'Pay no attention to that man behind the curtain': researchers show how human brain decides what's important

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Credit: Human Brain Project

The Wizard of Oz told Dorothy to "pay no attention to that man behind the curtain" in an effort to distract her, but a new Princeton University study sheds light on how people learn and make decisions in real-world

situations.

The findings could eventually contribute to improved teaching and learning and the treatment of mental and addiction disorders in which people's perspectives are dysfunctional or fractured.

The study appears in the journal *Neuron*.

The researchers studied how we learn what to pay attention to in order to learn more effectively—that is, to make the most of life experiences—assuming that in real-life situations most of what is going on is irrelevant and shouldn't be learn about. For example, when you order something new in a restaurant - perhaps anchovy pizza—you should learn whether you like or dislike anchovy pizza, rather than attribute the pleasurable experience to the particular table you're sitting at. Or when crossing a street, you should pay attention to the speed and direction of oncoming traffic, while the colors of cars can be safely ignored.

Participants in the study performed a multidimensional trial-and-error learning task, while researchers scanned their brains using functional magnetic resonance imaging (fMRI). The researchers found that selective attention is used to determine the value of different options. The results also showed that selective attention shapes what we learn when something unexpected happens. For example, if your pizza is better or worse than expected, you attribute the learning to whatever your attention was focused on and not to features you decided to ignore. Finally, the researchers found that what we learn through this process teaches us what to pay attention to, creating a feedback cycle—we learn about what we attend to, and we attend to what we learned high values for.

"If we want to understand learning, we can't ignore the fact that learning

is almost always done in a multidimensional 'cluttered' environment," says senior author Yael Niv, an associate professor in psychology and the Princeton Neuroscience Institute. "We want kids to listen to the teacher, but a lot is going on in the classroom—there is so much to look at inside it and out the window. So, it's important to understand how exactly attention and learning interact and how they shape each other."

Most research has looked at "exogenous" attention, or things that capture our attention automatically such as a loud noise or flash of light. But Niv and her colleagues are interested in "endogenous" attention, or how we choose to pay attention to the environment in order to maximize what we learn from each experience, and what processes shape those internal decisions of what to attend to.

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