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Oticon Realo: Audiological Innovations

Virginia Ramachandran, AuD, PhD
Head of Audiology, Oticon, Inc.

oticon
life-changing technology

Disclosures

Head of Audiology, Oticon, Inc.

Author & Associate Editor, Plural Publishing, Inc.

Adjunct Assistant Professor, Wayne State University

President, American Academy of Audiology

Disclaimer

The opinions and assertions presented are the private views of the presenter and are not to be construed as official or as necessarily reflecting the views of the American Academy of Audiology or of Oticon, Inc.

Learning outcomes:

1) After this course, participants will be able to describe the components of Oticon Real's Real Sound Technology features
2) After this course, participants will be able to explain the patient benefits of effective management of wind and handling noise via Oticon Real.
3) After this course, participants will be able to explain the patient benefits of effective management of sudden sounds via Oticon Real.

Optimal comfort

Optimal clarity

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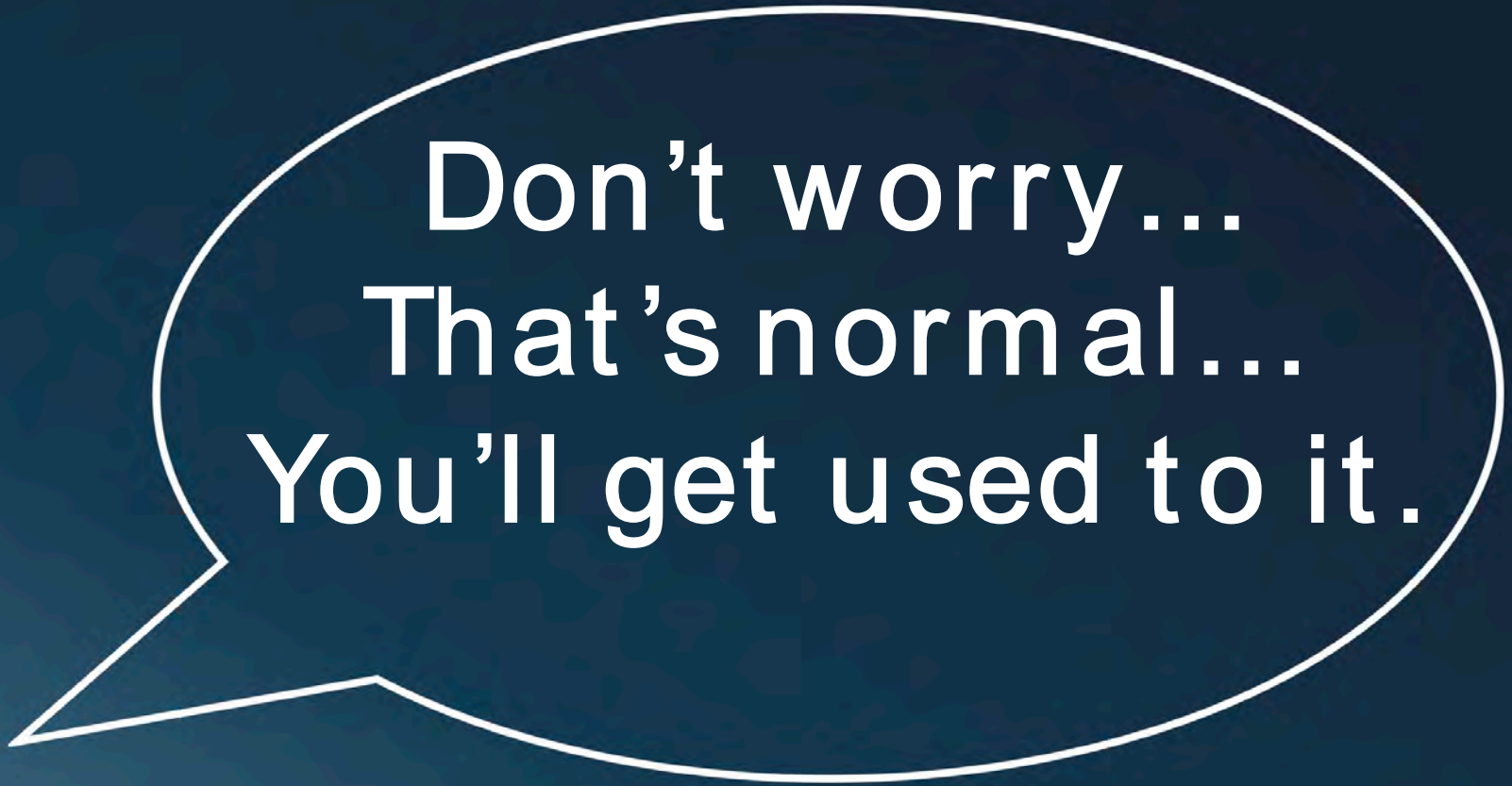
Optimal comfort

Optimal clarity

oticon

Optimal comfort

Optimal clarity


Don’t worry…
That’s normal…
You’ll get used to it.

For hearing aids to be effective they must be...

1) Fit well
2) Worn consistently

Optimal comfort

Optimal clarity

oticon

Polaris Ro

Powers
RealSound Technologyo
in Oticon Realo

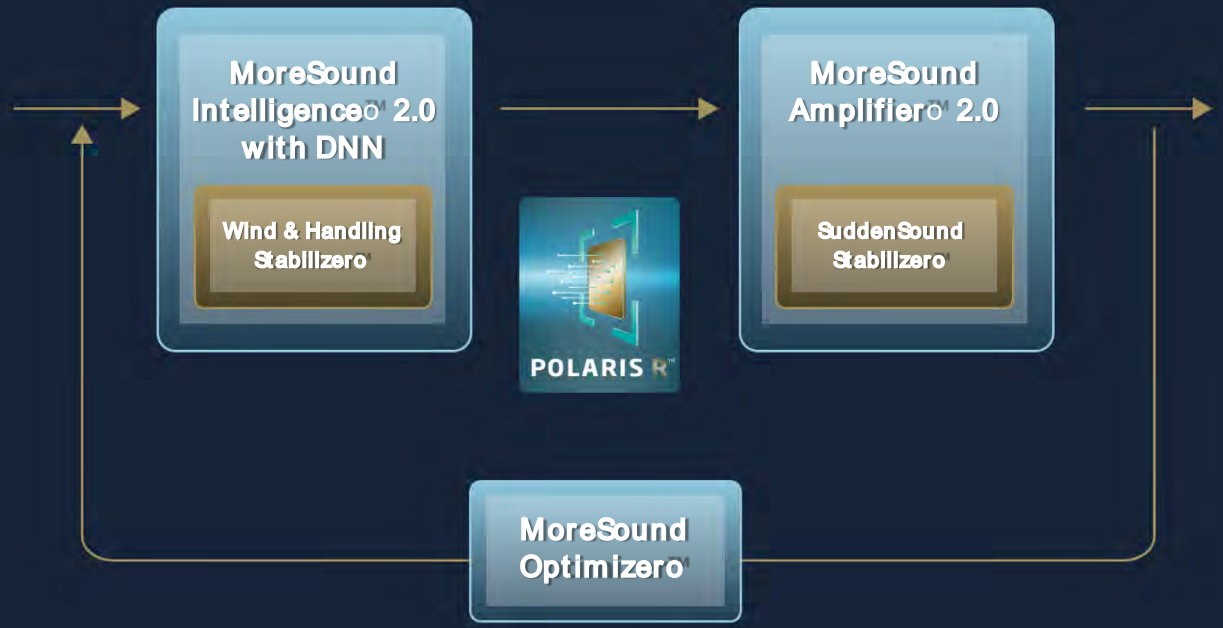
Features an onboard
Deep Neural Network
(DNN)

Runs new detectors for
fast and precise processing
of disruptive sounds

Future ready for wireless
updates

RealSound Technology

Helps users stay sharp in the real world



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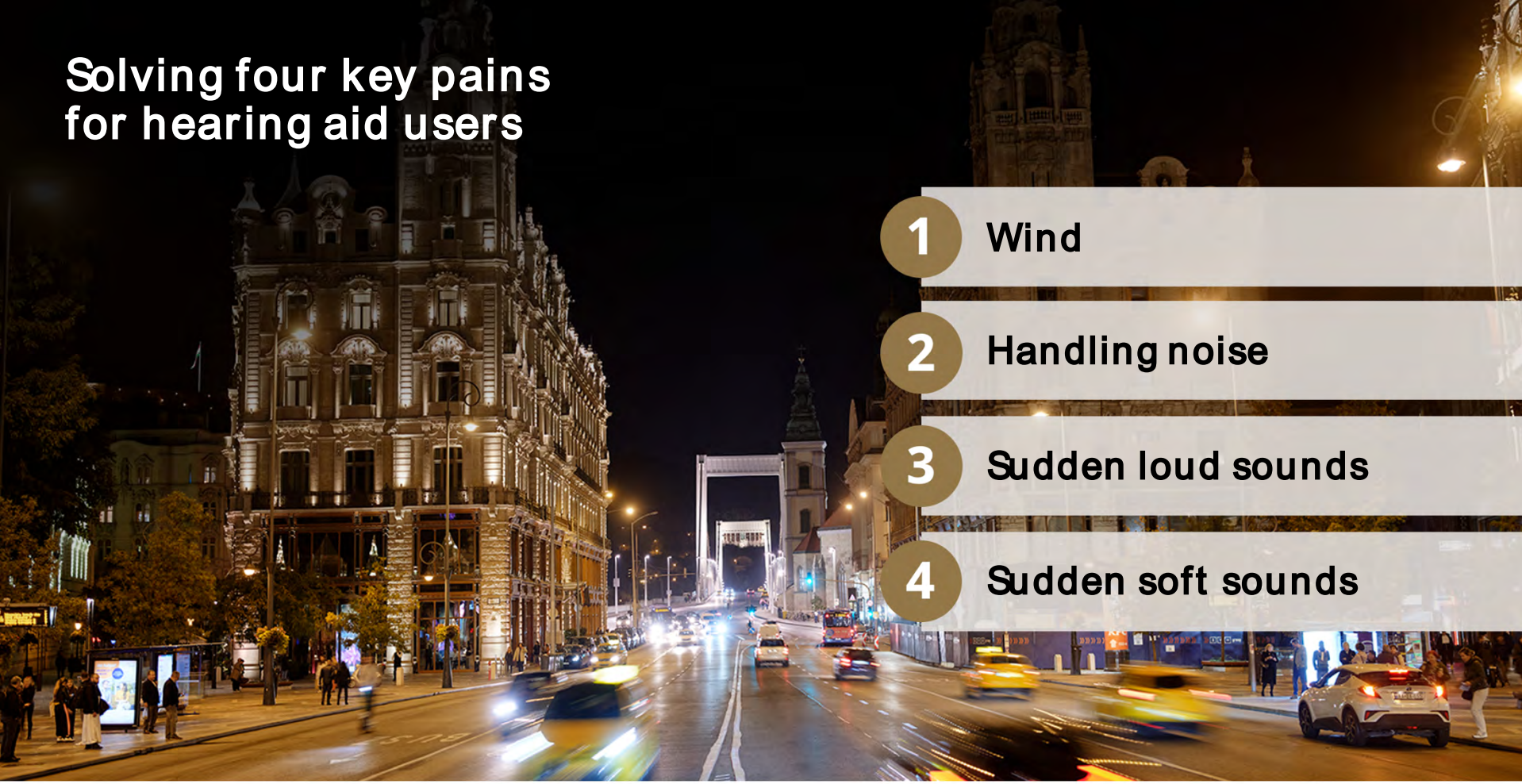
Solving four key pains for hearing aid users



1. Wind
2. Handling noise
3. Sudden loud sounds
4. Sudden soft sounds

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New MoreSound Intelligence 2.0

With Wind & Handling Stabilizer

POLARIS R™

MoreSound Intelligence™ 2.0 with DNN

Wind & Handling Stabilizer

World's first wind & handling prevention system

Improves access to speech in windy environments

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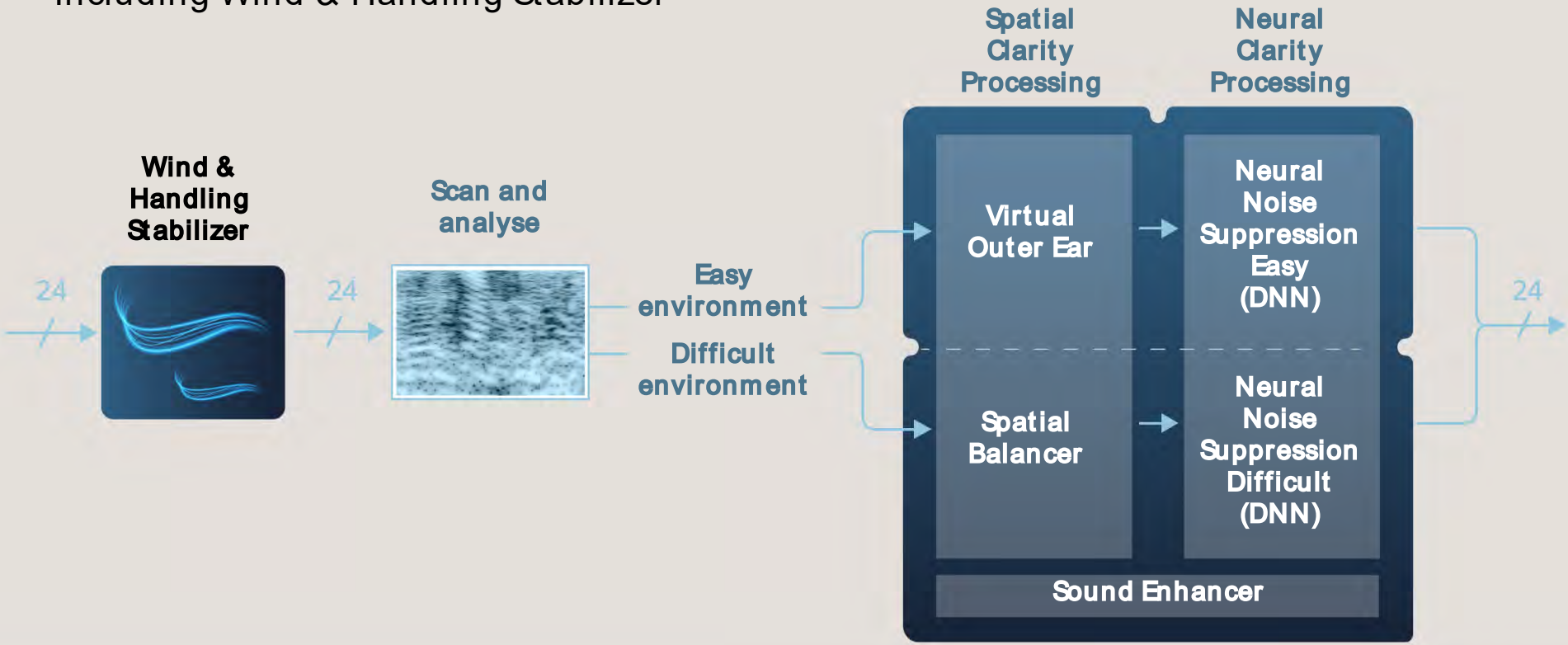
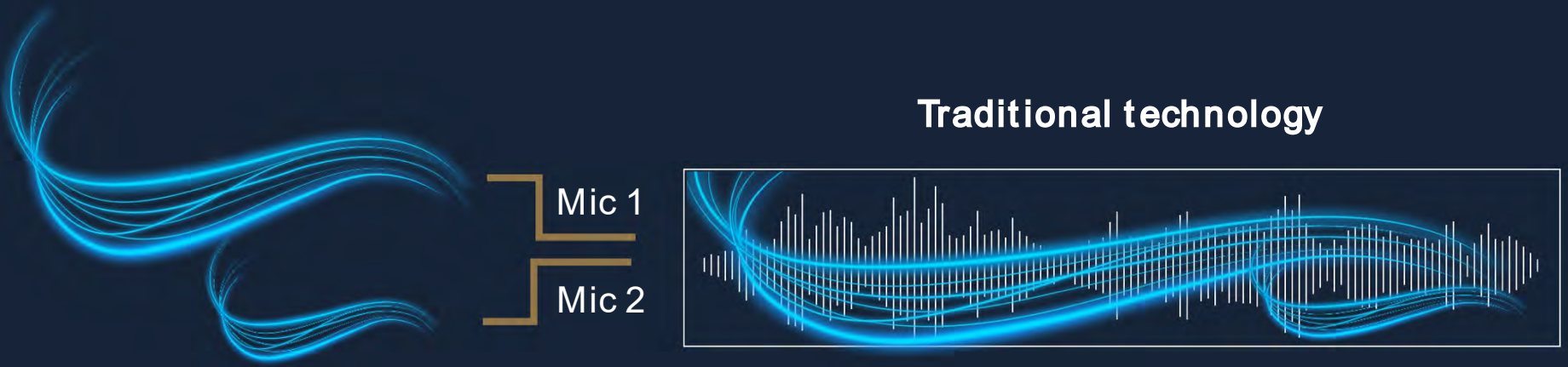
MoreSound Intelligence 2.0

