



Attention and Working Memory Correlate with Episodic Memory during Mnemonic Similarity Task in Young Children

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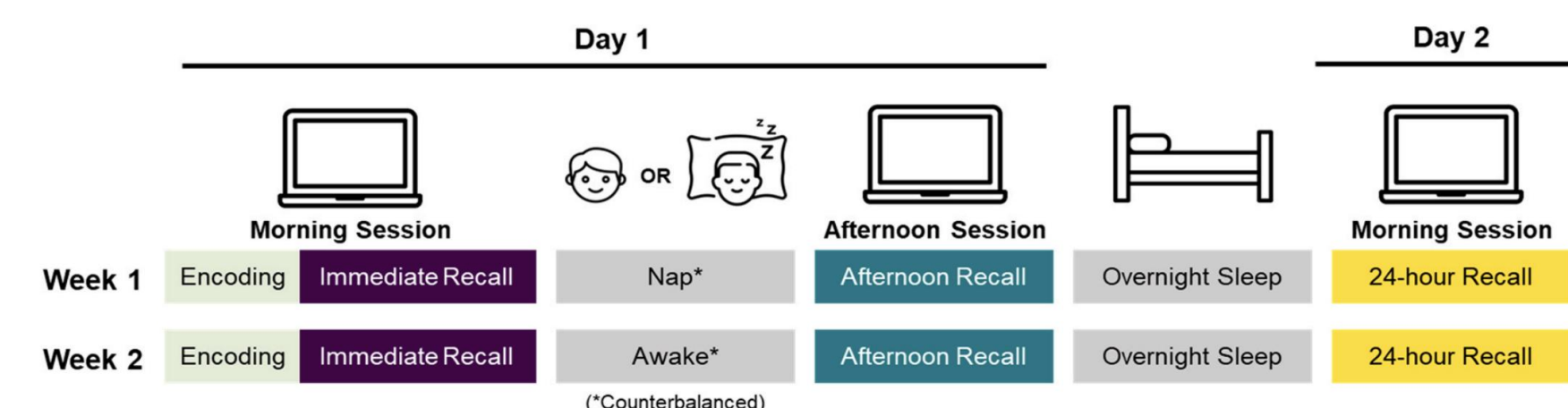
Introduction

- Early childhood is a period marked by rapid development of episodic memory, particularly in mnemonic discrimination; the ability to form distinct, non-overlapping memories (Ngo et al., 2018)
- The role of other cognitive processes, such as attention and working memory on the development of episodic memory remains underexplored

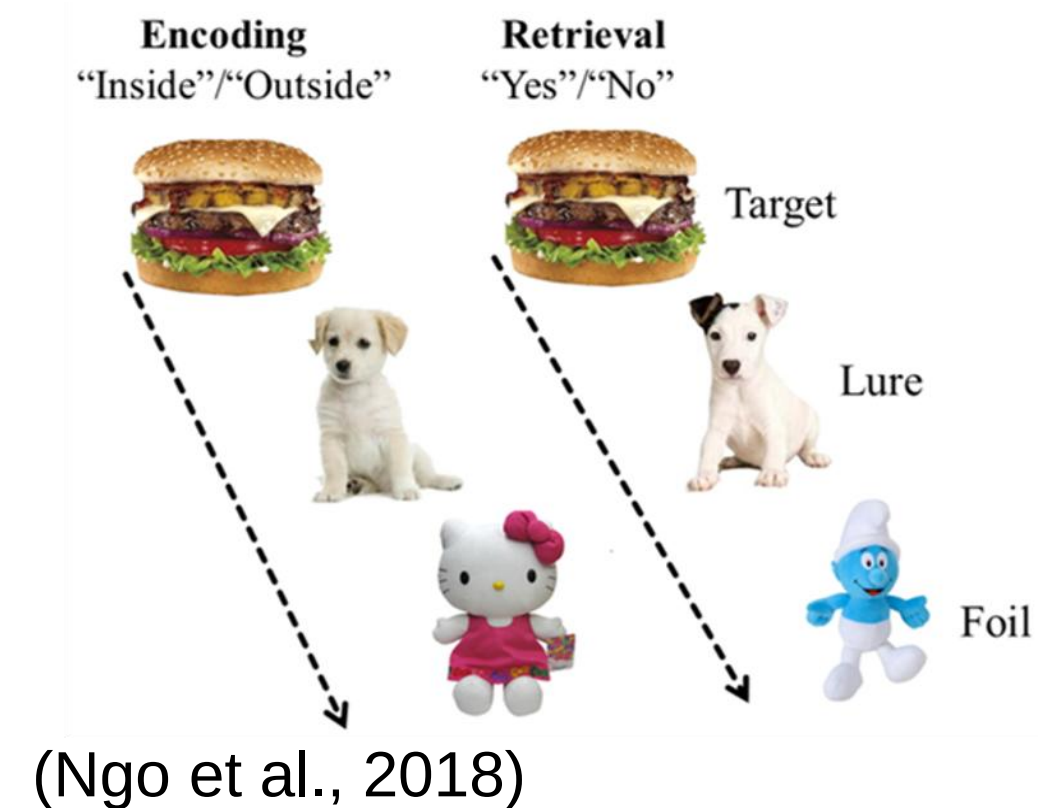
GOAL: Explore relations between mnemonic discrimination, attention, and working memory in a sample of 3-5 year-old children

