Editorial

Ecological Validity: Does Complexity Preclude Control?

In recent years, a number of individuals have begun to question how well the results of laboratory experiments can be generalized to real life. They have argued that, in the quest for ever tighter control of variables thought to affect outcomes, experimental designs are producing interesting but essentially trivial results, results that lack "ecological validity." They question whether the data gathered in such experiments have any relevance for understanding natural behavior in the real world.

The argument quickly spills over into the clinical arena. What, for example, do responses to single-syllable words presented to one ear via earphone tell us about how persons understand actual running speech in real listening environments. The traditional response has always been that, in either the clinical or the laboratory situation, it is too difficult to control satisfactorily all of the variables inherent in actual running speech and real listening environments.

Is it a matter of "you can't have your cake and eat it too"? Are we forever limited to either well-controlled studies of trivia or ecologically valid studies lacking adequate scientific rigor? Or is there a middle ground?

In this issue of *JAAA*, authors Cynthia Compton-Conley of Gallaudet University, Arlene Neuman and Harry Levitt of the Graduate Center at CUNY, and Mead Killion of Etymotic Research, Inc. address a persistent question: how best to assess the benefit of directional microphones. Anyone who has worked in this area is familiar with the complexity of the issues and the bewildering number of variables to be controlled. One must consider, for example, the differing polar response patterns of directional microphones, the nature of the competing signals, and the various directions from which competition may arise.

The approach of Compton-Conley et al was first to construct an ecologically valid live test environment, then to transfer it to the laboratory, and finally to compare HINT test scores for three different directional microphones in such an environment with analogous results in three laboratory-simulated environments: (1) a multimicrophone, multiloudspeaker simulation, (2) a single noise source behind the listener, and (3) a single noise source above the listener. The investigators then asked how well results from each of the three simulated environments compared with results from the live test environment. Interestingly, the rank ordering of the three microphones was the same in all environments, but only the multimicrophone/multiloudspeaker simulation yielded accurate estimates of the absolute performance of all three microphones in the ecologically valid live condition.

This is an excellent example of how a tightly controlled experiment can still lead to ecologically valid and clinically useful results.

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