

Evidence-based Technology: The Research Behind ReSound Sensia

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Key Takeaways

Key Takeaway	Clinical Implication
AcoustIQ delivers approximately 91% environmental classification accuracy across quiet, speech-in-noise, and noise-only scenes.	Supports confidence that the device's automatic programs correctly identify the patient's real-world listening situation.
Accurate classification alone is not sufficient — AcoustIQ shows 100% feature engagement accuracy versus 47–53% for competitor brands.	Correct feature activation (not classification alone) is the more clinically meaningful measure of automatic performance.
Multi bandsplit directionality applies omnidirectionality, a bilateral beamformer, and fixed directionality across low, mid, and high frequencies.	Patients retain natural own-voice perception while gaining SNR benefit and localization cues, without needing to choose a program manually.
DNN-based noise reduction activates automatically only in very loud, complex environments, working alongside 4-mic beamforming.	Patients do not need to manually adjust settings in the most difficult multi-talker situations.
In selective-attention testing, ReSound Vivia 9/Intelligent Focus showed statistically significant benefit over three competitor devices ($p=0.0038$, $p=0.046$).	Patients who must actively focus on one talker among several may experience a measurable speech-understanding advantage.
Across two independent real-world studies ($n=20$ and $n=24$), the frontal talker was rated best audible significantly more often with Sensia than with a competitor ($p<0.001$).	Supports a front-facing conversational benefit in complex, multi-talker listening environments such as group meals or meetings.
The new AllFit dome lineup expands from 10 to 19 sizing options, including a Sleeve dome designed to balance openness and feedback margin.	Correct dome sizing reduces gaps from poor canal-wall contact (too small) or crumpling/folding (too large), protecting both fit and sound quality.

Course Content

Learner Outcomes

- After this course, participants will be able to describe at least two fundamental differences between traditional hearing aid signal processing and DNN-based signal processing approaches.
- After this course, participants will be able to identify how DNN-based processing and directional signal processing can influence access to a target talker in complex speech environments.
- After this course, participants will be able to apply evidence from laboratory and clinical research to identify potential clinical implications of advanced DNN-based hearing aid processing for patients who experience difficulty communicating in complex listening environments.

The Challenge: Hearing in Noise

Market research indicates that hearing in noise remains the top challenge reported by hearing aid users: 90% struggle with conversations in a noisy background, and 80% report difficulty when more than two people are talking at once (MarkeTrak 25, 2025).

ReSound Sensia represents the latest step in a longstanding technology progression, building on prior generations of directionality and noise-reduction advancements.

