

# Can Visual Imagery Facilitate Mind-Control of Ambiguous Motion

Julia M. McClellan\*, Allison K. Allen and Nicolas Davidenko, Ph.D.

University of California, Santa Cruz



## Background

- One can ‘mind control’ motion in Illusory Apparent Motion (IAM), a polystable illusion of randomly texture-refreshing pixels<sup>2</sup>.
- Visual imagery activates cortical regions associated with cognitive control<sup>4</sup> and can bias perception of other bistable phenomena<sup>6</sup>.
- Visual imagery can leave a sensory-trace akin to weak perception<sup>5</sup>, showing analogous neural patterns of activation in early visual cortex<sup>1</sup>. The strength of neural overlap is predictive of an individual’s vividness of visual imagery<sup>3</sup>.
- Vividness of visual imagination as an underlying mechanism *during* perceptual control has yet to be explored.

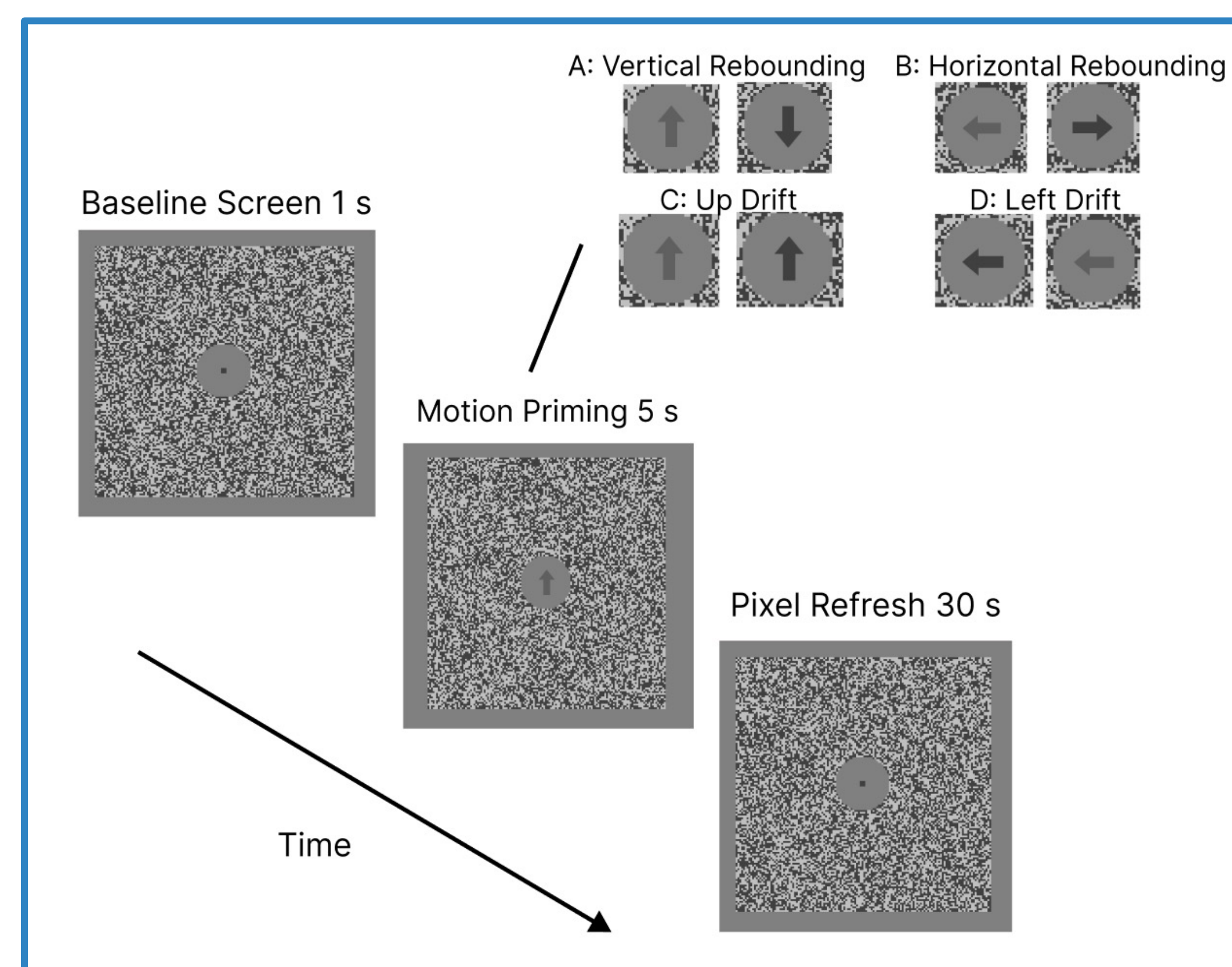
## References

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## Methodology & Experiments

