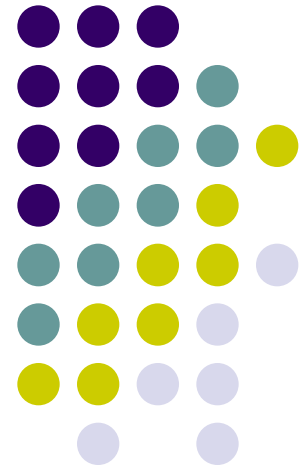
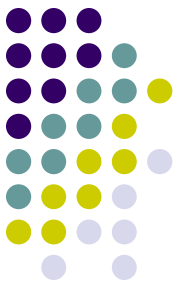


APHAB norms for WDRC hearing aids

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G. Alexander

The University of Memphis,
AuD Research Project, April, 2006

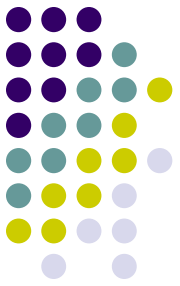




Introduction

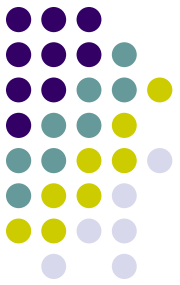
- In the present climate of consumer-driven healthcare, quality of service is determined in large through client opinion; which may be obtained using systematic self-report outcome measures.
- One such self-assessment measure is the Abbreviated Profile of Hearing Aid Benefit (APHAB) (Cox & Alexander, 1995). This outcome measure assesses residual activity limitations for hearing impaired individuals who have received amplification.

APHAB Norms



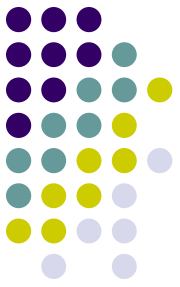
- Normative data for this outcome measure were obtained in 1995, using elderly hearing impaired subjects who wore 1990-era mostly linear hearing aids.
- Current hearing-impaired clients are predominantly fit with compression-capable hearing aids; for this reason different normative data may be needed for the APHAB using hearing aid wearers fit with current compression strategies.

Purpose



- This project has two purposes:
 - 1. To determine if the responses to the APHAB by users of WDRC-capable hearing devices are significantly different from the responses by linear hearing aid users
 - 2. To determine if normative values used for WDRC hearing aid users should be different from the 1995 norms

Abbreviated Profile of Hearing Aid Benefit (APHAB)



- The APHAB is a 24-item self-assessment inventory in which patients report the amount of trouble they are having with communication or noises in various everyday situations.
- The APHAB was developed to be used as part of a hearing aid fitting procedure, to provide a standardized test for quantifying the disability associated with the hearing impairment of a patient. It has been used clinically and for research purposes since its development in 1995.

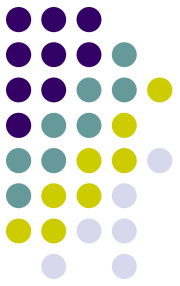


APHAB Subscales

- The APHAB produces scores for 4 subscales: Ease of Communication (EC), Reverberation (RV), Background Noise (BN) and Aversiveness of Sounds (AV).
 - EC, RV and BN describe speech understanding in different listening environments.
 - AV describes negative reactions to environmental sounds.

(Cox & Alexander, 1995)

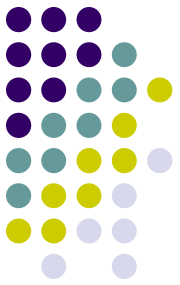
Client Responses



- Each item of the APHAB contains a statement for which the client must decide how often the statement is true.
- The client is given a list of seven descriptors associated with a percentage to help the client interpret the word.

APHAB Response Scale

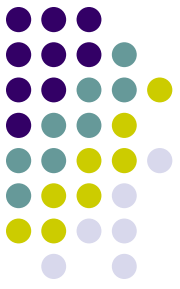
- A. Always (99%)
- B. Almost Always (87%)
- C. Generally (75%)
- D. Half-the-time (50%)
- E. Occasionally (25%)
- F. Seldom (12%)
- G. Never (1%)



Calculating Scores

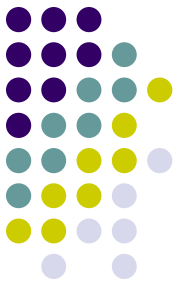
- Each item is answered for “without my hearing aid” and “with my hearing aid” so that each subscale produces a score for unaided listening and a score for aided listening.
- Benefit is calculated by comparing the patient’s reported difficulty in the unaided condition with their amount of difficulty when using amplification.

Study design

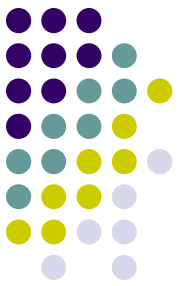


- This study was a multi-site cross-sectional survey; using hearing impaired individuals aged 60 years old or older who had been fit bilaterally with wide-dynamic-range-compression-capable hearing aids between six and eighteen months prior to recruitment.
- Subjects were identified by seven separate participating private practice audiologists. They were located in California, Georgia, Louisiana, Michigan, Tennessee and Texas.

Data were collected from these sites in the following manner:



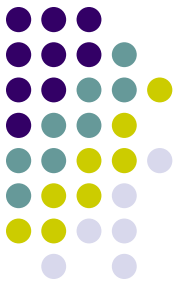
- Sampling Method:
 - Audiologists were asked to identify clients aged 60 and older, fit bilaterally with WDRC-capable hearing aids.
 - Audiologists identified all clients who met these criteria who were fit in December, 2004 and worked backward until they had identified 50 consecutive clients or until they reached clients fit prior to June, 2003.
 - Audiologists were specifically asked to identify all clients who met the inclusion criteria.



Data Collection (con'd)

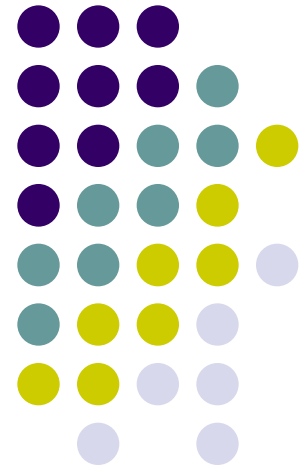
- Surveys were sent by mail to the addresses of potential participants by cooperating private clinic audiologists.
- Prospective participants received a letter attached to the survey which explained the purpose of the research project.
- Those who chose to do so mailed their completed surveys to the Hearing Aid Research Laboratory.
- Participants were given the opportunity to provide their names and mailing addresses in order to receive free hearing aid batteries in the mail.

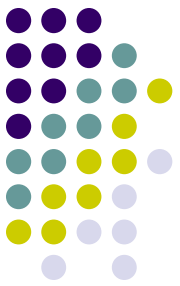
Subjects



- 321 surveys were mailed to those subjects who met the inclusion criteria
- 154 subjects returned completed APHABs
- From this group of questionnaires, only those subscale scores with at least 4 out of 6 questions completed were analyzed
- 146 of the returned surveys contained valid data

Results and Discussion



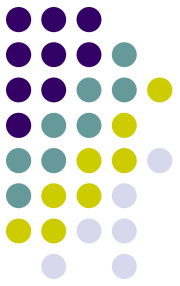


Results and Discussion

- It was decided that normative data would be generated using information from all of the known successful hearing aid users.
- “Success” is defined here as:
 - Daily use of amplification for more than 4 hours per day
 - Hearing aid experience greater than 1 year
- This yielded 117 successful subjects.