Methods

Participants: 68 participants, aged 3 to 5 years old. (M = 3.11 years, SD = 9 months, 36 female). Sample of convenience, predominately mid- to high SES, White



Mnemonic Similarity Task (MST) over zoom:



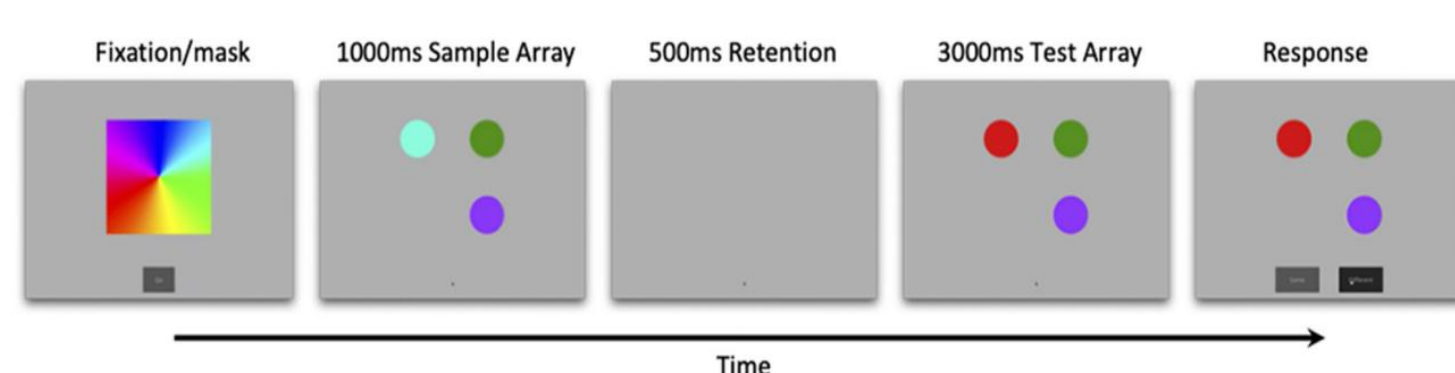
Item Memory (IM): *a measure of general item memory*

target hits - foil false alarms

Lure Discrimination Index (LDI): *a measure of mnemonic discrimination*

target hits - lure false alarms

Working Memory Task (n = 34) asynchronously online:

