

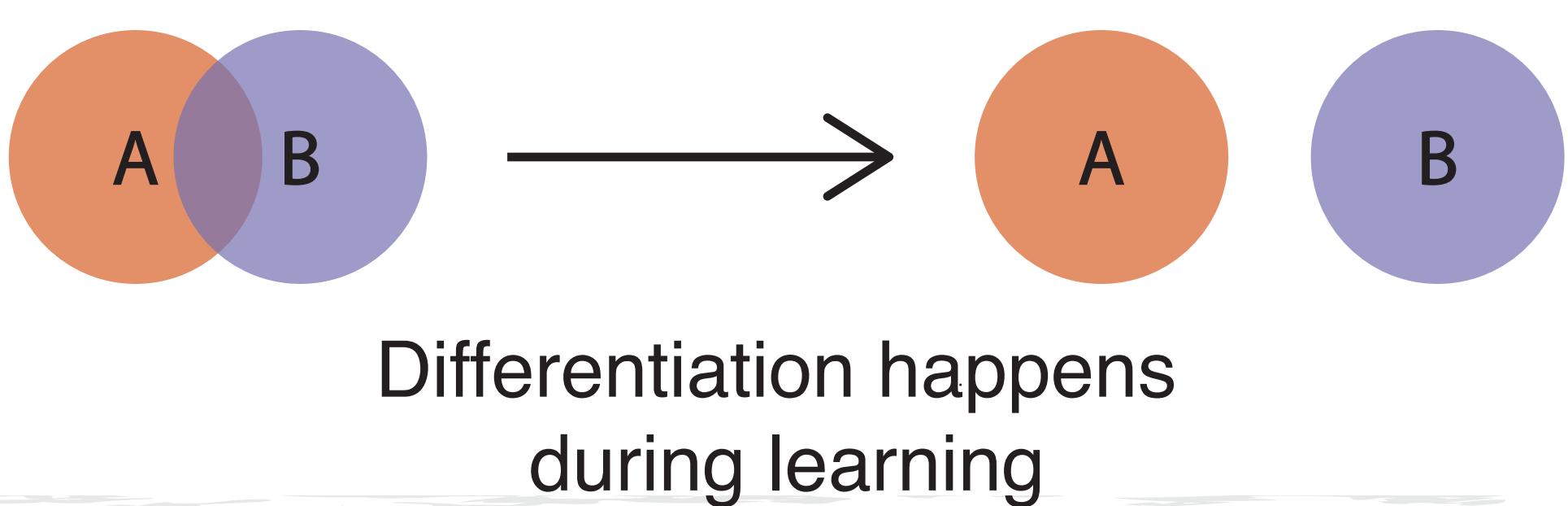
# Competition induces exaggeration in human memory

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## Introduction

- Overlap between similar memories trigger neural differentiation.<sup>1,2,3</sup>
  - Overlapping memories can become less similar than non-overlapping memories.
- Differentiation is thought to be adaptive.<sup>2</sup>



