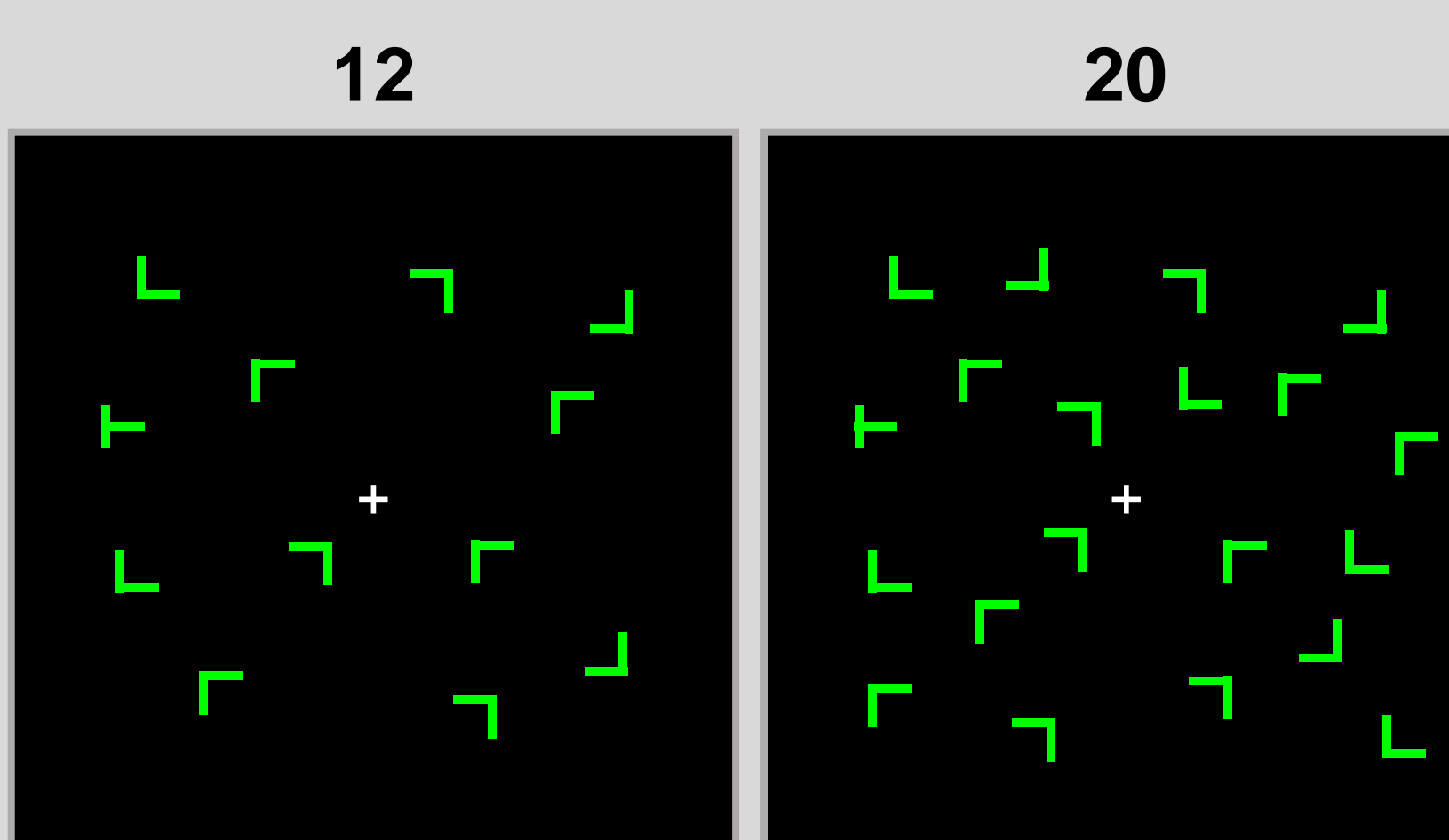
Training Blocks (1-12) Test Blocks (13-24)

Rich	Sparse	Rich	Sparse
50%	16.7%	25%	25%
Sparse	Sparse	Sparse	Sparse
16.7%	16.7%	25%	25%

Training Phase: target more likely to appear at a (rich) high-probability quadrant than at a (sparse) low-probability quadrant.

