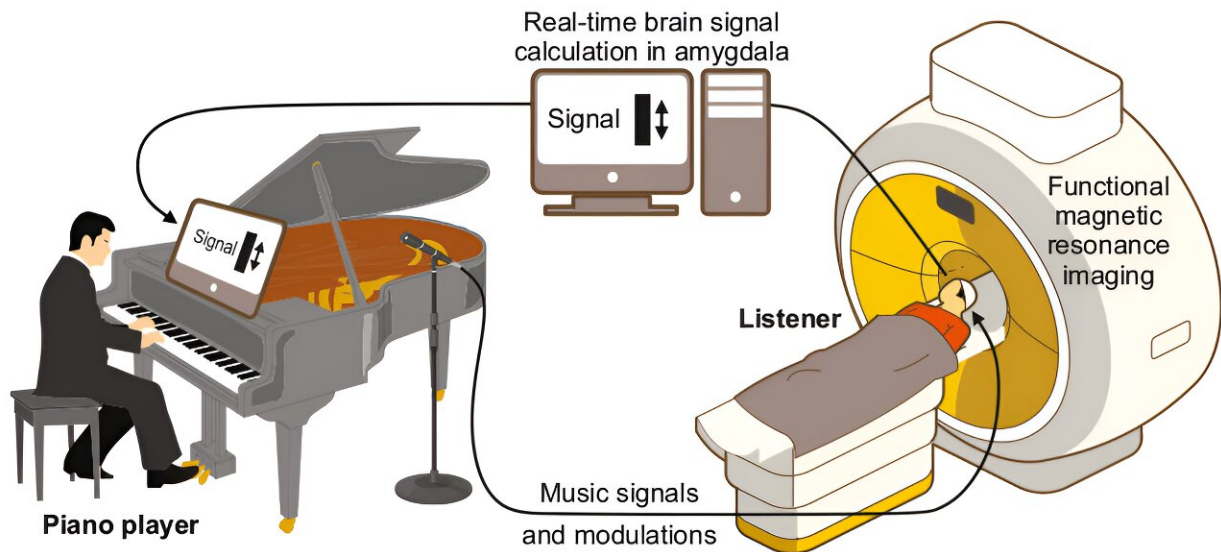


Live music emotionally moves us more than streamed music, show researchers

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The researchers conducted an elaborate experiment in which a pianist changed the live music he or she was playing to intensify the emotional reactions in the amygdala, the emotional center in the brain. Credit: UZH, Sascha Frühholz.

How does listening to live music affect the emotional center of our brain? A study carried out at the University of Zurich has found that live performances trigger a stronger emotional response than listening to music from a device. Concerts connect performers with their audience, which may also have to do with evolutionary factors.

Music can have a strong effect on our emotions. Studies have shown that listening to recorded music stimulates emotional and imaginative processes in our brains. But what happens when we listen to music in a live setting, for example, at a music festival, at the opera, or at a folk concert? Do our brains respond differently depending on whether the music we're listening to is live or streamed?

Live music stimulates the affective brain more strongly

A team of researchers at the University of Zurich led by Sascha Frühholz, professor of cognitive and affective neuroscience, has now explored this question. The researchers investigated the effects of [live music](#) and recorded music on emotional processes in the [human brain](#). They conducted an elaborate experiment in which a pianist changed the live music he or she was playing to intensify the [emotional reactions](#) in the amygdala, the emotional center of the brain.

During the experiment, the researchers used [magnetic resonance](#) imaging to measure the activity in the amygdala of the 27 listeners as well as the performer in real time. Based on these measurements, the pianist then immediately adapted his performance to intensify the audience's emotions further.

To compare reactions, the listeners were played a recording of the same music performed by the same musician but without the neurofeedback loop.

"Our study showed that pleasant and unpleasant emotions performed as live music elicited much higher and more consistent activity in the amygdala than recorded music. The live performance also stimulated a more active exchange of information in the whole brain, which points to

strong emotional processing in the affective and cognitive parts of the brain," says Frühholz.

The UZH researchers also analyzed how the piano music aligned with the audience's brain activity. A strong synchronization between subjective emotional experience and the auditory brain system, which assesses the music according to its acoustic quality, was only observed when the audience was listening to the live performance. Moreover, only live music showed a strong and positive coupling between features of the musical performance and brain activity in the listeners.

People have always used tools and instruments to make live music. It wasn't until [technological advances](#) in the early 20th century that music was able to be recorded on devices and made widely available to all people. Even today, though, despite music streaming platforms and high-quality loudspeakers and headphones, the social experience of attending a live concert cannot be replicated.

"This can perhaps be traced back to the evolutionary roots of music," says Frühholz. "People want the emotional experience of live music. We want musicians to take us on an emotional journey with their performances." Or, as the famous quote from the 1942 film *Casablanca* goes: "Play it once, Sam. For old times' sake."

The work is [published](#) in the journal *Proceedings of the National Academy of Sciences*.

More information: Trost, Wiebke et al, Live music stimulates the affective brain and emotionally entrains listeners in real time, *Proceedings of the National Academy of Sciences* (2024). [DOI: 10.1073/pnas.2316306121](https://doi.org/10.1073/pnas.2316306121). doi.org/10.1073/pnas.2316306121

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