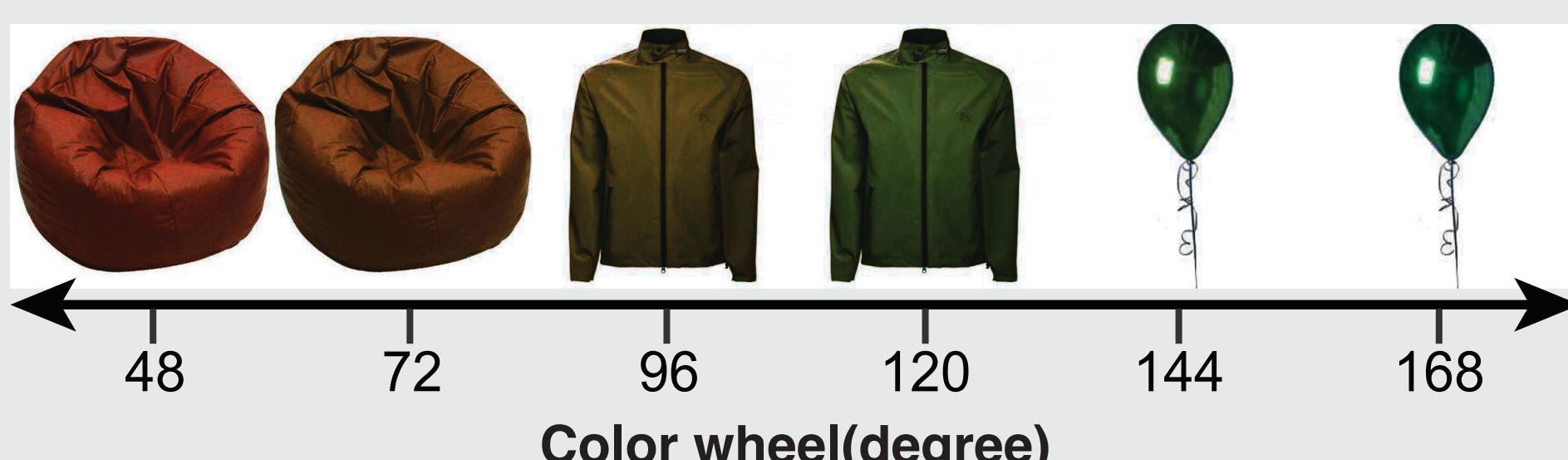
If neural representations are exaggerated, are the memory features exaggerated?

## Method

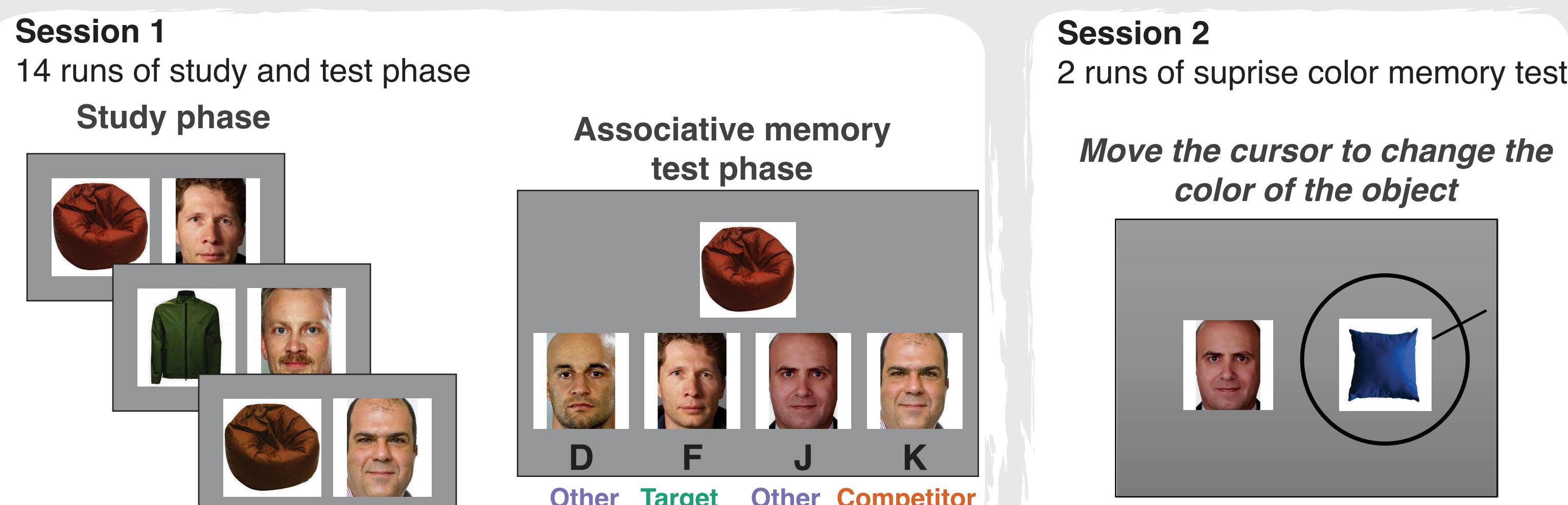
**Approach** Find a memory feature: 1. continuous 2. can be reported

