# Unified approach to hearing instrument fitting and rehabilitation: Professional end-user opinions in Germany (DE), the Netherlands (NL), & the UK

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## Objectives

The Aim of this study is to gather the views of professionals (audiologists & hearing aid dispensers) on current issues in rehabilitation with hearing instruments (focusing on technical approaches rather than on more psychological aspects of rehabilitation) for facilitating an improved European harmonization. This involves checking current frequency of usage for specific procedures, assessing professionals' opinion, attitude and acceptance of these procedures, finding which procedures have to be improved; figuring out the willingness of the professionals to adopt new procedures and their likely uptake, researching novel methods of individualized fitting for hearing instruments and learning about the degree to which further education and explanation about (new) procedures is necessary.

## Preceding pilot work and used internet (online) questionnaire

Initially a list with procedures and tests regarded as 'best practice' was established (Hearcom D6-1 and D6-2). The initial dataset was collected by a common internet questionnaire in the UK, DE and NL. The design and content of the questionnaire were established by a prior, more detailed evaluation using focus groups (performed in DE only). It was structured into three parts: 1) procedures prior to fitting, 2) procedures related to fitting, 3) evaluation and benefit (aided) measurements. The questionnaire had to be filled in in two steps:

Step 1: The task was to rate the frequency of use for each listed procedure (see section best practice procedures) in their *current practice* using the five categories "always", "often", "sometimes", "never" and "unknown".

Step 2: The participating professionals had to rate if the specific procedure should be included in the future daily practice, considering two different conditions, A) a *real* scenario with present constraints of time and facilities and B) an *ideal* scenario without any constraints. There were three possibilities for the rating: "stay in as it is" which means the procedure does not need any change; "stay in but improve" which means improvements in the procedure (rather than in frequency of use) are necessary; "remove" indicating the procedure does not have any value. Finally, four general questions were presented (see section general questions).

## Best practice procedures

Part 1: Entry (hearing loss & hearing instruments); Medical history; Otoscopy; Tuning fork tests; Tympanometry; Pure tone audiometry; Uncomfortable loudness level (ULL); Most comfortable loudness level (MCL); Information for the family; Questionnaire ratings (hearing difficulties, expectations, quality of life, speech intelligibility, hearing difficulties rated by family members and impact on daily life); Speech tests (speech intelligibility in quiet and noise, adaptive testing in quiet and noise); Comparison between speech audiogram and tone audiogram; Loudness scaling tests; Sound localization tests; TEN test; Frequency and temporal resolution tests; Binaural intelligibility level difference test; Tests above threshold.

Part 2: Choice of ear(s), choice of hearing aid(s), selection of earmould (or open fitting); Prescriptive fitting of one model of hearing aid(s) according to manufacturer fitting rules / generic fitting rules; Interactive optimizing of fitting for the individual using new techniques being researched currently; Fitting of alternative hearing aid(s) for comparative purposes; Fine tuning of hearing aid(s); Real-ear measures to verify fitting; Test of at least one hearing aid in daily life (trial period); Rating of hearing aid benefit; Explanation of functionality, handling and care of the hearing instrument.

Part 3: Questionnaire ratings (hearing difficulties, sound quality, speech intelligibility, hearing difficulties rated by family members, use of hearing aids, satisfaction with hearing aids, benefit); Speech tests (speech intelligibility in quiet and noise, adaptive testing in quiet and noise); Loudness scaling tests; Sound localization tests; Daily diary.

## Sample

The left part of the table shows the number of participants per country with HAD = hearing aid dispenser and AD = audiologist. The right part shows the number throughout the stages with Og = Opening; S1-S3 = stages 1 to 3; GQ = general questions. In total 182 persons participated.

| HAD | AD | Both | Other | Sum | | Og | S 1 | S 2 | S 3 | GQ |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 52 | 4 | 3 | 65 | UK | 65 | 40 | 38 | 35 | 34 |
| 22 | 24 | - | 1 | 47 | NL | 47 | 27 | 25 | 23 | 23 |
| 70 | - | - | - | 70 | DE | 70 | 45 | 45 | 44 | 44 |
| 98 | 76 | 4 | 4 | **182** | Total | **182** | 112 | 108 | 102 | 101 |