Including Wind & Handling Stabilizer



Wind & Handling Stabilizer

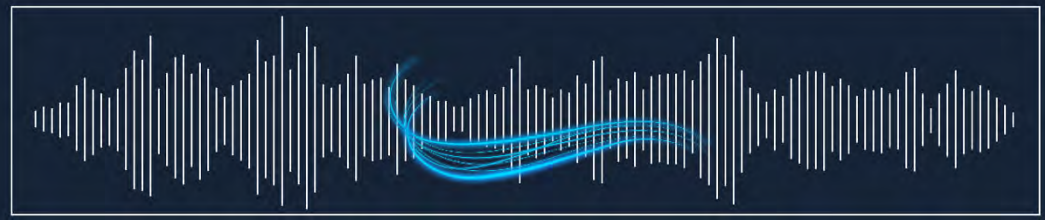
Speech and wind in hearing aids



Wind & Handling Stabilizer

Speech and wind in hearing aids

Wind & Handling Stabilizer in Oticon Real



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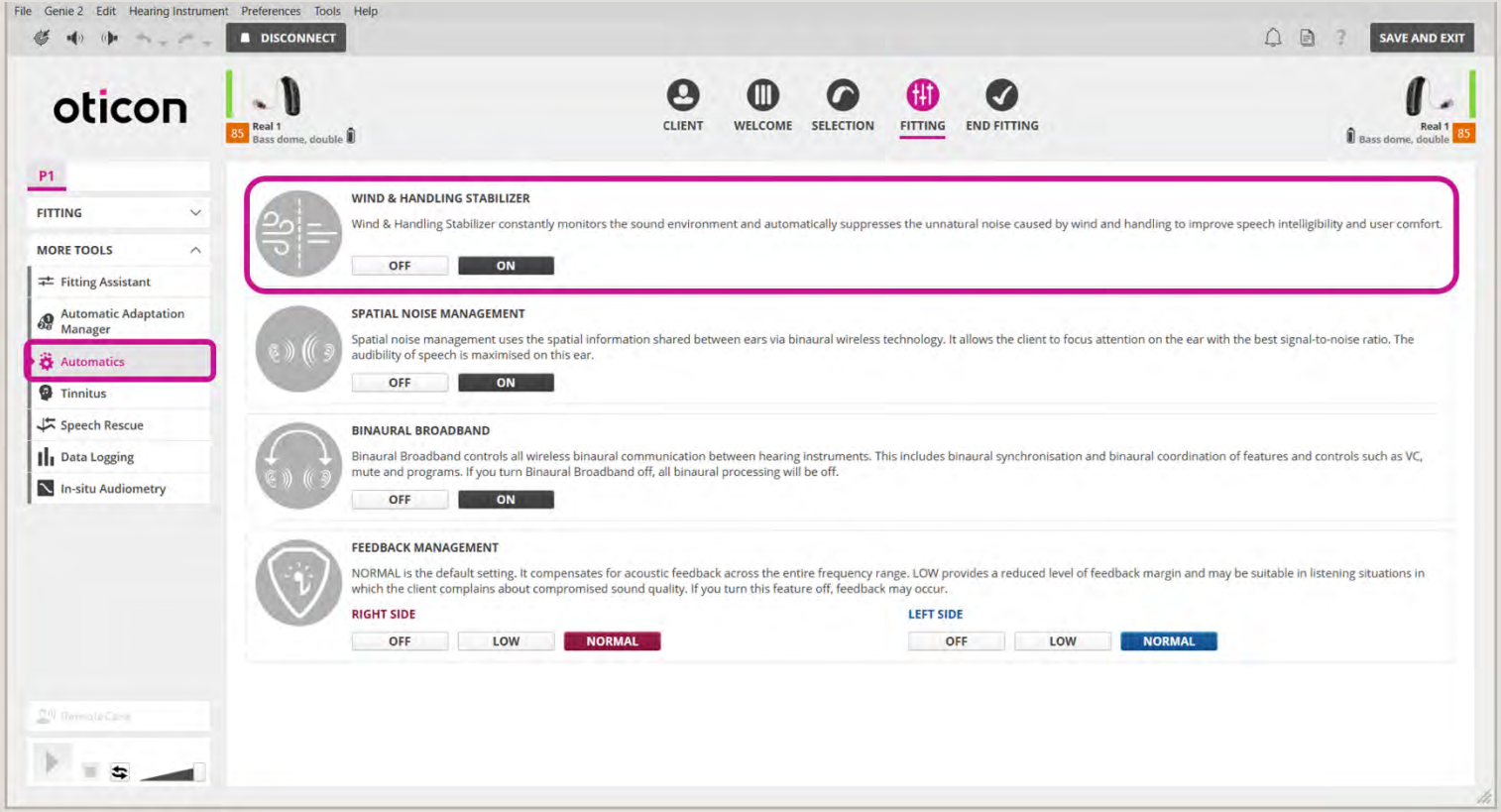
Wind & Handling Stabilizer

Example

oticon

Settings in Oticon Genie 2



Documenting the benefits of Wind & Handling Stabilizer

Better access to speech

Outperforming competition

oticon

Taking the test setup to the next level

Hearing aids recorded in a true-to-life controlled setting

Poul la Cour Tunnel

One of the largest university-owned wind tunnels in the world

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Better access to speech

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Better access to speech

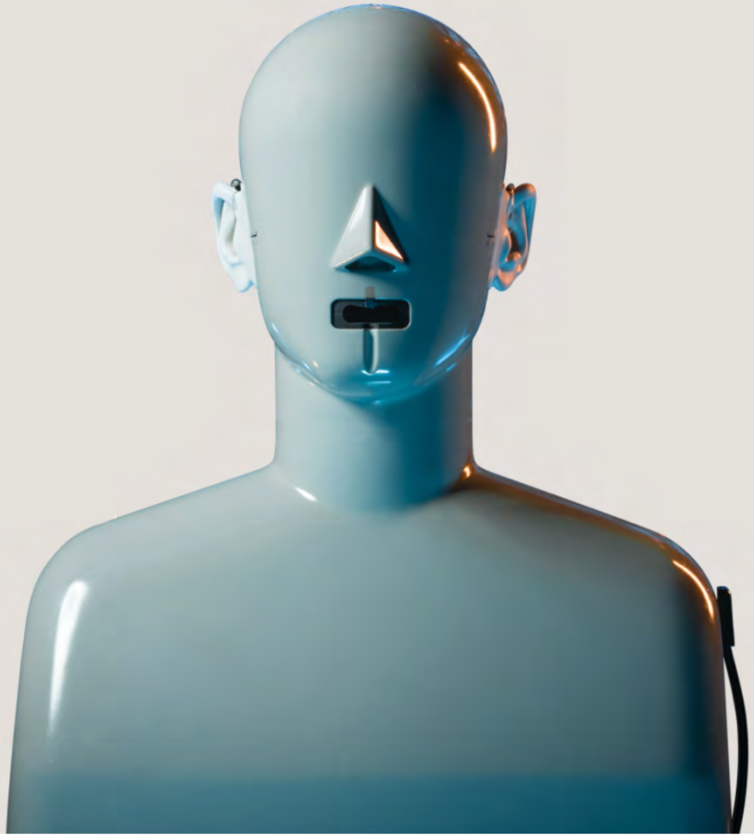
Technical evidence

ON vs. OFF

measuring the effect of
Wind & Handling Stabilizer

Oticon Real vs. Oticon More

measuring the improvement
compared to previous generation

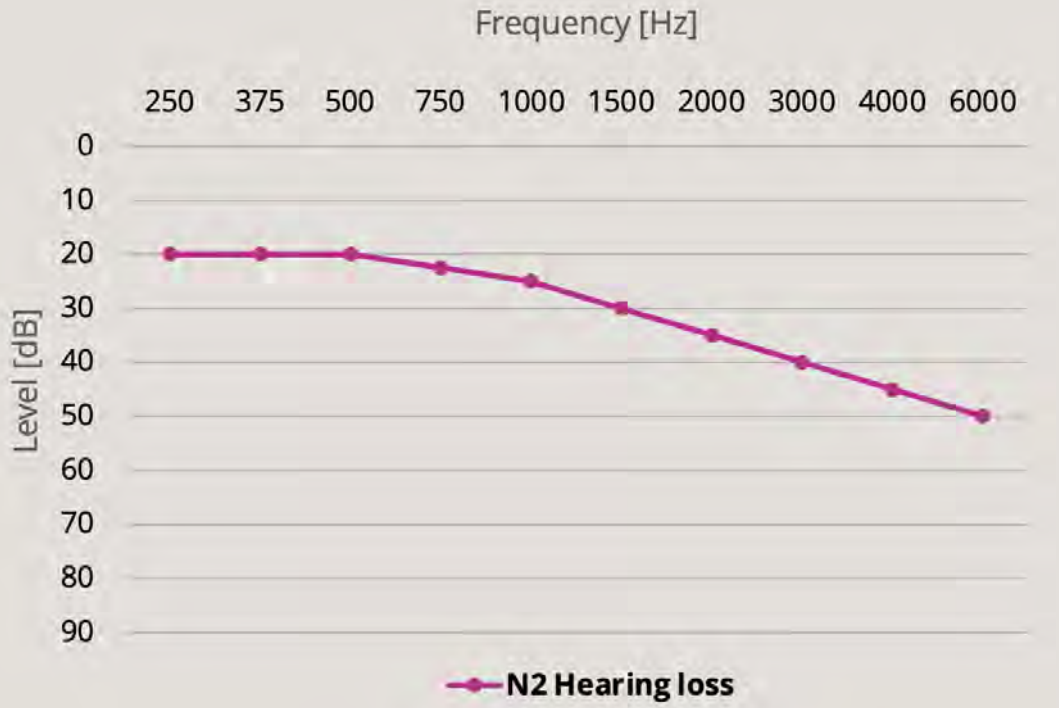


Method

Hearing aid settings

Hearing aid settings:

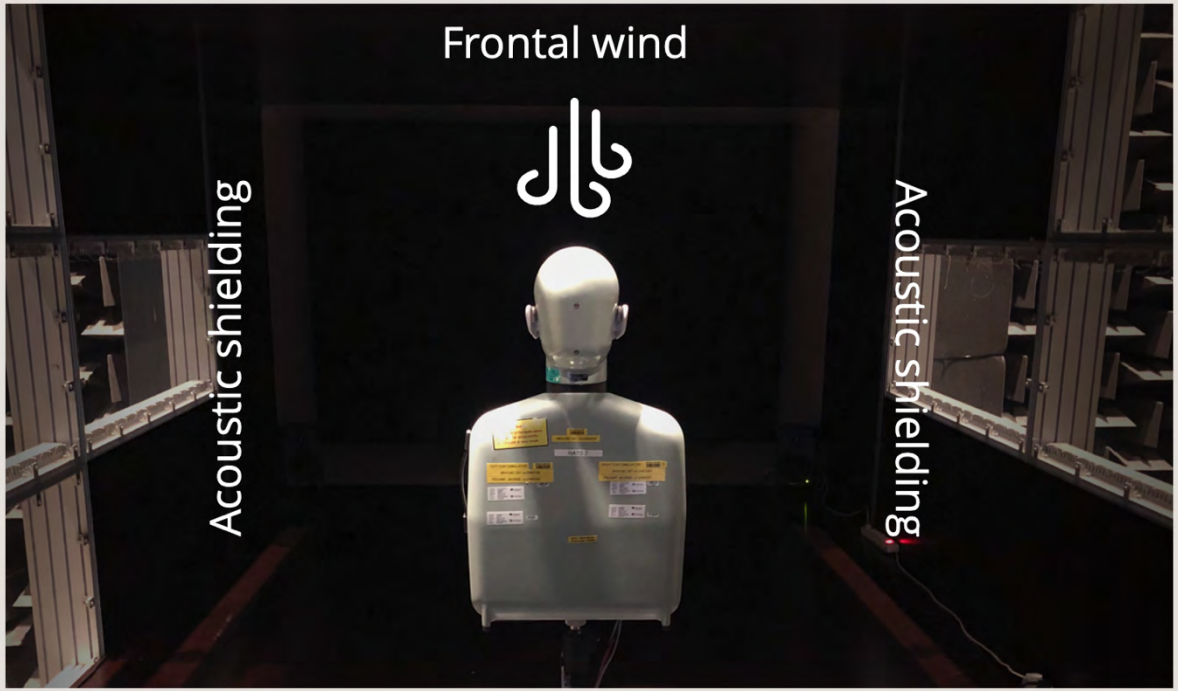
- Standard N2 hearing loss
- Oticon Real
  - Wind & Handling Stabilizer ON/OFF
- Oticon More
  - Wind Noise Management ON



