Stress can increase empathy

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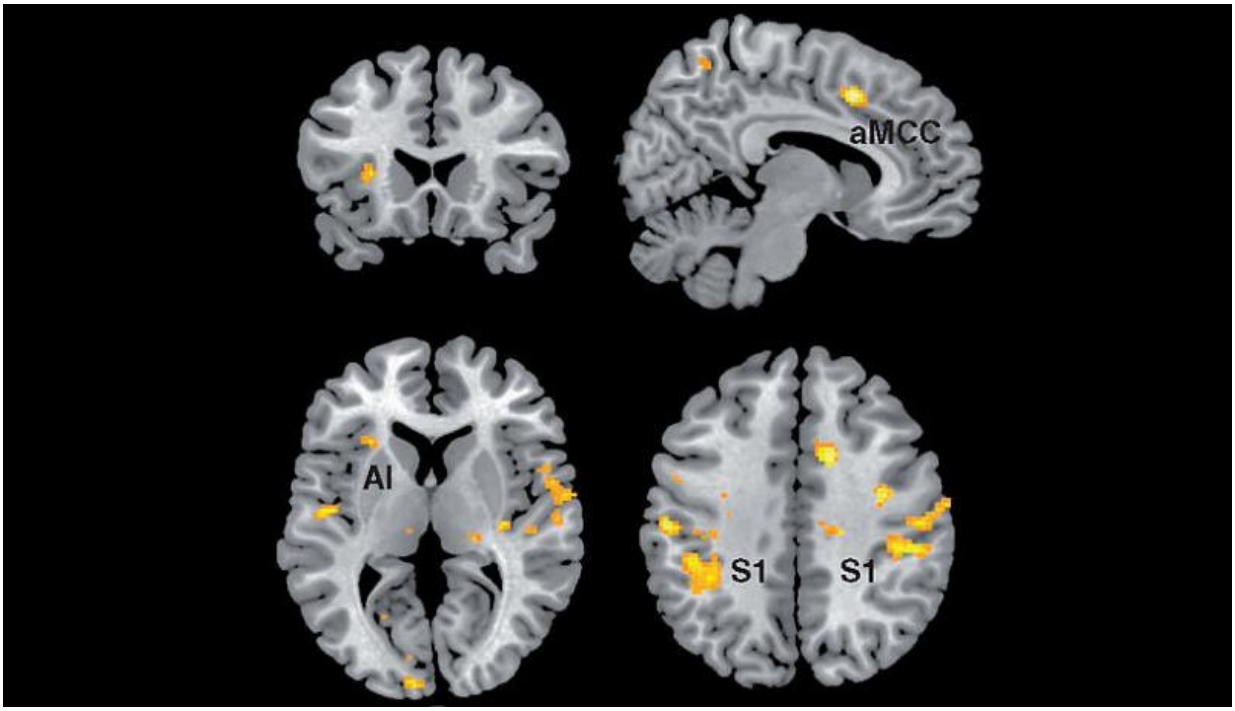

MRI scans of the brain: stress-induced brain activation during viewing pictures of other people in painful situations. The results show that the neural empathy network in people under stress was more sensitive to the pain of others. Credit: Claus Lamm (2016) Published by Oxford University Press

Acute psychosocial stress leads to increased empathy and prosocial behavior. An international team of researchers led by Claus Lamm from the University of Vienna investigated the effects of stress on neural mechanisms and tested the relationship between empathy and prosocial

behavior in a new experiment. The study has just been published in the journal *Social, Cognitive and Affective Neuroscience*.

Stress is an essential psychobiological mechanism without which we could not survive. It mobilizes the organism and enables it to manage threatening situations. It was previously assumed that stress elicited the so called fight or flight response. More recently however, based on the results of behavioral studies, this theory has been repeatedly called into question. Newer findings revealed that humans show an increase in prosocial behavior under stress. In their investigation, Claus Lamm and his team from the University of Vienna shed light on the neural processes underlying this behavior.

In an experiment using functional magnetic resonance imaging (fMRI), participants were exposed to acute stress while trying to empathize with another person. Meanwhile, their brain activity was measured using fMRI. The researchers focused especially on stress-related changes of neural activity in the so-called "empathy network".

A total of 80 (for methodological reasons exclusively male) participants were asked to empathize with others while solving difficult tasks under time pressure, all the while receiving negative feedback on their performance. The effects of this psychological stress induction were measured through cortisol increase. Subsequently, participants were shown photos of painful medical procedures performed on the hand, and asked to vividly imagine the pain of the depicted patient. For some photos, participants received the additional information that the patient's hand had been under anesthesia during the procedure. This required them to distinguish between their automatic aversive reaction to the image and the actual feelings of the patient, and thus intended to measure the participants' ability to take the patient's perspective and to regulate their own emotions. In the following, the researchers used the "dictator game", a game developed in behavioral economics, to measure

prosocial behavior. In this game, participants had to distribute a sum of money in whichever ratio they wanted between themselves and a stranger.

The results showed that the neural empathy network reacted more strongly to images of painful medical procedures when under stress. However, their neural reaction was equally strong when participants knew that the procedure was in fact not painful, speaking for a lack of perspective taking under stress. Additionally, neural activation correlated with the amount of money shared in a prosocial manner – the stronger the brain's reaction to others' pain, the more money the participant shared with the stranger.

Claus Lamm summarizes the findings as follows: "Based on their neural responses, stressed participants had a stronger emotional reaction to the pictures. However, this implies that they also ignored complex information about the actual situation the shown person was in. Our results thus support the hypothesis that humans show more empathy and are more prone to helping others when they are under stress, but that their perspective taking skills might deteriorate. In some circumstances, the stronger emotional response might thus result in aid that is uncalled for or inappropriate, for example when one's first impression of another's mental state does not match their actual emotion – e.g. when someone is crying out of joy. Hence, depending on the context and situation, stress can be either beneficial or detrimental in social situations."

More information: L. Tomova et al. Increased neural responses to empathy for pain might explain how acute stress increases prosociality, *Social Cognitive and Affective Neuroscience* (2016). DOI: 10.1093/scan/nsw146

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