

Allison Bruning and Jarrod A. Lewis-Peacock

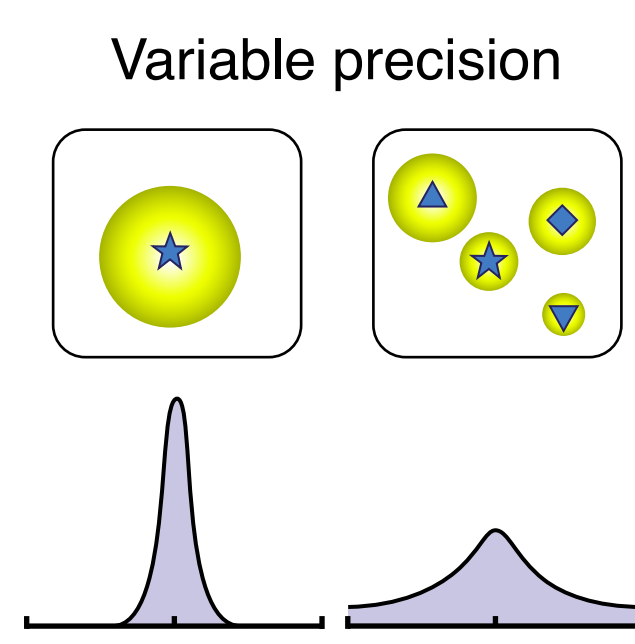
Department of Psychology, Center for Learning and Memory, University of Texas at Austin

1 INTRODUCTION

Background

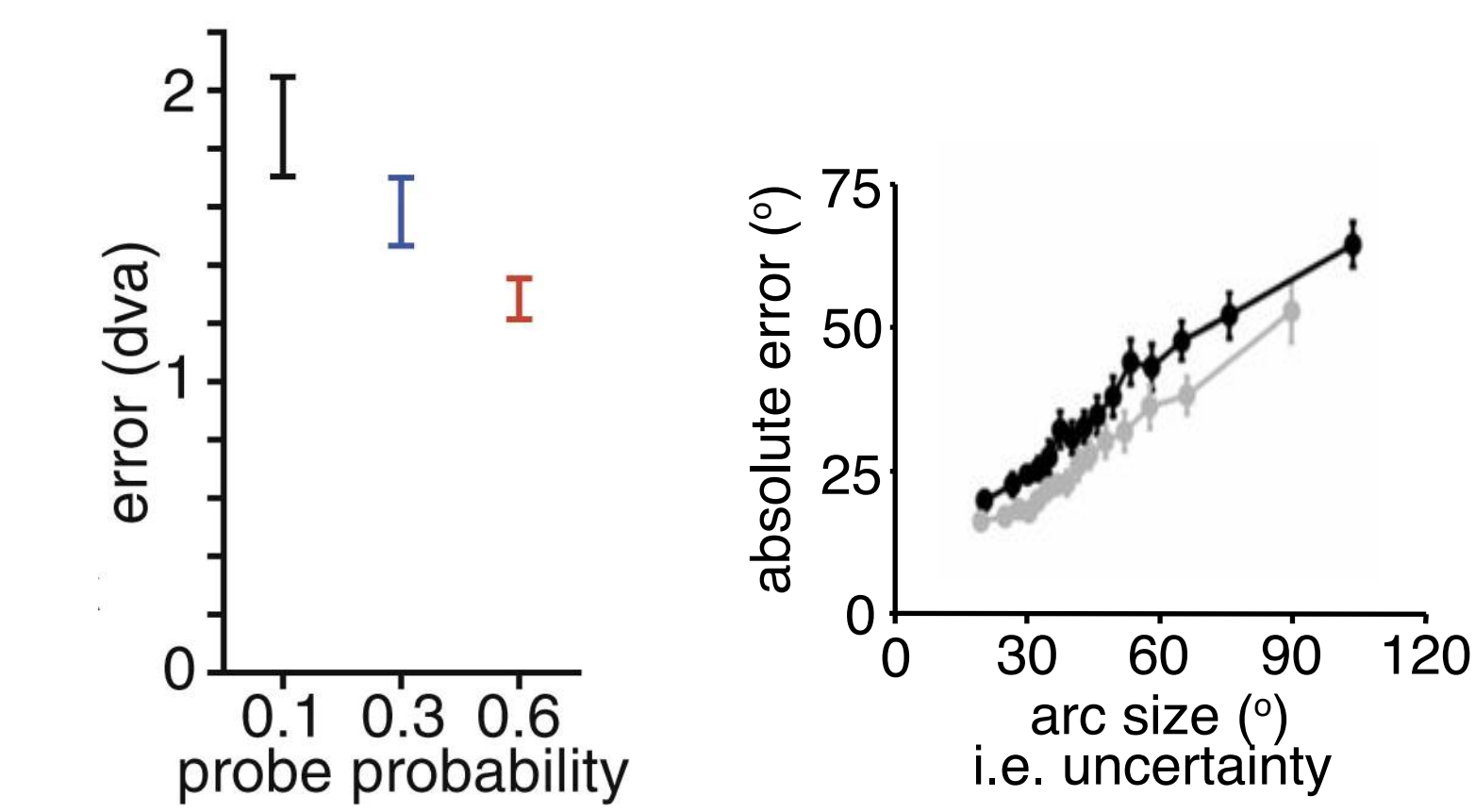
Working memory resources are limited but flexible