Methods

Test setup

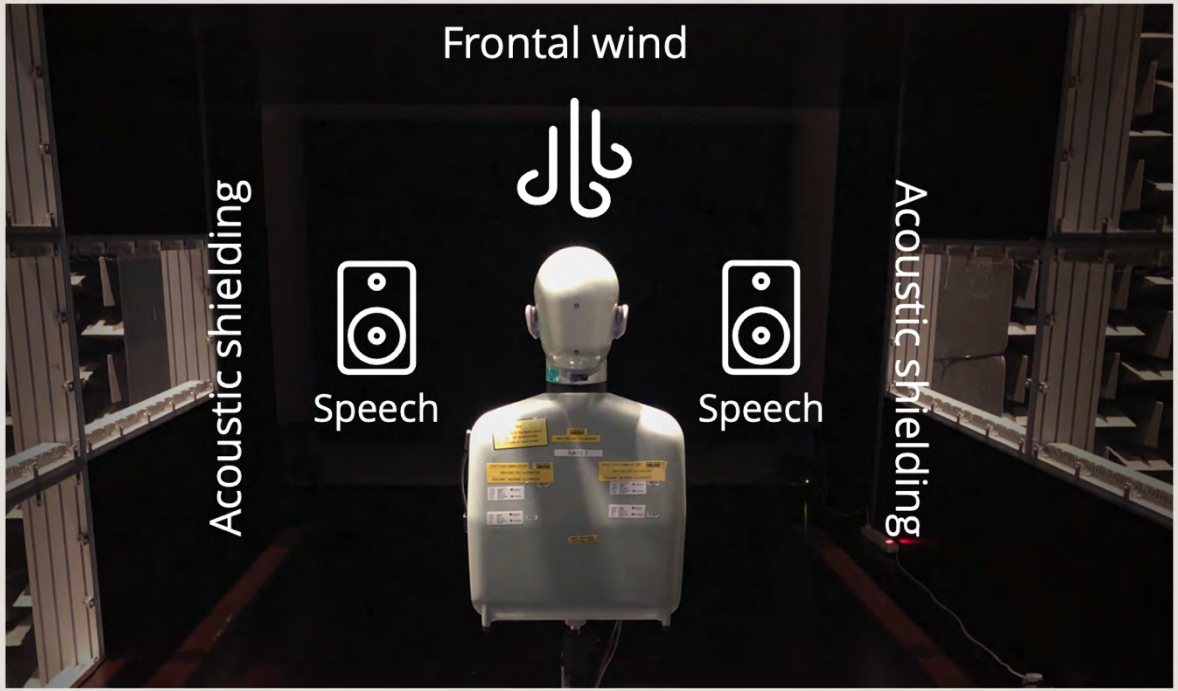
- HATS with hearing aids facing upstream
- Hearing aid output measured in ear canals
- Wind speeds:
  - Moderate: 5-7 m/s
  - Strong: 9-10.5 m/s



Method

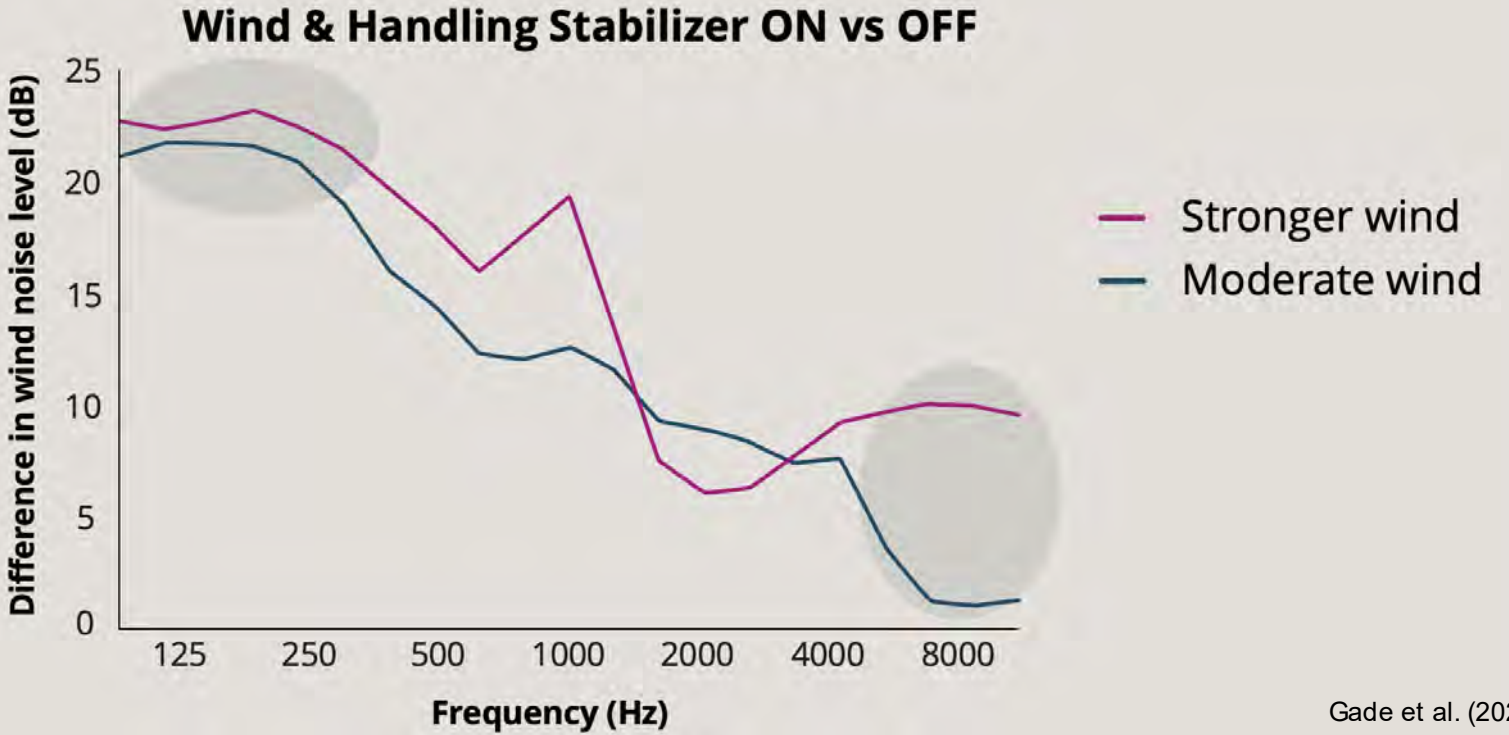
Test setup

- **Speech from one speakers in front at 80 dB SPL**
- Output signal-to-noise ratios (SNR) estimated based on 64 recordings



Results

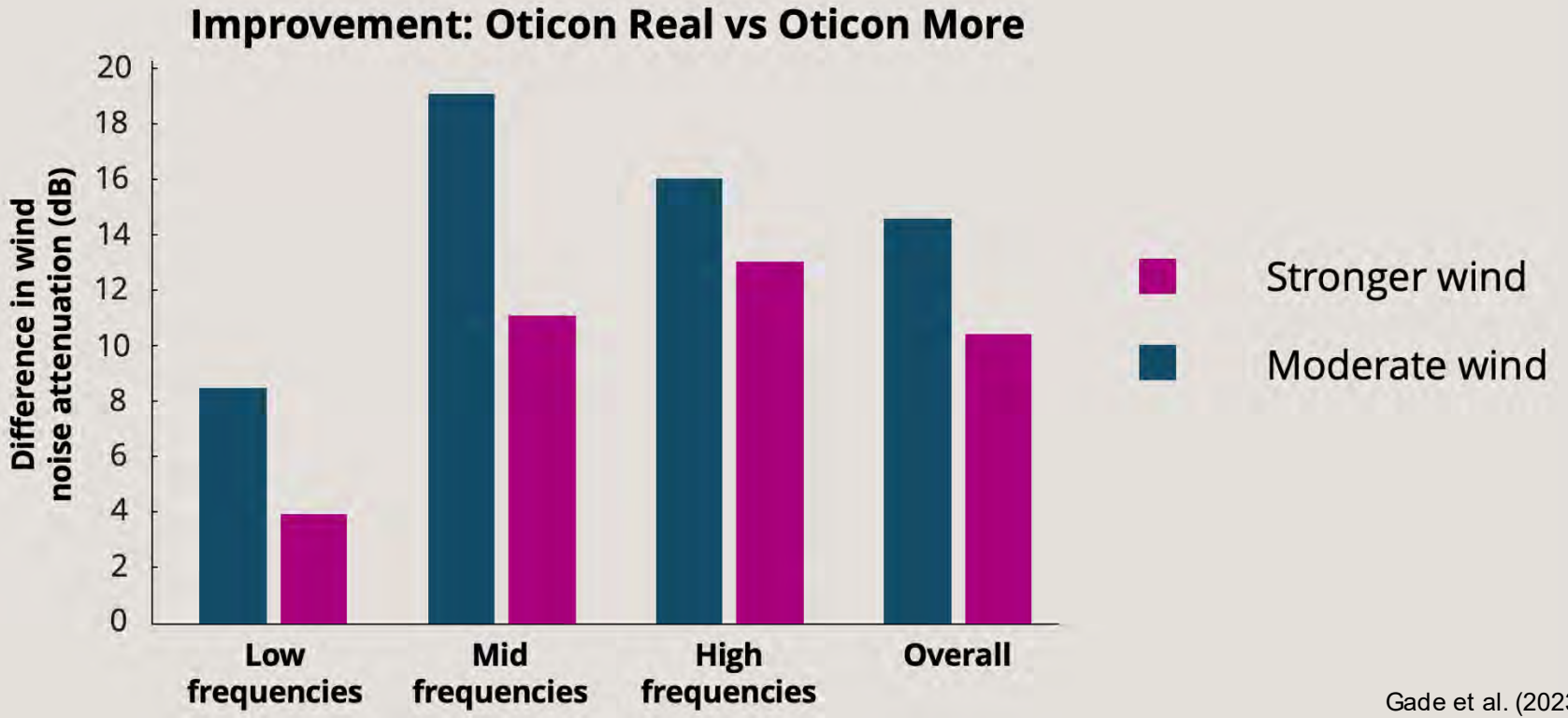
Wind & Handling Stabilizer ON vs OFF



Gade et al. (2023)

Results

Improvement with Wind & Handling Stabilizer



Gade et al. (2023)

Results

SNR improvement

4.3 dB

higher speech in Oticon Real
than in Oticon More

Gade et al. (2023)

Outperforming competitors

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Methods

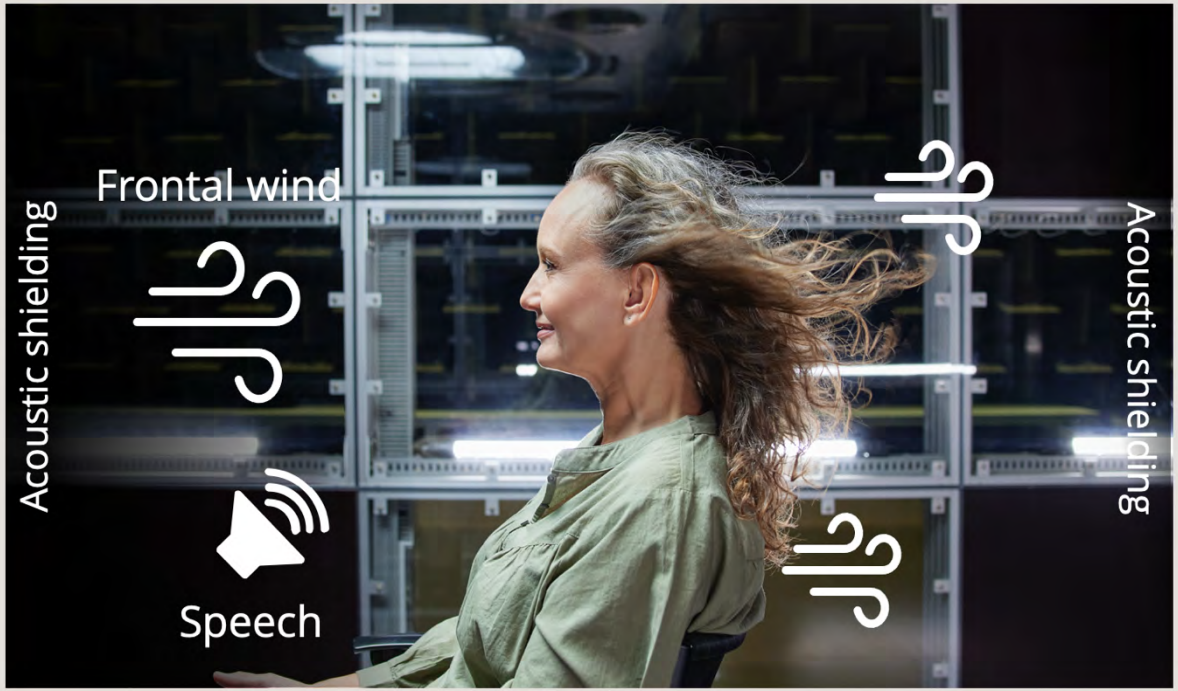
Test participants and test setup

Participants:

- 12 experienced users
- Average age: 70.6 years
- Mild-moderately severe hearing loss

Test conditions:

- Speech at 65 dB SPL
- Wind speed: 6 m/s



Which hearing aid is preferred?

Comparing perceived loudness of the wind noise and clarity of speech

OTICON | **Real**

Competitor 1

Competitor 2

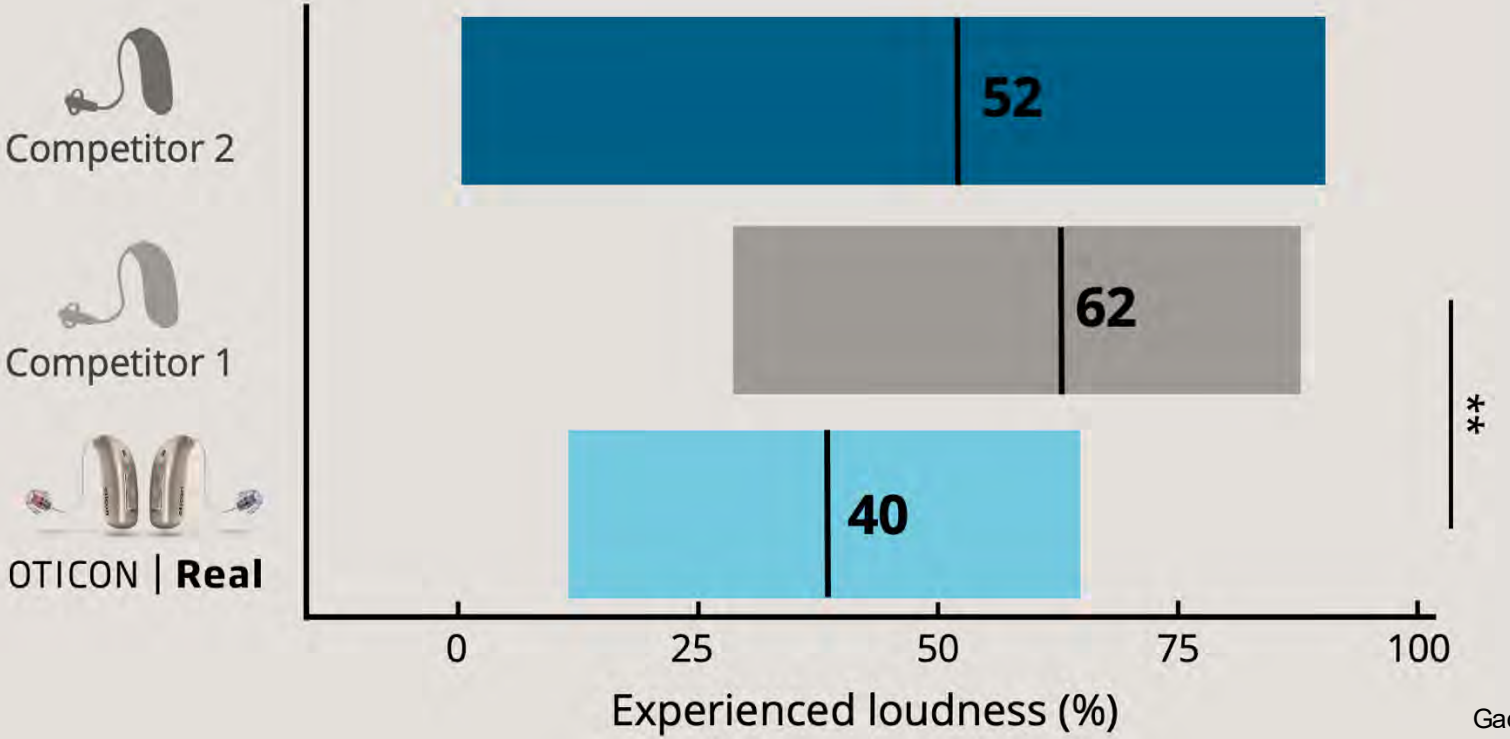
Test setup

Experiencing the sound scenes through different technologies

- Blinded test
- Rate **loudness** of wind noise
- Rate **clarity of speech**
- Rating scale from 0-10

