Audiological leadership through BrainHearing

Thomas Behrens
Vice President, Audiology & Applied Research
Hearing Aids

oticon
life-changing technology

Audiological leadership through BrainHearing

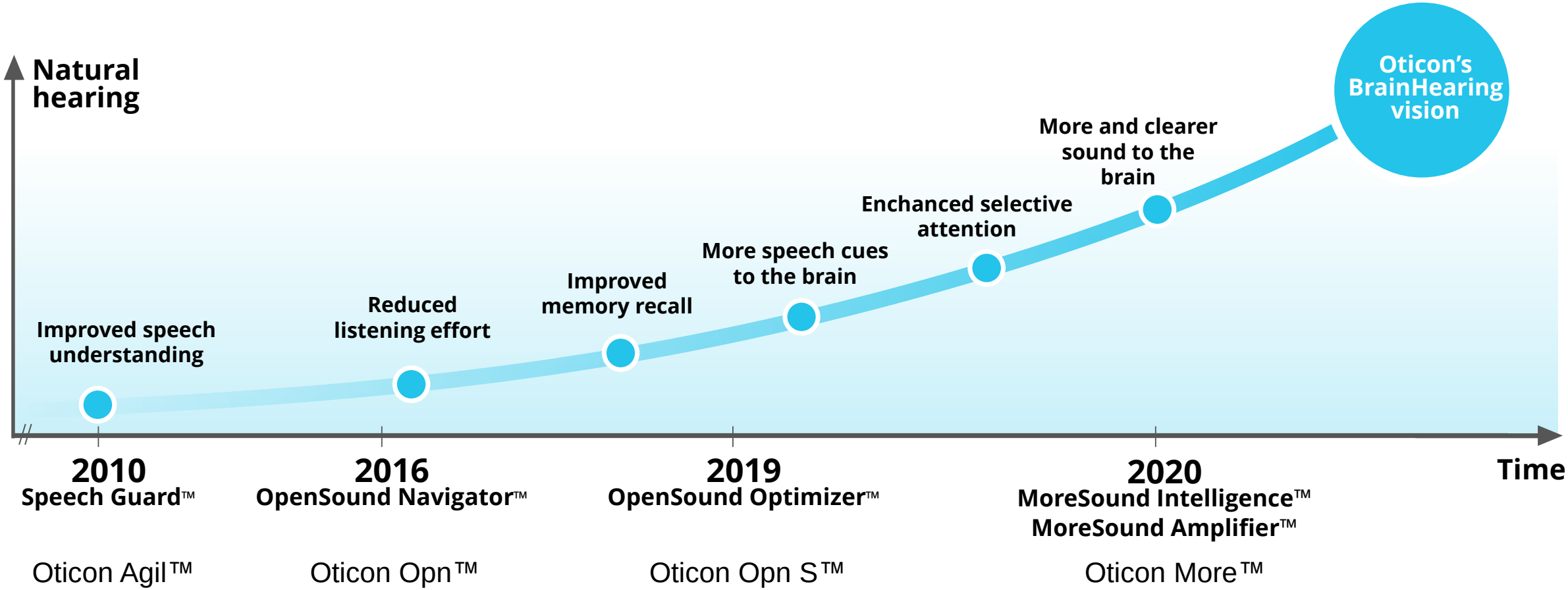
Agenda:

1. 25 years of research building on scientific discoveries in hearing and neuroscience

