2025

AUDITORY AGING

NEWSLETTER

AUDITORY AGING

Baycrest
Rotman Research Institute

www.auditoryaging.com

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ABOUT US

2025 Lab Photo

Dr. Björn Herrmann

The Auditiory Aging Lab studies how people engage in listening and communication as they age. The lab is led by Dr. Björn Herrmann who is a Scientist and Tier II Canada Research Chair in Auditory Aging at the Rotman Research Institute at Baycrest Academy for Research and Education, and an Assistant Professor at the University of Toronto, in Canada.

If you would like to see a tour of our lab, follow this link: https://youtu.be/YzBq3twCpQA

OUR MISSION

Our mission is to conduct cutting-edge research on how aging affects listening and communication, integrating mechanistic neurophysiology with real-world experiences. We are committed to:

INNOVATIVE RESEARCH: Utilizing behavioral studies, brain recordings, and qualitative social methods to uncover the complexities of age-related hearing loss.

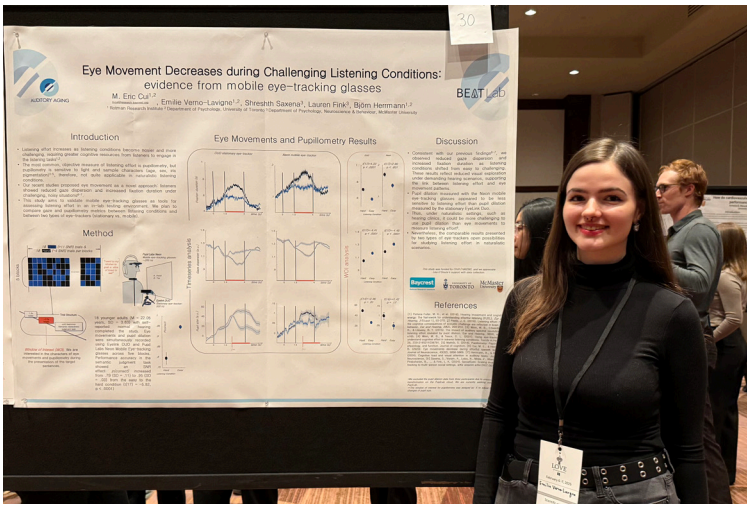
COMMUNITY ENGAGEMENT: Collaborating with participants and stakeholders to translate research findings into practical solutions that address everyday challenges faced by older adults.

EDUCATION & RESOURCES: Providing accessible tutorials, programming guidance, and scientific resources to empower both researchers and the public in understanding auditory aging.

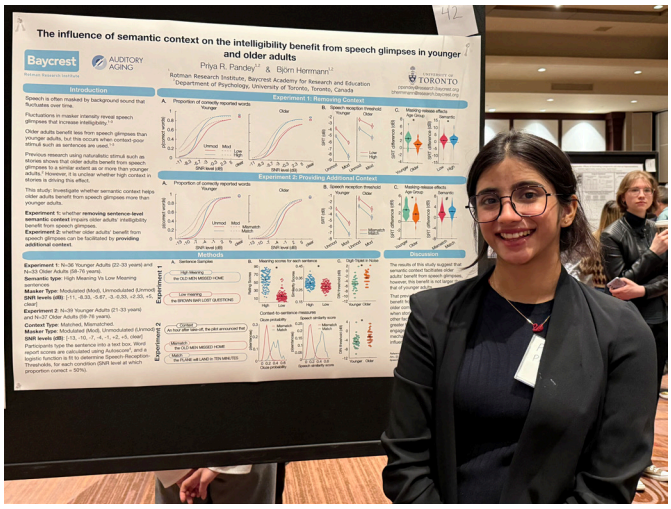
SHOWCASING WORK

The lab is always active in presenting our work at conferences across Canada and around the world. The conferences are very diverse, covering topics such as neuroscience, hearing loss, social gerontology, technology, speech, humanities, and more. Here are some photos of our lab members at these conferences this past year!

