

Localization disabilities in real-world situations

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Introduction

Localization helps provide a sense of comfort and security in an environment, and also helps listeners follow unpredictable shifts among talkers in group conversations. Poor sound localization is a frequent problem for hearing-impaired listeners (Noble & Atherley, 1970).

Knowledge of a client's localization ability may help the hearing aid fitter understand and address client complaints about hearing problems in difficult environments. Hence, measurements of localization may provide valuable clinical information.

Because psychophysical localization testing in real environments is not practical, a questionnaire measure may be more clinically feasible. This poster gives a report on one such measure, the Localization Abilities in Typical Environments (LOCATE) questionnaire.

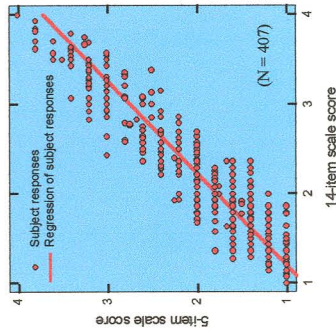
Psychometric properties

LOCATE questionnaire items were taken from Noble et al. (1995), and modified based on their results. Common American English terms also replaced the Australian English terms in the original items.

An acceptable degree of reliability (e.g. $\alpha \sim .90$) could be obtained with a smaller number of items. A 5-item version of the questionnaire was constructed from the most easily understood and generally applicable items in the 14-item form. Internal consistency reliability of the 5-item scale was $\alpha = .894$.

Alternate forms of the LOCATE

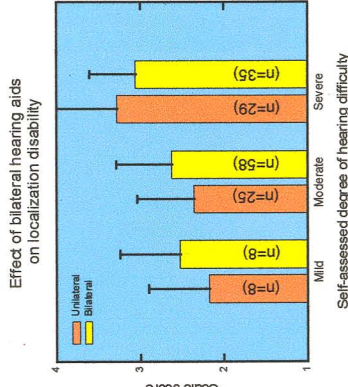
Relationship between 14- and 5-item forms of the LOCATE questionnaire



Fourteen- and five-item LOCATE questionnaire scale scores are strongly related to one another ($r = .952$). Thus, both forms will identify the same people as having better or poorer localization abilities.

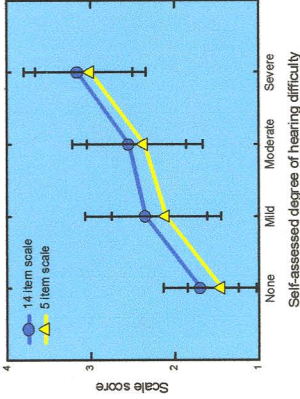
Effect of bilateral hearing aids

Laboratory studies (e.g. Byrne et al., 1992) have shown an interaction between degree of hearing loss and localization advantage from bilateral hearing aid fitting. Data from the LOCATE questionnaire are consistent with these results, showing that bilaterally-fitted listeners with greater amounts of hearing loss report slightly fewer localization disabilities.



Localization and hearing difficulty

Aided localization disability across degrees of hearing difficulty



When subjects were grouped into different levels of self-assessed hearing difficulty, ranging from "None" to "Severe," it was found that listeners reporting greater hearing difficulty also tend to report greater localization disability.

Conclusions

- Localization disability can be measured quite reliably using a 5-item questionnaire. However, it may be desirable to use the 14-item version in more comprehensive evaluations of localization disability.
- Results from the LOCATE questionnaire are consistent with laboratory studies suggesting that severely hearing-impaired people localize better if they wear two hearing aids.
- People who report more hearing difficulty in their everyday lives also tend to report more localization disability.

Ongoing work is directed toward identifying the auditory correlates of self-assessed localization disability.

References

- Byrne et al. (1992). Effects of long-term bilateral and unilateral fitting of different hearing aid types on the ability to locate sounds. *J. Am. Acad. Audiol.*, 3, 369-382.
- Noble & Atherley (1970). The Hearing Measure Scale: A questionnaire for the assessment of auditory disability. *J. Aud. Res.*, 10, 229-250.
- Noble et al. (1995). Disabilities and handicaps associated with impaired auditory localization. *J. Am. Acad. Audiol.*, 6, 129-140.



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Sample questionnaire items

1. Almost always
 2. Often
 3. Sometimes
 4. Almost never
- Do you turn the right way when someone that you can't see calls out to you?
 • You are outside. A dog barks loudly. Can you tell where the dog is without having to look?
 • You are standing on the sidewalk of a busy street. Can you tell the direction a bus or truck is coming from before you see it?

Subjects	
No hearing difficulty	232
Hearing aid wearers	177