Cochlear implant speech intelligibility outcomes with structured and unstructured binary mask errors - DTU Orbit (31/12/2018)

Cochlear implant speech intelligibility outcomes with structured and unstructured binary mask errors
It has been shown that intelligibility can be improved for cochlear implant (CI) recipients with the ideal binary mask (IBM). In realistic scenarios where prior information is unavailable, however, the IBM must be estimated, and these estimations will inevitably contain errors. Although the effects of both unstructured and structured binary mask errors have been investigated with normal-hearing (NH) listeners, they have not been investigated with CI recipients. This study assesses these effects with CI recipients using masks that have been generated systematically with a statistical model. The results demonstrate that clustering of mask errors substantially decreases the tolerance of errors, that incorrectly removing target-dominated regions can be as detrimental to intelligibility as incorrectly adding interferer-dominated regions, and that the individual tolerances of the different types of errors can change when both are present. These trends follow those of NH listeners. However, analysis with a mixed effects model suggests that CI recipients tend to be less tolerant than NH listeners to mask errors in most conditions, at least with respect to the testing methods in each of the studies. This study clearly demonstrates that structure influences the tolerance of errors and therefore should be considered when analyzing binary-masking algorithms.

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