Ryan, Priya, Geneva, Tara, Carolyn, Björn, Emilie, and Lisa at the L.O.V.E. Conference 2025



Emilie Verno-Lavigne and her research poster at the L.O.V.E. Conference 2025

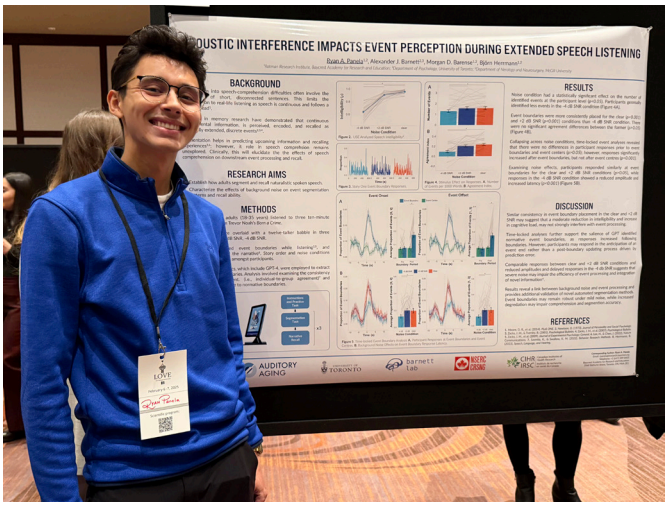


Priya Pandey and her research poster at the L.O.V.E. Conference 2025

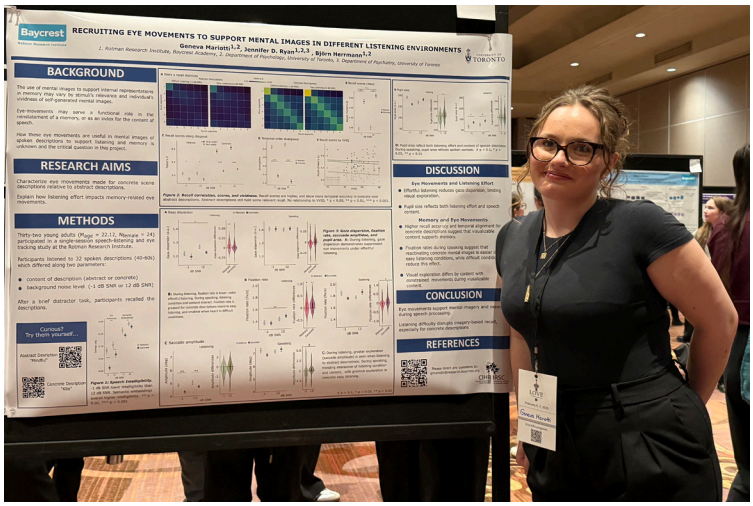
SHOWCASING WORK

Signe Lund Mathesien presenting at AgeWell 2024

Signe Lund Mathesien at ARVO 2024



Ryan Panela and his research poster at the L.O.V.E. Conference 2025



Geneva Mariotti and her research poster at the L.O.V.E. Conference 2025

Björn, Geneva, and Jen Ryan at TAMEG 2025

Priya, Björn, and Ryan at the ARO Conference 2025

GRAD STUDENT SPOTLIGHT

Tara (left) and Priya (right)

TARA RAESSI

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Outside of the lab, I am interested in everything sports: weightlifting, F1, hockey, and tennis. Moving forward, I hope to continue a career in academia as a professor.

PRIYA PANDEY

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I like to read, mediate, and go on walks. I would like to continue asking questions and seeking answers, and I would hope to see the research I conduct have an impact on the community.

GRAD STUDENT SPOTLIGHT

WHAT ARE YOUR RESEARCH INTERESTS?

PRIYA: Generally, studying how people use cognitive processes to facilitate listening, and how this further impacts our thoughts, memories, and listening experiences, as well as how these cognitive abilities change and interact with hearing deficits as we grow older.