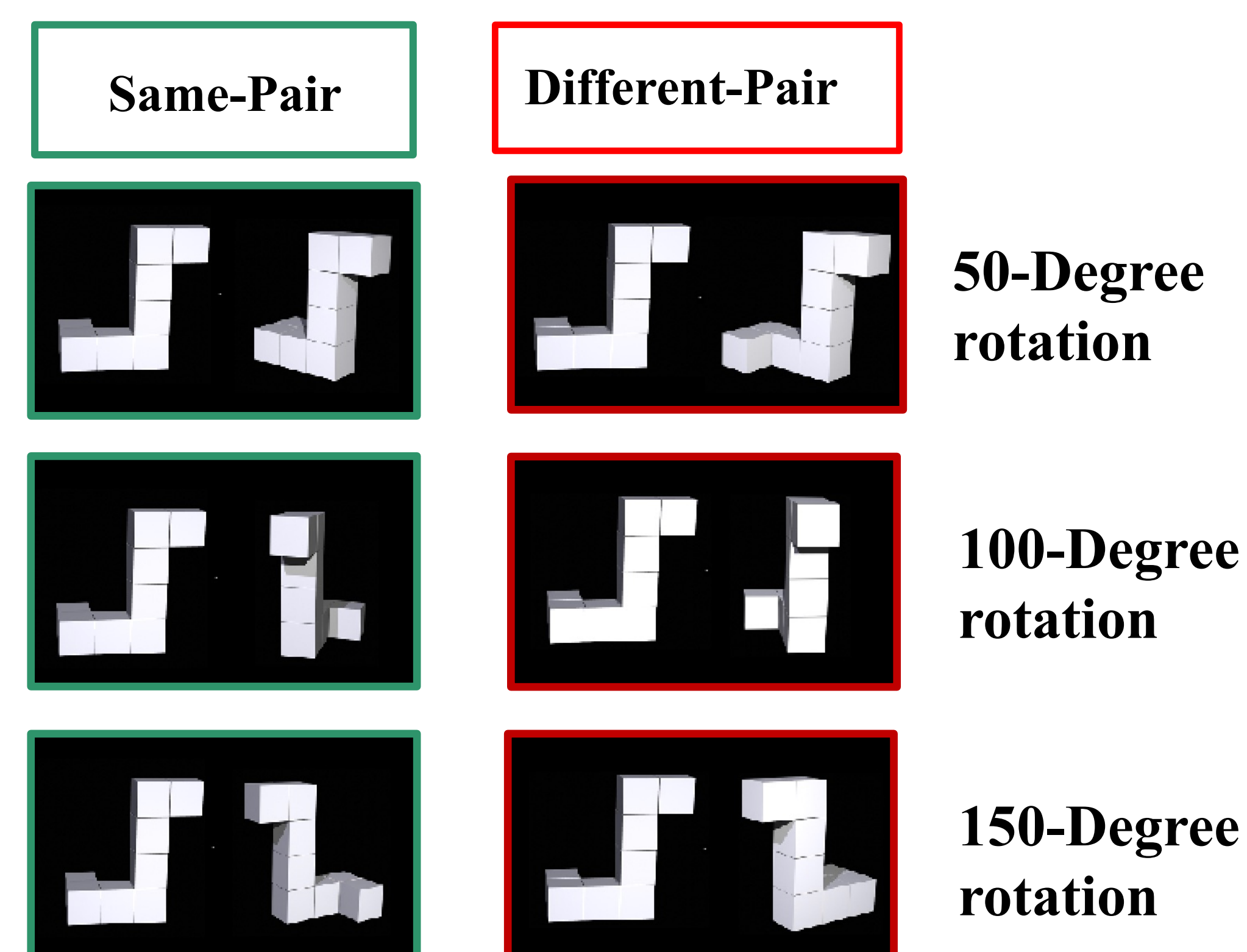
### Task 1: Perceptual Control in IAM

**Measure Perceptual Control:** Tasked to control and report time (ms) spent perceiving prime-congruent global motion of the pixels in IAM.