- We are capable of giving unequal attention to items during both encoding and maintenance^{1,2,3}.
- This flexibility allows for more optimal use of the limited resources of working memory by minimizing errors^{4,5}.



Working memory is influenced by multiple sources of information

- Behavioral relevance⁵
- Uncertainty⁶
- Long-term memory



RESEARCH QUESTION

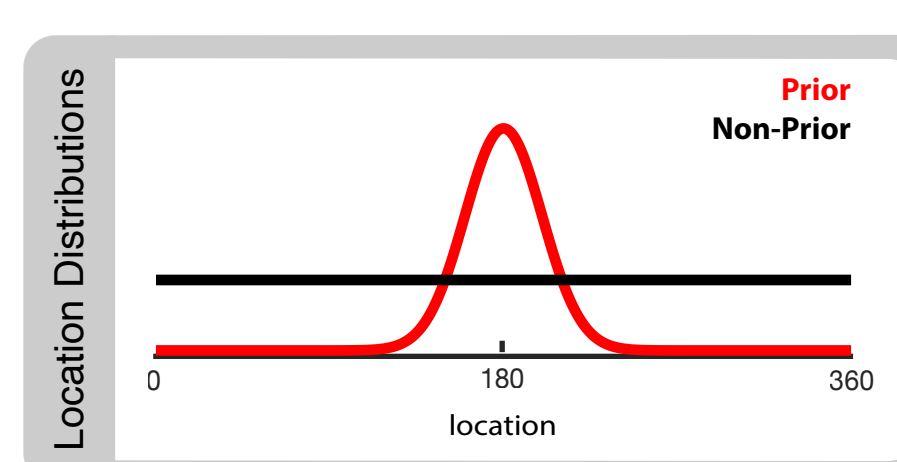
Do participants use goal relevant long-term memory information and how does it influence allocation of working memory resources?

