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Science Beyond Sound (Entanglement)
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Opinion Editorial
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Audiologists know that sound travels at approximately 1,087 feet per second in standard temperature and pressure situations. Further, we know that light (and electricity) travel across time and space at 186,000 miles per second. Although we don't really talk too much about it in the clinic, I suspect many of us have noticed sound can actually hitch a ride on various electronic shuttles (i.e., telephone lines, FM, Internet file transfers, wireless transmission etc) to get a "piggyback ride" boost sending otherwise snail-paced sound components sailing across time and space at 186,000 miles per second. Not bad.

So, if sound can travel as fast as light (via some sort of shuttle) — can anything travel faster than light?

We (not me personally) were all pretty comfortable saying "no" and then quantum physics came along. In the mid-1930s, Schrodinger wrote about "quantum entanglement," which might be thought of (more or less) as the ability of one particle to influence another across teeny tiny microscopic spaces. With regard to the physics and the physicists who have these discussions, they frame influence as "spin," which perhaps approximates the velocity of these tiniest particles. Nonetheless, if the two can "instantly" influence each other at a distance of, oh, say perhaps 18 kilometers--and if they really, really, really can instantly influence each other, then their influence (electrical, physical, cosmic, or other) would have had to have occurred as a speed faster than the speed of light.

Although not an audiologist, Albert Einstein didn't care much for quantum physics. Rudolph (2008) noted that in 1947, Einstein wrote a letter to Max Born in which Einstein said he wasn't buying into quantum entanglement as it appeared to be "spooky action at a distance." Davies (2000) reminds us that Einstein's relativity theory anticipates that if a particle were to exceed the speed of light, it would initiate a time warp. Such a time warp would be relatively negative, thus allowing the particle to travel backward in time. Seems unlikely, but okay.

Salart and colleagues (2008) recently entangled photon pairs transmitted across fiber optic cables on either side of Lake Geneva, Switzerland. The two locations are 18 km apart, with the source directly between the two. Nonetheless, despite a multitude of considerations for frames of reference (essential to many of Einstein's theories), Salart and colleagues recorded and described the influence of one particle on the other. Their calculations determined influence occurred at some 10,000 times the speed of light (i.e., four orders of magnitude).

So then, as audiologists, one might consider:

Presume the above is beyond dispute and the physicists and science writers all agreed that it's just true (even for the moment). Then presume sound could hitch a ride on the quantum physics-based "influence express" much like an MP3 file traversing the Earth via the Internet.

Thus, sound could travel faster than light. And, if sound traveled faster than light, would it actually be going backward in time (see Davies, above) such that a recording of that same sound would occur before the original words were spoken?

In a recent interview, Brian Clegg (see https://calitreview.com/51/the-strange-world-of-quantum-entanglement/, below) referred to Arthur C. Clarke's observation that "any sufficiently advanced technology is indistinguishable from magic."

For More Information, References and Recommendations:
Clegg, B. (2006): The God Effect : Quantum Entanglement, Science's Strangest Phenomenon ISBN 0-312-34341-8, St Martin's Press.

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Rudolph, TG. (2008): The Speed of Instantly. *Nature*. Vol 454/14, August, 2008. Page 831-832.

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