TARA: Broadly speaking, my research interests lie in anything to do with conversations, so I'm interested in how people understand conversations, especially as they age.

WHAT PROJECT(S) ARE YOU WORKING ON?

PRIYA: We are using EEG methods to assess central auditory processing, and how this impacts subsequent thoughts and memory. Also some studies that explore speech in noise processing in older adults.

TARA: I'm doing projects investigating memory in the presence of a competing speaker. This includes testing memory in different realistic environments, such as someone telling a story beside you.

WHAT IMPACT COULD THIS HAVE?

PRIYA: This research will allow us to understand the different processes that are involved in forming the listening experience, and it may help people function better in their daily lives as they get older.

TARA: This can help us understand mechanisms that may be overlooked in the relationship between hearing loss and dementia, which broadens our perspective on the topic.

DEEP DIVE: SIGNE

Exploring audiobooks after vision loss

Signe Lund Mathiesen

Many older adults experience vision loss, which can make reading printed stories difficult. Reading is important because engagement with narratives can help older adults stay connected and informed, reduce feelings of isolation, and support general well-being. Many older adults switch to audiobooks after experiencing vision loss, but we do not know much about how people adapt to the new medium and what challenges they face in the transition from print to audio. To ensure that older adults with vision loss continue to engage with narrative materials in the form of audiobooks, my research explores how this transition unfolds in everyday life.

Navigating the shift to audiobooks: What I learned

In my study, I spoke with 11 older adults with vision loss aged between 61 and 80, and who had or were still navigating the shift from print reading to audiobook listening. Through the interviews, I found that some embraced audiobooks and playback devices quickly, while others felt frustrated by unintuitive interfaces or grieved the loss of their print reading habits. Switching from print to audiobooks involved more than just learning new technology. Participants described a process of "learning to listen," including adjusting their attention and developing new cognitive skills to stay immersed in stories. Many emphasized the importance of the narrator's voice for this immersive experience. Finally, most of the people I spoke with described regaining joy and a sense of social connection through audiobook listening, both through the intimacy of the narrator's voice and through participation in audiobook clubs.

Why this matters

This research is especially relevant for older adults with vision impairment, their families, health care providers, and technology designers. It highlights how audiobook engagement can offer companionship, stimulate the mind, and even encourage social interaction, such as joining audiobook clubs. It also points to the need for more accessible audiobook platforms and better support during the transition from print to audio.

Looking ahead

Our study shed light on audiobook adaptation for older adults with vision loss, but there are still some questions to answer, both for research, technology design, and care practice. For example, many older adults have both vision and hearing loss, and we want to know more about how that might affect audiobook listening. Standard audiobook platforms often assume either intact hearing or vision. For users with dual sensory loss, a lack of customization (e.g., clear, slow-paced narration or high-contrast interfaces)

DEEP DIVE: SIGNE

can hinder access. Audiobook clubs or shared listening may become less accessible due to difficulties in group conversation, turn-taking, without visual cues. Should audiobook platforms be made more intuitive and inclusive for older users with varying sensory needs? Can audiobook producers better use speech technology to make narration fit the needs and preferences of older adults with dual sensory loss? What role might public libraries, healthcare systems, vision rehabilitation and audiologists, or community groups play in supporting the transition from print to audio? As the population ages, designing audiobook experiences that accommodate a range of sensory abilities and preferences will be essential for supporting narrative engagement, social connection, and overall well-being in later life.