Hypothesis

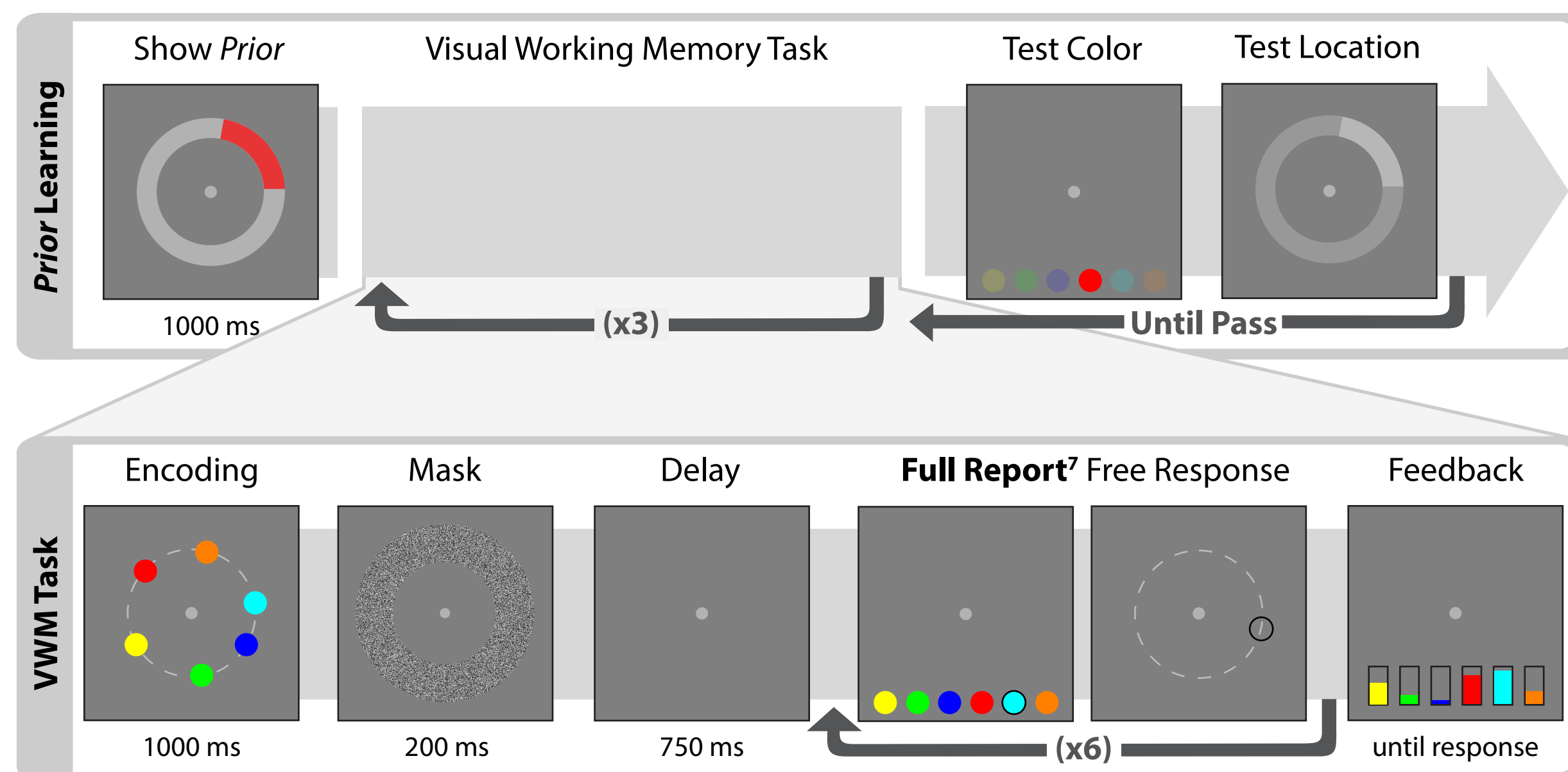
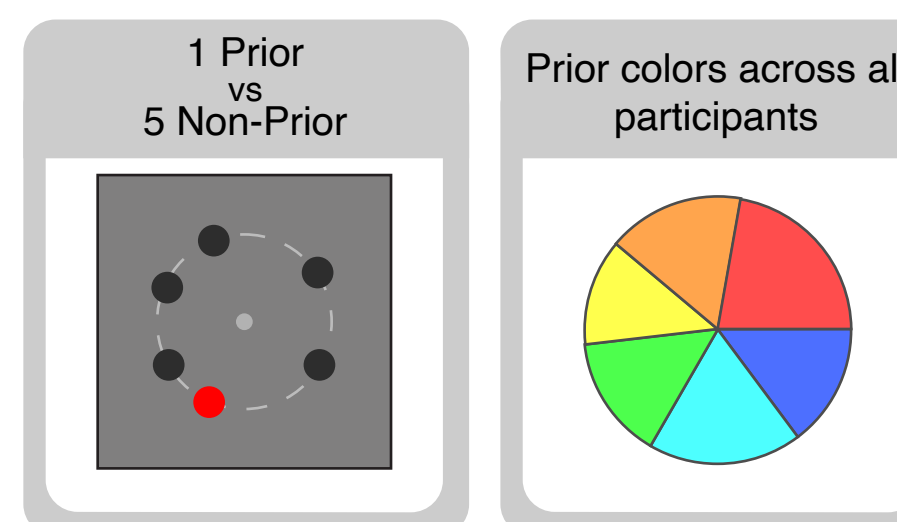
In order to reduce errors, participants will prioritize encoding items with no LTM information and rely on prior knowledge to make educated guesses

