



# YOUR PATIENTS





FEATURED SESSION AT  
**AUDIOLOGYNOW!® 2015**  
IN SAN ANTONIO, TX!

# ARE NOT AVERAGE

BY JASON GALSTER

Variability among our patients makes the treatment of hearing loss a dynamic and uniquely challenging prospect. However, without some form of outcomes assessment, it's difficult to understand if a patient is at, above, or below average.

A few years ago, while contributing to the development of guidelines for clinical best practice, I found it interesting that our recommendations were often developed from studies that drew conclusions from average data and the resulting statistical analysis. This is certainly the correct approach for the development of best practice guidelines, but the process isn't one that can easily address the variability among individuals that is an inherent consideration in the development of a personalized rehabilitation plan.

Hearing aid outcomes are highly variable; to suggest that patients will conform to the average would be misleading. For illustrative purposes, this article will focus on the dilemma of speech understanding in noise and the use of hearing aids in noisy environments. Directional microphones have the potential to provide great benefit for hearing aid wearers in noisy environments, but audiologists know from experience that patients' reported experiences with directional microphone hearing aids do not always align with laboratory data and established expectations.

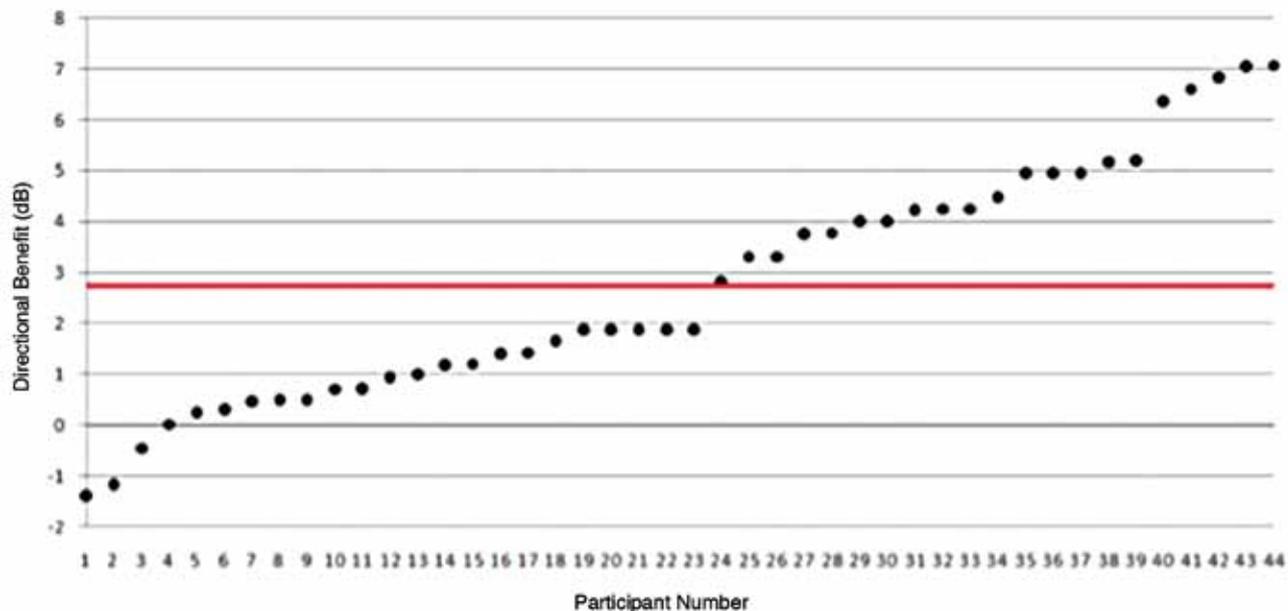
Take FIGURE 1 as an example: here we have data from 44 research participants who have completed the Hearing in Noise Test (HINT) (Nilsson et al, 1994). Each data point shows directional benefit for one patient (the difference between speech recognition in noise using omnidirectional and directional microphones). The data have been rank-ordered, ranging from the least to the most directional benefit, and the red line shows average performance. A question regarding FIGURE 1: How many participants in this sample have average performance? The answer is one participant. One participant's performance is equivalent to the group's average performance, a clear reminder that most patients are not average. In the case that a patient is not average and shows less than desired outcomes, an adjustment in the treatment plan or revision to counseling strategies is warranted. The challenge for the audiologist lies in the fact that variability originating from cognitive factors or physiologic factors cannot be explicitly controlled. There are, however, factors relating to the hearing aid and (to some extent) the patient's behavior that can be controlled or modified.

