

## **Mozart's gift of perfect pitch may not be so rare after all, according to new UC San Diego study on musical perception**

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At the tender age of seven, Wolfgang Amadeus Mozart displayed extraordinary musical talent, including perfect or absolute pitch, the remarkable ability to instantly name a musical note that one has just heard. Perfect pitch, a highly coveted faculty among musicians, has always been thought to be a rare occurrence, appearing in less than one per 10,000 people.

However, a new study by University of California, San Diego Psychologist Diana Deutsch, presented today at the annual meeting of the Acoustical Society of America in Columbus, Ohio, suggests that perfect pitch may not be so rare, and that it even could be universally attainable at an early age.

In her study, Deutsch, who specializes in musical perception, has found that perfect pitch is common among native speakers of tonal languages such as Mandarin Chinese and Vietnamese. The study tested seven Vietnamese and 15 Mandarin native speakers with little or no musical training. In a series of experiments, Deutsch found that the speakers displayed remarkably precise absolute pitch when asked to read lists of words in their native language.

"Our findings show that speakers of Vietnamese and Mandarin possess an extraordinarily precise form of absolute pitch, which is reflected in their enunciation of words," said Deutsch. "Since all except one of the subjects in the study had received little or no musical training, we conclude that this ability resulted from their early acquisition of tone language, and that they had learned to associate pitches with meaningful words very early in life."

According to Deutsch, while there have been various theories among musicians and scholars as to the genesis of perfect pitch, these hypotheses have all been equivocal. Some have argued that perfect pitch is an inherited trait, while others have claimed that it can only be attained with musical training at an early age. While previous studies indicate that there may be genetic predisposition for perfect pitch, Deutsch's findings show that there is likely great potential for the acquisition of this trait, especially considering that one-third of the world's population speaks in tonal languages.

The ability to judge one note in relation to another, known as relative pitch, is fairly common, at least among musicians. Most musicians have no difficulty identifying notes when they are played one after the other in a sequence, and in fact, it would probably be impossible to be a good musician without a keen sense of relative pitch. Mozart's perfect pitch, however, was evinced in his uncanny ability to identify instantaneously the note of virtually any sound, whether it be a clock or pocket watch striking, a note being played on the pianoforte, or the tolling of a church bell.

"For people with absolute pitch," said Deutsch, "naming a note is as simple and immediate as, say, naming an object's color. For most people, absolute pitch has always seemed a mysterious and extraordinary gift that one is either born with or extremely difficult to acquire. Now we know that this isn't necessarily true."

Much of listening to music, according to Deutsch, involves drawing on our memories and expectations and then confirming or disconfirming them. Composers such as Mozart constantly made use of this perceptual characteristic. For example, when composing musical themes and variations, the variations often become more and more removed from the theme as the piece progresses. But, since we know what basic structure to refer to, since we've heard it at the beginning, we have no real difficulty in perceiving the relationships between the different parts of the piece.

"Interestingly, what you hear appears to reflect what's on your mind," explained Deutsch. "Absolute pitch can be described as an unusual form of memory. The possessor has acquired long term representations of the notes of the scale along with their names. This brings up questions about how we generally store pitches in memory when absolute pitch is not involved. What happens, for example, when you play a tone, then wait for five seconds, (during which time different sounds are played), and then play another tone that's either the same in pitch as the first or a semitone removed."

In previous research, Deutsch has shown that most people are able to use some form of perfect pitch in perceiving music, even though they are unable to consciously categorize musical notes by their name. People also seem to use this form of perfect pitch in speech communication.

Recognized as a top authority on musical perception, Deutsch was the first researcher in the field to establish a direct correlation between music perception and the production of speech and language. In 1983, Deutsch discovered what is now known as the tritone paradox, which established that different cultural groups often perceive identical notes of music differently. In previous work, she has identified other musical illusions, and has found that differences in how we perceive music can also differ depending on biological factors such as whether we are right-handed or left-handed.

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