2 EXPERIMENTAL DESIGN

Prior vs Non-Prior



*Color and location randomized across participants

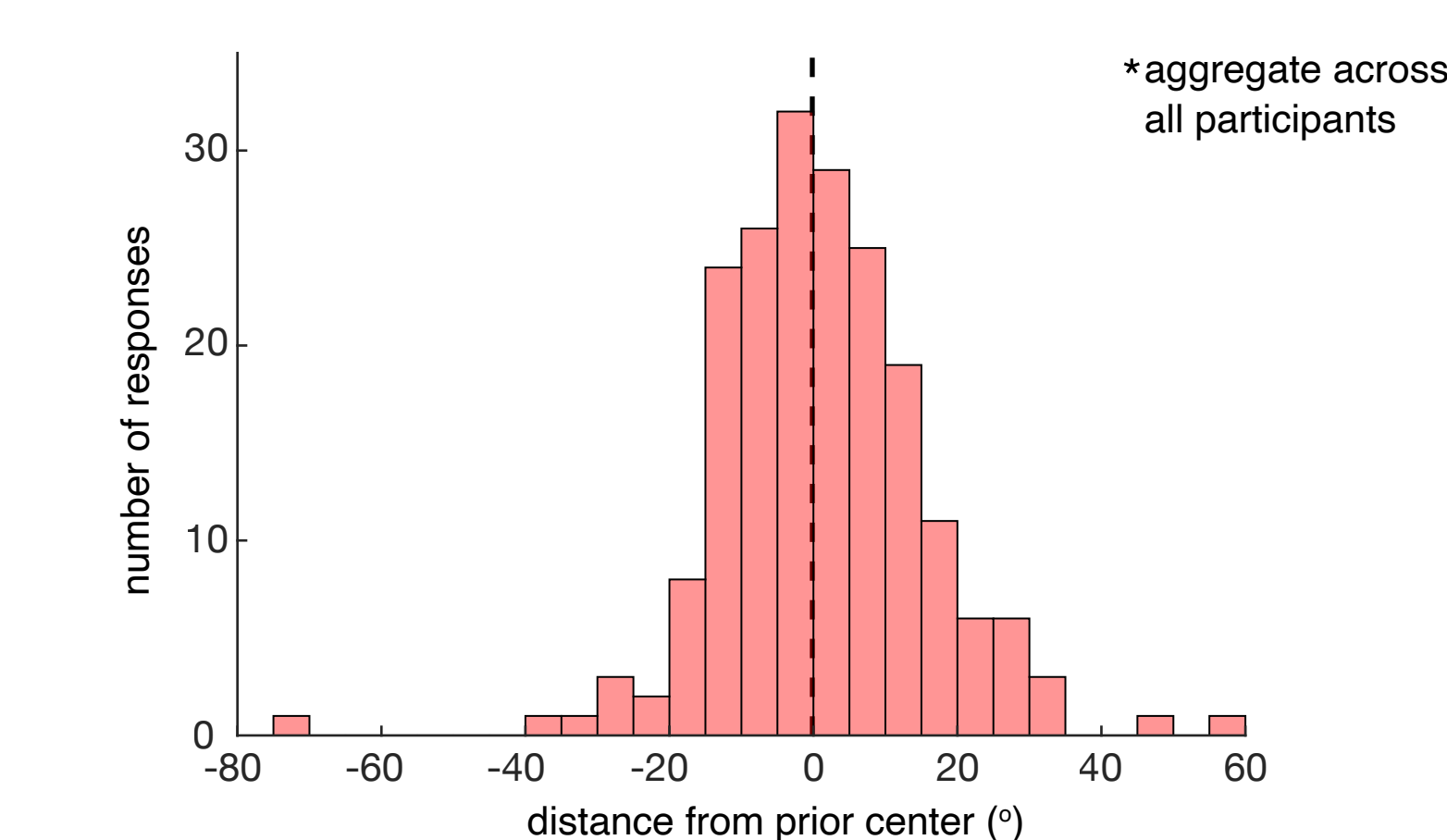


*Prior was shown once during training and remained constant throughout the experiment

Knowledge of the prior

Location checks of Prior

Participants were asked to report the center of the prior distribution at the end of each block of trials

