RESEARCH highlights

MUSIC ON PRESCRIPTION COULD HELP TREAT EMOTIONAL AND PHYSICAL PAIN

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

The project team, based at Glasgow Caledonian University and supported by the EPSRC, is using an innovative combination of music psychology and leading-edge audio engineering to look in more detail than ever before at how music conveys emotion.

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.

COMMUNICATING DIFFERENT EMOTIONS

“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 and project leader Dr Don Knox. “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.”

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.

A LYRICAL IMPACT

“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 MATHEMATICAL MODEL THAT EXPLAINS MUSIC’S ABILITY TO COMMUNICATE DIFFERENT EMOTIONS.
People respond to music in different ways.

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 an 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.”

* Music classified by the volunteers consists of contemporary popular music not available on general release, in order to eliminate any personal, subjective connotations any of the pieces may have for the volunteers. “This focus on popular music is an innovative feature of our project as previous studies on music’s emotional content have concentrated on classical music,” says Dr Knox. “We think concentrating on popular music is important as our work could have important implications for the use of personal music players and on how people interact with their music collections.”

15% of people have a bout of severe depression at some time in their lives.