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Eye gaze reflects episodic memory sampling during decision making

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Abstract

Episodic memory enables decision making by allowing choices to be guided by detailed past experiences. Yet, because this process unfolds covertly, the mechanisms governing how memories impact deliberation remain poorly understood. Here we use gaze reinstatement to reveal the hidden dynamics of episodic memory retrieval during value-based choice. We tracked participants' eye movements while they encoded episodes consisting of items with associated rewards at distinct spatial locations and subsequently made decisions based on these episodes. Critically, no visual information was provided to participants during their choices. Nonetheless, participants systematically directed their gaze toward the encoding locations of retrieved episodes during deliberation, and these gaze patterns predicted their choices. These findings demonstrate that eye movements provide a high-resolution window into moment-by-moment episodic sampling during decision making. By revealing which episodes are retrieved and when, this approach opens new directions for investigating how episodic memory guides adaptive behavior.