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Social Sciences

Zoom bias: The social costs of having a ‘tinny’ sound during video conferences

A new study shows that poor audio quality in videoconferencing negatively affects listeners’ judgments of the people speaking.

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By Mike Cummings

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Most job candidates know to dress nicely for Zoom interviews and to arrange a professional-looking background for the camera. But a new Yale study suggests they also ought to test the quality of their microphones.

A tinny voice caused by a cheap mic, researchers say, could sink their chances.

Through a series of experiments, the study demonstrates that tinny speech — a thin, metallic sound — during video conferences can have surprisingly deep social consequences, leading listeners to lower their judgments of a speaker's intelligence, credibility, and romantic desirability. It also can hurt an individual's chances of landing a job. These effects could be a potential source of unintentional bias and discrimination, given the likelihood that microphone quality is correlated with socioeconomic status, the researchers said.

“Now that videoconferencing has become so ubiquitous, we wondered how the sounds of people's voices might be influencing others' impressions, beyond the actual words they speak,” said senior author Brian Scholl, professor of psychology in Yale's Faculty of Arts and Sciences and the Wu Tsai Institute. “Every experiment we conducted showed that a

familiar tinny or hollow sound associated with a poor-quality microphone negatively affects people's impressions of a speaker — independent of the message conveyed.

“This is both fascinating and concerning, especially when the sound of your voice is determined not just by your vocal anatomy, but also by the technology you're using.”

The study was published March 24 in the journal the Proceedings of the National Academy of Sciences. Robert Walter-Terrill, a Ph.D. candidate in psychology in Yale's Graduate School of Arts and Sciences, is the study's lead author. Joan Danielle K. Ongchoco, an assistant professor in the psychology department of the University of British Columbia, and a former Ph.D. student at Yale, is a co-author.

Scholl, who is also director of the [Yale Perception & Cognition Lab](#), was inspired to pursue the study by a faculty meeting that he had participated in over Zoom during the early stages of the COVID-19 pandemic. During that video conference, one colleague was using a high-quality microphone in his home recording studio, which made his voice sound especially rich and resonant. Another colleague was using an old laptop that lent a tinny quality to his voice.

In that moment, it occurred to Scholl that the points raised by the colleague with the better sound quality seemed more profound, and those raised by the colleague with the weak mic seemed less compelling, even though he tended to see eye to eye with the latter colleague. It made him curious how superficial audio quality may affect listeners' perceptions of a speaker.

To answer that question, the researchers performed a series of six experiments in which participants listened to a short speech recording and then made judgments about the speaker. In each experiment, half of the participants were randomly assigned to listen to a recording that was clear and lively as though delivered through a high-quality microphone, while the other half heard a distorted version of the same message that mimicked the tinny and hollow sound associated with poor-quality microphones. Importantly, the words themselves were always identical, and the distortions did not affect the comprehensibility of the messages: In each experiment, the participants were asked to transcribe the words and sentences they had heard to confirm they had understood them.

Across the experiments, the researchers varied both the speaker’s gender (male and female) and accent (American and British). In some experiments, they even used obviously computer-synthesized voices, for which the “speakers” clearly couldn’t be responsible, in terms of either their vocal anatomy or their microphone choices.

In an experiment testing the effects of microphone quality on whether a candidate is hireable, participants listened to a male human voice deliver a standard elevator pitch for a sales job. (This experiment was repeated using a computerized voice. It was also used to test effects of audio quality on perceptions of intelligence.) In an experiment concerning romantic desirability, they listened to a female human voice responding positively to a potential suitor’s profile on a dating app. In one focused on credibility, participants listened to a computerized female voice with a British accent deny culpability for a traffic accident.

In these and the other experiments, participants’ value judgments significantly favored the recordings with the richer and more resonant tones. They perceived the people from the higher quality recordings as more hireable, desirable, intelligent, and credible. This work shows that judgments from speech are based not only on the content of their message, but also on the superficial vehicle through which that message is delivered.

The researchers noted that this effect may be particularly difficult to notice in practice.

“During videoconferencing, of course you know how you look, since you can see yourself too,” Walter-Terrill noted. “But on a call with dozens of people, you may be the only one who *doesn’t* know how you sound to everyone else: you may hear yourself as rich and resonant, while everyone else hears a tinny voice.”

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