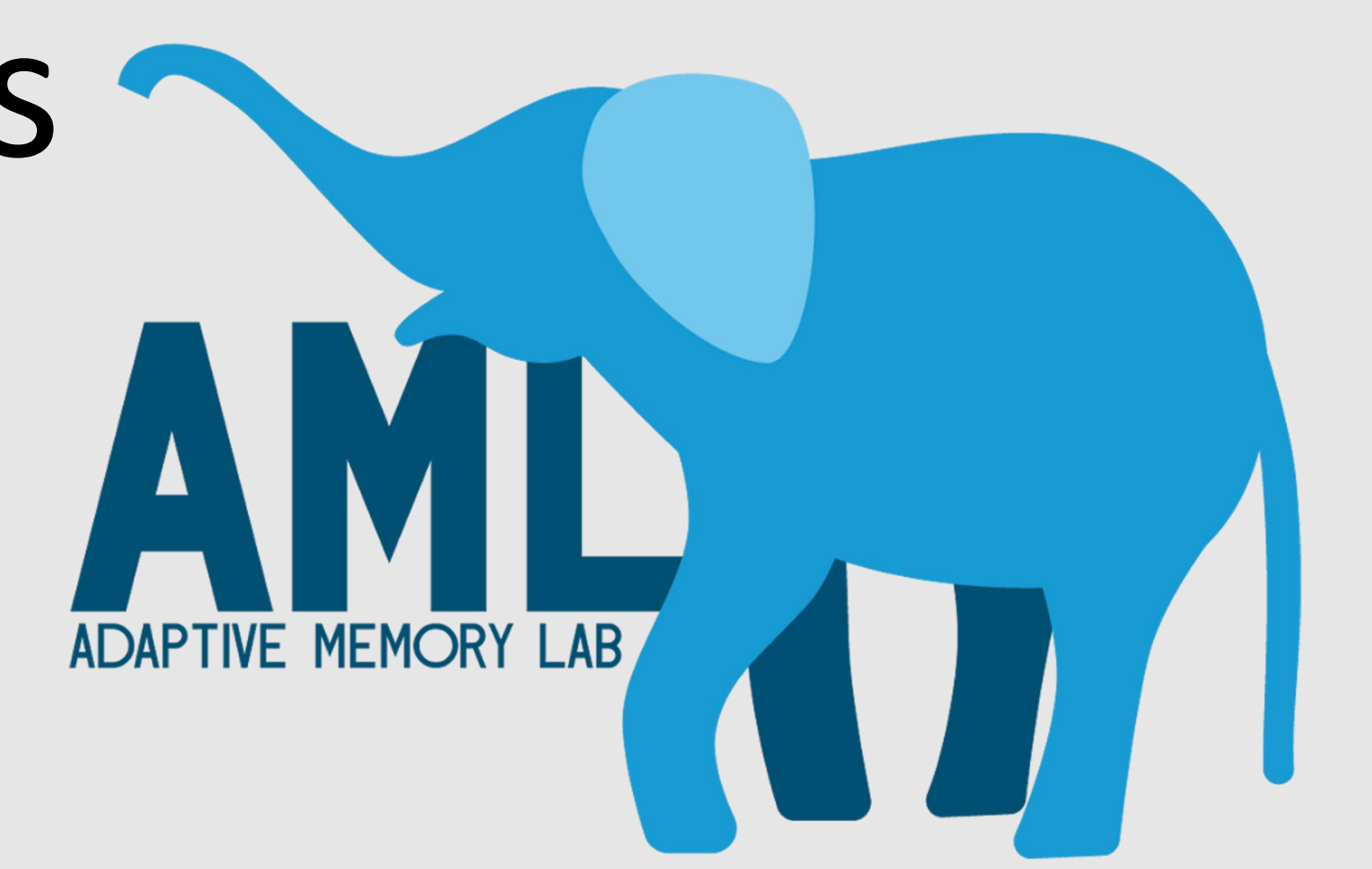


Actively testing hypothesis using acquired information during encoding enhances delayed memory.

