

## **Pupil Size: A Measure of Identification Memory in Target Present Lineups**

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**Abstract :** Pupil size has been found to change irrespective of luminosity, suggesting that it can be used to make inferences about cognitive processes, such as cognitive load. To see whether identifying a target requires a different cognitive load to rejecting distractors, the effect of viewing a target (compared with viewing distractors) on pupil size was investigated using a sequential video lineup procedure with two lineup sessions. Forty one participants were chosen randomly via the university. Pupil sizes were recorded when viewing pre target distractors and post target distractors and compared to pupil size when viewing the target. Overall, pupil size was significantly larger when viewing the target compared with viewing distractors. In the first session, pupil size changes were significantly different between participants who identified the target (Hits) and those who did not. Specifically, the pupil size of Hits reduced significantly after viewing the target (by 26%), suggesting that cognitive load reduced following identification. The pupil sizes of Misses (who made no identification) and False Alarms (who misidentified a distractor) did not reduce, suggesting that the cognitive load remained high in participants who failed to make the correct identification. In the second session, pupil sizes were smaller overall, suggesting that cognitive load was smaller in this session, and there was no significant difference between Hits, Misses and False Alarms. Furthermore, while the frequency of Hits increased, so did False Alarms. These two findings suggest that the benefits of including a second session remain uncertain, as the second session neither provided greater accuracy nor a reliable way to measure it. It is concluded that pupil size is a measure of face recognition strength in the first session of a target present lineup procedure. However, it is still not known whether cognitive load is an adequate explanation for this, or whether cognitive engagement might describe the effect more appropriately. If cognitive load and cognitive engagement can be teased apart with further investigation, this would have positive implications for understanding eyewitness identification. Nevertheless, this research has the potential to provide a tool for improving the reliability of lineup procedures.

**Keywords :** cognitive load, eyewitness identification, face recognition, pupillometry

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