# "Yes, I have experienced that!" – How daily life experiences may be harvested from new hearing aid users

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Both auditory and non-auditory aspects of the rehabilitation process play a role in successful hearing aid uptake. The sound may be experienced differently in the clinic compared to daily life and the skills and knowledge related to HA use vary from patient to patient. The aim of the present study is to assess daily life experiences of new hearing aid users and to explore ways to utilize these assessments in a follow-up situation. The approach is based on online reporting, where the patients over a period of two months "swipe" through 453 possible experiences related to HA use. Seventeen patients volunteered to register experiences for a period of two months, and participated in a follow-up interview, where the registered data were presented. Results suggest that data can shed light on the development within various categories of hearing aid experience and promote reflection on the hearing rehabilitation process.

## INTRODUCTION

New users often experience challenges when first fitted with hearing aids (HA). The challenges may be related to various factors such as benefit, comfort, maintenance, attitude, dexterity etc. (Bertoli *et al.*, 2010; Hickson *et al.*, 2014; McCormack *et al.*, 2013). Due to the diversity of factors related to use, it is difficult to get reliable data on patient experiences during the first months of use. The aim of the present study is to collect data on what new HA users experience over a two-month period to gain insight into the experiences they have and how these experiences develop over time. The research question is thus: *How may daily life experiences be harvested from new adult hearing aid users and do these data represent added value for patients or hearing care professionals?*

By presenting a tool for logging a wide range of everyday life experiences related to HA use, we expect to enable registrations of positive and negative experiences among new HA users. A hypothesis is that the tool will also provide users with a vocabulary to give words to these experiences in a follow-up interview. Fig. 1, shows the interface developed for this purpose.

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**Fig. 1:** Example of possible experience: 'I could hear the food sizzling on the frying pan', and the response options presented in the interface: 'Have experienced', 'Have not experienced' or 'Not relevant'.

## METHODS

Twenty nine participants were included in the study. Seven female and ten male participants, in all fifteen new and two experienced HA users, completed the pilot study by logging experiences over a period of two months. Twelve participants withdrew from the study. The mean age was 67 (youngest 54, oldest 83) years. Fifteen participants agreed to face-to-face follow-up interviews and two gave written feedback instead of an interview.

Data were collected online and consisted of 453 pre-fabricated sentences representing experiences related to HA use. The sentences were developed through a participatory design process involving various stakeholders such as patients, practitioners and hearing care experts (Lund *et al.*, 2020).

The sentences representing possible experiences were presented using an online tool that allowed individual logging. The participants could log as many sentences as they wanted and spend as much time as they liked. The online tool allowed participants to 'swipe' through the experiences, which were presented in random order (with random repetition after completing all 453 experiences), see example in Fig. 1. Subjects would then be able to indicate, whether they had had a given experience or not, and were also allowed to skip decision by answering "irrelevant". The users were encouraged to log experiences every day, or at least once a week. Participants were hoped to find their own preferred rhythm for logging that would suit their specific daily routines.

After 30 responses, a break would be suggested. Users could also take breaks whenever they preferred, and would continue where they left off by signing in with their unique credentials. The possible experiences were subdivided into the following 13 categories containing between 9 and 85 possible experiences: 1) speech intelligibility, 2) spatial, 3) sound quality, 4) adaptation to new sounds, 5) noise, 6) loudness, 7) fatigue, 8) use, 9) tinnitus, 10) handling and maintaining the HA, 11) fit, 12) support, and 13) quality of life.

The participants did not receive feedback on data and did not have access to the data during the period of logging. If there were no log-activity for more than two weeks, a reminder was sent by email to the participants, who had shared email contact information in advance. After two months of logging experiences, an individual interview was made by one of the researchers (Lund). An interview-protocol was followed and log-data for each patient were visualized (as shown in Fig. 2) and reflected on. The interview-protocol included the following questions:

- Have you experienced improvement over the two months / challenges that have been overcome?

- Do you experience continuing challenges? If yes, please describe them.

- Did you have contact with the clinic within the two months? If yes, what was it about?

- What has it been like to register your experiences? Has it been easy / difficult etc.?

- Did you involve anyone else in the log-activity / talk to someone about it?

- Do you feel that the activity of logging experiences has made you act differently? Have you, for example, become more aware of something because it was presented to you in the sentences?

- Have there been sentences that were completely irrelevant to you or something that annoyed you when logging the experiences?

