

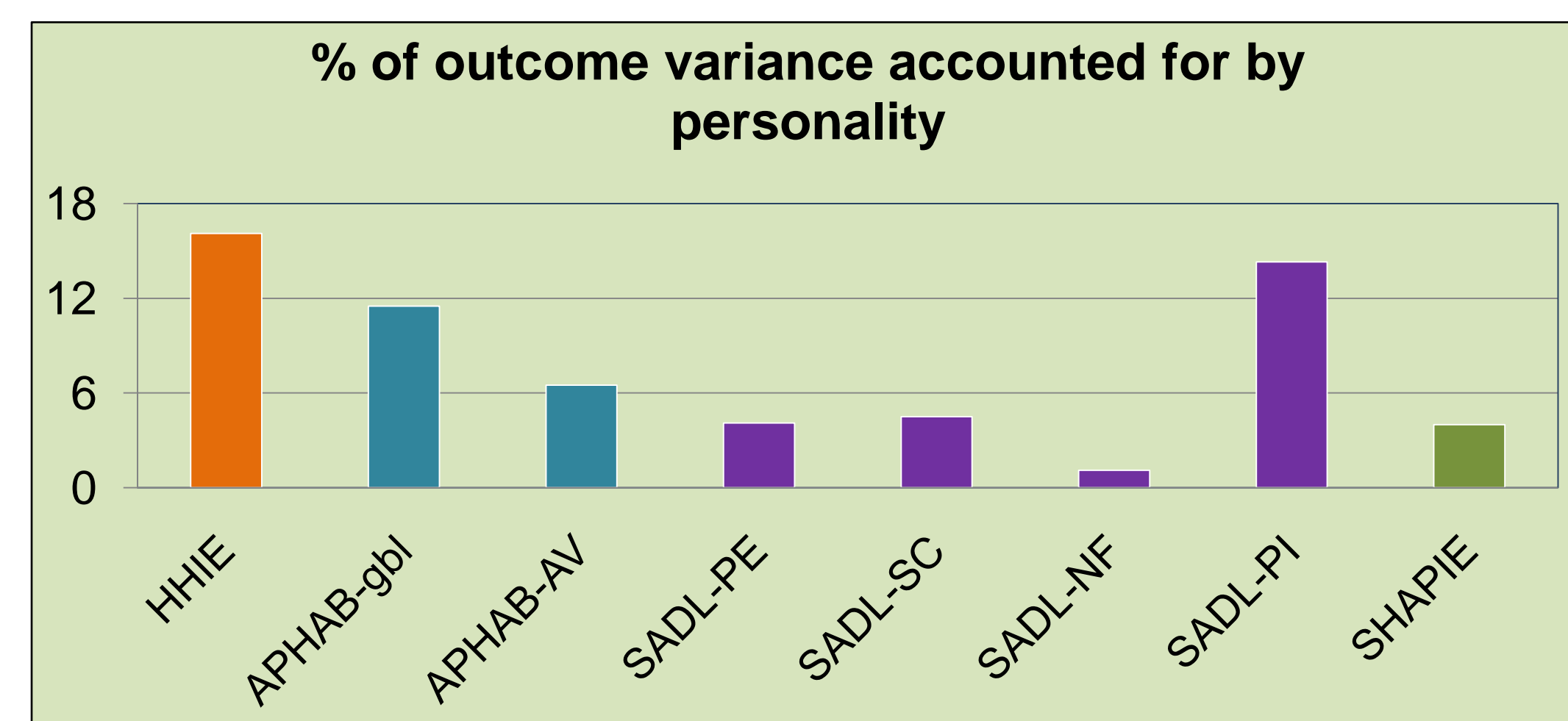
Development of the Device-Oriented Subjective Outcome (DOSO) Scale

Robyn M. Cox, Genevieve C. Alexander & Jingjing Xu
 Hearing Aid Research Laboratory, University of Memphis, Memphis, TN
 Presented at the American Auditory Society Convention, Scottsdale, AZ, March 2009

WHY DO WE NEED ANOTHER QUESTIONNAIRE?