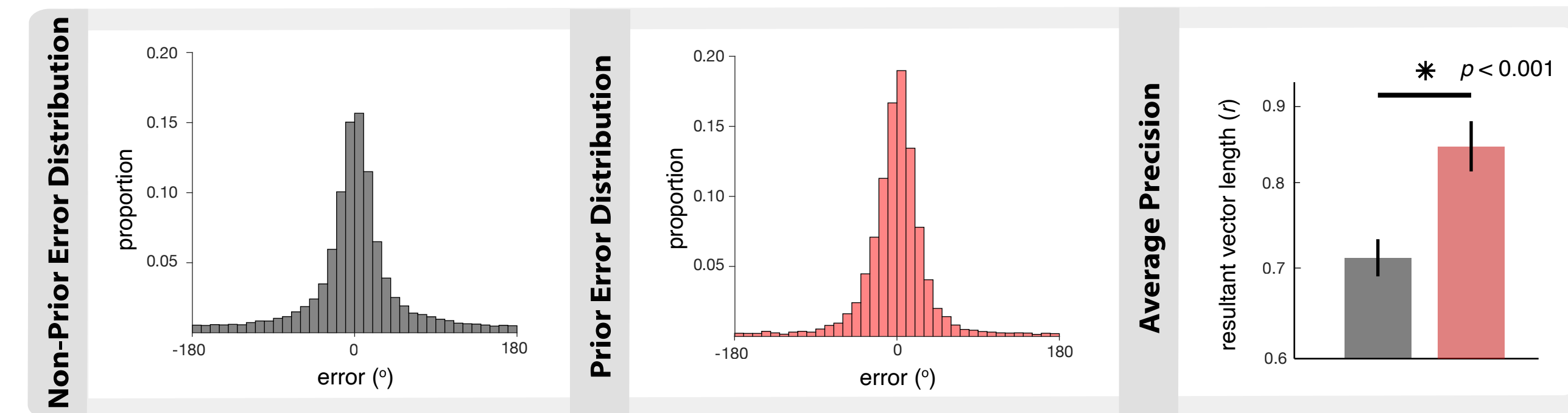


*aggregate across all participants

3 BEHAVIORAL RESULTS | N = 54

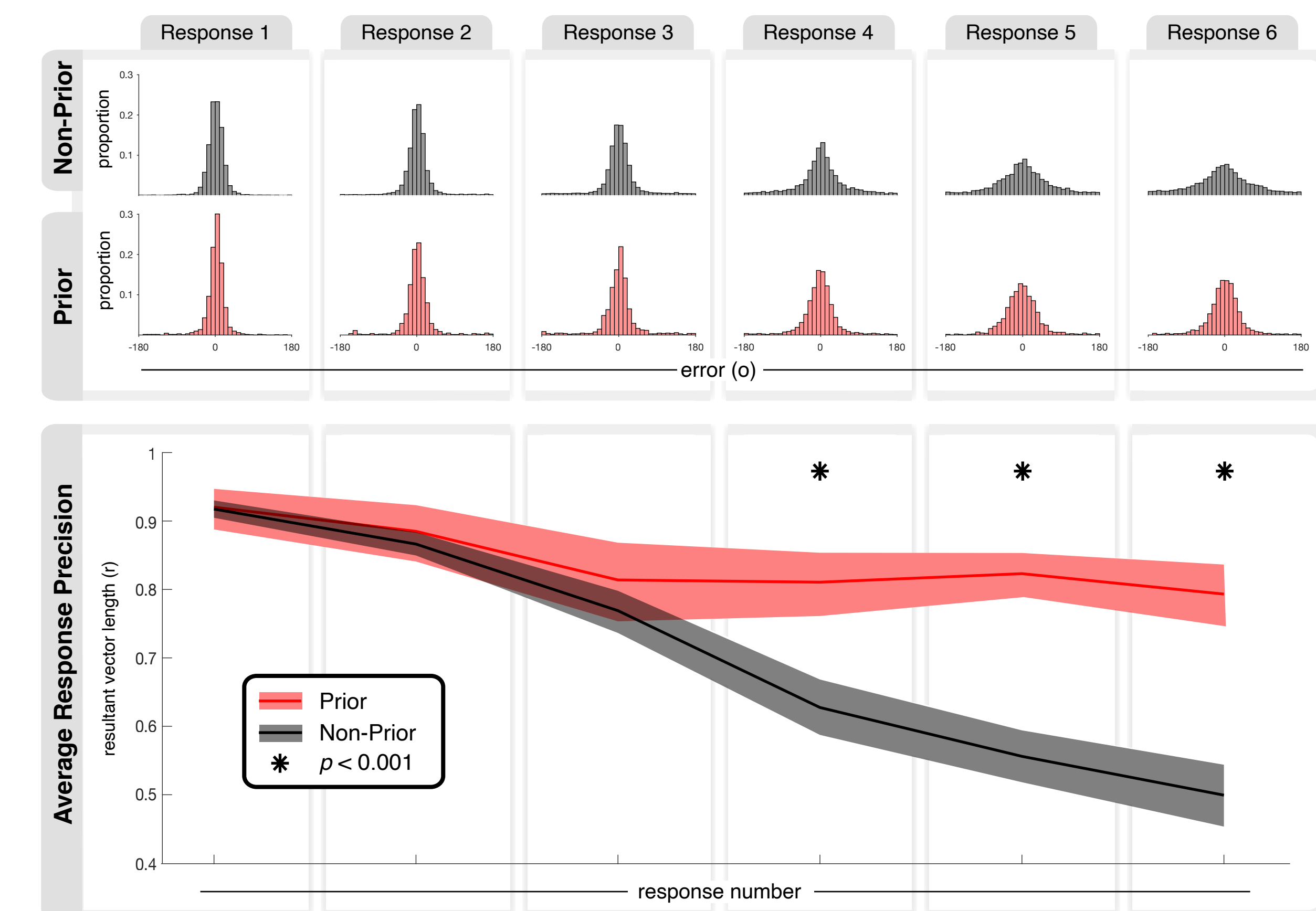
Participants use prior information

Non-Prior responses have greater error



Difference in error only present in the late responses

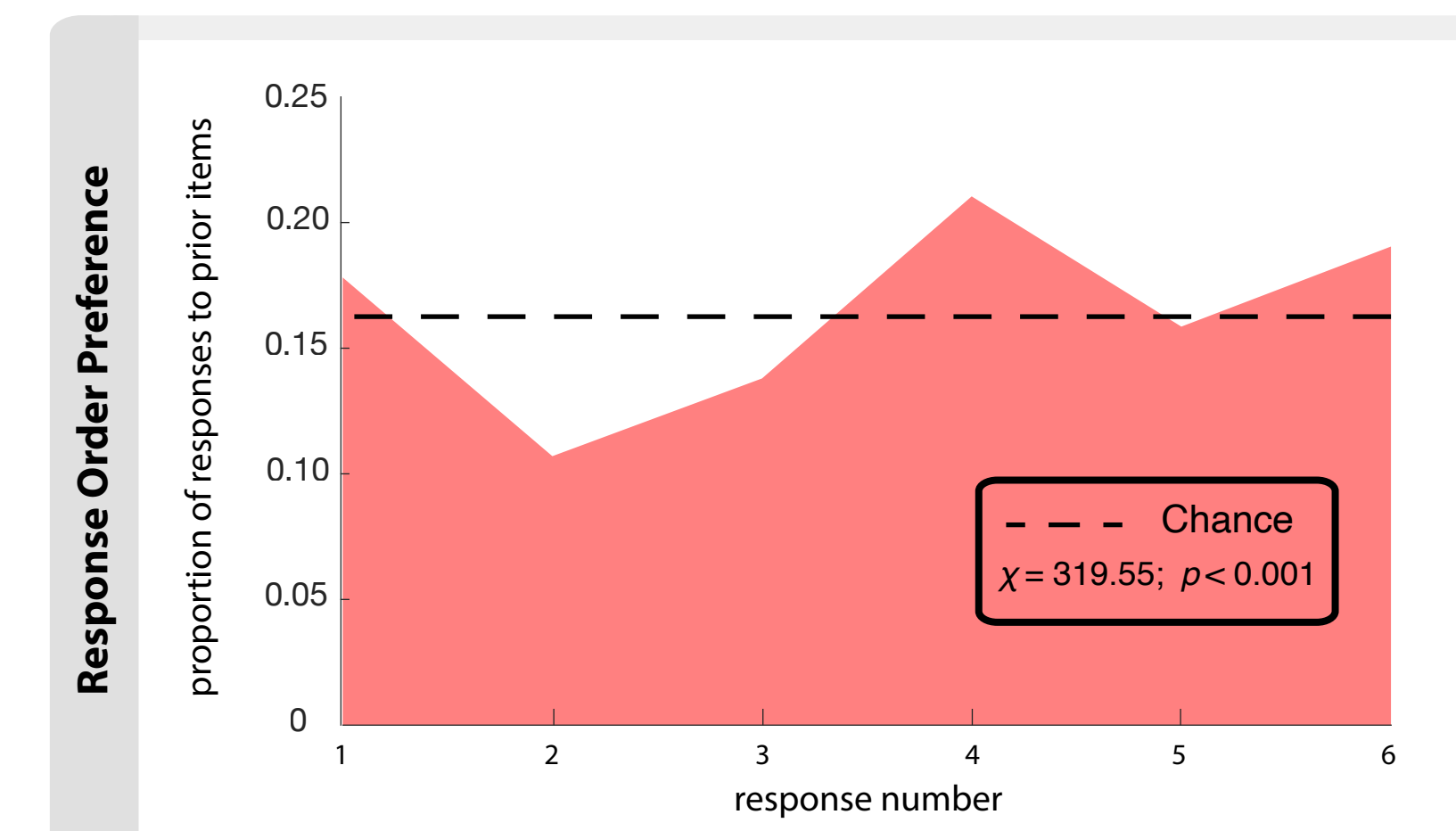