Xinxu Shen¹, Ian C. Ballard², Vishnu P. Murty¹, David V. Smith¹

¹Department of Psychology, Temple University

²University of California, Berkeley



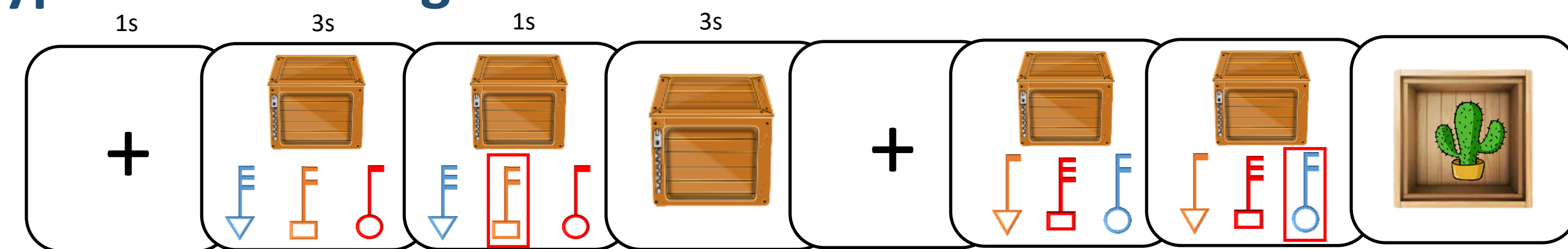
Purpose

- People are motivated to actively seek information because information itself is of value¹.
- People prefer to know information in advance even if there are costs associated with information, independent of its utility².
- Acquired information can be used for hypothesis testing to resolve uncertainty as people update information value³.
- Information seeking enhances memory⁴, but we don't know relationship between hypothesis testing and memory

How does hypothesis testing and adaptively updating value of information influence memory encoding state?

Study 1 Tasks

Hypothesis testing task

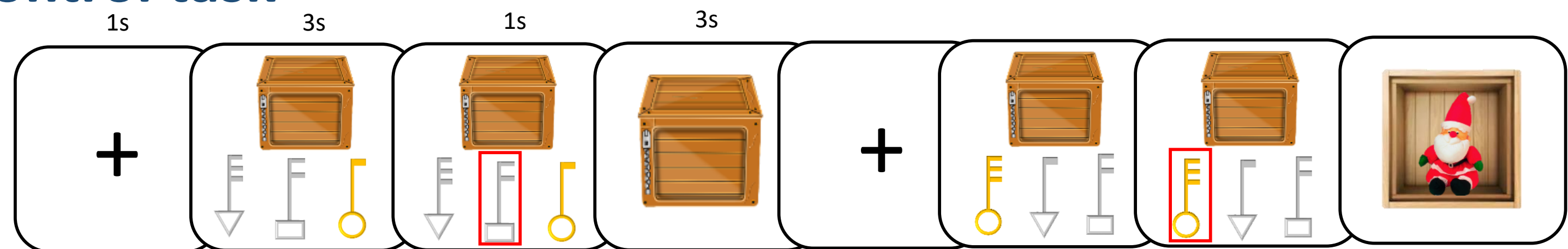


Keys consist of one feature on each of the three dimensions (color, handle shape, tip shape)

Switch Rules: After subject got 4 consecutive trials correct, rule switched

Block: After subjects viewed 20 object images, the block ended. Subjects moved on to next block

