

Hearing is Believing:

Demonstrating the benefits of Hearing Assistive Technology

Justin R. Burwinkel , Au.D. SENIOR RESEARCH AUDIOLOGIST



Hear better. Live better.

Webinar FAQs

**Hearing is
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Demonstrating the
benefits of Hearing
Assistive Technology**

How to Ask a Question

Click Q & A, type your question,
click Send

Where to get the Handout

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may be accessed through your
Pending Courses on Audiology
Online or by clicking on the link in
Chat within the classroom

Webinar FAQs

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- CEUs are available with a paid Audiology Online Unlimited CEU Access membership. After completing the course, go to your Pending Courses on Audiology Online and pass the multiple-choice exam

Assistance or Tech Support

- Call Audiology Online at 800-753-2160
- customerexperience@continued.com
- Use the Q & A window

Learner Outcomes

1

Understand the efficacy of wireless assistive listening technologies in improving speech recognition and SNR for individuals with hearing loss.

2

Describe the impact of counseling and in-office demonstrations on patient awareness, information retention, and motivation for using hearing assistive technologies.

3

Discuss the analysis of real-world recordings that were used to estimate speech intelligibility improvements in ecological listening environments.

Hearing is Believing:

Demonstrating the benefits of Hearing Assistive Technology

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Hear better. Live better.

Clinical evidence regarding the recommendation and demonstration of Hearing Assistive Technology



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Juliette Sterkens,
Au.D.



Daniel Marquardt,
Ph.D.

Research Questions

- 1 What is the SNR benefit from using wireless assistive hearing technology in real-world and laboratory environments?
- 2 How is listening effort perceived with and without direct audio input?
- 3 What is the effect of hearing loop demonstration and experience on telecoil information retention and use?

Why recommend Assistive Listening Technology?

Environmental Factors:



Reverberation



Distance



Background Noise



Physical
barriers





Why recommend Assistive Listening Technology?

Improving SNR

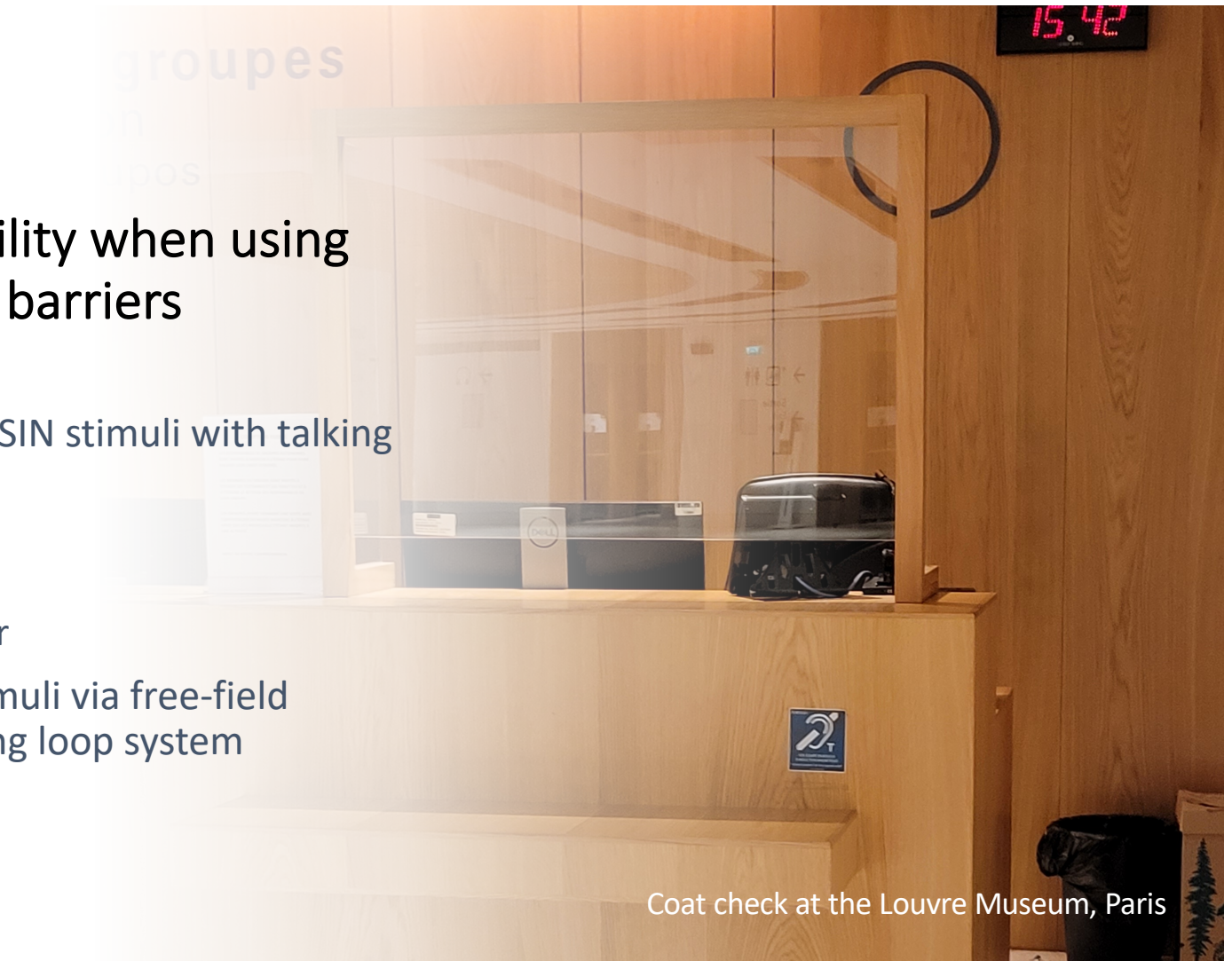
Public Venues

- Places of worship
- Performance venues
- Meeting spaces
- Ticketing windows
- Information desks
- Airports & Public transit

Study 1

Speech intelligibility when using facial masks and barriers

- Re-recorded QuickSIN stimuli with talking manikin
 - Unobstructed
 - Facial mask
 - Plexiglass barrier
- Presented new stimuli via free-field speaker and hearing loop system
 - RIC users (n=13)
 - ITE users (n=7)