Test Phase: target equiprobable at each quadrant.

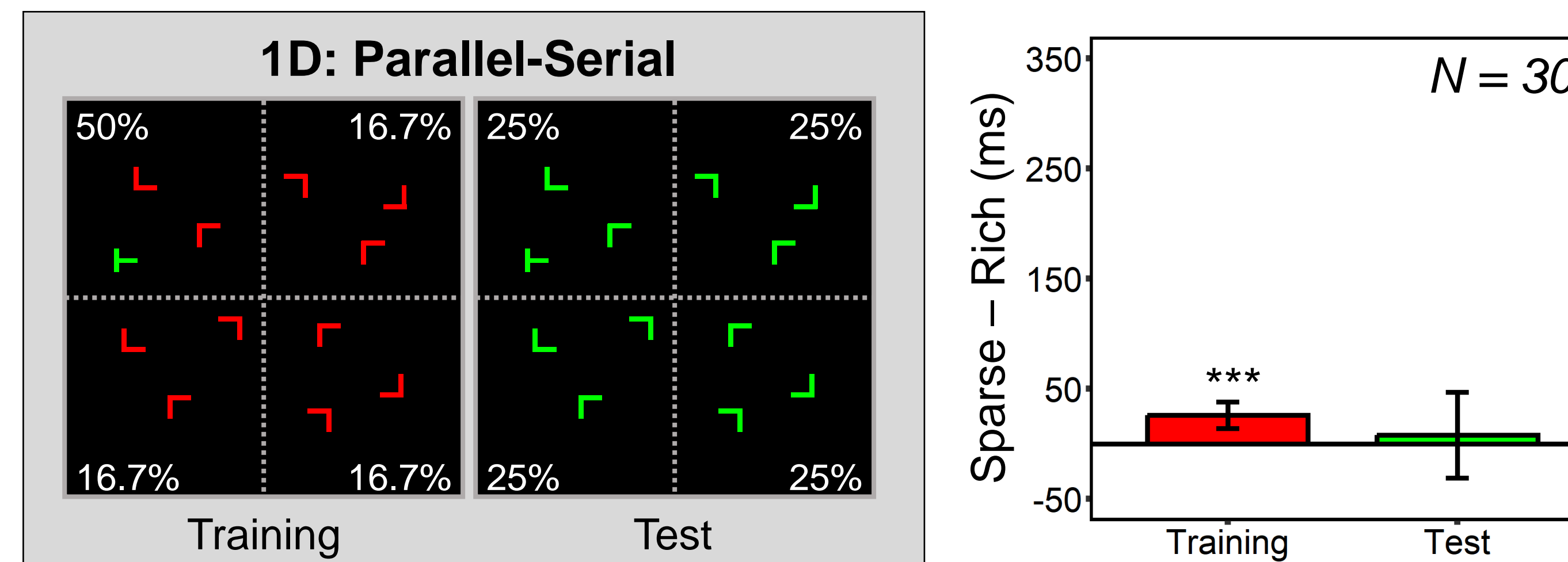