2. Oticon More – raising the bar in hearing aid technology and outcomes

3. Latest additions and new strong evidence

A visionary journey of Oticon's BrainHearing philosophy



BrainHearing

Hearing

Neural Code

From ear to brain

Orient

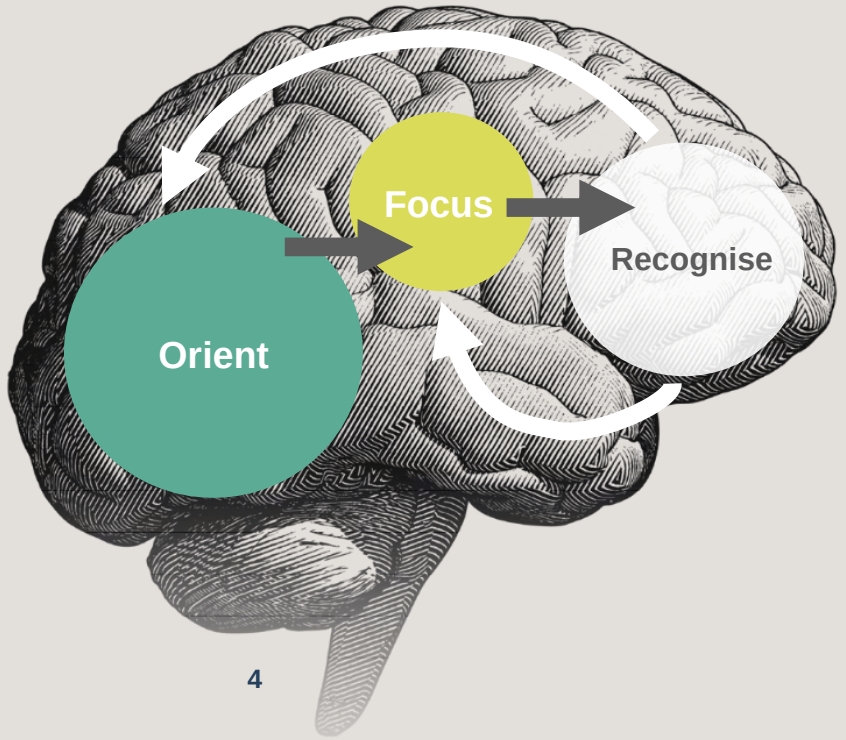
Focus

Hearing system in the brain

Recognise

Cognition

Increasing separation



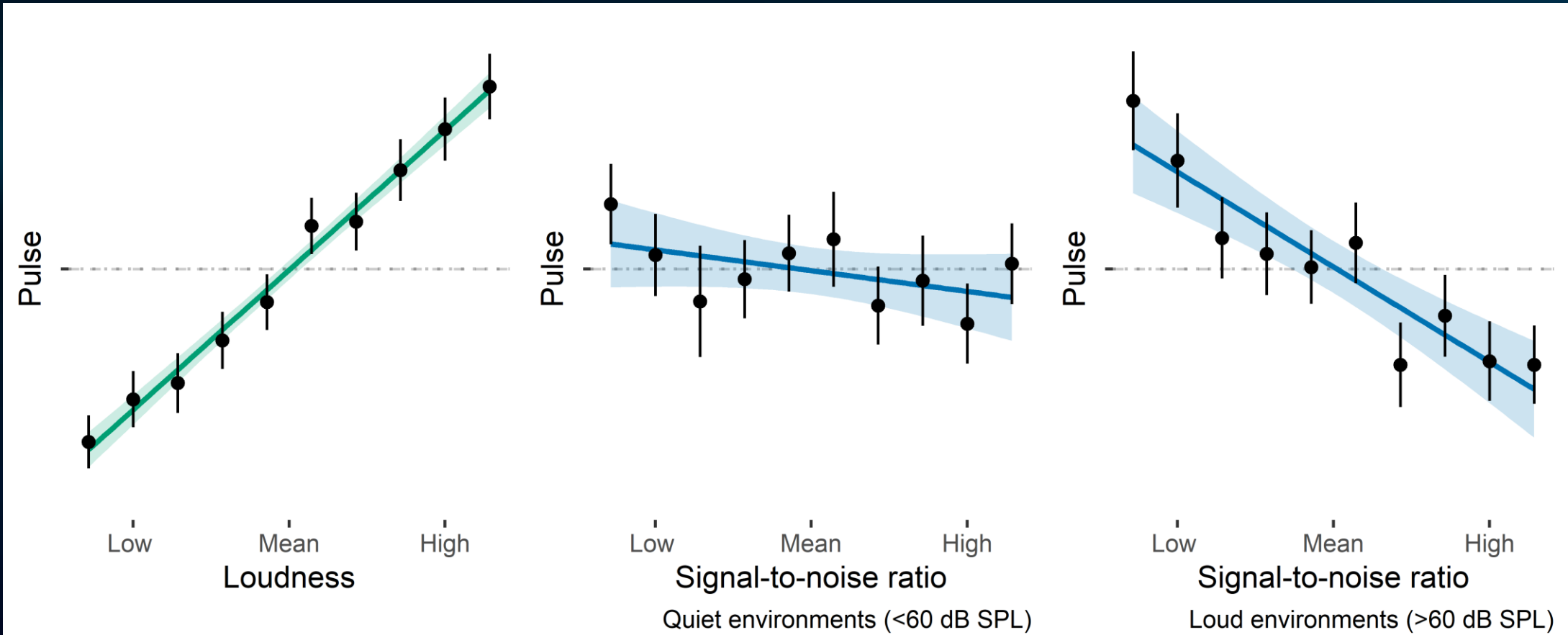
Oticon More

Hearing aid innovation taken to a new level

Deep learning in health care driving end-user benefits

- Medical imaging & diagnostics
  - Well-known stronghold of deep learning; identity patterns/anomalies that humans cannot see – also applies to sound
- Personalised treatment
  - Understanding the individual patient from many types of data
- Improved health monitoring
  - Including wearables with real time data
- Natural language understanding
  - Chat bots

Deep Learning: Potential future application



Christensen et al, 2021, ”The everyday acoustic environment and its association with human heart rate: …”, Royal Society Open Science.
Data from 98 hearing aid users and 1 month use each, gathered between June and December 2019.

