# Personalization of Hearing Aids through Bayesian Preference Elicitation

Published: 27-05-2008 Last updated: 07-05-2024

The goal of the HearClip project is to improve the hearing-aid fitting procedure. The development is tweaked by listening experiments.

Ethical review	Approved WMO	
Status	Pending	
Health condition type	Hearing disorders	
Study type	Observational non invasive	

# **Summary**

### ID

NL-OMON32265

**Source** ToetsingOnline

Brief title HearClip

# Condition

• Hearing disorders

**Synonym** deafness, hearing loss

**Research involving** Human

# **Sponsors and support**

**Primary sponsor:** Academisch Medisch Centrum **Source(s) of monetary or material Support:** Technologiestichting STW

### Intervention

Keyword: Bayesian networks, Hearing aids, interactive fitting

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### **Outcome measures**

#### **Primary outcome**

The primary outcome is the viability of the newly developed procedure for

clinical practice.

#### Secondary outcome

Secondary outcome variables are the preference of hearing-impaired listeners

for a hearing-aid setting, as well as speech intelligibility for this setting.

# **Study description**

#### **Background summary**

Modern hearing aids have evolved into complex digital signal processing (DSP) devices. The tuning of DSP parameters so as to maximize user satisfaction, i.e. fitting of a hearing aid, has become similarly complex. Several factors contribute to the complexity of this optimization task, including: \* the dimensionality of the parameter space is large;

\* the determinents of beering inspired user esticle stick are

\* the determinants of hearing-impaired user satisfaction are unknown;

\* the evaluation of this satisfaction through listening tests is costly (in terms of patient burden and clinical time investment) and unreliable (due to inconsistent responses).

As a result, the vast majority of the hundreds of parameters of a hearing aid are fixed by the manufacturer at an average value. Fewer than ten of the parameters are personalized by the hearing-aid dispenser based on the severity of the hearing loss. Thus, fitting of hearing aids relies more on empirical procedures than on mathematical optimization methods.

#### **Study objective**

The goal of the HearClip project is to improve the hearing-aid fitting procedure. The development is tweaked by listening experiments.

#### Study design

This would be easy, if we knew what determines user satisfaction. Since we do not know this, within HearClip we model the uncertainty about user satisfaction through probability distributions. The framework is Bayesian incremental utility elicitation. To apply this framework to hearing-aid fitting, it is planned to develop algorithms that are computable in a reasonable amount of time. This involves research into numerical issues of approximate inference in probabilistic models and efficient optimization in large domains. Another part concerns the development of probabilistic models for user satisfaction in the hearing domain and the construction of sound libraries.

The current experiment involves the evaluation of (parts of) the newly developed framework, as well the clinical evaluation of the developed procedure. Each subject is his/her own control, by comparing the results of different hearing-aid settings to other setting for the same subject. The evaluation of the entire fitting procedure will be done by comparing the results to a conventional fitting method, if available.

#### Study burden and risks

For each subject, testing time will not exceed 3 hours per session. All experiments will be limited to at most two sessions. The experiment has, besides the time spent, no adverse consequences. There are no risks associated with participation.

# Contacts

**Public** Academisch Medisch Centrum

Meibergdreef 9 1105 AZ Amsterdam Nederland **Scientific** Academisch Medisch Centrum

Meibergdreef 9 1105 AZ Amsterdam Nederland

# **Trial sites**

### **Listed location countries**

Netherlands

# **Eligibility criteria**

Age Adults (18-64 years) Elderly (65 years and older)

### **Inclusion criteria**

Normal hearing (threshold <20 dB HL) Moderately sensorineurally hearing impaired (20

# **Exclusion criteria**

large hearing loss (threshold>75 dB HL) hearing impairment other then sensorineural age over 80 mental/physical problems

# Study design

# Design

Study type:	Observational non invasive	
Intervention model:	Other	
Allocation:	Non-randomized controlled trial	
Masking:	Open (masking not used)	
Control:	Active	
Primary purpose:	Other	

#### Recruitment

NL	
Recruitment status:	Pending
Start date (anticipated):	01-05-2008
Enrollment:	35
Туре:	Anticipated

# **Ethics review**

Approved WMO Application type: Review commission:

First submission METC Amsterdam UMC

# **Study registrations**

# Followed up by the following (possibly more current) registration

No registrations found.

# Other (possibly less up-to-date) registrations in this register

No registrations found.

# In other registers

**Register** CCMO ID NL22572.018.08