Pupillometry as a Measure of Effort Exertion in Cognitive Control Tasks

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Abstract

Despite recent interest in pupillometry as a psychophysiological measure, it remains unclear what construct the physiological measure is assessing in cognitive control tasks: task load or mental exertion. This debate is of particular interest as cognitive effort remains an elusive construct partly due to the difficulty in empirically quantifying mental exertion. The current research aims to differentiate these disparate accounts by leveraging rewards as motivation for effort exertion. Using an individual differences approach, a sample of 80 undergraduate students performed a cognitive control taskTask switching. Critically, monetary incentives were used to motivate participants to exercise cognitive control, and found to improve overall performance. Pupillary responses were found to increase in response to trials requiring more cognitive control, and relate to performance improvements in the rewarded conditions. The present findings provide some support for the effort account, and suggest that pupillometry may be a viable index of cognitive effort.