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Effects of spatial factors of speech, noise, and reverberation sounds on listening difficulty

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It is well known that the amount of auditory masking in binaural listening is affected by spatial factors of signal and masking sounds such as the degree of interaural cross-correlation and the arriving direction. The amount of auditory masking for speech signal are usually measured using speech intelligibility tests. However, in the sound fields that appears in everyday life, speech intelligibility are usually close to 100%. Therefore, it was unclear how much the effects of spatial factors on speech communication in everyday life are. Listening tests were performed to clarify the effects of spatial factors on listening difficulty ratings [M. Morimoto *et al.*, J. Acoust. Soc. Am. **116**, 1607-1613 (2004)] focussing on the degree of interaural cross-correlations of speech, noise, and reverberation sounds, and on the arriving direction of speech signal. The two spatial factors were controlled by several loudspeakers which are horizontally installed in an anechoic room. The results of listening tests showed that the effects of the two spatial factors on listening difficulty ratings decreased with improving listening conditions, and the effects can be ignored in the sound fields that often appears in everyday life.