Deep Learning requires rich data

Deep Learning mimics learning in real life

Learning a language requires

- Words – sentences – context
- Repeated exposure
- Feedback to enable learning

Deep learning for hearing aids

- Recordings of relevant sound scenes
- Sound scenes representing all daily life situations
- Curated library of sound scenes
- Learning algorithm that takes us to an optimum solution

Successful Deep Learning

Capturing details humans cannot describe

Providing the right feedback during training will allow the deep neural network to capture the important details

The trained Deep Neural Network is embedded on the Polaris platform

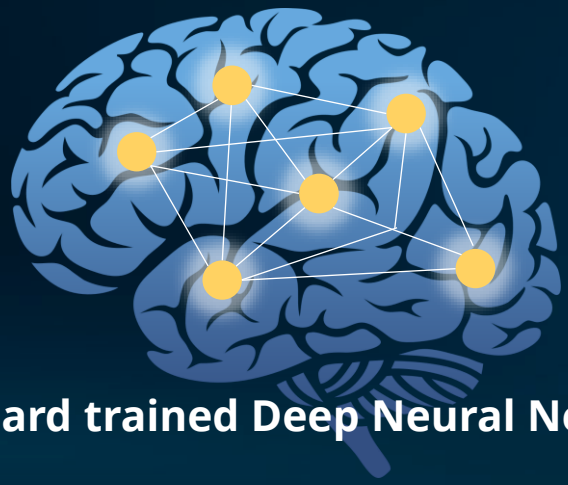
The Polaris platform

100%
More processing power

Secure platform

12 million
Sound scenes

x8
More memory



On-board trained Deep Neural Network

500
Scans per second

28nm
Chip technology

154 million
Transistors

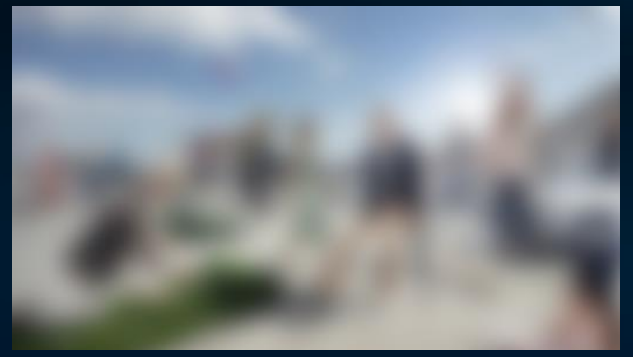
64
Signal-processing channels

Make sure benefits apply when needed

The Deep Neural Network

- Has learned to recognise challenging situations
- Creates clarity where hearing loss compromises it
- Impact is individual
- Fitting software is setup to allow individualisation

Normal hearing

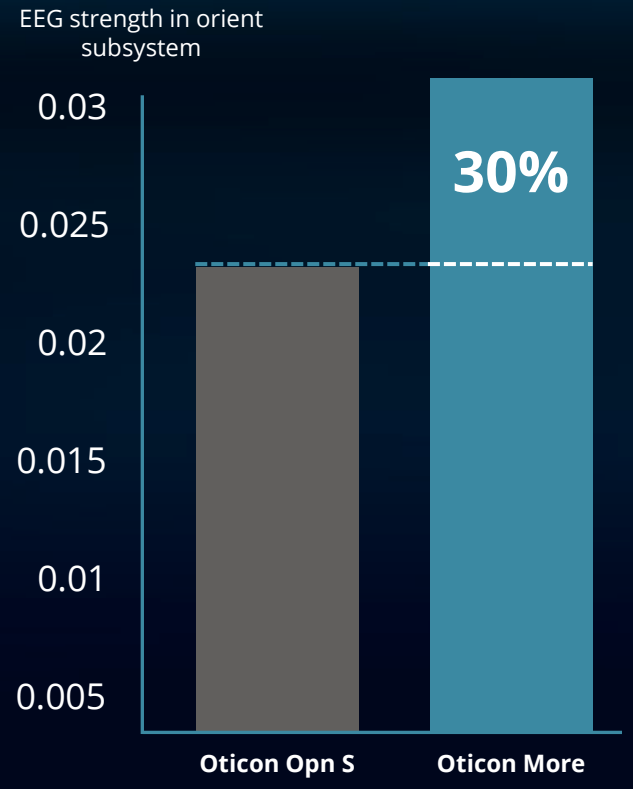


Hearing loss

Oticon More

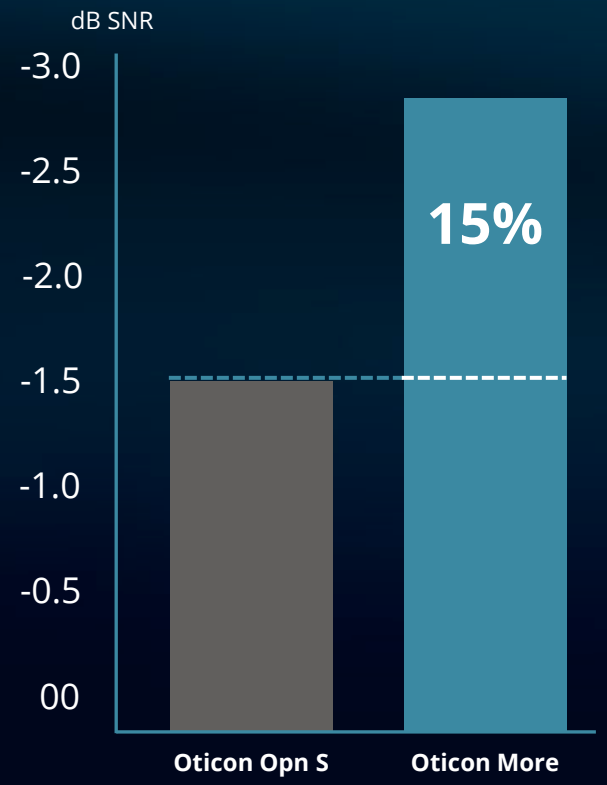
Oticon More delivers 30% more sound to the brain