Control task



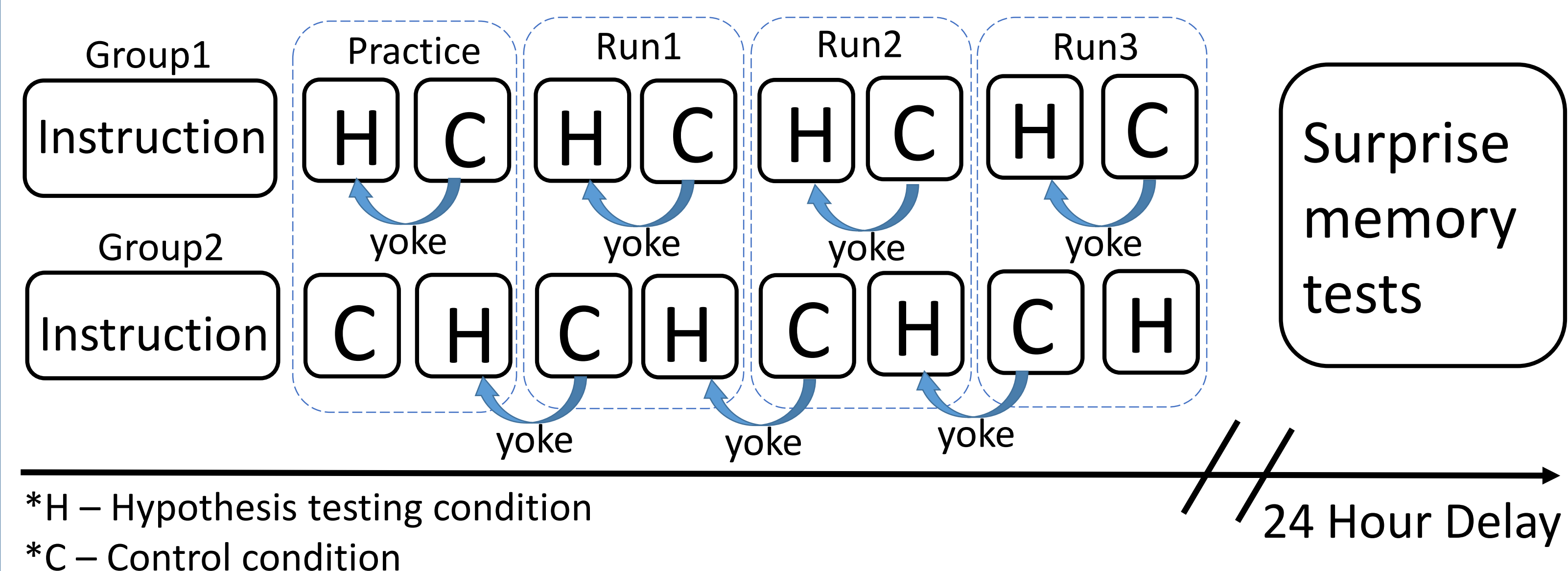
- Subjects were asked to choose golden keys only
- Outcomes in control task were yoked to outcomes in hypothesis testing task

Surprise memory test



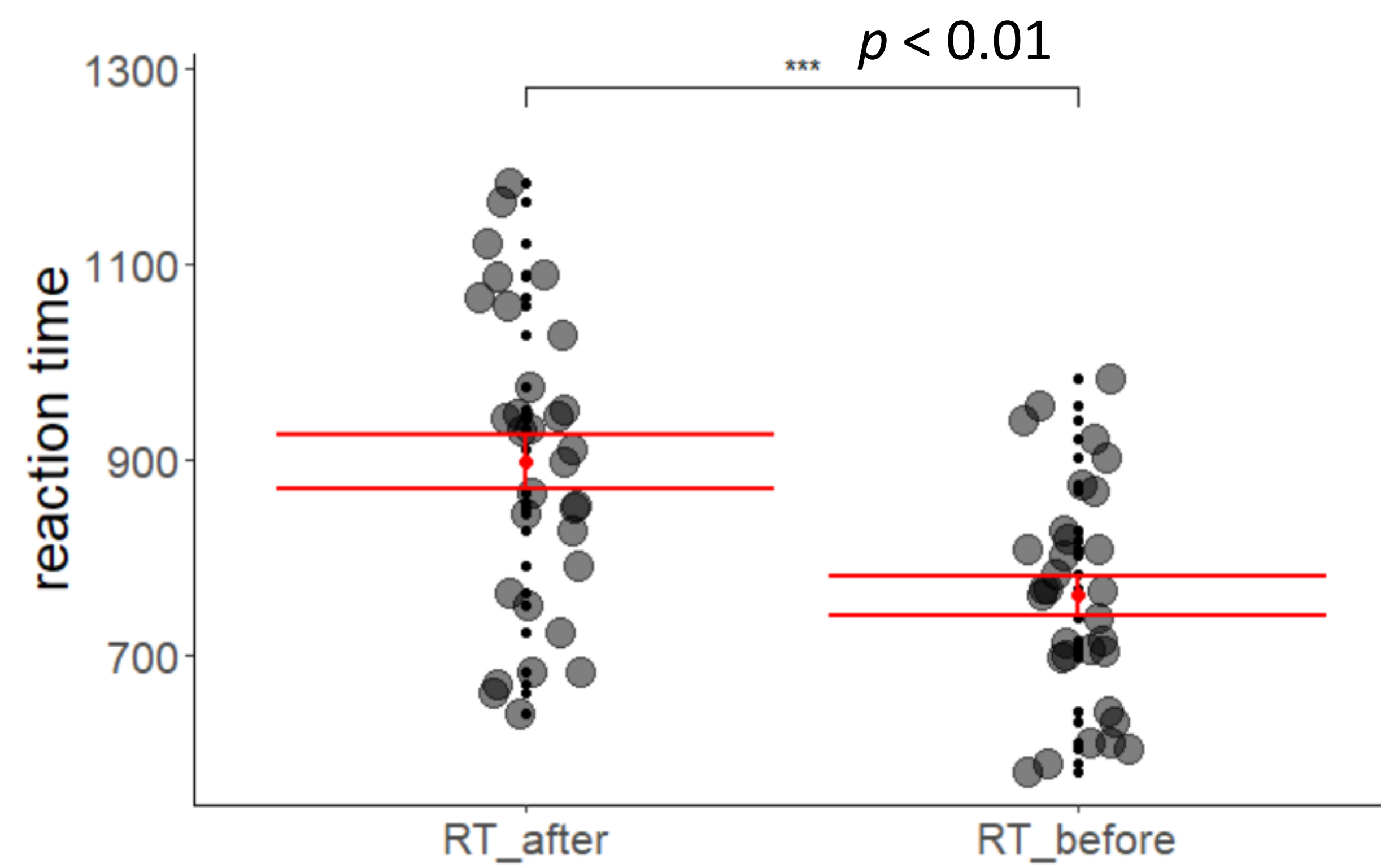
- 120 old objects from 3 runs of hypothesis testing condition and control condition & 120 new objects
- Self paced