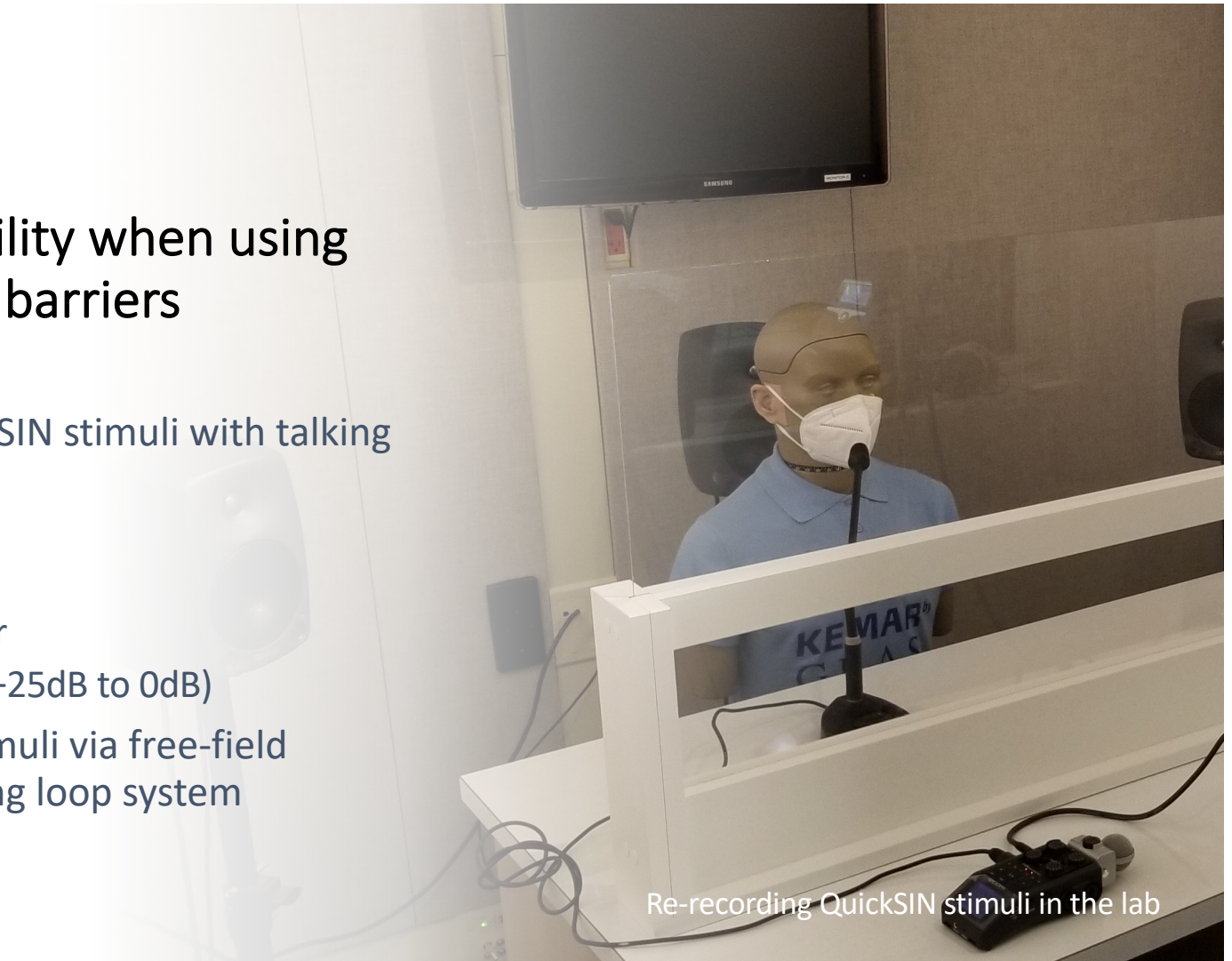


Coat check at the Louvre Museum, Paris

Study 1

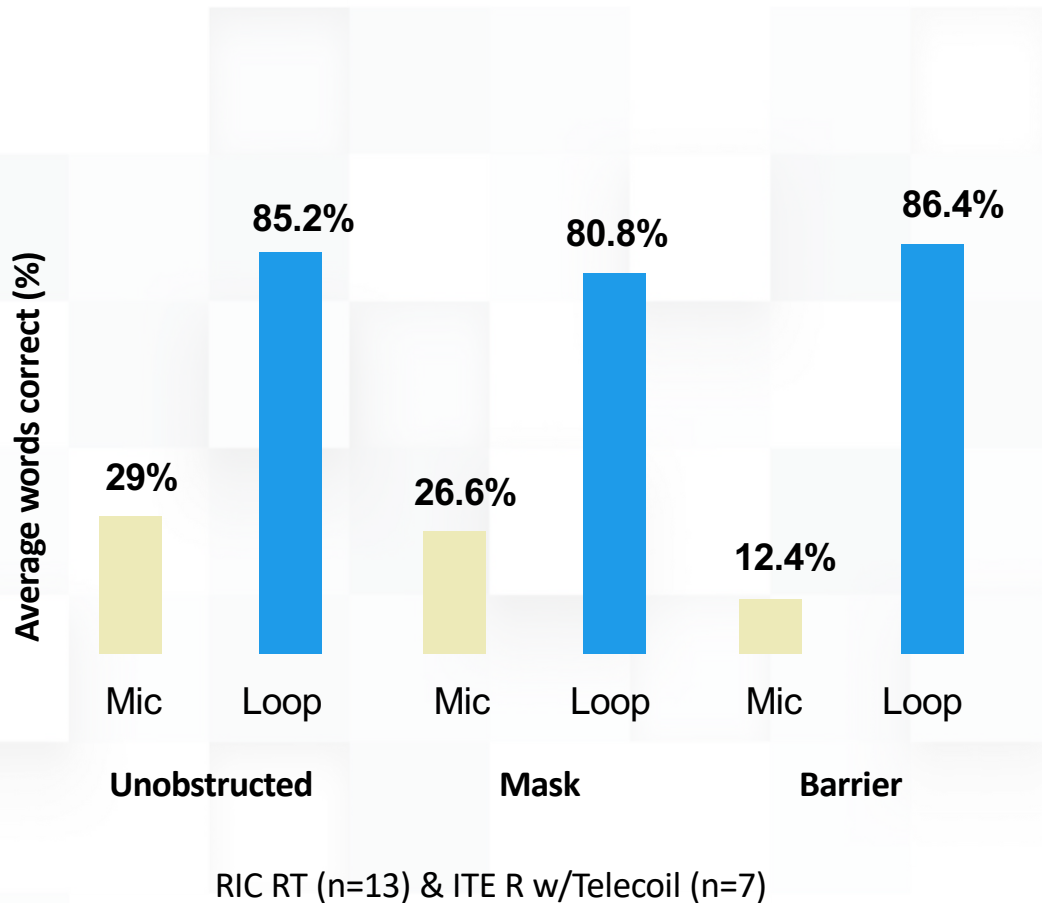
Speech intelligibility when using facial masks and barriers

- Re-recorded QuickSIN stimuli with talking manikin
 - Unobstructed
 - Facial mask
 - Plexiglass barrier
 - 5dB SNR steps (+25dB to 0dB)
- Presented new stimuli via free-field speaker and hearing loop system
 - RIC users (n=13)
 - ITE users (n=7)