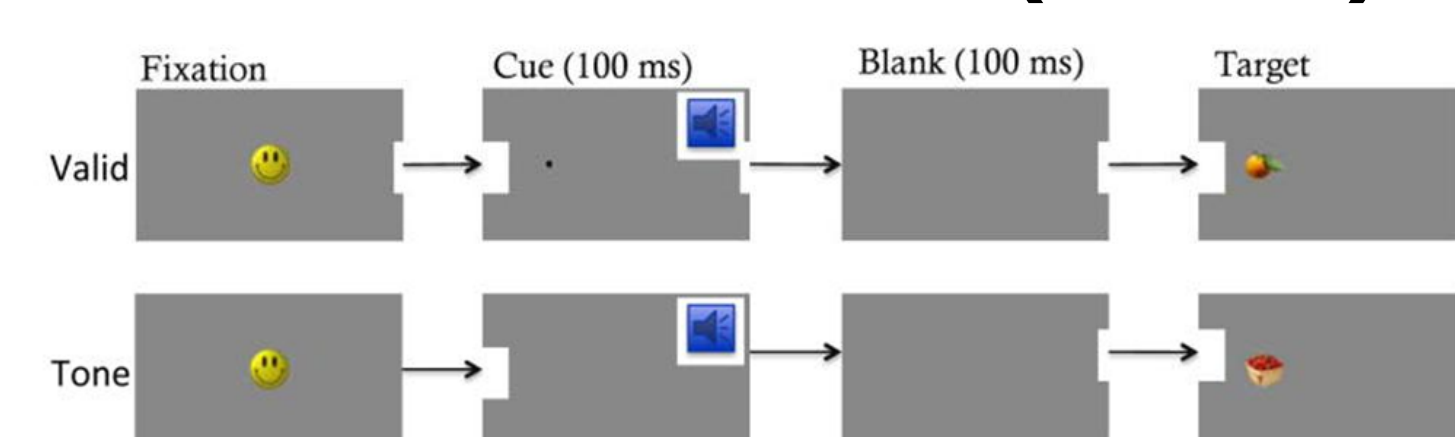


Capacity Score: *a measure of how many items could be retained from an array of 4*

$$4 \times (\text{Hit Rate} - \text{False Alarm Rate}) / (1 - \text{False Alarm Rate})$$

(Ross-Sheehy et al., 2021)

Attention Task (n = 36) asynchronously online:



Average Facilitation: *a measure of how much reaction time (RT) was decreased by an ipsilateral cue*

$$((\text{baseline RT} - \text{valid RT}) / \text{baseline RT})$$

(Ross-Sheehy et al., 2017)