Study1 Design



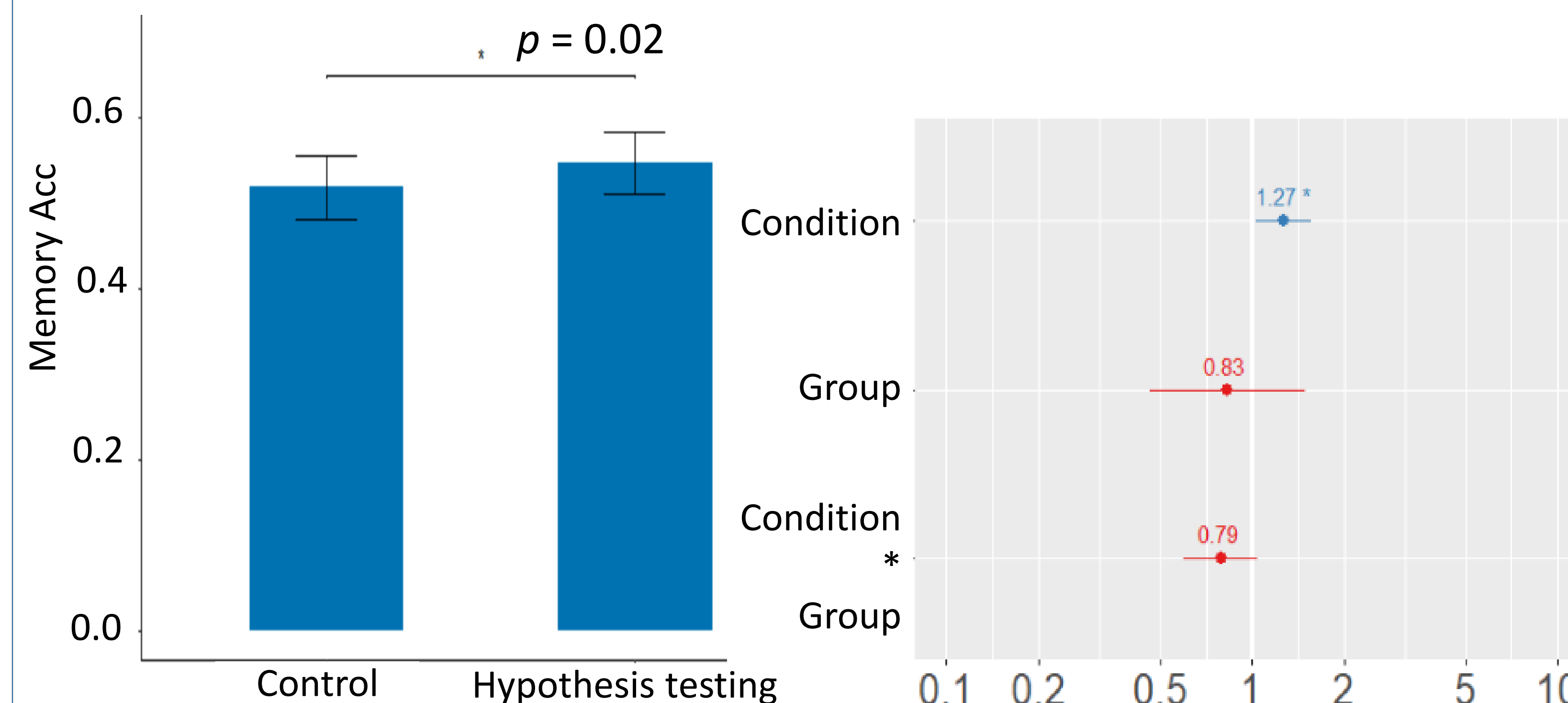
Manipulation check

N = 35; Group1 = 18; Group2 = 17



Reaction time before rule switch is significantly *shorter* than reaction time after rule switch
 → Participants successfully figured out different rules during hypothesis testing condition