MoreSound Intelligence is proven to make the full sound scene **clearer**



Better speech understanding with even less effort

Resources are freed for **remembering**, **responding** and **engaging**



Santurette, Ng, Juul Jensen & Man, 2020

Oticon More

Latest additions and new strong evidence

Evidence obtained by bringing the real world to the lab…

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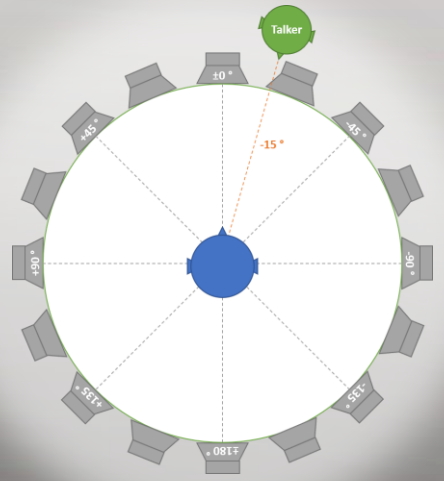
…

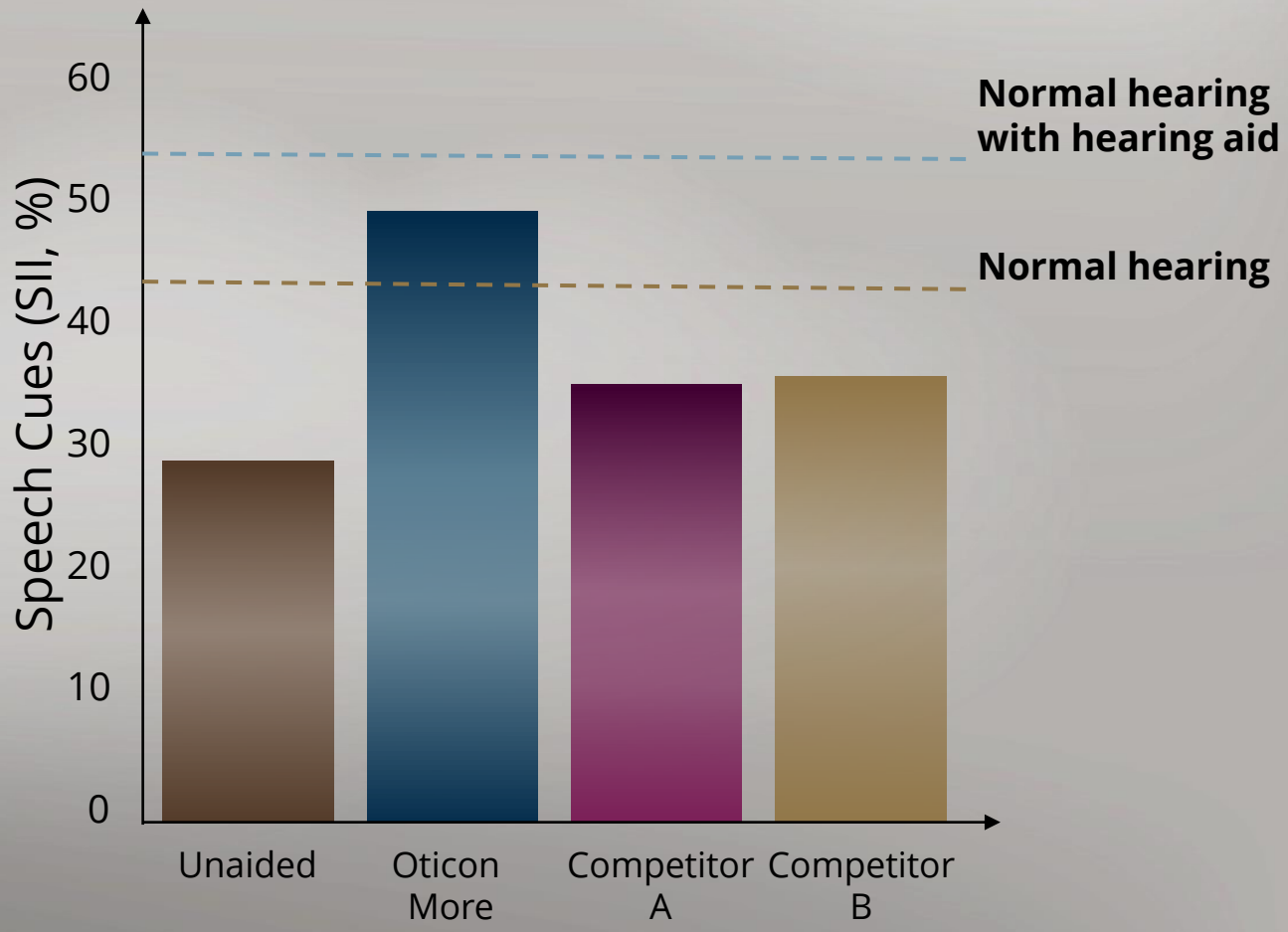
Oticon More outperforms competition in real-life situations…

