CALCULATING HEARING HANDICAP

To the Editor:

In his recent paper, Kryter (1998) reviews selected literature and proposes changes in the way most states calculate hearing handicap for purposes of workers' compensation. I believe these proposals are unjustified.

Kryter’s paper begins with an abstract that states that the 1979 AAO method for hearing handicap (HH) estimation “underestimates measured HH” by 17 to 35 dB. This assertion is not repeated in the text of the paper, nor is it ever apparent where these numbers come from.

Kryter’s key proposal is a change in “low fence” from 25 dB HL to 15 dB HL. He justifies this by citing several studies and by performing some calculations based on articulation index methodology. Two of the cited studies were also used by Kryter in an earlier essay (Kryter, 1973). Published comments at that time by the late Dixon Ward (1973) are still apt: regarding the Nett et al paper (still undated!), Ward said “I await publication with interest” (we still await publication of this mysterious paper). Regarding Kell et al (1971), Ward said:

...the results of Kell et al...strike me as simply irrelevant... That such persons [with pure-tone averages of 39 dB] are handicapped is obvious; only the degree is in question, and the data cited provide us no information on that. This is true because only the relative incidence of “difficulty” is given, not the “percentage missed” or percent handicapped” as judged for himself by each individual, and there is no necessity, clearly, for such figures to correspond at all—for example, 90% of the workers could report that they missed 20% of the speech.

Kryter goes on to cite Robinson et al (1984) and Lutman et al (1987), who showed that even persons with normal hearing (<10 dB HL) reported difficulties in some difficult listening situations (who among us has not missed words from a public address system in a noisy airport?). However, these same authors acknowledge in a later paper (Lutman and Robinson, 1992) that studies of this type were “unsuitable as the basis of a percentage scale of disability because there is no explicit distance between the scale points.”

Kryter’s Figure 3 includes a dotted line said to represent “the average of the various curves plotted on Figure 2 showing percent incorrect words in simple sentences...” The curves in Figure 2 are very different from one another, but the one that comes closest to the dotted line in Figure 3 is taken from Suter (1978), for a speech-to-noise ratio (SNR) of zero (based on average speech peaks compared to steady noise level). It is not too surprising that even people with 0 dB HL pure-tone averages miss a few words (about 15%) when speech peak levels just reach noise level. What is surprising is that Kryter implicitly offers this very difficult situation as “everyday speech communication.” The data of Pearsons et al (1977), reprinted as Kryter’s Figure 1, clearly show that most “real-life” situations were characterized by background noise levels of 50 dBA or less, and that even using Pearson et al’s convention of comparing average speech levels to average noise levels, SNRs were almost always positive, and usually greater than +10 dB. SNRs in terms of peak levels would have been about 3 to 5 dB higher. To base a method for estimation of HH on performance when SNR = 0 is unjustified because this is an unusually difficult listening situation.

Ultimately, common sense and clinical experience compel us to reject the notion that people who have 0 dB HL have a 15 percent HH. Even Kryter eventually backs away from the curves in Figure 3, suggesting that the low fence be set at 15 dB (i.e., 0% HH if the pure-tone average is 15 dB or less). No data are offered in support of the new 15-dB low fence; it appears to be simply arbitrary.

The “adjustment for normal presbycusis” appears (in Fig. 3) to be age correction (subtraction of median age-related thresholds from the subject’s audiogram), followed by calculation of HH. This seems unfair, because in many cases it will result in an obviously handicapped individual being labeled nonhandicapped after age correction. For this reason, age correction of this type has been criticized in several documents of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) and its predecessor organizations (e.g., AAO-HNS, 1998).

In contrast to the procedure inferred from Figure 3 (above), the text seems to describe a different, and more confusing, procedure. Kryter calls for calculation of two HH scores, one based on unaltered hearing levels and the other based on age-corrected hearing levels. The difference between the two HH scores is said to represent the amount of HH attributable to “noise or other non-age factors.” Because the difference between
these scores will be negligible for young people and large for elderly people, it would seem that the difference score might better estimate the age component of HH.

Kryter’s proposal changes the current 5:1 weighting in favor of the better ear to 3:1, and suggests that this is supported by data discussed in “reviews of related research.” In fact, there are no peer-reviewed published data that support a 3:1 better ear weighting. One of the “reviews” he cites (King et al., 1992) never mentioned 3:1 weighting and ultimately recommended a variable weighting (when one ear is normal, and the other is deaf, their weighting is approximately 5:1). The other, his own book (Kryter, 1994; chapter 7), actually recommends a 2:1 weighting based on two papers reviewed: one by Kryter and Archer listed as “in preparation” (a MEDLINE search showed no such publication to date) and another by Harris and Myers (1974), which is an unpublished US Navy report, apparently relating to the influence of simulated unilateral loss on speech reception in extremely poor speech-to-noise conditions. As previously noted, performance deficits seen under the most adverse and unusual listening conditions cannot be considered representative of “everyday” communication. Such data could be given some weight, appropriate to the frequency and importance of the conditions they represent, but should not be the sole basis for determining the characteristics of a method for HH estimation, such as low fence or the better ear:poorer ear ratio.

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REFERENCES


Reply to Dobie

I appreciate the opportunity to reply to the comments of Dobie regarding my paper “Evaluation of Hearing Handicap” (JAAA 9:141–146, 1998). I will attempt to respond in the approximate order in which his comments were given. All bibliographic references are as given in my paper and Dobie’s comments.

Dobie properly criticizes the statement in my abstract that the 1979 AAO method “underestimates measured hearing handicap by . . . 17 dB to 35 dB,” without citing in the text where those numbers come from. The numbers represent the general magnitude and trend of the difference between the measured versus AAO predicted percentage hearing handicap as a function of threshold losses, as shown in Figure 3 of the paper.

Albeit, the Nett et al “paper” is an unpublished progress report; it deserves weight, of course, only if it is consistent with findings, as it is, from published research.

Ward (1973) suggested that the data of Kell et al (which I had discussed in an earlier paper) were “simply irrelevant to the issue [assessment of speech hearing handicap] at hand. . . .” However, Ward did not—as also, apparently,