Study finds solos twice as common in sad songs

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Music can transport a spirit from sullen to joyful. It can bring a concertgoer to unexpected tears. But the details of just how that connection between performance and emotion works remain largely

mysterious.

A new study helps illuminate the ways in which a composer might intentionally impart sadness into the lines of an orchestral piece. Here's a clue: It doesn't take much.

The solo player proves to be an important element of the kind of songs that tighten our throats and leave us searching for a tissue mid-performance, found a study led by Niels Chr. Hansen of The Ohio State University.

Orchestral passages with sad characteristics are twice as likely to feature solos, found the study, which appears in the journal *Music Perception*.

"Composers make creative choices about their pieces based on a wide variety of factors, but one of the possible reasons for solos may be that they convey feelings of isolation, loneliness or vulnerability," said Hansen, a postdoctoral researcher in Ohio State's Cognitive and Systematic Musicology Laboratory.

One need look no further than this performance of John Williams' "Schindler's List," and its violin and English horn solos, to understand the emotional power of the solo, said Hansen, who is also part of the university's Center for Cognitive and Brain Sciences. Popular music employs the same technique to the same effect, he said, offering the example of the guitar solo, played here by Prince, in The Beatles' "While My Guitar Gently Weeps."

Hansen and study co-author David Huron, professor of music, wanted to apply science to that music-emotion connection to better understand the theory behind the use of the solo instrument in an orchestral composition, Hansen said.

They focused on 11 instruments featured on an orchestral excerpts website called orchestraexcerpts.com.

The researchers characterized 330 randomly selected excerpts as solos or not solos and then independently analyzed the same passages based on seven musical features previously linked to sad affect. Those include mode (the use of major or minor key), tempo, dynamics, articulation, rhythmic smoothness, relative pitch height and pitch range.

Passages that were characterized as sad/relaxed were twice as likely—74 percent, compared to 37 percent of non-sad excerpts—to include a solo performance.

The researchers followed up this comparison with another statistical analysis to determine if the seven "sad" factors could predict the likelihood of a solo. As a whole, they did. But when the music theorists separated the factors, only two independently predicted the likelihood of a solo in the musical passage—legato articulation (meaning the notes are smooth and connected) and quiet dynamics.

Though composers have a variety of reasons for including solos in their pieces, this study suggests that imparting a sad quality is likely to be one of them, Hansen said.

He said he was particularly interested in looking at solos in orchestral pieces because composers have such great latitude when deciding which instruments—and how many—to assign to a given passage.

"Composers have all the colors of the musical rainbow available to them and it's interesting to study how and why they pick which ones to use," Hansen said. "Music impacts us deeply and I'm interested in understanding some of the mechanisms behind that."

Previous work by Huron and other colleagues from Ohio State ranked instruments based on their capacity for conveying sadness, and many of the saddest ones are commonly featured in solos in somber compositions. At the top of the list: the cello, the human voice, the violin, the viola and the piano. Percussion instruments including the tambourine and snare drum fell at the bottom of the pack as the least suitable for conveying sadness.

More information: Niels Chr. Hansen et al, The Lone Instrument, *Music Perception: An Interdisciplinary Journal* (2018). DOI: 10.1525/mp.2018.35.5.540

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