Differences due to:

- Speech made clearer relative to noise
- Speech made more audible relative to hearing loss



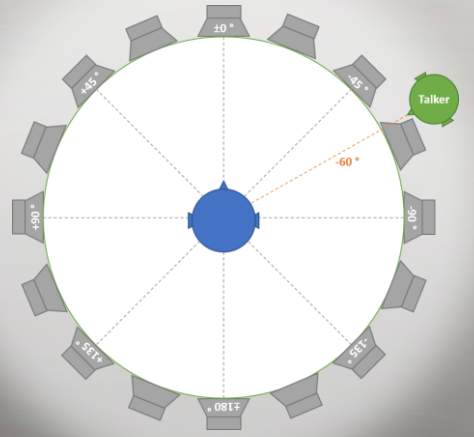
Relatively simple listening situation



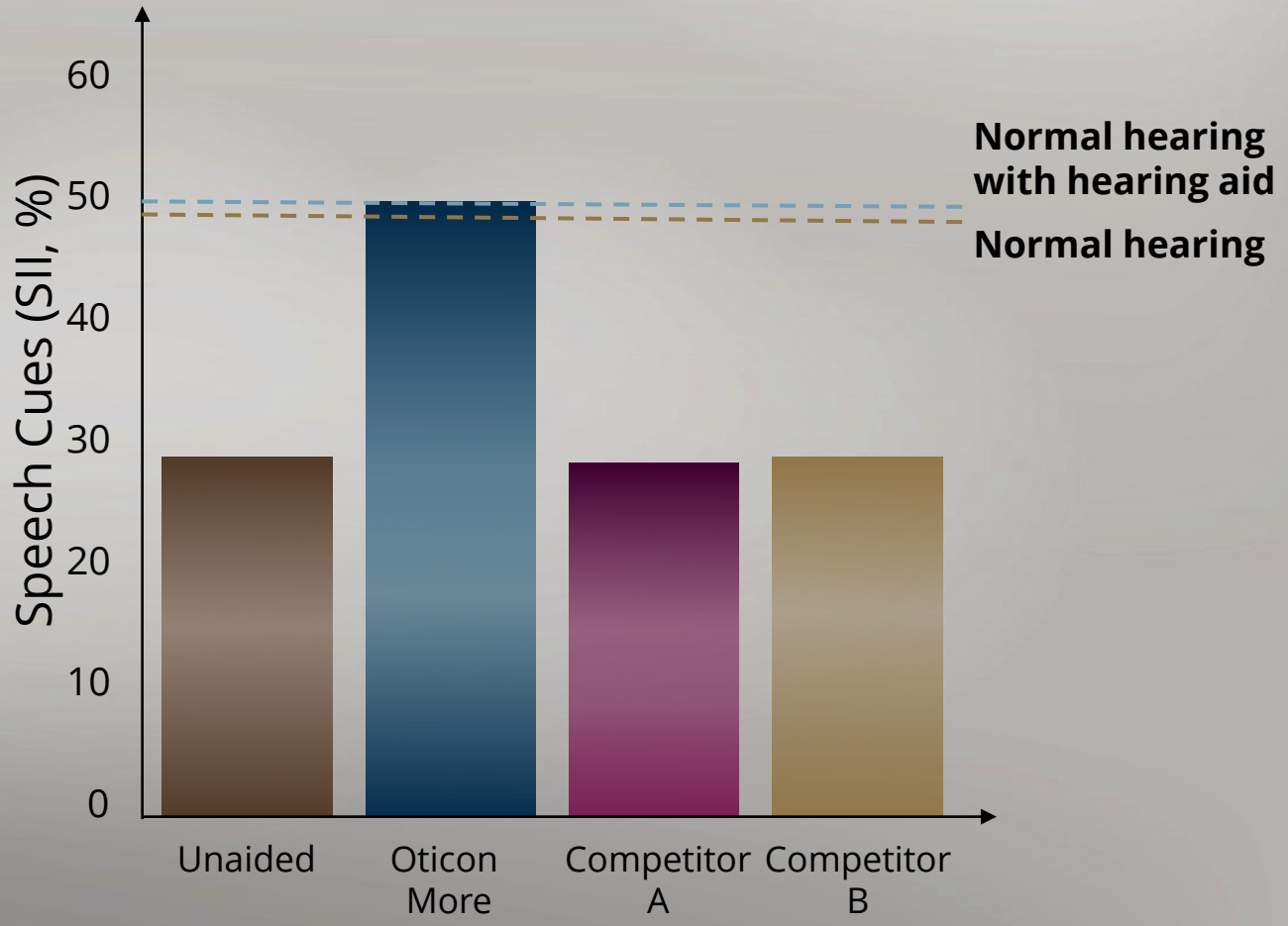
…and the gap to competitors is even larger in difficult listening environments

