

Audiovisual speech perception in cochlear implant recipients – examinations based on virtual reality

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ABSTRACT

Cochlear implants (CI) aim at (partially) restoring listening in patients with profound hearing loss by electrical stimulation of the auditory nerve. CI recipients frequently have particularly good skills in using visual speech (1, 2). This may be due to the need to overcome the relatively limited cues provided by the electrical stimulation thereby supporting the outcome of the CI. Hence, audiovisual speech plays an especially crucial role in CI users. Moreover, assessing audiovisual perception has high ecological validity since daily-life communication typically contains both, auditory and visual speech cues.

However, audiovisual speech is often not systematically considered with CI rehabilitation, partly due to the lack of appropriate speech material. One promising approach is the use of virtual reality (VR) to provide visual speech cues. So called “talking heads” allow visualization of arbitrary speech materials and have the advantage of combining realistic settings with precise control of stimulus presentation (3, 4).

The present talk gives insight into VR-based audiovisual speech presentation and shows several research areas addressing speech perception in cochlear implant listeners.

Keywords: cochlear implant, audio-visual speech, virtual reality

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REFERENCES

1. Rouger J, Lagleyre S, Fraysse B, et al. Evidence that cochlear implanted deaf patients are better multisensory integrators. *Proc Natl Acad Sci U S A*, 2007, 104, 7295–7300.
2. Winn MB, Rhone AE, Chatterjee M, Idsardi WJ. The use of auditory and visual context in speech perception by listeners with normal hearing and listeners with cochlear implants. *Front Psychol*. 2013 Nov 5;4:824. doi:10.3389/fpsyg.2013.00824
3. Massaro DW, Cohen MM, Tabain M, et al. Animated speech: research progress and applications. In G. Bailly, P. Perrier, E. Vatikiotis-Bateson (Eds.), *Audiovisual Speech Processing 2012* (pp. 309-345). Cambridge: Cambridge University Press.
4. Schreitmüller S, Frenken M, Bentz L, Ortmann M, Walger M, Meister H. Validating a Method to Assess Lipreading, Audiovisual Gain, and Integration During Speech Reception With Cochlear-Implanted and Normal-Hearing Subjects Using a Talking Head. *Ear Hear*. 2018 May/June;39(3):503-516. doi:10.1097/AUD.0000000000000502.

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