

Pupil Dilation during a Number Line Estimation Task

Hanit Galili¹, Avigail Langer², Avishai Henik²

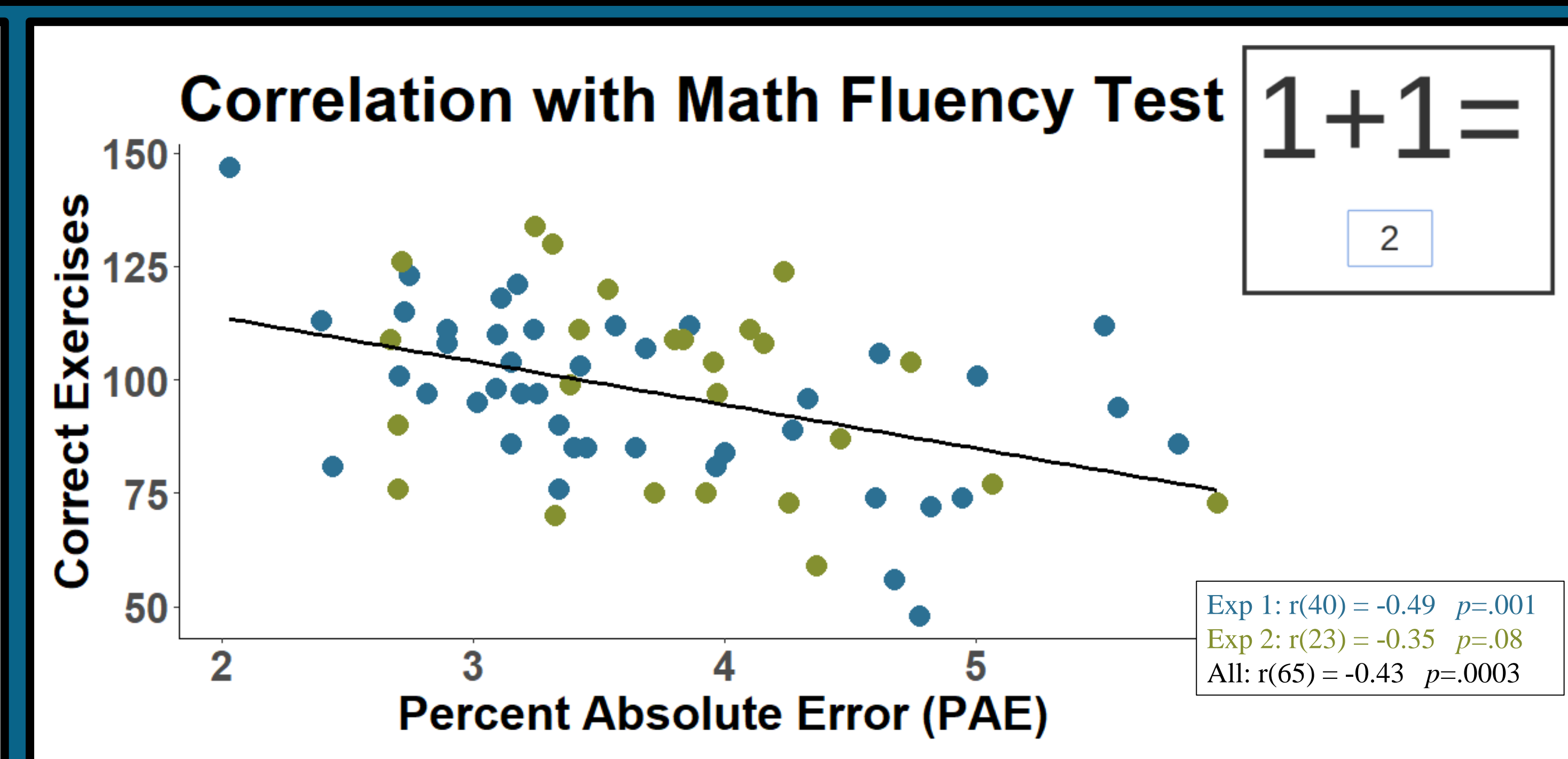
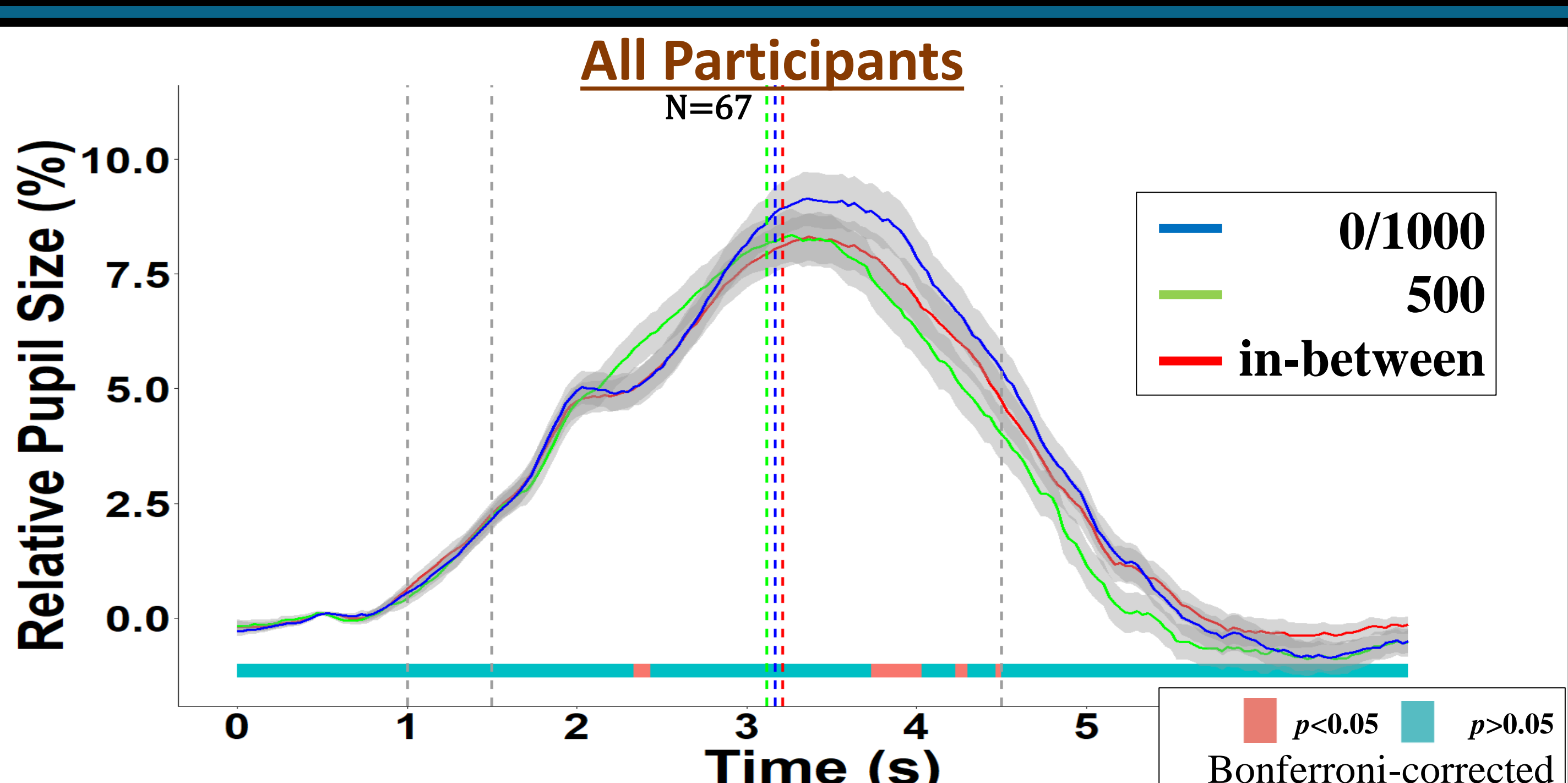
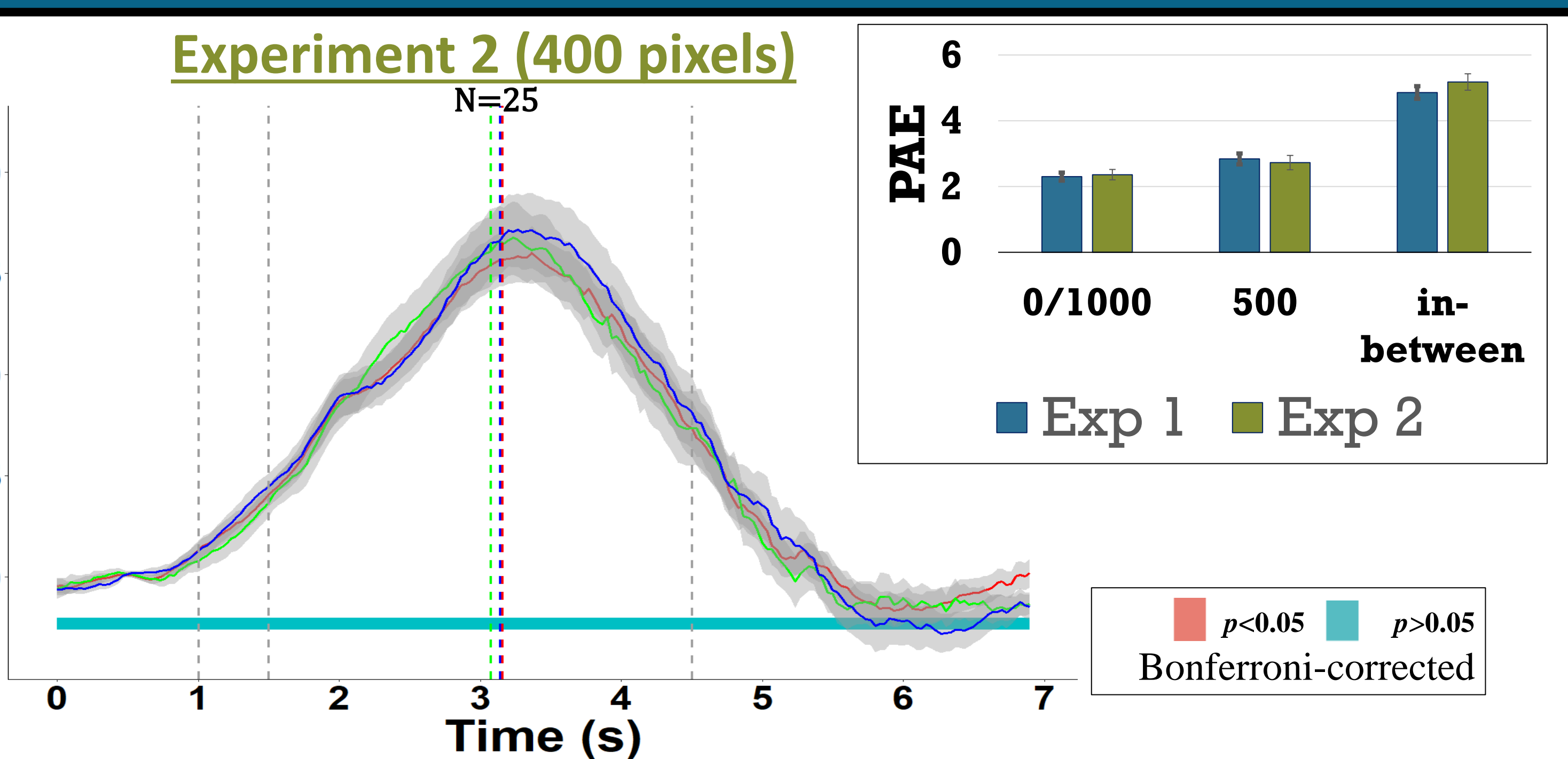
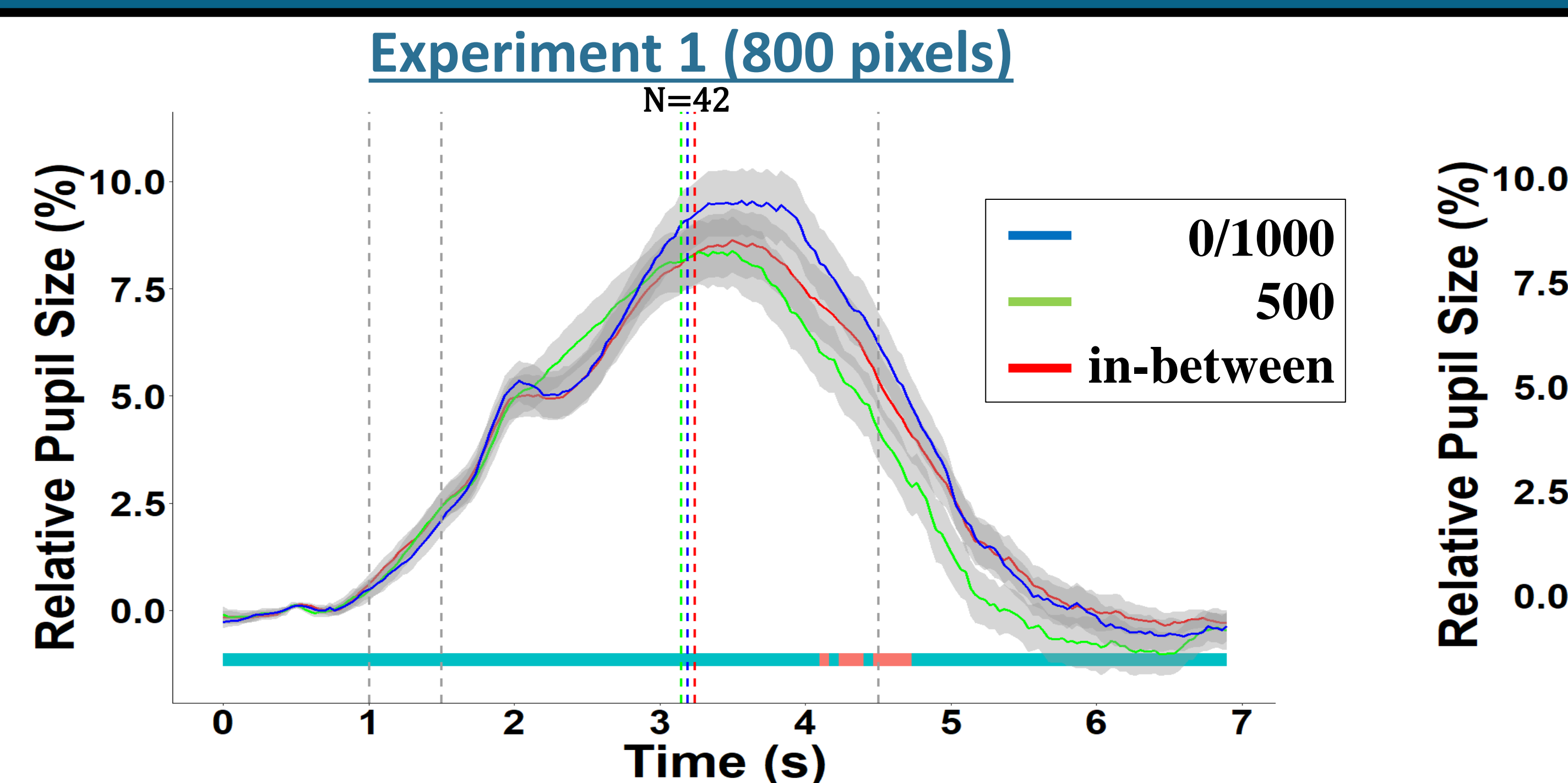
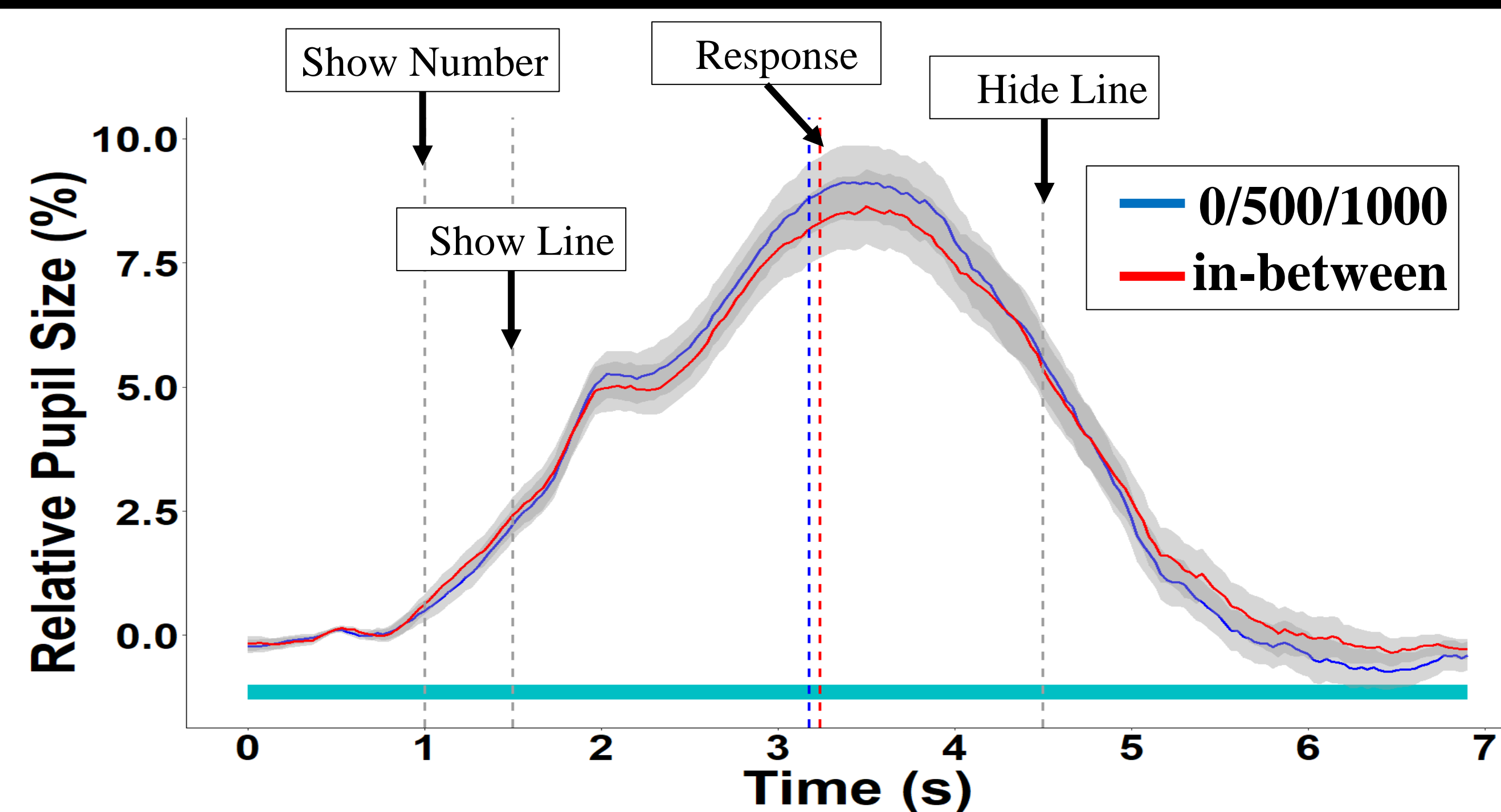
