

**ACOUSTICS2008/2366**  
**Influence of multi-channel dynamic range compression on  
intelligibility: effect of envelope modulation bandwidth**

Michael Stone, Christian Füllgrabe and Brian Moore  
University of Cambridge, Department of Experimental Psychology, Downing Street, CB2 3EB Cambridge,  
UK

Stone and Moore [J. Acoust. Soc. Am. (in press)] showed that, as the speed and number of channels in a multi-channel compressor increased, intelligibility of noise-vocoded signals in a competing speech task decreased. The noise vocoder is often used to simulate the information conveyed by cochlear implants. However, the vocoder of Stone and Moore preserved only low-rate ( $<45$  Hz) envelope modulations whereas some implantees show sensitivity to envelope modulation rates up to about 300 Hz. Furthermore, intrinsic fluctuations in the noise carriers affect the reception of low-rate modulations of the signal (Whitmal et al. [J. Acoust. Soc. Am. 122:2376-2388, (2007)]). Here, a tone vocoder with  $N=8$  or  $N=16$  channels was used. Vocoding was preceded by  $N/8$ ,  $N/4$ , or  $N/2$  channels of compression, each using one of three speeds, affecting modulation rates up to about 2, 6, or 18 Hz, respectively. The lowpass filters extracting the channel envelopes had corner frequencies of 45 or 180 Hz. Intelligibility was measured using IEEE sentences with a competing speaker. The deleterious effect of compression with increasing channel number and speed was greater for the lower corner frequency. Compression of rates below 6 Hz affected intelligibility, independent of the presence of higher modulation rates.