**Title**: Detecting changes in pupil response to light associated with cannabis consumption

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**Abstract**: The rate of cannabis consumption has increased with the legalization of cannabis for recreational and medical use. The implications of cannabis legalization on traffic and occupational safety are understudied, and there is a need for objective and validated measures of acute cannabis impairment that may be applied in public safety and occupational settings. Identifying a reliable, objective biomarker of recent cannabis use has proven challenging, but pupillary response to light may offer an avenue for detection that outperforms typical sobriety tests and blood THC concentrations. We use tools from functional data analysis (FDA) to model the impact of recent cannabis consumption on trajectories of pupillary light in participants. The FDA models significant differences in pupil responses after cannabis use, and better predict recent cannabis use (AUC = 0.71) when compared to traditional methods (AUC=0.66). These analyses show the promise of pairing pupil light response and FDA methods to determine recent cannabis use potentially leading to better roadway and occupational safety.