Continuing with the example of directional microphones, many audiologists have experienced this same variability, with the occasional patient reporting poorer-than-expected benefits when listening in noisy conditions. In cases where a patient reports a

poorer-than-expected experience, there are several opportunities to improve outcomes and attempt to constrain some of that individual's variability. A first point of consideration is the fitting configuration; it is an acoustic expectation that the effective directivity of directional microphones will be reduced as the ear-coupling configuration becomes progressively more open. A patient who requires more from directional microphones may benefit from a more occluding earmold that improves audibility for the amplified (i.e., processed) signal pathway (Magnusson et al, 2013).

With regard to behavioral modification, directed counseling on the utility of visual cues can be an impactful focus that greatly improves speech recognition in noise (Wu and Bentler, 2010). Of course, counseling on access to visual cues is a routine topic, but in the context of the noise-challenged patient, a counseling strategy more focused on accessing and maintaining visual cues may be of value to the patient.

The purpose of these examples is to demonstrate the utility of establishing a range of expectations for patient outcomes. In the laboratory, we establish these ranges through behavioral assessment and subjective outcome assessment. In a clinical setting, the options are slightly more limited, but the best option for subjective outcomes assessment remains questionnaires. For those interested



**FIGURE 1.** Directional microphone benefit in dB (the difference between directional and omnidirectional test conditions) is shown for each of 44 research participants who completed the Hearing in Noise Test. The red line shows group average directional benefit.

in freely available and well-validated outcome measures, the Web site [www.harlmemphis.org](http://www.harlmemphis.org) includes downloads for a number of useful tools, including the Abbreviated Profile of Hearing Aid Benefit (APHAB; Johnson et al, 2010) and the International Outcome Inventory for Hearing Aids (IOI-HA; Cox et al, 2003).

Patients who fall within the range of expected outcomes might receive one embodiment of a treatment plan, while those falling outside of a defined range of outcomes will be better served with a modification to that treatment plan. Abrams and Chisolm (2013) describe the intentional tiering of treatments as Progressive Audiologic Rehabilitation (PAR). Each patient enters the rehabilitation plan at a lower tier, in which counseling and treatment strategies may be less directed, leaving more control to the patient. In the case where the patient experiences less success, the treatment plan is modified and more direct actions are taken. These adjustments may include modification of hearing aid characteristics, directive counseling, inclusion of accessory devices (i.e., remote microphones), and/or prescription of auditory rehabilitation and training.

Variability among our patients makes the treatment of hearing loss a dynamic and uniquely challenging prospect. However, without some form of outcomes assessment, it's difficult to understand if a patient is at, above, or below average. Once the individual's outcomes are understood, a set of progressive treatment strategies can be formed. Several examples were provided here to address the needs of a noise-intolerant patient. Whether addressing comfort, audibility, or noise tolerance, the development of a progressive treatment plan can assist in managing individual variability by starting patients out with a rehabilitative strategy that becomes more personalized as the requirements for successful treatment increase. 

Jason Galster, PhD, is a senior manager of audiological research with Starkey Hearing Technologies in Minneapolis, MN. He is also the Featured Sessions chair of AudiologyNOW!® 2015.

## References

Abrams H, Chisolm T. (2013) Will my patient benefit from audiologic rehabilitation? The role of individual differences in outcomes. *Sem Hear* 34(2):128–140.

Cox R, Alexander G, Beyer C. (2003) Norms for the international outcome inventory for hearing aids *J Amer Acad Audiol* 14(8):403–413.

Johnson J, Cox R, Alexander G. (2010) APHAB norms for WDRC hearing aids. *Ear Hear* 31(1):47–55.

Nilsson M, Soli S, Sullivan J. (1994) Development of the hearing in noise test for the measurement of speech reception thresholds in quiet and in noise. *J Acous Soc Amer* 95:1085–1099.

Magnusson L, Claesson A, Persson M, Tengstrand T. (2013) Speech recognition in noise using bilateral open-fit hearing aids: the limited benefit of directional microphones and noise reduction. *Inter J Audiol* 52(1):29–36.

Wu YH, Bentler RA. (2010) Impact of visual cues on directional benefit and preference: part I—laboratory tests. *Ear Hear* 31(1):22–34.

## ENJOY THIS ARTICLE?

This topic will be a featured session at AudiologyNOW!® 2015, Saturday, March 28, 10:30 am–12:00 pm. View more featured sessions, events, and activities at [www.audiologynow.org](http://www.audiologynow.org).