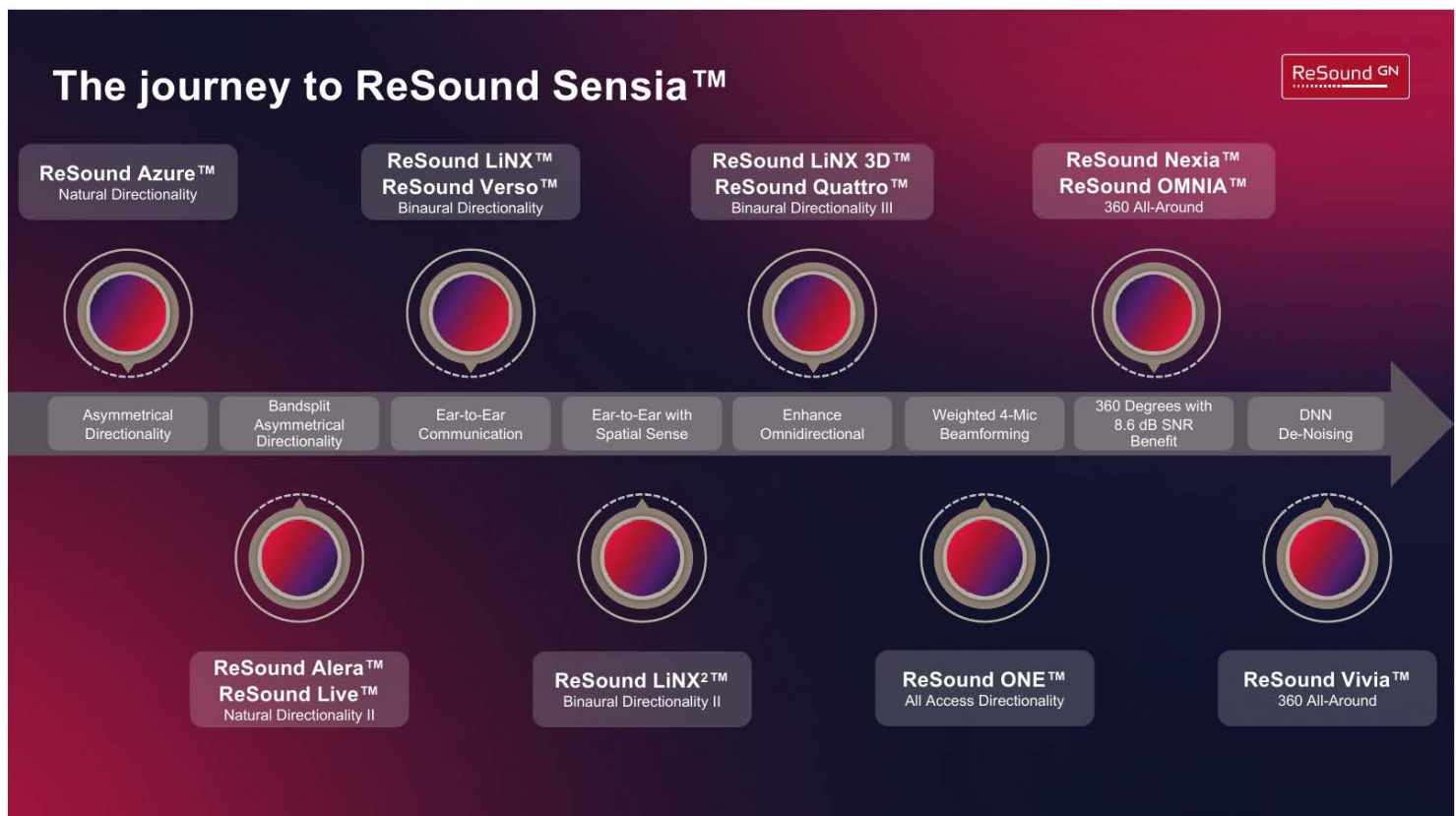


Figure 1. The product evolution timeline leading to ReSound Sensia.

Hearing care professionals have reported wanting automated performance that reduces complexity for patients — including automatic DNN processing and automatic chip activation — rather than requiring conscious, manual intervention (ReSound Sensia Quantitative Messaging Test, n=81, Feb 2026).

From Automation to Natural Listening

ReSound Sensia is built on three listening modes that reflect how people naturally listen: spatial awareness, better ear advantage, and speech clarity in noise.

Spatial Cue Preservation	Maintains sound quality, awareness of surroundings, and localization cues important for natural navigational abilities in quiet and speech-only environments.
Better Ear	Gives better audibility to speech in noise while still allowing access to surrounding sounds and localization cues.
Speech Intelligibility	Provides the strongest support for speech intelligibility in complex situations where speech and noise compete, while still providing localization cues.

Two complementary noise-reduction strategies are applied depending on the listening situation:

Perceptual Noise Reduction	Used in noise-only and moderate speech-in-noise situations. Works with directionality to support natural listening and adapts to the environment, applying more reduction as noise increases. Keeps listening natural without over-processing.
Deep Neural Network (DNN) Noise Reduction	Activated in very loud, complex environments. Focuses on the speaker in front — not just the loudest voice — combined with 4-mic beamforming for precise focus. Helps users hear who they want to hear.

