People with less body response to stress task had more PTSD signs after COVID-19 began

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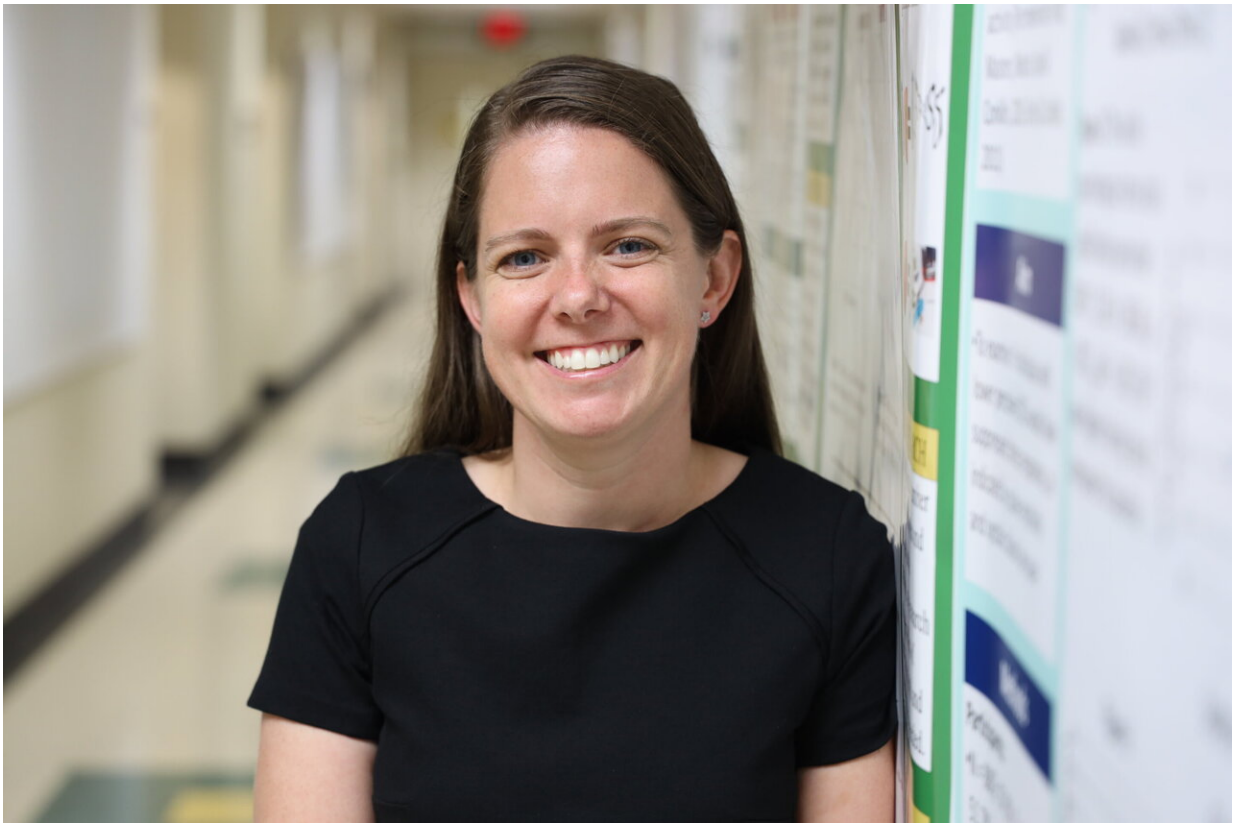

Baylor University psychologist Annie Ginty, Ph.D. Credit: Baylor University

People who did not have a large heart rate response to a stress task surprised researchers later—after the onset of the COVID-19 pandemic—when they showed more symptoms of post-traumatic stress

disorder related to the crisis than others who also did the stress task and COVID-19 stress ratings.

Researchers had anticipated that the reverse would be true—that those with higher heart rate reactions to the stress task would experience more distress related to COVID-19. Previous work shows individuals with a PTSD have higher responses to stress. But very few studies have examined heart rate responses to acute stress before the onset of a traumatic event, researchers said.

"The study shows that diminished biological arousal—how the body responds when it is exposed to something startling or stressful—before a global pandemic may predict PTSD symptoms related to the event," said principal investigator Annie T. Ginty, Ph.D., assistant professor of psychology and neuroscience at Baylor University.

The biological reactions were measured by blood pressure and heart rate, said co-author Danielle Young, Psy.D., research coordinator in the Baylor Behavioral Medicine Lab.

The study, published in the journal *Psychosomatic Medicine*, grew out of an ongoing study of undergraduate students at Baylor University.

"The research also showed that some college students were experiencing distress related to the pandemic in its earliest stages, even when social distancing was just beginning," Ginty said.

In the study's first phase, with 120 participants, researchers measured their resting heart rate and blood pressure before and during a standard acute psychological stress test. They asked students to do mental math, rather than writing down figures or using a calculator, and give the scorers verbal responses. In a four-minute test, they were asked to add consecutive single-digit numbers while remembering the most recent and

adding it to the next number presented. They did this while being videotaped with a scorer present and looking at themselves in a mirror.

"The standard acute psychological stress task is meant to increase levels of stress by including requirements of cognitive effort, social evaluation, self-evaluation and competition," Ginty said. "The task substantially increases heart rate and feelings of stress."

The study's first phase, which ended in February 2020, was done in Central Texas. After the pandemic's onset, researchers launched a second phase between March 26 and April 5, sending participants a follow-up questionnaire about COVID-19. The participants were in 22 states after early campus closure due to COVID-19. When asked, none had tested positive for COVID-19 and 87.5 percent were living in a city/state with a "shelter in place" order.

The questionnaire included standard items used to measure PTSD symptoms of intrusion (dreaming about the event and having trouble staying asleep), hyperarousal (irritability and having trouble concentrating) and avoidance (trying not to think or talk about the event) in the seven days before they responded to the questionnaire.

The findings are in line with a previous study of soldiers, which showed that a lower response of cortisol—the primary stress hormone—to an acute psychological stress task before deployment predicted greater PTSD symptoms post deployment.

The present study supports growing evidence that lower biological arousal in response to psychological stress may be bad for health outcomes, particularly mental health outcomes. The findings support Ginty's previous work, which demonstrated that lower arousal to acute stress is associated with higher levels of perceived stress—meaning that people rate their environment as more stressful.

Previous work also has shown that higher levels of biological arousal may be associated with developing PTSD symptoms. But those studies used what are considered passive tasks—such as hearing loud bursts of noise. Lower biological responses to stress tasks that require participants to actively engage in the task may be a unique biomarker for mental health outcomes.

Ginty said that future research should aim for more comprehensive measures of biological reactivity and include a lifetime history of traumatic event exposure. However, the current study did account for childhood trauma and diagnosis of a mental health condition before the pandemic's onset.

"Since findings suggest that individuals with diminished arousal to active stress may be at greater risk for negative mental health outcomes, it could be helpful to offer preventive treatment or resources to them at the early stages of stress or trauma exposure," Ginty said.

More information: Annie T. Ginty et al, Heart rate reactivity to acute psychological stress predicts higher levels of PTSD symptoms during the COVID-19 pandemic, *Psychosomatic Medicine* (2020). DOI: 10.1097/PSY.0000000000000848

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