## Exemplary Data

The questionnaire covered more than 80 specific procedures and tests to be rated by the participating professionals. Here only one result is shown. Data is displayed as follows (see Figure 1 as an example): There are 3 illustrations in every figure. The first on the left upper corner shows the frequency of use in the "current situation", that is the conditions under which the participants are working now. They had to rate how often they used each procedure using the four categories "always", "often", "sometimes" and "never". If they did not know the test they could select "unknown". The leftmost column in the diagram is the cumulative rating for all participants, regardless of their origin (Tot). The three columns to the right are the separated results for the three countries: United Kingdom (UK), The Netherlands (NL) and Germany (DE). The numbers in the diagrams give the absolute numbers of participants who chose the respective category. The numbers behind the countries (N=…) indicate the sum of participants in the particular country. All four columns are normalized, the height of the bar section represents the proportion of respondents choosing each response category. The two lower diagrams show how the participants would like to see things changed for the "real situation" (left diagram) and for the "ideal situation" (right diagram). Otherwise the presentation of these results is the same as for the frequency of use ratings. Be aware that only those professionals who use this specific test or procedure "always", "often" or "sometimes" are able to "remove", use this test "as it is" or "improve" it. Only the professionals who "never" use this test can add it to the real or ideal world.
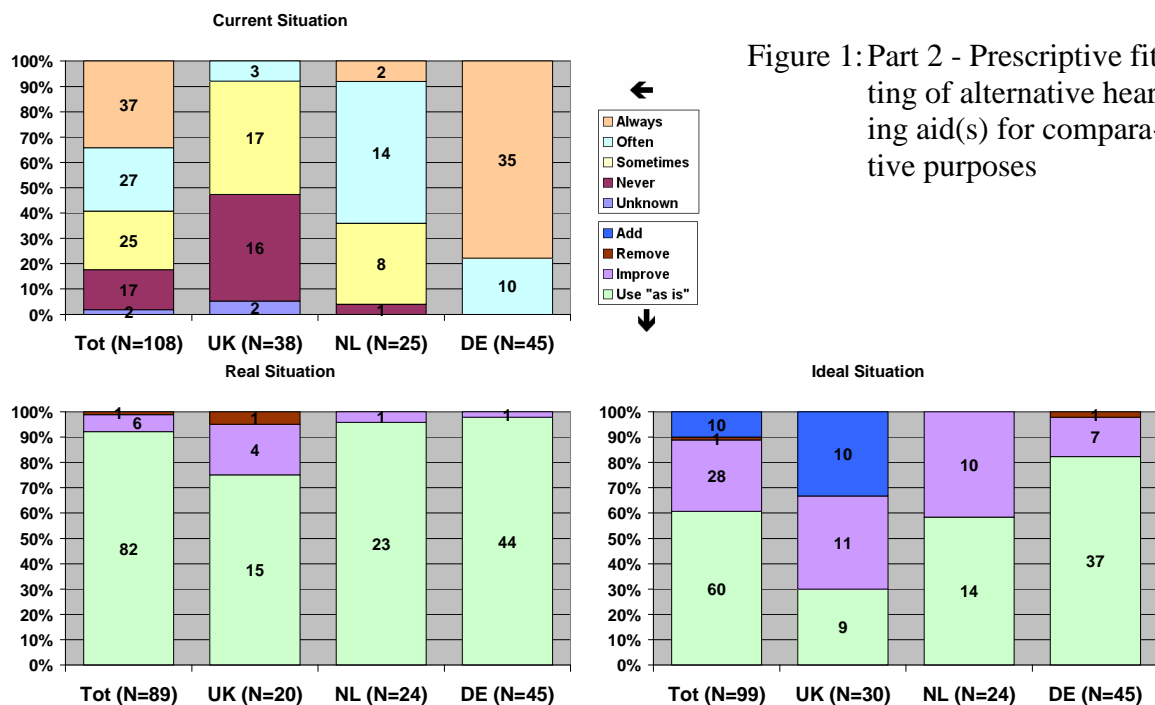


Figure 1: Part 2 - Prescriptive fitting of alternative hearing aid(s) for comparative purposes

Figure 1 shows the results for the Part 2 procedure "fitting alternative hearing aids for comparative purposes". This is common practice in the Netherlands and Germany, but not in the UK. However when we look at the results shown in Figure 1, it is clear that there are a number of UK professionals who are currently using this technique (20 out of the 38). Most of them use the technique only "sometimes" but it was surprising that it is being used at all. Most of the UK respondents work in the public sector, which is a free of charge service at the point of delivery to the patient. The hearing aids remain the property of the NHS (national health service) and are

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on loan to the patient. Because of this, it is unlikely that professionals will be able to give patients more than one hearing aid per ear to try out, due to cost implications. This type of technique is also not considered as best practice in the UK, due to constraints within the service. However it is possible that a situation may arise when a patient is not happy with the initial choice of aid and the professionals feel that they would like to try another hearing aid to see if it is an improvement. There were no specific comments given that mentioned this technique, so further investigation of this is not possible at this stage.

In terms of numbers of professionals who would use the technique in an improved situation, the picture for the Netherlands and Germany stays nearly the same for the real and ideal world situations, although there are some professionals who would like to see improvements in this technique,
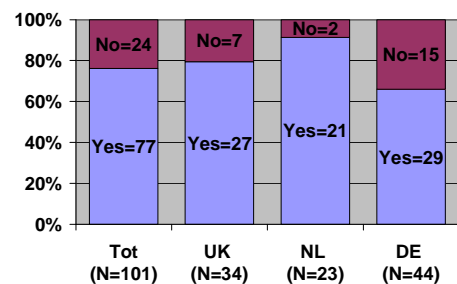
especially in an ideal world. However, it is also interesting that there are more UK professionals who would like to use this technique in an ideal world (30 out of 38) than in the real world, revealing that this procedure is estimated as valuable but time-consuming. Ten of 16 professionals who are not using this technique at the moment would use it, if there were no constraints, e.g. regarding time and costs.