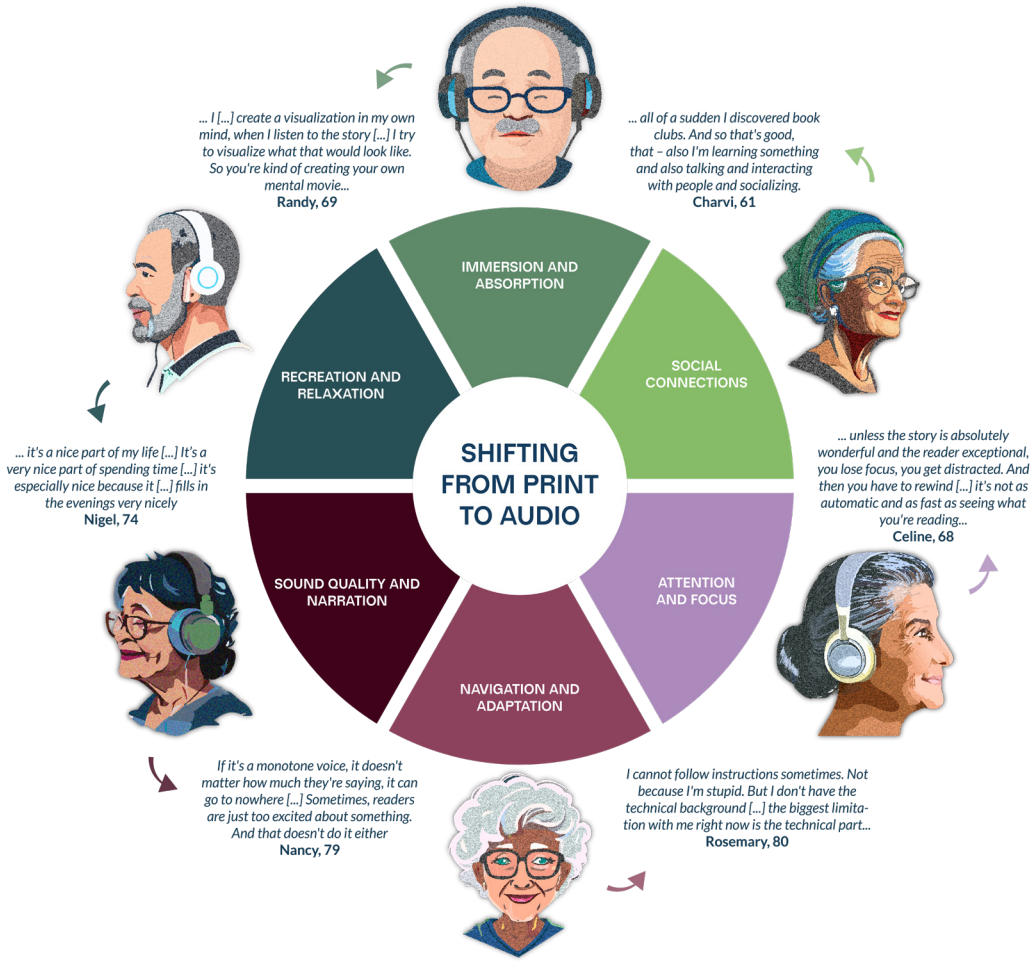


Figure 1:
Shifting from print to audio. Key findings from interviews with older adults who adapted to audiobooks after vision loss. Themes include Immersion and Absorption, Social Connections, Attention and Focus, Navigation and Adaptation, Sound Quality and Narration, and Recreation and Relaxation.

Publications:

- Mathiesen SL, Grenier A, Wittich W, Sukhai M, Herrmann B (2025) Age, vision loss, and audiobooks: Experiences of the transition to a new medium. OSF preprints.
- Mathiesen SL, Grenier A, Wittich W, Sukhai M, Herrmann B (2025) Narrative engagement in story listening: The challenge of age and vision loss. Journal of Aging Studies 75:101355.

DEEP DIVE: RYAN

Automated Segmentation and Recall

Ryan Panela

The world around us is highly complex and ever changing. New sights, sounds, and information unfold moment-by-moment, but our brains make sense of them by breaking them into meaningful pieces. This mental process, known as event segmentation, helps us comprehend our current experiences and supports how we remember it later. In both research and clinical settings, evaluating perception and memory often relies on time-consuming, manual methods. Our research explores how artificial intelligence – particularly large language models (LLMs) – can offer an efficient, scalable way to measure how we perceive and remember everyday events.