### Stimuli

- Select colors every 24 degree along color wheel
- Create same-object-of-similar-colors pairs
- Pair each object with a unique neutral male face



### Procedure



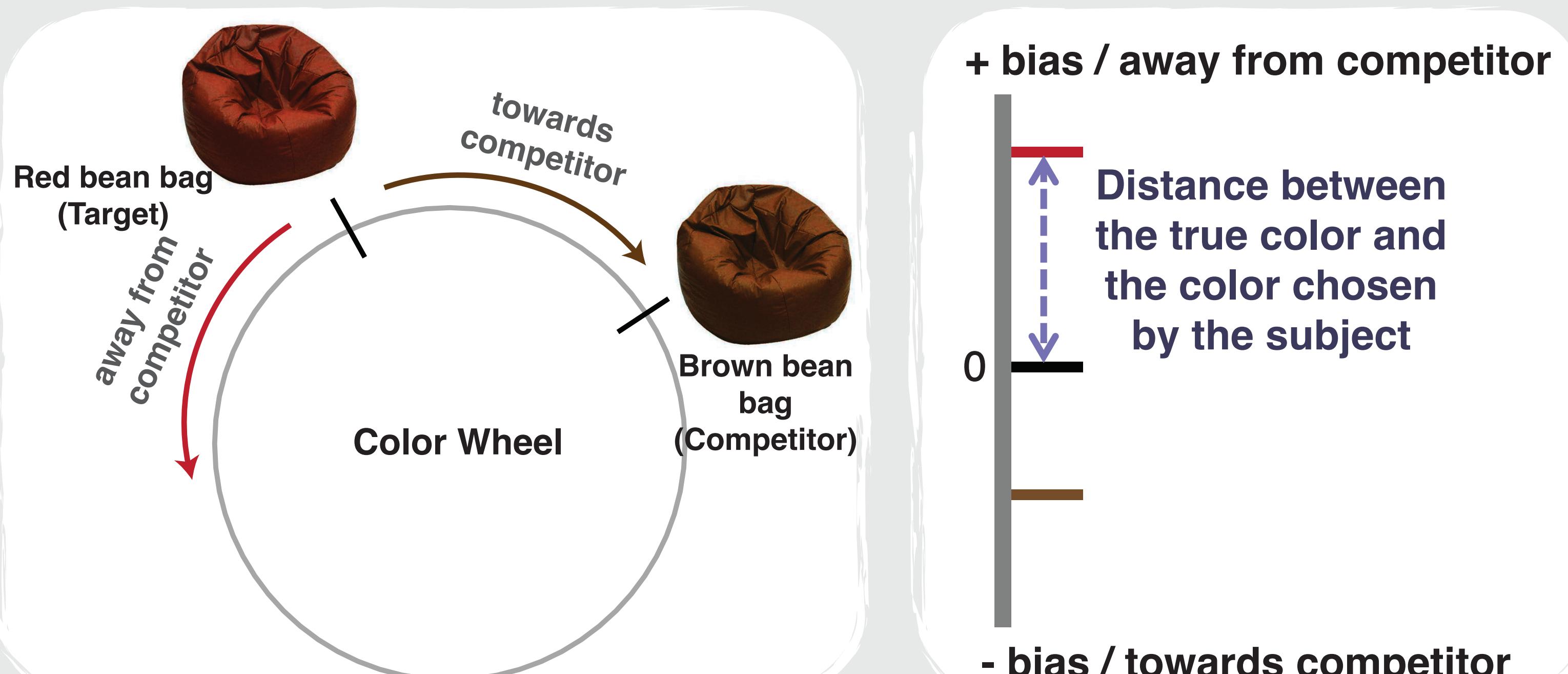
### Subjects

n = 34 after excluding 11 subjects who chose **other** faces on more than **2%** of trials in the last 4 runs of the associative memory phase

