Does Acceptable Noise Level Predict Hearing Aid Success?

Kathryn Shaughnessy Schwartz and Robyn M. Cox

Old Dominion University, Norfolk, VA and The Hearing Aid Research Laboratory, University of Memphis, Memphis, TN

Presented at the American Auditory Society Convention, Scottsdale, AZ, March 2012

Rationale

Audiologists and consumers both desire the ability to predict hearing aid success prior to purchase. Nabelek al. (1991) hypothesized that a person who accepts more background noise will be more successful with hearing aids. To explore this, they developed the Acceptable Noise Level (ANL) test, which measures a person’s acceptance of background noise.

An ANL score of 7 or less has been reported to predict hearing aid success with 85% accuracy (Nabelek et al. 2006). This prediction rule was based on logistic regression exploring the relationship between ANL scores and hearing aid success, when success was determined using a single question about hearing aid use. Many researchers have studied the elements of hearing aid success and have generally found that hearing aid success is multi-dimensional, including, for example, hearing aid use, satisfaction, benefit, and quality of life. The ANL test is gaining widespread popularity, however little research has been done to substantiate the accuracy of the prediction of hearing aid success.

Research Purposes

1. To substantiate the relationship between ANL score and hearing aid use, satisfaction, benefit, and quality of life.

2. To assess the extent to which the ANL score predicts hearing aid use when success is quantified using other standardized outcome measures.

METHODS

Subject Description

- 50 subjects with sensorineural hearing loss
- Mean age: 68 years
- Range: 40 – 82 years
- All at least 6 months of bilateral hearing aid experience

Predictor Variable

Acceptable Noise Level

Stimuli: ANL Test CD (purchased from Frye Electronics)
Condition: Unaided
Instructions: Standard
ANL score: Average of 2 measurements

Independent Variables

Measuring Hearing Aid Success

- 5 standardized hearing aid outcome measures.
- All questionnaires were administered prior to speech testing
- Questionnaire order was randomized to minimize bias

OUTCOMES

Success Criteria

A criteria was set to determine hearing aid success for each of the 4 types of outcome measures.

1. Hearing Aid Use

Nabelek al. (2006): Successful = Choose #1
- I wear my hearing aids whenever I need them.
- I only wear my hearing aids occasionally.
- I do not wear my hearing aids.

2. Satisfaction

Satisfaction with Amplification in Daily Life Scale (SADL)
- Scored on a 7 point scale
- Of 5, 6, or 7 are associated with “satisfied” or “very satisfied” with hearing aids (Cox et al., 2001)
- Successful = Score of 5, 6, or 7

3. Quality of Life

Psychosocial Impact of Assistive Devices Scale (PIADS)
- Change in quality of life (QOL)
- Scored on a 7 point scale
- Of 1, 2, or 3 indicate a positive change in QOL
- Successful = Score of 1, 2 or 3

4. Benefit

- Measures reduction in problems
- Successful = Unaided (UA) minus Aided (A) benefit
- Relative benefit >25% of unaided problems

Abbreviated Profile of Hearing Aid Benefit (APHAB)
- Subjective speech communication
- Successful = relative benefit >25% of unaided problems

Speech in Noise (QuickSIN)
- Objective word understanding
- Successful = relative benefit >25% of unaided errors

PROCEDURE

Questionnaire Administration

All questionnaires were administered prior to speech testing.

Speech Testing Administration

QuickSIN: 6 Lists Unaided, 6 Lists Aided
Presentation Level: 50 dB HL
Scoring: Number of target words incorrect
Order was randomized to minimize bias

DISCUSSION

Accurate Prediction of HA success based on ANL score was not very accurate in this study. The high success rate (85%) reported by Nabelek et al. was not substantiated. However, the current study and the Nabelek et al. study were both retrospective studies. A prospective study is needed to conclusively test the effectiveness of the ANL score as a predictor of hearing aid success.

REFERENCES

Please contact kshaughnessy@odu.edu for further information.