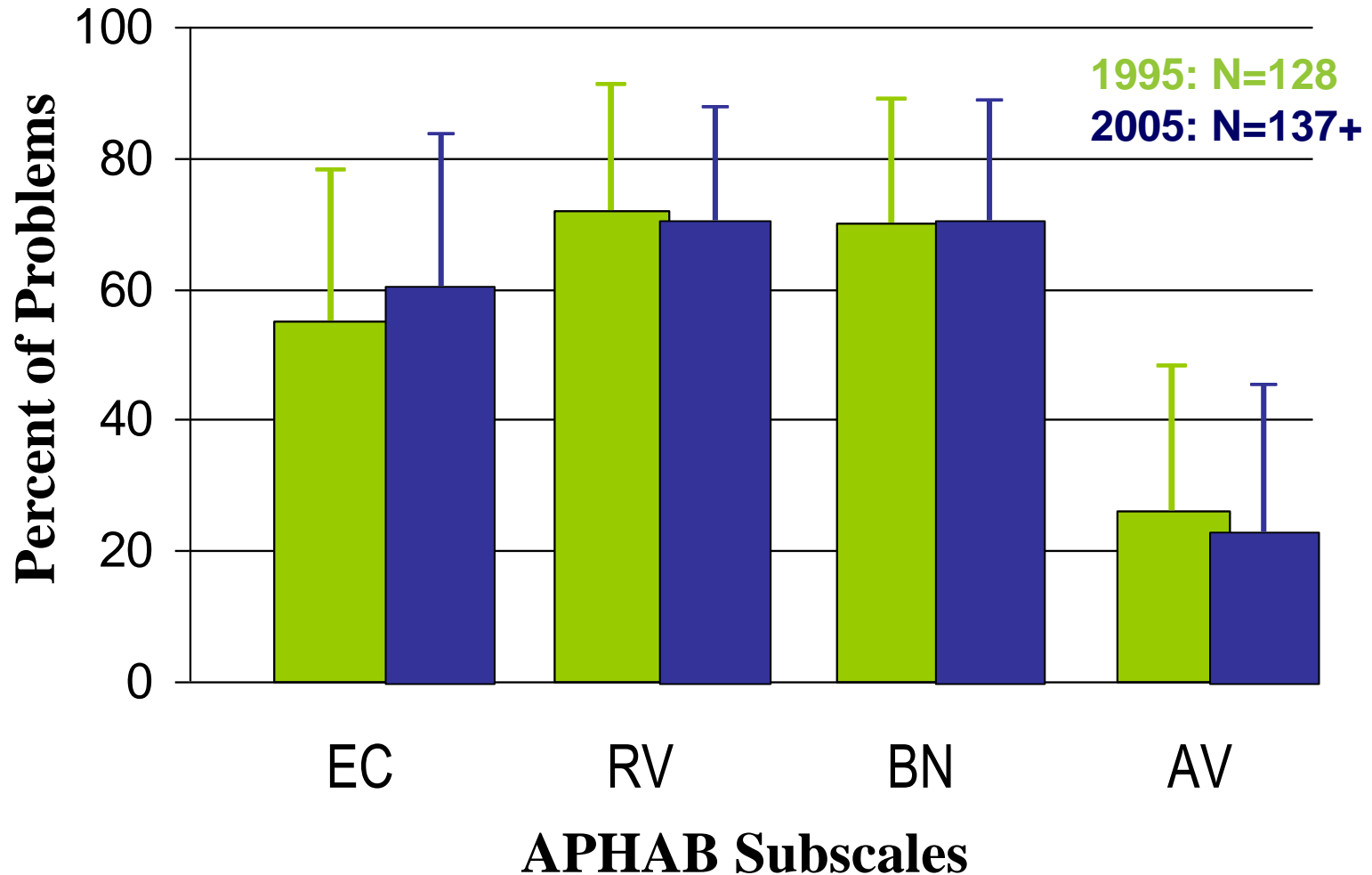
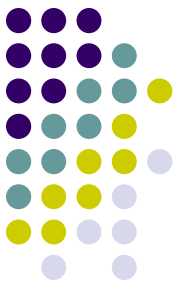
Results and Discussion

(con'd)

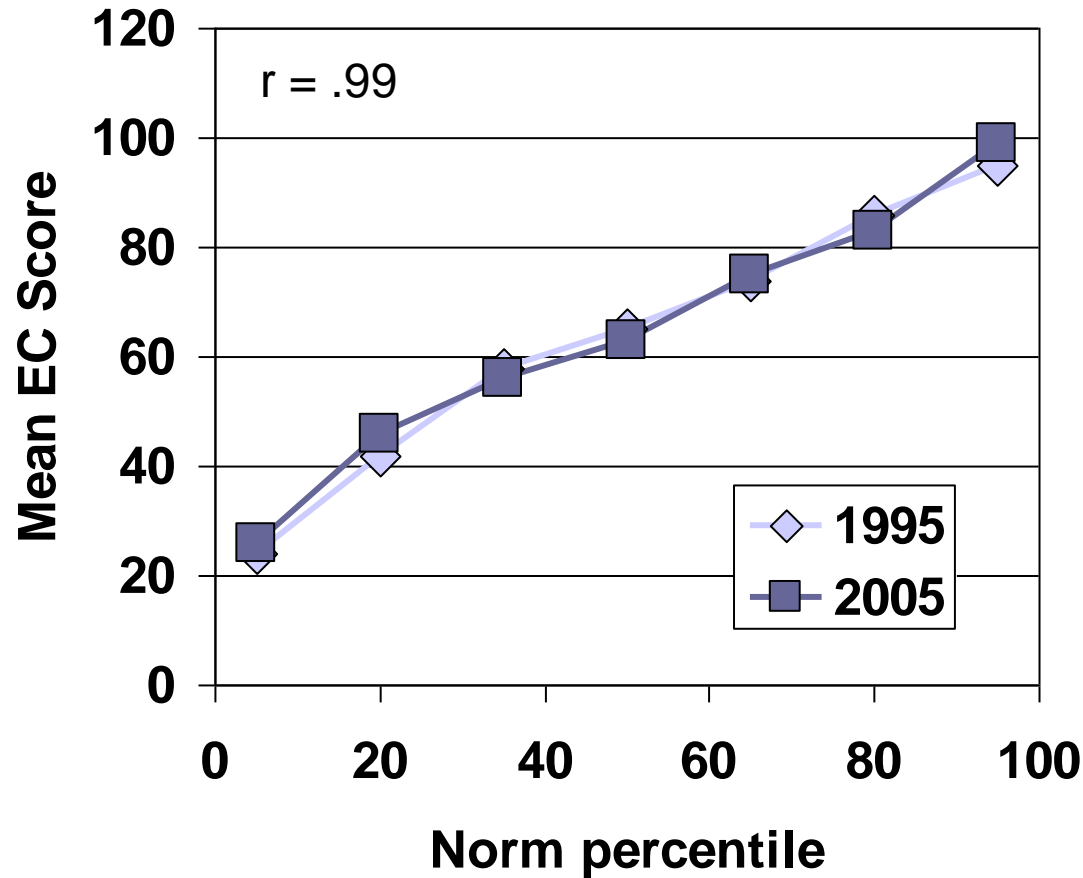
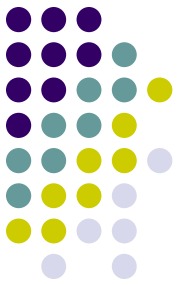


- Comparisons of mean data were made between the 1995 and 2005 questionnaire results for all subjects (1995: N=128; 2005: N=142).
- Comparisons of 5th - 95th percentiles were made between 1995 and 2005 norms using data from successful subjects (1995: N=55; 2005: N=117).