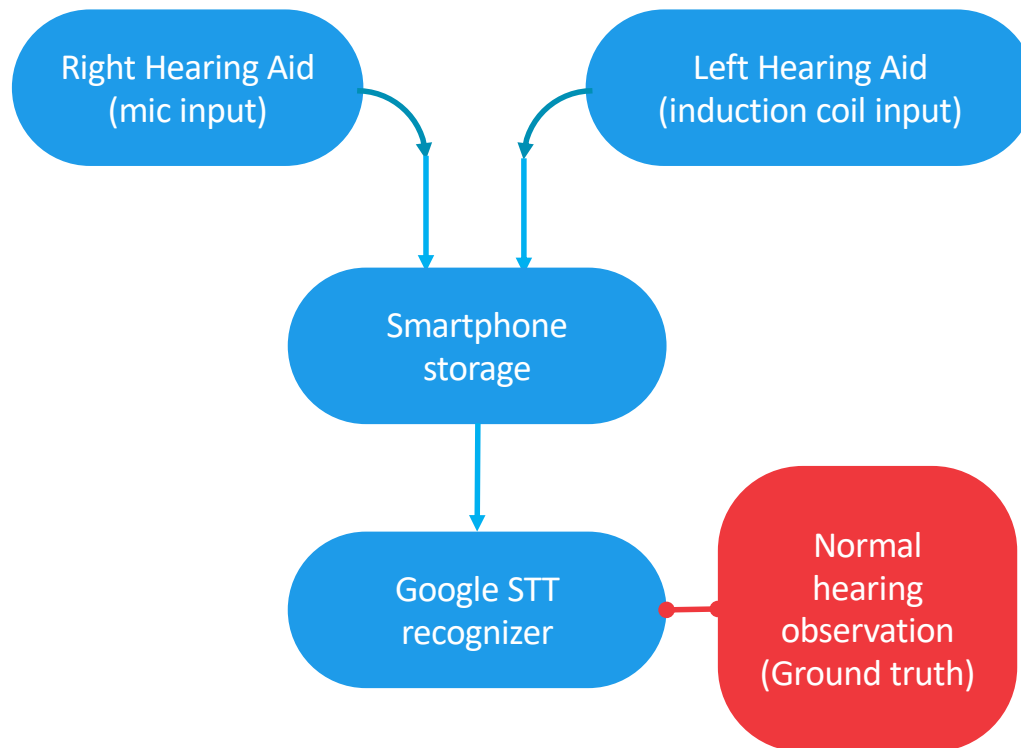
Telecoil/Loop Performance

Telecoils **significantly improve** speech understanding in degraded listening conditions



Note:

Words correct was calculated based on the key words for all QuickSIN SNR-step levels ranging from +25dB to 0dB SNR



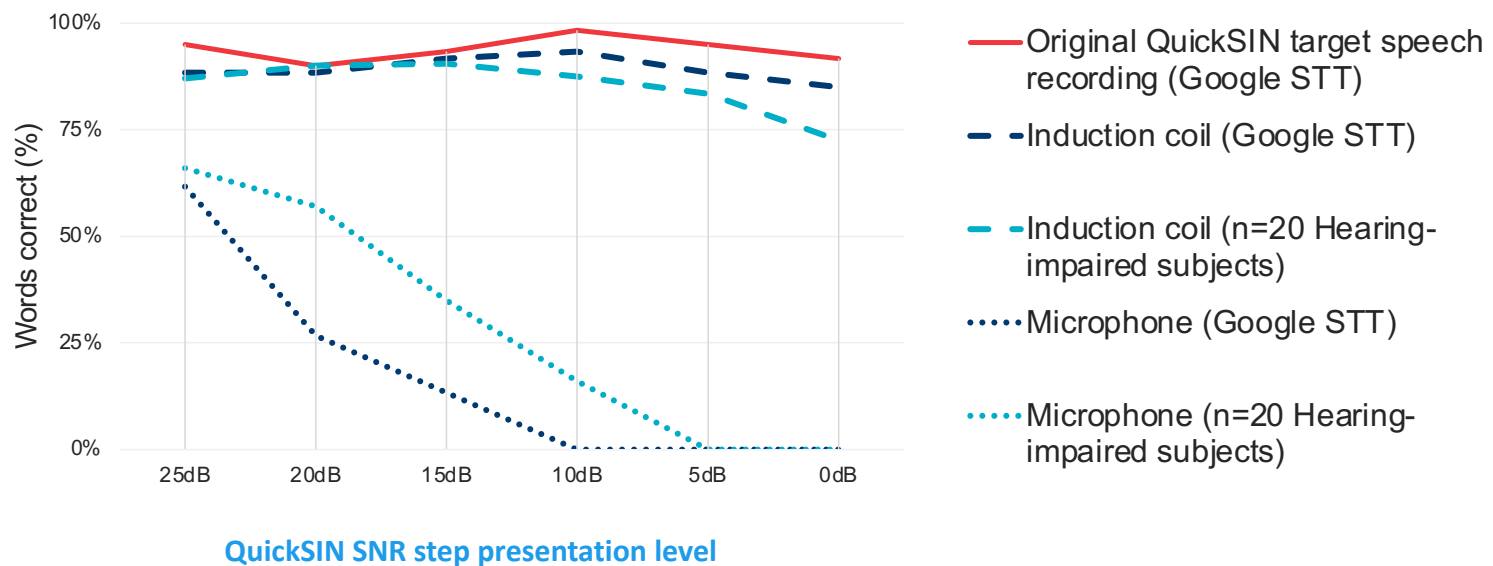
Study 2

Intelligibility using real-world hearing accessibility systems

- Research hearing aid firmware allowed storing synchronous microphone and induction coil audio
- Compared intelligibility of recordings by using Google Speech-to-Text (STT) recognizer performance
- Related hearing-impaired listener performance (n=20) to the Google STT recognizer

Google STT vs Hearing Impaired Listeners (n=20)

Google STT recognizer performance compared to hearing-impaired subjects (n=20) at various SNR levels



Airport Departures Hall

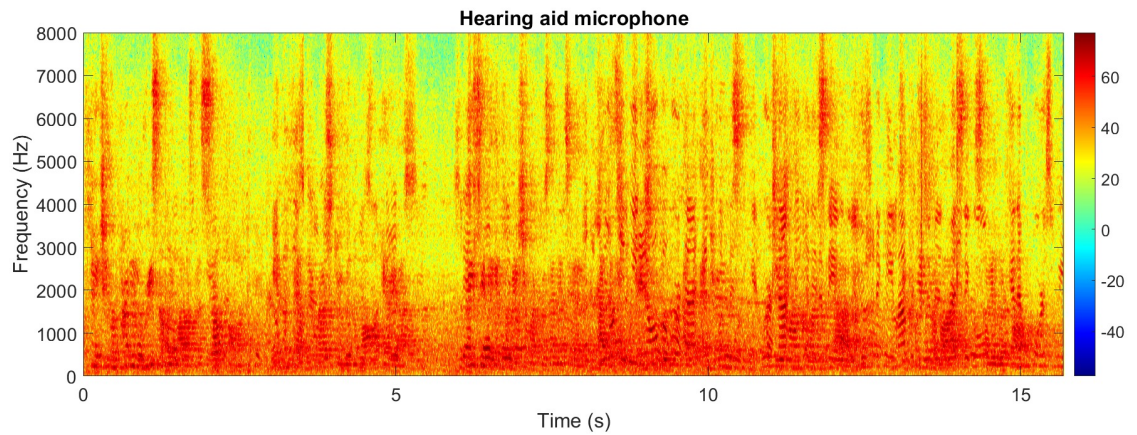
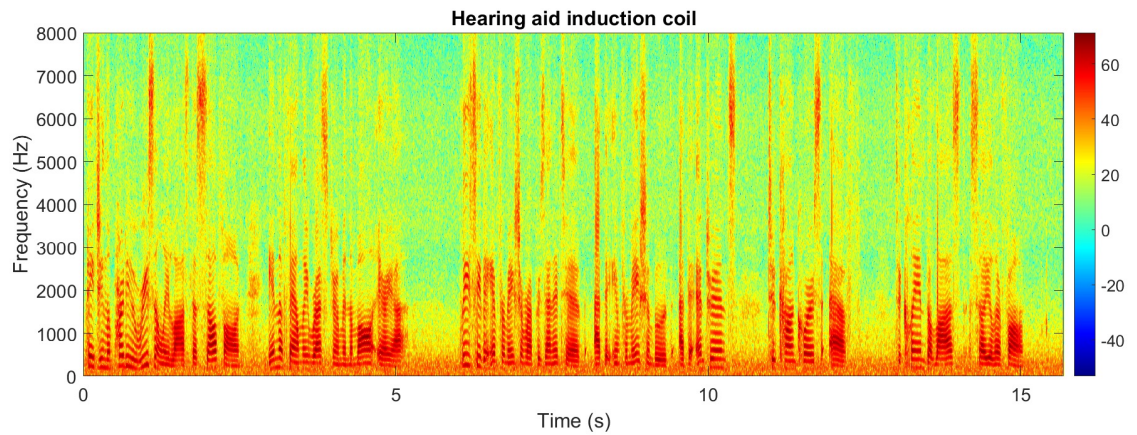
Microphone

