Decider or ditherer? How we make decisions

April 3 2018

Credit: AI-generated image (disclaimer)

Professors Peter Brown and Rafal Bogacz in the Nuffield Department of Clinical Neurosciences describe their research team's discovery that a certain 'hold your horses' function in decision-making occurs in an extremely brief window of time, and involves bursts of a specific type of activity in a brain centre known as the subthalamic nucleus.

Are you a decider or a ditherer? When making decisions, we not only

have to decide what to choose, but also how much time to spend making the decision. How long should we spend collecting relevant information to inform our choice?

Imagine, for example, that you are choosing which meal to pick up during a lunch break. Dwelling over this decision might mean that you miss out on valuable time that could be spent chatting with friends, whereas quickly choosing a menu option without proper thought might mean that you overlook a better alternative.

It was already thought that the subthalamic nucleus might play an important role in balancing the opposing demands of speed and accuracy during decision-making. Scientists suspected that it helped us delay decisions for the optimum amount of time, to enable the best choice to be made in any given situation. But our own research reveals that this part of the brain gets involved in adjusting these 'decision thresholds' at a very particular and brief moment during the process of deliberation.

The aim of our new study was to probe the mechanisms by which the subthalamic nucleus influences decision-making. We were able to do this using deep brain stimulation in Parkinson's patients (an intervention which has been shown to be very successful in alleviating some of the movement symptoms related to this condition).

The research team asked ten patients to decide whether a cloud of moving dots appeared to move to the left or to the right on a computer screen. The percentage of dots moving coherently to one direction was either high or low, and participants were instructed to respond as fast or as accurately as possible. If it was difficult to determine the answer (i.e. the percentage of dots moving coherently in one direction was low), the response time was longer.

Participants responded more quickly when deep brain stimulation was

applied during the difficult tasks. But this effect was confined to an incredibly brief moment during the time that people were trying to decide how to respond. Remarkably, if stimulation was applied later than 500 milliseconds after the task started, it had no influence at all on response time, even though most responses during difficult tasks were made later than 500 milliseconds into the task.

This result implies that deep brain stimulation interfered with a very particular time-limited process of setting the decision threshold to the required level according to task difficulty. This supports existing hypotheses that the decision threshold is set according to the difficulty of the task in a single abrupt change, and depending on information gathered in an initial period. This raises the possibility that it is this specific time-related mechanism that is dependent on the subthalamic nucleus.

Our observations add to the converging evidence that decision thresholds are adjusted through dynamic modulations of cortico-basal ganglia networks.

Provided by University of Oxford

Citation: Decider or ditherer? How we make decisions (2018, April 3) retrieved 10 April 2024 from https://medicalxpress.com/news/2018-04-ditherer-decisions.html