- Following previous work, participants report items in order of highest precision to lowest?
- Prior items have greater resistance to degrading due to the prior information allowing for educated guesses



Participants report items in strategic order

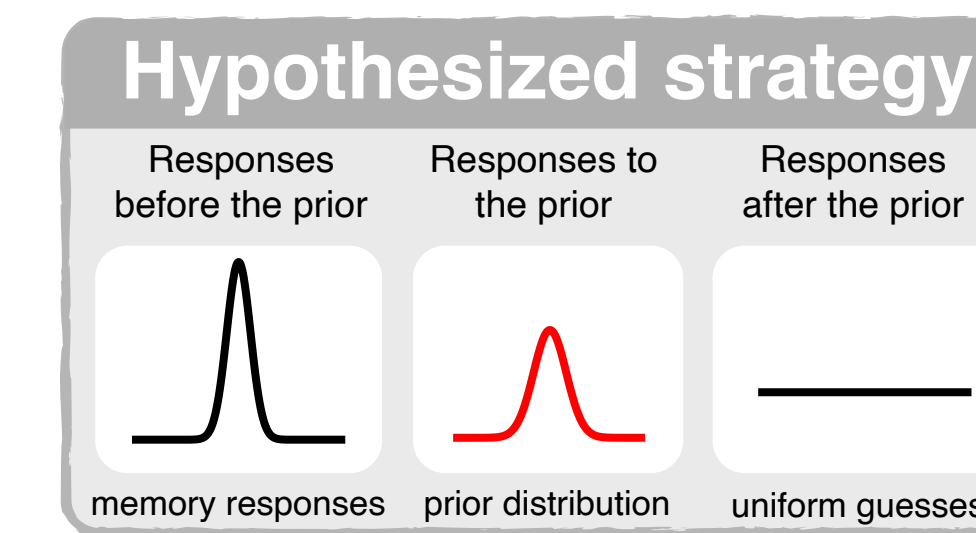
Prior item response order is non-uniform