Unaided Responses: 1995 (green) vs 2005 (blue)

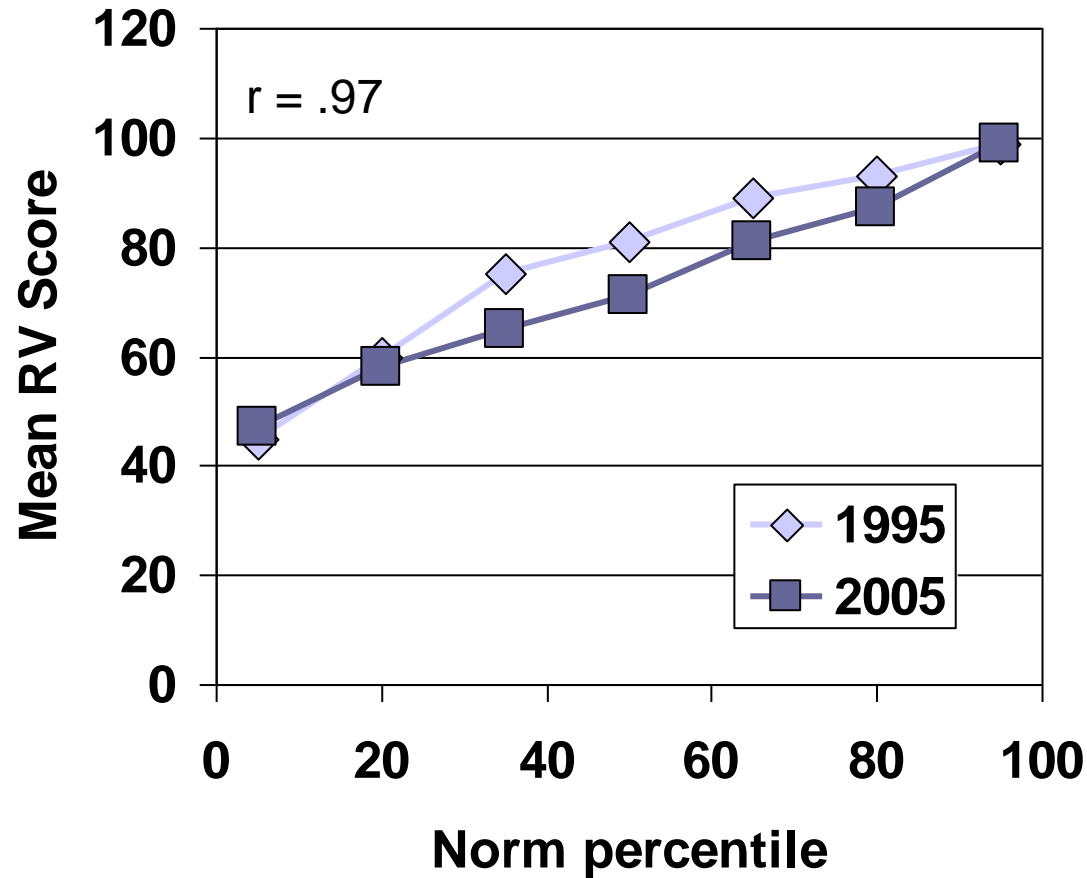
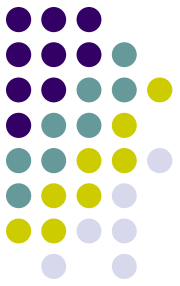


Unaided EC Norms



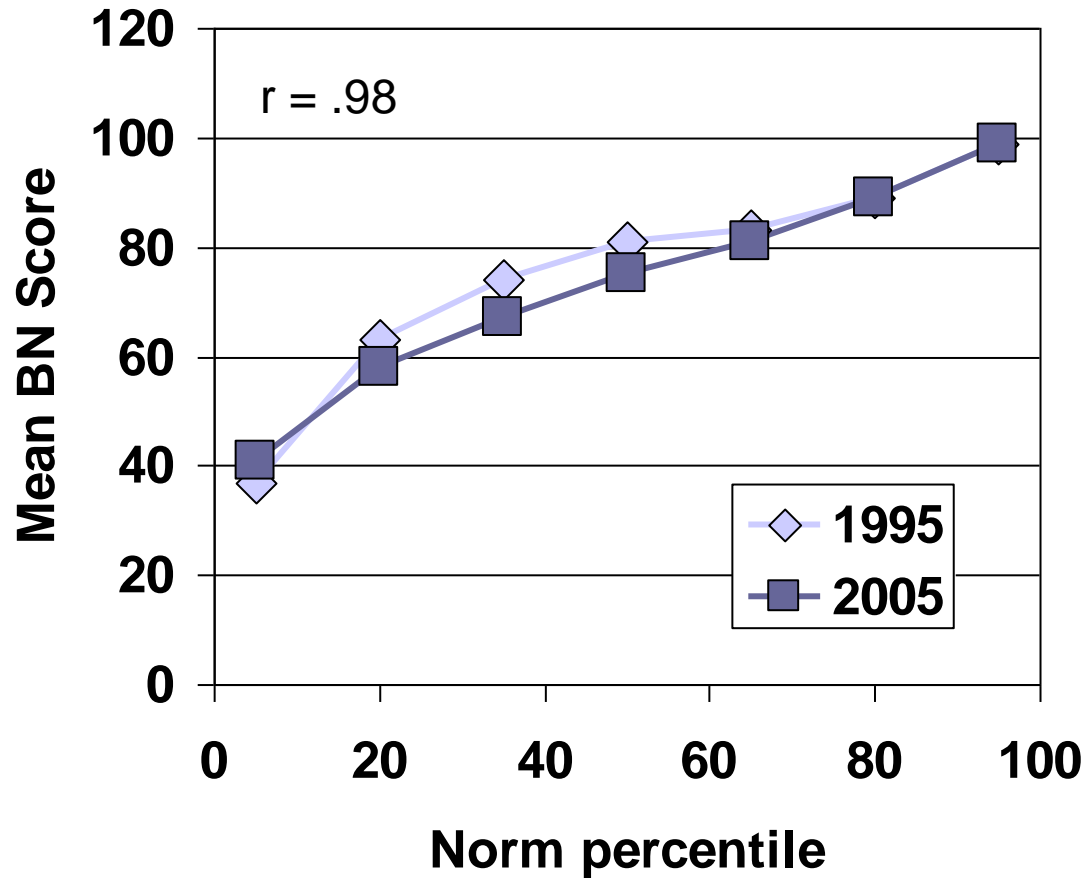
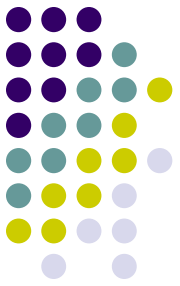
1995: N = 55
2005: N = 110

Unaided RV Norms



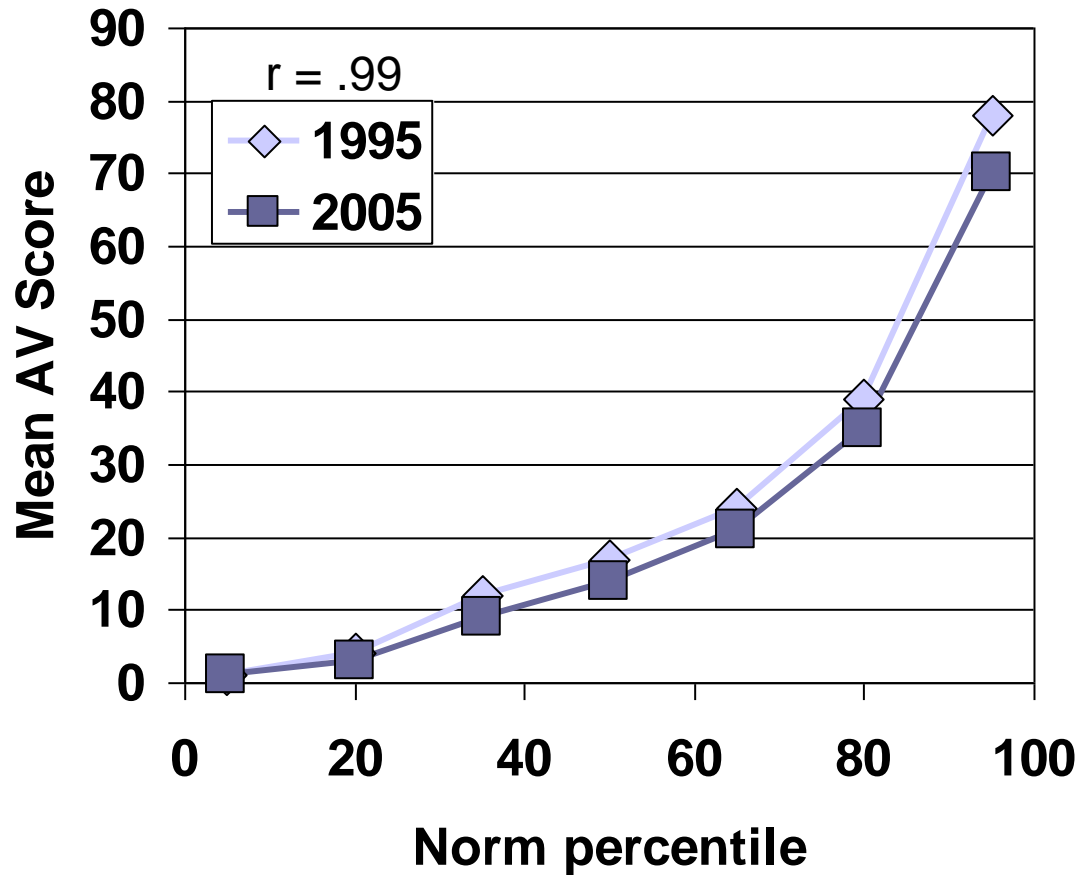
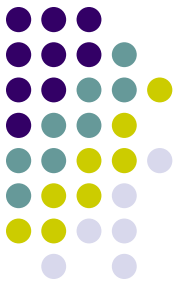
1995: N = 55
2005: N = 107