- Have you had experiences, which you would have liked to log, but which were not represented in the sentences (missing sentences)?

- Do you think you will use your HAs in the future?

- Would you have liked to continue logging your experiences if possible?

After answering the questions in the protocol, the log-data were presented to the participants. Some of the positive and negative experiences that dominated in the beginning of the log-period and after the two-month period were read aloud to help the participant remember the experience referred to and elaborate on it.

**RESULTS**

**Log-data**

The participants who completed the study logged between 170 and 3171 experiences in the period from March until August 2019. The approaches to logging differed in both number of logs and the distribution of log-activities as shown in Fig. 3.

The average number of answers per patient is 753. This is, however, based on some of the patients being very active (example Figs. 4 and 5) and others being very inactive (example Figs. 6 and 7).
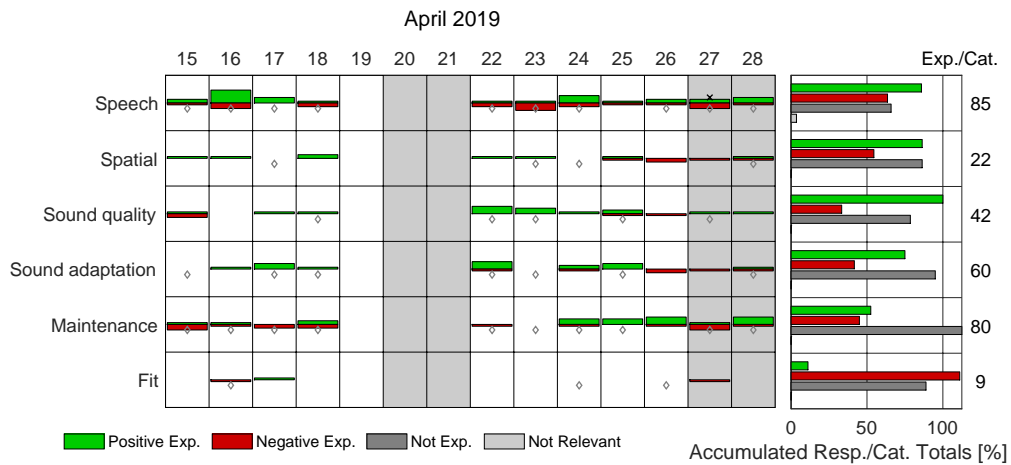
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**Fig. 2:** Data for each participant displayed in a calendar-like format showing the logs of each day and month (only two weeks displayed here). Categories are listed to the left (only six of the 13 categories are shown here) and to the right the accumulated scores of positive, negative, not experienced and not relevant experiences are listed. The number to the far right represents the number of sentences in each category.
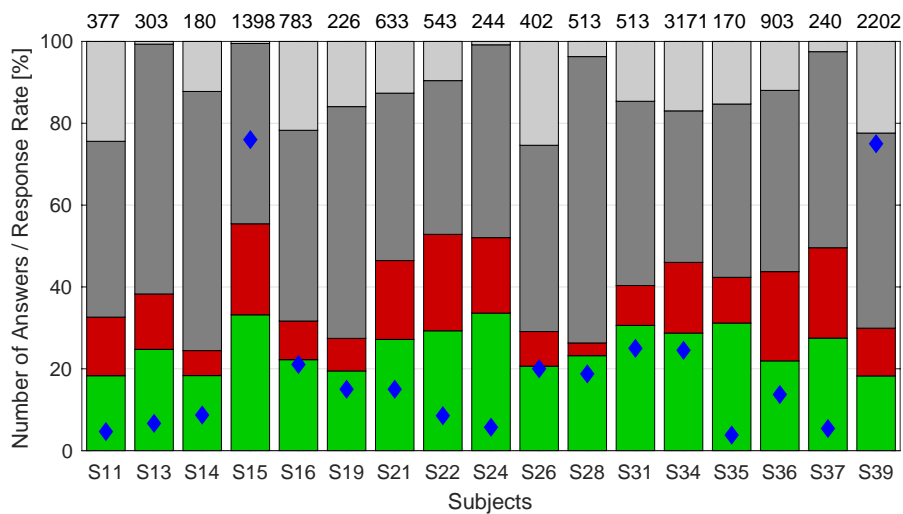