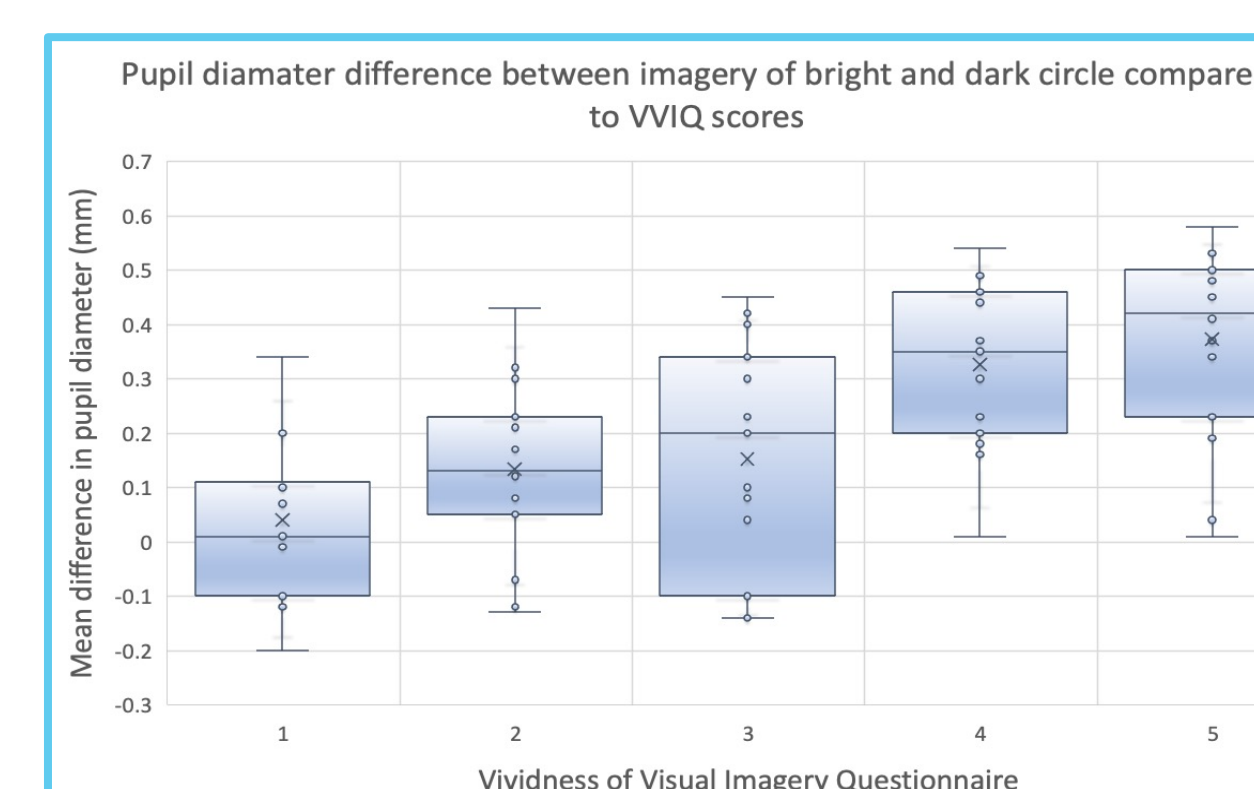
