Exploring status quo bias in the human brain

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The more difficult the decision we face, the more likely we are not to act, according to new research by UCL scientists that examines the neural pathways involved in 'status quo bias' in the human brain.

The study, published today in Proceedings of the National Academy of Sciences (*PNAS*), looked at the decision-making of participants taking part in a tennis 'line judgement' game while their brains were scanned using functional MRI (fMRI).

First author Stephen Fleming, Wellcome Trust Centre for Neuroimaging at UCL, said: "When faced with a complex decision people tend to accept the status quo, hence the old saying 'When in doubt, do nothing.'

"Whether it's moving house or changing TV channel, there is a considerable tendency to stick with the current situation and choose not to act, and we wanted to explore this bias towards inaction in our study and examine the regions of the brain involved."

The 16 study participants were asked to look at a cross between two tramlines on a screen while holding down a 'default' key. They then saw a ball land in the court and had to make a decision as to whether it was in or out. On each trial, the computer signalled which was the current default option - 'in' or 'out'. The participants continued to hold down the key to accept the default and had to release it and change to another key to reject the default.

The results showed a consistent bias towards the default, which led to errors. As the task became more difficult, the bias became even more pronounced. The fMRI scans showed that a region of the brain known as the subthalamic nucleus (STN) was more active in the cases when the default was rejected. Also, greater flow of information was seen from a separate region sensitive to difficulty (the prefrontal cortex) to the STN. This indicates that the STN plays a key role in overcoming status quo bias when the decision is difficult.

Stephen added: "Interestingly, current treatments of Parkinson's disease like deep-brain stimulation (DBS) work by disrupting the subthalamic nucleus to alleviate impaired initiation of action. This is one example of how knowing about disease mechanisms can inform our knowledge of normal decision making, and vice-versa.

"This study looked at a very simple perceptual decision and there are obviously other powerful factors, such as desires and goals that influence decisions about whether or not to act. So, it would be of interest to investigate how these regions respond when values and needs come into play."

More information: 'Overcoming status quo bias in the human brain' is published online ahead of print in *PNAS*.

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