[F11] Reductions in phoneme confusions from waveform compression in an essentially nonlinear hearing aid. Peter Gilchrist¹, Metin Oz¹, Julius L. Goldstein¹, & Michael Valente², ¹Hearing Emulations, LLC and BECS Technology, Inc., ²Washington Univ. Medical Center, St. Louis, MO, USA.

Villchur (1973) proposed that syllabic gain compression is useful for restoring the dynamic range of hearing impaired listeners. The nature of the improvement provided by hearing aids with syllabic release times is difficult to quantify (Allen 2002) and there is little consensus on their efficacy (see review by Levitt 2004). A novel multichannel hearing aid that achieves Villchur's proposal using instantaneous gain compression and controlled waveform compression has been developed (Goldstein et al. 2002). Clinical intelligibility tests using a simulation of this hearing aid design showed a benefit from waveform compression of relatively clean SPIN speech (Kalikow et al. 1977, Bilger et al. 1984) for moderately impaired subjects. This result inspired a method for measuring the improvements provided by compression by analyzing impaired listeners' responses to SPIN target words at the phoneme level. Phonetic confusions of initial consonants, center vowels and final consonants in target words processed using compression were compared to responses to a simulation of a conventional hearing aid with a long release time. Subjects showed increased intelligibility at all phoneme positions, most notably the final consonant position where the performance improvement with compression was 10.7%. These benefits accompany an increase in sound level of quiet consonants relative to louder vowels. [Work Supported by NIH-NIDCD SBIR-Grant DC04028, J.L. Goldstein (PI)]