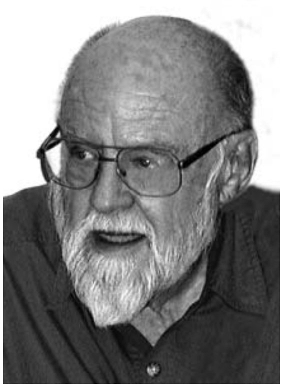
Editorial

The Laboratory versus the Natural Environment



There has always between a gap between what laboratory findings tell us about hearing aids and what actual users report. Too often the theoretical benefit predicted by laboratory data fails to materialize in real-life situations. Perhaps one reason is that laboratory experiments are too removed from the natural environment in which hearing aids are used. Proper experimental design, it is argued, requires tight control of all variables; therefore, simulating the natural environment is not realistic. That is certainly a logical argument, but does it leave us with pristine results that do not help us very much in trying to understand the problems faced by actual users of hearing aids? A case in point is the directional microphone. Its theoretical advantage has been demonstrated in the laboratory by a number of investigators, but theory has not always been congruent with reports of successful use.

In this issue of *JAAA*, in the article "Quantification of Directional Benefit across Different Polar Response Patterns," authors Ruth Bentler, Jessica Egge, Jill Tubbs, Andrew Dittberner, and Gregory Flamme addressed the directivity issue by measuring speech perception in the presence of a diffuse noise field in both new and experienced hearing aid users. Participants were tested wearing an omnidirectional microphone and four directional microphone arrangements, all differing on a theoretical directivity index (DI).

A particularly noteworthy feature of the test environment was that the noise and multitalker babble were presented via an eight-speaker array, specifically arranged in such a way that diffusion avoided the problem often encountered when fewer speakers are used, namely that the background noise may fall within a null of the microphone's polar response pattern.

Bentler et al asked to what extent DI differences actually translated into differences in listener performance on the Hearing-in-Noise Test (HINT) in the presence of speech-shaped noise, or on the Connected Speech Test (CST) in the presence of multitalker babble. Results showed that, in comparison with the omnidirectional pattern, speech understanding was better for all directional microphones, but there were no real differences among the four directional microphones in spite of substantial variation in directivity. In other words, when a natural listening environment was simulated by a diffuse sound field, the theoretical advantages associated with different directivity patterns failed to appear.

All participants were fit binaurally, but, in one of the four directional arrangements, the microphone was directional on one ear only. On the other ear, the microphone was omnidirectional. The authors had expected that this would yield a result intermediate between the binaural omni-directional and the three binaural directional arrangements. But, in fact, the one-sided directional condition produced a result equivalent to the three binaural directional conditions. In other words, a directional microphone on just one ear yielded the same benefit as directional microphones on both ears.

Experiments like this, in which the natural environment of the listener is considered, will hopefully lessen the gap between research and clinical practice.

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