What makes music sound so sweet (or not)

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Ever since ancient times, scholars have puzzled over the reasons that some musical note combinations sound so sweet while others are just downright dreadful. The Greeks believed that simple ratios in the string lengths of musical instruments were the key, maintaining that the precise mathematical relationships endowed certain chords with a special, even divine, quality. Twentieth-century composers, on the other hand, have leaned toward the notion that musical tastes are really all in what you are used to hearing.

Now, researchers reporting online on May 20th in Current Biology think they may have gotten closer to the truth by studying the preferences of more than 250 college students from Minnesota to a variety of musical and nonmusical sounds. "The question is, what makes certain combinations of musical notes pleasant or unpleasant?" asks Josh McDermott, who conducted the studies at the University of Minnesota before moving to New York University. "There have been a lot of claims. It might be one of the oldest questions in perception."

The University of Minnesota team, including collaborators Andriana Lehr and Andrew Oxenham, was able to independently manipulate both the harmonic frequency relations of the sounds and another quality known as beating. (Harmonic frequencies are all multiples of the same fundamental frequency, McDermott explains. For example, notes at frequencies of 200, 300, and 400 hertz are all multiples of 100. Beating occurs when two sounds are close but not identical in frequency. Over time, the frequencies shift in and out of phase with each other, causing the sound to wax and wane in amplitude and producing an audible

"wobbling" quality.)

The researchers' results show that musical chords sound good or bad mostly depending on whether the notes being played produce frequencies that are harmonically related or not. Beating didn't turn out to be as important. Surprisingly, the preference for harmonic frequencies was stronger in people with experience playing musical instruments. In other words, learning plays a role—perhaps even a primary one, McDermott argues.

Whether you would get the same result in people from other parts of the world remains to be seen, McDermott says, but the effect of musical experience on the results suggests otherwise. "It suggests that Westerners learn to like the sound of harmonic frequencies because of their importance in Western music. Listeners with different experience might well have different preferences." The diversity of music from other cultures is consistent with this. "Intervals and chords that are dissonant by Western standards are fairly common in some cultures," he says. "Diversity is the rule, not the exception."

That's something that is increasingly easy to lose sight of as Western music has come to dominate radio waves all across the globe. "When all the kids in Indonesia are listening to Eminem," McDermott says, "it becomes hard to get a true sense."

More information: McDermott et al.: “Individual Differences Reveal the Basis of Consonance.” Publishing in Current Biology 20, 1-7, June 8, 2010. DOI 10.1016/j.cub.2010.04.019

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