## Behavioral Results

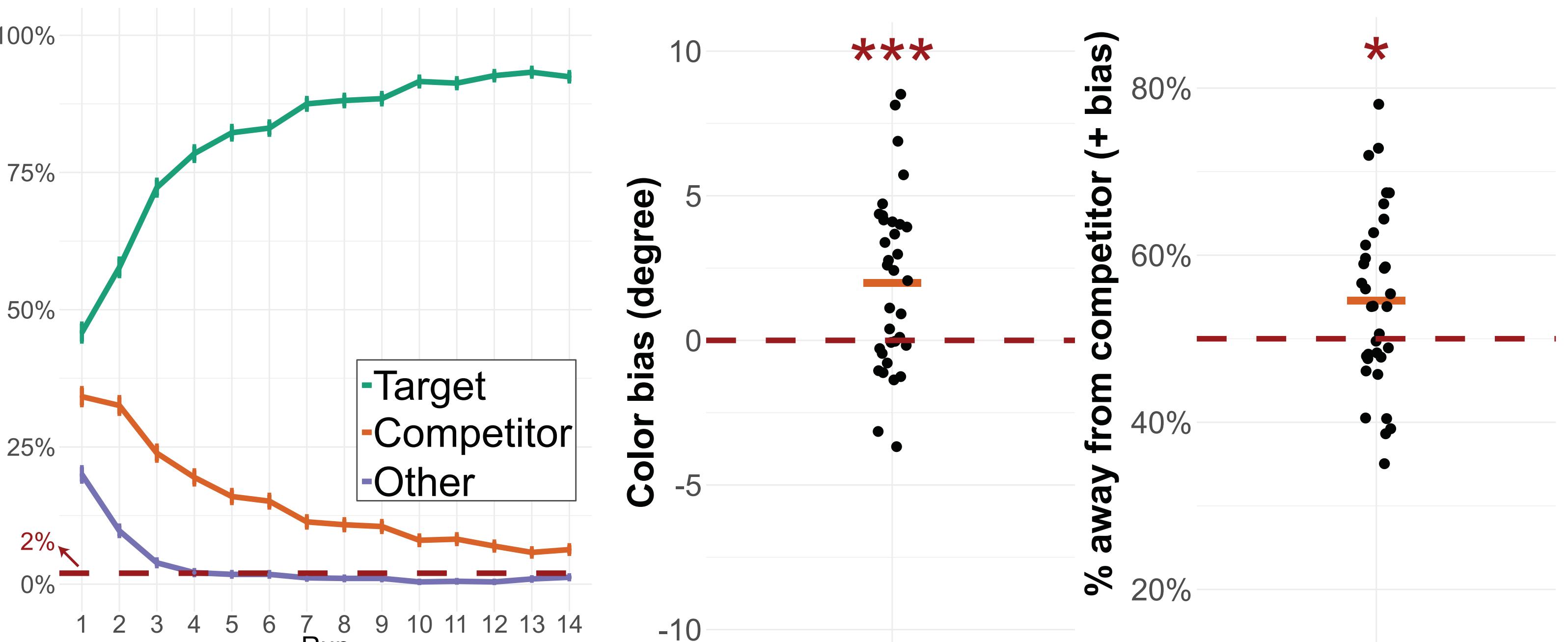
### Measures for the color memory test

#### 1. Color bias