Effect of hypothesis testing on memory

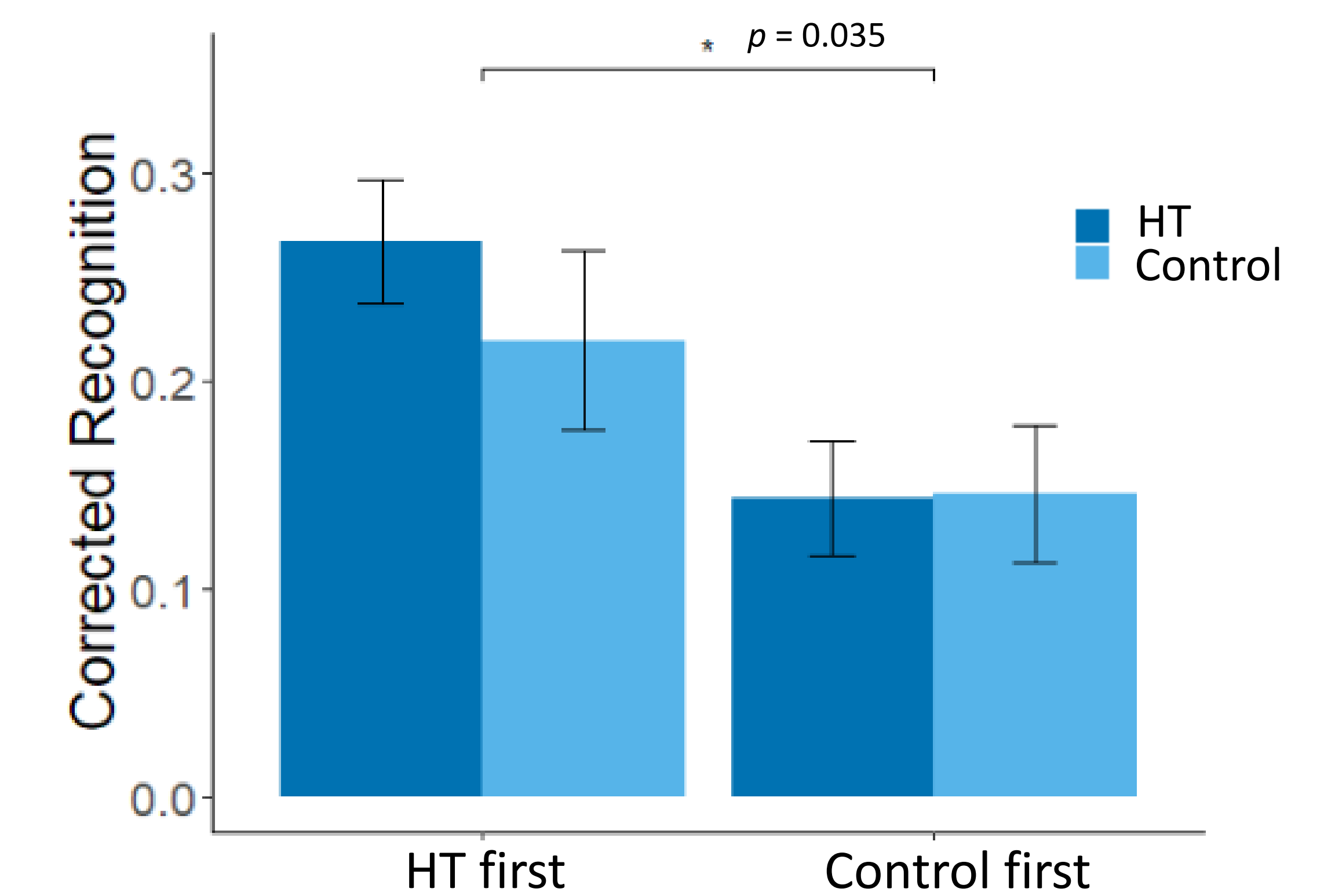


Hypothesis testing during encoding enhances memory

Reference

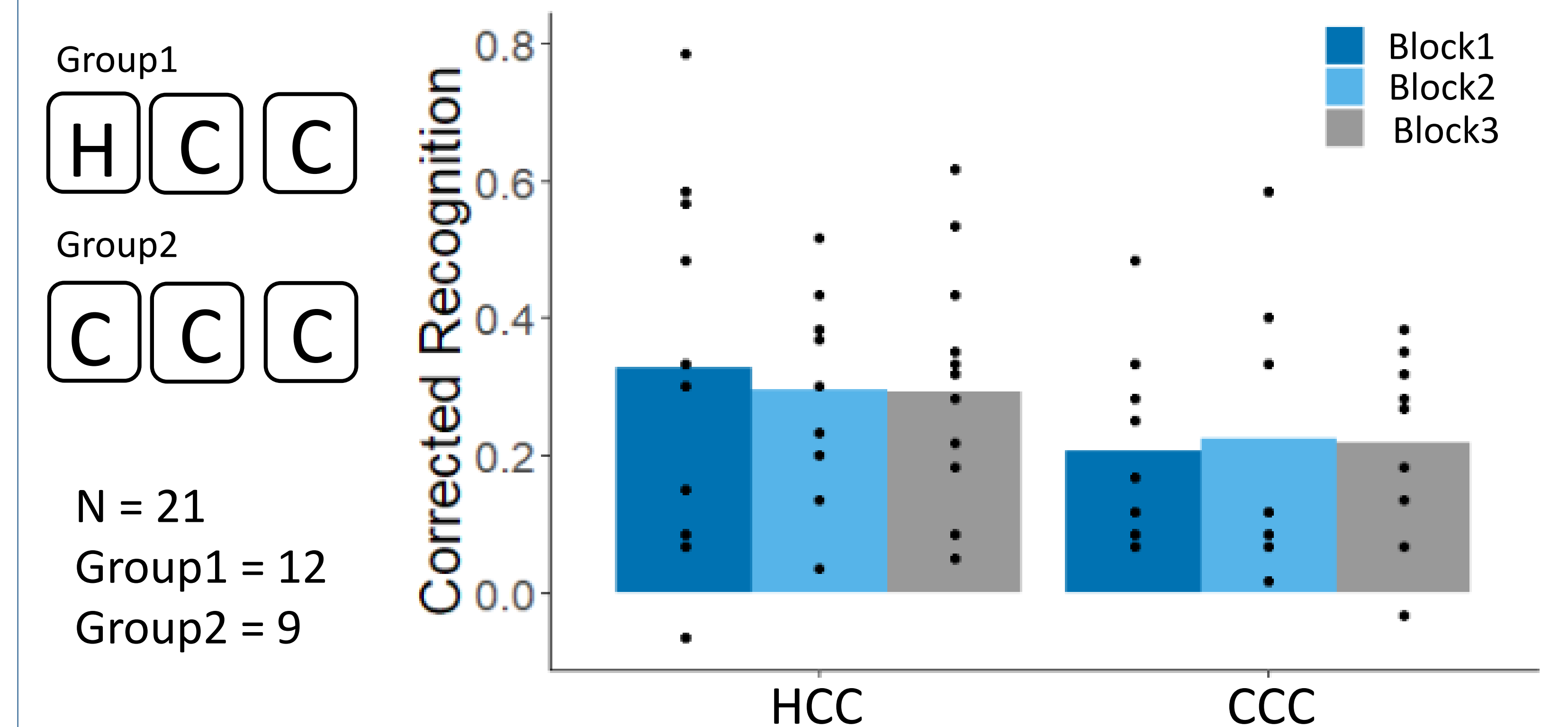
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Hypothesis testing produces prolonged memory benefit



The effect of hypothesis testing carries over
 → Hypothesis testing produces prolonged memory benefit

Study2 – Does brain state of hypothesis testing carry over?



Hypothesis testing creates a brain state that enhances memory encoding for a long period of time

Summary

- **Study1:** Actively testing hypothesis and updating values during encoding enhances memory for acquired information during hypothesis testing.
- **Study2:** Hypothesis testing creates a brain state that enhances memory for a long period of time.
- **Future Direction:** Use computational models to characterize how uncertainty, surprise and RPEs in hypothesis testing influence memory