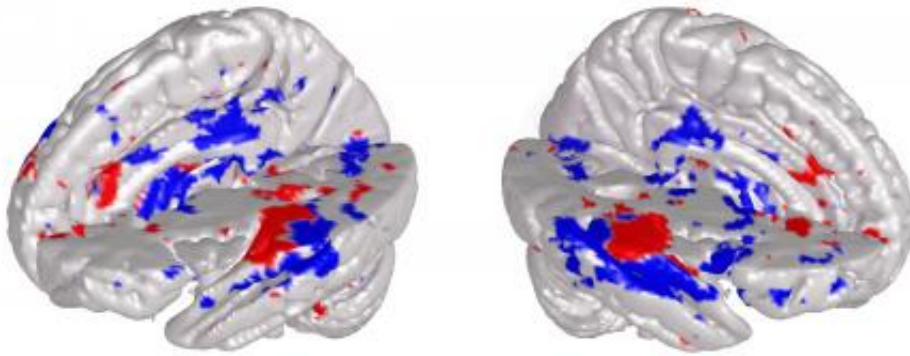# Musical brain-reading sheds light on neural processing of music

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Finnish and Danish researchers have developed a new method that performs decoding, or brain-reading, during continuous listening to real music. Based on recorded brain responses, the method predicts how certain features related to tone color and rhythm of the music change over time, and recognizes which piece of music is being listened to. The method also allows pinpointing the areas in the brain that are most crucial for the processing of music. The study was published in the journal *NeuroImage*.

Using functional magnetic resonance imaging (fMRI), the research team at the Finnish Centre of Excellence in Interdisciplinary Music Research in the Universities of Jyväskylä and Helsinki, and the Center for

Functionally Integrative Neuroscience in Aarhus University, Denmark, recorded the [brain responses](#) of participants while they were listening to a 16-minute excerpt of the album Abbey Road by the Beatles. Following this, they used computational algorithms to extract a collection of musical features from the musical recording. Subsequently, they employed a collection of machine-learning methods to train a computer model that predicts how the features of the [music](#) change over time. Finally, they develop a classifier that predicts which part of the music the participant was listening to at each time.

The researchers found that most of the musical features included in the study could be reliably predicted from the brain data. They also found that the piece being listened to could be predicted significantly better than chance. Fairly large differences were however found between participants in terms of the prediction accuracy. An interesting finding was that areas outside of the auditory cortex, including motor, limbic, and frontal areas, had to be included in the models to obtain reliable predictions, providing thus evidence for the important role of these areas in the processing of musical features.

"We believe that decoding provides a method that complements other existing methods to obtain more reliable information about the complex processing of music in the [brain](#)", says Prof. Petri Toiviainen from the University of Jyväskylä. "Our results provide additional evidence for the important involvement of emotional and motor areas in music processing."

Provided by Academy of Finland

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