- Reporting prior items later indicates participants are prioritizing resources for non-prior items

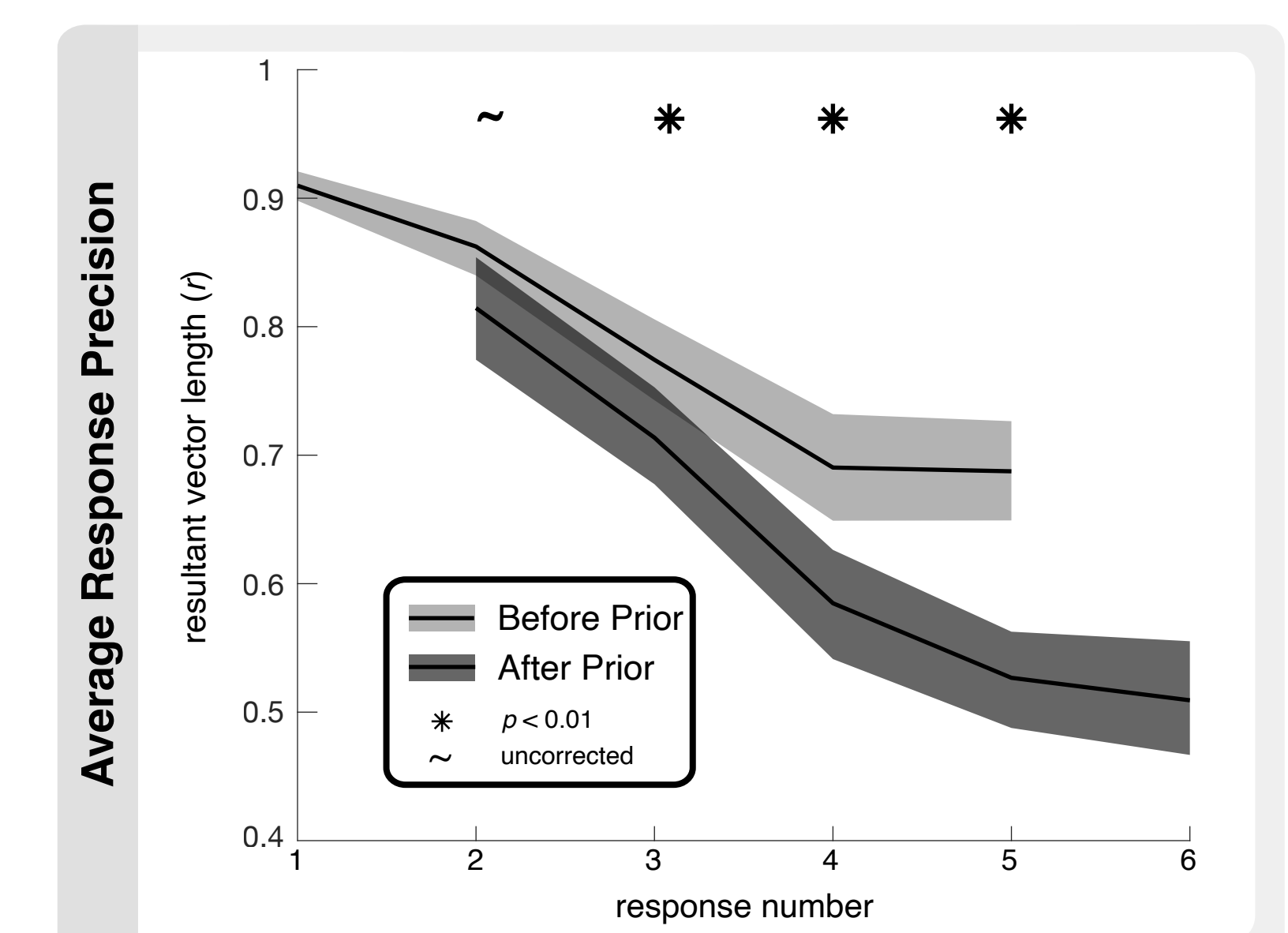


Non-prior responses have greater precision when reported before the prior item

- We propose this is due to the prior item marking a boundary between reporting items in memory and guessing



- This would indicate that rather than encoding the prior item, participants are relying on the prior information and instead encoding non-prior items