Unaided BN Norms



1995: N = 55
2005: N = 108

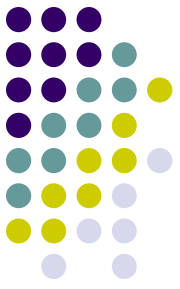
Unaided AV Norms



1995: N = 55
2005: N = 107

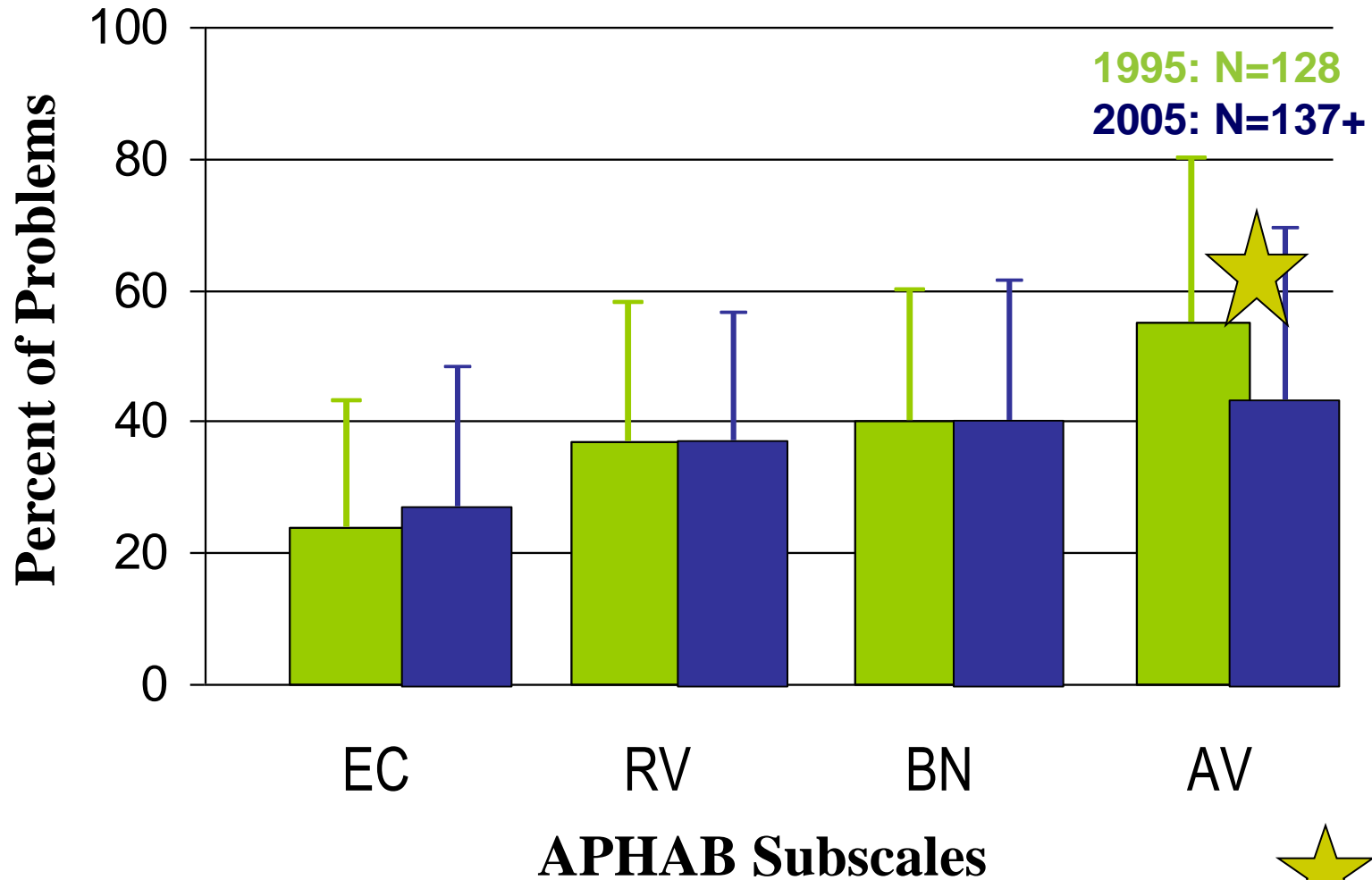
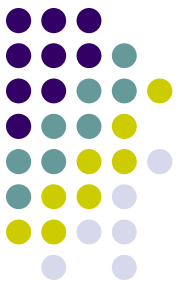
Discussion:

Unaided Comparisons

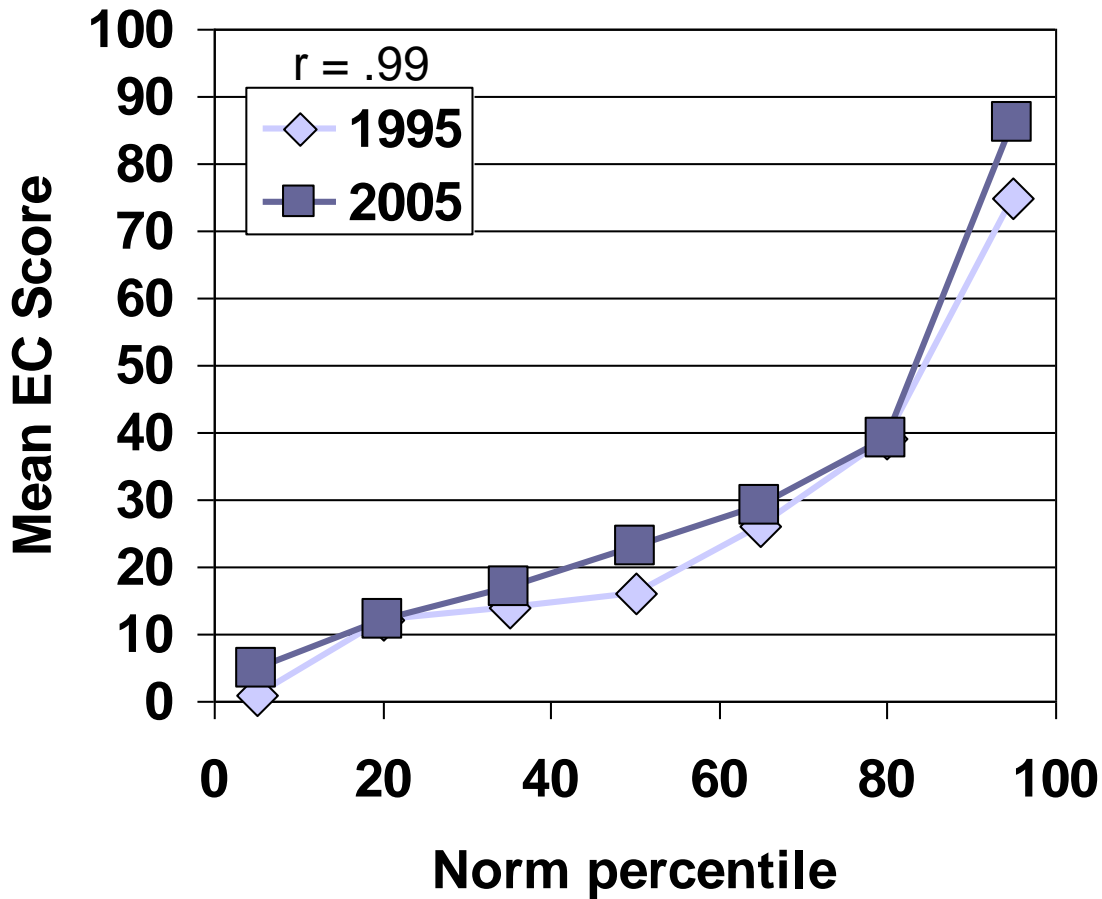
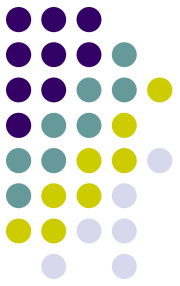