Results

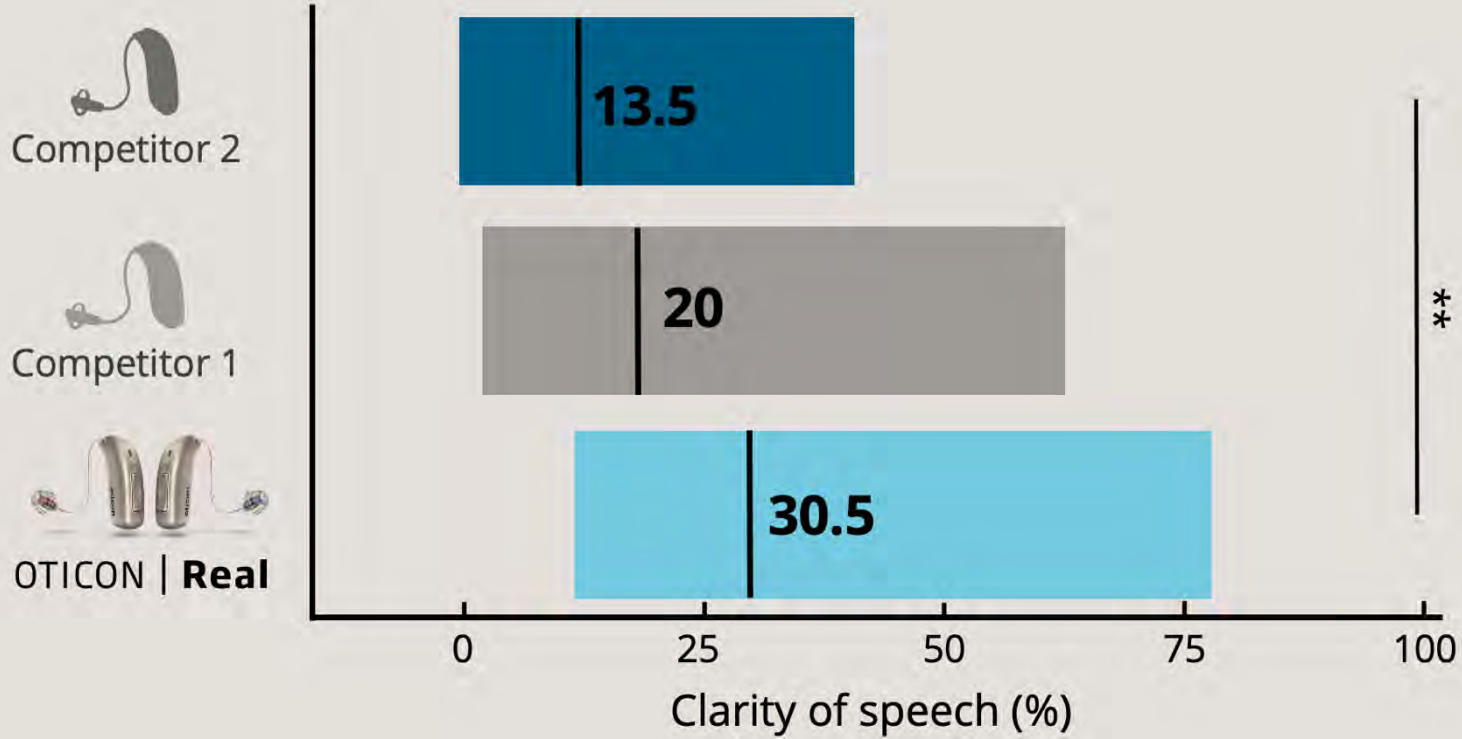
Loudness of wind noise



Gade et al. (2023)

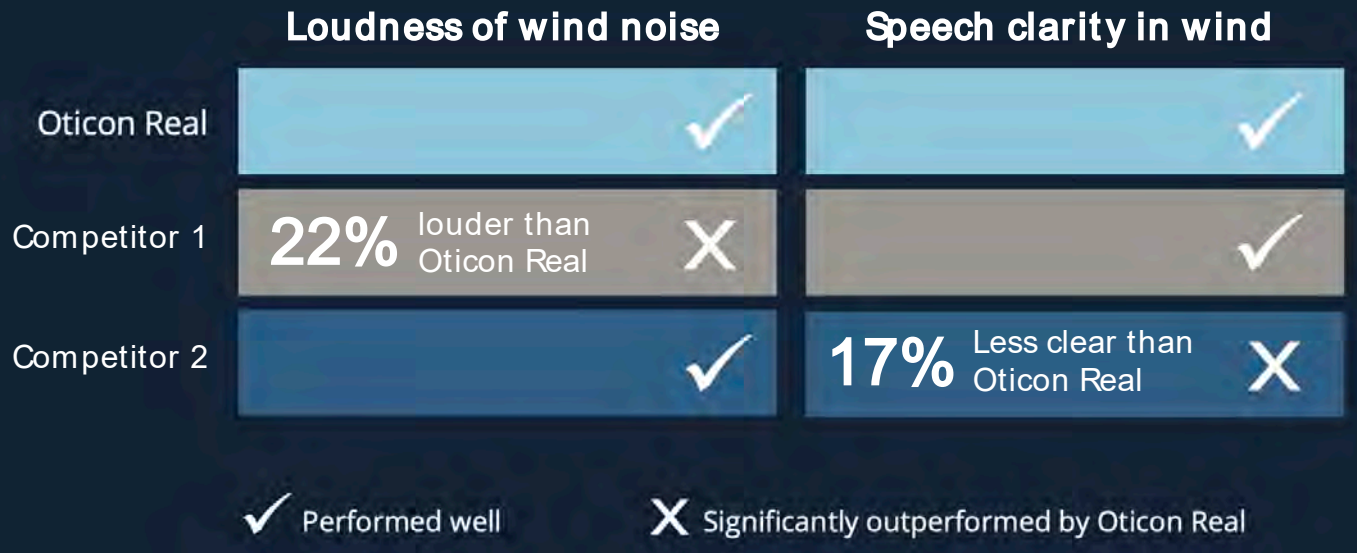
Results

Clarity of speech



Gade et al. (2023)

Exceptional at reducing wind noise and providing better speech clarity



Gade et al. (2023)

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Documenting improved handling noise

Background

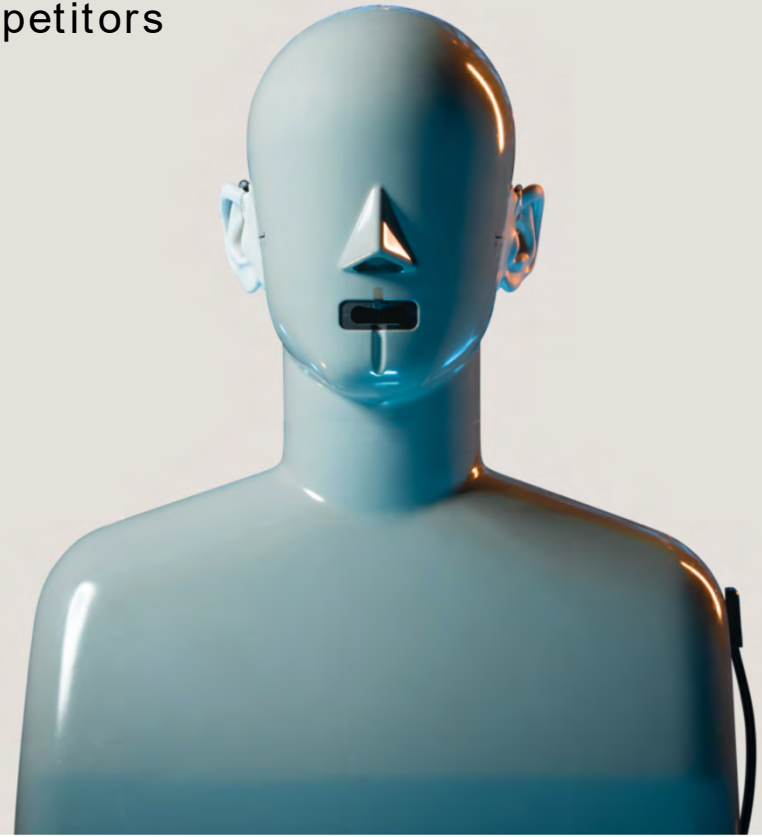
- Handling noise is not widely explored
- Handling noise occurs in many situations daily
- **44%** of users express experience with bothersome handling noise
- **93%** of users wear glasses on a daily basis

Gade et al. (2023)

Method

Comparing Oticon Real to two premium competitors

- HATS with hearing aids
- Standard N3 hearing loss
- Two test conditions
  - Brushing hair
  - Brushing microphones with a finger
- 12 trials handling events in 2 trials



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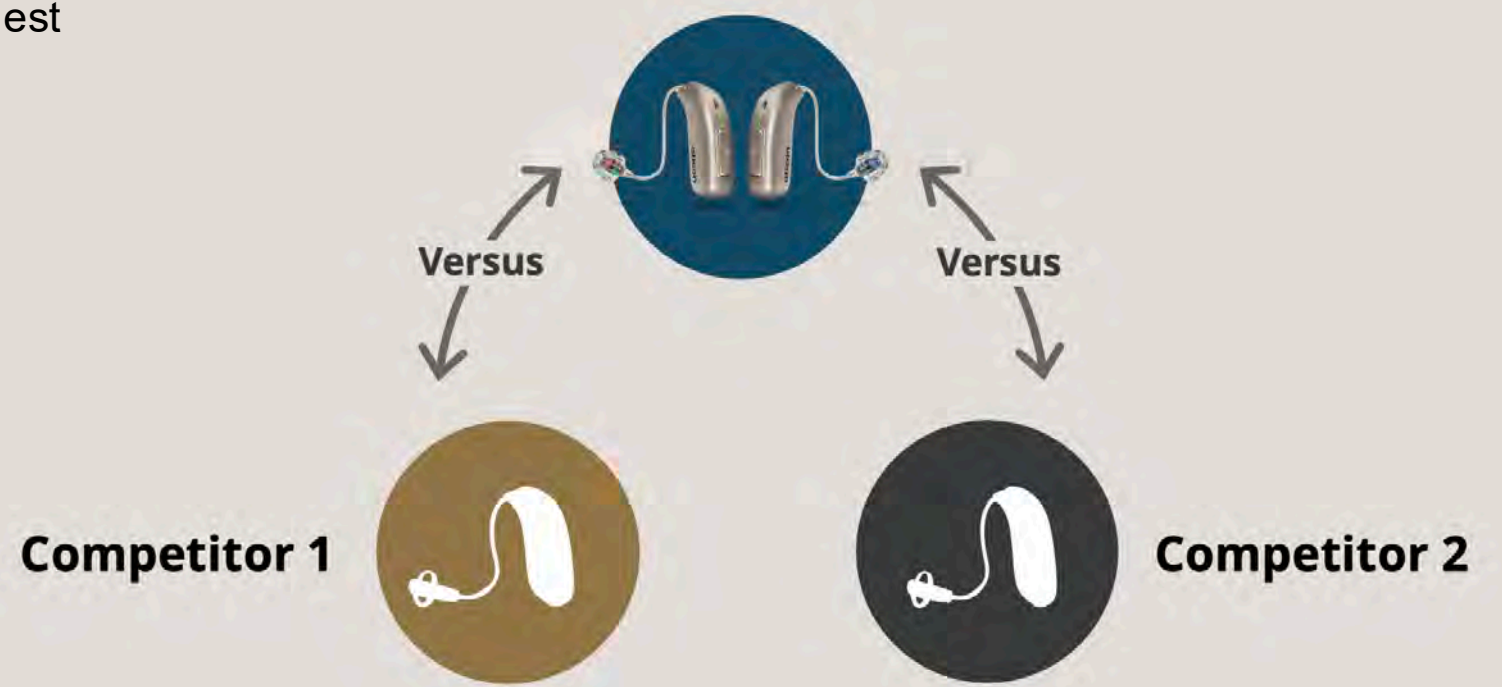
Paired comparisons

Shapiro-Wilk test



Results

Significant difference between Oticon Real and both competitors

Brushing hair

Oticon Real: 59 dB SPL

Competitor 1: 68 dB SPL

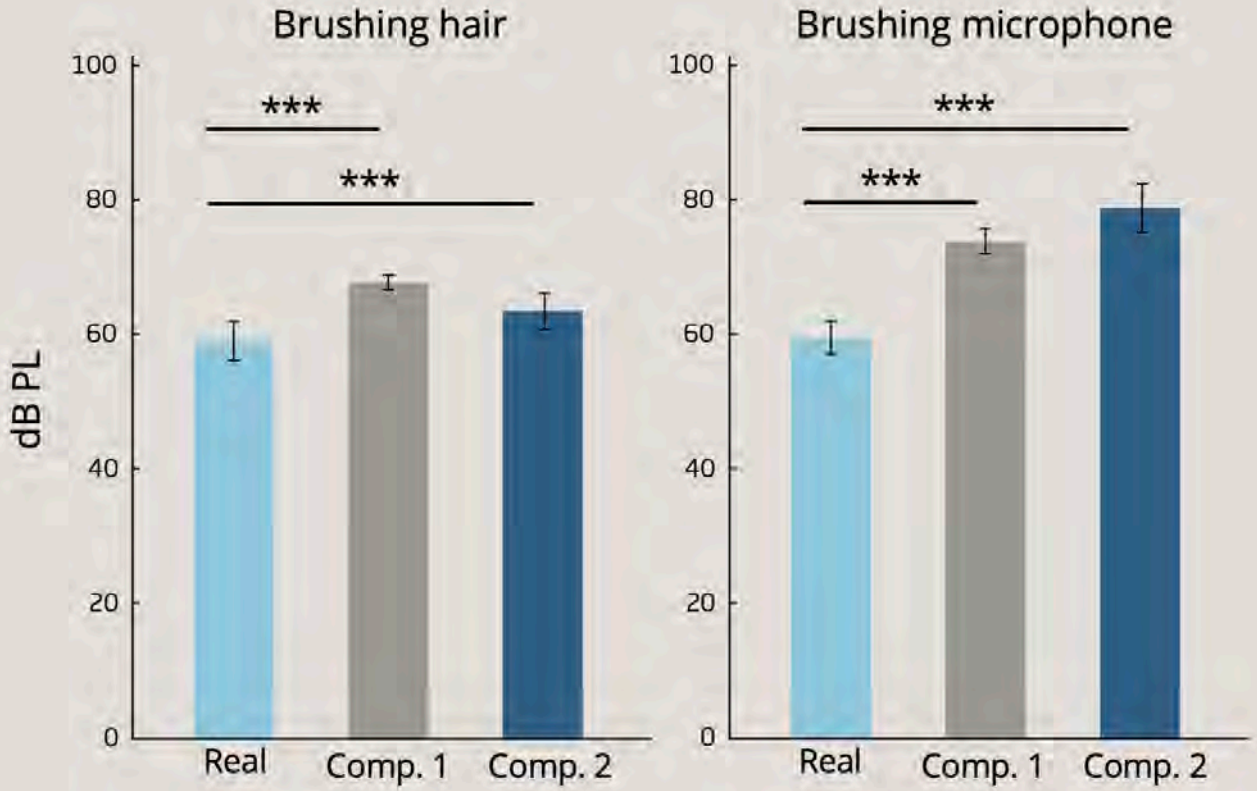
Competitor 2: 64 dB SPL

Brushing mic

Oticon Real: 60 dB SPL

Competitor 1: 74 dB SPL

Competitor 2: 79 dB SPL



Gade et al. (2023)

