

Dissonant music brings out the animal in listeners: researchers

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Jimi Hendrix

(Phys.org) -- Ever wonder why Jimi Hendrix's rendition of "The Star-Spangled Banner" moved so many people in 1969 or why the music in the shower scene of "Psycho" still sends chills down your spine?

A UCLA-based team of researchers has isolated some of the ways in which distorted and jarring [music](#) is so evocative, and they believe that the mechanisms are closely related to distress calls in animals.

They report their findings in the latest issue of the peer-reviewed

scientific journal *Biology Letters*, which publishes online June 12.

"Music that shares aural characteristics with the [vocalizations](#) of distressed animals captures human attention and is uniquely arousing," said Daniel Blumstein, one of the study's authors and chair of the UCLA Department of Ecology and [Evolutionary Biology](#).

Blumstein is an authority on animal distress calls, particularly among [marmots](#). In 2010, he and a team of researchers captured media attention with a study of the soundtracks of 102 classic movies in four genres: adventure, drama, horror and war. They determined that the soundtracks for each genre possessed characteristic emotion-manipulating techniques. Scores for dramatic films, for example, had more abrupt shifts in frequency, both up and down. Horror films, on the other hand, had more screaming females and distorted sounds. The researchers were even able to detect recordings of animal screams in some scores.

The latest findings are based on a series of experiments that Blumstein designed and conducted with Peter Kaye, a Santa Monica-based composer of movie and television scores, and Greg Bryant, an assistant professor of communication studies at UCLA who specializes in research on vocal communication and evolutionary psychology. In addition to being an academic, Bryant is a musician and recording engineer.

Using synthesizers, Kaye and Bryant composed a series of original music pieces of several types or "conditions," with each piece lasting just 10 seconds. "We wanted to see if we could enhance or suppress the listener's feelings based on what's going on with the music," Blumstein said.

In the control condition, the music was generic and emotionally neutral, without noise or abrupt transitions in frequency or pitch. Bryant likened

it to rather plain elevator music.

Another condition began in an easy-listening manner but then suddenly broke into distortion, much like Hendrix famously did at Woodstock.

Undergraduate students were asked to listen to an example of each condition and then rate the examples based on two factors: how arousing they found the music and whether the emotional feeling in the music was positive (such as happy) or negative (such as fear-inducing or sad). No subject heard more than one example from any condition.

When the music featured distortion, subjects rated it as more exciting than the compositions without distortion. They also were more likely to describe the music as charged with negative emotion.

The researchers believe the effect of listening to music with distortion is similar to hearing the cries of animals in distress, a condition that distorts animals' voices by forcing a large amount of air rapidly through the voice box.

"This study helps explain why the distortion of rock 'n' roll gets people excited: It brings out the animal in us," said Bryant.

The researchers also believe their study is the first work to incorporate what scientists know about animal communication into the study of music perception.

"Composers have intuitive knowledge of what sounds scary without knowing why," Bryant said. "What they usually don't realize is that they're exploiting our evolved predispositions to get excited and have negative emotions when hearing certain sounds."

Most of the effects, however, are undermined if the music is paired with

unevocative imagery, the researchers found.

In a second study, they paired the same music compositions with 10-second video clips designed to be minimally evocative, showing, for example, people walking or drinking a sip of coffee. The researchers presented the pairings to another group of undergraduates. When the subjects heard the distorted musical pieces in the context of the videos, they did not find the music arousing but they did find the pieces more negative than when they were not paired with the videos.

"The video eliminated how exciting the distorted-sounding music seemed, but it didn't trump the emotional content of the music," Bryant said.

In the future, the researchers plan to test how different types of music affect a listener's nervous system. Past research has shown that calls of distress raise heart rates and skin conductance among animals.

"We need to study this more to understand the physiological mechanisms by which this works," Kaye said.

Provided by University of California, Los Angeles

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