- Comparisons of mean unaided scores from successful wearers of linear hearing aids and successful wearers of WDRC-capable hearing aids suggest similar hearing difficulty in both populations without the use of amplification for all subscales.
 - These similarities indicate that hearing aid wearers' perceptions of their degree of hearing difficulty without amplification has not changed over that period; therefore, post-amplification responses should not be influenced by pre-amplification differences in the degree of hearing difficulty between populations.

Aided Responses: 1995 (green) vs 2005 (blue)

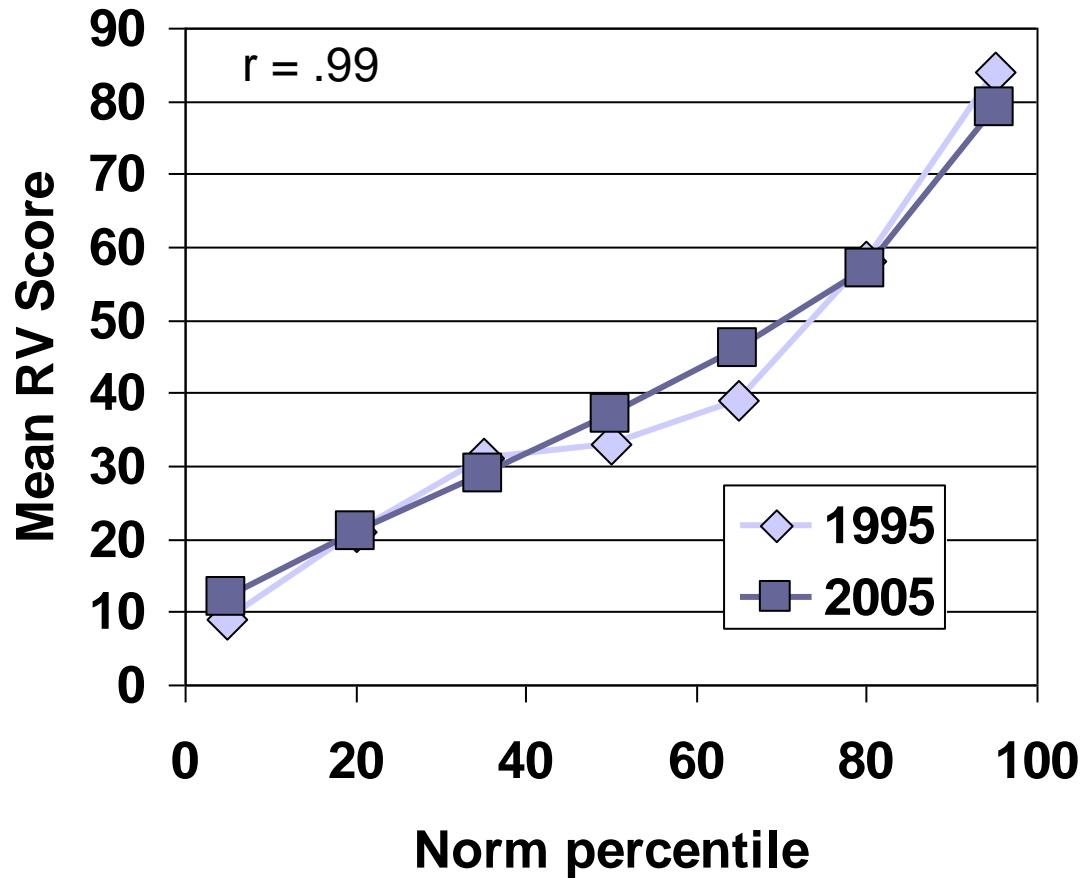
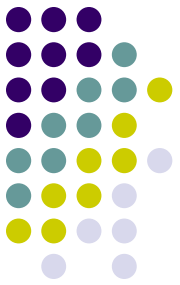


Aided EC Norms



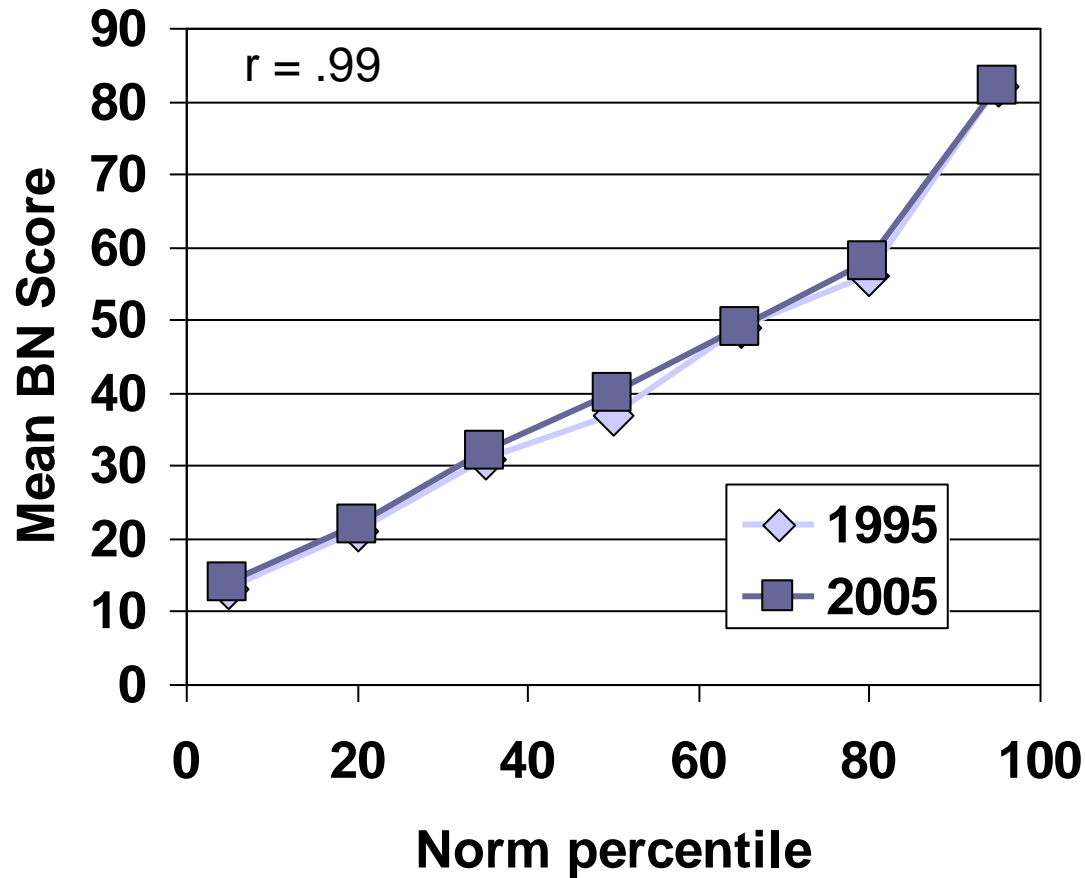
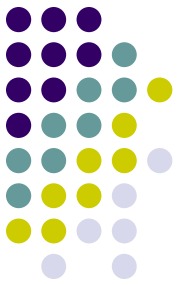
1995: N = 55
2005: N = 111

