CFA '18 LE HAVRE ▪ 23-27 avril 2018
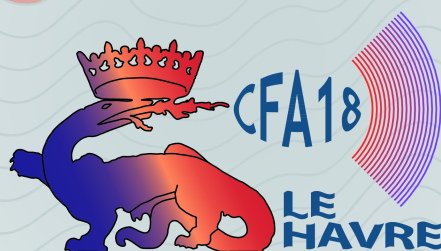# 14ème Congrès Français d'Acoustique

"Turn an ear to hear": how hearing-impaired and unimpaired listeners alike can optimise their speech intelligibility in noisy environments

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For speech intelligibility in noise, the Jelfs et al. (2011) model of spatial release from masking predicts a substantial benefit of listeners facing away from the target speech when interferers are spatially separated (Culling et al., 2012). Grange & Culling's (2016a) normal-hearing (NH) baseline study confirmed the predicted head-orientation benefit (HOB). Grange & Culling's (2016b) showed how cochlear implant (CI) users, in a sound-treated lab, could reap a 30° HOB similar to that of NH listeners (up to 5 dB), without compromising their lip-reading. A highly realistic restaurant simulation over headphones demonstrated the robustness of NH listeners' 30° HOB (1-2 dB) with multiple interferers and reverberation. Grange et al. (2017b) demonstrated how this head-shadow benefit extended to mild-to-moderately hearing impaired (HI) listeners and simulated CI users (using the SPIRAL vocoder, Grange et al, 2017a). Speech-reception thresholds were elevated, from NH, by 3 and 12 dB for HI listeners and simulated CI users, respectively; a 30° head turn provided 1-3 dB HOB, depending on position in the restaurant and interferer type. Significantly more HOB was obtained in CI simulations employing voice rather than noise interferers (interaction not found with NHs). NH and CI listeners were generally poor at spontaneously exploiting HOB; evidence-based guidance on "turning an ear to hear" and training for hearing-impaired listeners would help them with the far-too-often poor acoustical accessibility of social settings.

Jelfs et al. (2011) Hear.Res. 275(1-2), 96-104. Culling et al. (2012) Ear&Hear. 33(6), 673-682. Grange & Culling (2016a) JASA 139(2), 703-712. Grange& Culling (2016b) JASA 140(6), 4061-4072. Grange et al. (2017a) JASA-EL 142(5), EL484-489. Grange et al. (2017b) ISAAR 2017 proceedings (in print).