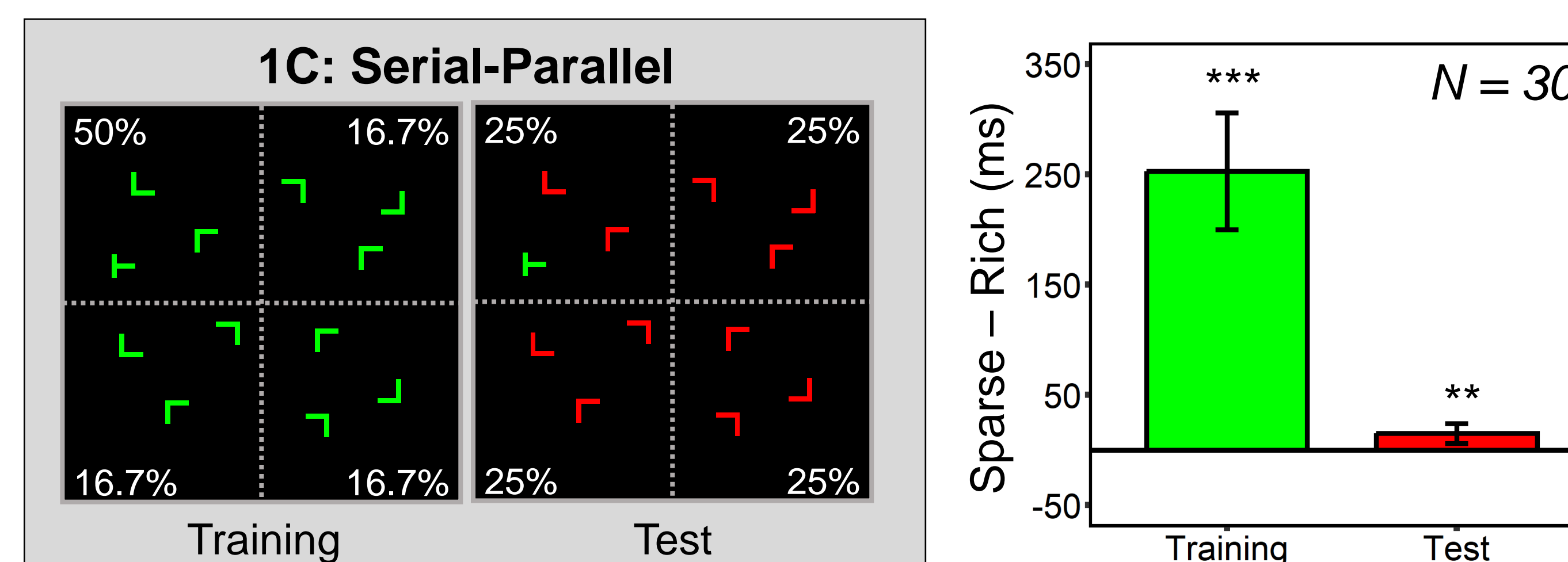
