Using the Adult Auditory Performance Scale to Identify Self-Perceived Hearing Difficulties

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Abstract

This study determined normative data for the Adult Auditory Performance Scale (AAPS), a 36-item questionnaire that assesses self-perceived listening abilities across multiple domains. Results revealed minimal listening difficulties across domains, with greatest difficulty reported for noisy environments. Significant increases in AAPS scores (i.e., greater difficulty) were observed for a comparison group of adults with self-perceived hearing difficulties. Results suggest that the AAPS is a useful tool for evaluating self-perceived auditory performance in adults.

Introduction

- Audiometric findings may not always reflect a patient's hearing complaints, particularly those they experience in complex listening environments[2].
- Subjective questionnaires addressing self perceived hearing may paint a more robust picture of a patient's overall hearing experience[3].
- Self-report data on ease of listening in different environments can be a useful tool for patient counseling and treatment recommendations [1].
- The **Adult Auditory Performance Scale** (AAPS) was revised for use in an adult clinical population from the Children's Auditory Performance Scale (CHAPS)[6].
- The **purpose** of the present study was to establish normative data for the AAPS and to examine its sensitivity to differences between normal hearing adults with and without self-perceived hearing difficulty.

Methods

PARTICIPANTS

- 14 Young Adults (YA) without hearing difficulty (20-35 years; 8 female, 6 male)
- 17 Middle-Aged (MA) Adults without hearing difficulty (36-57 years; 14 female, 3 male)
- 8 Adults with Self-Reported Hearing Difficulties (HD) (18-49 years; 8 female)

Inclusion Criteria

- (1) Normal hearing (thresholds ≤ 25 dB HL 250-8000 Hz);
- (2) Normal otoscopy and tympanometry;
- (3) Native speakers of English;
- (4) Negative history of traumatic brain injury;
- (5) Word recognition in quiet, left and right (50 word NU-6 lists) [7]

MATERIALS

- Auditory Processing Measures:
  - Gaps in Noise Test (GIN) [5]
  - SCAN-3A [4]
- AAPS Questionnaire

PROCEDURES

- AAPS Questionnaire Completion
  - At the start of the session (pre-AP testing);
  - Repeat AAPS was measured 1-4 weeks after the initial test (session 2) for a subset of 10 participants
- Auditory Processing Measures
  - Presentation level 50 dB HL via insert earphones.

AAPS Questionnaire

AAPS Subscales and Scoring

- **AAPS Subscales**: Questions were designed to assess ease of listening in 6 different conditions:
  1. **Ideal**: *"If listening in a quiet room, no distractions, face to face with eye contact how often do you experience difficulty hearing and understanding?"*
  2. **Quiet**: *"If listening in a quiet room, how often do you experience difficulty hearing and understanding?"*
  3. **Noise**: *"If listening in a room where there is background noise... how often do you experience difficulty hearing and understanding?"*
  4. **Multiple Inputs (Mult-In)**: *"When in addition to listening there is some other form of input…"*
  5. **Auditory Memory Sequencing (AMS)**: *"If required to recall spoken information…"*
  6. **Auditory Attention Span (AAS)**: *"If extended listening is required…"*
- Each item is answered on a Likert scale from 0 to 6; 0 being 'never' and 6 being 'always'.
  - The score from each subscale is the mean of all item scores for that subscale.
- A global score is calculated as the mean of all 36 items

AAPS vs Auditory Processing Measures

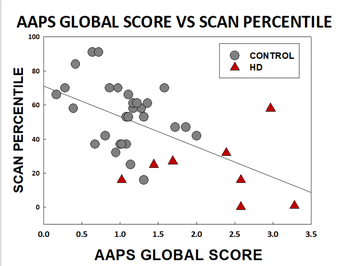

Figure 1. Bivariate plot with AAPS global score on the abscissa and SCAN percentile score on the ordinate. The line represents the regression from the mean, demonstrating a significant negative correlation (r=-0.560, N=38, p=0.001).