Research from our laboratory has indicated that many self-report outcome measures are associated with the personality of the hearing aid wearer. To illustrate this, the figure below depicts the extent to which outcome data from several popular questionnaires can be attributed to personality (Cox et al, 2007).

- Notice that questionnaires differ in the strength of their link to personality (eg., HHIE versus SHAPIE).
- Also note that even within a questionnaire (eg., the SADL), some subscales are more closely linked to personality than others.



Our studies have shown that, regardless of the outcome domain (handicap, benefit, satisfaction, etc.), self-report hearing aid outcomes fall into two broad categories: We call them device-oriented and wearer-oriented. Wearer-oriented outcomes are associated with user personality, but device-oriented outcomes are not (or very little).

This association between personality and subjective outcomes is a problem for certain applications especially when we wish to measure differences between hearing aids or technologies.

Because they depend partly on the personality of the hearing aid patient, wearer-oriented outcomes are not very sensitive to differences between hearing aids. As a result, wearer-oriented outcomes are not optimal for use in clinical trials of new technology or processing strategies.

There are no existing questionnaires that are known to be primarily device-oriented and relatively free of personality influence. In this poster, we describe the development of a questionnaire that is intended to be device-oriented.

DEVELOPMENT OF ITEMS

From previous research, it appeared that the wording of the items is important in determining whether the item will elicit wearer-oriented or device-oriented data. Items can be fashioned to "point" towards the wearer or towards the hearing aid (device). This is demonstrated in the table below.

Data	Item
Device-oriented	"how well does the hearing aid separate speech from noise"?
Wearer-oriented	"how well do you understand speech in a noisy place"?

Seventy-five potential questionnaire items were developed using the strategy of "pointing" towards the hearing aid, whenever possible.

DATA COLLECTION & ITEM SELECTION

Subjects

- Two groups of subjects were used for data collection:
- Field subjects – 189 current hearing aid wearers recruited from audiology practices (2004-5).
 - Laboratory subjects – 117 individuals who were fitted with bilateral hearing aids for field trials (2004-6).

Analyses

- Five items were omitted by >10% of subjects, so these items were eliminated, leaving 70 items.
- Eleven subjects omitted more than 10 of the remaining items, so these subjects were eliminated, leaving 295 subjects.
- Missing Value Analysis (MVA, SPSS version 16) was run to explore the patterns in the few remaining missing data points. This resulted in deletion of four more items, leaving 66.
- MVA was used for data imputation to replace the remaining missing data points (1.4% of items).
- Principal Components Analysis was run with 66 items and 295 subjects.
- Six components (capturing 64% of the outcome variance) satisfied theoretical and construct validity requirements and were retained.
- Items were selected from each component to comprise six subscales.

SUBSCALES & PSYCHOMETRIC PROPERTIES

Subscale Name	Number of Items	Cronbach's Alpha
Speech Cues A	7	.94
Speech Cues B*	7	.94
Listening Effort A	5	.89
Listening Effort B*	5	.86
Quietness	5	.87
Pleasantness	4	.86
Convenience	4	.67
Use	3	.71