Q1

Quiz Hint: DNN-based noise reduction is activated automatically in very loud, complex environments, where it reads the environment in real time and focuses on the speaker in front rather than simply the loudest voice — a more adaptive approach than fixed, always-on traditional processing.

Q5

Quiz Hint: The DNN in ReSound Sensia refers to Deep Neural Network processing. It is the technology the hearing aid uses to recognize and process complex sound scenes, combined with 4-mic beamforming, to help the wearer focus on the speaker in front rather than just the loudest voice.

Directionality is also applied with the narrowest directional beamwidth in the product line, using multi bandsplit directionality: omnidirectionality in low frequencies preserves natural own-voice perception, a bilateral beamformer in mid frequencies maximizes SNR, and fixed directionality in high frequencies supports better sound localization.

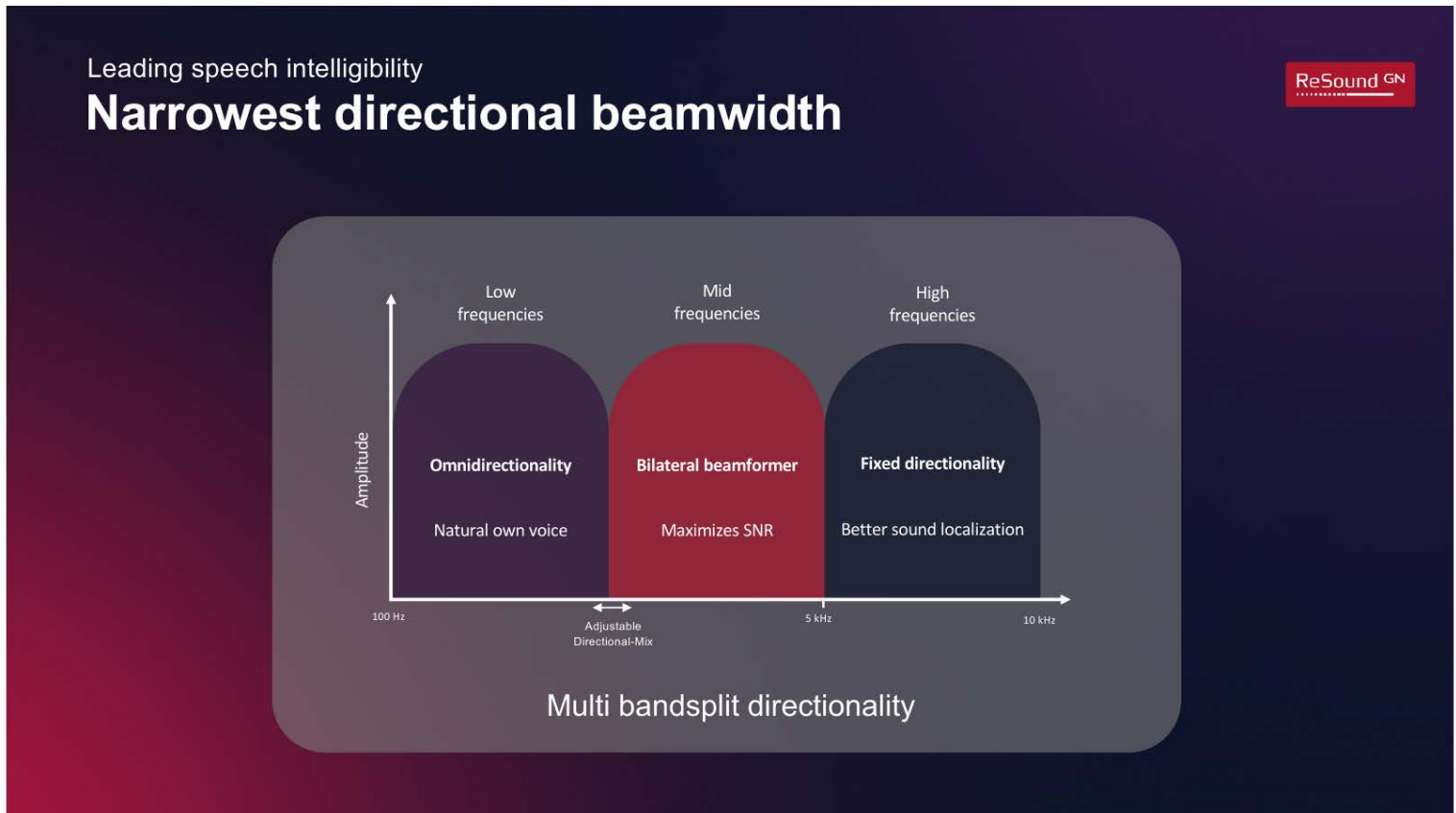


Figure 2. Multi bandsplit directionality across low, mid, and high frequencies.

Together, these elements are designed to deliver seamless natural transitions — adapting as environments change without jarring shifts or the need for the wearer to think or adjust — along with power that lasts all day through smart, stable use of processing power.

AcoustIQ: Real-Time Sound Sensing

AcoustIQ is described as the most accurate real-time sound sensing technology in the product line. It reads the listening environment in real time and engages and activates the optimal combination of directionality, noise reduction, and gain settings.

Q3

Quiz Hint: AcoustIQ is the technology in ReSound Sensia that reads the listening environment in real time and engages the optimal combination of directionality, noise reduction, and gain settings — helping the device make the right decisions right away.

A comparative study evaluated environmental classification accuracy across six premium hearing aid brands, eight real-world sound scenes, and three environment types, examining whether automatic programs correctly activate directionality, reduce gain in noise, and preserve prescribed gain in speech-only environments (Groth & Cui, 2026).