Oticon Real vastly outperforms competitors in reducing handling noise

Oticon Real

Competitor 1
14 dB louder
than Oticon Real

Competitor 2
19 dB louder
than Oticon Real

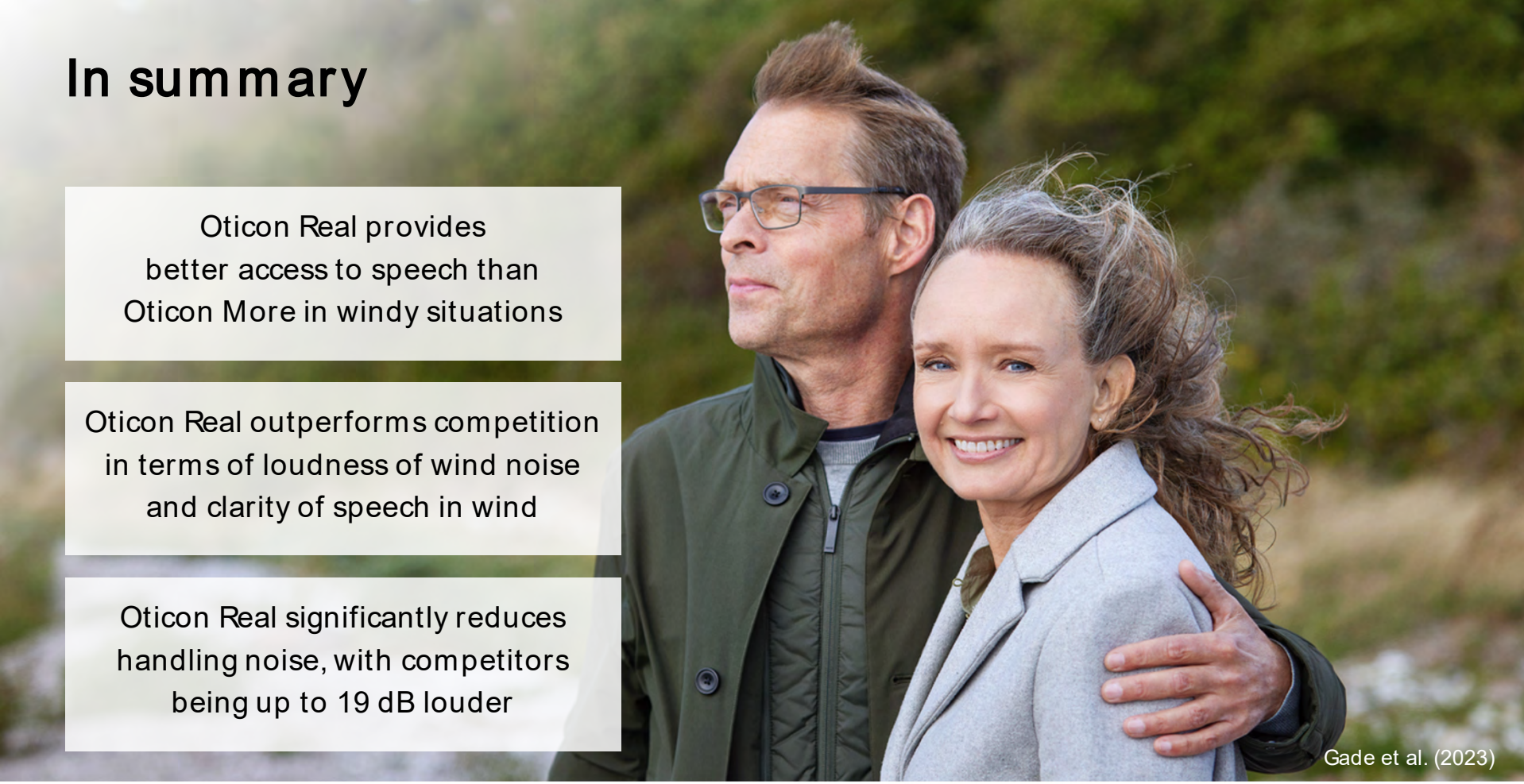
Gade et al. (2023)

In summary

Oticon Real provides
better access to speech than
Oticon More in windy situations

Oticon Real outperforms competition
in terms of loudness of wind noise
and clarity of speech in wind

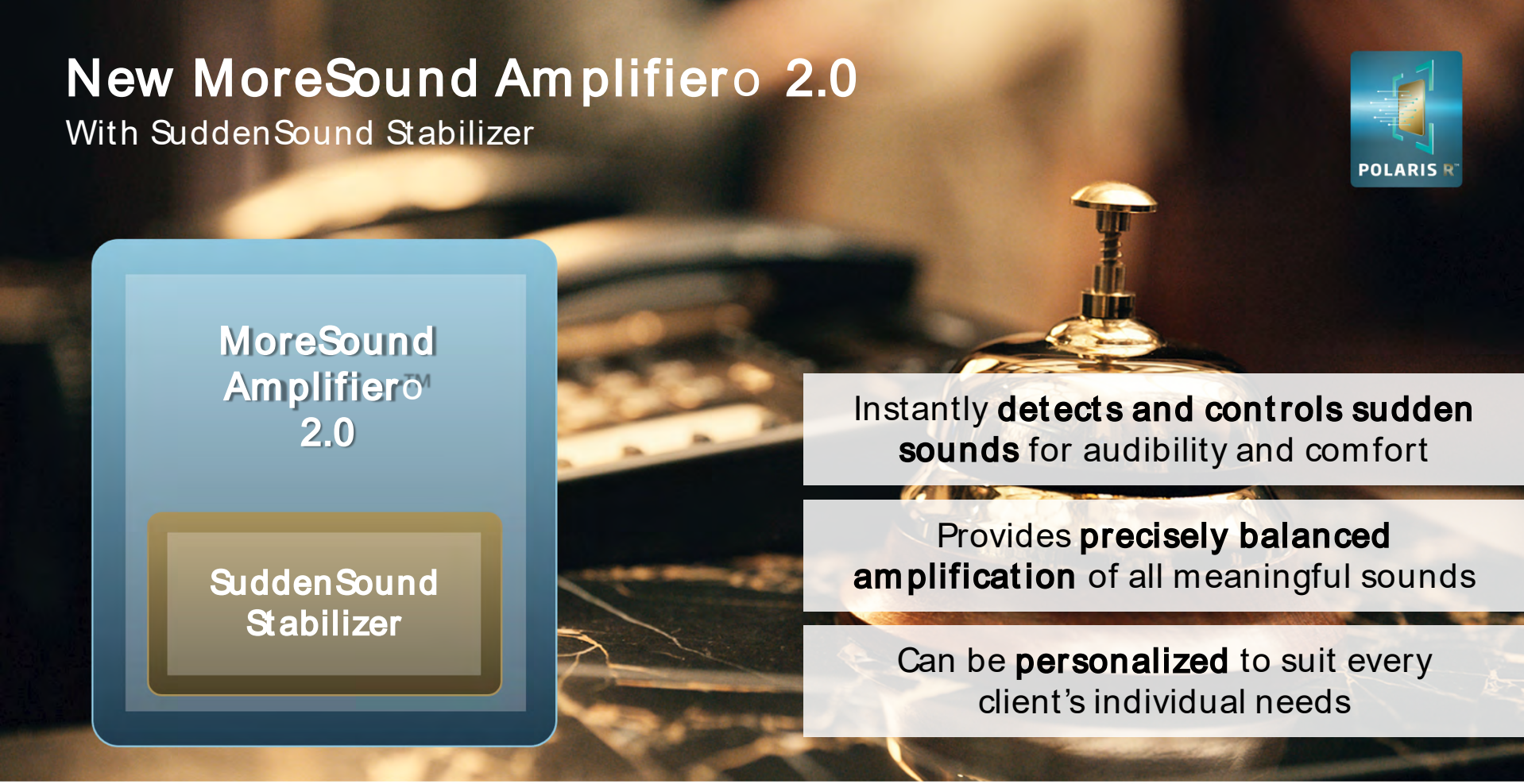
Oticon Real significantly reduces
handling noise, with competitors
being up to 19 dB louder



Gade et al. (2023)

New MoreSound Amplifiero 2.0

With SuddenSound Stabilizer



- Instantly **detects and controls sudden sounds** for audibility and comfort
- Provides **precisely balanced amplification** of all meaningful sounds
- Can be **personalized** to suit every client's individual needs

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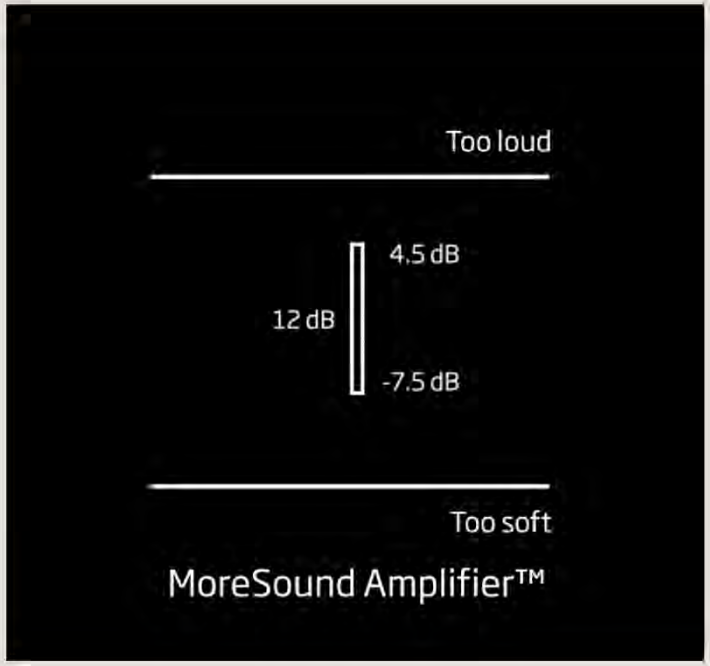
MoreSound Amplifier

An adaptive amplification approach

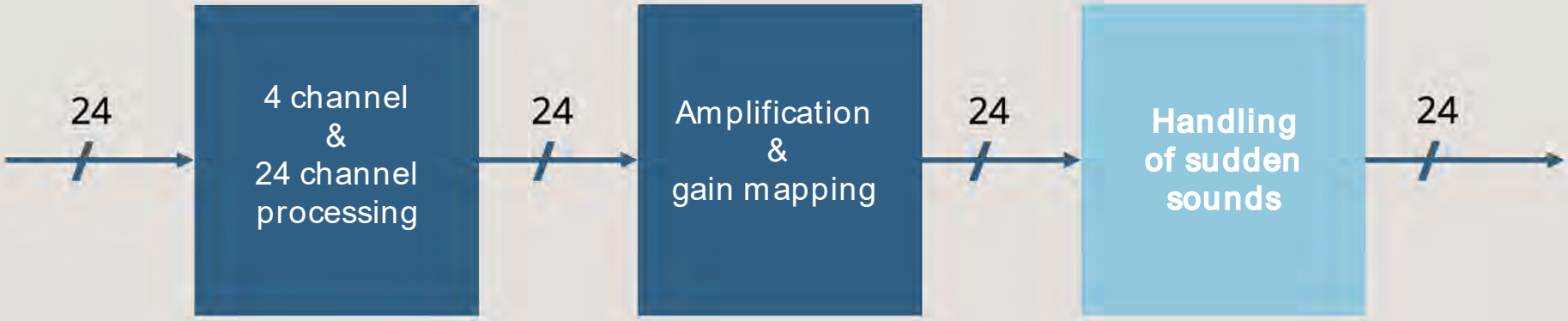
- Linear amplification window of 12 dB*
- Adapts quickly to changes in the input signal
- Sounds are kept audible and within a comfortable range
- Peaks and valleys are preserved
- Works within the input range of 113 dB SPL

Better preservation of speech cues



SuddenSound Stabilizer

A part of MoreSound Amplifier 2.0

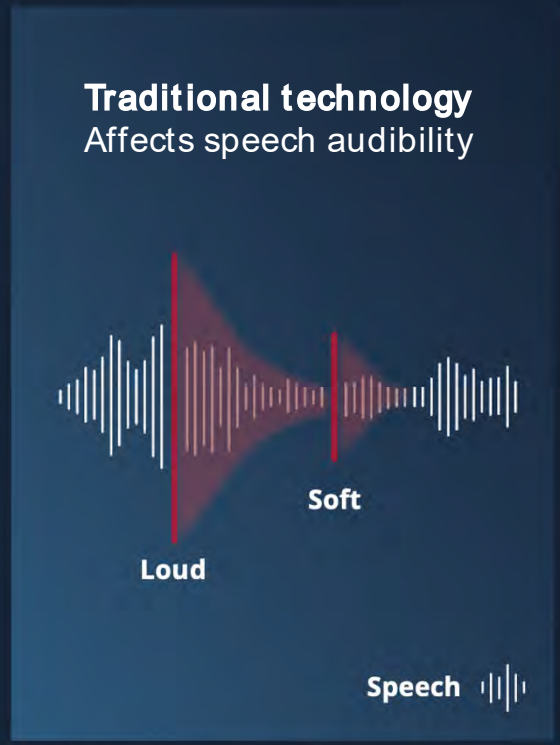


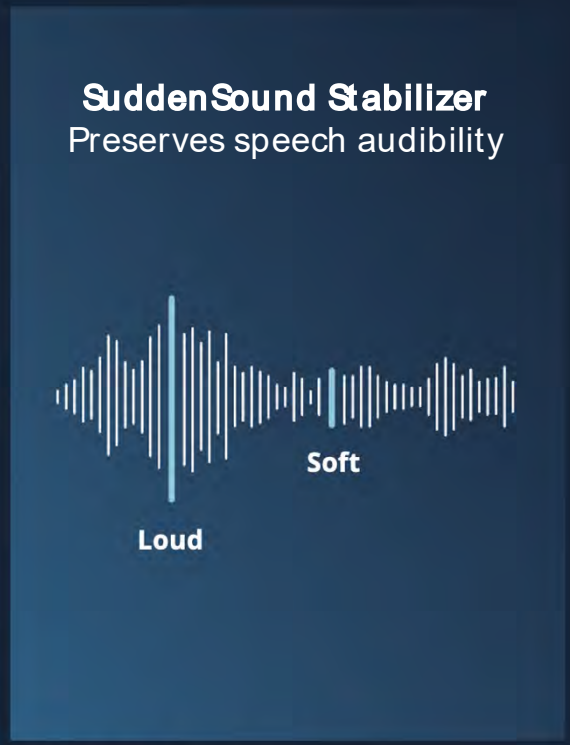
SuddenSound Stabilizer finalizes the processing in MoreSound Amplifier 2.0

SuddenSound Stabilizer

Access to speech

- **Instant attack and release**
- **High precision**
- **Better access to speech**





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SuddenSound Stabilizer effect

OFF vs High setting

SuddenSound Stabilizer OFF

SuddenSound Stabilizer ON (High setting)