What did we find?

We asked twenty adults to read short narrative and mark where they felt one meaningful event ended and another began. We then prompted AI models, including GPT-4 and LLaMA 3.0, to perform the same task. Both models, especially GPT-4, closely matched human segmentation patterns — often with more consistency than humans showed amongst each other. After reading, participants recalled the stories aloud. We transcribed their responses and compared them the original stories using text embeddings – a technique that allows AI to measure how similar two text are in meaning. The automated recall scores correlated with human ratings, capturing both what was remembered and how it was structured.

Why does this matter?

This research has broad implications across the memory sciences – for research in cognitive aging and clinical assessments. It provides a foundation for scalable, objective tools that can measure comprehension and memory performance using materials – such as written or spoken narratives – encountered in everyday life. This enables faster, more accessible assessments that support cognitive health screening in older adults or individuals with memory difficulties.

Looking ahead

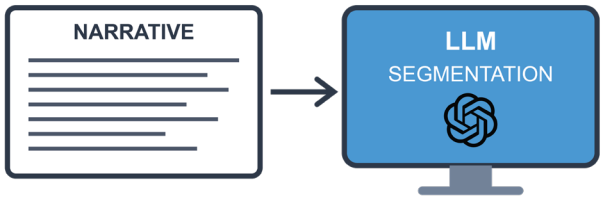
The speech that we encounter every day is often masked by varying degrees of background noise – whether on public transit, busy restaurants, classrooms, and normal shopping malls. Building on our results, we will apply these AI-based methods to study how people perceive and remember spoken information in these more naturalistic and acoustically challenging environments. Ultimately, this work can help us uncover the cognitive strategies humans use to understand and organize speech in real-world conditions, revealing how perception and memory operate when listening becomes effortful.
This extends especially to older adults, who often experience age-related hearing loss and

DEEP DIVE: RYAN

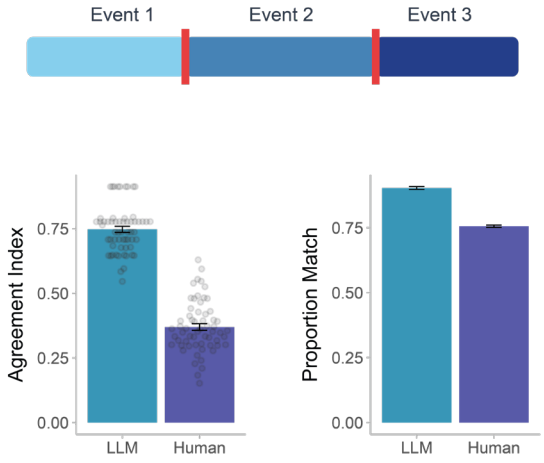
cognitive challenges that enhances listening challenges. By applying our validated approach, we hope to better understand how these environmental and age-related factors affect perception and memory during everyday communication.

