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HEARING TECHNOLOGY

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BRAIN STIMULATION HELPS PEOPLE SUFFERING FROM HEARING IMPAIRMENT

Improved speech perception by electric brain stimulation (UOL164)

BACKGROUND

Hearing-aid users and hard-hearing people often have a problem distinguishing spoken language from background noises. Human speech perception can be identified in the electric activity of the brain as an envelope of the speech signal. Speech perception can be markedly improved if the brain areas responsible for processing the speech signals are electrically stimulated by an envelope (curve) that corresponds to the speech signal.

SOLUTION

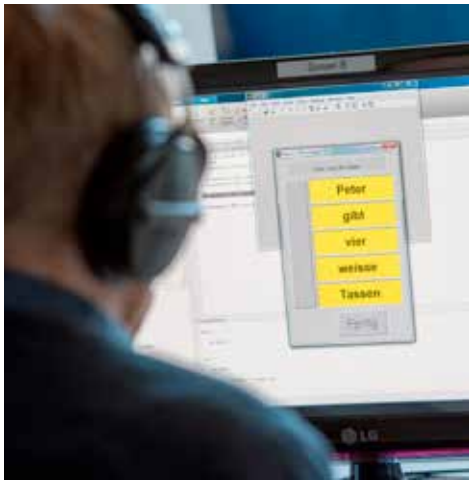
The invention describes a noninvasive method to stimulate the brain of hard-hearing persons in order to improve their recognition of spoken sentences embedded in background noise.

The new method couples an acoustic signal with a transcranial electric signal. To this end, the sound signal is first recorded and then a corresponding digital envelope curve is calculated. In a parallel process, the latency between an arriving signal and the electric activity of the auditory cortex is determined in an electroencephalogram (EEG). This makes it possible to shift the digital envelope by the determined latency. Next, the envelope is transformed into a constant current signal which is used to stimulate the auditory cortex by skin electrodes.

This invention was made in the scope of the excellence cluster "Hearing4all" at the Carl von Ossietzky University in Oldenburg. So far, it has only been tested in healthy people. A prototype is planned to be built in the scope of a BMBF project by 2020. In the long term, the electrodes and the data-processing technology are to be further developed and miniaturized to an extent that will allow them to be combined with hearing aids already available on the market.

ADVANCES AND APPLICATIONS

Previous approaches trying to improve speech perception required an implant to stimulate the auditory nerve in the inner ear. However, the new invention does not need any surgical intervention to markedly improve speech perception. It can be applied either as a supplement combined with hearing aids or cochlear implants, or independently to achieve a better speech perception.



Photography: Prof. Dr. Christoph Hermann, University of Oldenburg

FIELD OF APPLICATION
Hearing aids, cochlear-implants

KEYWORDS
Speech perception, envelope stimulation, noninvasive

PROPERTY RIGHTS
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AN INVENTION OF
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