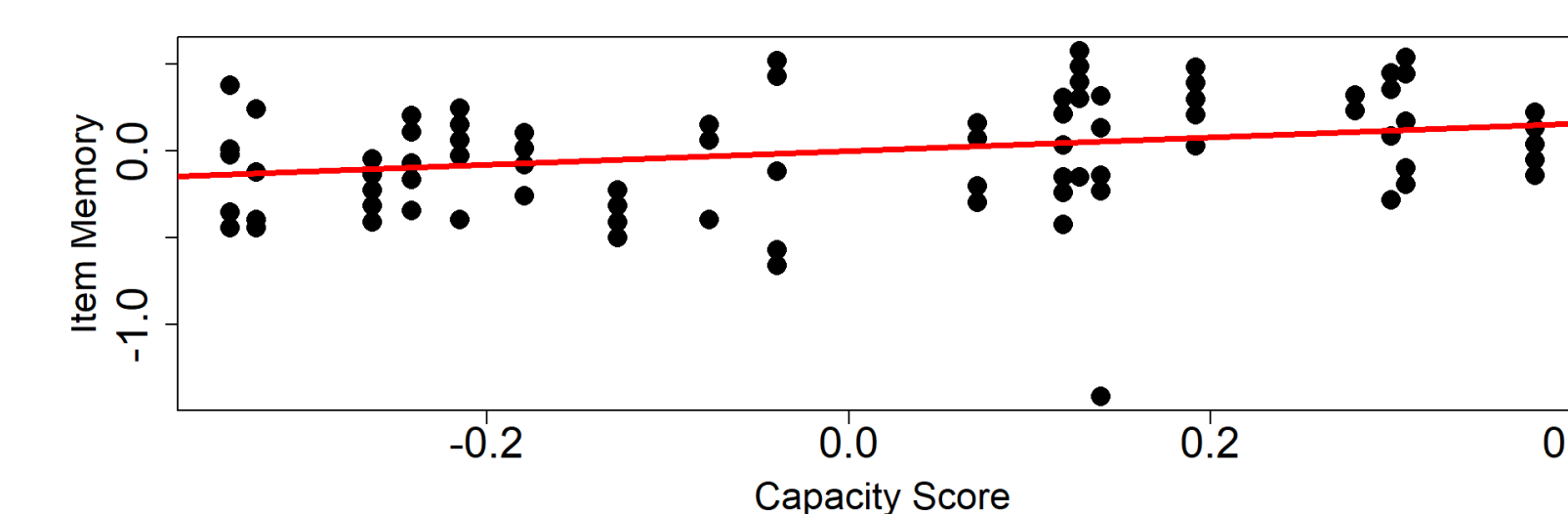
Analysis

Linear mixed-effects (LME) models were used to investigate associations between IM, LDI, and average facilitation, and capacity score.

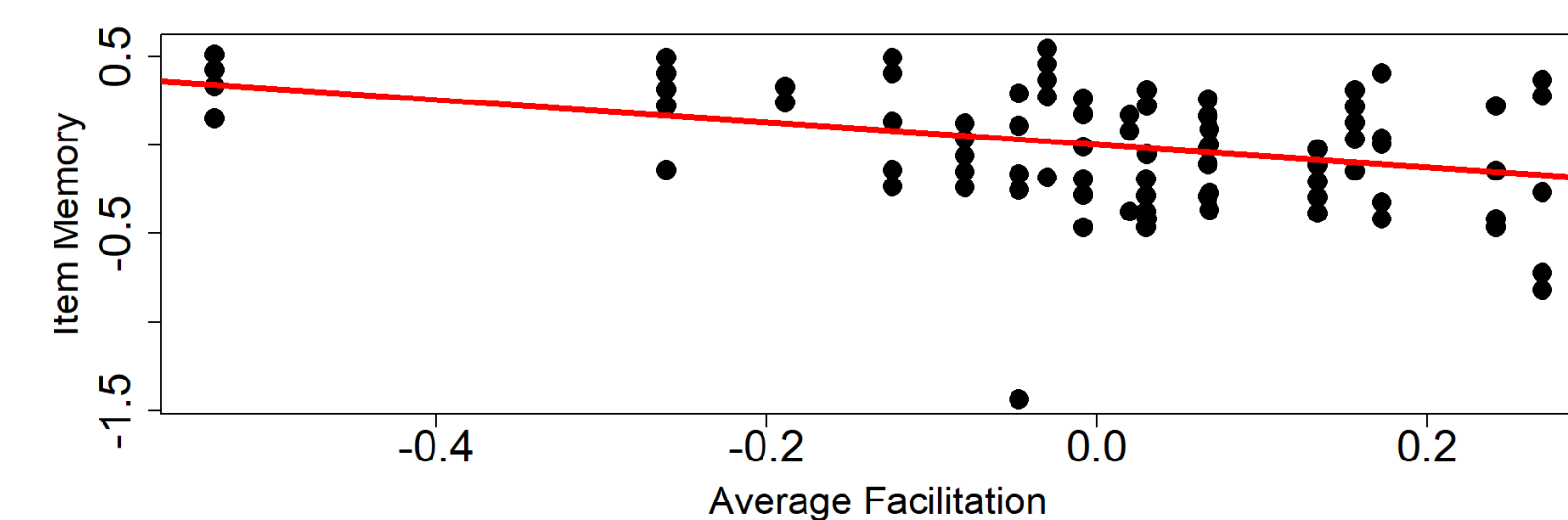
- Age and counterbalancing order were included as fixed effects.
- Subject was included as a random effect

Results

Main Effects on IM:

