For persons with normal hearing, can speech understanding in noise be influenced by a history of temporary threshold shift?

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ABSTRACT

Recent animal experiments have found that noise-induced temporary changes in hearing threshold (TTS) unexpectedly caused persistent suprathreshold changes in auditory function, even though long-term thresholds remained normal. It was postulated that in humans the effect could influence speech communication in noise. We have studied 46 male and female students with normal hearing who completed a questionnaire concerning hearing, exposure to noise, experiencing TTS-like symptoms, and speech understanding. Subjects reported statistically significant reductions in their ability to understand speech when trying to communicate in noisy environments. However, when groups reporting TTS-like symptoms ("exposed"), and "controls" (reporting no TTS-like symptoms) were formed that were matched in hearing thresholds, there was no difference in mean word scores between groups in a psychophysical test of speech intelligibility. The exposed group did exhibit a statistically significant deterioration in threshold for detecting 4Hz amplitude modulation of a 500Hz carrier, suggesting persons with normal hearing reporting TTS-like symptoms may experience subtle suprathreshold changes in hearing. Nevertheless, the reported changes in speech understanding could not be confirmed by an objective test. [Work supported by NIOSH]