Induction Coil

Airport Ticketing Area Announcements

Google STT Accuracy

- Microphone: 0%
- Induction coil: 91.8%



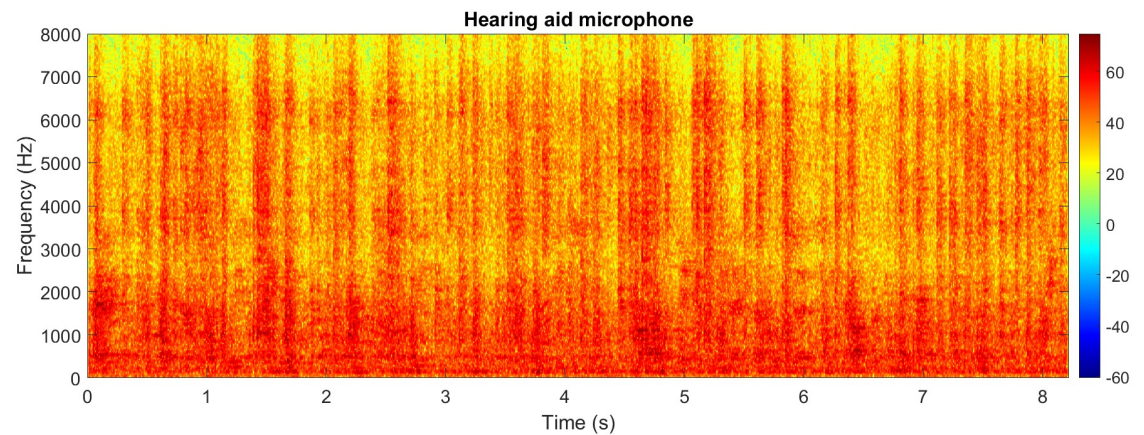
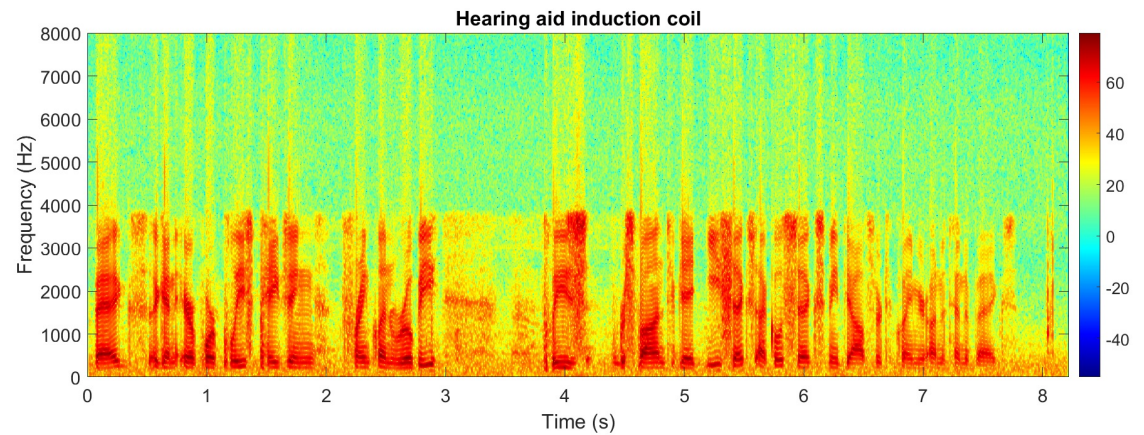
Airport Baggage Claim



Airport Baggage Claim Announcements

Google STT Accuracy

- Microphone: 11.5%
- Induction coil: 96.2%



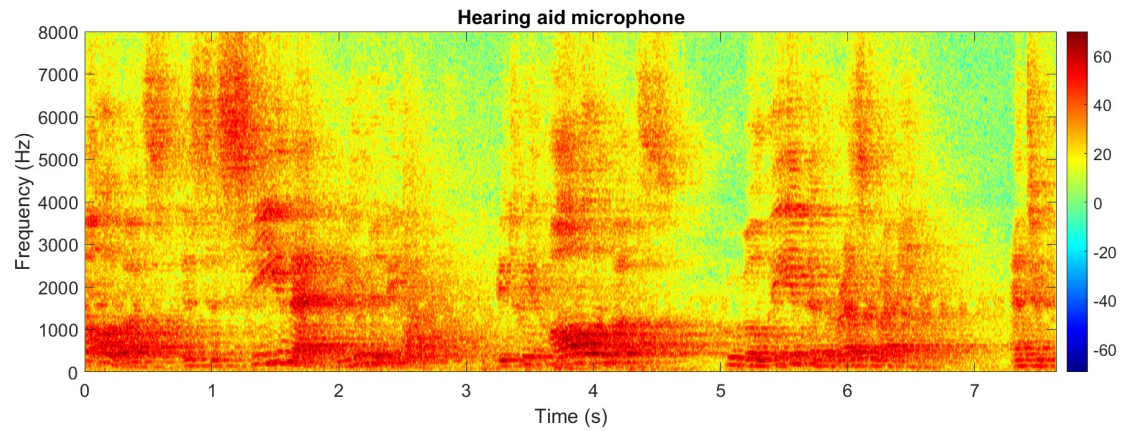
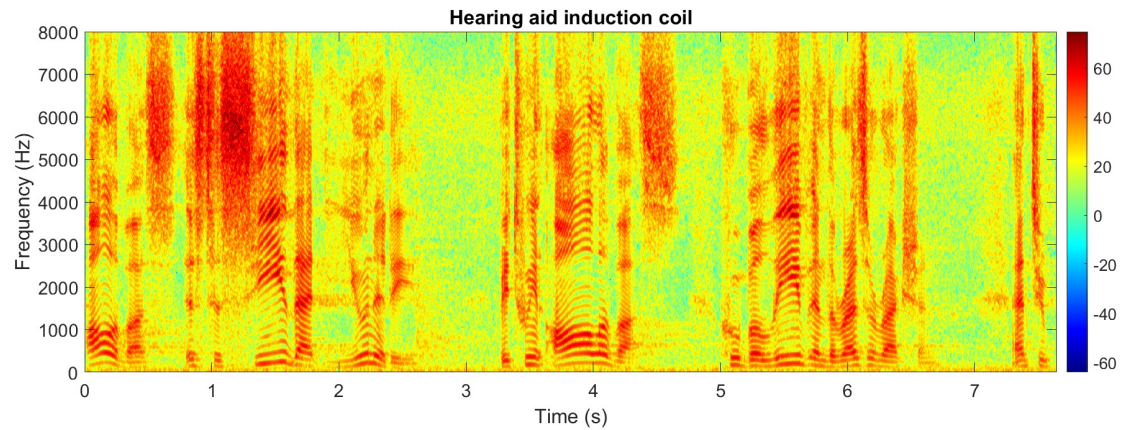
Historic Chapel