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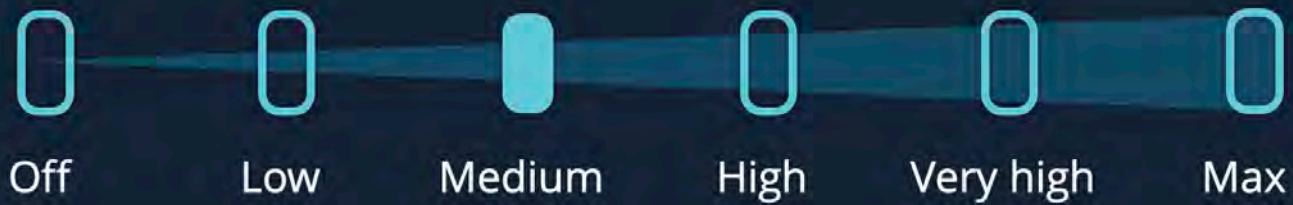
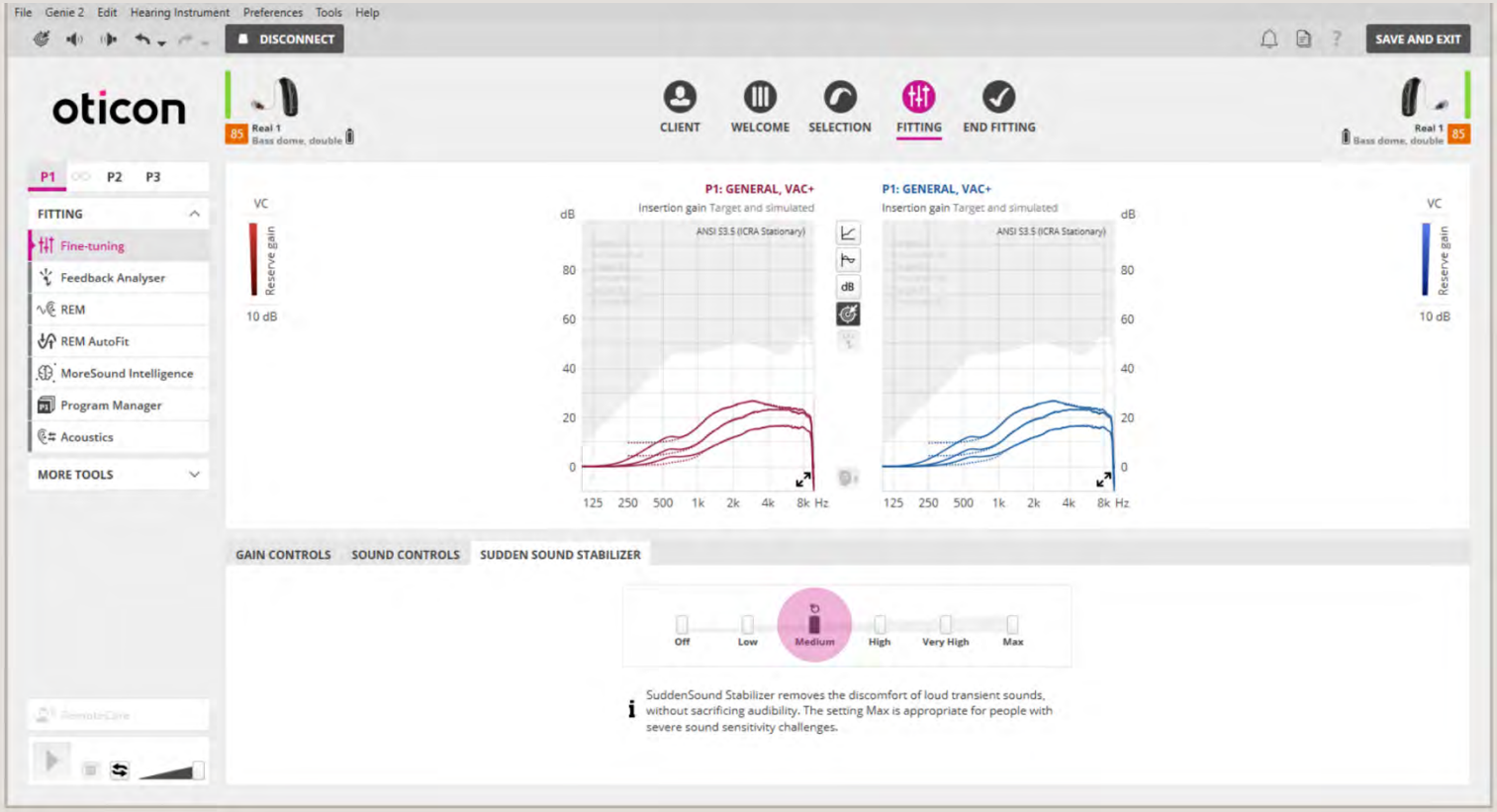
SuddenSound Stabilizer for personal preferences

	OFF	LOW	MEDIUM	HIGH	VERY HIGH	MAX
Activation level	-	60 dB SPL	55 dB SPL	40 dB SPL	40 dB SPL	40 dB SPL
Max. attenuation	0	10 dB	15 dB	20 dB	25 dB	30 dB



Settings in Oticon Genie 2



Documenting the benefits of SuddenSound Stabilizer

Performance and benchmark

Improved speech clarity

Reduced listening effort

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Performance and benchmark

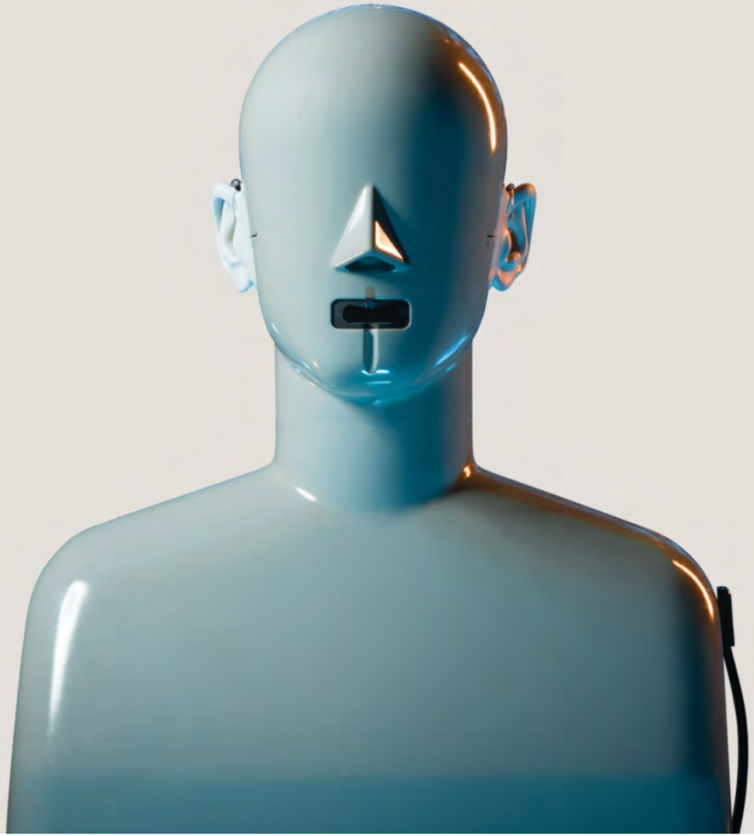
oticon

Performance and benchmark

Technical evidence

SuddenSound Stabilizer effect
measuring the impact of the SuddenSound Stabilizer settings

SuddenSound Stabilizer vs. other technologies
measuring the improvement compared to Oticon More as well as other premium devices

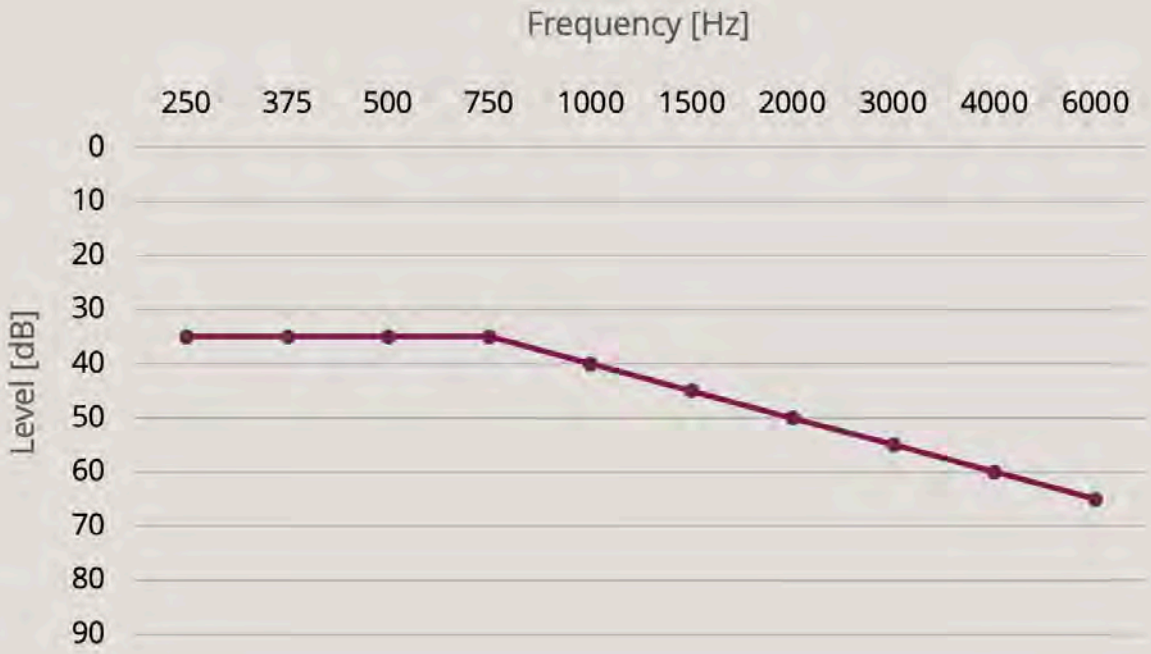


Method

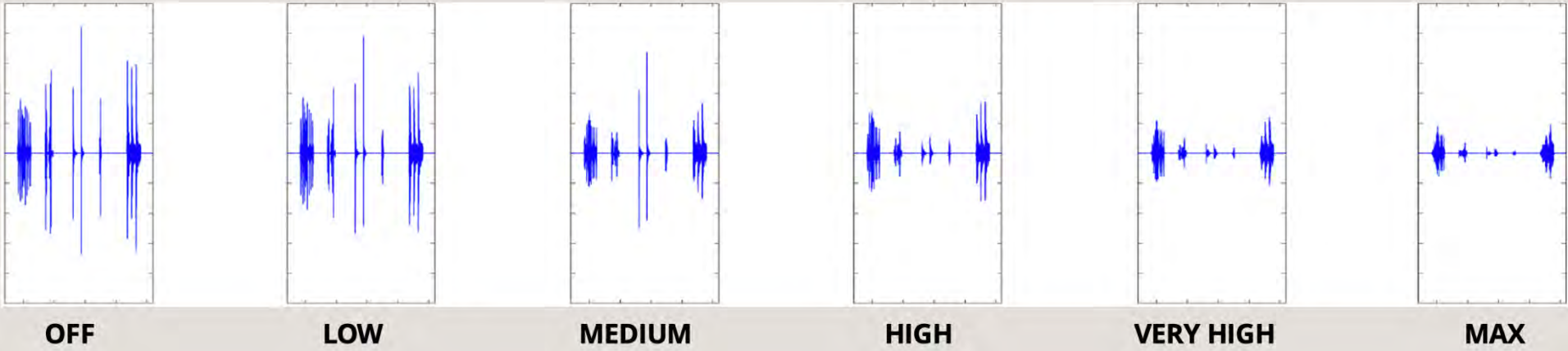
SuddenSound Stabilizer ON vs. OFF

Test conditions:

- HATS with Oticon Real hearing aids
- Standard N3 hearing loss
- “First fit” prescription
- 20 diverse sudden sounds
- Hearing aid output measured in ear canals



Amplitude of sudden sounds with different SuddenSound Stabilizer settings



Method

SuddenSound Stabilizer vs. other technologies

Test conditions:

- HATS with 4 pairs of hearing aids
- 20 sudden sounds
- Standard N3 hearing loss
- NAL-NL2 fitting
- Transient noise management:
  - Minimum/OFF
  - Maximum setting

Competitor 1

Competitor 2

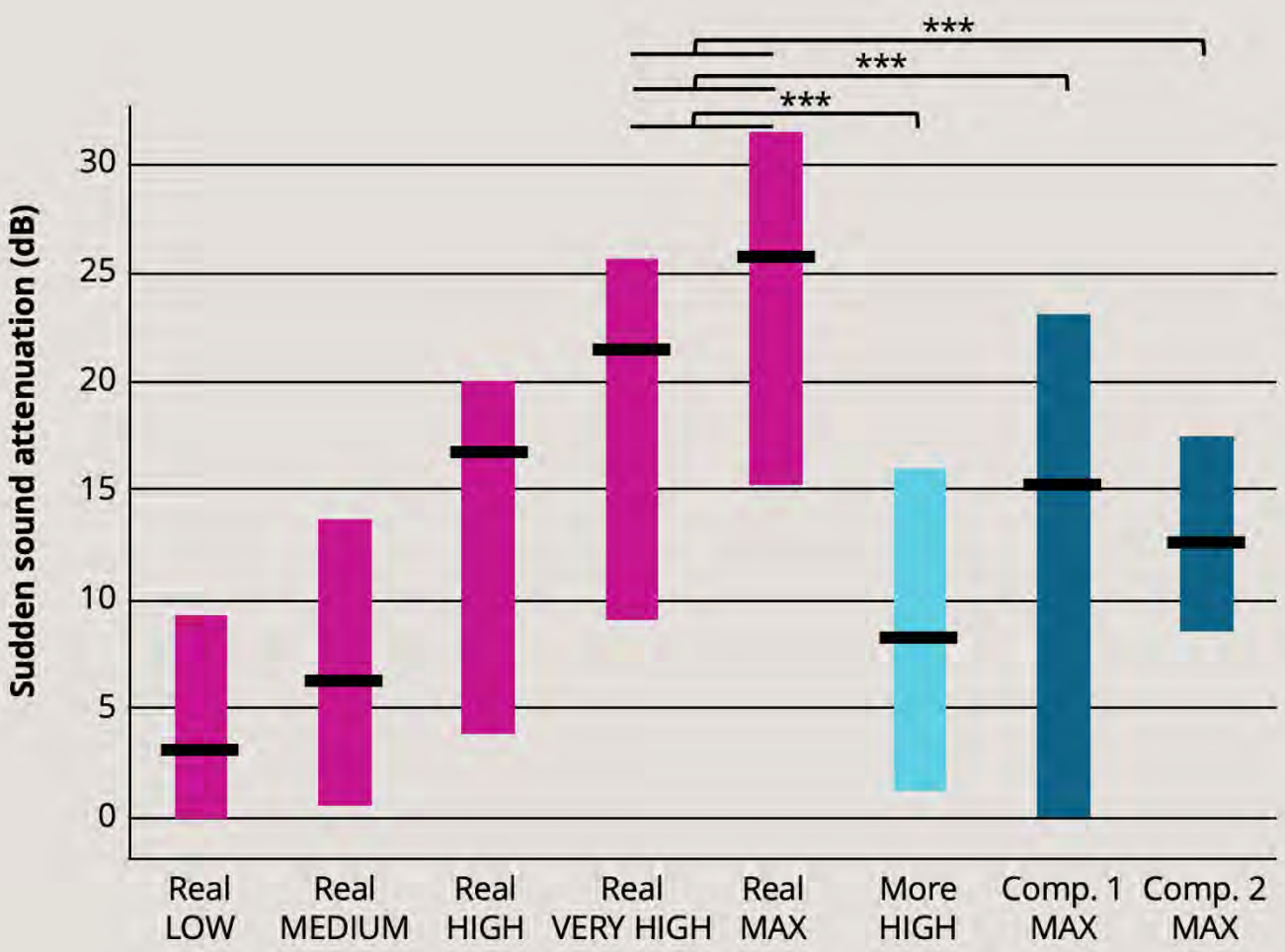
OTICON | **More**

OTICON | **Real**

Results

SuddenSound Stabilizer effect

Allowing for better comfort in the presence of sudden sounds



Santurette, S., Brændgaard, M., Wang, J, & Sun, K. (2023)