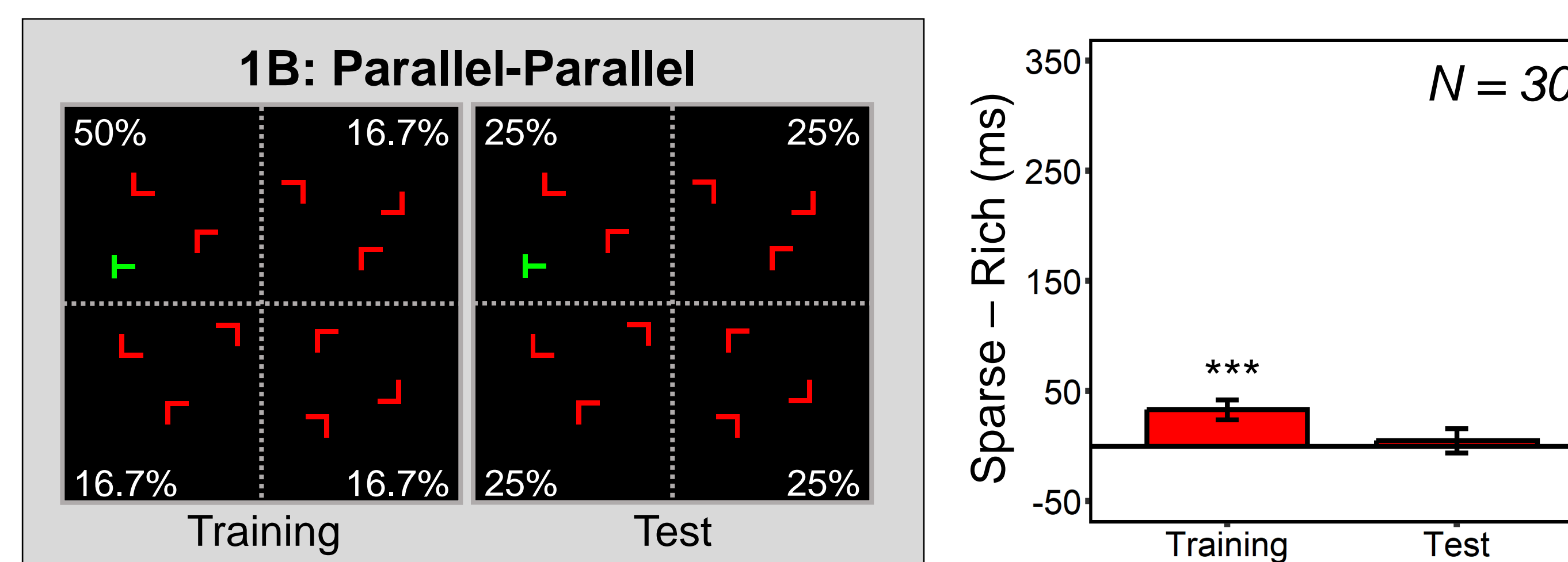
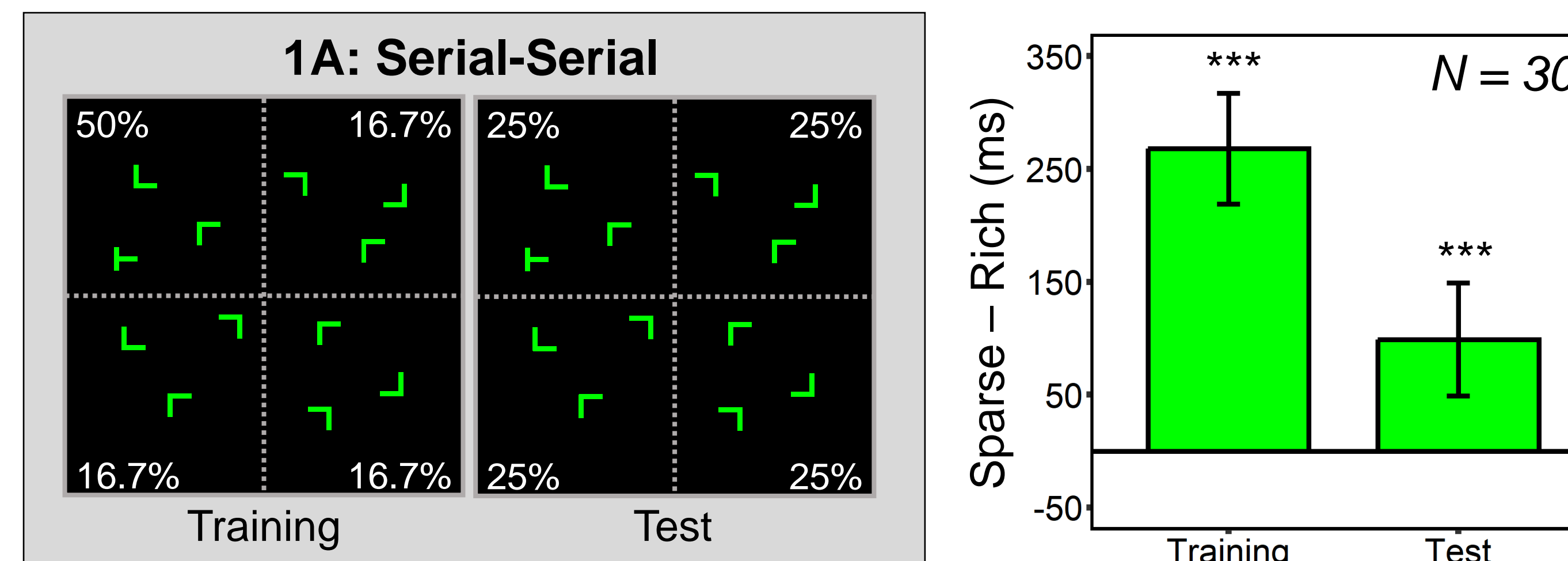
D) Set Size



