

Emotionally resonant vibrotactile comfort objects as a calming social anxiety intervention

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Credit: University of Glasgow

People who live with social anxiety could be given a helping hand to deal with their stress by the power of good vibrations, new research suggests.

Computing scientists and psychologists from the University of Glasgow have worked with socially anxious people to prototype a series of handheld "comfort objects" in a research study.

The study tested whether the objects, which pulse and vibrate in patterns that recall calming sensations like purring cats or the pitter-patter of raindrops, could offer [emotional support](#) during an anxiety-inducing presentation.

The results suggest that uniquely shaped handheld objects that vibrate in ways that evoke personal emotional resonance for people may help to reduce the intensity of their feelings of anxiety in social situations.

The finding, which builds on previous research into the potential benefits of tactile feedback technology as a way to regulate emotional distress, could inform the development of future devices designed to discreetly aid people in anxiety-creating social situations.

The researchers discuss the process of collaborating with volunteers to develop the prototypes in a paper [published](#) in the journal *ACM Transactions on Human-Computer Interaction*.

Dr. Shaun Macdonald, of the University of Glasgow's School of Computing Science, led the research. He said, "Social anxiety disorder can be a debilitating experience for the 12% of the population who will experience it at some point during their lives. It reduces their ability to function in everyday situations and negatively affects their quality of life.

"Listening to calming music or meditating, for example, can sometimes help people reduce their anxiety but it's not practical to put on headphones or find a quiet corner in the middle of most social situations.

"What we wanted to explore in this study was whether a handheld, silently-vibrating device could help reduce people's stress levels to help support them during social interaction without others noticing.

"The idea is drawn from other research which suggest that the feeling of vibration can help people reduce how quickly their heart beats or how fast they breathe during stressful situations. Other studies suggest that certain kinds of vibrations can induce calm by helping people recall emotional memories of the natural world."

In the first phase of the study, the researchers recruited 20 volunteers who reported living with social anxiety. They were tasked with making palm-sized objects of whatever shape they preferred using familiar crafting materials like Lego, clay and fake fur. Around half the prototypes were spherical, with the rest featuring hand grips, square shapes, or had modeled features like flower petals. Most had soft, fuzzy textures reminiscent of pets like cats or hamsters.

Then the researchers added different vibrations to the objects and asked the participants to pick a vibration style which helped them recall some kind of emotional connection to a calming feeling, like a cat purr, a small stream, or rain. Of the participants, 90% found their new vibrotactile object pleasant to hold, and 70% felt it helped to calm them.

In the second phase, the researchers built three more robust devices based on designs from phase one—a fluffy ball, a solid cube with different textures on each face, and a malleable tube shape. Each delivered more significant vibrations than the phase one prototypes.

The 29 subjects were asked to participate in an anxiety-inducing activity—delivering a three-minute presentation to others over Zoom. Half of the participants were allowed to hold a comfort object during their presentation while the other half had to speak without any devices to aid them. During the presentation, their physiological response to stress was measured with sensors. Afterwards, they were asked to report on how they felt while delivering their presentation.

While comfort objects didn't directly reduce physiological signs of anxiety for most testers, they did appreciably widen the range of their self-reported anxiety levels.

Dr. Macdonald added, "The feedback from participants showed that they appreciated being able to tailor their comfort objects to their own preferences for their shape and texture. They also felt that having the opportunity to pick a vibration that had an emotional meaning for them made it more likely to be able to reduce their anxiety."

Professor Stephen Brewster, also from the School of Computing Science, is a co-author of the paper. He said, "Technology offers us huge potential to deal with a wide range of physical and [mental health issues](#), but it's important that any new devices take into account the preferences and lived experiences of users right from the start.

"Although this is a small study, it suggests there is value in offering people discreet access to emotionally resonant vibrations during stressful situations to help reduce their discomfort. Further studies could help deepen our understanding of the benefits vibrotactile technology offers people living with [social anxiety](#) and lead to commercial products in the future."

Professor Frank Pollick, of the University of Glasgow's School of Psychology and Neuroscience, and Dr. Euan Freeman, of the School of

Computing Science, are co-authors on the paper.

More information: Shaun Macdonald et al, Prototyping and Evaluation of Emotionally Resonant Vibrotactile Comfort Objects as a Calming Social Anxiety Intervention, *ACM Transactions on Computer-Human Interaction* (2024). [DOI: 10.1145/3648615](https://doi.org/10.1145/3648615)

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