Improved speech clarity

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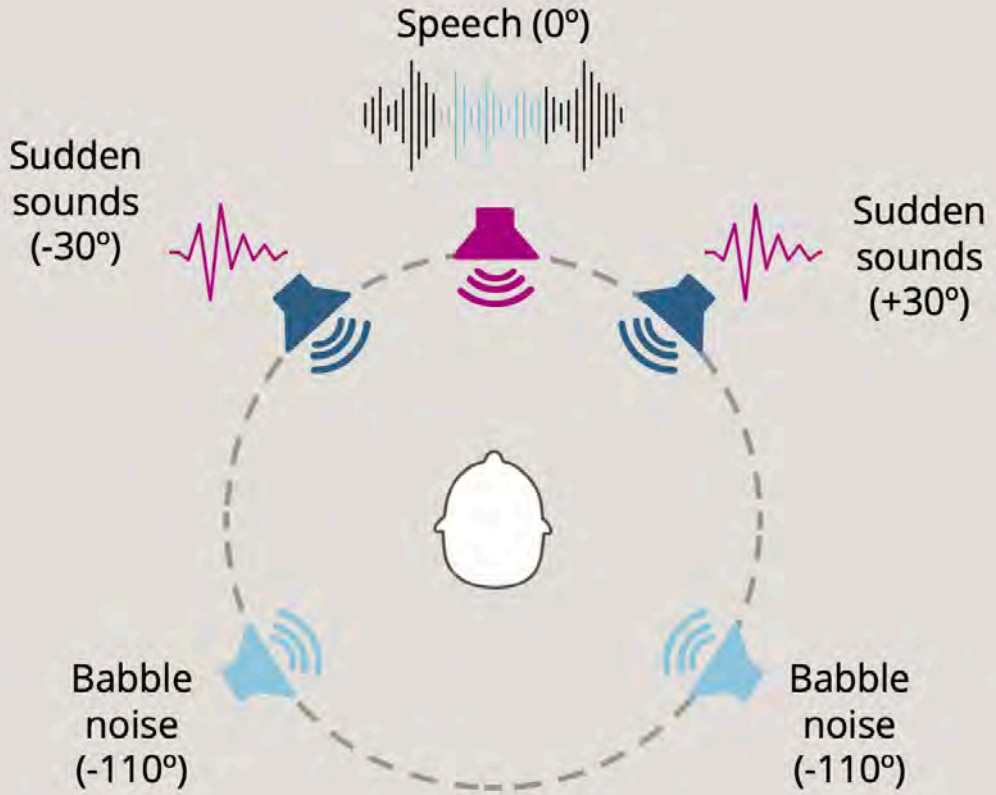
Method

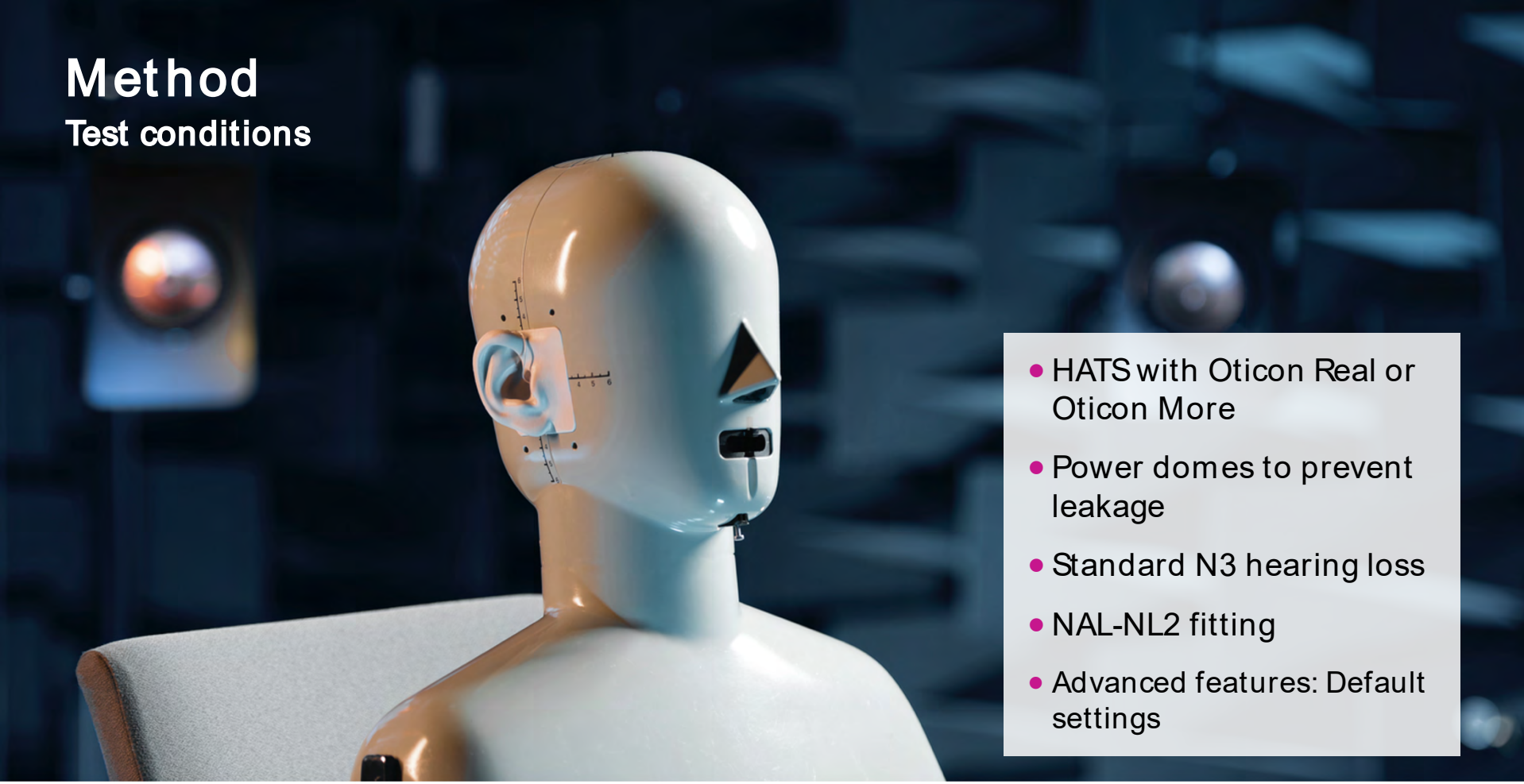
Test setup

- Female talker from front at 70 dB SPL
- Sudden sounds at +/- 30º
- Four-talker babble noise from 100° and 260° at either 60, 65, or 70 dB SPL
- HATS in the middle (1.6 m from speakers)



Method

Test conditions



- HATS with Oticon Real or Oticon More
- Power domes to prevent leakage
- Standard N3 hearing loss
- NAL-NL2 fitting
- Advanced features: Default settings

Method

Comparing SII weighted output SNRs

OTICON | **Real**

OTICON | **More**

SudденSound Stabilizer settings:

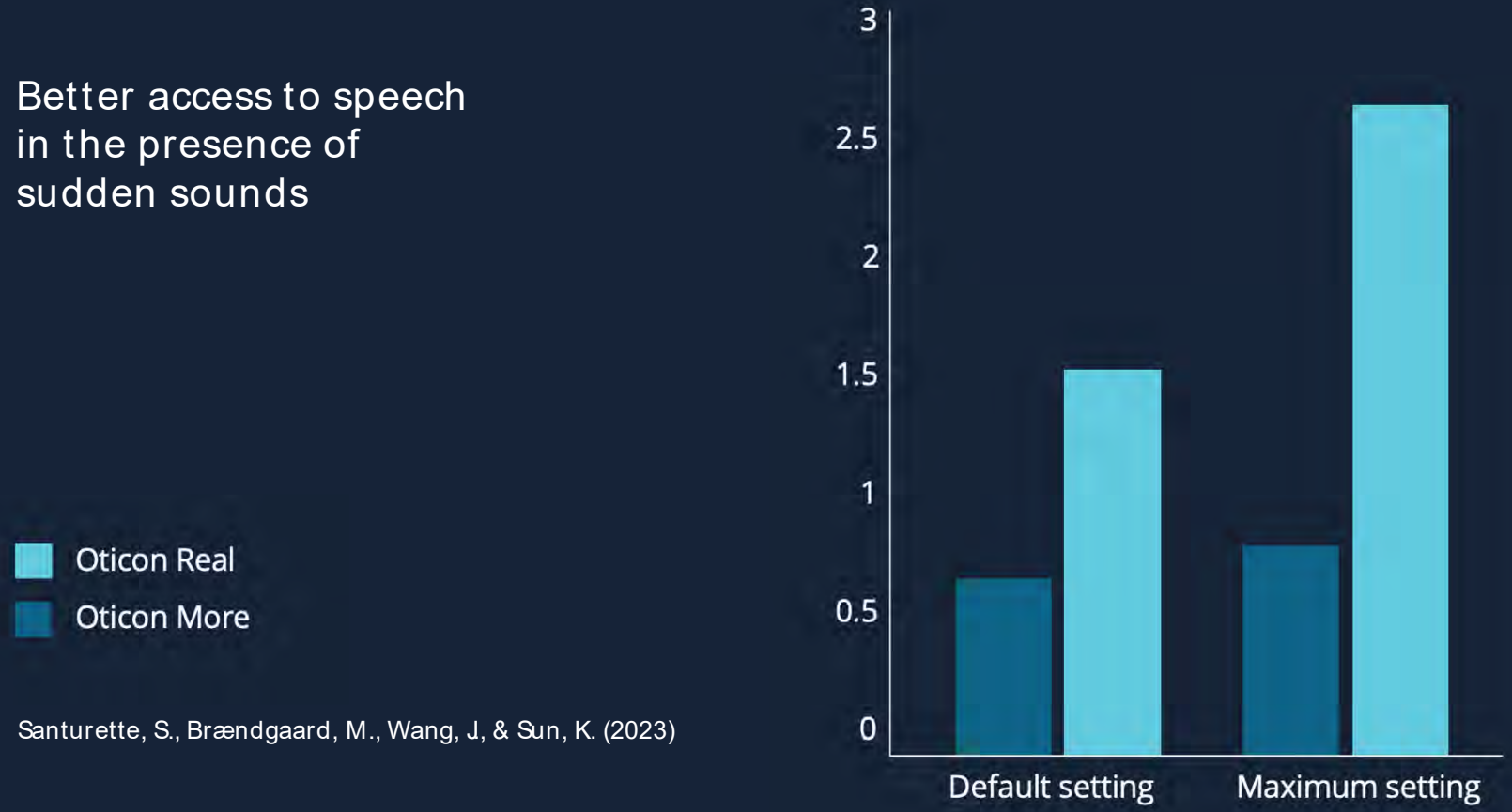
- OFF
- MEDIUM
- MAXIMUM

Transient Noise Management settings:

- OFF
- MEDIUM
- HIGH

SuddenSound Stabilizer improves speech clarity

Better access to speech in the presence of sudden sounds



Santurette, S., Brændgaard, M., Wang, J, & Sun, K. (2023)

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Reduced listening effort

oticon

Pupillometry

An other perspective of what happens in the brain

- Records pupil dilation over time
- Effort is reflected by the change in the pupil size
- Can determine if people can engage effortlessly

Ohlenforst et al. 2018

Background on pupillometry

Pupil size can reflect cognitive effort

- Pupil changes are controlled by muscle activity in the iris
- Adaptive response to changes in the environment
- Reflect changes in attention/stress and **effort***

*Kahnemann et al. 1973

Method

Task

Participants:

- 29 participants
- Mild-moderate hearing loss

Hearing aid settings:

- VAC+ default prescription
- Advanced features: Default settings
- SuddenSound Stabilizer:
  - ON
  - OFF

Method

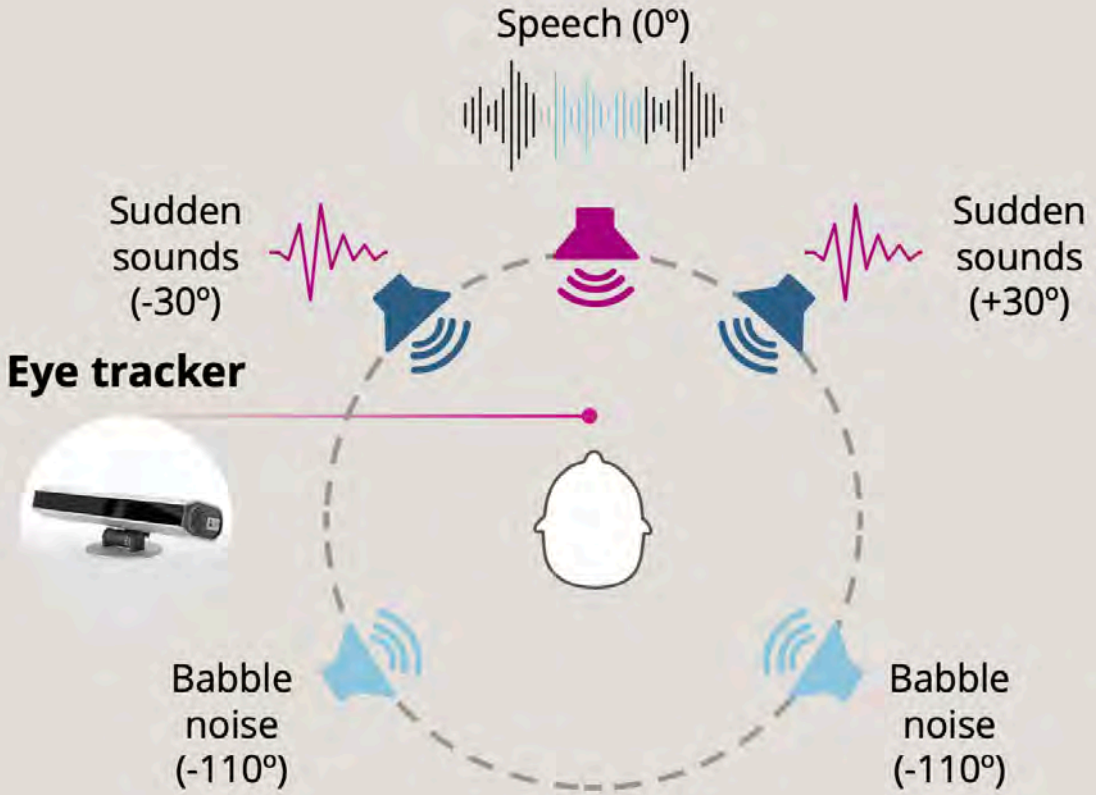
Test setup

Test conditions:

- Same speaker setup
- Eye tracker to monitor pupil dilation
- Target speech at 70 dB SPL
- Background noise adjusted to ensure 80% speech intelligibility
- Speech understanding and pupil responses were recorded

