

Human screams communicate at least six emotions

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Human screams signal more than fear and are more acoustically diverse than previously thought, according to a study published April 13th 2021 in the open-access journal *PLOS Biology* by Sascha Frühholz of the

University of Zurich, and colleagues. Remarkably, non-alarming screams are perceived and processed by the brain more efficiently than alarming screams.

In [nonhuman primates](#) and other [mammalian species](#), scream-like calls are frequently used as an [alarm signal](#) exclusively in negative contexts, such social conflicts or the presence of predators or other environmental threats. Humans are also assumed to use screams to signal danger and to scare predators. But humans scream not only when they are fearful and aggressive, but also when they experience other emotions such as despair and elation. Past studies on this topic largely focused on alarming fear screams, so the broader significance of various scream types has not been clear. In the new study, the researchers addressed this knowledge gap using four different psychoacoustic, perceptual decision-making, and neuroimaging experiments in humans.

Twelve participants were asked to vocalize positive and negative screams that might be elicited by various situations. A different group of individuals rated the emotional nature of the screams, classified the screams into different categories, and underwent [functional magnetic resonance](#) imaging (fMRI) while listening to the screams.

The results revealed six psycho-acoustically distinct types of scream calls, which indicated pain, anger, fear, pleasure, sadness, and joy. Perhaps surprisingly, listeners responded more quickly and accurately, and with higher neural sensitivity, to non-alarm and positive scream calls than to alarming screams. Specifically, less alarming screams elicited more activity across many auditory and frontal brain regions. According to the authors, these findings show that scream calls are more diverse in their signaling and communicative nature in humans than frequently assumed.

Dr. Frühholz notes: "The results of our study are surprising in a sense

that researchers usually assume the primate and [human](#) cognitive system to be specifically tuned to detect signals of danger and threat in the environment as a mechanism of survival. This has long been supposed to be the primary purpose of communicative signaling in screams. While this seems true for scream communication in primates and other [animal species](#), scream communication seemed to have largely diversified in humans, and this represents is a major evolutionary step. Humans share with other species the potential to signal danger when screaming, but it seems like only humans [scream](#) to signal also positive emotions like extreme joy and pleasure. Signaling and perceiving these [positive emotions](#) in screams seemed to have gained priority in humans over alarm signaling. This change in priority might be likely due to the requirements of evolved and complex social contexts in humans."

More information: Frühholz S, Dietziker J, Staib M, Trost W (2021) Neurocognitive processing efficiency for discriminating human non-alarm rather than alarm scream calls. *PLoS Biol* 19(4): e3000751. doi.org/10.1371/journal.pbio.3000751

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