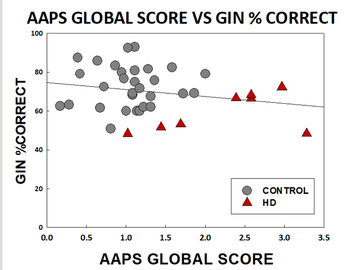

Figure 2. Bivariate plot with AAPS global score on the abscissa and GIN % correct on the ordinate. The line represents the regression from the mean. However there is a weak negative association (r=-0.213, N=38, p > 0.05).

Results

AAPS Test Scores

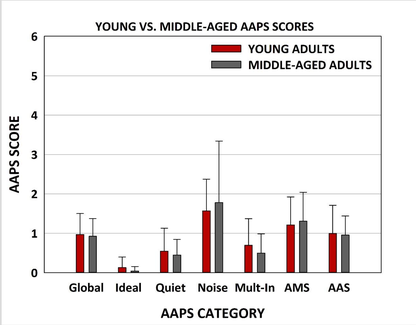

Figure 3. Mean AAPS scores for young and middle-aged adults. Error bars indicate one standard deviation. RM-ANOVA revealed no significant difference between groups (p > 0.05).

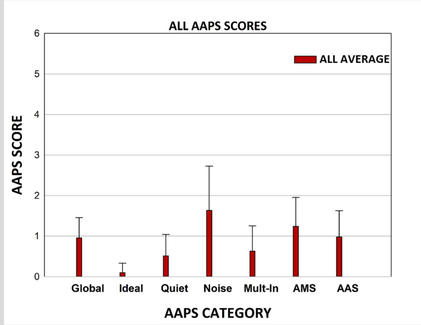

Figure 4. Mean AAPS scores collapsed across age groups. Error bars indicate one standard deviation. Ideal subscale scores were significantly lower than all other subscales. Noise subscale scores were significantly higher than all other subscales except AMS and AAS. (Paired-samples t-tests, Bonferroni correction; p < 0.003).

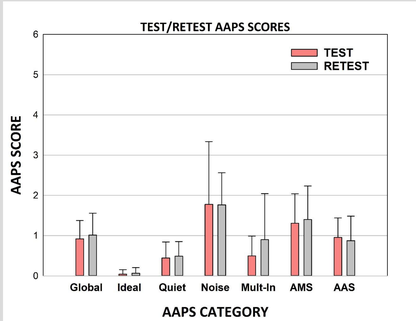

Figure 5. Mean AAPS scores for a subset of 10 participants who were administered the questionnaire twice an average of 16 days apart. RM-ANOVA revealed no significant difference between groups (p > 0.05).

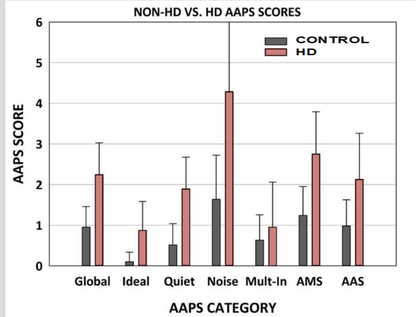

Figure 6. Mean AAPS scores for the normative control and the self-perceived hearing difficulties group. The two groups differed significantly on the global score and all subscale scores except the multiple-input subscale (independent samples t-tests, p < 0.003).

Discussion

AAPS Findings

- As expected, results demonstrated that normal hearing subjects had low global AAPS scores reflecting few auditory complaints.
- On average, participants reported the greatest amount of listening difficulty for the **Noise subscale** and the least amount of listening difficulty for the **Ideal subscale**.
- Questionnaire scores remain stable when administered twice (one and three weeks apart).
- There was no significant effect of age; AAPS scores did not differ between young adults (20-35 years) and middle-aged adults (36-57 years) with normal hearing.
- The AAPS is sensitive to differences between adults with self-reported hearing difficulties and a normative control group. The average AAPS score for the subjective hearing difficulty group was significantly higher than the normative control group.

Conclusions

- In addition to providing normative data for the AAPS questionnaire, the present study indicates the potential for clinical use of the AAPS in separating patients with and without hearing complaints.
- The AAPS demonstrates potential for counseling utility as it divides listening into six domains in which patients may experience difficulty.
- Clinicians may provide individualized counseling advice, additional testing, or referrals depending on the AAPS global or subscale scores.

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