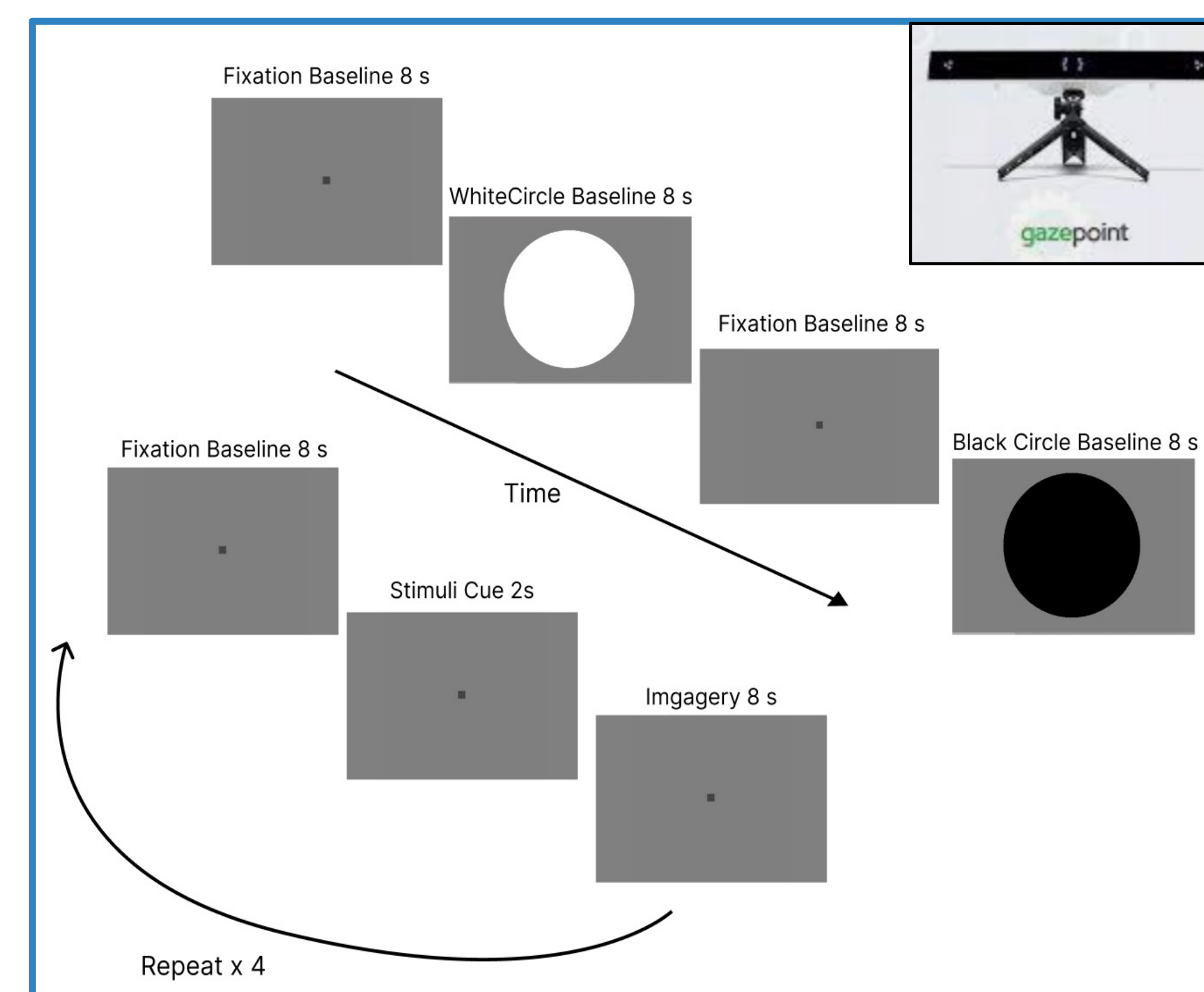
### Task 3: Mental Rotation

