

Scientists suss out the secrets of human screams

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Humans may be the only species on Earth to build a whole industry off well-timed cinematic screams, but the act of screaming itself is common in many animals ranging from frogs and foxes, to birds, rabbits, goats,

and nonhuman primates.

Screaming is well-studied in animals, where it's thought the behavior has evolved as a way to startle an attacking predator and provide a chance to escape, or, in social animals, to recruit help when in trouble.

Surprisingly, much less is known about how human screams function in communication, or how similar or different human screams are from those of other species.

To help unlock the secrets of human screaming, psychology professor Harold Gouzoules and his students at Emory University had 181 volunteers, mostly [undergraduate students](#), listen to 75 human vocal sounds, representing both a broad acoustical range and array of emotional contexts, and classify each as a scream or a nonscream. To see what qualities make sounds more screamlike, Gouzoules, the head of Emory's Bioacoustics Laboratory, and graduate students Jay W. Schwartz and Jonathan W.M. Engelberg analyzed the sounds with respect to 28 acoustic parameters that assess pitch, timbre, duration, frequency range, and roughness (or rapid amplitude modulation).

"Rough sounds are perceived as harsh, raspy, gravelly or buzzing. Some recent research has suggested that roughness might be a defining quality of screams, so one of our goals was to assess this idea," said Schwartz, who will describe the work in a presentation at the 177th Meeting of the Acoustical Society of America, which takes place May 13-17, at the Galt House in Louisville, Kentucky.

The researchers found that the sounds most often classified as screams shared certain acoustic factors, including a high and sweeping/arcing pitch, as well as high roughness. Strangely, there was one decidedly nonscream sound—a whistle—that 71% of participants labeled as a scream. "This made sense though, when we looked into the acoustic qualities of the whistle," Schwartz said. "It exhibited many of the traits

we found to generally be associated with screams," such as a high and arcing pitch, and moderate-high roughness.

Surprisingly, the vocalizations people labeled as screams came from a wide range of emotional contexts, said Schwartz. "Some were fearful, while others were angry, surprised, or even excited," he said. "In almost all other species, screams are reserved for a particular situation, like an attack by a predator or rival."

Gouzoules's team found a great deal of acoustic variation among human screams—in other words, screams don't all sound the same. This begs the question: Do humans use different-sounding screams in different situations, and can we discriminate those screams and interpret them? "In the future we plan to incorporate [functional magnetic resonance imaging \(fMRI\)](#) to examine the neurological underpinnings of people's reactions to screams," Gouzoules said.

"Screams are inherently interesting vocalizations but there are also potential human health applications of research on screams as there are multiple psychiatric disorders that involve screaming behavior," Gouzoules said.

More information: Presentation #3aABb2, "What is a scream? Acoustic characteristics of a human call type," will be given during a poster session that begins at 10:00 a.m., Wednesday, May 15, in Grand Ballroom C of the Galt House in Louisville, Kentucky.
acousticalsociety.org/asa-meetings/

Provided by Acoustical Society of America

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