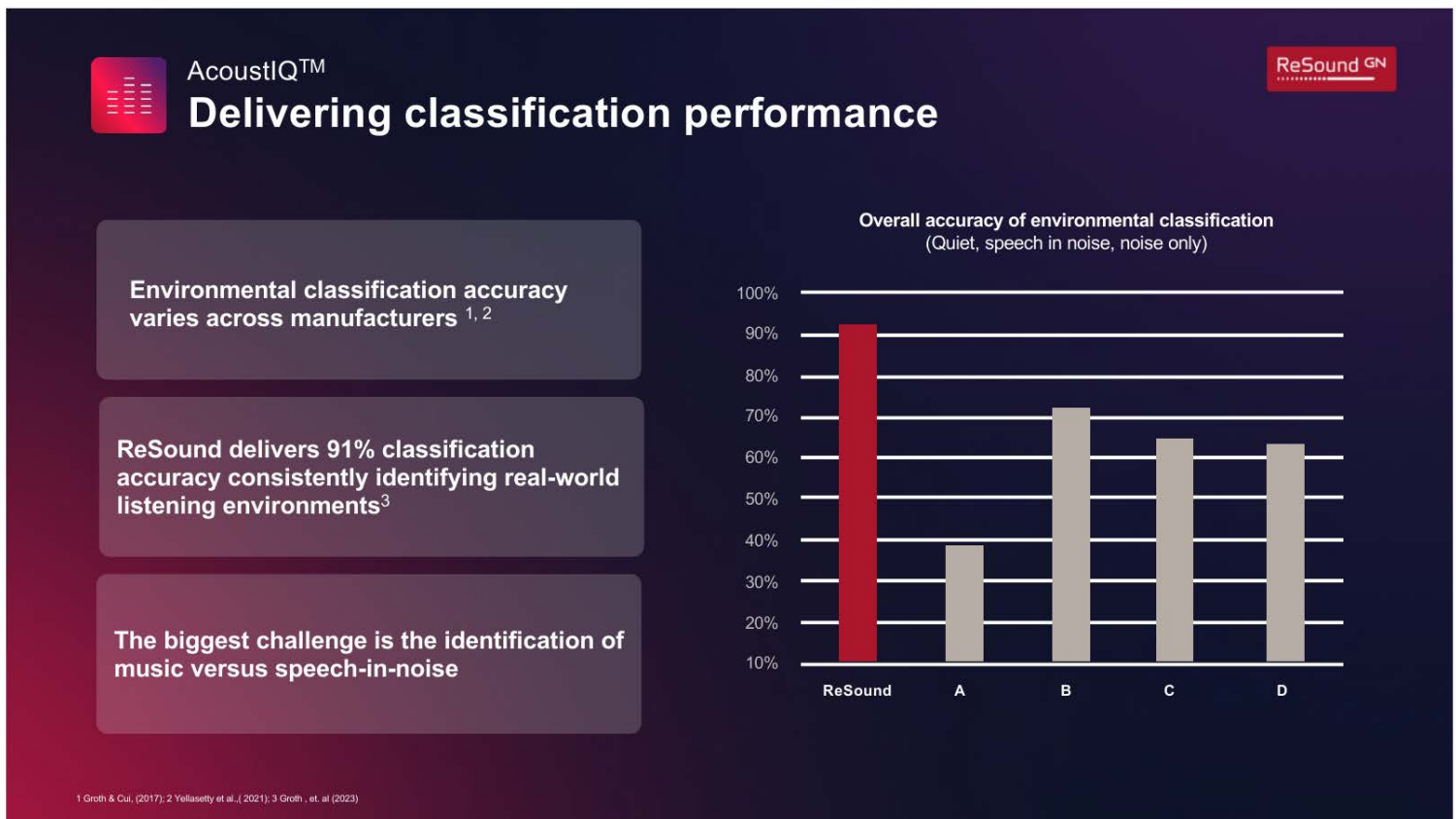


Figure 3. Overall accuracy of environmental classification, ReSound vs. four competitor brands.

The research further indicates that accurate classification alone is not enough if it does not translate into correct feature activation. AcoustIQ showed 100% feature engagement accuracy overall, and consistently high accuracy across scene types (voices in quiet, speech-in-noise, and noise), compared with substantially lower and more variable accuracy among competitor brands.