**Measure Strength of Visual Imagery:** 30 trials presenting 30 pairs of 2D-objects; average response time (ms) across hits.



### Task 2: Pupillary Light Response

**Measure Strength of Visual Imagery:** Mean difference in pupil diameter (mm) between imagination of bright and dark stimuli.



Measure if higher VVIQ Score predicts stronger pupillary light response

### Task 4: Vividness of Visual Imagery Questionnaire

**Measure Strength of Visual Imagery:** The VVIQ administers 16 questions tasking the participant to imagine different visual scenarios; scored on a Likert Scale. 8 Vividness of Motion Imagery items were incorporated into the questionnaire.

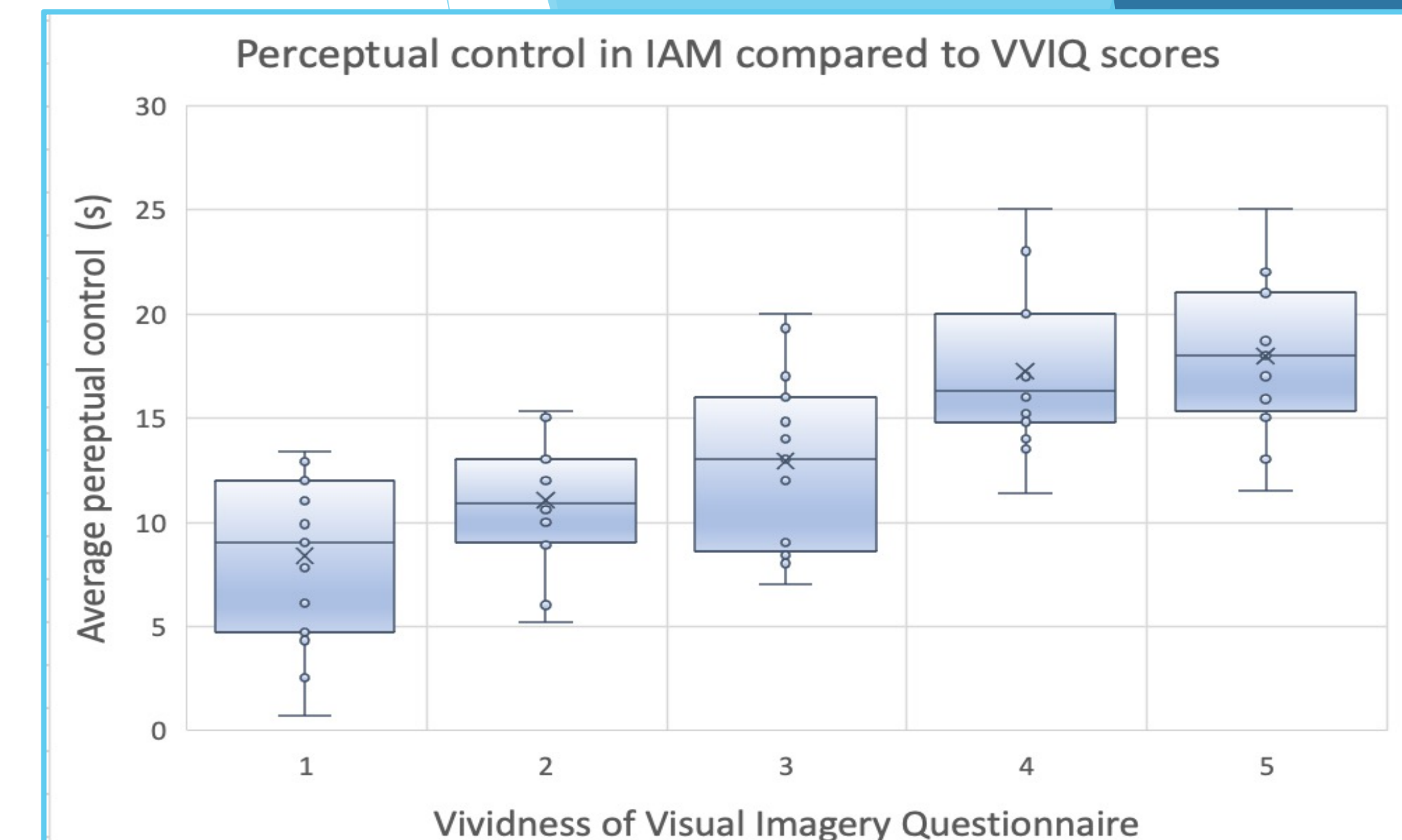
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For each scenario try to form a mental picture of the people, objects, or setting. Consider carefully the vividness of your visual imagery experience. Does some type of image come to mind? Rate how vivid the image is using the 5-point scale. If you do not have a visual image, rate vividness as '1'. Only use '5' for images that are as lively and vivid as real seeing. The rating scale will be presented at each question, and is as follows:

