

Psychologist explores human perception

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(PhysOrg.com) -- Faces tell the stories in UC Riverside professor Larry Rosenblum's ecological listening lab, as volunteer test subjects show that they can "read" unheard speech — not just from lips, but from the simple movements of dots placed on lips, teeth and tongue.

They can also recognize people's voices just from seeing their faces, and vice versa, and seem to be able to distinguish among a variety of rooms on campus just from their echoes.

"We get people ready for a test and tell them what we want them to do, and a lot of them think there's absolutely no way they'll be able to do that," said Rosenblum, whose field is perceptual psychology. "Some are very surprised when it turns out that they can."

Rosenblum has given test subjects quite a few such surprises. For example, participants in his work have shown that they can determine the locations of objects by listening to echoes as noise bounces off them. Other test subjects have used room echoes to figure out where they are on campus — blindfolded.

Rosenblum's research explores speech, faces and hearing from an ecological perspective. Ecological psychologists study the ways humans perceive and act in natural environments. The emphasis is on identifying the information available to people's senses, rather than the mental processes by which they interpret it, he said.

"One thing these projects all have in common is the 'wow factor,'"

Rosenblum said of his work in audio speech, visual speech and [face recognition](#).

Test subjects routinely glean more information than they expect from faces.

"We all read lips to some degree, even when we don't know we're doing it," Rosenblum said. "We also read faces. The ways people's faces move as they speak adds to what we comprehend."

The ambient sound in any room also offers more information than people might expect, Rosenblum said. One experiment asked subjects to listen to recorded sounds and try to recognize where on campus the recordings were made.

"We picked different places — a men's bathroom, the old gym, a walk-in closet — and it turns out that people are terrific at it," Rosenblum said.

In another experiment, Rosenblum and his team showed 18 UC Riverside undergraduates three shapes they would be attempting to identify — a triangle, a disc and a square cut from sound-insulating foam board covered with black tape.

The undergrads also saw an array of eight horn-style loudspeakers that the shapes would block, and were told that the speakers would make a white-noise sound. Blindfolded, they were asked to identify which shape was positioned in front of the loudspeakers.

"Our results show that listeners can identify the shape of sound-occluding objects at better than chance levels, with some listeners displaying near-perfect performance," Rosenblum said.

That research, he said, seeks a better understanding of how human hearing is affected by silent objects. His projects are all motivated by theoretical questions rather than a quest for a particular application, Rosenblum said, but real-world considerations are important.

"We discuss practical applications in papers so engineers can use them in the work they do, whether it's designing computer software or rehabilitation programs for the blind or the deaf."

Provided by University of California - Riverside

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