

First-of-its-kind study suggests stress levels stay the same with or without deadlines

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Four face illustrations conveying the plight of knowledge workers during research pursuits near and afar from deadlines. The facial expressions and postures were taken from actual observational data during the naturalistic study. The individual characteristics of the researchers were altered to preserve anonymity. Credit: University of Houston

Deadlines are part and parcel of modern knowledge work. Journalists must serve their weekly columns, managers must turn in their monthly reports, and researchers must submit their papers and proposals on time. Despite their ubiquity, deadlines conjure up negative feelings and are perceived as challenging events. Accordingly, there has been a trend to do away with deadlines, where possible. For instance, the National Science Foundation (NSF) in the United States introduced no-deadline submissions in some of its programs. Critics, however, have been arguing that although deadlines may be painful, they are necessary, because they motivate people to act.

Researchers from the University of Houston, Texas A&M, and the Polytechnic of Milano set out to address the question at the heart of the matter: "Does knowledge work near deadlines incur higher sympathetic load than knowledge work away from deadlines?" Sympathetic activation is the state of physiological arousal that indicates how much people are "on the tips of their toes," and often leads to stress. This is why its intensity and duration should be kept in check, according to the researchers.

The first-of-its-kind study published in the Proceedings of the ACM Human Factors in Computing, was led by Ioannis Pavlidis, professor of computer science and director of the Affective and Data Computing Laboratory at UH.

Per an institutionally approved ethical protocol, 10 consenting researchers were monitored as they worked at the office in the two days leading to a critical [deadline](#), and two other days without an impending deadline. Miniature cameras were placed at the researchers' university office to unobtrusively record their facial physiology and expressions, as well as their movements throughout the working day. The participants' sympathetic activation was measured every second through quantification of their imaged perinasal perspiration levels.

Applying advanced data modeling on hundreds of hours of data recordings, the team found that researchers experience high sympathetic activation while working, which speaks to the challenging nature of the research profession. Surprisingly, this high sympathetic activation remains about the same with or without deadlines.

"Research is tough every day," said Pavlidis. "Using a metaphor, if you are under heavy rain all the time, if one day the rain is a little heavier, it would not make much difference to you because you are already wet to the bone. This is what our models show with respect to the effect of deadlines on researchers."

The only factors found to exacerbate sympathetic activation were extensive smartphone use and prolific reading/writing. The first factor is a manifestation of the gadget-based addiction trends that have altered human behaviors across the board. The second factor is integral to research work, and thus unavoidable.

Thankfully, however, researchers appear to auto-regulate increases in their sympathetic activation by instinctively adjusting the frequency of physical breaks. It was observed that on average, researchers take one physical break every two hours. From this baseline, data analysis showed that for every 50% increase in sympathetic activation, the break frequency nearly doubles, revealing the limits of cognitive work under increasing stress.

"Our naturalistic study not only brings fresh insights into researchers' behaviors but also challenges some prevailing views about deadlines", Pavlidis said. "With the recent advances in affective computing, I expect such naturalistic studies to proliferate across domains, challenging misconceptions we hold about a lot of things," added Pavlidis.

The study is published in the *Extended Abstracts of the 2023 CHI*

Conference on Human Factors in Computing Systems.

More information: MD Tanim Hasan et al, Sympathetic Activation in Deadlines of Deskbound Research—A Study in the Wild, *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems* (2023). [DOI: 10.1145/3544549.3585585](https://doi.org/10.1145/3544549.3585585)

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