Differences due to:

- Speech made clearer relative to noise
- Speech made more audible relative to hearing loss



Relatively difficult listening situation



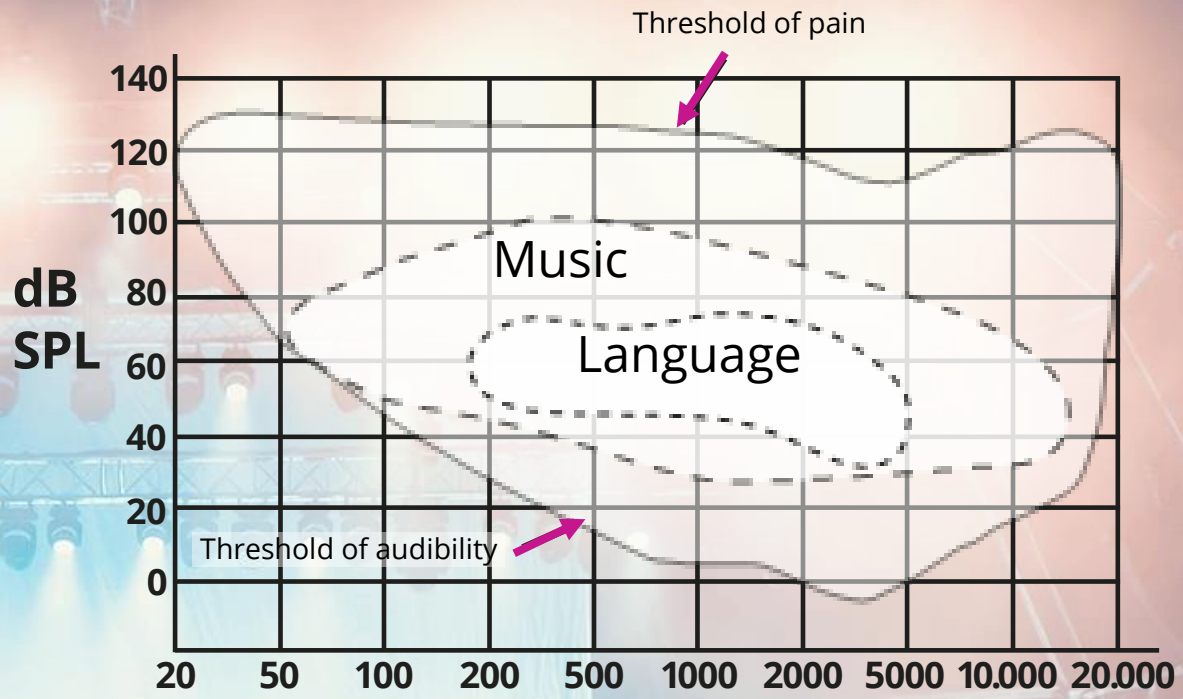
Oticon MyMusic

A fuller and more detailed experience

24
channels
⬇
access to details

Optimised settings of
More Sound Optimizer

Virtual Outer Ear
in ”Aware” setting

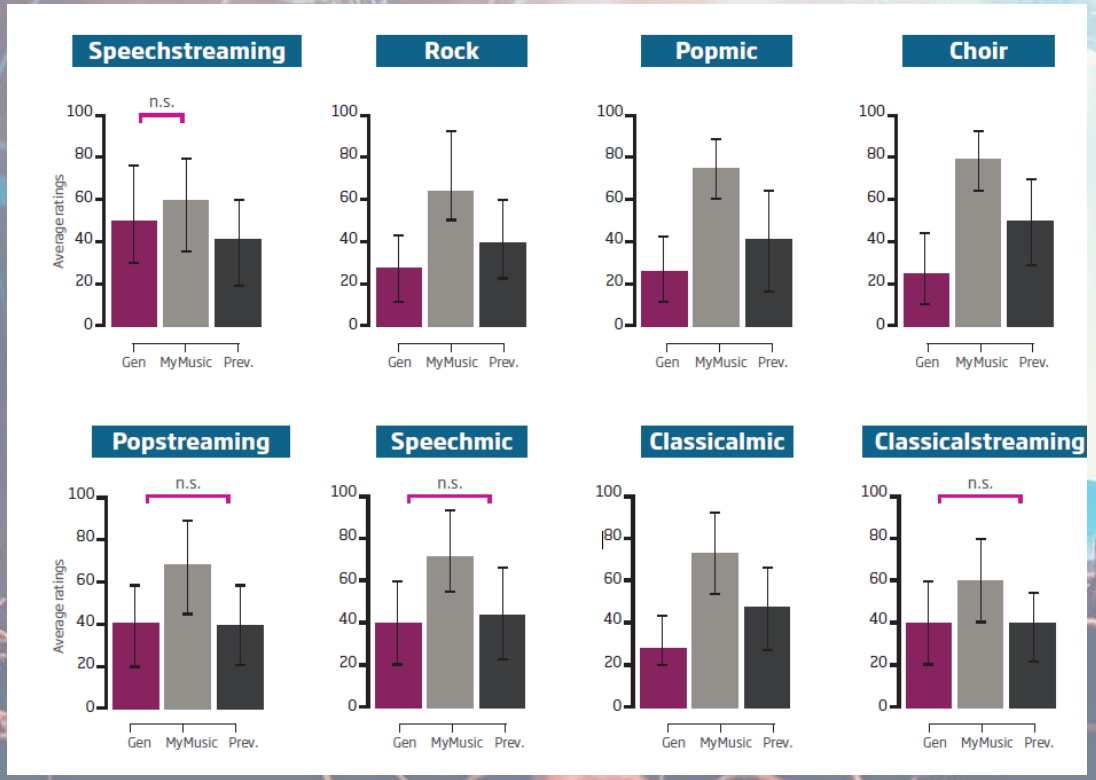


