That split-second panic when something rushes toward you may hinge on one deceptively simple sound cue

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Credit: Image generated by the editorial team using AI for illustrative purposes.

Those jolts of terror that seem to occur whenever a noise comes closer? While we assume that this is an age-old survival reaction, modern

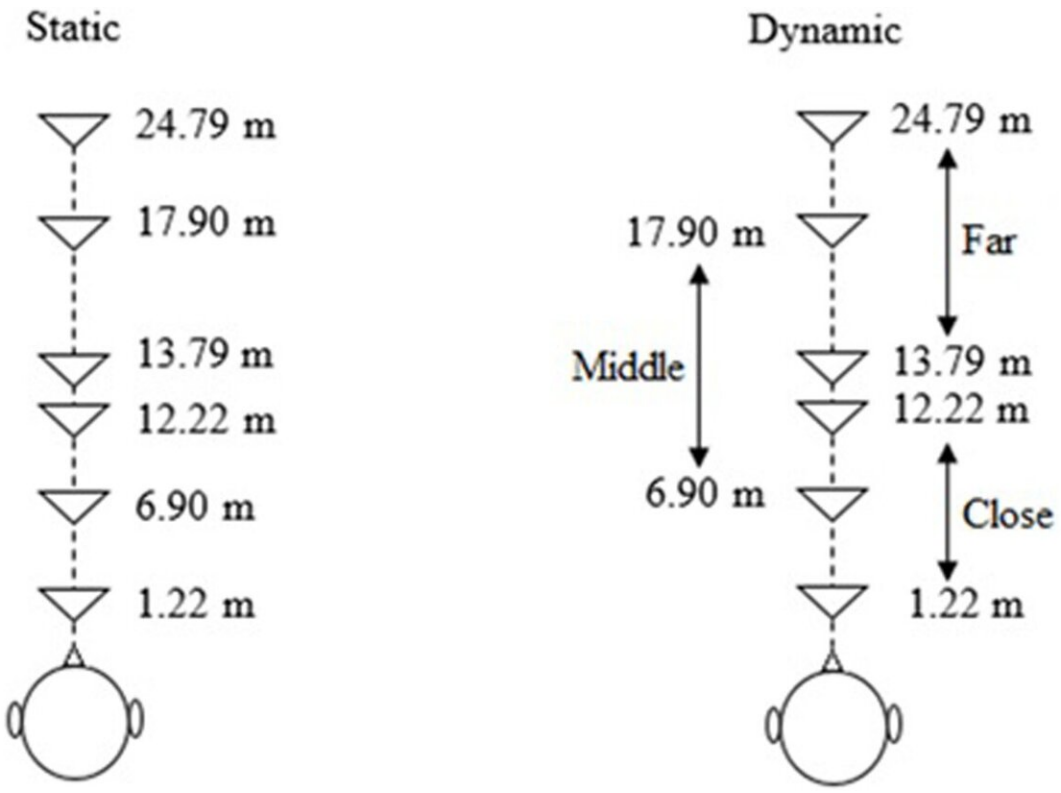
revelations show that there may be an easier explanation for what's occurring.

Many of us have experienced the heart-jolt of an approaching car horn or booming footsteps from behind. By the time we realize what's happening, the sound already seems much closer than it really is—as if our brains had an extra warning system.

It's long been thought that humans possess an adaptive looming bias—an inborn tendency to perceive advancing sounds as nearer or more urgent than receding ones. In fact, one hearing expert suggests we evolved an "auditory looming bias" that provides "advanced warning of approaching sound sources." That sounds logical: in nature, an approaching noise usually signals danger (or opportunity), and getting a head start to react is valuable. But what if this accepted wisdom isn't the whole story?

Blindfolds in the sound lab

In a recent study published in the journal *Proceedings of the Royal Society B: Biological Sciences*, blindfolded volunteers with normal hearing listened through headphones to sounds that either approached or receded. The sounds—pure tones or broadband noise—were simulated to move over an 11-meter path, starting from three different distances (near, middle, far). After each sound, participants reported how far away it began and ended.



