Model-based objective assessment of noise reduction systems for hearing aids

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Since the ultimate goal of hearing-aid development is the (subjective) judgment of the individual hearing-impaired listener, time-consuming tests with the end user are indispensable. However, time- and effort-saving objective methods to assess the potential benefit of different versions and parameter sets of hearing aid algorithms are gaining importance. This contribution reviews perception-model-based approaches to predict the hearing-impaired judgement and speech reception performance achieved with various noise reduction schemes. The perceptual similarity measure PSM evaluates the similarity between a tested condition and an "ideal" reference condition not on the physical level, but rather on the perceptual level at the output of a perception model for the individual hearing-impaired listener. The binaural extension of the SII approach uses a binaural preprocessing stage followed by a speech intelligibility index (SII)-based prediction scheme capable of predicting the relative benefit of binaural signal presentation and signal enhancement in complex spatial signal and noise source configurations. Both model-based schemes can be combined to assess the effect of noise reduction algorithms (such as adaptive beamformers) and to optimize their respective performance for different acoustical situations.