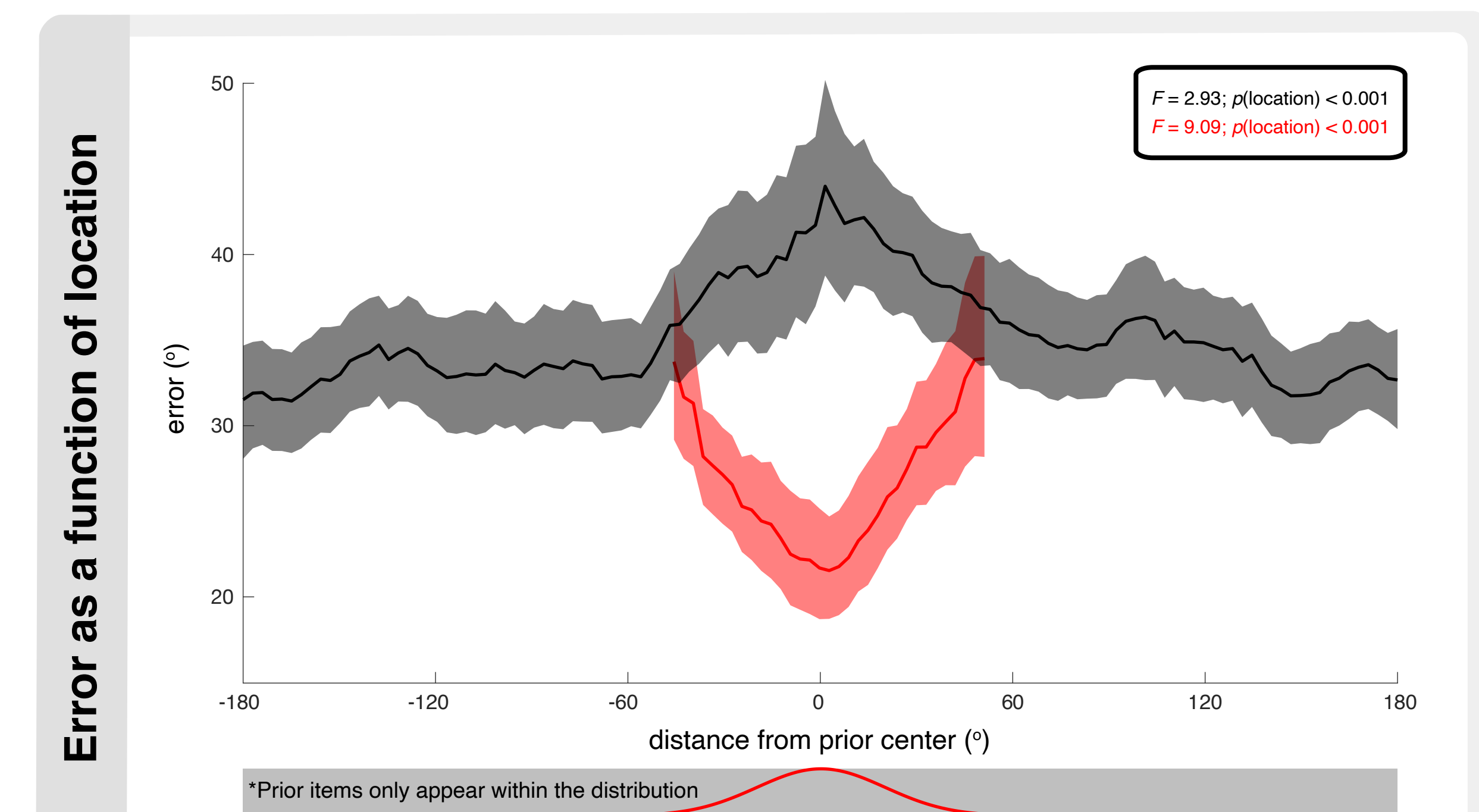
Participants attend away from the location of the prior

Error for the prior and non-prior items show an inverse relation as a function of location

- Responses to **non-prior** items **increase** in error as the item's true location approaches the center of the prior distribution
- The increase in error for non-prior items indicates participants are allocating fewer resources to this area

- Responses to **prior** items **decrease** in error as the item's true location approaches the center of the prior distribution
- The decrease in error for prior items indicates participants are using the prior information to guess, i.e. if the participant always reports the mean of the prior distribution, error would increase the farther the item is from the center

- By choosing to constrain where they attended, participants benefited from decreased error for prior items, however at a cost of increased error for non-prior items that appeared in that same area



4 DISCUSSION

- These results indicate that participants can and do make use of long-term memory information in order to minimize error
- Specifically, we have demonstrated that participants prioritized non-prior items in working memory by attending away from the location of the prior
- Critically, this came at the cost of increased error for non-prior items in that location, indicating that incorporation of long-term memory optimizes allocation but does not increase capacity

References

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- Emerich et al., 2017. *J Exp Psych*
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