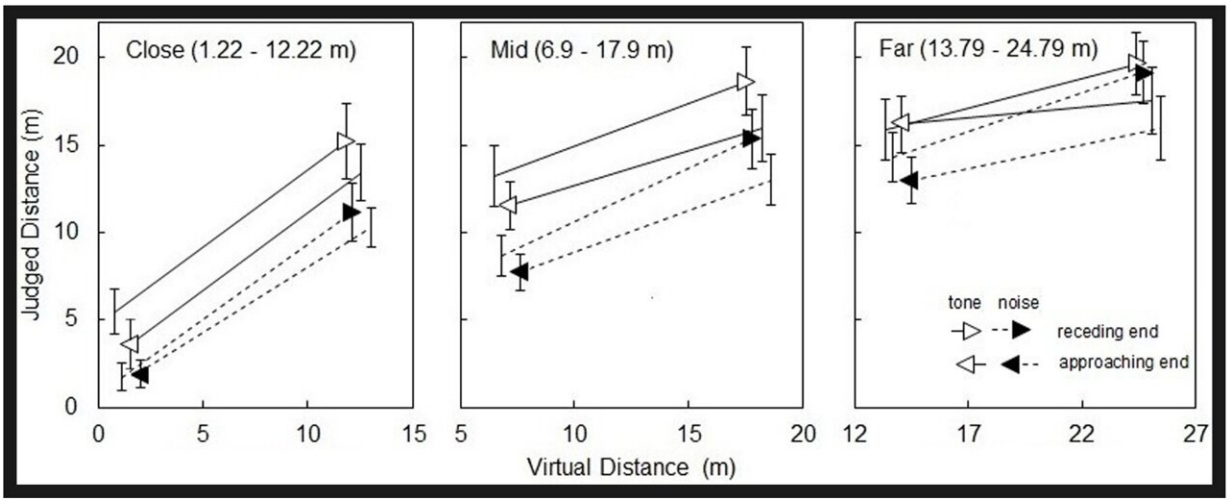
How the sounds moved. This diagram illustrates the virtual sound sources approaching and receding from the listener, mimicking the experimental setup. Participants judged the start and end distances of these moving sounds. Credit: *Proceedings of the Royal Society B: Biological Sciences* (2026). DOI: 10.1098/rspb.2026.0157

Because the experiments took place in an anechoic chamber with blindfolded listeners, the only distance cues came from changes in loudness as the sound moved. With vision eliminated and no echoes, any looming illusion would have to come from volume. Would approaching sounds still feel closer under those conditions?

Unexpected results

The answer was yes—partially at least. On average, the approaching sounds were perceived to be closer both when they started and when they ended, compared to the receding sounds, particularly if the approaching sound was close at the start. This is in line with the classical phenomenon of looming.

However, a number of predictions based on the hypothesis of the hard-wired alarm system turned out to be incorrect. For example, there was no significant difference between judgments of distance when the sound stimulus was either a pure tone or noise. Also, surprisingly, the distance traveled by the approaching sound was roughly equal to that of the receding sound.



