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Mind

Speed of decision-making reflects our biases

Within a group of decision-makers, the longer it takes someone to make a choice, the less likely they are to be influenced by their inherent biases according to a mathematical model

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The speed with which we reach a decision can reveal the strength of our biases
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In a large group of independent decision-makers, those who reach a decision most quickly also tend to be those with the strongest initial biases. The finding comes from a mathematical model of decision-making that could be applied broadly across biology.

"Many decision-making models in economics assume that people make a decision based on one or two pieces of information, but I think these models have to be expanded," says Krešimir Josić https://www.math.uh.edu/~josic/ at the University of Houston in Texas. He and his colleagues turned to an "evidence accumulation" model where a decision-maker – an "agent" – only makes a choice after accumulating enough information to cross some preset threshold.

When they presented early findings of their research at a conference, a pair of mathematicians – Sean Lawley https://www.math.utah.edu/~lawley/ and Samantha Linn https://scholar.google.com/citations?user=zcX-ChwAAAAJ&hl=en at the University of Utah – pointed out that decision-making is influenced by another important factor: the initial biases held by the agents. Lawley and Linn collaborated with Josić and his colleagues to produce a refined model, which found that these inherent biases have a big effect on the time it takes an agent to make a decision.

They devised a mathematical model that captures up to 10,000 agents, all of which must reach the same information threshold to make one of two choices. The agents differ from one another in the strength of the inherent biases they hold, which could influence the choice they make. Simulating the agents' decision-making on a computer revealed that those with the strongest initial biases – which meant they were already close to the decision threshold – were the first to make a choice. What's more, the simulations also showed that the agents who decided last not only had weaker initial biases, but also made a choice that was effectively independent of those biases.

In other words, says Josić, fast deciders reach their choice very quickly because their inherent bias directs them rapidly to some definitive point in "decision space", while slow deciders take so much longer to accumulate information that they essentially "forget" about their inherent biases. This means that agents who decide later also make a choice based on a fairer and more accurate assessment of the available information.

"Trying to place this in my own life, I think about how people are susceptible to groupthink. So, if I am in a group of people who are making a very fast decision, maybe I should be more careful about evaluating it," says Linn.

Greg Cox https://www.albany.edu/psychology/faculty/gregory-cox at the University at Albany in New York says that since the agents in the study didn't interact with each other, the simulation may not be appropriate for capturing decision-making within an organisation or among a small group of people working together to reach a decision, but it could offer insights into behaviours of groups of more independent decision-makers

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Moreover, he thinks the findings could have implications for understanding how the billions of neurons in our brains, each in itself a tiny decision-maker, give rise to our individual choices /article/mg26134791-200-the-strange-truth-about-why-thinking-hard-makes-you-feel-exhausted/. "This is a very hot topic, with quite a lot of room left for exploration," he says.

Journal reference: *Physical Review E*, forthcoming https://journals.aps.org/pre/accepted/7507aYa4A7615c7426048f639fac7e78cb8b18d41