Why your brain craves Beethoven

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We all know that music has the power to move us, to trigger a staggering range of emotions, tell stories, calm us, make us dance, make us cry - but how, exactly, does music do it? A special performance called "Beethoven and Your Brain" explored that question earlier this week in front of a sell-out audience at the Royal Conservatory's Koerner Hall in Toronto. The event was billed as a "first-of-its-kind partnership" between an orchestra, a conductor and a neuroscientist.

The neuroscientist was Daniel Levitin, a psychologist at McGill University and author of the bestsellers This is Your Brain on Music and The World in Six Songs. He was joined onstage by the Kitchener-Waterloo Symphony and its conductor, Edwin Outwater. Together they took the audience a guided tour of Beethoven's Fifth Symphony, perhaps the best-known work in the Western musical canon. Audience members were given electronic "clickers" with which they could respond to Levitin's questions and voice their own reactions to what was being played; the results were displayed on a giant screen in real time.

"Everyone knows the symphony's famous opening - the "da da da dummm" - but most of us, in all likelihood, haven't stopped to think about how Beethoven's repeated use of that motif works its magic on us so effectively. It's not just that the dramatic notes grab our attention, Levitin says; it's the way the composer employs it again and again, but in different guises, varying the key..."
and the tempo and even the instruments that produce it. (The orchestra, at Outwater's command, played key snippets of the symphony to highlight specific examples.) Interestingly, this repetition works even if the listener has no idea what's going on, Levitin says. The reason, he argues, is that our brains are hard-wired to seek out such patterns, wherever they may occur.

In one of the more dramatic demonstrations of the evening, the orchestra was asked to play that opening motif three times - twice in the wrong key and once in the correct one. The audience was quizzed, via those electronic clickers, to see if they could identify the correct version. A whopping 97 per cent got it right, even though most audience members had no musical training. (I'm happy to report that I got it right, too - even though I know nothing about musical theory, can't play any instruments, and can not really tell you what a "key" is, except that it has something to do with pitch.)

Your brain, Levitin says, is constantly trying to predict what will come next in any musical composition. We want to be reassured, but also, on occasion, surprised - and so the best composers set "rules" for their compositions and then proceed to violate those rules here and there. In the symphony's quieter second movement, for example, we feel a sense of calm - the movement "is more like a backrub than a boxing match," Levitin says - and yet the opening motif is still lurking in the background. Even if we're not consciously aware of the repetition, our brains respond to it.

The audience seemed to relish every moment of the performance, which was part concert, part science lecture, and part "interactive Beethoven love-in". Those who were hoping for some hard-core neuroscience, though, may have been somewhat disappointed. Levitin showed just a few brain diagrams, and briefly mentioned the role of brain structures such as the amygdala and the prefrontal cortex. (The amygdalae, for example, are activated when we respond to something emotionally; those same structures "light up", so to speak, when we hear the symphony's opening motif.)

As for why our brains react the way they do when we hear certain kinds of music, Levitin believes he has at least part of the answer: evolution. Musical patterns closely resemble patterns of speech, he says, and music may have been just as important as spoken language in binding early human communities together. It's no surprise, then, that an appreciation for music passed on from generation to generation. (Indeed, Levitin suggests that music may even predate speech.)

Not everyone shares that view. Cognitive scientist Steven Pinker has referred to music as an "epiphenomenon" - that is, something that has no adaptive value on its own, but merely evolved as a byproduct of other, more useful, traits; he once described music as "auditory cheesecake". For Levitin, though, it's just the opposite; music, he argues, lies as close to the core of the human experience as anything that distinguishes our species from the rest of the animal kingdom. Human beings, he says, "are a highly musical species, and our brains are literally wired to absorb, produce, and appreciate music".

Although the Toronto event was billed as a one-off production, two more performances are scheduled for later this month in Kitchener-Waterloo, Ontario, and Levitin's publicist hinted in an e-mail that additional concerts are a possibility. In fact, seeing Levitin and Outwater hamming it up on stage together, it almost seemed as though they had been practicing a routine; even if an all-out "music and the brain" tour isn't in the cards, it does seem like they're planning something. "We might do 'Mozart and the Mind' next time," Outwater joked as they left the stage.
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