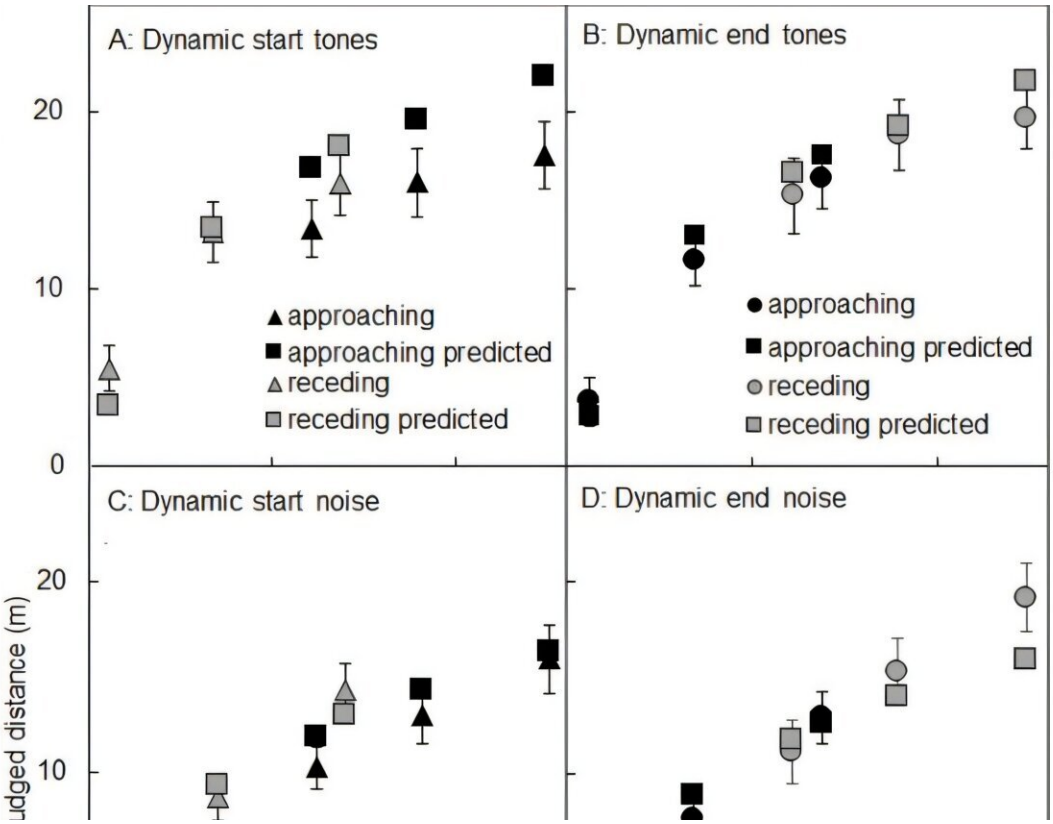
Perceived distance vs. actual movement. This graph shows how participants judged the start and end points of approaching and receding sounds across different distance ranges. Notice that approaching sounds were generally perceived as closer than receding sounds. Credit: *Proceedings of the Royal Society B: Biological Sciences* (2026). DOI: 10.1098/rspb.2026.0157

Louder means closer

So if it's not a special bias, what is going on? It turns out the answer lies in simple acoustics. As a sound draws nearer, it naturally gets louder, and louder sounds tend to be interpreted as closer. The researchers ran the same sounds through a standard loudness model for time-varying signals. The result was striking: the model's predictions matched the human judgments almost perfectly.

The authors explain, "The pattern of results was accurately predicted using a model of loudness for time-varying sounds," adding that "it is not necessary to invoke the adaptive perceptual bias theory to account for asymmetries in loudness and distance judgements between approaching and receding sounds."

They even note that this is "the first time that auditory distance estimates are predicted using a loudness model." In other words, no mysterious looming detector was needed—just basic hearing.



The loudness model's accuracy. This graph compares the distances judged by participants (data points) with the distances predicted by the loudness model (square symbols). The close alignment suggests that perceived loudness, not an adaptive bias, drives distance judgments. Credit: *Proceedings of the Royal Society B: Biological Sciences* (2026). DOI: 10.1098/rspb.2026.0157

Beyond the lab

While these studies do not imply that there are no reflex responses to approaching dangers, visual looming stimuli and other types of auditory stimuli (echoes, higher frequencies) will trigger an involuntary reaction whenever danger is near. Yet, the most significant finding is that when sound serves as a basis for determining the distance of an approaching stimulus, people apply an unambiguous rule.

These findings are highly applicable to various situations; VR game developers may adjust their volume cues, while security systems should use volume ramps. Hearing assist technologies can also employ these principles to inform the user about the distance from a certain sound source.

More importantly, these results refute one of the widespread beliefs about our response mechanisms. According to the researchers' claims, once loudness becomes a key indicator of the distance of the approaching stimulus, all distance decisions "are based on loudness." The authors conclude that this approach is not grounded in some auditory looming bias.

More information: Asymmetries in human judgements of distance for approaching and receding sounds are predicted by a loudness model for time-varying sounds, *Proceedings of the Royal Society B: Biological Sciences* (2026). DOI: 10.1098/rspb.2026.0157. doi.org/10.1098/rspb.2026.0157