The Speech, Spatial and Qualities of Hearing scale (SSQ) as a benefit measure

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Introduction

The Speech, Spatial and Qualities of Hearing scale ("SSQ"; Gatehouse & Noble, 2004) was designed to measure self-reported auditory disability in a wide variety of listening situations. Its 49 questions cover many aspects of speech perception, spatial hearing, and more general qualities of hearing, such as listening effort. It can uncover small differences in function, such as minor departures from normal binaural ability (see Noble & Gatehouse, 2006; Gatehouse & Akeroyd, 2006). The SSQ therefore has the potential to reveal the sometimes subtle effects that different hearing-aid fitting strategies and technology would be expected to have on auditory function.

Accordingly, we developed a version of the SSQ to directly measure the benefits offered by a hearing aid. This new version ("SSQ-B", for Benefit) is designed to compare performance with a hearing aid to performance before the hearing aid was fitted. It is intended for first-time users of hearing aids.

Here we report a "road test" of the SSQ-B, using data collected at sites in Denmark and UK. We ran the SSQ on a small set of listeners prior to hearing-aid fitting, waited about 12 weeks to allow for acclimatization, then ran the SSQ-B.

Method

SITES
- Eriksholm Research Centre, Denmark
- MRC Institute of Hearing Research, Glasgow, UK

PARTICIPANTS
- Hearing-impaired, no special HL requirements
- Non-HA-users about to receive first hearing aid(s)

PROTOCOL
- SSQ pre-fitting (unaided)
- HA fitting
- Wait about 12 weeks to allow for acclimatization
- SSQ-B (aided)

Eriksholm: Interview plus paper-pencil form
Glasgow: Interview plus computerized form

HEARING AIDS
- No special requirements
- Eriksholm: Oticon HAs, BTE open fittings
- Glasgow: Siemens HAs, ITE/ITC

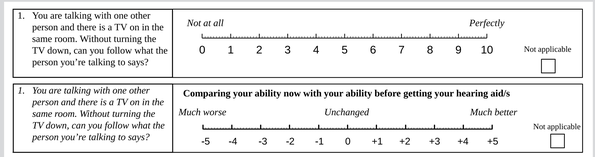
Unaided SSQ data are compared with data from Gatehouse & Noble (2004).

The SSQ-B

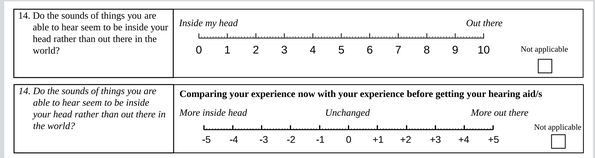
The SSQ-B has the same questions as the original SSQ. The text specifies that the task is to report how the respondent's ability or experience is now, compared to before receiving their hearing aid(s) – see examples on the right.

The rating scale used in the SSQ-B is a visual analog scale comparable to that used in the SSQ. The SSQ-B scale ranges from -5 to +5, where -5 indicates 'much worse' with hearing aids than without, while +5 indicates 'much better'. The midpoint of the scale (0) indicates that the ability or experience is 'unchanged'.

The anchor terms used at the end points of the scale vary depending on the item, as they do for the original SSQ questions (see illustrations): a positive rating always indicates an improvement with hearing aids, while a negative rating always indicates worse ability or experience.



Example: Item 1 in the Speech section of the SSQ (upper) and SSQ-B (lower). This item asks about an 'ability'.



Example: Item 14 in the Spatial section of the SSQ (upper) and SSQ-B (lower). This item asks about an 'experience'.