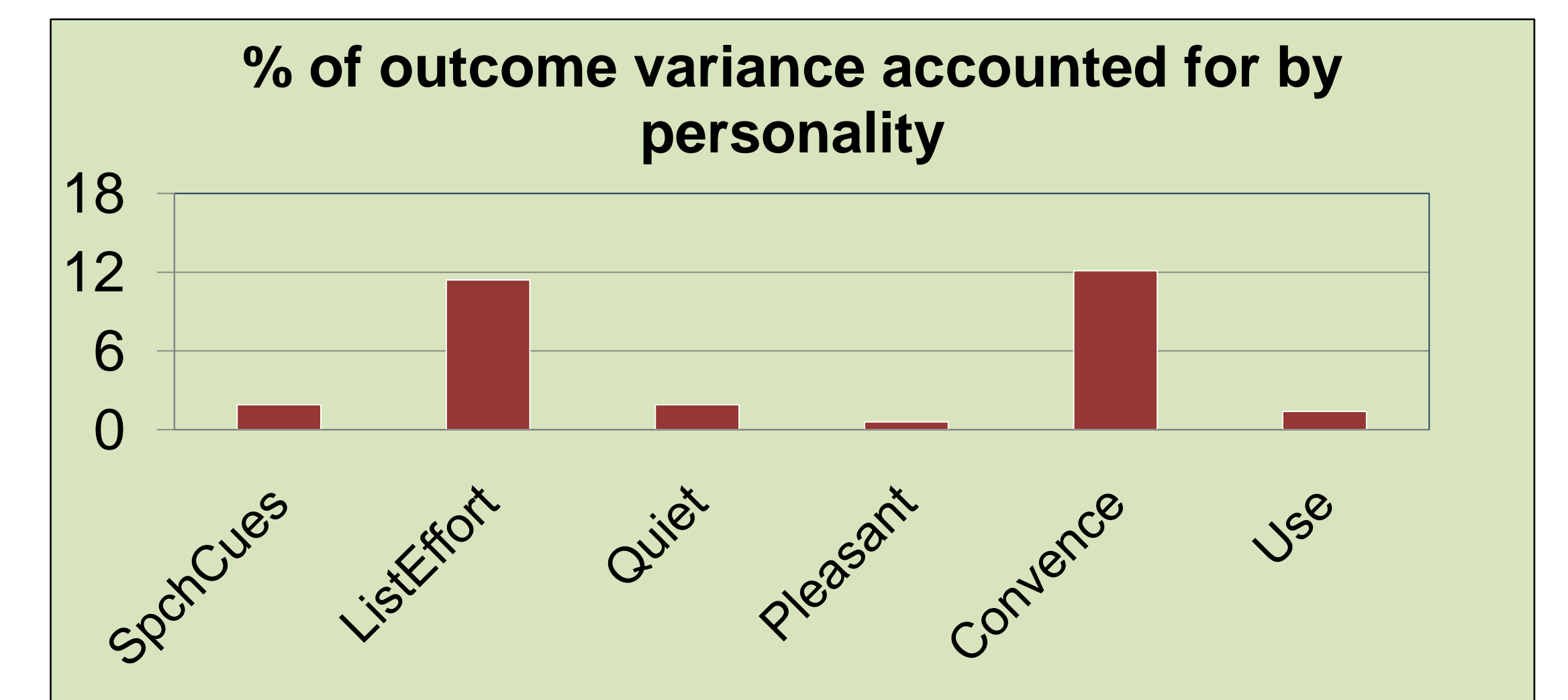
*Two subscales (Speech Cues and Listening Effort) each have 2 equivalent forms (A & B). This allows for test-retest applications, for example. An alternative questionnaire format is to combine all the items from both forms of these 2 subscales (and exclude the remaining 4 subscales). This yields a 24 item questionnaire with 2 subscales.

TYPICAL SUBSCALE ITEMS

How good are the hearing aids at.....	
Speech Cues	Picking up what strangers say the first time?
Listening Effort	Making conversation easier?
Quietness	Keeping background noise to a minimum?
Pleasantness	Making your voice sound natural to you?
Convenience	Not using up batteries too fast?
Use	How many days a week do you usually wear hearing aids?

ARE DOSO SCORES INDEPENDENT OF PERSONALITY?

