

How Stress Drains Decision-Making Over Time

September 22, 2017



Whether you're a stay-at-home parent or a high-ranking politician, each day brings its own set of stressors. Despite these trying situations, we are expected to go on with our lives, making decisions and taking actions that affect us and others.

When you experience a stressful event, the sympathetic nervous system is activated, followed by activation of the hypothalamic-pituitary-adrenal axis; in turn, these release neural impulses and hormones that can affect behavioral and cognitive functions — including those related to decision-making.

In a 2017 article in the *European Journal of Neuroscience*, researchers Samuel Bendahan (Ecole Polytechnique Fédérale de Lausanne and University of Lausanne), Lorenz Goette (University of Lausanne), John C. Thoresen (Ecole Polytechnique Fédérale de Lausanne), Leyla Loued-Khenissi (Ecole Polytechnique Fédérale de Lausanne), Fiona Hollis (Ecole Polytechnique Fédérale de Lausanne), and Carmen Sandi (Ecole Polytechnique Fédérale de Lausanne) found that the impact of stress on decision-making, including risk aversion and antisocial behavior, increases over the course of the first hour after a stressful event. This conflicts with previous research, which suggested a more constant effect across time.

To examine this, the researchers divided participants into a stress group and a control group. They then simulated an acute-stress event by having participants in the stress group prepare and deliver an oral presentation and perform a mental math task in front of an unresponsive jury and camera. In the control group, participants completed two nonstressful tasks: reading text in a low voice and performing an easy counting task.

Participants in both groups then played a standard risk game and an antisocial risk game. In the standard risk game, participants had to indicate the probability at which they would choose to enter a lottery with a 20-Swiss-Franc (CHF) gain rather than sticking with a guaranteed win of 10 CHF. The antisocial risk game was similar, except that participants were told their choice impacted another anonymous participant. If they chose the lottery, the other participant would not receive any winnings. If they chose the sure gain, the other participant would receive the same amount that they received.

To determine how stress influenced decision-making in the hour after stress exposure, the researchers had participants from both groups play these economic games at different time points (immediately after stress induction, 20 minutes after stress induction, and 45 minutes after stress induction). The researchers measured heart rate continuously throughout the study. Cortisol levels were used to assess psychological markers of stress, and a visual analogue scale was used to assess participants' subjective stress levels at different time points throughout the study.

The authors found that individuals were less risk averse immediately following exposure to stress, but became more risk averse as time elapsed. They also found that stressed individuals fixated on themselves and ignored the negative consequences of their choices to others. These findings highlight the complex impacts of stress on decision-making.

Reference

Bendahan, S., Goette, L., Thoresen, J. C., Loued?Khenissi, L., Hollis, F., & Sandi, C. (2017). Acute stress alters individual risk taking in a time?dependent manner and leads to anti?social risk. *European Journal of Neuroscience*, 45, 877-885.