Variations in voice level and fundamental frequency with changing background noise level and talker-to-listener distance while wearing hearing protectors: A pilot study

Objective: Speech production in noise with varying talker-to-listener distance has been well studied for the open ear condition. However, occluding the ear canal can affect the auditory feedback and cause deviations from the models presented for the open-ear condition. Communication is a main concern for people wearing hearing protection devices (HPD). Although practical, radio communication is cumbersome, as it does not distinguish designated receivers. A smarter radio communication protocol must be developed to alleviate this problem. Thus, it is necessary to model speech production in noise while wearing HPDs. Such a model opens the door to radio communication systems that distinguish receivers and offer more efficient communication between persons wearing HPDs. Design: This paper presents the results of a pilot study aimed to investigate the effects of occluding the ear on changes in voice level and fundamental frequency in noise and with varying talker-to-listener distance. Study sample: Twelve participants with a mean age of 28 participated in this study. Results: Compared to existing data, results show a trend similar to the open ear condition with the exception of the occluded quiet condition. Conclusions: This implies that a model can be developed to better understand speech production for the occluded ear.

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