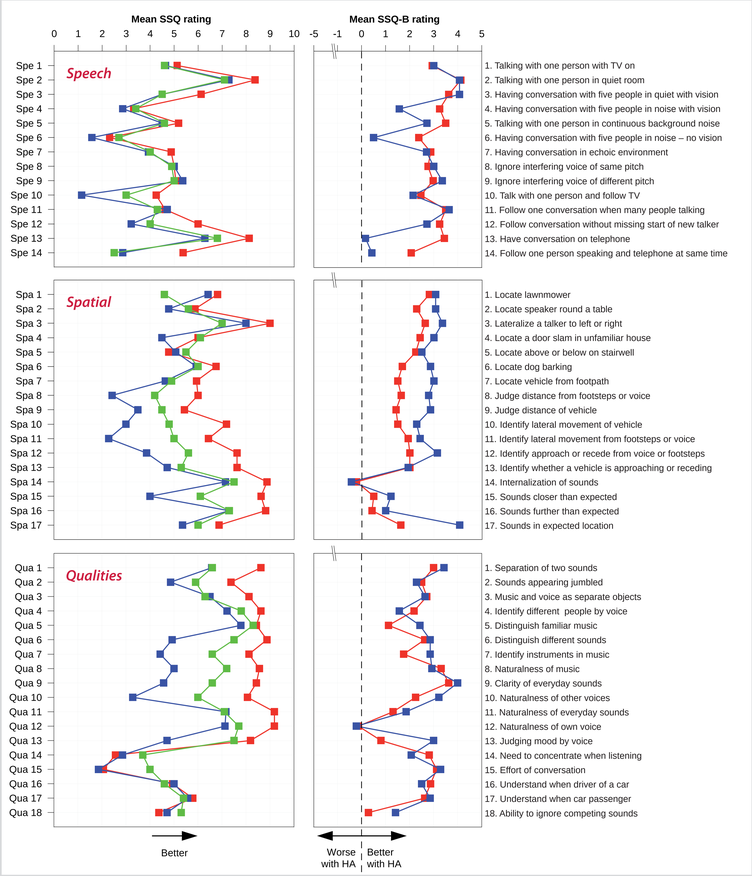
For this road test we took the opportunity to revise the original SSQ and remove various spelling mistakes, etc. The updated version is termed SSQ 5.6. For a copy, please contact the authors.

Results

Below, the mean (unaided) SSQ ratings for each of the items are plotted to the left (for each site). The corresponding mean SSQ-B ratings are plotted to the right.

The main characteristics of the groups of participants are summarized in the table to the right.

	Eriksholm	Glasgow	Gatehouse & Noble
Language	Danish	English	English
N	8	7	163
Mean age (years)	68	63	71
Better Ear Average (dB HL)	31	39	39
Worse Ear Average (dB HL)	40	45	53
Hearing-aid style	BTE (open fittings)	ITE/ITC	---
Unilateral/Bilateral fittings	0/8	6/1	---

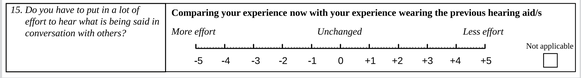


Discussion

- Overall (unaided) SSQ response patterns are quite similar across studies. However, absolute differences between studies occur for many items, especially in the Spatial and Qualities sections. This may be due to the overall difference in hearing loss between groups.
- The data make sense. Problematic situations (as measured by the SSQ) and the benefit of hearing aids in these situations (as measured by the SSQ-B) are generally ranked according to expectations.
- High SSQ-B ratings on items where the SSQ ratings were already high indicate that the SSQ-B can demonstrate a benefit even when there is a ceiling effect on the SSQ.
- Positive mean SSQ-B ratings were observed on many items, but some items showed negative SSQ-B ratings, indicating that subjects managed to relate to and differentiate between items.
- The individual variation in ratings is quite large on many items (not shown in the data display). With a low N, very strong conclusions should not be drawn based on these data.

The SSQ-C

Based on our experience with the SSQ-B, an additional version ("SSQ-C", for Comparative) is in development – see example below. This version will be used for comparing two different hearing aids (i.e., the hearing aid used presently with the hearing aid used previously). The first test of the SSQ-C is currently in preparation.



Example: Item 15 in the Qualities section of the proposed SSQ-C.

Conclusion

The outcome of the "road test" of the newly developed SSQ-B indicates that the concept of a differential SSQ is viable. The concept will be extended to the SSQ-C, which is intended for use in direct comparisons between hearing aids.

References

- Gatehouse S., Noble W. (2004): The Speech, Spatial and Qualities of Hearing Scale, Int. J. Audiol. 43(2), 85-99.
- Gatehouse S., Akeroyd M. (2006): Two-eared listening in dynamic situations. Int. J. Audiol. 45 Suppl 1, S120-S124.
- Noble W., Gatehouse S. (2006): Effects of bilateral versus unilateral hearing aid fitting on abilities measured by the Speech, Spatial, and Qualities of Hearing scale (SSQ), Int. J. Audiol. 45(3), 172-181.

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