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Some Temporal and Spatial Effects of Room Acoustics on Speech Privacy

John Bradley, Marina Apfel and Brad Gover
National Research Council, 1200 Montreal Rd, Ottawa, ON, Canada K1A 0R6

The speech privacy of meeting rooms relates to the possibility of eavesdroppers outside the room being able to understand speech from within the meeting room. Although the speech privacy of meeting rooms is usually assumed to relate to the level of the speech transmitted from the room relative to the ambient noise outside the room, the intelligibility of the transmitted speech is also influenced by room acoustics. However, the audibility of speech is only influenced by the levels of the transmitted speech and ambient noise. This paper reports on a series of speech intelligibility tests in which the components of the problem were systematically added. As expected, adding early reflections of speech from various directions increases intelligibility but later-arriving speech sounds decrease intelligibility. While a spatial separation of speech and noise sources in free field conditions increases speech intelligibility (spatial release from masking), in more realistic conditions, representing a diffuse ambient noise field, the effects are much smaller. Conditions are further complicated by the sever filtering of the speech on transmission through typical walls. The combined effects can be estimated and are significant. If ignored costly over-design of the sound isolation of the meeting room could occur.