Historic Chapel

Google STT Accuracy

- Microphone: 30.7%
- Induction coil: 85.4%



Study 3

Lab benefit and the effect of demonstration on patient utilization



**Evolv AI CIC & Remote
Microphone +
(with telecoil)**
14 Participants



Mild to Moderately-Severe Hearing Loss

**28 INDIVIDUALS WITH HEARING LOSS
(EXPERIENCED HEARING AID USERS)**



**Evolv AI
PowerPlus BTE 13
(with onboard telecoil)**
14 Participants



Moderately-Severe to Severe Hearing Loss

Before the BTE participants left their fitting session...

- **BTE Participant Groups**
 - **No Demo Group (n=7):**
 - Verbal counseling
 - Shown the ADA accessibility signage
 - **Demo Group (n=7):**
 - Verbal counseling
 - Shown the ADA accessibility signage
 - Experienced a loop “demo” and practiced accessing the “Loop” program
 - Given a list of local loops available to try on their own



Asked 1 month later...

All BTE Participants

- *Do you recall talking about the telecoil?*
- *Do you recall what the "Loop" Program does?*
- *Do you recall how to access the "Loop" Program?*

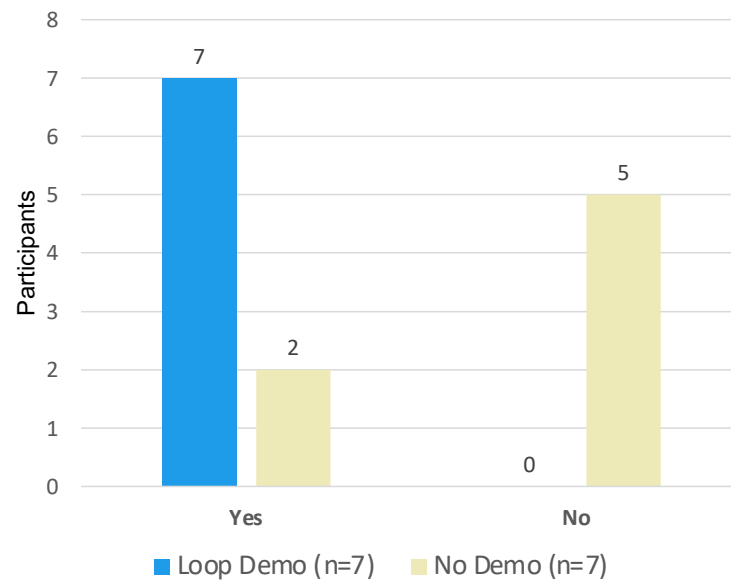


QUESTION 1:

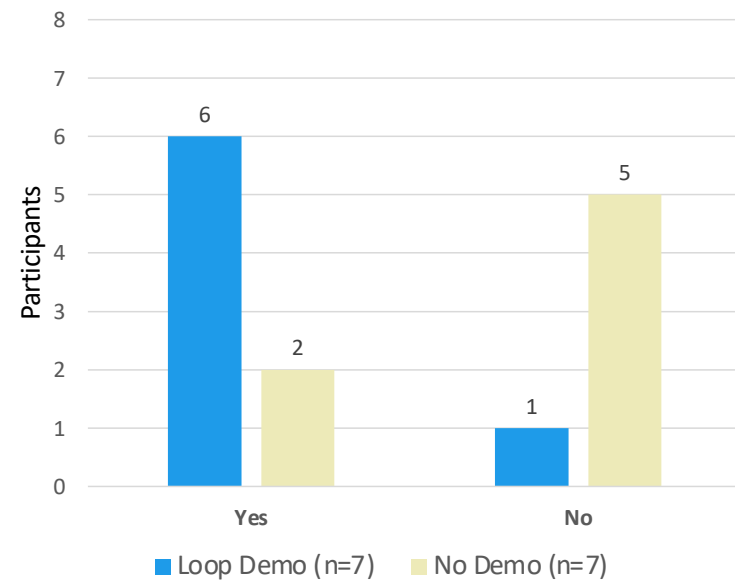
**Do you remember talking
about the telecoil?**

Demonstration assists with information retention regarding the "Loop"

Do you recall what the "Loop" Program does?

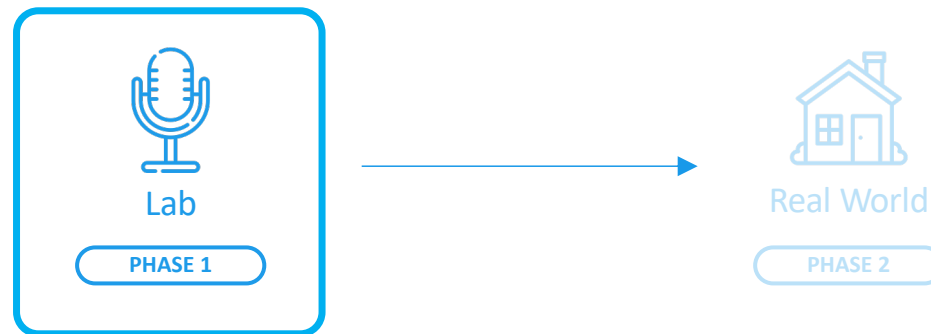


Do you recall how to access the "Loop" Program?



Lab Study

Speech Understanding with hearing aids alone, telecoil, and remote microphone in the lab



Benefit of Remote Microphone and Telecoil Technology

Test material: AzBio Sentences

- Speech level: 65 dBA
- Babble noise level: 55 dBA
- Distance: 3 meters (118 in.)

