EXAMINING THE ONLINE MECHANISMS OF VISUAL STATISTICAL LEARNING USING PUPILLOMETRY

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INTRODUCTION

This study examines how prediction, or the ability to use past experiences to generate expectations about future sensory input, supports statistical learning (SL). This work unifies theories that have proposed that prediction is a core aspect of adult brain function and statistical learning studies that suggest prediction is at play .

METHODS

53 adults completed a standard **visual statistical learning task** composed of a familiarization phase and test phase. Participants' **pupil size** was measured using an eyetracker (Eyelink 1000).

Familiarization phase: Participants viewed images one at a time. Unbeknownst to the participants, the images actually followed a **triplet pattern (e.g. ABC-DEF-ABC-GHI).** Each trial was 1250ms and composed of a 500ms blank screen followed by the image in the center of the screen for 750ms.

Test phase: Participants saw a triplet sequence and foil sequence and were asked **"which sequence looked more familiar?"**

RESULTS

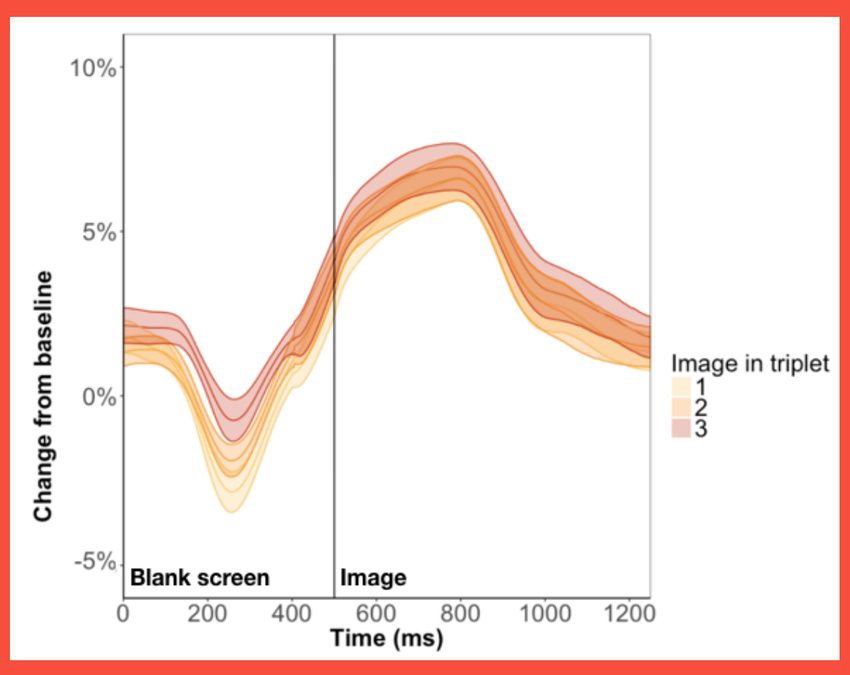

Figure 1. Participants' pupil size during the familiarzation phase. Image position was a significant predictor of pupil change during the blank screen ($\beta = 0.0065$, $p < 0.001$) but not the image period ($\beta = 0.0026$, $p = 0.10$).

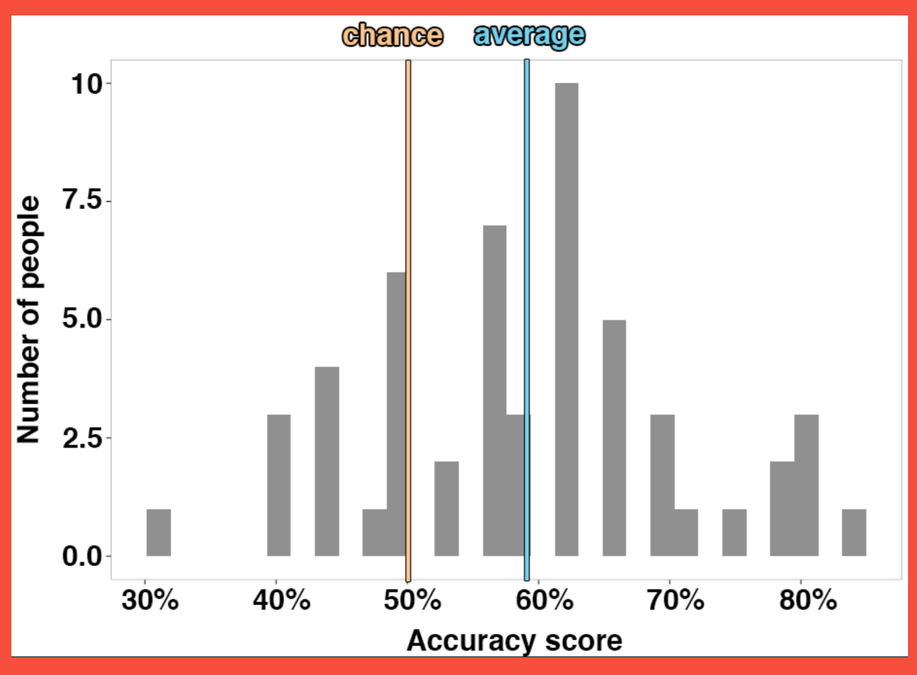

Figure 2. Participants' performance on the test phase. The average accuracy score on the test phase was low (59%) but significantly above chance ($t(49) = 5.23$, $p < 0.001$).

CONCLUSION

The more predictable an image, the smaller the pupil constriction during the blank screen period of familiarization. However, this pupil change during familiarization did not predict accuracy during test phase. Given previous results linking prediction and SL, these results suggest that perhaps pupillometry is not the ideal method for studying prediction in SL.

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