

Acoustic Measurements of Soft Speech at the Eardrum

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Abstract

Measurements of speech acoustics and speech perception have generally been accomplished by presentation of speech at a comfortable listening level or at some level defined as normal; frequently 65-70 dB SPL. When using hearing-impaired subjects as listeners, it is common practice to compute the average and standard deviation of all the subjects' losses and illustrate those statistics in a graph of hearing threshold level separate from any representation of acoustic measurements. While there is an abundance of information on measurements of speech acoustics and perception at moderate levels, by comparison, relatively little has been published about the acoustic properties and perceptual aspects of speech at or near threshold. The purpose of this study was to measure certain acoustic properties of threshold speech recorded near the eardrum and relate those measurements to the listener's hearing levels. Thresholds of Intelligibility (TI) for spondees were measured in sound field in an acoustically treated chamber. Along with measurements of TI, acoustic records of the spondaic words were obtained near the eardrum of hearing-impaired listeners. Recordings of threshold speech were plotted over each listener's SPL-ogram. These measurements represent certain aspects of the acoustic signature of threshold speech near the eardrum. Results were analyzed in terms of bandwidth, amplitude spectra, and duration and the influence of each on correct word identification at Threshold of Intelligibility.