Aided RV Norms



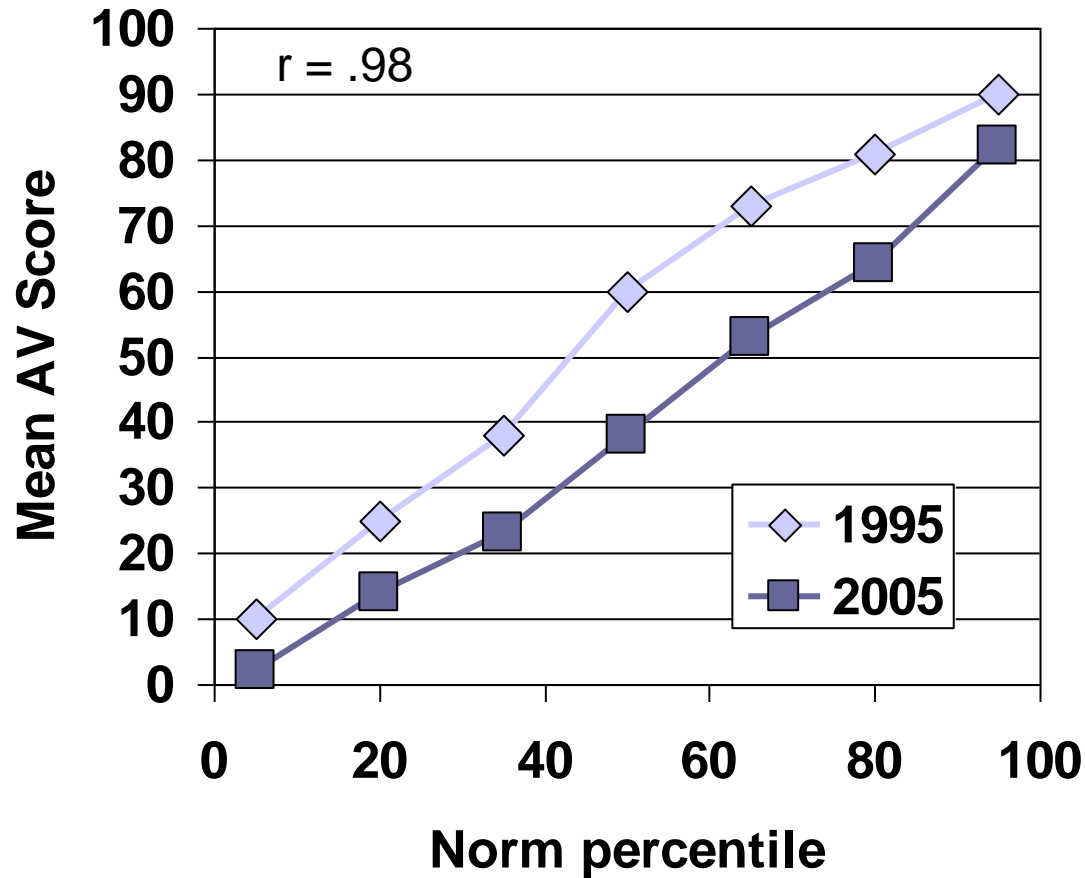
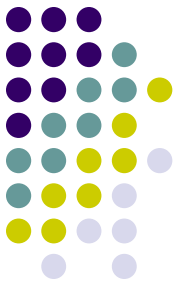
1995: N = 55
2005: N = 107

Aided BN Norms



1995: N = 55
2005: N = 109

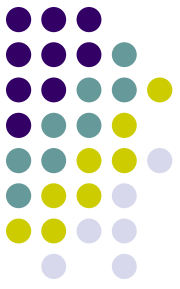
Aided AV Norms



1995: N = 55
2005: N = 108

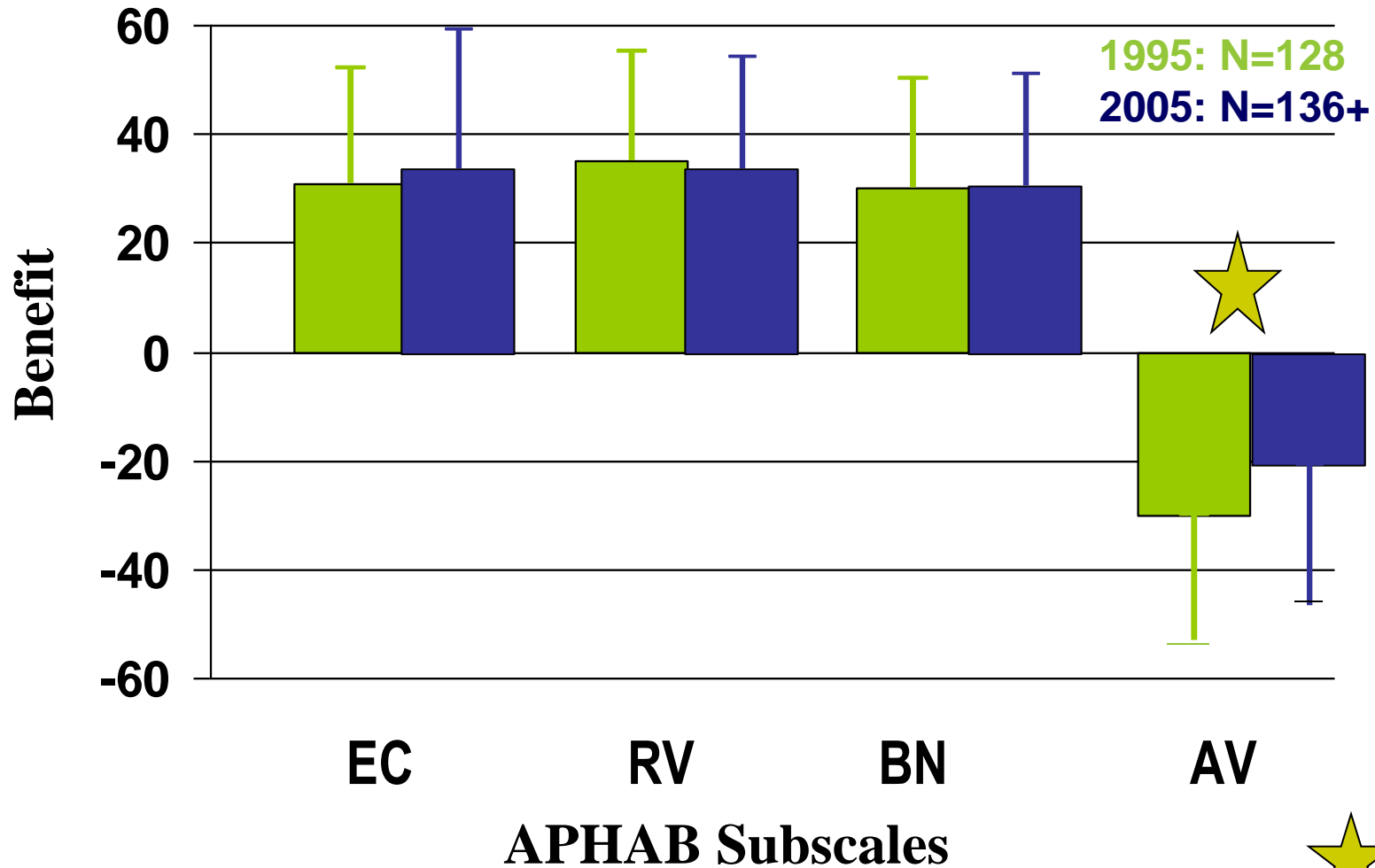
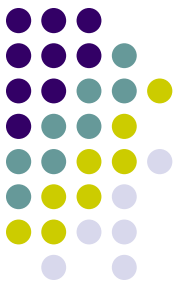
Discussion:

Aided Comparisons



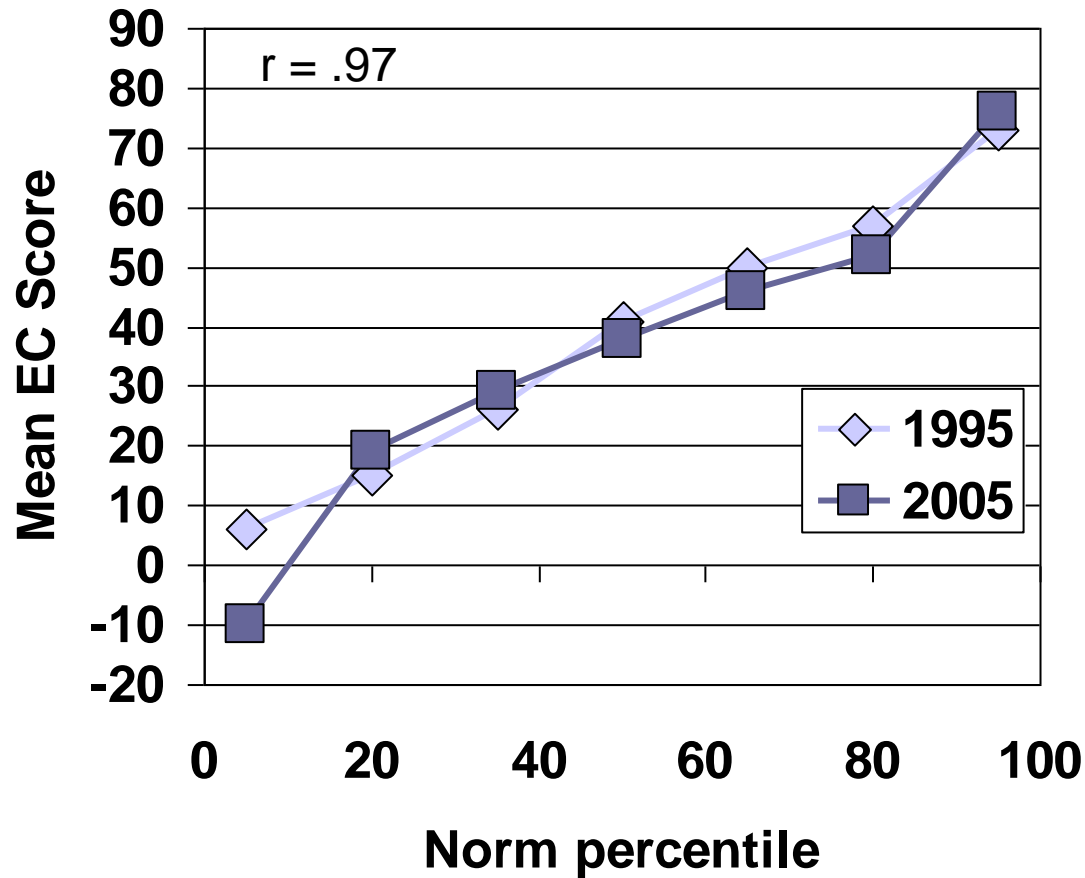
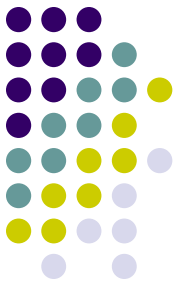
- Comparisons of mean aided scores between populations suggest that there are fewer reported problems with digital hearing aids for the AV subscale. Similar responses were given for the EC, BN and RV subscales.
- Aided comparisons suggest that difficulty with understanding amplified speech has not improved with new technology in the last ten years. On the other hand, differences in mean AV scores indicate that newer technology has addressed the common complaint that hearing aids cause many everyday sounds to become objectionably loud. These results indicate that the compression capabilities of current hearing aids have resulted in less negative reactions to environmental sounds when compared to linear hearing aids.

Benefit Responses: 1995 (green) vs 2005 (blue)



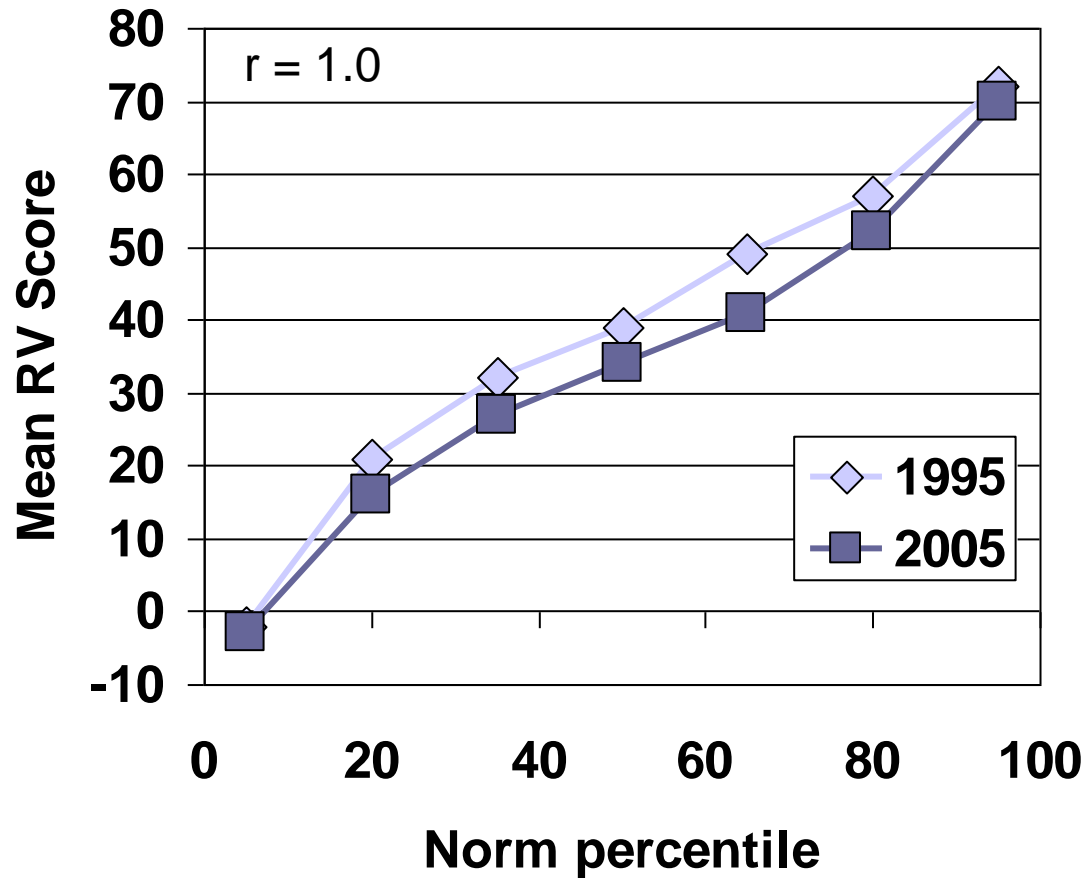
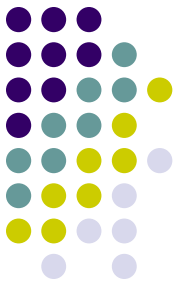
★ $p = < .01$

