Why language and music develop over generations

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The ability to acquire and reproduce music and language varies from person to person because brains are organised differently. This is shown by new brain research from Aarhus University, which also explains why language develops over time, so that people speak differently today than in the 1970s.

In the game of Telephone, a sentence changes into something entirely different after being passed from person to person a few times. The same is true of language and music. The change becomes clear when looking back a couple of generations.

Until now, the fact that spoken language and music from just a few decades ago sounds different to us today has been attributed to cultural development. A new research project now shows that the cause should also be found in our brains.

Brain scans while listening to music

In a research project, 52 people had their brains scanned to localise the communication that takes place between different areas of the brain while we listen to music. They were also subjected to a test that resembles a childhood game of Telephone, in which they had to listen to tones and reproduce them.

The tones were from a scale which the participants had never heard

before, known as the Bohlen-Pierce scale, which is often used in research and is an alternative to the octave-based scale that the majority of Western music is composed around. This ensured that none of the participants recognised the melodies they had to learn.

"We were able to see differences in how the brains of the participants functioned during the scan, and this was also shown in the way that the participants received and communicated music. Some of them altered the music a lot when they reproduced it, others only a little. This shows that we do this differently depending on how our brains are organised," says Assistant Professor Massimo Lumaca from the Center for Music in the Brain at Aarhus University.

Shilopsi—yeah, yeah, yeah

The result helps to explain why both music and language evolve over generations.

"The study has shown us how our individual brain architecture affects our communication. This is the scientific explanation for the development of human language and musical expression all over the world. At the same time, it helps explain why some people are more creative than others, because they alter the input they receive and take it in a new direction," says Peter Vuust, professor at the Center for Music in the Brain at Aarhus University, who also participated in the project.

The development is almost invisible because it takes place over an extended period of time. But it is reminiscent of the process that small children go through when they learn to talk. Or when someone learns a new language.

"When children try to say what they think adults are saying, they often invent new—and funny—words. The individual interpretation is very

clear when this happens. If we didn't correct them, this would develop our language. Many people also remember how children sang songs in another language before they were actually able to speak it. For example, growing up in Denmark, the Beatles chorus in 'She loves you' became 'Shilopsi' when I sang it as a child. Now we know that this paraphrasing has a connection to the auditory cortex," says Peter Vuust.

More information: Massimo Lumaca et al. Functional connectivity in human auditory networks and the origins of variation in the transmission of musical systems, *eLife* (2019). DOI: 10.7554/eLife.48710

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