When does your brain think something is worth the wait?

Whether it’s braving the long line at a trendy new restaurant or hanging on just a few minutes longer to see if there’s a post-credits scene after a movie, the decision to persevere or ditch it depends on specific regions of our brains.

Waiting is not always about self-control. Deciding to wait (or not to wait) also involves gauging the value of the potential reward. In an experiment that investigated wait times among people with lesions in the frontal cortex of the brain, University of Pennsylvania psychologist Joe Kable and his research team found that subjects with damage to certain regions of the prefrontal cortex were less likely to wait things out.

“[Our] findings suggest that regions of the frontal cortex make computationally distinct contributions to adaptive persistence,” he and his team said in a study recently published in the Journal of Neuroscience.

Wait for it

Kable looked for subjects with damage to three parts of the prefrontal cortex: the ventromedial prefrontal cortex, dorsomedial prefrontal cortex and anterior insula. Their behavior was compared to both healthy controls and controls with lesions in the other parts of the frontal cortex.

The ventromedial prefrontal cortex is involved with action control, memory, and making decisions. The dorsomedial prefrontal cortex is even more important when it comes to

decision-making; it also has an integral role in regulating cognition, emotion, and action. The anterior insula regulates how subjective feelings are processed. The performance of subjects with lesions in these areas was compared not just to healthy controls, but controls with lesions in other regions of the frontal cortex.

Participants sitting in front of a computer screen were told that a coin would appear on the screen. That coin was supposed to increase in value over time and change color when its value matured. It could then be sold for a 10 cent reward by pressing the space bar. Even if the coin hadn’t matured yet, the space bar could still be pressed to stop the waiting period and make a new coin appear, though they missed out on the 10 cents.

What nobody participating in this experiment knew was that the coins’ maturation followed one of two patterns. In the high-persistence pattern, the coin could mature any time during a period of 20 seconds, so waiting was the best strategy. Conversely, in the limited-persistence alternative, it was optimal to stop waiting a little after two seconds if the coin didn’t mature by then, because if it didn’t, it would go without maturing for the full 40 seconds The purpose of this test was to make as much money as possible in 12 minutes.

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