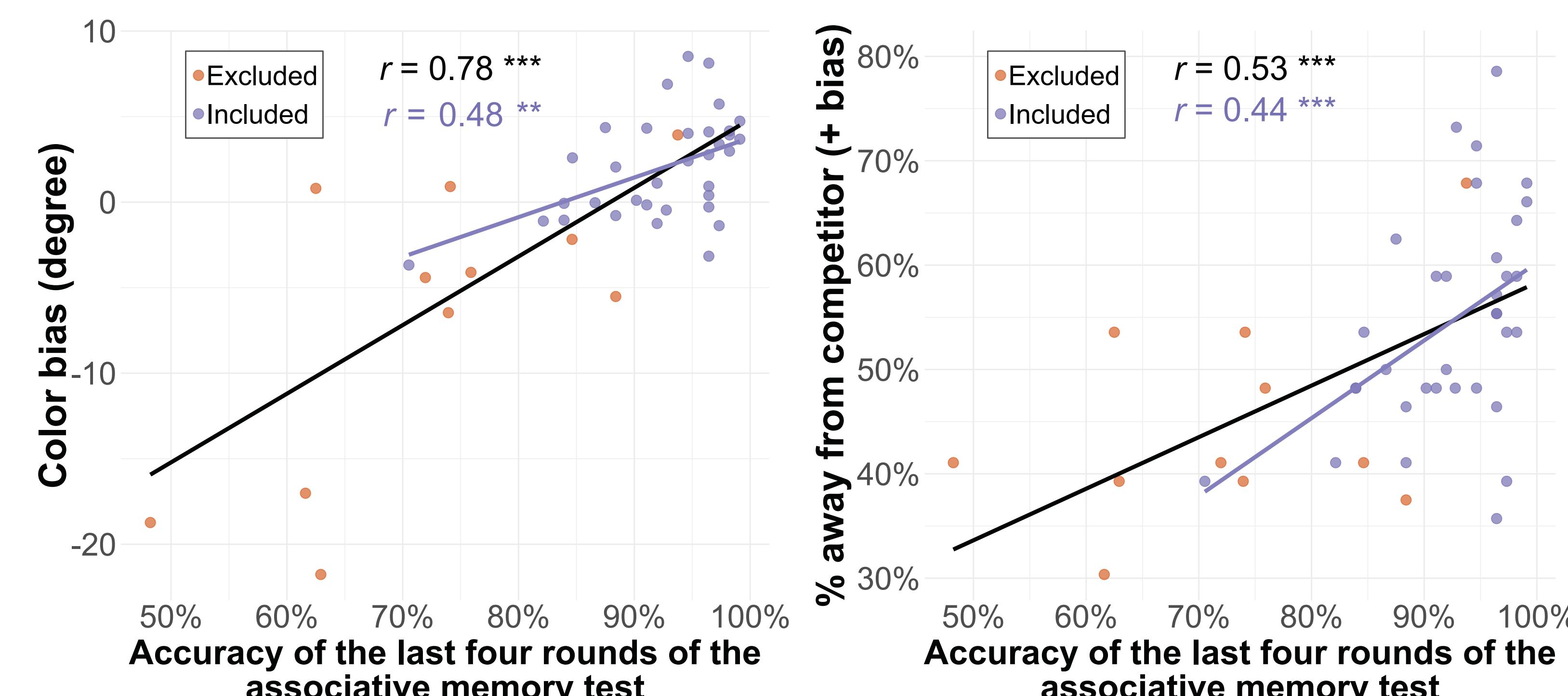


#### 2. Percentage of away from competitor (+ bias)

### • Associative memory test • Color memory