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Do you hear what I hear?

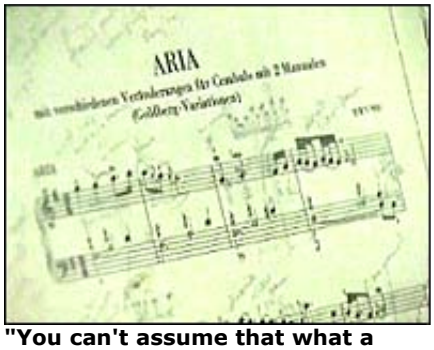
What one person hears in music isn't necessarily what another person hears, according to Dr. Deutsch

By Steven Hunt, March 5, 1997

Music is a highly subjective thing. No one denies that. What one person claims to be a near-perfect symphonic performance, another individual may view as a musical disaster. Yet with two such divergent opinions about the same piece of music, they can't *both* be right. Or *can* they? Some fascinating research in the field of music perception is suggesting that our brains are *not* all tuned to the same frequency, so to speak.

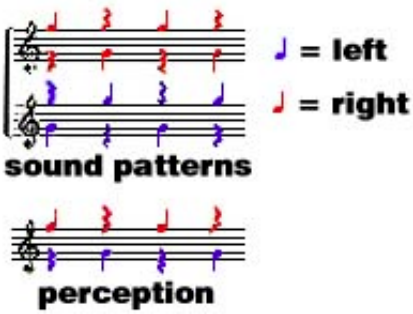
Dr. Deutsch giving presentation, complete with sound effects, at AAAS meeting in Seattle this week

Dr. Diana Deutsch, a pioneer in the field of musical illusions and our perception of them, has been studying why we don't all necessarily hear the same piece of music in the same way. Deutsch, a professor of psychology at the University of California in San Diego, presented her most recent findings to the *American Association for the Advancement of Science* annual meeting in Seattle this past week. "Since the time of the ancient Greeks, philosophers and musicians have speculated that strong ties must exist between speech and music," she said in her speech to the AAAS, "however, explicit connections between the two have been difficult to establish." Yet Deutsch has, in her over 25 years devoted to the study of this topic, focussed on this connection and what it all boils down to.



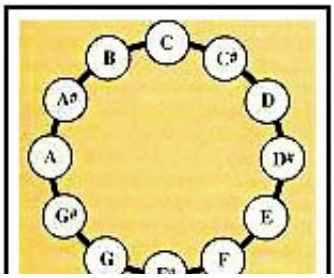
"You can't assume that what a person's going to hear is the same as what's on a written score."

"One group of illusions occur when two simultaneous streams of tones are presented, one to the right ear and the other to the left," she explains. "There are striking differences between individuals in how these illusions are perceived." She suggests that some of these illusions are a result of the way our brains receive and process the information - and that's where the arguments between two people listening to the same music come into play. But Deutsch says she can explain *some* of the discrepancies.

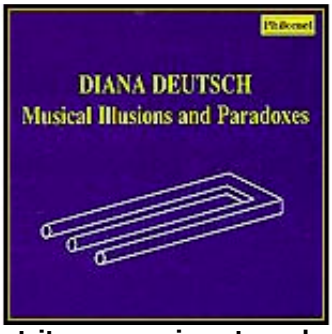


The pattern that produces the octave illusion and a way that it is often perceived

"Perceptual disagreements tend to arise between righthanders and lefthanders, indicating that they reflect variations in innate brain organization," she remarks. "In general, on listening to such patterns, righthanders tend to hear higher tones in their right ear and lower tones in their left ear regardless of where the tone is indeed coming from." The same cannot be said for lefthanders, however.



"Experimental findings indicate that these illusions are perceived in ways that reflect activity primarily in the dominant hemisphere [of the brain], or the hemisphere that is dominant for speech," she explains. To see for yourself, try the following musical illusions provided by Deutsch, and compare your findings with a friend. Don't be surprised if your perceptions differ!



More tritone experiments and other auditory illusions can be found on Dr. Deutsch's CD

Click the icon to download the Real Audio Player.

In the tritone paradox, pairs of tones are played opposite each other, such as C followed by F#

Octave illusion (use headphones for best results)

Scale illusion (use either headphones or stereo speakers)

Glissando illusion (use headphones for best results)

Even more complex is what Deutsch calls the 'Tritone paradox'. "The basic pattern that produces this illusion consists of two tones that are related by a half-octave," she says, "and this interval is called a tritone. When two such tones are presented in succession, some people hear an ascending pattern. Yet other people, when listening to the identical pair of tones, hear a descending pattern instead." Try it for yourself:

'Tritone paradox' (use either headphones or speakers)

But the contradictions with tritones don't end there. "As another paradox, any given listener hears the pattern as ascending when it is played in one key, but as descending when it is played in a different key," claims Deutsch. As a result of her own research and that which has spawned similar studies, Deutsch suggests the relationship of music to speech is being gradually pieced together. And the 'Tritone' research itself has resulted in some rather peculiar correlations.

According to Deutsch's research, and that of others in the field, how people perceive the 'Tritone paradox' depends on such diverse factors as the pitch range of voices that listeners hear around them, and even the *dialect* to which the listener has been exposed. "One study compared the perceptions of the two groups of subjects," says Deutsch. "One group had grown up in California and the other group had grown up in the south of England." The results were quite astounding.

"A statistical difference between the two groups emerged," she recalls. "In general, when a Californian subject heard the pattern as ascending, a subject from the south of England heard it as descending and vice versa." Even newer research has shown a significant correlation between how a child experiences the 'Tritone paradox' and how his or her mother perceives it. So what does all of this research tell us?

In the end, "the illusions show that people can differ strikingly in the way that they hear even very simple musical patterns," states Deutsch. "You can't assume that what a person's going to hear is the same as what's on the written score, and this is an assumption people have been making." Even if a listener is really good, really musical, and really listens hard, it doesn't mean they have an innate ability to interpret a piece of music in the 'right' way. "That is something that can be debunked," she remarks.

With a conclusion like that, however, Deutsch is not about to sit idle. "We're in the middle of an MRI study on the octave illusion and handedness," she says. Although the experiments are not yet complete, she did say, "it's exciting and it's looking very promising." In the meantime, maybe your healthy disagreement with a friend about last

night's symphonic or jazz performance can boil down to the fact that he or she is from somewhere else and/or they're a 'leftie'. Whatever the case, perhaps the hardest thing will be to admit that *both* of you may be right!

To find out a bit more about some of Deutsch's work, check out the Diana Deutsch: Musical Illusions and Paradoxes website, or if you're still craving for more auditory illusions, try these final two:

'High-low' (use stereo speakers or headphones)

Mystery melody (use headphones or speakers)