ASSESSING MEMORY WITH LARGE LANGUAGE MODELS

Event Segmentation

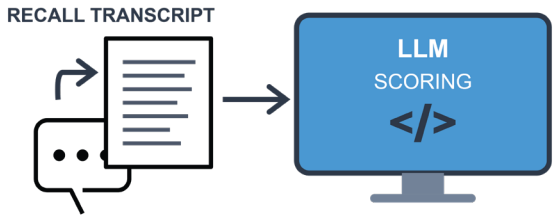


Segmented Narrative

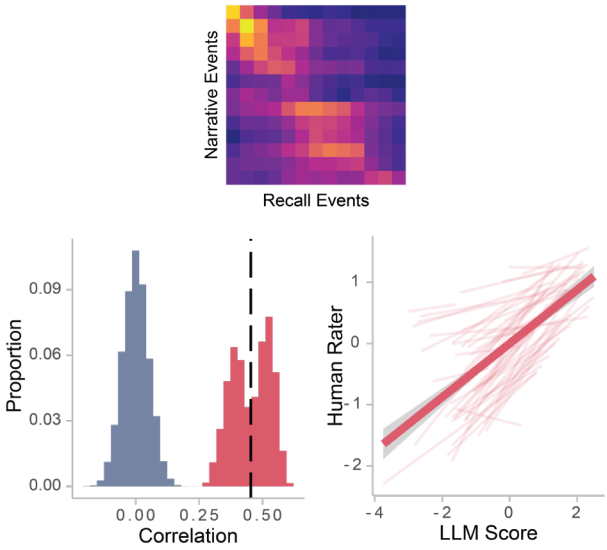


LLMs show greater internal consistency and alignment to human event boudaries than humans themselves.

Narrative Recall



Narrative × Recall Similarity



LLM scores capture meaningful narrative information and align closesly with human raters.

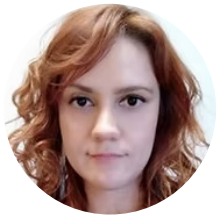
Publications:

- Panela RA, Barnett AJ, Barense MD, Herrmann B (2025) Event segmentation applications in large language model enabled automated recall assessments. arXiv.
- Herrmann B (2025) Language-agnostic, automated assessment of listeners' speech recall using large language models. Trends in Hearing 29:1-22.

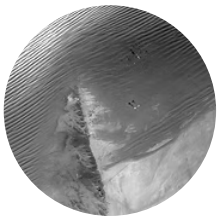
MEET THE TEAM

Björn Herrmann - Principal Investigator

Signe Lund Mathiesen - Postdoctoral Fellow



Yulia Lamekina - Postdoctoral Fellow



Yue Ren - Postdoctoral Fellow

Geneva Mariotti - Graduate Student

Ryan Panela - Graduate Student

Eric Cui - Graduate Student

MEET THE TEAM

Priya Rakesh Pandey - Graduate Student

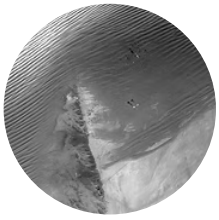
Tara Raessi - Graduate Student

Sarah Bobbitt - Research Assistant

Lisa D'Souza - Co-op Student

Carolyn Kortje - Co-op Student

Rojin Firooz - Co-op Student



Emilie Verno-Lavigne - Undergraduate Thesis Student

PUBLICATIONS

2024

Mathiesen SL, Van Hedger SC, Irsik VC, Bain MM, Johnsrude IS, Herrmann B (2024) Exploring age differences in absorption and enjoyment during story listening. *Psychology International* 6:667-684.

Kraus F, Ross B, Herrmann B, Obleser J (2024) Neurophysiology of effortful listening: Decoupling motivational modulation from task demands. The *Journal of Neuroscience* 44:e0589242024.

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Motala A, Johnsrude IS, Herrmann B (2024) A longitudinal framework to describe the relation between age-related hearing loss and social isolation. *Trends in Hearing* 28:1-18.

Bobbitt SG, Herrmann B, Butler BE (2024) A survey of narrative listening behaviors in 8-13-year-old children. *International Journal of Listening* 38:16-27.

Panela RA, Copelli F, Herrmann B (2024) Reliability and generalizability of neural speech tracking in younger and older adults. *Neurobiology of Aging* 134:165-180.

2025

Mathiesen SL, Grenier A, Wittich W, Sukhai M, Herrmann B (2025) Narrative engagement in story listening: The challenge of age and vision loss. *Journal of Aging Studies* 75:101355.

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Herrmann B (2025) Age-related differences in the impact of background noise on neural speech tracking. *Neurobiology of Aging* 153:10-20.

Herrmann B (2025) Language-agnostic, automated assessment of listeners' speech recall using large language models. *Trends in Hearing* 29:1-22.

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FUNDING

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Thank you to our funders for the support we have received to conduct our research. Thank you also to all research participants and community partners. We are committed to making a positive impact in the lives of older people through our research. Our work would not be possible without all of you.