Audio-visual integration in normal and elderly hearing impaired listeners using ventriloquism illusion

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

Summary

ID

NL-OMON37860

Source
ToetsingOnline

Brief title
AVIS01

Condition

- Hearing disorders

Synonym
deafness, hearing-impairment

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: audiovisual integration, ventrilloquism illusion

Outcome measures

Primary outcome

Investigate differences of audio-visual integration between participant groups.

Investigate effect of different stimuli on the ventriloquism effect.

Secondary outcome

Investigating how size of the visual stimulus contributes to the ventriloquism

effect.

Investigate the distribution in audio/visual integration skill of individuals.

Study description

Background summary

Hearing-impaired listeners rely heavily on lip-reading for communication. Integrating the visual and auditory cues results in a higher understanding of speech compared to linearly combining the sole modalities. A continuing hypothesis is that (elderly) hearing-impaired listeners are better audio-visual integrators because they rely more on visual cues than audio during communication. We hypothesize that this can be shown using the ventriloquism effect. As interpretation of the ventriloquism experiment is straightforward, it provides a useful tool to study audio-visual integration, and is also ideally suited to compare different groups (e.g. normal and elderly hearing impaired listeners) and stimuli. For better audio-visual integrators we expect the illusory effect to occur more strongly. Furthermore, we can directly compare speech and non speech stimuli to ascertain the difference between both types of audio-visual integration.

Our research exploring this hypothesis will provide us a better understanding of audio-visual integration of speech, a topic especially important for hearing-impaired (and usually also elderly) listeners as many rely on visual speech cues to supplement poor auditory speech perception due to deafness. It would give answers to which factors are key in processing multi modal speech information. E.g. an increased performance with a combined speech and

non-speech stimulus would indicate that visual integration of speech incorporates many visual cues other than speech reading alone. This would contribute to e.g. functional brain research and computational speech-perception models, as well as better designs of communication devices. In practice, if this hypothesis is proven to be true, hearing-impaired listeners can benefit from these newly gained insights. For instance, if the hearing-impaired individual is not proficient in traditional speech-reading, simplified strategies or other non-speech signals could enhance speech understanding in day-to-day communication.

Study objective

In the ventriloquism illusion different sources of audio and visual stimuli interact and therefore make it more difficult to lateralize the individual audio source. Hence, the strength of the illusion gives a measure of audio-visual integration. In the present study, the stimuli will be presented as speech and non-speech, and both as audio and/or video for the purpose of quantifying audio-visual integration. To test if the illusionary effect is greater in better audio-visual integrators, testing will be performed with normal and elderly hearing-impaired listeners.

Study design

Behavioural study. The participants are provided with audio-visual stimuli with conflicting source locations and are asked to perform a lateralization task.

Study burden and risks

There are no risks associated with the experiment. The study is designed to keep burden to a minimum. The maximum duration of the experiment is 4 hours with adequate breaks build in.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

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

Inclusion criteria

Hearing impaired participants must have a average hearingloss below 40 dB over frequencies 1, 2 and 4kHz (PTA) for a period of 2 years or longer and must be older than 60.
Normal hearing participants must have a PTA of 20 dB of better.

Exclusion criteria

Participents will be excluded when:
- Unable to complete test participant screening (see protocol 3.4, page 12)
- Unable to complete the experiment
- Unable to find 95% of the catch cases (see protocol 5.2, page 15)

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:	Recruitment stopped
Start date (anticipated):	04-07-2012
Enrollment:	24
Type:	Actual

Ethics review

Approved WMO

Date:	01-02-2012
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	ID
CCMO	NL38274.042.11