Set sizes of 12 and 20 items were randomly interleaved to obtain a measure of search slope, used to assess the nature of search.

3. EXPERIMENT 1

GOAL: Replicate previous findings related to persistence/transfer of spatial probability effect under conditions of serial and parallel search.



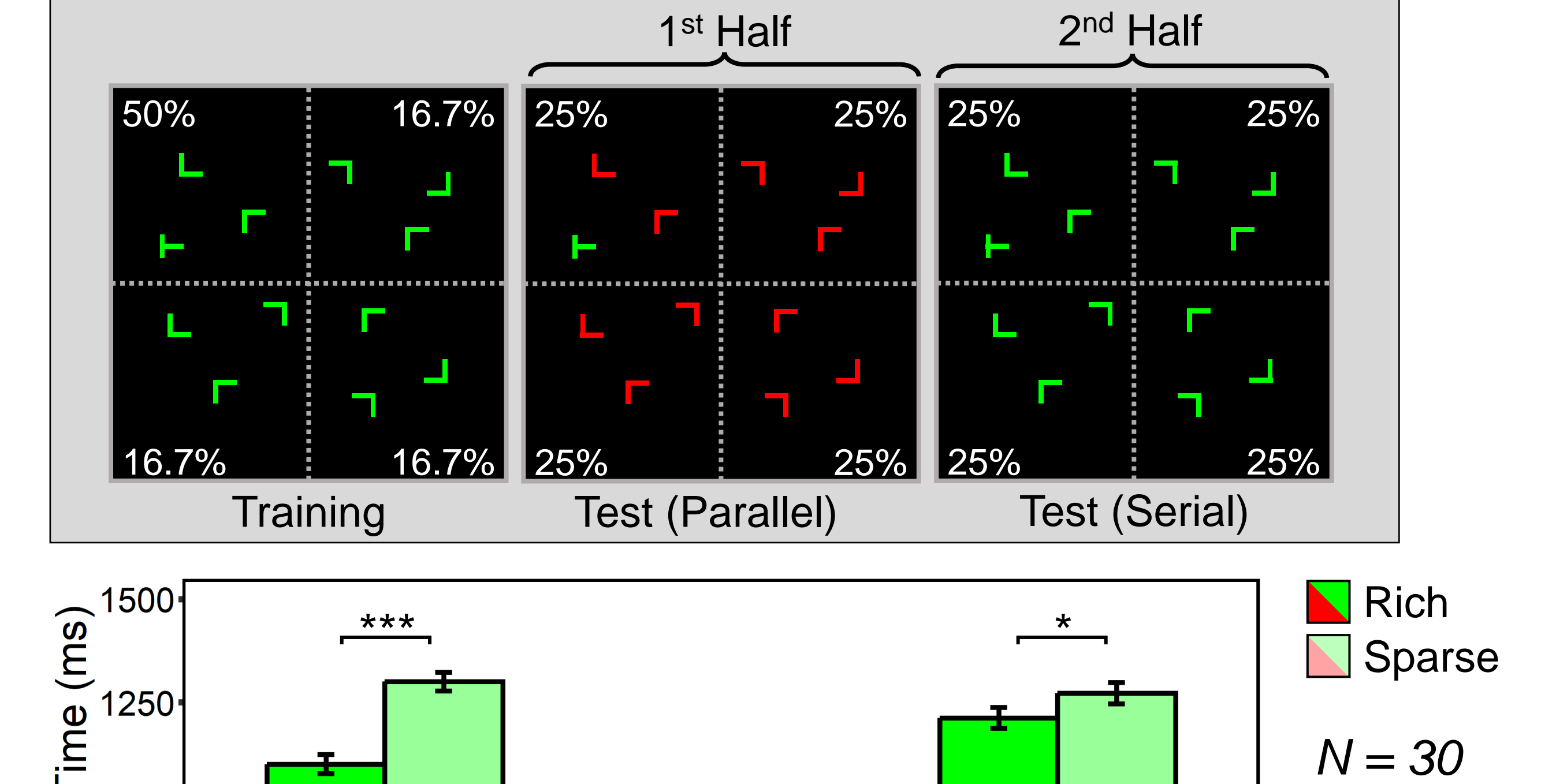
Spatial probability effect always present during training. Transfer to test phase only when trained with serial search (even when test is parallel).

6. DISCUSSION

- We believe that an additive bias⁴ enhances the gain of items in the previously rich quadrant, regardless of the nature of search present at test.
- However, because the sensory strength of the target outweighs this additive bias during parallel search, the target item is at a competitive advantage regardless of its location (masking the spatial probability effect).
- As such, while prior spatial learning may exert minimal influence on performance during parallel search (at test), the bias itself is unaffected by the search environment.

