The hidden cost of video-call glitches

Video-call glitches might seem harmless, but they can reduce people's chances of getting hired, closing a business deal or following a doctor's recommendation. Human brains expect video calls to feel like in-person conversations. When glitches break that illusion, it feels unsettling and strange, harming judgements of trustworthiness, likeability and credibility.

This is a summary of:
Brucks, M. S. *et al*. Video-call glitches trigger uncanniness and harm consequential life outcomes. *Nature* https://doi.org/10.1038/s41586-025-09823-0 (2025).

Cite this as:
Nature https://doi.org/10.1038/d41586-025-03820-z (2025).

The question

People frequently use video calls for mundane conversations, including work collaborations and social calls, as well as for important and sometimes life-altering communications such as job interviews and court hearings. But video calls are susceptible to a common and understudied problem: glitches, or intermittent errors in the transmission of audio-visual information. People often dismiss glitches as annoying but ultimately harmless. We tested this assumption by examining empirically whether these commonplace interruptions could be taking a hidden toll on people's lives.

The discovery

First, we observed organic 'get-to-know-you' video calls and studied whether glitches were associated with a reduced sense of connection between conversation partners. We then conducted several experiments in which we randomly assigned participants to experience the same video call either with or without glitches. Some of our experiments used minor glitches, such as brief freezes during pauses between sentences, and others contained more disruptive issues, including echoes and video distortion.

We measured how glitches affected outcomes in several contexts — including job interviews, medical appointments, social calls and legal proceedings — and investigated why glitches might influence the calls' results. Possible explanations include a reduced comprehension because of disruptions to the call and blame being assigned to the other caller because of a bad Internet connection. We also tested the theory that we thought was most likely: that glitches can feel eerie, creepy and strange[1].

We found that glitches harm outcomes in many contexts. For example, glitches during a virtual interview, health consultation and business meeting decreased people's interest in working with the person on the call and reduced trust in their recommendations.

The stakes are especially high during virtual parole hearings. We found that the presence of glitches during these hearings was associated with lower rates of individuals being granted parole.

We found that calls were perceived more negatively even when freezes were brief and occurred during pauses in speech, when there were no issues with comprehension and when people did not blame each other for Internet problems. Instead, as we predicted, we found that glitches are harmful because they make the call feel unsettling.

We reasoned that this happens because some video calls mimic real, in-person interactions[2]. Glitches are unnatural and break this illusion (for example, by distorting faces or making movements seem choppy). This mismatch evokes 'uncanniness', a concept from robotics and animation research in which people become uncomfortable when something seems almost, but not quite, human[3]. In support of this theory, glitches in a video call that did not mimic a real in-person interaction — one that used a 'shared screen' presentation in which the caller's face was not visible — were not harmful (Fig. 1).

The implications

Glitches are more harmful than people realize. They can have life-altering consequences, as indicated by our finding that such issues during legal proceedings reduce people's chances of being granted parole. We want to equip people with this information so that they can mitigate potential harms. For example, we found that individuals should consider meeting in person for important interactions. However, this is not always an option. In those cases, people without reliable high-speed Internet could face systemic disadvantages as videoconferencing becomes more widespread.

We urge public and private organizations to allocate further resources to improve their digital infrastructure, access and equity. The Internet has generally been considered an equalizer because it provides remote access to services that would otherwise be inaccessible to some groups, but inequitable access to digital services could exacerbate disadvantages instead.

Regrettably, we cannot confidently recommend what actions people should take when a glitch occurs. In our studies, apologizing or warning people of glitches in advance seemed to draw more attention to the glitch. Joking was sometimes helpful, but the joke that we tested did not fully restore the participants' positive opinion of the caller after a glitch. Previous research has found that uncanniness, once triggered, is difficult to reverse. Our struggle to find a reliable solution might be intrinsic to the concept of uncanniness.

Communications technology will continue to advance. We think that future technologies will become even more realistic and thus could produce even more uncanniness when they falter.

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EXPERT OPINION

"The paper presents extensive empirical evidence, both causal and correlational, demonstrating negative effects of glitches in virtual communication on important interpersonal outcomes such as likeability and trust. I am impressed by the authors' body of evidence and the rigour of enquiry. Crucially, I think that the authors have identified an interesting, novel and important phenomenon. I am especially concerned about the effect of glitches in court hearings." (CC BY 4.0)

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FIGURE

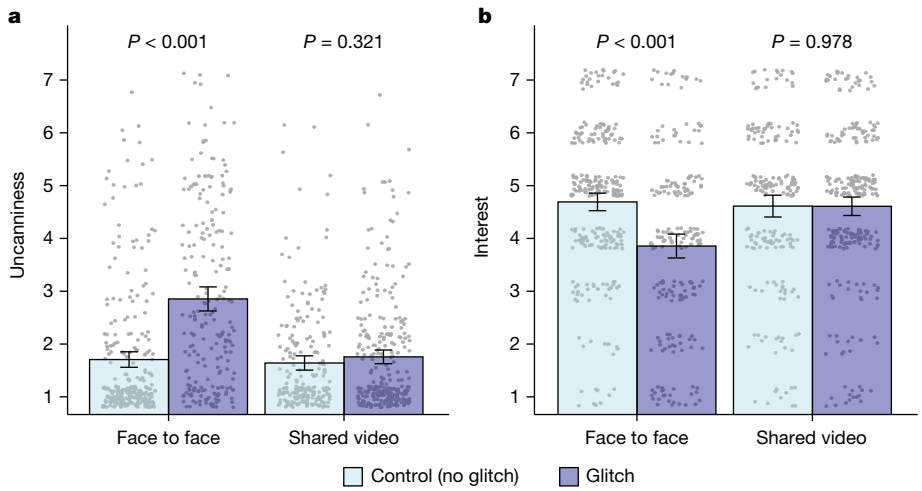

Figure 1 | Glitches affect people's opinions of a video caller negatively only when the call simulates an in-person, face-to-face interaction. People noticed glitches that were introduced experimentally in both a simulated face-to-face video call with a financial adviser and a 'shared screen' version of the call in which the adviser spoke over visual elements as if giving a presentation. **a**, **b**, When asked to rate uncanniness (through three associated characteristics, each rated 1–7), only participants who were shown the face-to-face, glitched version of the call reported that the adviser seemed uncanny (**a**), and expressed less interest (rated 1–7) in working with the person (**b**). Means, 95% confidence intervals and individual responses are shown for 484 participants. All statistical tests were two-sided, and no adjustments were made for multiple comparisons.

BEHIND THE PAPER

In our third study, we introduced glitches in face-to-face calls with a financial adviser and in shared-screen, presentation-style video calls, and compared their effect. We were testing a hunch that glitches were problematic because they interfere with something fundamental to human perception (rather than simply being annoying or interrupting conversations). As soon as we saw that the glitches were noticed by participants in both the shared-screen and face-to-face interactions but were harmful only in face-to-face video calls, we realized that we were onto something important and potentially new.

Notably, because the three of us are at different universities, we did not all meet in person for the first four years of the collaboration. Naturally, our research meetings were riddled with every glitch you can possibly think of.

J.R.R. and **M.S.B.**

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FROM THE EDITOR

We are moving many important interpersonal interactions online and this makes it easier for people to connect. But do the glitches inherent to video calls have negative consequences? This paper stood out to me because it answered this question with a rigorous study design. It documented the negative effects of such glitches on real-life outcomes and then used experimental data to explain what might have caused these effects.

Mary Elizabeth Sutherland, Deputy Editor, *Nature*