Benefit EC Norms



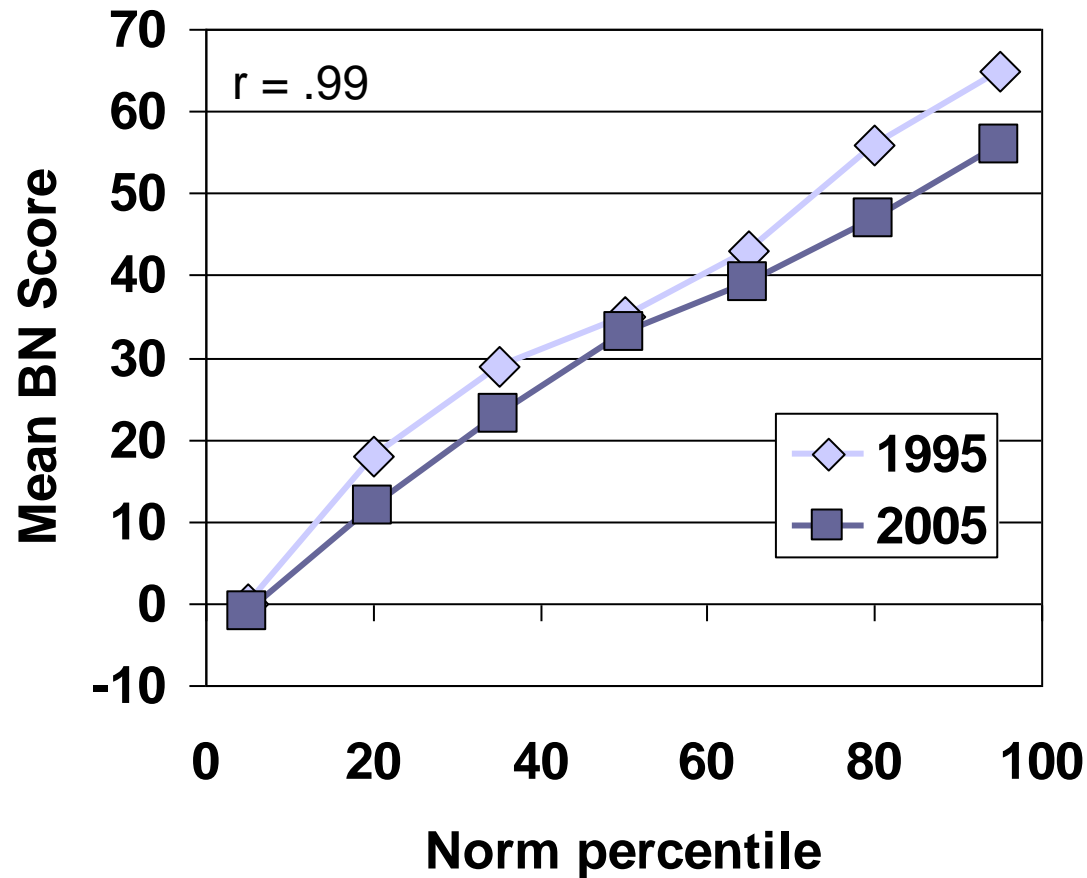
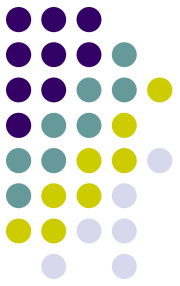
1995: N = 55
2005: N = 110

Benefit RV Norms



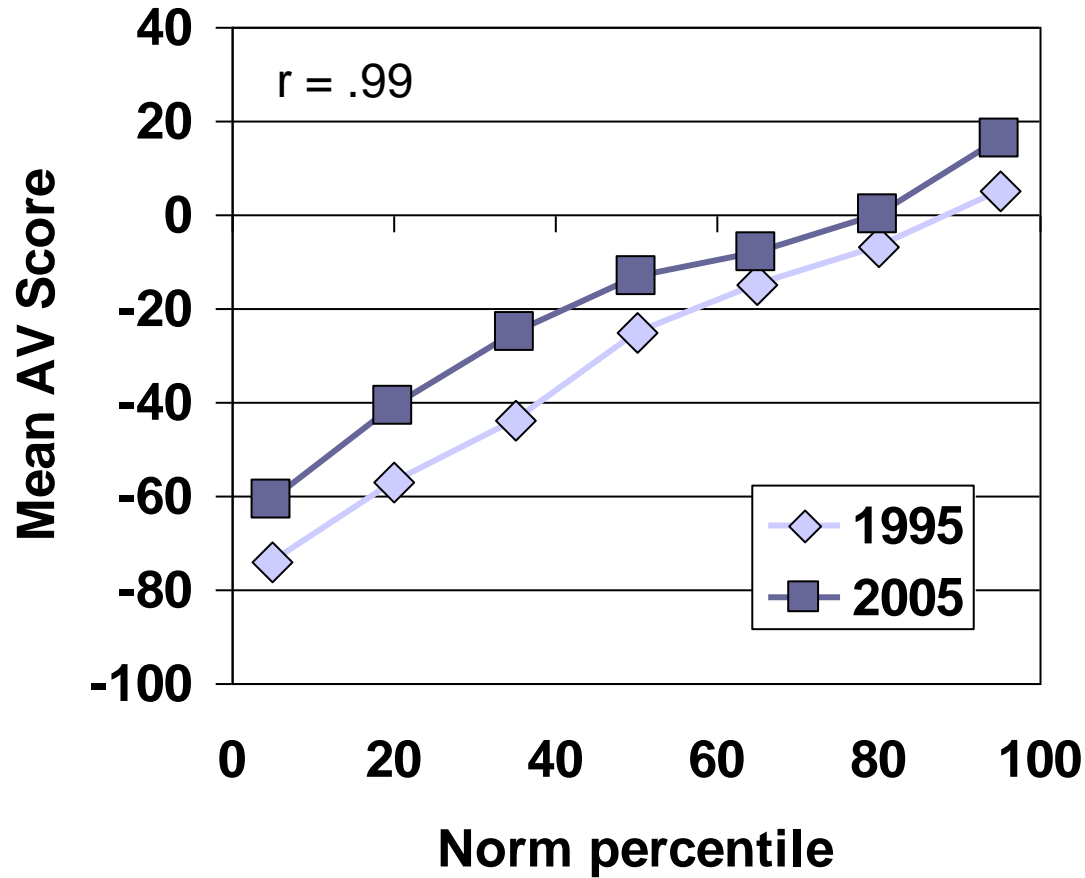
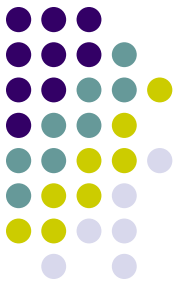
1995: N = 55
2005: N = 106

Benefit BN Norms (N=117)



1995: N = 55
2005: N = 108

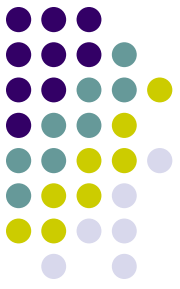
Benefit AV Norms



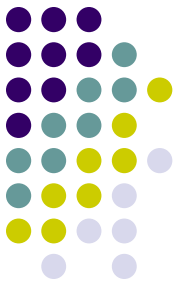
1995: N = 55
2005: N = 107

Discussion:

Benefit Comparisons

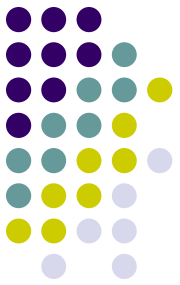


- Comparisons of mean benefit scores indicate similar benefit for both populations for the EC, RV and BN subscales; however, significantly less deficit was noted for the AV subscale for WDRC-capable hearing aid users.
 - These comparisons suggest that despite improvements in technology, wide-dynamic-range-compression-capable hearing aids have not resulted in changes in benefit for speech communication.



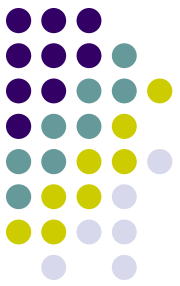
2005 Norms

- New normative data for the APHAB using modern WDRC-capable hearing aid users were generated based on the responses from successful hearing aid users.



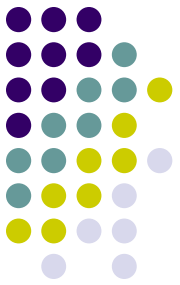
Conclusions

- Responses to the APHAB reported by modern digital WDRC hearing aid users are significantly different than those reported by linear analog hearing aids, particularly for the Aversiveness of Sounds subscale.
- New normative values for the APHAB should be used when obtaining baseline and hearing aid outcome measures for WDRC hearing aid users in order to ensure accurate clinical interpretation of client responses to this survey.



Study Limitations

- Relatively low survey response rate (48%).
 - This is only important if the subjects are self-selected in some way related to the APHAB.
- Questionnaire administration method did not prevent missing data.
 - The presence of missing data made it necessary to discard twelve subjects; however, all acquired data was valid.
- Long-term hearing impaired individuals may have difficulty recalling unaided situations.
 - Nevertheless, unaided data is almost an exact replica of previous unaided data, supporting sub-test reliability.



References

Cox, RM, Alexander, GC. (1995). The Abbreviated Profile of Hearing Aid Benefit. *Ear & Hearing*, 16, 176-186.