

Stressful day? Stress can predict decreases in social interaction, says study

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When you're stressed, do you ever feel like you just don't want to be around other people? According to a Dartmouth study, greater levels of stress on a given day were found to be predictive of decreases in social interaction the following day. The results are published in the journal *Emotion*.

"For our study, we wanted to investigate how feeling stressed impacts the amount that we socialize with others," says senior author Meghan Meyer, an assistant professor of psychological and brain sciences at Dartmouth and director of the Dartmouth Social Neuroscience Lab.

"Our findings show that people who experienced more [stress](#) on one day socialized less with others the next day. This effect may persist for up to two days later after someone has had a stressful day."

Previous studies with animals, such as with rodents, have shown that animals prefer not to socialize with their peers if they were stressed the day before, a phenomenon known as "stress-induced social avoidance." To date, it has been difficult to determine if humans also engage in social avoidance as a result of stress, as researchers have not had the tools to effectively measure how stress affects real-world social interactions. Past research on the topic has often relied on self-reports of social behavior by participants, which tend to be biased. Dartmouth's study however, relied on [mobile phone](#) sensing data (e.g. passive and automatic sensing data) obtained via the StudentLife app—an app that was developed earlier by co-author Andrew T. Campbell, the Albert Bradley 1915 Third Century professor in computer science at Dartmouth.

Through the StudentLife app, data on sleep, movement, and time spent at home was provided passively by 99 Dartmouth undergraduate students, who agreed to participate in the two-month study. The sample was 56% female and 44% male. To protect participants' privacy, the data was anonymized.

The StudentLife app also measured how much [social interaction](#) participants had each day by detecting human conversation through the mobile phone's microphone. Actual conversations or sounds were not recorded for ethical reasons. Through the app, participants were also asked questions about their overall well-being, including stress. Once a

day randomly, between 9 a.m. and 8 p.m., participants were asked to report their daily stress by tapping on the image that best described their stress level on a scale from 1 (no stress) to 16 (extreme stress). This photographic methodology was developed by other researchers, which the team refers to as the "mobile photographic stress meter," given its application in a mobile phone context. The images varied from that of a peaceful pond to one of someone pulling their hair out. Prior research has shown that this method of measuring stress strongly correlates with people's responses in formal psychological stress assessments, and that it is especially effective for longitudinal sampling given how engaging and easy it is for participants to use.

With so much participant data collected over a period of two months, the team was able to run sophisticated analyses examining stress-social interaction patterns across this long period of time for each of the participants, while other studies might bring participants into a lab for just an hour. In analyzing the data, the researchers used several models to assess how stress affects social interaction, and investigated whether participants' stress-social interaction patterns persisted even when controlling for participants' amount of sleep, movement, and time at home, other variables that were also passively measured by the smartphones and have been shown to be related to stress.

"By leveraging mobile sensing technology, our research is among the first to examine the temporal relationship between stress and socialization," says co-author Alex daSilva, Guarini '21, a Ph.D. student in psychological and brain sciences at Dartmouth. The team's findings provide some of the first concrete evidence of stress induced social avoidance in humans. "Our findings showed that higher levels of stress on one day predicted decreased social interaction the next day while accounting for levels of movement, sleep, and time spent at home," adds daSilva.

Gender did not appear to have a moderating effect on the relationship between stress and socialization. The results also showed a correlation between spending more time at home and decreased levels of both movement and social interaction the next day. The opposite was also found to be true: Greater social interaction was found to be associated with more movement and spending less time at home. However, one striking aspect of the results was that with the stress-social interaction relationship, it was only the case that stress predicted less social interaction the next day. The reverse was not true—the amount of social interaction on a given day did not predict stress the following day. This speaks to the possibility that the stress-social interaction relationship really goes in one direction, with stress on a given day preferentially predicting less social interaction the next day.

"College is a time when a lot of mental health issues emerge in young adults. At the same time, previous research has shown that being integrated into your social network is really good for mental health, as it buffers mental health issues in a number of ways," says Meyer. "Stress is a big risk factor for the onset of a lot of mental health conditions and it often precedes the onset of depression and anxiety disorders. If students are stressed and then they withdraw from their social environment in response, they may be missing these opportunities to use their social interaction to buffer their mental health issues. They're withdrawing from people at a time when they may need them most."

The research team states that mobile sensing approaches and physiological measures can be used in the future to study stress and [social avoidance](#) further, as well as the biological stress responses that may be involved.

In addition to Meyer, DaSilva and Campbell, Jeremy Huckins, a lecturer in psychological and [brain sciences](#), and Weichen Wang, Guarini '17, a Ph.D. student in computer science at Dartmouth, and Rui Wang, Guarini

'18, at Facebook, also served as co-authors of the study.

More information: A. W. daSilva et al, Daily perceived stress predicts less next day social interaction: Evidence from a naturalistic mobile sensing study., *Emotion* (2021). DOI: [10.1037/emo0000994](https://doi.org/10.1037/emo0000994) daSilva

Provided by Dartmouth College

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