

Keeping up that positive feeling: The science of savoring emotions

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Savoring a beautiful sunset and the positive emotions associated with it can contribute to improved well-being, according to research. But why and how are some people better than others in keeping the feeling alive?

"It's important to consider not just how much emotion you experience, but also how long these emotions persist," says Aaron Heller, former graduate student at the University of Wisconsin-Madison Center for Investigating Healthy Minds (CIHM) at the Waisman Center and current assistant professor of psychology at the University of Miami. "We're looking at how one person can savor a great deal from that beautiful sunset or a memorable meal, but how another person who might be susceptible to depression can't savor that sunset and those positive emotions subside quickly."

Heller and colleagues' findings, published in *The Journal of Neuroscience*, suggest that the duration of activity in specific circuits of the brain, even over relatively short periods of time such as seconds, can predict the persistence of a person's positive emotion minutes and hours later. The results and the study's unique design contribute to a growing understanding of how mental disorders such as depression might be manifested in the brain. Depression affects more than 350 million people globally, according to the World Health Organization.

Until now, researchers have examined savoring and the impact of emotions on individuals either in the laboratory or in a real-world setting, but not in both with the same people and prompts. Heller says the study

is one of the first of its kind to take the same experiment from the lab into the field while linking emotion responses in both settings to neural activity in the brain.

Over the course of the study, roughly 100 adult participants played a short guessing game and answered questions about their emotions when prompted by a smartphone over a 10-day period. The guessing game provided participants with the following instructions: "The computer chose the number 5. Please guess whether the next number will be higher or lower than 5."

Participants would win money or win nothing based on their response. Winning was intended to give people bursts of positive emotion, while not winning was intended to create negative feelings. In addition, Heller and colleagues wanted to learn how long these emotions lingered after the game, so they asked a series of questions on average every 15 minutes afterward to get a sense of whether people were savoring positive or negative emotion—or neither.

The same participants played the guessing game while scientists collected functional MRI scans of their brains during the game. Individuals with more persistent activation in the part of their brain associated with reward and reward learning—called the ventral striatum—reported positive emotion that was sustained for longer periods of time after the game. The magnitude of activation in another area of the brain responsible for executive functioning, the dorsal [lateral prefrontal cortex](#), predicted how much a person's positive emotion increased immediately following a reward.

Richard Davidson, senior author of the paper and founder of CIHM, says the neural pattern observed in the new study, particularly in the ventral striatum, has also predicted higher levels of well-being in previous studies. He adds that practices such as "lovingkindness" and

compassion toward others, which aim to cultivate certain forms of positive emotion, might help to increase savoring.

"The methodological innovations showcased in this study can be applied to study the impact of simple forms of meditation on both reports of sustained positive emotion sampled in real-world contexts as well as sustained ventral striatal activation measured in the laboratory," he says.

Heller emphasizes that in order to draw larger conclusions, the research needs to be replicated and taken in new directions to include negative emotion, too, but notes that the work creates opportunities to explore the "dose" or amount of exposure to a positive experience that can yield lasting [positive emotions](#).

"Most patients spend only one hour per week in psychotherapy. That's less than 1 percent of their waking time, so the fact that anything changes at all is pretty remarkable," he says. "The idea is if we can use cell phone technology to provide similar prompts to help people sustain positive emotion throughout the week, we may be able to create faster changes in [brain](#) networks that give rise to improved mood."

Provided by University of Wisconsin-Madison

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