4. EXPERIMENT 2

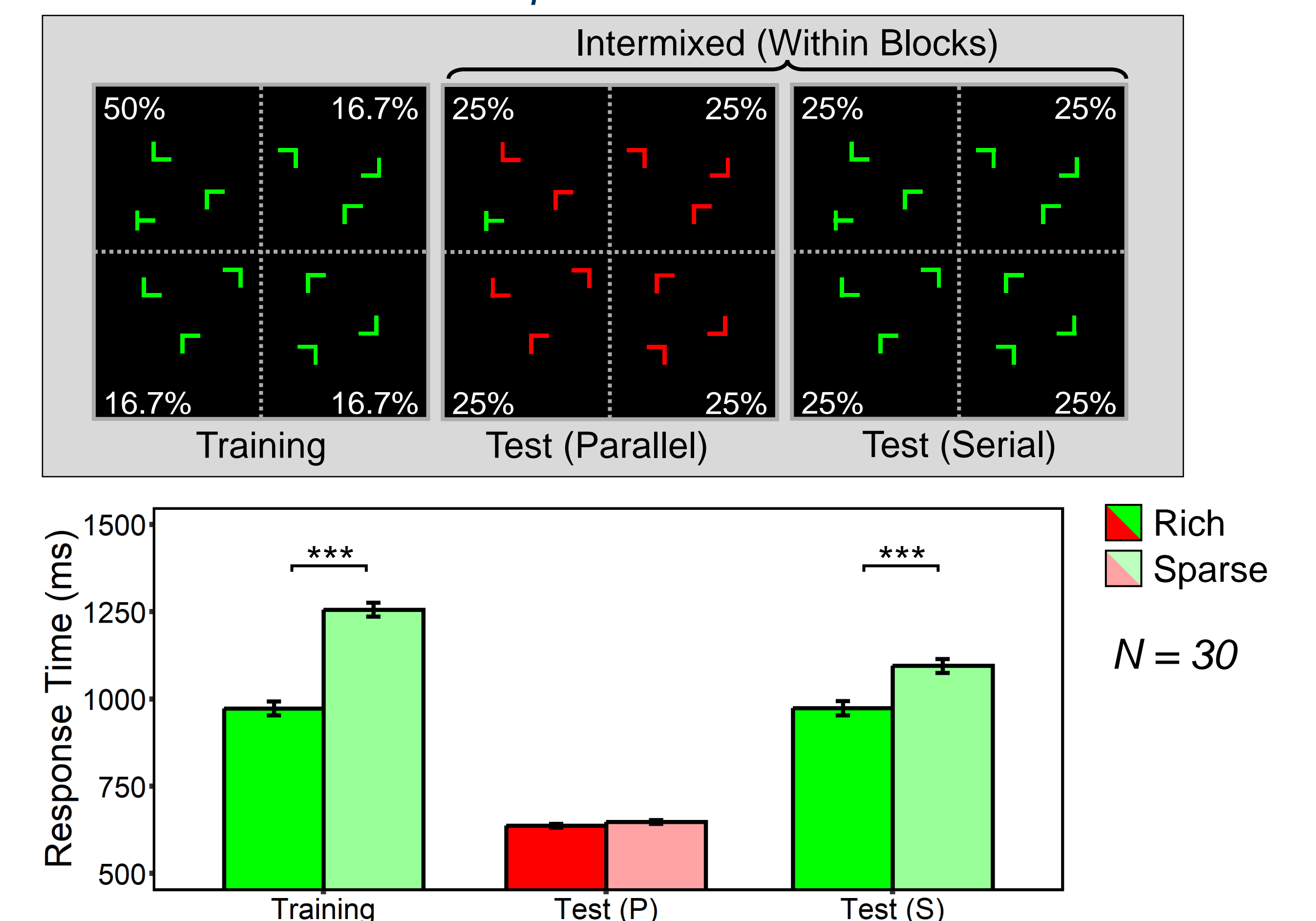
GOAL: Examine whether exposure to parallel search affects persistence of spatial probability effect for serial search.



Reemergence of spatial probability effect when serial search reinstated.

5. EXPERIMENT 3

GOAL: Examine persistence of spatial probability effect when serial and parallel search conditions are unpredictable.



Spatial probability effect limited to serial search displays at test.