test



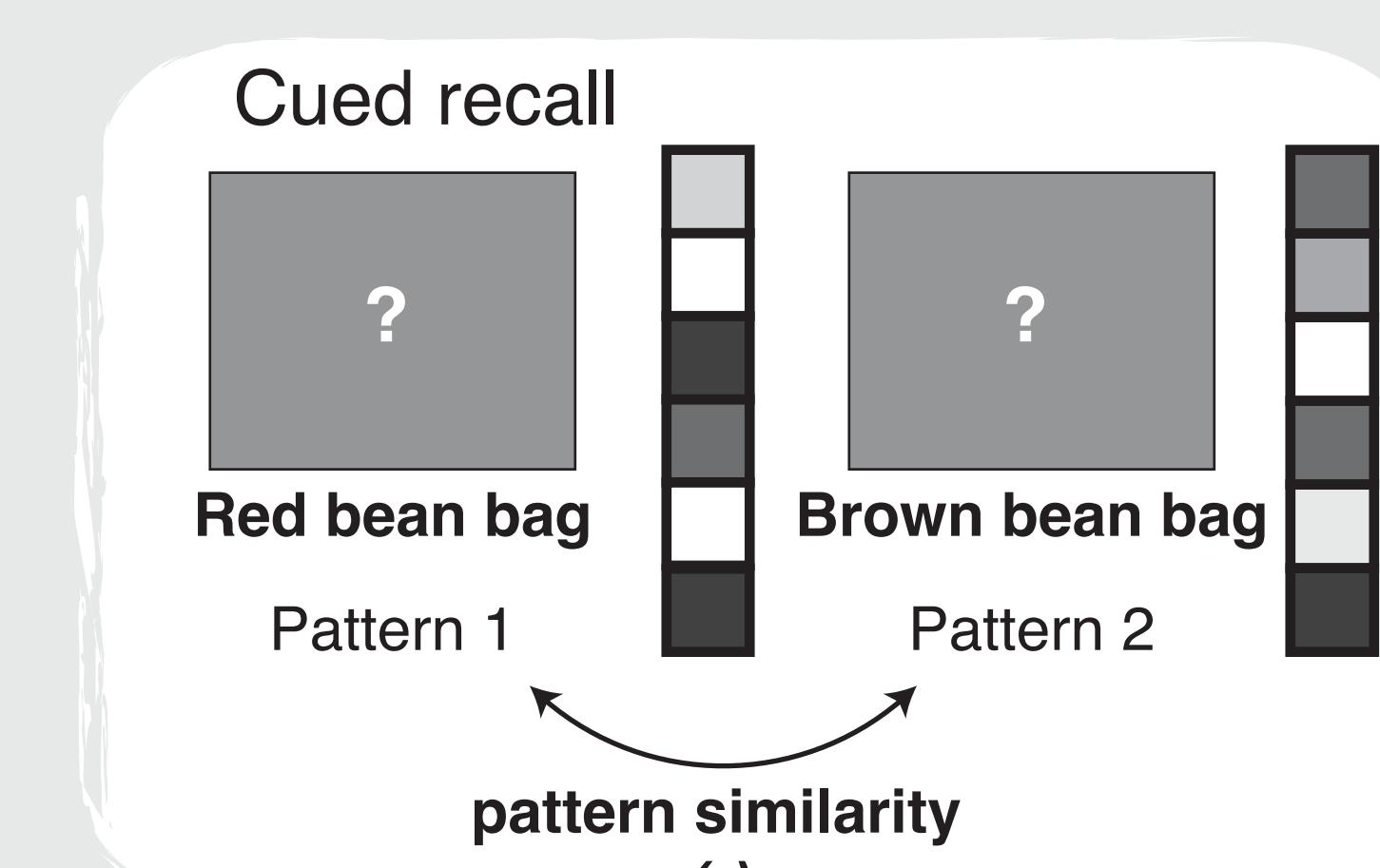
### • Correlation between the color memory test and the associative memory test



