

Emotional and physical pain sufferers prescribed a dose of music

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The computer software in action

New research into how music conveys emotion could benefit the treatment of depression and the management of physical pain.

Using an innovative combination of [music](#) psychology and leading-edge audio engineering the project is looking in more detail than ever before at how music conveys emotion.

The project, at Glasgow Caledonian University is supported by the Engineering and Physical Sciences Research Council.

The research could lead to advances in the use of music to help regulate a person's mood, and promote the development of music-based therapies to tackle conditions like depressive illnesses. It could help alleviate symptoms for people who are dealing with physical pain and even lead to

doctors putting music on a prescription that is tailored to suit the needs of an individual.

“The impact of a piece of music on a person goes so much further than thinking that a fast tempo can lift a mood and a slow one can bring it down. Music expresses emotion as a result of many factors,” says audio engineering specialist Dr. Don Knox, project leader. “These include the tone, structure and other technical characteristics of a piece. Lyrics can have a big impact too. But so can purely subjective factors: where or when you first heard it, whether you associate it with happy or sad events and so on. Our project is the first step towards taking all of these considerations - and the way they interact with each other - on board.”

Raymond MacDonald, Professor of Music Psychology at Glasgow Caledonian University, is also playing a central role in the initiative.

The team has already carried out an unprecedentedly detailed audio analysis of pieces of music, identified as expressing a range of emotions by a panel of volunteers.

Each volunteer listens to pieces of previously unheard contemporary popular music* and assigns each one a position on a graph. One axis measures the type of feeling (positivity or [negativity](#)) that the piece communicates; the other measures the intensity or activity level of the music. The research team then assess the audio characteristics that the pieces falling into each part of the graph have in common.

“We look at parameters such as rhythm patterns, melodic range, musical intervals, length of phrases, musical pitch and so on,” says Dr. Knox. “For example, music falling into a positive category might have a regular rhythm, bright timbre and a fairly steady pitch contour over time. If tempo and loudness increase, for instance, this would place the piece in a more ‘exuberant’ or ‘excited’ region of the graph.”

The team are now about to start their assessment of the impact of lyrics, and then hope to focus on how individuals use and experience music at a subjective level.

The ultimate aim is to develop a comprehensive mathematical model that explains music's ability to communicate different emotions. This could make it possible, within a few years, to develop computer programs which identify pieces of music that will influence a individual's mood (e.g. to motivate them when exercising or when revising for exams), meet their emotional needs and help them cope better with [physical pain](#).

“By making it possible to search for music and organise collections according to emotional content, such programs could fundamentally change the way we interact with music,” says Dr. Knox. “Some online music stores already tag music according to whether a piece is ‘happy’ or ‘sad’. Our project is refining this approach and giving it a firm scientific foundation, unlocking all kinds of possibilities and opportunities as a result

Provided by Engineering and Physical Sciences Research Council

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