Test Conditions

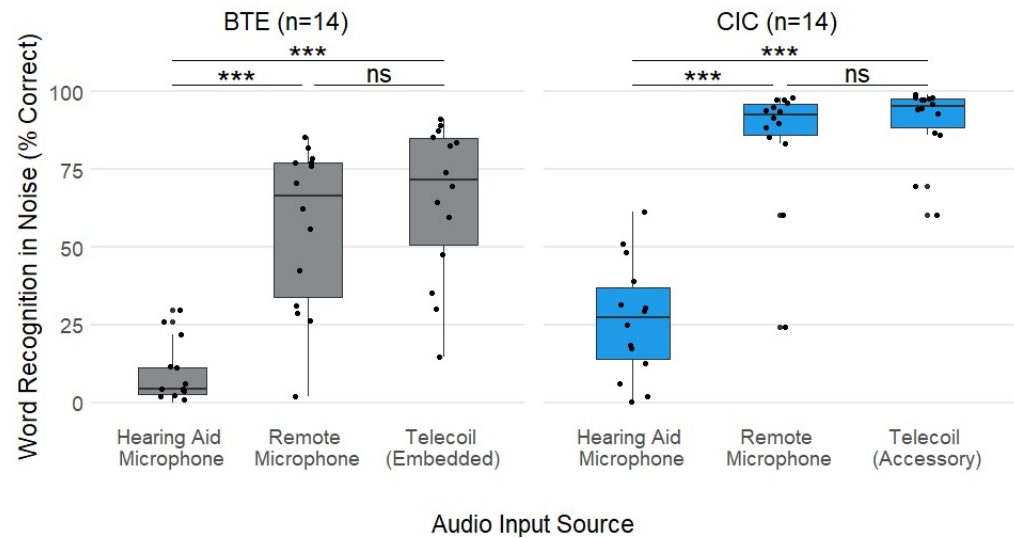
- Hearing Aid alone
- Telecoil
- Remote microphone

Methods

Simulated condition
with high reverberation,
distance, and noise



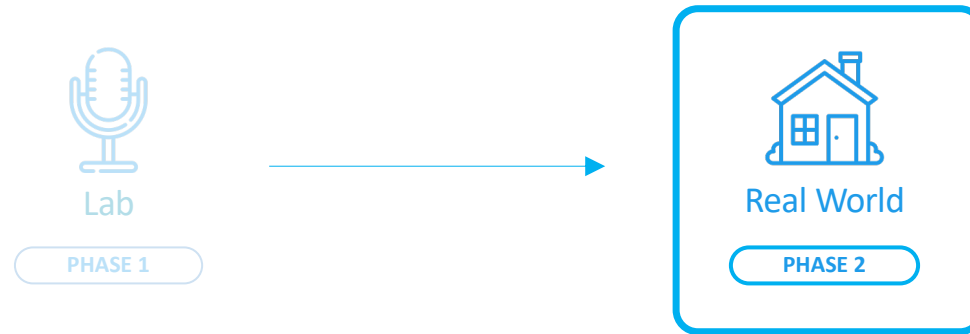
Assistive Listening Devices **significantly improved speech recognition** in noise in a challenging, reverberant environment



Speech reception scores with hearing aid, remote microphone, and telecoil inputs

Telecoil Benefit

in Simulated Theater Experience



Simulated Theater Experience

14 BTE Users

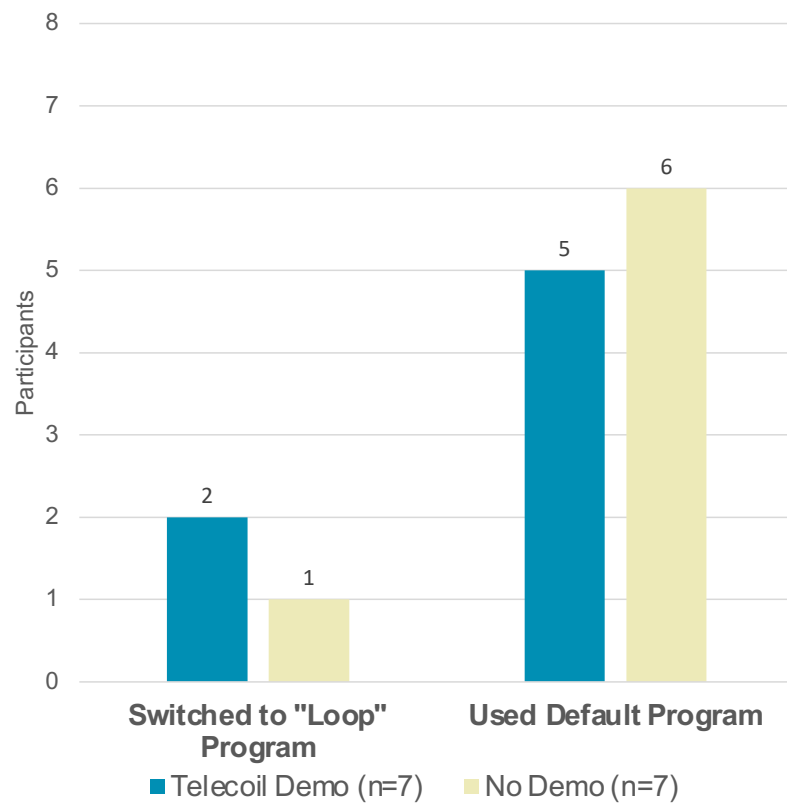
13 CIC Users

Greeted at the door and led into the theater,
then BTE participants' self-selected HA program
was observed after the movie began to play.

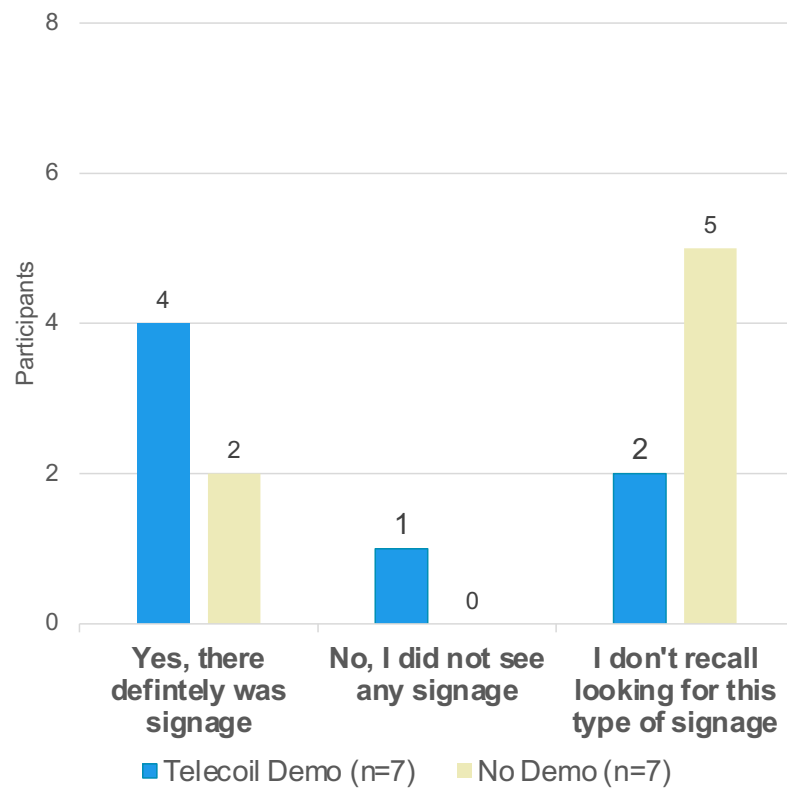
Austin Theatre at Starkey



Self-initiated "Loop" Program utilization during simulated movie theater event



Participants' awareness of ADA-mandated accessibility signage outside simulated movie theater