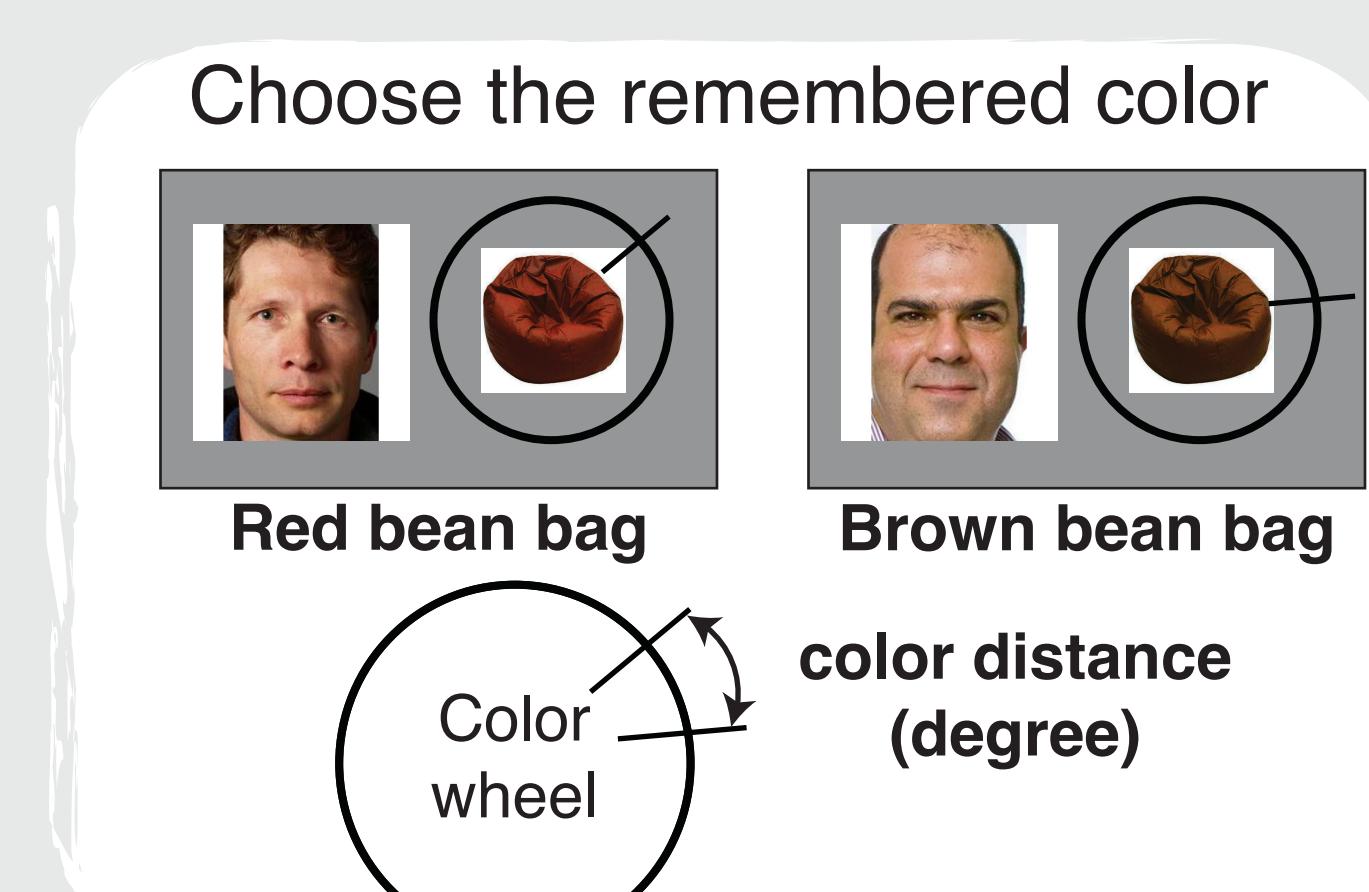
## fMRI study

### Design

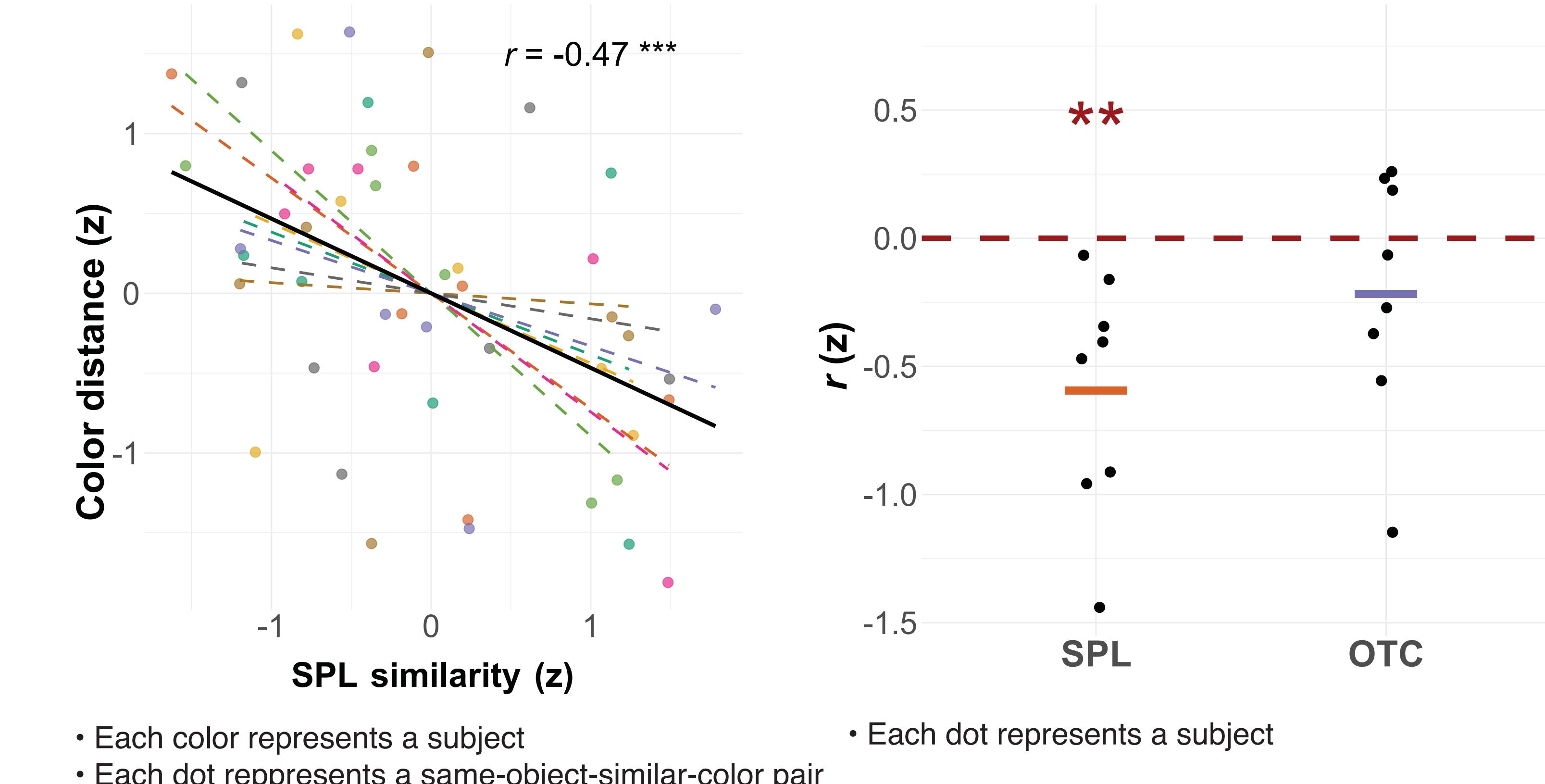
#### In scanner



#### Post test



- Correlation between the pattern similarity and the color distance for same-object-similar-color pairs



## Discussion

- Overlap triggers repulsion of feature memory.
- Repulsion of features is adaptive.
- Parietal cortex tracks repulsion of retrieved memories.
  - Consistent with prior evidence at adaptive feature repulsion in parietal cortex.

### References

- Hulbert & Norman (2014). *Cerebral Cortex*
- Favila, Chanales & Kuhl (2016). *Nature communications*
- Chanales, Favila & Kuhl (2017). *Current Biology*
- Favila, Samide, Sweigart, & Kuhl (2018). *Journal of Neuroscience*

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