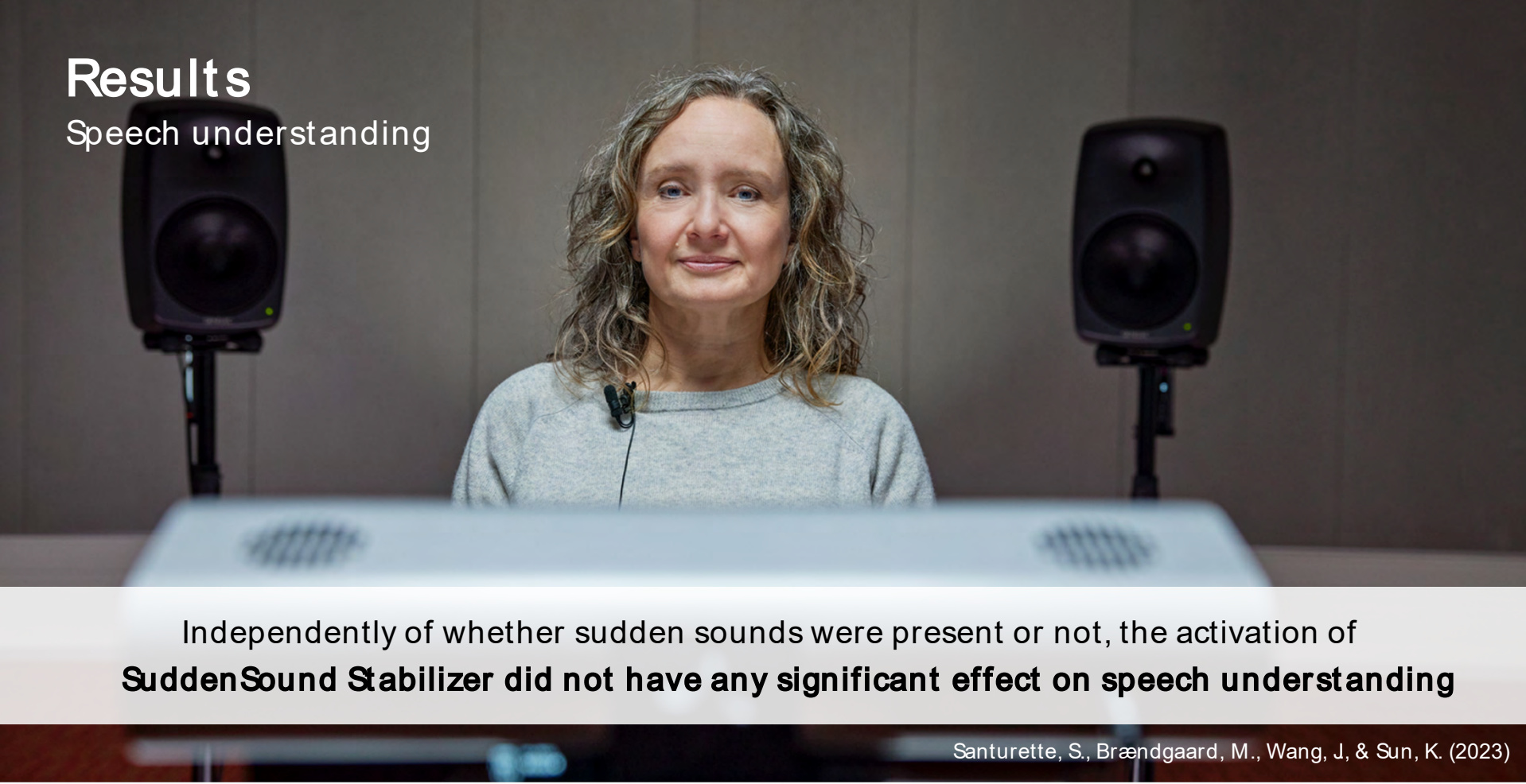
Task:

- Repeat two keywords
- Subjective evaluation through questionnaire



Results

Speech understanding



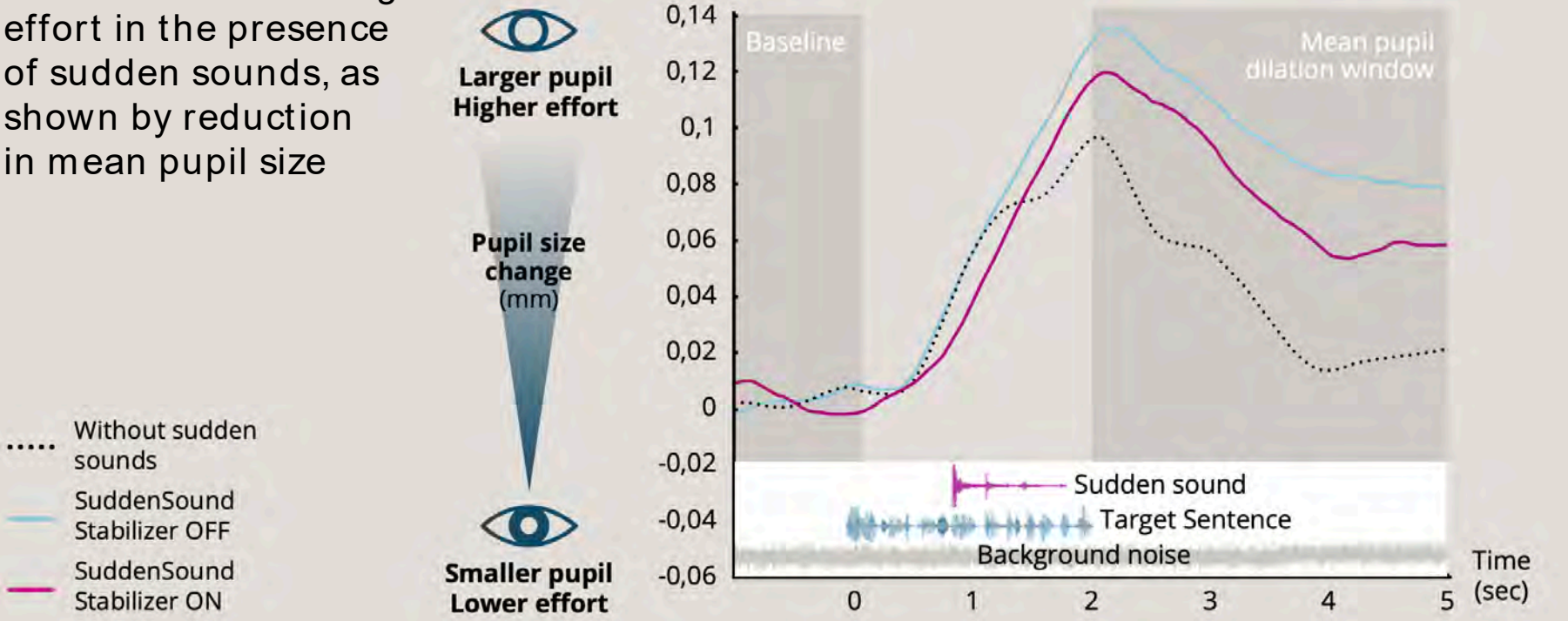
Independently of whether sudden sounds were present or not, the activation of

SuddenSound Stabilizer did not have any significant effect on speech understanding

Santurette, S., Brændgaard, M., Wang, J, & Sun, K. (2023)

Results

22% reduced listening effort in the presence of sudden sounds, as shown by reduction in mean pupil size



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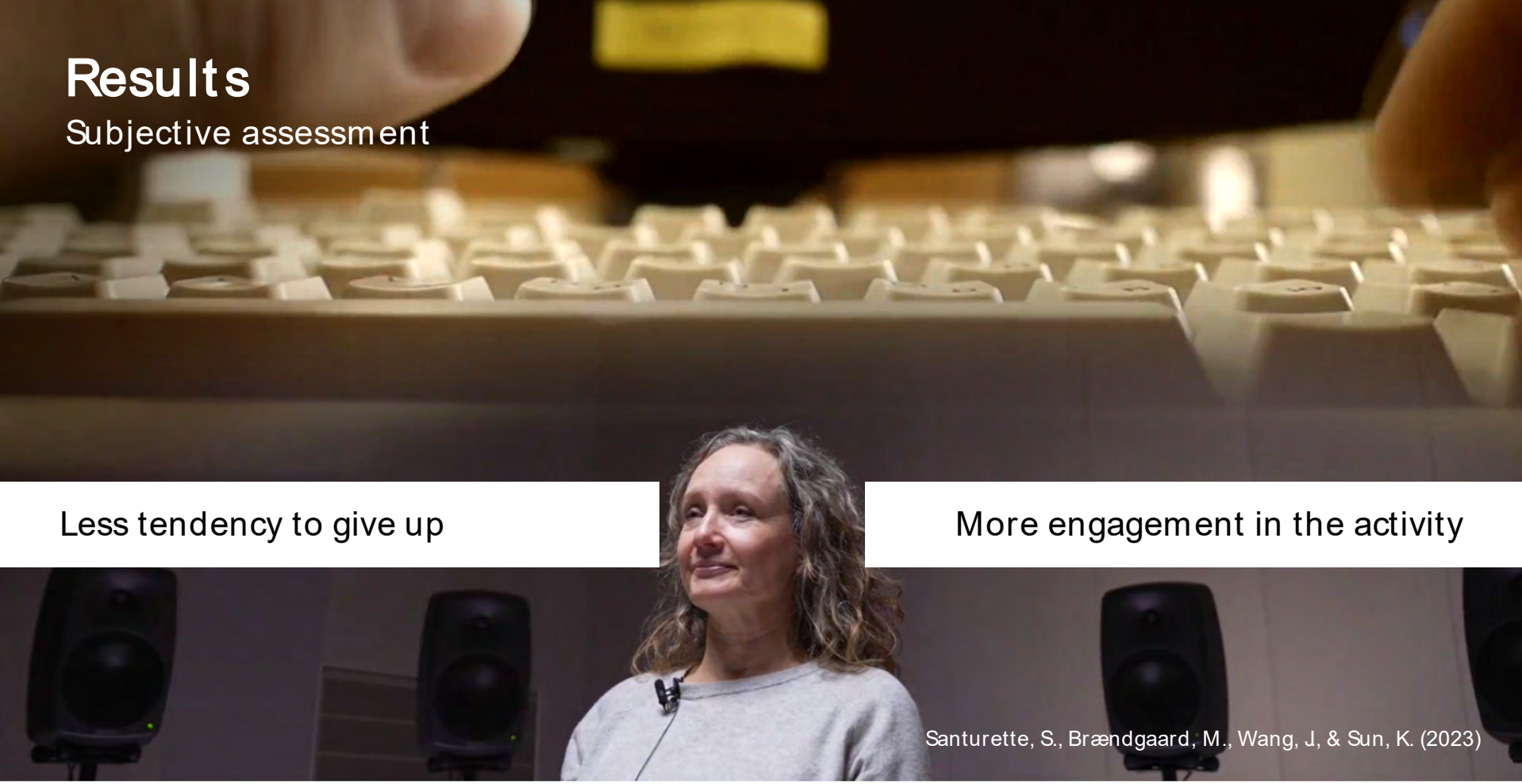
Results

Subjective assessment



Less tendency to give up

More engagement in the activity

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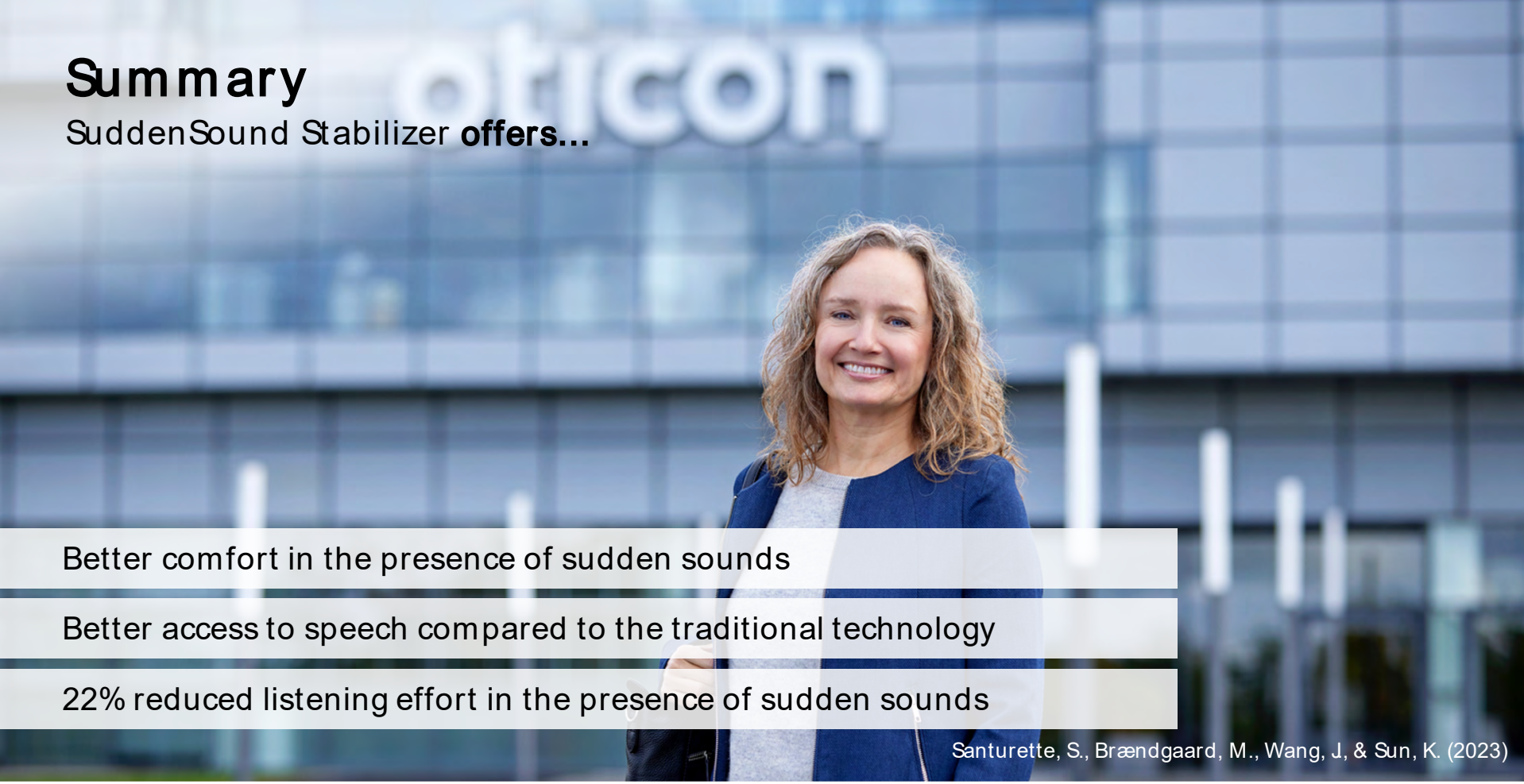
Summary

SuddenSound Stabilizer **offers...**



- Better comfort in the presence of sudden sounds
- Better access to speech compared to the traditional technology
- 22% reduced listening effort in the presence of sudden sounds

Santurette, S., Brændgaard, M., Wang, J, & Sun, K. (2023)

For hearing aids to be effective they must be...

1) Fit well
2) Worn consistently

Learn more

Wind & Handling Stabilizer Whitepaper

MoreSound Intelligence Technical paper

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Oticon Realo: Audiological Innovations

Virginia Ramachandran, AuD, PhD
Head of Audiology, Oticon, Inc.

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