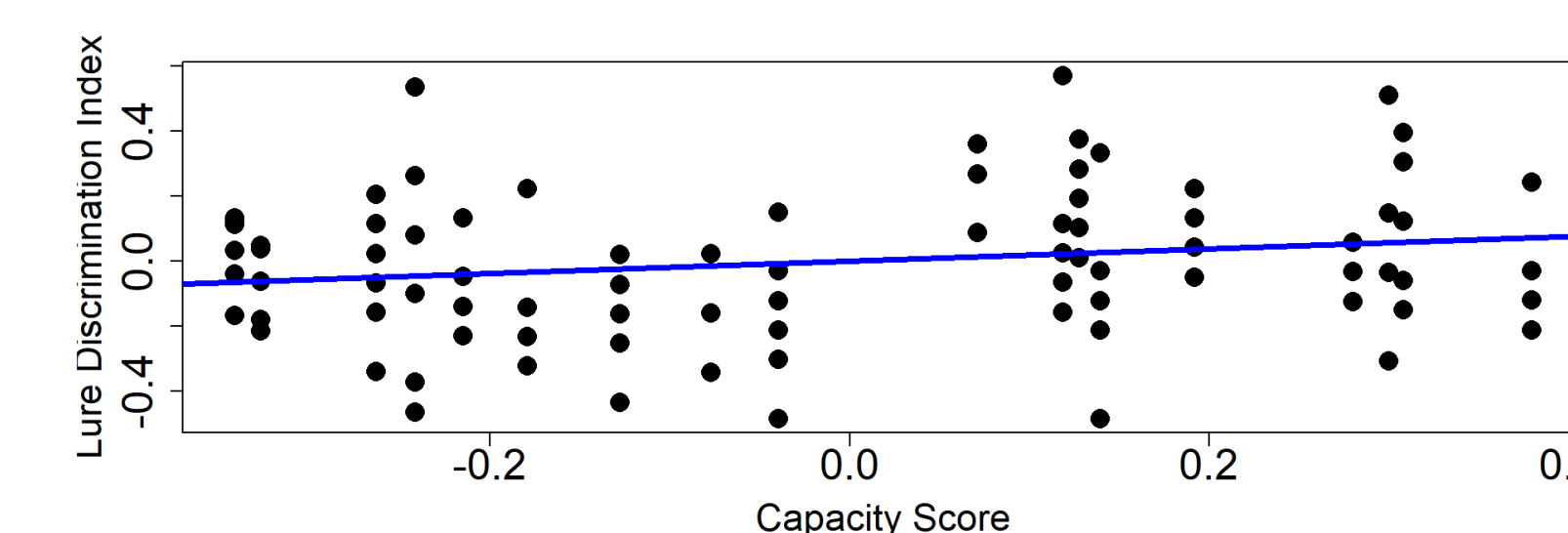


- Capacity Score ($b = 0.47$, $SEb = 0.15$, $t = 3.13$, $p = 0.0106$)