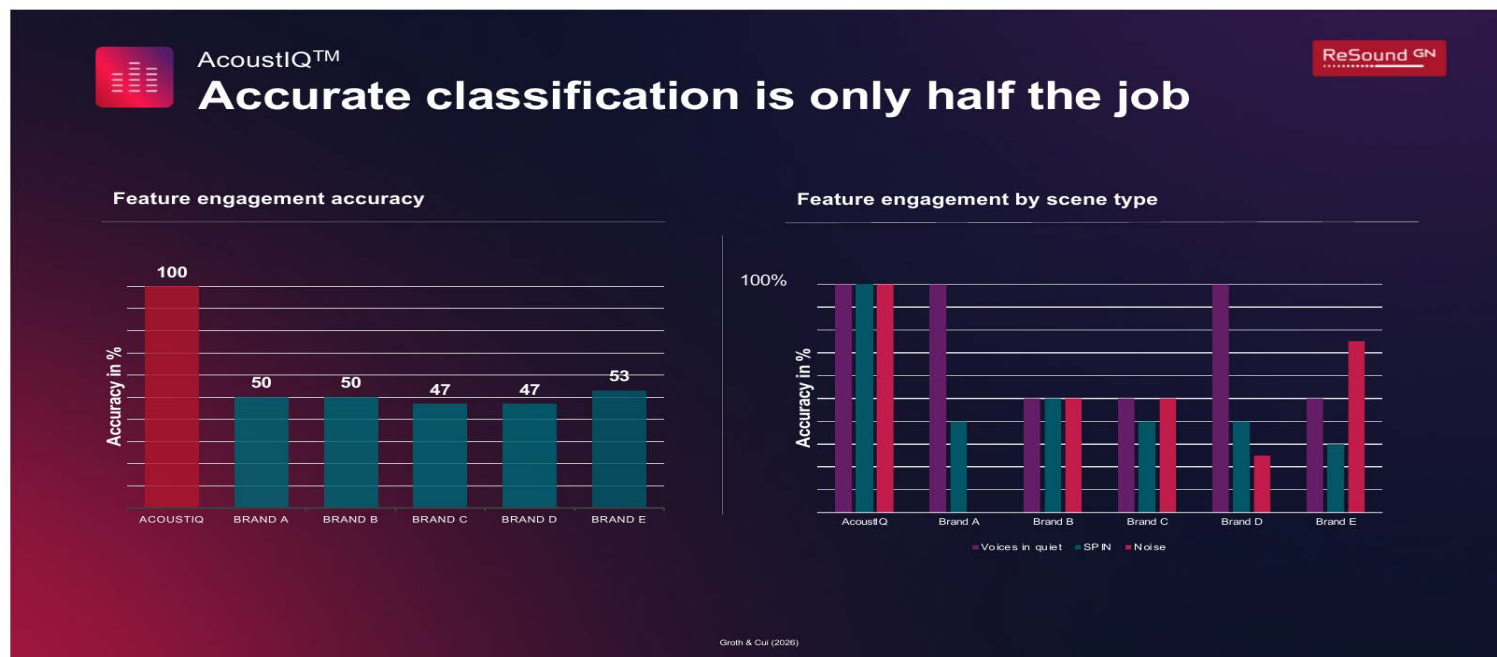


Figure 4. Feature engagement accuracy overall and by listening scene type.

Overall, AcoustIQ demonstrated 91% environmental classification accuracy, 100% overall accuracy of feature engagement, and 88% greater accuracy in real-time classification and feature engagement than the closest premium competitor brand (Groth & Cui, 2026; Groth & Cui, 2024).

Clinical Evidence: Speech Understanding in Complex Environments

The "cocktail party problem" describes the difficulty of following one chosen voice amid competing talkers and competing noise. In noise, the brain performs an extraordinary act: it enhances one voice, suppresses others, predicts linguistic patterns, and fills in gaps.

Q2

Quiz Hint: Competing-talker situations are especially challenging because other talkers' speech shares many of the same acoustic characteristics as the target voice — unlike steady

background noise — so separating the target from competing speech requires the brain to actively enhance one voice, suppress others, and rely on linguistic prediction to fill in gaps.