## General Questions

The participants were asked to answer the following general questions. The responses are given in the respective figures on the right side of the questions and are summarized in highlights.
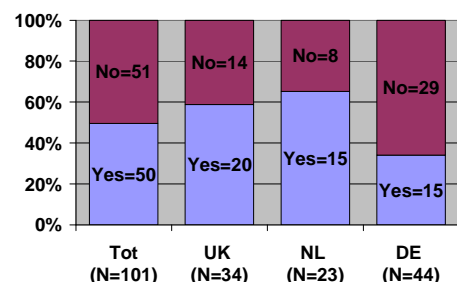
**Question 1**: Would you be interested in using tests or questionnaires that are standardised across Europe, to enable large data sets to be obtained for comparative purposes?
**Highlight 1**: Standardization alone is a sufficient incentive for the professionals to use (newly developed) standardized procedures.
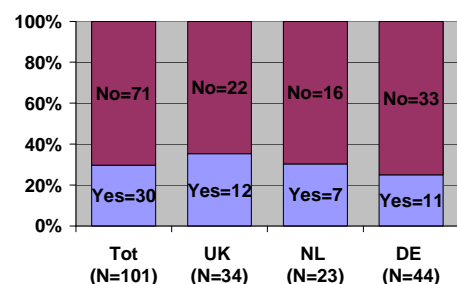


**Question 2**: Would you be interested in allowing your patients/clients to assess benefit from fitting in the com-fort of their own home by using properly designed and controlled tests or questionnaires that can be run on the Internet?
**Highlight 2**: Professionals do not see added value in obtaining the test itself over the internet, whilst they do see added value in remote testing.
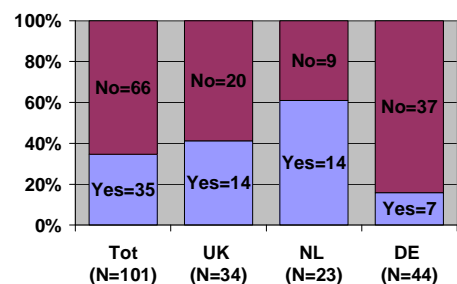


**Question 3**: Do you think it is possible to develop a procedure which would allow your patients/clients to adjust the settings of their hearing aid(s) themselves using safe + appropriately calibrated tools on their own (maybe over Internet) in the future?
**Highlight 3**: Professionals are very skeptical about the possibility of developing safe and good tools for the self-fitting of hearing aids.



**Question 4**: If such a procedure (general question 3) did exist, would you use it?
**Highlight 4**: Some professionals were interested, although they thought such procedures are not feasible – other professionals vice versa. A large number of comments indicate controversial positions and doubt about e.g. liability issues.



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## Discussion

● Different (historical) philosophies in practice and service structures are not reflected in differences in the views of the professionals. ● There are good scientific reasons to propose the routine use e.g. for sentence materials in adaptive SNR conditions. It is likely, though, that some education of hearing aid professionals will be needed to ensure a good uptake of these methods. ● The focus group discussions with hearing impaired people indicated that speech tests using sentences in noise are likely to be well accepted by clients as these have an obvious relevance to their everyday hearing difficulties. ● Impact of time constraints on current practice is powerful: procedures that give better information are only likely to be accepted if they involve no additional time and effort from the professional. This is in contrast to the views of hearing-impaired people, who are very willing to invest time in improved results from hearing aid fitting. ● Sound localization and loudness scaling tests were more popular in an ideal world – since the tests are hardly used at present, people may not be aware of their benefits. ● Even though there is low use of the TEN test, BILD test and temporal and frequency resolution tests, they were popular in an ideal world ● Professionals want to see improvements in fitting rules and were enthusiastic about interactive fitting tools. ● It is noteworthy that UK professionals were interested in fitting alternative hearing aids for comparison purposes although this is not standard practice.

## Conclusions

The proposed set of procedures (good practice) is well accepted by professionals. ● It is crucially important to reduce the range of alternatives that are potentially able to be used if standardization is to be improved. ● Many professionals are interested in using pan-European standardized procedures. ● Most professionals want to use speech tests if they are easy and quick to use. ● There are two main areas with need for clearer scientifically led consensus: speech tests and questionnaires. ● There is strong evidence that professionals prefer familiar methods (particularly for speech tests). ● In all areas, much has still to be done to point out advantages of new approaches. ● Professionals need further education & introduction to the benefits of some procedures. ● It seems that major changes in professionals' practice require not only education but also external pressure, e.g. from quality standards required by health insurance or national standards bodies. ● There should be particular safety measures that would make professionals accept remote fitting and testing procedures. ● Professionals will most likely need full explanations concerning how remote procedures are carried out and how much control the professionals still may have.

## Acknowledgement

## References

Hearcom D6-1: Report on the analysis and evaluation of current fitting procedures used throughout Europe, see www.Hearcom.org

Hearcom D6-2: Feasibility of a more unified approach to hearing aid fitting and rehabilitation: views of professional end-users in Germany, the Netherlands, and the UK