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Modelling History-Dependent Evidence Accumulation across Species

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Abstract

Mice are increasingly used to study the neural circuitlevel basis of behavior, often with the ultimate goal to extrapolate these insights to humans. To generalize insights about neural functioning between species, it is crucial to first ensure correspondence in behavioral and cognitive strategy. Here, we analyzed decision-making behavior in both humans and mice, and identified the same cognitive strategy of history-dependent evidence accumulation. Specifically, individual differences in choice repetition were explained by a history dependent bias in the rate of evidence accumulation – rather than its starting point. Evidence integration over multiple temporal scales thus reflects a fundamental aspect of decision-making, conserved across mammalian species. These findings set the stage for linking the computations of decision-making to neural dynamics at the single-cell and population levels.