A study conducted at the Hörzentrum Oldenburg, Germany, examined which hearing aid strategy provides the best intelligibility of single target talkers and turn-taking talkers in the presence of interfering speech in the front hemifield, using the Concurrent Oldenburg Sentence Test (CCOLSA). This dual-type paradigm was designed to better capture attentional listening demands (divided and selective attention), offering higher ecological validity and capturing cognitive listening effort than single-talker tests.

Advantage of Concurrent Oldenburg Sentence Test (CCOLSA)



Real-world listening
uses competing speech



Engages Selective
attention/Divided attention



Higher ecological validity



Captures cognitive listening
effort

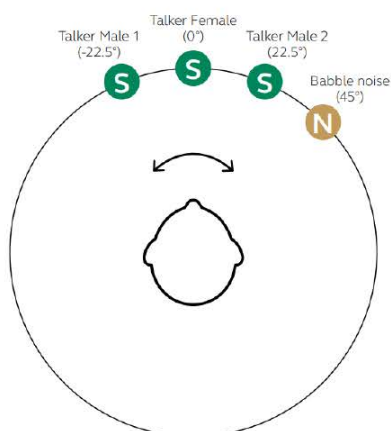


Figure 1. Illustration of test setup used for speech recognition testing.

Dual type paradigm designed
to better capture attentional
listening demands

Individual SRTs measures with
adaptive CCOLSA prior to

CCOLSA talkers presented at +4
dB louder than individual SRTs

Overlap x sentences were set
individually after measuring overlap
time threshold for 50% correct.