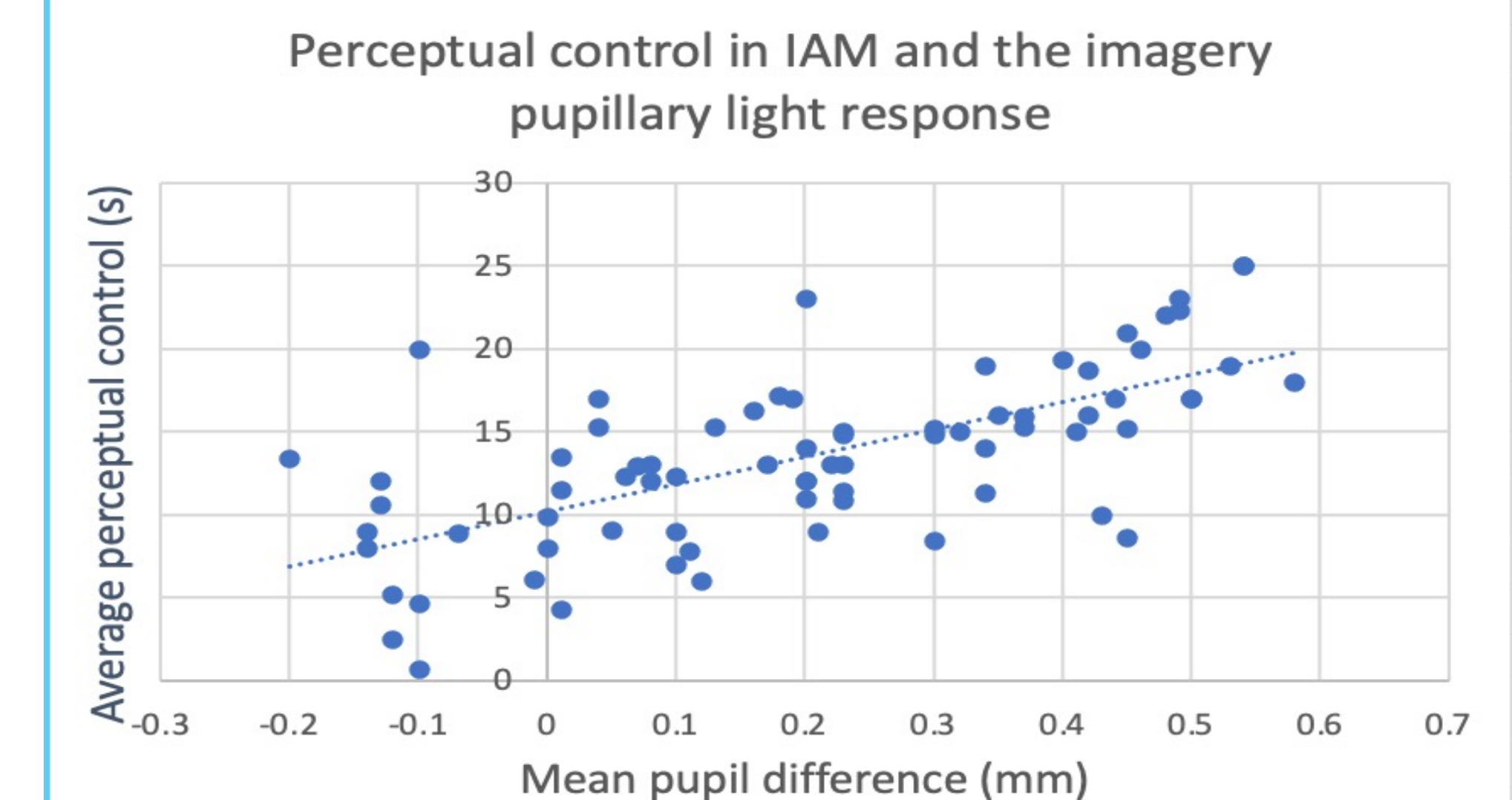
- 1: No image at all, I only "know" I am thinking of the object
- 2: Dim and vague image
- 3: Moderately realistic and vivid
- 4: Realistic and reasonably vivid
- 5: Perfectly realistic, as vivid as real seeing

## Predicted Results

**Prediction 1: Higher VVIQ Score predicts stronger perceptual control.**



**Prediction 2: Stronger Pupillary Light Response during imagination predicts stronger perceptual control.**



**Prediction 3: Stronger perceptual control predicts faster response time in mental rotation.**

