

## **Impact of Auditory Experience on Speech Recognition in Adult Cochlear Implant Users**

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Different types of auditory experiences, such as musical training and multilingual exposure, have been shown to contribute to significant advantages in speech perception for normal-hearing individuals and can impact several domains of hearing and physiological processes. Individuals with previous exposure to complex sounds, voices, and instruments via musical training tend to process dynamic auditory features better, demonstrated by the observed 'musician effect' in many auditory tasks. Similarly, early exposure to multiple languages has been associated with structural brain changes, and individuals demonstrate enhanced performance on speech perception tasks. Cochlear implants (CIs) are prosthetic devices that restore some sense of hearing to profoundly deaf individuals. CIs are particularly beneficial in quiet listening environments, but CI users are disadvantaged by degraded auditory input in adverse conditions. Further, individual CI users differ greatly in their speech understanding abilities. However, the impact of prior auditory experience on CI users is still unknown. In the current study, we present a comprehensive review of how music and language experience affect speech perception in adults, and the relationship between auditory experience and enhanced speech perception in adverse listening conditions. We further discuss how these auditory experiences may help listeners compensate for hearing loss or a CI. Then, we explored the music and language exposure of experienced CI users with good speech perception outcomes, and the potential contributions of their prior auditory experience to observed variability in outcomes. An analysis of language background survey data was done to determine the relationship between musical and language experience and speech perception performance in individuals with CIs. Findings from the current study will be a first step towards understanding the relationship between prior auditory experience and CI users, and can give insight to potential treatments, predictive technologies or diagnosis for those with hearing issues.