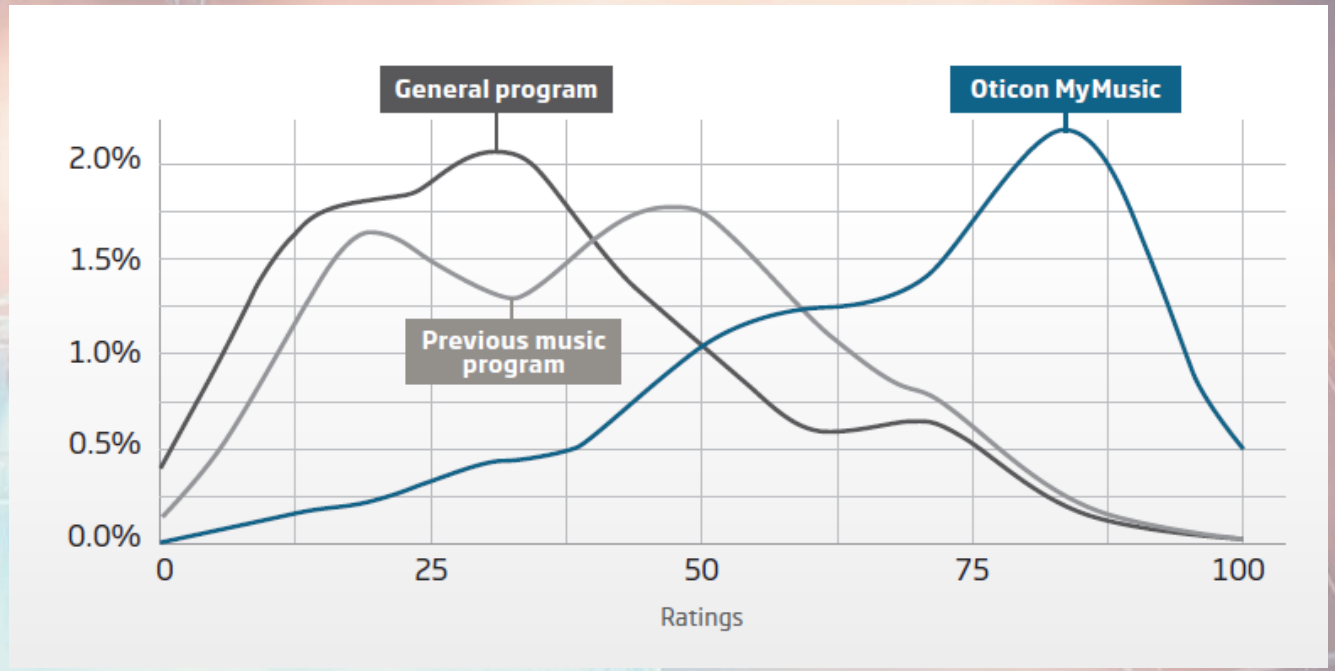
New prescription

Gain settings that enhance details and preserve dynamics

Oticon MyMusic

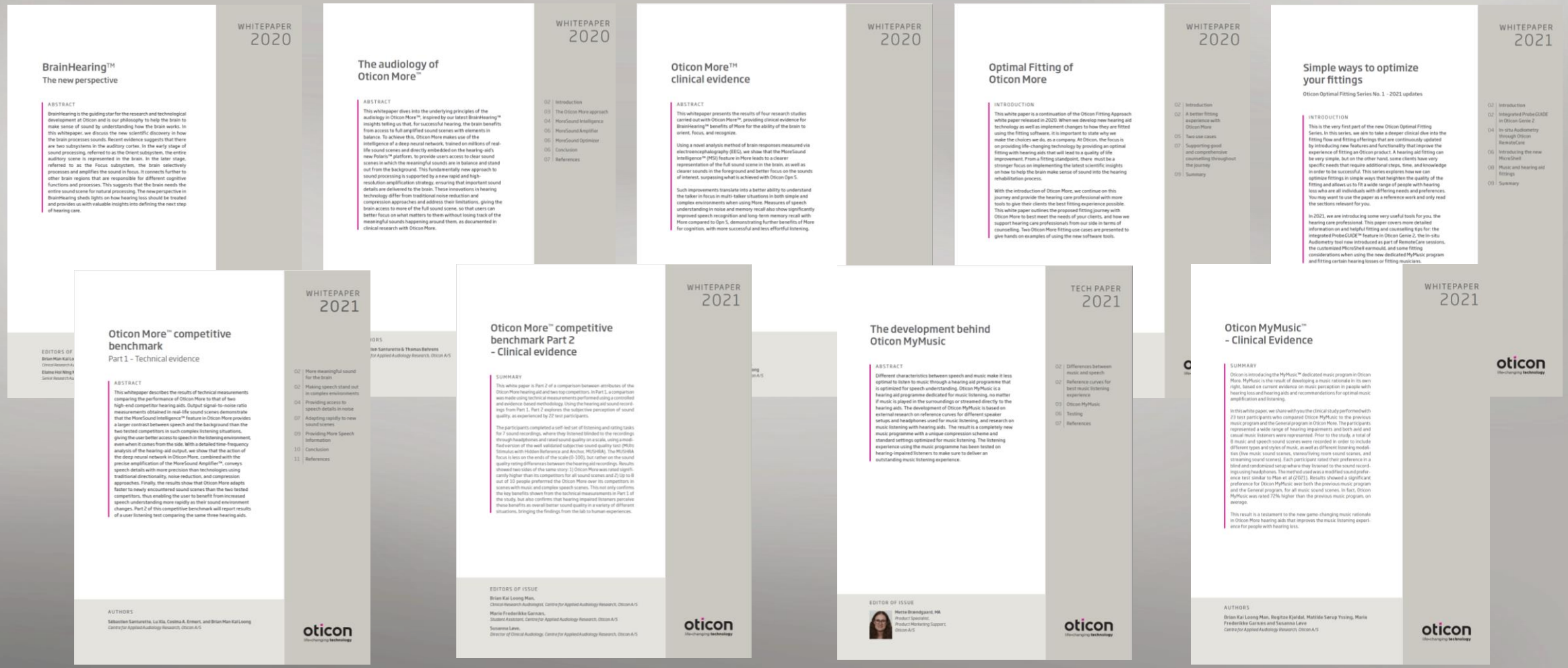
A fuller and more detailed experience



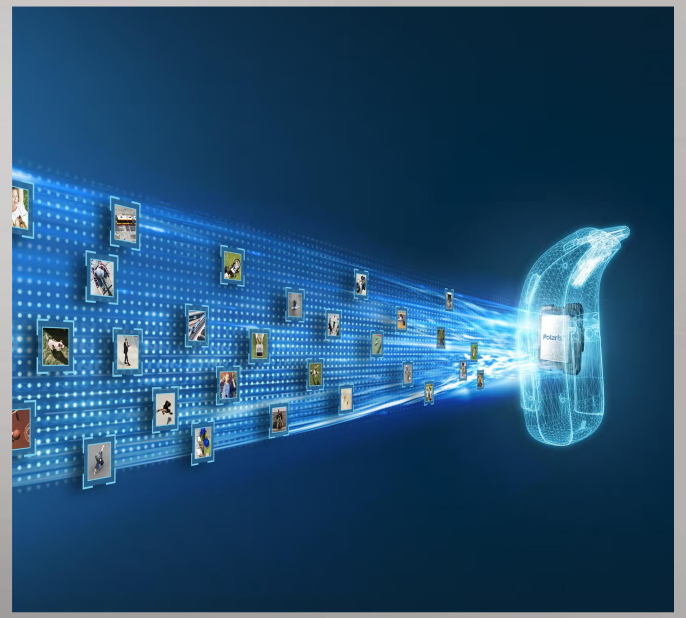


Oticon More & BrainHearing

Evidence & whitepapers



Audiological leadership through BrainHearing

1. BrainHearing – a unique approach, that has proven itself to lead to strong innovations and better outcomes
2. Oticon More – clarity and precision – sound delivered the way the brain needs it – leading to new benefits never seen before in the industry
3. Latest additions – continued improvements in sound quality for greater enjoyment of speech and music
4. BrainHearing, an evolving journey: More than 25 years of continuous improvements in hearing aid technology and new user benefits

Oticon BrainHearing™ Technology