

# It's not as difficult as you think to shout upwind, shows study

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To make the measurements, a car was used to move a model of a shouter, generating wind past it. Credit: Aalto University

For years, Ville Pulkki has been wondering why it feels so difficult to shout upwind. The sensation is common enough to have found its way into an idiom about not being understood. But Pulkki, a professor of acoustics at Aalto University, wanted a scientific explanation for the phenomenon—and there wasn't been one.

In a new study published in *Scientific Reports*, Pulkki's research team showed that our common sense understanding of this situation is wrong. It isn't harder to shout into the [wind](#); it's just harder to hear yourself.

In fact, acousticians have long known that sound carries better within the first 100 meters upwind. Many people have noticed that a siren sounds louder as it approaches and then quieter as it moves away. The mechanics behind this is similar to the Doppler effect, in which a sound changes frequency as it moves.

Pulkki's earlier research had confirmed that wind doesn't affect the emanation pattern of speech, so there was no reason why shouting into the wind would be difficult. He therefore asked one of his master's students, Rapolas Daugintis, to study whether the phenomenon was due to how we hear. Daugintis carried out measurements and simulations to test the idea, and Senior Researcher Timo Lähivaara from the University of Eastern Finland contributed acoustic and flow field simulations.

Their results were surprising but simple: it's harder for people to hear themselves when shouting upwind.

"When someone shouts upwind, their ears are situated downwind from their mouth, which means that their [ears](#) receive less sound—it's harder from them to hear their shout than when there's no wind," says Pulkki.

The same thing happens when someone is moving quickly even if there's no wind blowing—if you're cycling, for example. As a person bikes,

their motion generates a wind around their head even in stationary air, and they end up shouting because they can't hear their own voice well.

So be careful what you shout upwind, for others might hear you just fine, even if you don't. This information is particularly useful for people who work with [sound](#), such as musicians.

"My musician friend told me that when they have to sing on a sailboat, they always sit with their back against the wind in order to not strain their voice. The same phenomenon is at play here: because it's harder for my friend to hear themselves when singing upwind, it makes them unknowingly sing louder than usual," says Pulkki.

**More information:** Ville Pulkki et al, Perceived difficulty of upwind shouting is a misconception explained by convective attenuation effect, *Scientific Reports* (2023). [DOI: 10.1038/s41598-023-32306-z](https://doi.org/10.1038/s41598-023-32306-z)

Provided by Aalto University

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