

Why Are Human Ears Shaped That Way?

The shape of the ear has a big effect on how one hears, with the outer flap, or pinna, acting as a sound gatherer



ENLARGE

Despite their somewhat odd shape protruding from the side of the head, 'ears do a pretty good job for what they are meant to do,' an expert says. Photo: iStock

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45 COMMENTS

Burning Question: Why are our ears shaped the way they are?

It's easy to poke fun at someone with big ears, but human bodies have an interesting way of evolving to optimize their effectiveness. One expert, Todd Ricketts, director of graduate studies in the department of Hearing and Speech Sciences at Vanderbilt University, in Nashville, sounds off on how the shape of our ears muffles noises from behind and why large flaps may actually make someone a better listener.

Size Matters

The shape of the ear has a big effect on how one hears, and since we're only born with one pair, we get used to the sounds they deliver to the eardrum and eventually to the brain, says Dr. Ricketts, who does research into hearing aids. While some animals have rotating ears, many scientists have speculated that humans, at the top of the food chain, don't need ear functions with up-down precision hearing, "since we're not likely to be attacked from above or carried off by a bird," Dr. Ricketts notes.

The ear's outer flap, called the pinna, acts as a sound-gatherer, "a bit like a horn," Dr. Ricketts says. That horn is pointed slightly to the front, allowing the ear to gather more sound from what it is facing rather than from what is behind. "The sounds from the back are sort of like shadows, and they don't travel so well around the ear flaps," Dr. Ricketts says.

Alfred E. Neuman-size ear flaps should help drown out ambient noise behind a person, thus allowing him to hear the person he is facing better. People with flatter ears, on the other hand, can conceivably pick up sound from behind better, "which you could argue is a good monitoring ability," the professor says. No matter your ear shape, to hear more clearly when speaking with someone face to face, simply cup the pinnas with your hands to concentrate the oncoming sound.

Extra Benefits

The distance between our two ears helps people locate where a sound is coming from. The little ridges and folds that most people have on their pinnas alter the frequencies of sounds and also help us better locate the initiation of the sound. Whether the top of your ear is fully curled or has bumps or dents, "everyone has a unique sound signature," says the professor.

Earlobe shapes—whether attached or low-hanging—tend to be genetic and haven't

been shown to affect acoustic ability, notes the professor. They are, however, loaded with nerves, “which is why many people feel a lot of sensation around their ears,” he says. Scientists accept that earlobes have no real biologic function, Dr. Ricketts admits.

Down the Canal

The swirly shape of the ear leads sound down into the auditory canal, which acts as an amplifier. “Humans have a natural amplification in the 2,000- to 4,000-Hz range, which is where the difference between consonant and vowel sounds comes into play,” says Dr. Ricketts.

At the end of the canal, the soft tympanic membrane, also called the eardrum, is both protected and hypersensitive to sound. If it should tear, “it has the unusual ability to heal on its own,” Dr. Ricketts says.

Under Pressure

In a healthy ear, after sound travels through the canal, pressure changes push and pull on the eardrum, causing it to vibrate and register vibrations as music, voices or noise. Past the tympanic membrane is the tympanic cavity, where small bones sit in an air pocket along with the Eustachian tubes, which help equalize pressure. Then there is the inner ear, a space filled with fluid that transmits sound waves to the sensory ear organ and ultimately the brain.

Intelligent Design

The ear is a self-cleaning, self-oiling machine, “which is why doctors will tell you not to shove a Q-tip in there,” says Dr. Ricketts, though he admits to sometimes succumbing to this guilty pleasure. Placing objects inside the ear can impact ear wax, which is meant to capture and expel dirt. “Cleaning your ear can actually dampen your hearing,” cautions the professor. Despite their rather odd shape, “ears do a pretty good job for what they are meant to do,” says Dr. Ricketts.