Telecoil Preference

14 BTE Users

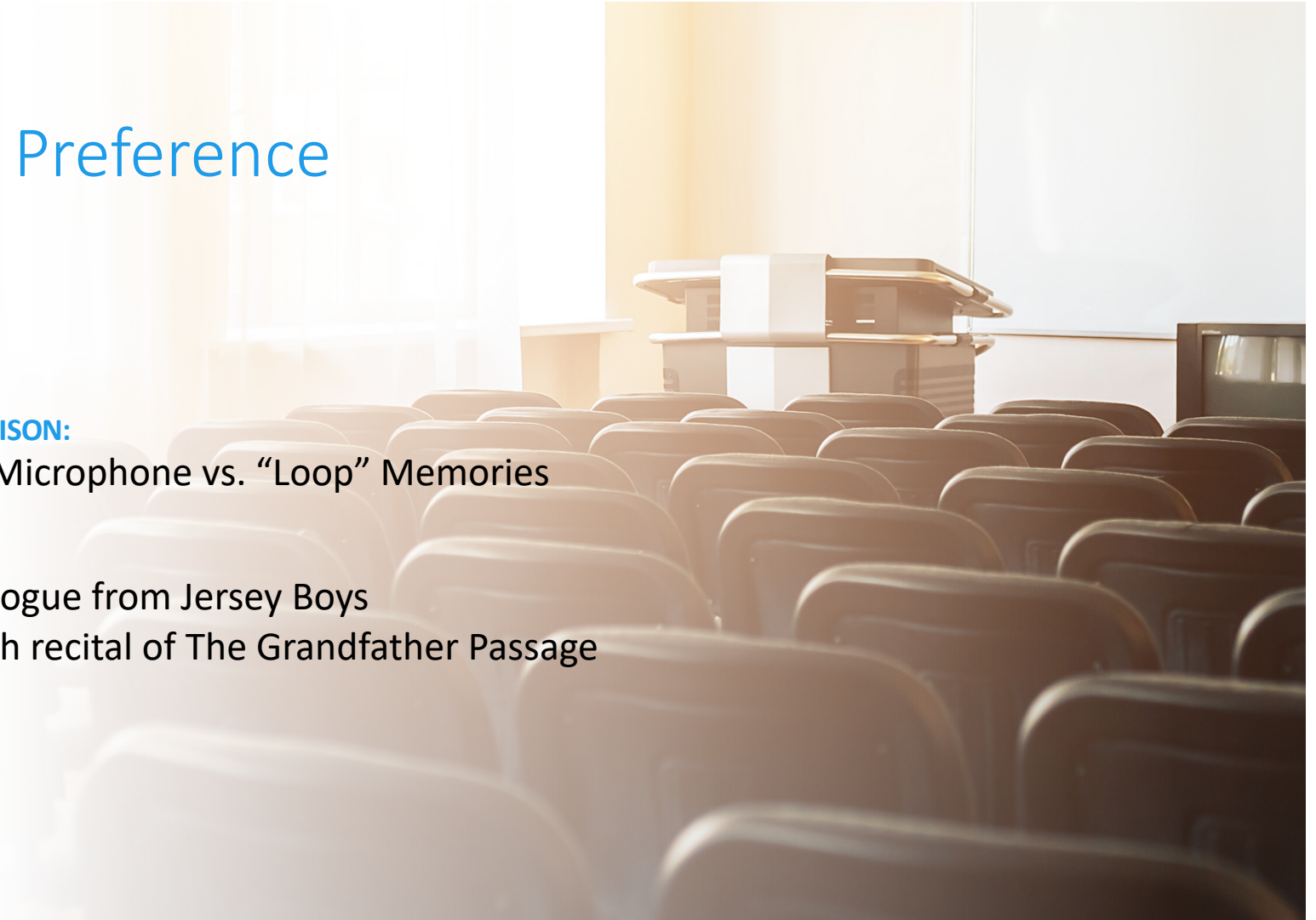
13 CIC Users

PAIRED COMPARISON:

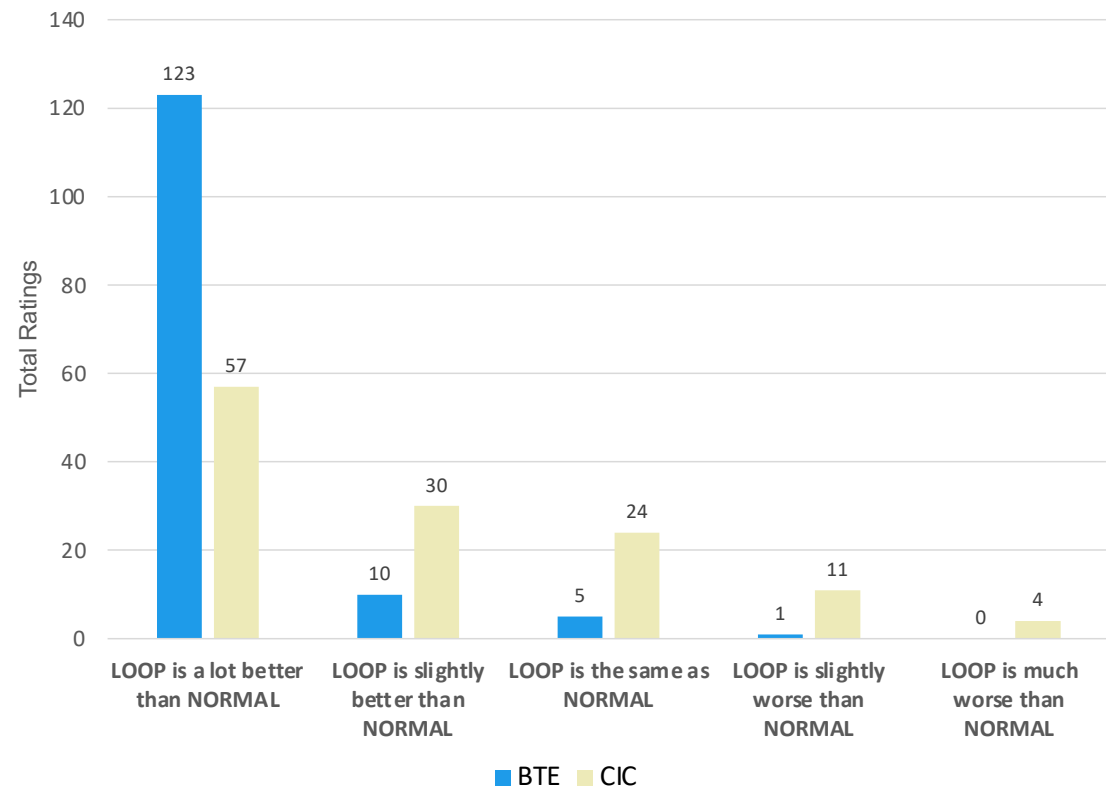
- “Normal” Microphone vs. “Loop” Memories

TEST MATERIAL:

- Movie dialogue from Jersey Boys
- Live-speech recital of The Grandfather Passage



