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A neural mechanism for terminating decisions

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The brain makes decisions by accumulating evidence until there is enough to stop and choose. Neural mechanisms of evidence accumulation are well established in association cortex, but the site and mechanism of termination is unknown. Here, we elucidate a mechanism for termination by neurons in the primate superior colliculus. We recorded simultaneously from neurons in lateral intraparietal cortex (LIP) and the superior colliculus (SC) while monkeys made perceptual decisions, reported by eye-movements. Single-trial analyses revealed distinct dynamics: LIP tracked the accumulation of evidence on each decision, and SC generated one burst at the end of the decision, occasionally preceded by smaller bursts. We hypothesized that the bursts manifest a threshold mechanism applied to LIP activity to terminate the decision. Focal inactivation of SC produced behavioral effects diagnostic of an impaired threshold sensor, requiring a stronger LIP signal to terminate a decision. The results reveal the transformation from deliberation to commitment.

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