RELIABILITY AND PREDICTABILITY OF SELF-ASSESSED HEARING AID BENEFIT (F10-PS05B)

Robyn M. Cox*, Izel M. Rivera, and Suzanne House
Department of Veterans Affairs Medical Center *and Memphis State University, Memphis, TN.

INTRODUCTION

To evaluate the success of a hearing aid fitting, audiologists sometimes administer a questionnaire in which the hearing aid wearer gives his/her subjective opinion about the extent to which the instrument helps in daily life.

Because the judgement of the wearer is the ultimate criterion of fitting success, this approach has much intuitive appeal.

Nevertheless, both clinicians and researchers may be skeptical about the validity of self-assessed benefit data. It seems possible that such data may be unreliable, or biased by factors such as the individual's adaptation to hearing loss. For example, individuals who tend to deny that they have a hearing loss may also tend to deny that a hearing aid provides benefit.

This study was undertaken to evaluate some of these issues for self-assessed hearing aid benefit obtained using the Profile of Hearing Aid Benefit (PHAB).

Research Questions:

1. Can self-assessed benefit be predicted from
   a. Reported unaided difficulties
   b. Adaptation to hearing loss?
2. How reliable is self-assessed benefit over time?

THE PROFILE OF HEARING AID BENEFIT (PHAB)

Number of items = 66
Responses = 2 per item
Response 1 = "without hearing aid"
Response 2 = "with hearing aid"
Benefit = Response 1 minus response 2

Subscales:

* *Familiar Talkers (FT)*: communication under relatively easy listening conditions with persons whose voices are known.
* *Ease of Communication (EC)*: effort involved in communication under relatively easy listening conditions.
* *Reverberation (RV)*: speech understanding in moderately reverberant rooms.
* *Reduced Cues (RC)*: speech communication without visual cues or when intensity is low.
* *Background Noise (BN)*: speech understanding in the presence of multitalker babble or other environmental competing noise.
* *Aversiveness of Sounds (AV)*: negative reactions to environmental sounds.
* *Distortion of Sounds (DS)*: quality of voices and other sounds.

METHOD

Subjects:
Fifty-eight hearing aid wearers with a mean age of 68 years.

Distribution of audiometric data, in percent.

	Slope (dB/octave)			
SRT	<6	6-14	>14	Total
<40	2	22	26	50
40-60	9	21	14	44
>60	3	3	0	6
Total	14	46	40	100

Distribution of hearing aid experience and daily use, in percent.

Hearing Aid Experience	Use (hours/day)				
	<1	1-4	4-8	8-16	Total
6wks-11mos	0	2	0	2	4
1 - 10 yrs	5	17	22	28	72
>10 yrs	0	2	8	14	24
Total	5	21	30	44	100

Procedure:

1. Self-assessed hearing aid benefit was measured using the PHAB. There were 7 scores for benefit, one for each subscale.
2. Reported unaided difficulties were quantified using the "without hearing aid" responses to the PHAB. There were 7 scores for unaided problems, one for each subscale.
3. Adaptation to hearing loss was measured using 13 scales of the Communication Profile for the Hearing Impaired (CPHI, Demorest & Erdman, *JSHR*, 29:515-535, 1986). These were combined to produce three composite CPHI scores, as shown in the box below.
4. Twenty-eight subjects completed the PHAB two more times, separated by an average of 12 weeks (1st vs. 2nd administration) and 23 weeks (2nd vs. 3rd administration).

CPHI COMPOSITE SCORES:

Comstr: (Maladaptive Behaviors + Verbal Strategies + Nonverbal Strategies)/3.
Peradj: (Self-acceptance + Acceptance of loss + Anger + Displacement of Responsibility + Exaggeration of Responsibility + Discouragement + Stress + Withdrawal)/8.
Proden: (Problem Awareness + Denial)/2.

RESULTS: PREDICTABILITY OF BENEFIT

Multiple regression analyses were performed for each subscale to determine the extent to which benefit could be predicted from reported unaided problems and/or the three composite CPHI scores: comstr, peradj, and proden.

For the five subscales that reflect speech understanding, only the proportion of unaided problems made a significant contribution to prediction of benefit.

Subscale & Equation	S_{ee}	r
FT = .70(UFT)*-3.8	11.1	.79
EC = .52(UEC)-1.2	16.3	.58
RV = .40(URV)+0.5	17.4	.32
RC = .29(URC)+1.0	11.9	.27
BN = .43(UBN)-3.2	14.9	.41

* Subscale unaided score

This table shows the equation that can be used to predict benefit for each subscale from the reported unaided problems for that subscale. The standard error of estimate and the correlation coefficient for each relationship are also shown.

Because all of the equation constants are small, it is reasonable to conclude that typical benefit for each subscale was essentially a constant proportion of the reported unaided problems. It is interesting to note that the hearing aids produced the greatest relief (about 50-70%) for unaided problems with speech understanding in relatively easy listening situations (subscales FT & EC). When the listening environment was more difficult (subscales BN, RC, and RV), hearing aids gave less relief (about 30-40%).

Note also that the correlation coefficients are quite modest. This indicates that a large proportion of the variance in benefit cannot be accounted for by reported unaided problems. Other variables that could be related to self-assessed benefit include specific hearing aid fitting, psychoacoustic abilities, and aspects of personality.

For the two subscales that reflect the quality and aversiveness of environmental sounds, DS and AV, two variables contributed to benefit prediction: unaided problems and proden.

Subscale	Predictor added	Multiple r
AV	Unaided probs.	.41
	Proden	.54
DS	Unaided probs.	.48
	Proden	.57

The direction of the relationship between benefit and proden was negative. This suggests that individuals who are more willing to make negative self-appraisals may also be more willing to evaluate a hearing aid in a negative way.

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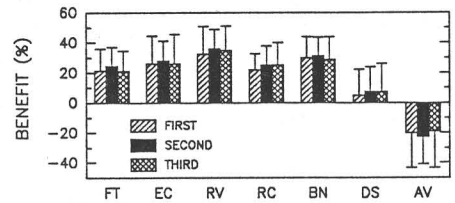
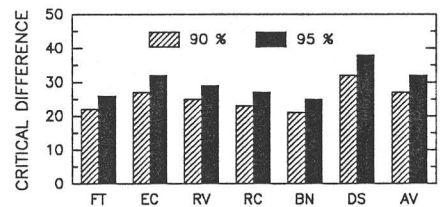
RESULTS: RELIABILITY OF BENEFIT



The Figure above shows means and standard deviations of benefit scores for each of the three administrations of the PHAB. The mean differences were not statistically significant, suggesting that self-assessed benefit was reliable for the group as a whole.



This Figure depicts critical differences (CDs) for each subscale, computed from test-retest differences. The CDs were large considering the likely size of benefit differences between, say, two different prescriptions. These data suggest that, when administered on an individual basis, the PHAB will be sensitive to large differences between hearing aid conditions but it will not detect small differences between conditions.

Comparison with other published data indicates that the reliability of benefit measured using the PHAB is similar to reliability reported for other subjective instruments used with hearing-impaired persons.

CONCLUSIONS

1. Self-assessed benefit for the speech communication subscales of the PHAB was significantly related to reported magnitude of unaided difficulties but not to adjustment to hearing loss.
2. Self-assessed benefit for the sound perception subscales of the PHAB was predicted best using a combination of reported magnitude of unaided difficulties and one CPHI-based measure of adjustment to hearing loss.
3. Reliability of self-assessed benefit over 3 to 6 months was good on a group basis but limited for individuals.