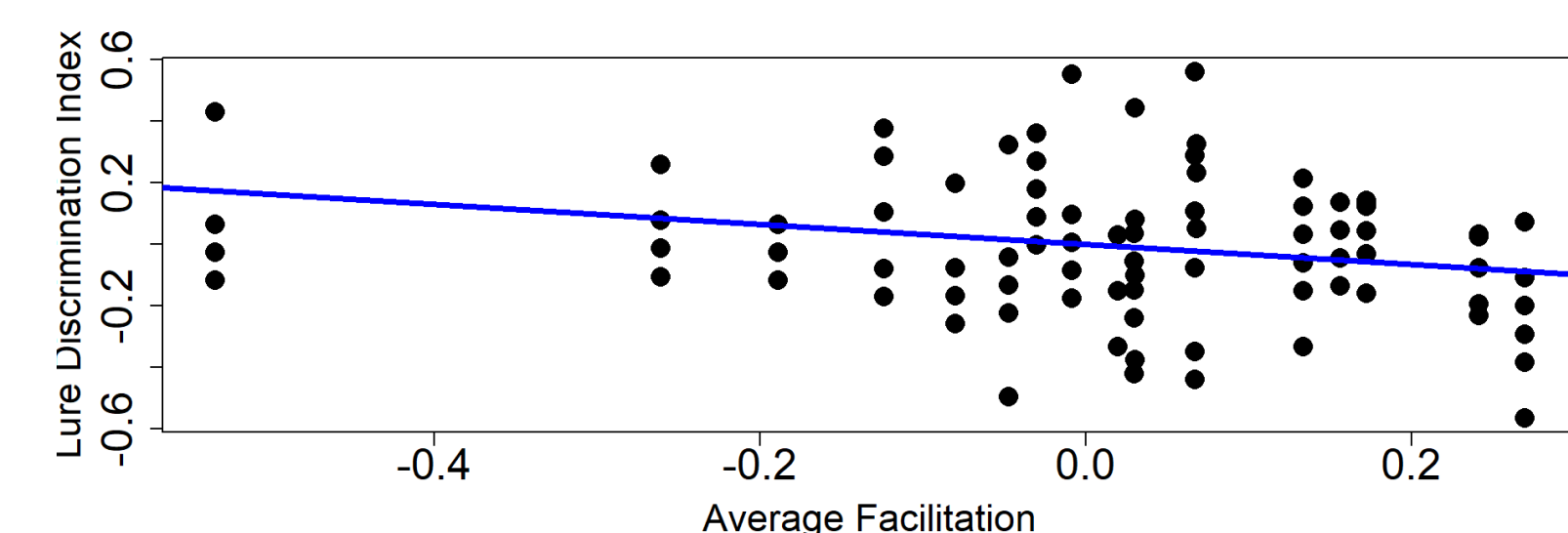


- Average Facilitation ($b = -0.69$, $SEb = 0.18$, $t = -3.84$, $p = 0.0033$)

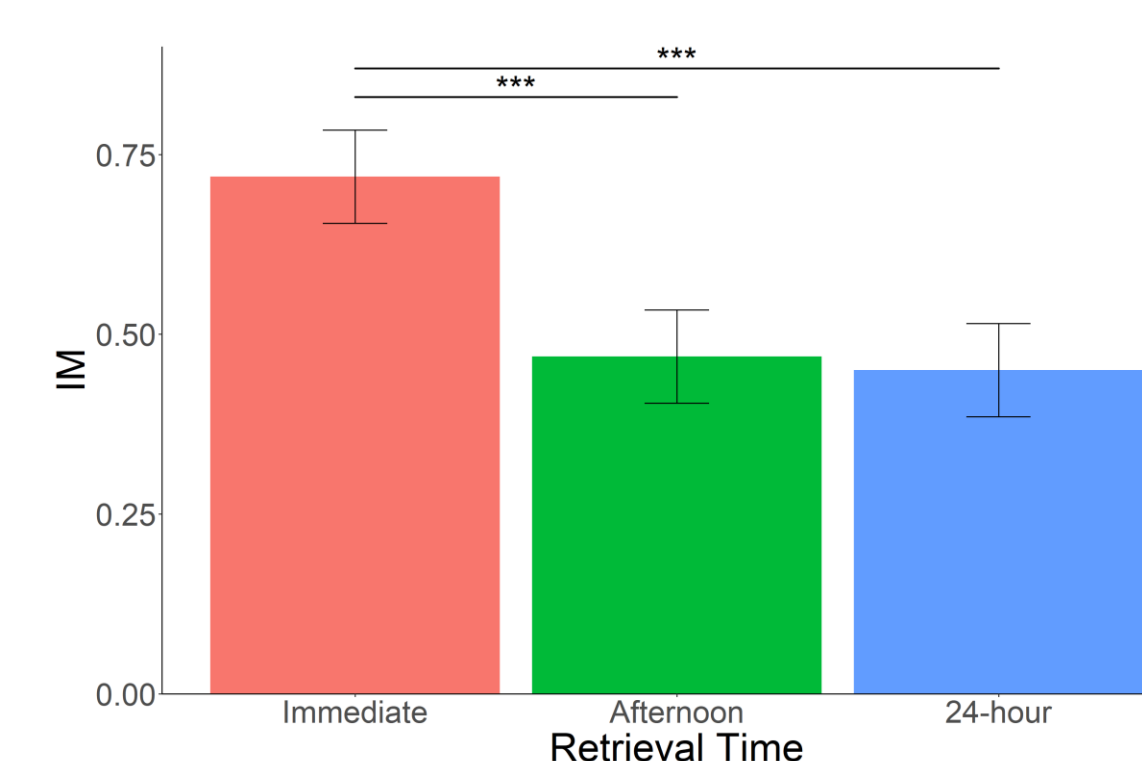
Main Effects on LDI:



- Capacity Score ($b = 0.22$, $SEb = 0.09$, $t = 2.34$, $p = 0.0411$)



- Average Facilitation ($b = -0.36$, $SEb = 0.12$, $t = -3.09$, $p = 0.0114$)

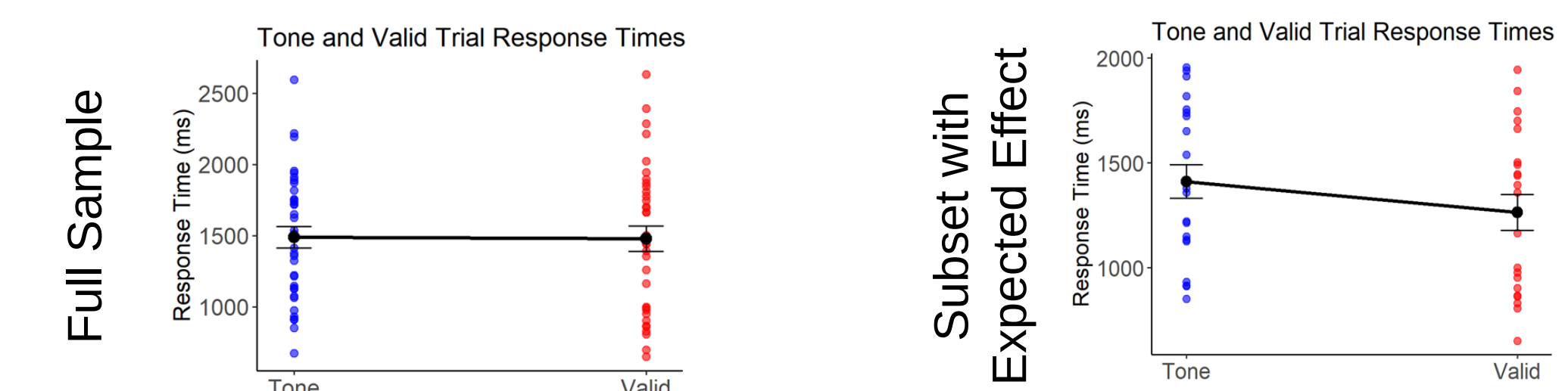


Main Effect of Recall Session:
($F(2, 74) = 10.294$, $p = 0.0001$)

Discussion

- Working memory was **positively** associated with both general item memory as well as lure discrimination scores
- Adds to literature that suggests that attention, working memory, and episodic memory processes interact to support memory development.

- Attention was **negatively** associated with both general item memory and lure discrimination scores
- 13 participants did not show the expected effect of reaction time being decreased by an ipsilateral cue



- With these 13 participants removed, attention is not significant and working memory is marginally significant

- Item Memory:
 - Capacity Score ($b = 0.49$, $SEb = 0.16$, $t = 2.97$, $p = 0.0969$)
 - Average Facilitation ($b = 0.26$, $SEb = 0.68$, $t = 0.38$, $p = 0.7402$)
- Lure Discrimination Index:
 - Capacity Score ($b = 0.19$, $SEb = 0.17$, $t = 1.14$, $p = 0.3737$)
 - Average Facilitation ($b = -0.05$, $SEb = 0.69$, $t = -0.068$, $p = 0.9521$)

- Future Directions
 - Investigate the differences between the attention task administered asynchronously versus by an experimenter
 - Complete a longitudinal investigation of the development attention, working memory, and episodic memory

References

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