**Fig. 3:** The number of positive (green), negative (red), not experienced (dark grey) and not relevant (light grey) answers are shown in percentage for each participant. The blue diamond shows the response rate where 100% represents log-activity every day of the log period (10%: log-activity two days every three weeks; 20% log-activity three days every two weeks). The number of answers for each participant is shown with the numbers at the top of each bar.
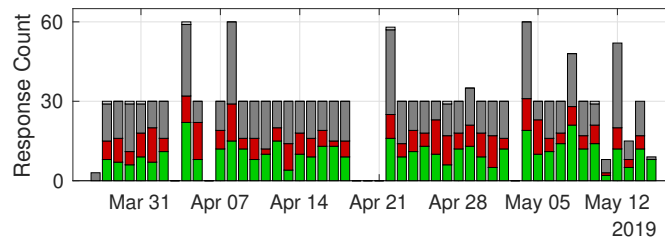
**Fig. 4:** Response rate and number of responses per system entry for one of the most active participants (S15, new HA-user). The period from the first to the last entry was seven weeks. The number of responses are displayed on the y-axis while the log-period is shown along the x-axis.

The distribution of responses in Fig. 4 indicates that participants stopped logging, when the system suggests a break after 30 or 60 sentences. This is a general observation across subjects, regardless the number of answers each patient made.
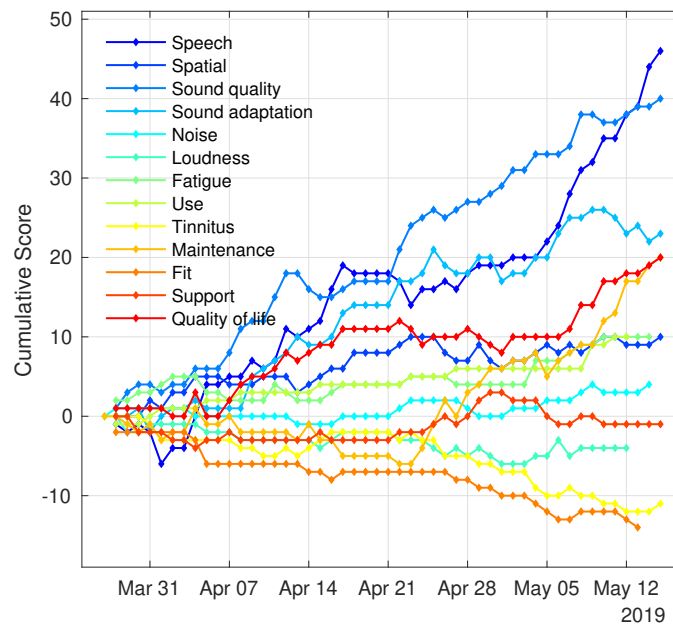


**Fig. 5:** Cumulative score for the same participant as in Fig. 4 (S15). Zero on the y-axis represents an equal amount of positive and negative responses in a category while the numbers above zero represent a positive cumulative score and the numbers below represent a negative score.

Fig. 5 shows that the patient experienced challenges with fit and tinnitus. This was a general observation, which applied to several of the patients. In particular, fit was a challenge to almost all participants. Negative experiences with tinnitus were not necessarily related to the new HA and the challenges could even have decreased after fitting despite a negative score in the accumulated data. No objective before-after

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measure was available for critical assessment of the suggested progression. Most patients registered positive accumulated scores in the categories 'Speech', 'Sound adaptation' and 'Sound quality' (as S15), which were not verified objectively either.
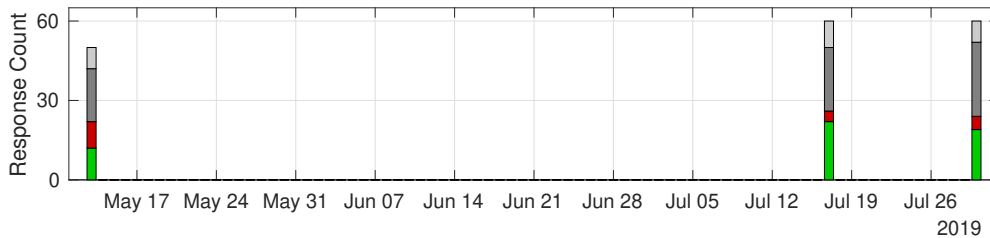


