Three experiments were designed to examine temporal envelope processing by cochlear implant (CI) listeners. In experiment 1, the hypothesis that listeners' modulation sensitivity would in part determine their ability to discriminate between temporal modulation rates was examined. Temporal modulation transfer functions (TMTFs) obtained in an amplitude modulation detection (AMD) task were compared to threshold functions obtained in an amplitude modulation rate discrimination (AMRD) task. Statistically significant nonlinear correlations were observed between the two measures. In experiment 2, results of loudness-balancing showed small increases in the loudness of modulated over unmodulated stimuli beyond a modulation depth of 16%. Results of experiment 3 indicated small but statistically significant effects of level-roving on the overall gain of the TMTF, but no impact of level-roving on the average shape of the TMTF across subjects. This suggested that level-roving simply increased the task difficulty for most listeners, but did not indicate increased use of intensity cues under more challenging conditions. Data obtained from one subject, however, suggested that the most sensitive listeners may derive some benefit from intensity cues in these tasks. Overall, results indicated that intensity cues did not play an important role in temporal envelope processing by the average CI listener.

**Hearing Aids**


**Cochlear Implants**


We studied the effect of the cochlear implant (CI) on language comprehension and production in deaf children who had received the CI in the second year of life. We evaluated lexical and morpho-syntactic skills in comprehension and production in 17 Italian deaf children (mean age: 54 months) with CI and two control groups of hearing children (one matched for chronological age and the other whose chronological age corresponded to the duration of CI activation). We also compared children with unilateral CI to children with bilateral CI. Children with CI appeared to keep pace with hearing children matched for time since CI activation in terms of language acquisition, and they were similar to same-age hearing children in lexical production. However, children with CI showed difficulties in lexical comprehension when requiring phonological discrimination, as well as in grammar comprehension and production. Children with bilateral CI
showed better comprehension than children with unilateral CI, the two groups were similar for production. Activation of CI in the second year of life may provide deaf children with a good opportunity to develop language skills, though some limitations in phonological and morphological skills are still present three years after auditory reaafferentation.

**Geriatrics**


The aim of this study was to investigate self-reported hearing difficulties, uptake, and hearing-aid outcomes and their relationships to demographic, cognitive, psychosocial, and health variables in 85 year olds. Three hundred and forty-six elderly adults participated in a survey that included questionnaires and home visits. Fifty-five percent of participants admitted to having hearing difficulties, and 59% of these owned hearing aids. The participants' most frequently cited reason for not acquiring hearing aids was that they did not think their hearing problem was perceived as severe enough. Participants with hearing difficulties who did not own hearing aids showed worse general and mental health. Many of the elderly participants were successful in their rehabilitation, and their hearing-aid outcomes were similar to those of a younger group, with the exception of a greater proportion of non-users among the elderly. Many older people with self-reported hearing difficulties do not acquire hearing aids, despite this study’s findings that older people are likely to have success with hearing rehabilitation. It is important to make greater efforts to try to increase elderly adults’ awareness of hearing loss and the benefits of hearing rehabilitation.

**Directional Microphones**


The objectives were: (1) to examine the effects of a directional microphone with different directivity patterns and different microphone combinations on wind noise levels at the hearing aid output; and (2) to derive strategies appropriate for hearing aid selection and future designs. Design: The in-situ frequency responses of a behind-the-ear hearing aid (BTE1) were matched when the hearing aid was programmed to dipole, hypercardioid, cardioids, or adaptive microphone mode. The in-situ frequency responses of another hearing aid (BTE2) were matched among an omnidirectional microphone (OMNI), an adaptive directional microphone (ADM), and a combination of omnidirectional microphone at low frequencies and an adaptive directional microphone at high frequencies (MIXED). Flow noise was recorded at flow velocities of 0, 4.5, 9.0, and 13.5 m/s. Measurements were repeated for the hypercardioid pattern of BTE1. Study sample: Flow noise recorded using directional microphones with four directivity patterns and using OMNI, ADM, and MIXED. Results: Directional microphones with different directivity patterns generated similar flow noise levels. ADM yielded higher overall levels than OMNI and MIXED, which had similar overall levels. Conclusions: The adaptive directional microphone is the most versatile microphone for use in wind. The mixed microphone mode is a viable wind noise reduction option.