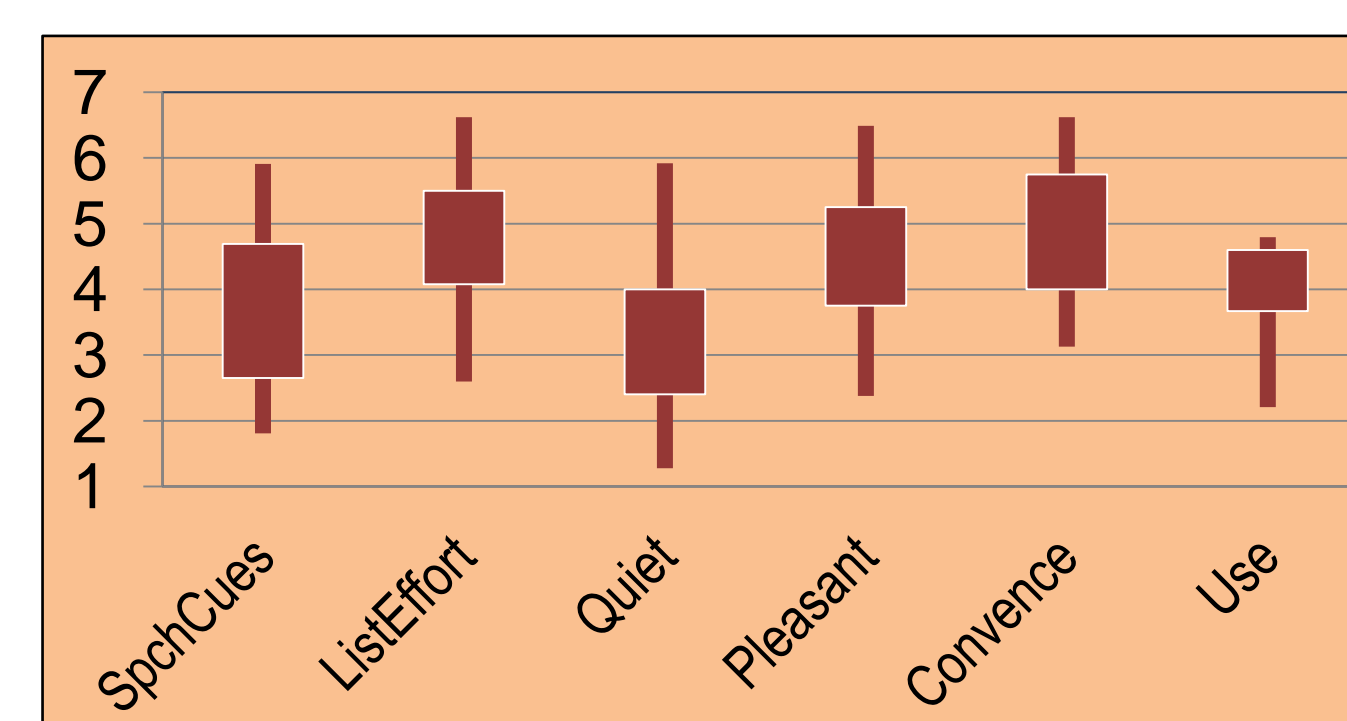
A definitive answer to this question is not yet available. However, interim data are given below showing the association between scores on the PANAS personality test and the DOSO subscales.



These data suggest that four subscales are independent of personality, but the Listening Effort and Convenience subscales are associated with personality. Further research is needed on this question.

INTERIM NORMS FOR DOSO

Data from the field subjects were used to compute interim norms for the DOSO subscales. The DOSO is scored on a 1 (worst) to 7 (best) scale. The boxed area depicts the middle 50%. Bars show the 5th to 95th percentile range of scores.



ACKNOWLEDGEMENTS



1. Audiologists who assisted with recruitment of field subjects were:
 - Erin Wright, Au.D., Broadmead Hearing Clinic, Victoria, BC
 - Chuck Whitfield, M.S., Audiologist
 - Lorra Pettit Au.D., Audiology Associates, Monroe, LA.
2. The experimental studies that provided the laboratory subjects were supported by NIDCD R01DC006222, and by the Eriksholm Research Center, Denmark.
3. A PDF-version of this poster can be obtained at <http://www.ausp.memphis.edu/harl/>