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# Modelling of Binaural Speech Intelligibility for Hearing Impaired Listeners Using Intrusive and Non-Intrusive Binaural Speech Intelligibility Models

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## ABSTRACT

Modelling binaural speech intelligibility for hearing impaired listeners and comparing the results to measured speech reception thresholds (SRTs) can help to identify and understand contribution of different factors of hearing impairment (e.g. audibility) to speech perception. This study investigates SRTs obtained for 16 hearing-impaired listeners in a spatially co-located ($S_0N_0$) and a spatially separated ($S_0N_{90}$) speech in noise task using the Polish sentence test in noise. The obtained data are predicted using binaural speech intelligibility model (BSIM), which combines an Equalization-Cancellation process as a model of binaural unmasking with the speech intelligibility index. Hearing impairment is modelled by incorporating the individual audiogram as additional internal noise sources into the BSIM. First results indicate that BSIM overestimates the influence of the audiogram on SRTs already in the $S_0N_0$ condition. The standard deviation of SRTs across listeners is much smaller than in the predicted data. On the other hand, the predicted binaural release from masking, which is the difference in SRT between the $S_0N_0$ and $S_0N_{90}$ scenario, shows good agreement with the individual perceptual data ($R^2$=0.83). The predictions obtained with BSIM are compared with predictions using the non-intrusive "Framework for Auditory Discrimination Experiments" by incorporating a binaural feature extraction.

Keywords: Binaural Hearing, Speech Intelligibility