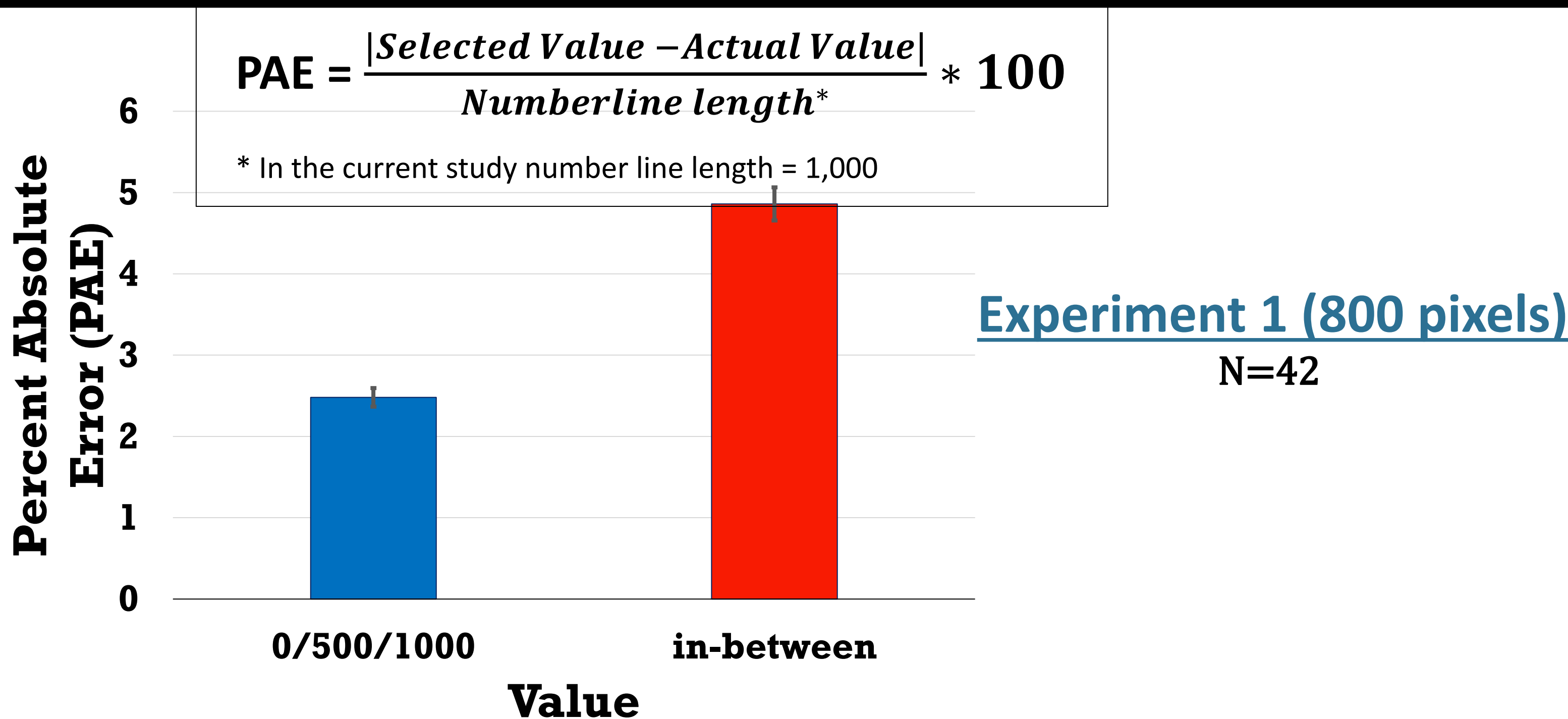
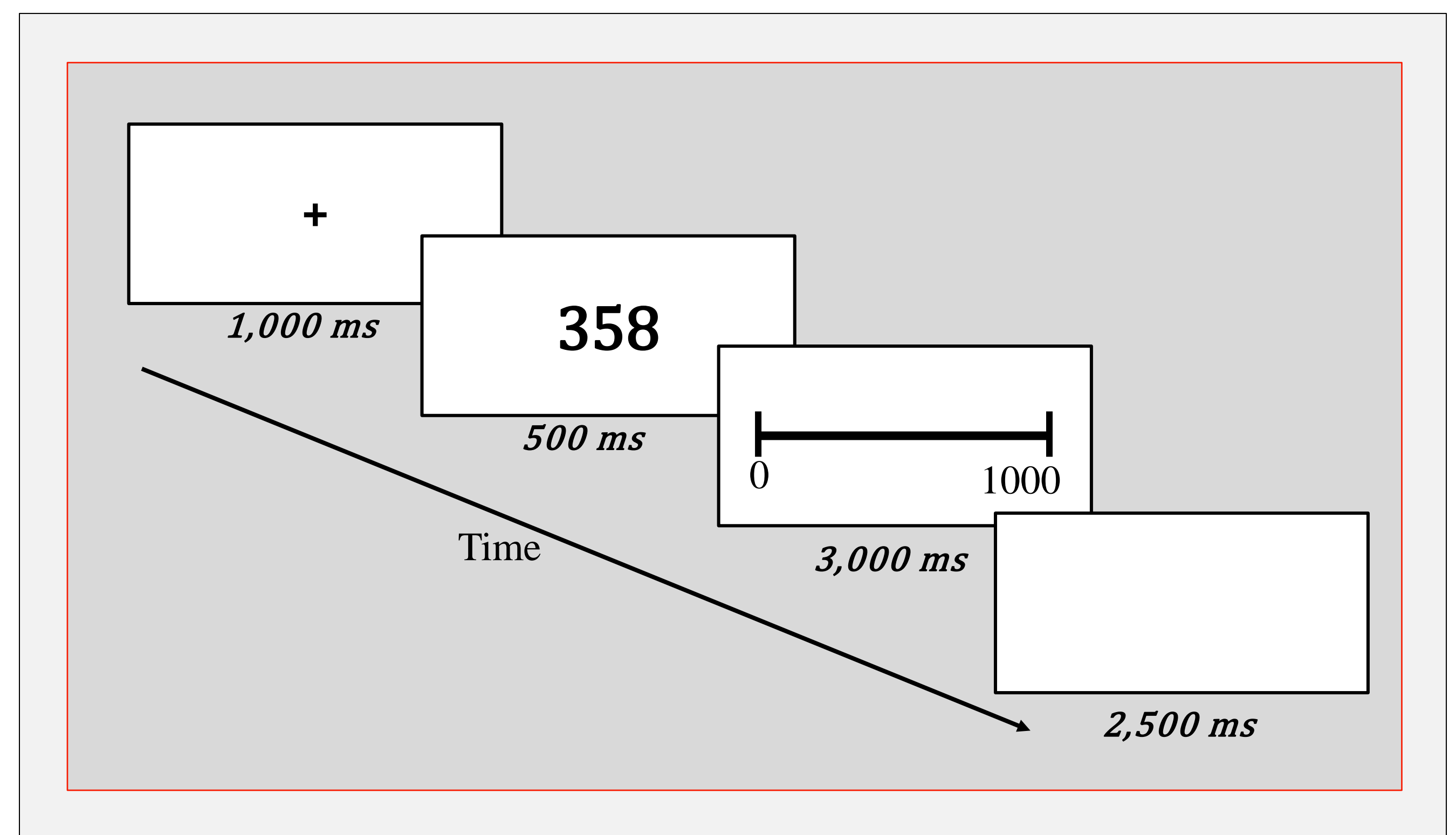
¹Department of Cognitive and Brain Sciences, ²Department of Psychology
Ben-Gurion University of the Negev, Beer-Sheva, Israel



Introduction

- In number line estimation tasks, participants are presented with a number (e.g., 358) and asked to estimate this number position on a line between 0 and 1,000 (0 and 100 for young children or 0 and 1 for fractions).
- Researchers have suggested that this task captures participants' intuitions regarding numbers and their magnitudes.
- Accuracy on this task, which correlates with math achievements, is higher at specific orientation points (e.g., ends or middle of the line) and for integers than for fractions.
- We reasoned that the different estimation requirements entail different needs of mental manipulation and attention.
- In the current study, we measured pupil dilation while performing the task and checked correlation with a math fluency task (Gliksman et al., 2022).

Method



Discussion

- As expected, accuracy is higher and response time is lower for numbers near orienting points and in the middle (near 500).
- Pupils dilated more for numbers near the ends, suggesting more mental attempts or more weighing of alternatives is required for these numbers than for other numbers along the line.
- Negative correlation between number of correct exercises in a math fluency task and PAE in the number line estimation task was found. Both tasks correlate with math achievements.

Reference

Gliksman, Y., Berebbi, S., Hershman, R., & Henik, A. (2022). BGU-MF: Ben-Gurion University Math Fluency test. *Applied Cognitive Psychology*, 36(2), 293-305.

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Email:
hanit.galili@gmail.com