

# New method for quantifying boredom in the body during temporary stress

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A research team from University of Tsukuba has developed an innovative method to quantify stress using Integrated Information Theory. This approach comprehensively evaluates biological signals and

has demonstrated a strong correlation with subjective stress reports, especially in relation to feelings of boredom. This suggests that the method may serve as a comprehensive measure of stress, encompassing objective and subjective aspects.

Stress is a common experience for everyone, but its multifaceted nature makes it challenging to quantify objectively. Evaluating individual physiological indicators such as [blood pressure](#), perspiration, or brainwave patterns—whether assessed separately or in combination—can be influenced by hidden factors, complicating the overall interpretation of stress.

In [a study](#) in *iScience*, researchers evaluated subjectively perceived stress by considering various physiological indices as an integrated system, encompassing the body and brain, rather than treating each index separately.

They performed an experiment wherein [subjects](#) were asked to solve [computational tasks](#) of varying difficulty levels (low, medium, and high) to induce temporary stress.

During these tasks, biological signals such as electroencephalogram, electrocardiogram, and skin [electrical activity](#) were measured. Stress was then mathematically evaluated from the overall values of these biological signals using Integrated Information Theory, a method for quantifying the coherence (degree of integration) of a dynamic system consisting of multiple time-series data.

The results showed that the index had the lowest integration (indicating the lowest stress) for tasks of medium difficulty and the highest integration for tasks of low and high difficulty.

Analysis of the subjects' various subjective reports also revealed that the

new index had the strongest correlation with the item "boredom," suggesting that it could serve as a comprehensive measure of stress that included subjective experiences.

These findings imply that the feeling of "boredom" underlies subjective stress, providing a new perspective on [stress](#) as a response to the absence of explicit external stimuli.

**More information:** Takayuki Niizato et al, Toward stressor-free stress estimation: The integrated information theory explains the information dynamics of stress, *iScience* (2024). [DOI: 10.1016/j.isci.2024.110583](https://doi.org/10.1016/j.isci.2024.110583)

Provided by University of Tsukuba

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