Neural Mechanisms of Pupillary Dynamics and Cognitive Effort

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The pupillary response has been used to measure mental workload because of its sensitivity to stimuli and high resolution. The goal of this study was to understand interconnections between the visual or auditory pathway and the resulting pupillary response relative to cognitive effort. A multinomial processing tree was used as a diagnostic tool in order to disentangle and measure separate cognitive processes, with the resulting output being a change in pupil diameter. This model was fitted to previous test data related to the pupillary response when presented a mental multiplication task. Two models were derived as a result: a subject response category tree and a pupil dilation response category tree. One tree compares the visual and aural pathways, while the other compares latent processes within the visual pathway. This results in a parsimonious model that facilitates in the understanding of the neural interconnections involved with the pupillary response to cognitive load.