

Music as medicine

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Katie Silver



IMAGE: JONI MITCHELL'S INTIMATELY PERSONAL MUSIC ALLOWED HER FANS TO CONNECT WITH THE SINGER. (MICHAEL PUTLAND/GETTY IMAGES)

Music can be more effective than anti-anxiety or pain relief drugs and can help recovery from severe brain trauma by reconnecting neural pathways to retrieve memories or language lost. As **Katie Silver** writes, it's also simply a good pick-me-up.



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How does the brain perceive music?

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A young fan of Joni Mitchell once told the singer, 'before Prozac there was you'. Music has long been used to self-medicate. On a rough day you might try to boost your mood with some upbeat pop, or wallow with Norah Jones.

'Music moves us because it serves as a metaphor for emotional life,' says Daniel Levitin, one time rock musician and record producer turned neuroscientist.

'It has peaks and valleys of tension and release. It mimics the dynamics of our emotional life.'

Mr Levitin is a professor of psychology and neuroscience at McGill University in Montreal, Canada. He argues that music arouses feelings and emotions better than language can.

'Language tends to be representational, it tends to be very concrete,' he says, adding that music, by contrast, is more metaphorical—and that ambiguity lets it mean different things to different people.

Music can also tug on one's heartstrings by acting as a retrieval cue for certain memories. That is, as a bait to recall a particular memory.

Many songs tend to be associated with a very particular time in our lives, says Mr Levitin, pointing to the fact that most pop songs of the past half-century have had very brief shelf-lives.

'That's exactly what you want in a retrieval cue, because it is uniquely associated

Even if you've got damage in some areas of the brain, because rhythm is processed so diffusely across the brain, it's still an avenue for accessing rehabilitation pathways.

JEANETTE TAMPLIN, MUSIC THERAPIST

with a time and place and with other memories of your life.’

This helps explain why people with Alzheimer's disease or some forms of dementia can often remember songs from their teenage years.

Mr Levitin puts this down to how music is represented in the brain:

What determines musical taste?

From the womb - Familiarity: Musical tastes begin to form in the womb based on what the foetus is exposed to. By the age of one, babies show a preference for the music they heard during this time.

Childhood - Cultural: Different cultures have different musical rules. For example, Western music has the same 12 tones, the same scale, and the same rules, regardless of whether it's heavy metal, classical, jazz, country or pop. The music of other cultures, such as Indian, Aboriginal Australian or Chinese, each has its own scales and rules. We internalise the rules of the music we grow up with and form preferences within that system.

Teen years – Social identity: During adolescence we tend to gravitate towards music that helps to brand us and our social identity.

‘Music has all these different components; there's melody, there's rhythm, there's the lyrics, there's the tempo, the pitches, the harmony.

‘And we now know that these are served by different neural networks, different regions of the brain.

‘So there are these multiple reinforcing and redundant cues within memory. You may not be able to access all of them but if you can get just a few they trigger the others.’

Music activates more regions of the brain than almost anything else we know about. Two of the major ones are:

Brodman area 47 in the prefrontal cortex: Helps us to form expectations about what's going to happen in the world. It is very active when we listen to music, trying to predict what's going to come next.

Cerebellum: Latin for ‘little brain’ this bundle of fibres is—among other things—the

brain's central timekeeper. It discerns whether sounds are happening with metronomic robotic regularity or not. It is also very connected with the seats of human emotion—the frontal cortex and the limbic system—meaning it acts as a gateway to emotion.

Jane Davidson, of the ARC Centre of Excellence for the History of Emotions, agrees there is a strong connection between music and emotion.

She believes that having music as a strong presence throughout our lives is invaluable.

One example of this is extraordinary New York composer Tobias Picker, who suffers from Tourette's Syndrome.

After being given his first piano at age eight, Mr Picker's behaviour improved dramatically.

'My teachers commented on my report cards that there was a change in me ever since the piano came into my house,' he says.

'I could vent my emotions through playing the piano, especially my rage. I was very good at playing loud, fast, angry music.'

He adds that being able to dominate and control 'the king of instruments' became a compensation for his inability to control the tics.

As in the case of Tobias Picker, Daniel Levitin and his colleagues at McGill University believe that music has huge potential in therapeutic settings to contribute to our greater health and wellbeing.



The music in your brain

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In their recently published paper, 'Music and Neurochemistry: Evidence for

Health Outcomes,' they cite findings that which show music is a more effective relaxant than Valium, and that it can increase your physiological pain threshold. That is, you feel less pain when you are listening to music that you like.

According to Jane Davidson, this begins right from the start of our lives, with music serving a nurturing function during infancy.

As mothers 'goo' and 'ga' they are interacting with their babies on a sound-level, she says.

Practitioners in the growing field of musical therapy use music in a clinical setting to heal a range of physical injuries.

For example, if a stroke patient has impaired capacity in a hand and they wish to re-establish that neural pathway, drumming can be effective as the rhythm gives the client a fixed target and something to work towards. Singing has also proven useful for people with speech disorders.

In melodic intonation therapy, practitioners use singing to try to recover a patient's speech, Ms Davidson says.

The information for speech and singing is stored and used in a different part of the brain to speech, she says.

'Eventually, you get a crossover and some transference back to the capacity to speak,' said Ms Davidson.

Jeanette Tamplin is a music therapist at Royal Talbot Rehabilitation Hospital in Melbourne.

'Everything that we do is based on rhythm,' says Ms Tamplin.

She explained that, while the cerebellum might be involved in the coordination of movement, rhythmic processing is a whole-brain activity.

'Even if you've got damage in some areas of the brain, because rhythm is processed so diffusely across the brain, it's still an avenue for accessing rehabilitation pathways.'

Among others, Ms Tamplin has used Bob Dylan, Pink Floyd and the Beatles in helping her patient Mark recover following a severe stroke.

'We were singing, "Knock, knock, knocking on heaven's door," and he managed to come out with the last word,' she says.

'And then over time we've just gradually built on that, so now he can sing whole songs.'

This therapy has improved Mark's language skills outside singing, along with his mood.

'As his partner I can see that there is actual genuine pleasure,' says Louisa, who has been with Mark for 17 years.

'His vocabulary has really expanded, which is very special. Before we came here to the Talbot, Mark wasn't speaking at all.'

Ms Tamplin also uses song writing to help people who have had a traumatic injury adjust to change.

She says it's particularly useful for young male patients, who are more likely to be affected by spinal injuries, and can find it difficult to express themselves emotionally.



The power of music

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Another of Ms Tamplin's patients is Annie, a young girl in the spinal injury unit who had a severe car accident caused by a suspected aneurysm.

Over a six week period, Ms Tamplin's patients write three songs, looking at the past, present and future respectively. Annie has just finished her first song, which looks at who she was before the accident:

'It's interesting looking back at what I had... I think I'm a better person now,' says Annie.

She says the process has also improved her memory and concentration, describing the process as 'lovely' and 'amazing'.

Like Annie, Joni Mitchell wrote music about herself in a way that was very self-disclosing. Daniel Levitin says Joni Mitchell's work was intimately personal, making it universal.

'I think when we are sad... one of the things that happens is that we feel alone and misunderstood,' he says.

'Then we listen to someone who has been through that mess talk about it in an articulate and sensitive way and we no longer feel alone.

'There's this wonderfully therapeutic effect of the sad music that picks you up.'

Find out more with Lynne Malcolm, at All In The Mind.

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