

The sound of silence? Researchers prove people hear it

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Silence might not be deafening but it's something that literally can be heard, concludes a team of philosophers and psychologists who used auditory illusions to reveal how moments of silence distort people's perception of time.

The findings address the debate of whether people can hear more than sounds, which has puzzled philosophers for centuries.

"We typically think of our sense of hearing as being concerned with sounds. But silence, whatever it is, is not a sound—it's the absence of sound," said lead author Rui Zhe Goh, a Johns Hopkins University graduate student in philosophy and psychology. "Surprisingly, what our work suggests is that 'nothing' is also something you can hear."

The research has been published in *Proceedings of the National Academy of Sciences*.

The team adapted well-known auditory illusions to create versions in which the sounds of the original illusions were replaced by moments of silence. For example, one illusion made a sound seem much longer than it really was. In the team's new silence-based illusion, an equivalent moment of silence also seemed longer than it really was.

The fact that these silence-based illusions produced exactly the same results as their sound-based counterparts suggests that people hear silence just like they hear sounds, the researchers said.

"Philosophers have long debated whether silence is something we can literally perceive, but there hasn't been a scientific study aimed directly at this question," said Chaz Firestone, an Assistant Professor of Psychological and Brain Sciences who directs the Johns Hopkins Perception & Mind Laboratory. "Our approach was to ask whether our brains treat silences the way they treat sounds. If you can get the same illusions with silences as you get with sounds, then that may be evidence that we literally hear silence after all."

Like [optical illusions](#) that trick what people see, auditory illusions can make people hear periods of time as being longer or shorter than they

actually are. One example is known as the one-is-more illusion, where one long beep seems longer than two short consecutive beeps even when the two sequences are equally long.

In tests involving 1,000 participants, the team swapped the sounds in the one-is-more illusion with moments of silence, re-working the auditory illusion into what they dubbed the one-silence-is-more [illusion](#). They found the same results. People thought one long moment of silence was longer than two short moments of silence. Other silence illusions yielded the same outcomes as sound illusions.

Participants were asked to listen to soundscapes that simulated the din of busy restaurants, markets, and train stations. They then listened for periods within those audio tracks when all sound stopped abruptly, creating brief silences. The idea wasn't simply that these silences made people experience illusions, the researchers said. It was that the same illusions that scientists thought could only be triggered with sounds worked just as well when the sounds were replaced by silences.

"There's at least one thing that we hear that isn't a sound, and that's the silence that happens when sounds go away," said co-author Ian Phillips, a Bloomberg Distinguished Professor of Philosophy and Psychological and Brain Sciences. "The kinds of illusions and effects that look like they are unique to the auditory processing of a sound, we also get them with silences, suggesting we really do hear absences of sound too."

The findings establish a new way to study the perception of absence, the team said. The researchers plan to keep exploring the extent to which people hear silence, including whether we hear silences that are not preceded by [sound](#). They also plan to investigate visual disappearances and other examples of things people can perceive as being absent.

More information: Goh, Rui Zhe et al, The perception of silence,

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