Relationship between Acceptable Noise Levels and Hearing Aid Success

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INTRODUCTION

Rationale

Audiologists and consumers both desire the ability to predict hearing aid success prior to purchase. Poor success with hearing aids can occur for several reasons, but the primary reason is difficulty understanding speech in the presence of background noise. In 1991, Nabelek et al. hypothesized that a person who accepts more background noise will be more successful with hearing aids. The researchers developed the Acceptable Noise Level (ANL) test, to test their theory on speech in noise tolerance. The ANL test measures a person’s acceptance of background noise. The ANL test is proposed to predict hearing aid success. Developers of the ANL test have used a single question about HA use as the measure for hearing aid success. One limitation of this application is that HA use encompasses only one aspect of HA success. Many researchers have conducted studies on the components of HA success and found that hearing aid success is multi-dimensional. Based on a review of the literature, a working definition of HA success was created for this study using seven different outcome domains. The purpose of this study was to investigate the association between ANL scores and hearing aid success, when hearing aid success is defined using a multi-dimensional format.

Research Questions

1. To what extent are the seven outcome domains of hearing aid success associated with ANL scores?
2. Can clinically obtained ANL scores allow audiologists to predict whether a patient will be successful with hearing aids?

METHODS

MEASURING HEARING AID SUCCESS

Although no universal description of hearing aid success has been published, extensive literature review revealed seven hearing aid outcome domains that contribute to hearing aid success. One test was chosen to measure each domain.

Outcome Domain Abbreviation

Objective Speech Benefit

Subjective Speech Benefit

PIADS

Psychosocial Impact of Assistive Devices Scale

SADL

Satisfaction with Hearing Aid Benefit (AV Scale)

HHIE

Hearing Handicap Inventory for the Elderly

Residual Problems

HHEE

Hearing Handicap Inventory for the Elderly

Hearing Aid Use

USE

Subjective Outcome

Device Oriented Subjective Outcome (Use Subscale)

Change in Quality of Life

PIADS

Psychosocial Impact of Assistive Devices Scale

SADL

Satisfaction with Hearing Aid Benefit (AV Scale)

ANL Test

Previous published research indicates that the ANL test is related to outcomes including: Hearing Aid Use, Subjective Speech Benefit, and hearing residual problems. The ANL test is proposed to predict hearing aid success. The ANL test is conducted in a double-walled sound room.

PROCEDURE

Outcome Variables

Questionnaire Administration

All questionnaires were administered prior to speech testing.

Questionnaire order was randomized to minimize bias

QAISN Administration

Conditions: Unaided and Aided (Bilateral)

Stimulus level: 50 dBHL

Listening conditions and lists were controlled to minimize learning and fatigue effects

6 QSIN lists per condition (aided and unaided)

Scoring calculated by total words correct (each condition)

Speech Test Set-Up for ANL and QSIN

1 Meter

Negative Reaction to Environmental Sounds

Factor 3 is related to intolerance of unwanted sounds

ANL Score

Figure 1: Measuring Hearing Aid Success

RESULTS

1. To what extent are the seven outcome dimensions of hearing aid success associated with ANL scores?

Correlation Between Each Outcome Domain and ANL Score

<table>
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<tr>
<th>Domain</th>
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<th>p</th>
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<tbody>
<tr>
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<td>-0.28</td>
<td>.06</td>
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<td>SADL</td>
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<td>USE</td>
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<td>.03</td>
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<tr>
<td>PIADS</td>
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<tr>
<td>USE</td>
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<td>HHIE</td>
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Factor Analysis results indicate that:

(1) ANL scores are significantly associated with aversiveness to loud sound.

(2) The ANL score is not significantly related to any of the other six outcome domains.

2. Can clinically obtained ANL scores allow audiologists to predict whether a patient will be successful with hearing aids?

Factor Loading of the 7 Outcome Domains

Factor 1

Factor 2

Factor 3

Correlation of the 3 Factor Scores and ANL Score (N=42)

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The ANL test is proposed to predict hearing aid success. Although no universal description of hearing aid success has been published, extensive literature review revealed seven hearing aid outcome domains that contribute to hearing aid success. One test was chosen to measure each domain. The ANL test is conducted in a double-walled sound room.

REFERENCES


Please contact Kathryn Shaughnessy Schwartz for further information. PDF version of this poster can be obtained at http://www.ausp.memphis.edu/harl/