

Hearing aid listens in to your thoughts

Frank Swain

PEOPLE who wear hearing aids can often struggle with the “cocktail party effect” – the inability of the brain to follow a single conversation in a room crowded with voices. Now a device that listens to your brain’s activity can help pinpoint exactly which voice you want to focus on.

Most hearing aids use microphones to identify which voices are coming from in front of the wearer, and then amplifies these. But conversations don’t just happen face to face.

So Florian Denk and his colleagues at the University of Oldenburg in Germany combined a hearing aid with a behind-the-ear device that can sense brainwaves. They were able to show the two could work together to amplify the sounds that a wearer was paying attention to, no matter which direction they were facing.

The brainwave-sensing is carried out by a flexible C-shaped EEG device that wraps behind the ear. It uses 10 small electrodes to pinpoint electrical activity in the brain. The device samples both the wearer’s brainwaves and the audio

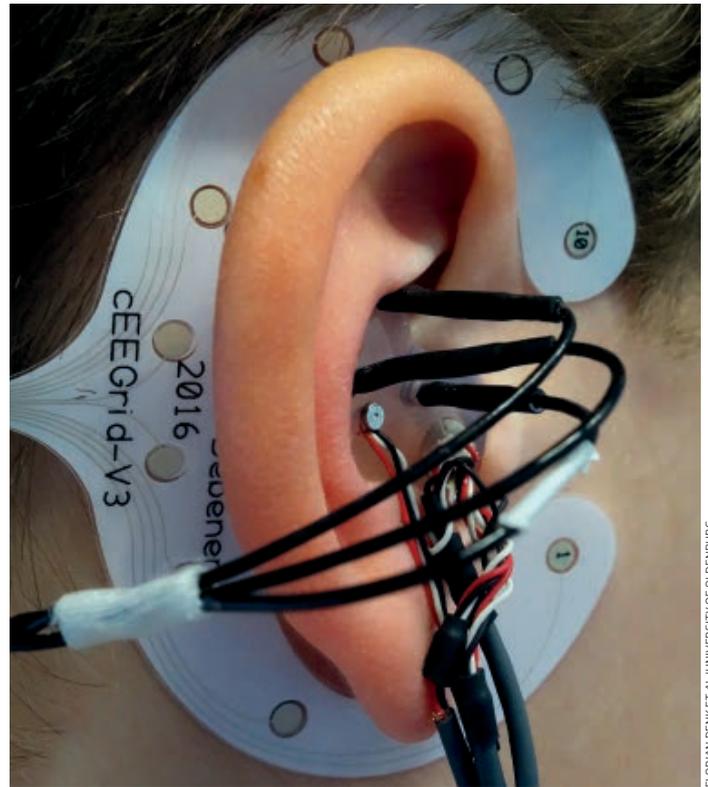
signals in the room and can match the two together, indicating what the person is concentrating on.

The device is still just a proof of concept and would have to be much smaller to be useful. At the moment it uses a matchbox-sized amplifier to boost the brain signals, which are then decoded

“A portable device like this could let us study the brain during unpredictable events, such as seizures”

on a desktop computer. But many high-end hearing aids now come with Bluetooth connections that link them to a smartphone, and it is possible that the decoding could be offloaded here, or even to a remote server. “Cloud computing would have a delay of 200 milliseconds, which is unimportant for listener intent,” says Simon Carlile at Starkey Hearing Technologies.

Such a wearable EEG sensor might have further uses. For example, recording an EEG usually requires wearing a cap of electrodes pressed against the head, which can be painful over long periods. This limits



FLORIAN DENK ET AL./UNIVERSITY OF OLDENBURG

This prototype hearing aid can help people zero in on conversations

the amount of data recorded.

If an EEG device could be made small and comfortable enough to wear constantly, it could provide researchers with data about the brain and how it responds to the environment. It would also allow them to study the brain during unpredictable

events, such as seizures.

Other potential uses include a connected headset that allows your smartphone to wake you at the perfect point in your sleep cycle, ensuring you feel alert first thing. Or it could warn drivers if they are fatigued or distracted.

Not so fast, says Carlile. “This technology is not going to arrive in the near term – more like 10 years,” he says. ■

Quolls finally learn to avoid toxic toads

CONSERVATIONISTS have trained endangered quolls to avoid the toxic toads that kill them.

Northern quolls are marsupials from northern Australia. In the 2000s, poisonous cane toads hopped into their territory. The quolls, knowing no better, ate them and died in swathes. They were wiped out in much of their range and are now endangered.

To save the species, some were moved to the toad-free English Company Islands off Australia’s north coast. There, Jonathan Webb at the University of Technology Sydney and his colleagues have tried to prepare the quolls for a return to the mainland.

The team trained the quolls not to eat cane toads by feeding them non-poisonous toads containing a chemical that induced nausea.

The team then reintroduced 29 quolls – 22 trained to avoid cane toads and seven with no training – to Kakadu National Park on the mainland. They tracked them using radio collars.



JONATHAN WEBB

Quolls have some studying to do if they are to survive

Six of the seven untrained quolls were poisoned within days, compared with just four of the 22 trained quolls. At least three survived for 21 weeks (*Austral Ecology*, doi.org/gdbgmt).

However, dingoes ate the last untrained quoll and six of the trained ones. The English Company islands may have been too safe. “It could have been that the quolls lost some of the behaviours that helped them survive,” says Webb.

He suggests teaching dingoes to avoid quolls, using “Trojan” quolls carrying nasty chemicals in special collars. Joshua Rapp Learn ■