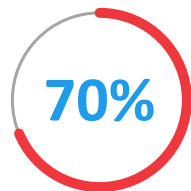
Preference for Telecoil over Microphone in Auditorium environment





of BTE users

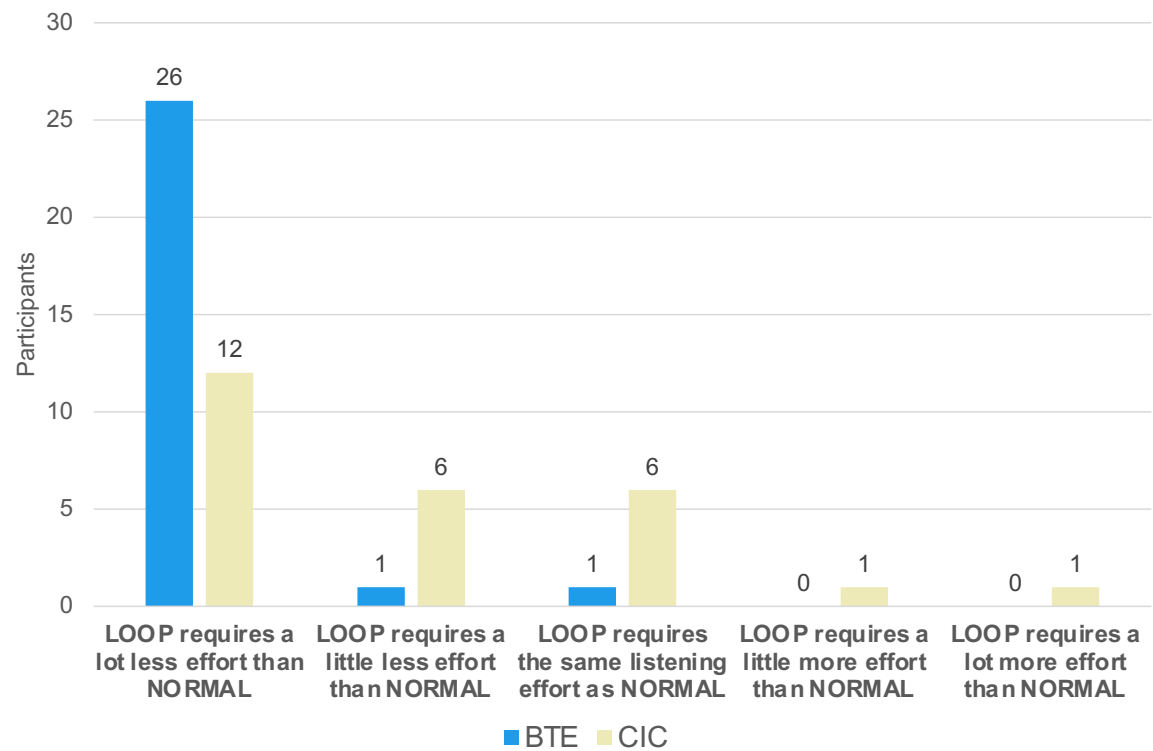
experienced less effort
with telecoil than without



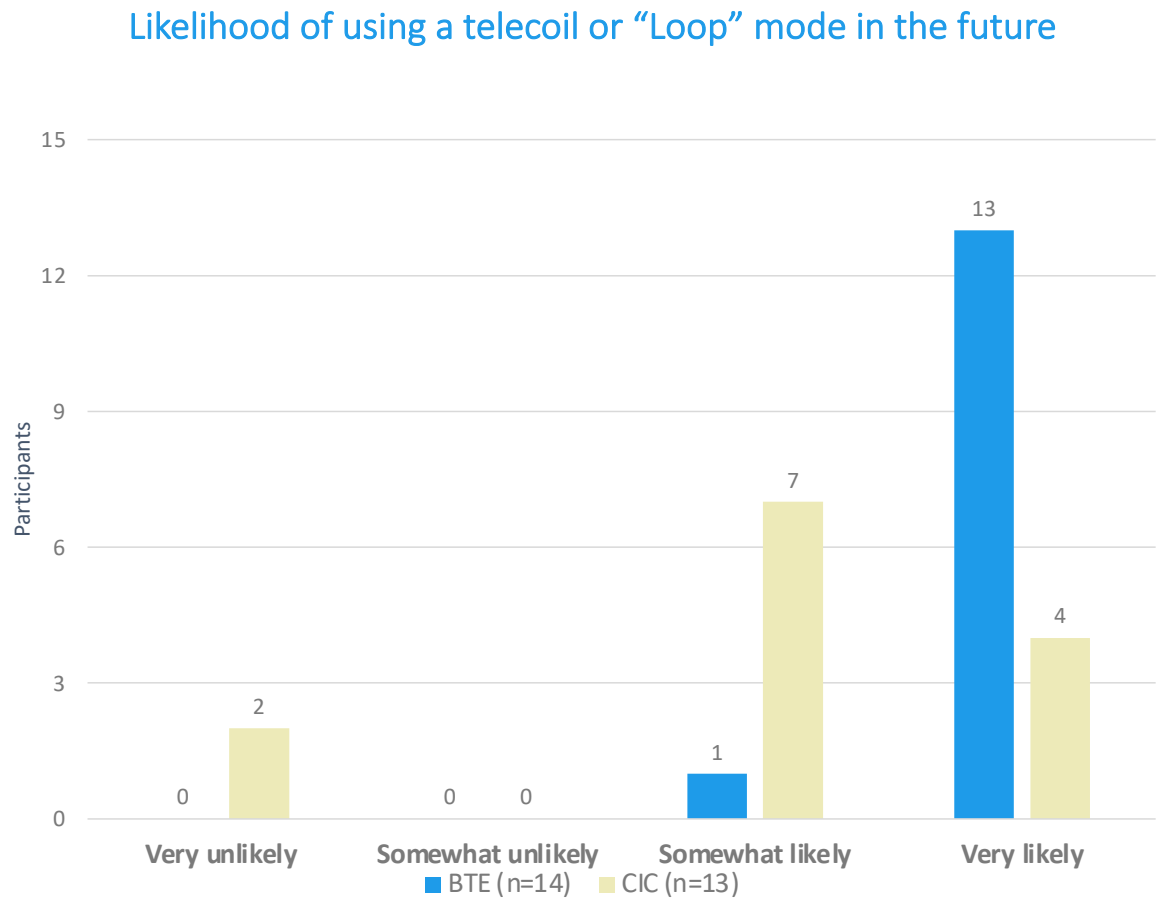
of CIC users

experienced less effort
with telecoil than without

Effect of Listening Mode on Perceived Listening Effort



Most wanted to
continue using
the Loop



Conclusions and Takeaways

- Our findings **validate the recommendation** of wireless assistive listening systems with hearing aids, even for individuals who have more mild degrees of hearing loss.
- Results also underscore the **importance of counseling and in-office demonstration** of how to utilize these systems with hearing aids.
- Encouraging patients to make paired-comparison evaluations, in realistic scenarios, may **improve perceived benefit** and lead to **lasting behavior changes**.

Thank You

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Audio demonstrations available:

