Have scientists found a secret chord for happy songs?

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Credit: AI-generated image (disclaimer)

In the BBC radio comedy show I'm Sorry I Haven't A Clue, panellists are sometimes asked to sing "one song to the tune of another". Hilarious results ensue when the words of one song fit the rhythm and metre of the other but they have completely different sentiments: Jabberwocky and Jerusalem, for example. The game works because audiences recognise

the disconnect between the sentiment of the lyrics and the music. Everyone knows that a good tune needs not just to fit the rhythm of the words but to convey something appropriate to their meaning.

We can explain the meaning of lyrics by looking at their component words and grammatical structure. But how do we explain the meaning of music? What does the music of, say, Leonard Cohen's Hallelujah convey? Some people think if we gather enough data to answer these questions then we might be able to program a machine to work out what our ears tell us with ease: that Jerusalem is rousing and Singin' in the Rain is joyful.

New research published in the journal *Royal Society Open Science* attempts to tackle this issue by investigating the links between the emotions of lyrics and the musical elements they are set to. While the methods used are sophisticatedly statistical, the conclusions are extremely dry. The finding that a single chord type is most associated with positive lyrics is a huge simplification of the way that music works, highlighting the sheer scale of the challenge of creating a machine that could understand and compose music like a human can.

The data came from combining information from three large-scale public sources, two of them originally intended for entirely different purposes. The authors downloaded the lyrics and chord sequences of nearly 90,000 popular songs from Ultimate Guitar, a longstanding community website where users upload their own transcriptions of music.

To match the lyrics of the songs to emotions, the researchers took data from labMT, a crowd-sourced website that rates the emotional valence of words (the degree to which they represent good or bad feelings). The details of when and where the songs originated from were taken from Gracenote, the same database as your music player probably uses to

show artists' information.

By correlating the valence of words with the type of chord accompanying them, the authors confirmed that major chords were associated more with positive words than minor chords. Unexpectedly, they found that seventh chords – chords with four different notes rather than the usual three – had an even higher association with positive words, even in the case of minor seventh chords. This is in constrast to other studies which have placed the valence of seventh chords between minor and major.

Quantitative studies like this of music and emotion are becoming increasingly common and popular, using ever larger quantities of data. The most highly cited articles in Journal of New Music Research (which I edit) are of this type. They sometimes provoke amazement that art, often set in opposition to science, can be explained by numbers. And sometimes they provoke fear that soulless machines are invading the territory of human creativity.

Counting things is a proven way of making discoveries in other domains, so we shouldn't be surprised this is so in music also. And those who are frightened of the musical machines need to be aware that it is too late: they are among us already. Look, for example, at Microsoft's Songsmith. My fear, instead, is that humans will make do with poorly made musical machines. We should not ignore the knowledge of centuries of music theory just because we have shiny new data science tools.

The authors of this new paper come from a university (Indiana) with one of the largest music schools in the US, but they all worked in the Department of Informatics. While they thank some members of the music school for discussions, the sophisticated statistical analysis in this article is not matched by a depth of music theory.

More than decoration

Seventh chords are not interchangeable with major and minor chords. They have a particular musical function and occur at different places in a phrase, just as adjectives have a different function from nouns. The authors claim their approach of using the words of vocal music as a key to its emotional content is novel, but this is not the case. One of the most influential books on music and emotion in its day, The Language of Music by Derek Cooke (1959), used exactly that approach. Alas for modern universities, where researchers' universes seem to have been shrunken to their own particular disciplines.

We should beware the lazy assumption that words carry the true meaning of a song and music and the rest are just feelings, to be applied like cake decorations. Music has its own elements and structures, and speaks in many ways. The experience of music is so much more than just its sounds.

Quantitative studies have huge potential to help understand these processes, but they need to treat the music in the light of what we know about it as music. After all, the meaning of the music of Leonard Cohen's Hallelujah seems clear. If only the same could be said about the words.

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