**Fig. 6:** Response rate and number of responses per system entry for one of the least active participants (S35, new HA-user). The period from the first to the last entry was 12 weeks.
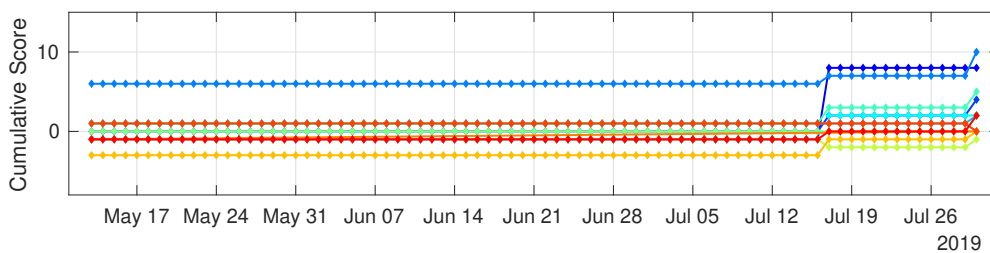


**Fig. 7:** Cumulative score for the same participant as in Fig. 6 (S35). The x-axis shows the period from the first to the last patient log. The dots along the lines indicate the days of the log-period. Each line represents a category. Changes along the lines indicate that the patient has registered experiences in the system.

In the data analysis in Fig. 7, the logs have been accumulated to indicate whether there is progression over time. Some of the lines are above zero (the accumulated score suggests that the patient has had more positive than negative experiences) on the days of the three registrations, and some are below zero (the accumulated score shows more negative than positive experiences). Three registrations seem, however, not to be sufficient data to draw a proper picture of progression over time.

A daily rhythm of logging experiences seems favorable to reach an amount of log-data that shows either a positive or a negative progression over time as in participant S15 (Figs. 4 and 5). S35 (Figs. 6 and 7) had only three system entries over the period of 12 weeks reaching a total of 170 answers. The cumulative score shows to some extend an overweight of positive experiences, but gives only a vague indication on progression due to the low response rate.

**Follow-up interviews**

In the follow-up interview, the participants were asked to elaborate on the activity of logging: Sixteen of the 17 participants said that the system was easy to operate. Nine participants expressed that sentences presented were frequently not relevant to them, and it was therefore difficult to relate to them. Four had become aware of functionalities in the HA, which they were not familiar with when first fitted. Three participants experienced technical challenges such as difficulties with logging on to the system, which were overcome during the log-period.

The participants were asked if they were missing sentences representing situations they had been in during the log-period. Five had missed sentences for describing experiences related to the acoustical environment, the HA falling off, HA comfort, the sound of paper, television volume and the sound quality of different voices, whereas 12 could not think of any situations they would have liked to register, which did not occur in the sentences.

When looking at the log-data, examples of responses were read aloud, which lead to reflections among participants with both high and low response rates. In general, all participants who agreed to the face-to-face interview reflected on the sentences read aloud. A reaction could, for example, be related to the sentence 'I was overwhelmed by the sound as I went to a restaurant'. One of the participants said: *"That's about getting used to sounds, which I haven't been able to hear. I'm looking forward to going hunting in the end of August. For many years, I haven't been able to hear if something was rustling in the scrub."* The experienced users also reflected on sentences such as 'I heard noise coming from the coffee machine' e.g. by saying: *"I could hear it and I'm not used to that. Even when I'm sitting in the living room I can hear it in the kitchen. That's an alright experience because it means that I hear more than I did before."* The reflections were generally positive, also when reflecting on a negative response and focus was to a large extend on progression.

**CONCLUSIONS**

As expected, the number and frequency of patient logs differed. The suggested breaks after 30 and 60 responses were decisive for the number of logs per time a patient would access the system. The majority of the participants had negative accumulated scores in the categories 'Fit' and 'Tinnitus' and positive accumulated scores in 'Speech', 'Sound adaptation' and 'Sound qualities'. It is unknown whether this reflects an improvement after HA fitting compared to unaided hearing, as there are no objective measures before and after the period of observations. Data may however show progression (positive / negative) in various categories of the hearing experience during a two-month period after fitting.

Despite challenges with relating to some of the sentences, a part of the participants experienced that the sentences had caused them to think more about different aspects of use. The participants were able to express their experiences and to reflect on data as

well as describe aspects of the process from fitting until follow-up. A daily rhythm of logging experiences seems favorable to reach an amount of log-data that shows either a positive or a negative progression over time. The tool was used to tap the memory of and promote reflections in participants with both many and few responses as well as new and experienced HA-users. The results apply for the method and the options for data retrieval.

## ACKNOWLEDGEMENTS

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