

Abstract EFAS/DGA 2007

Recognition of complex temporal envelopes in normal-hearing listeners and cochlear implantees

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Speech intelligibility of young normal-hearing listeners is extremely robust to an increase in speech rate or in other words, when speech is submitted to time compression. However, this form of “perceptual constancy” for temporally-compressed speech is reduced or abolished in elderly listeners with normal hearing, hearing-impaired listeners and more to the heart of the present study, cochlear implantees (e.g., Fu, Galvin & Wang, 2001). Cochlear implants convey mostly temporal envelope information; thus, the poorer-than-normal capacities of cochlear implantees to recognize temporally compressed speech might result from an impairment in the ability to follow temporal-envelope patterns when the latter are compressed in time.

The ability to recognize complex temporal-envelope patterns submitted to temporal compression is assessed cochlear implantees and normal-hearing listeners using an XAB, matching-to-sample-procedure. X, the reference stimulus, is obtained by applying the sum of two, inharmonically related, sinusoids to a white noise carrier. A and B are obtained by multiplying the frequency of each modulation component of X by the same time compression factor, a . For each trial, A or B is a time-reversed rendering of X, and the listeners’ task is to choose which of the two is matched by X.

Overall, the results indicate that in both group of listeners, recognition performance degrades continuously and similarly as a function of a . These results indicate that the ability to perceive time-compressed patterns per se is not degraded by the speech processor of current cochlear implants.

These preliminary data suggest that the poorer-than-normal recognition of time-compressed speech (as produced by rapid speakers) reported previously in implantees is imputable to limited access to speech redundancy (a consequence of poor reception of spectral and fine structure cues) rather than to abnormal temporal-envelope processing.

Literatur:

Fu, Q-J., Galvin, J.J., & Wang, X. 2001. Recognition of time-distorted sentences by normal-hearing and cochlear-implant listeners. *J Acoust Soc Am*, 109, 379-384.



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