Figure 5. Test setup used for CCOLSA speech recognition testing.

Results showed that, for the selective attention condition, ReSound Vivia 9/Intelligent Focus provided statistically significant average benefit relative to three competitor hearing aids: +6.3 percentage points versus one competitor ($p=0.0038$) and +4.8 percentage points versus another ($p=0.046$). When listeners had to selectively attend to a target talker, this device provided a measurable performance advantage.

Benefit Graph = (HA1 score) – (Competitor score)

- Benefit for HA1 relative to that of each of the three HAs
- For the selective attention condition, statistically significant average benefits

Better speech understanding when focusing on a target talker

- **+6.3 percentage points** vs. HA1 **
- **+4.8 percentage points** vs. HA2 *

Both differences were statistically significant
p=0.0038 | *p*=0.046

When listeners had to selectively attend to a target talker, HA1 provided a performance advantage.

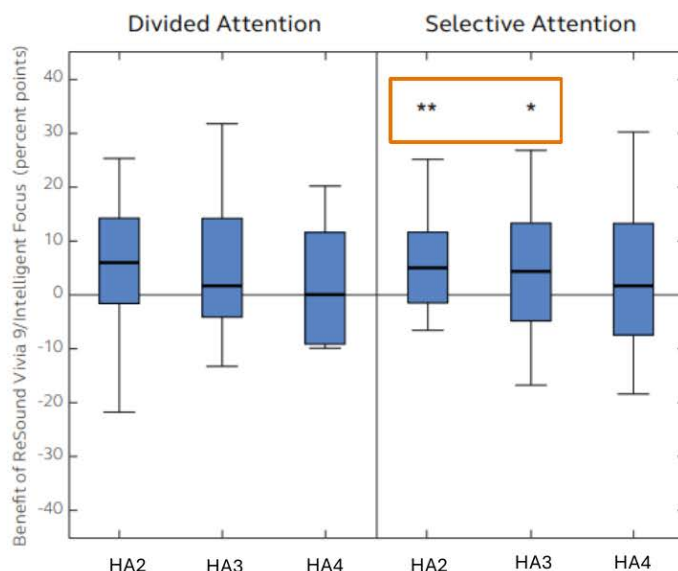


Figure 6. Benefit graph comparing performance under divided vs. selective attention.

Two additional real-world studies reached the same conclusion. The first (n=20 participants with mild-to-moderate bilateral hearing loss) used cocktail-party noise with a target speaker at 0° and a distractor at -90°, asking listeners to identify which talker was most audible. The second, conducted at Hörzentrum Oldenburg (n=24 participants with moderate bilateral hearing loss), used two complex sound scenes with diffuse cafeteria noise from 16 loudspeakers, again asking listeners to identify the most audible talker.



Two studies. Same conclusion.

Proven in real-life situations

ReSound GN

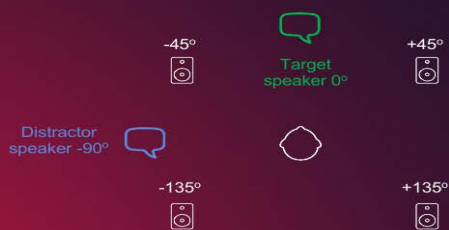
Our study¹

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Participants with mild-to-moderate bilateral hearing loss

ReSound Sensia vs. leading premium RIE with DNN denoising

- Cocktail-party noise (multi-talker babble)
- Target vs. distractor speech (matched effort level)
- Task: identify which talker is most audible



Hörzentrum Oldenburg study²



24

Participants with moderate bilateral hearing loss

ReSound Sensia vs. leading premium RIE with DNN denoising

- Two complex sound scenes (A & B)
- Diffuse cafeteria noise (16 loudspeakers)
- Task: identify which talker is most audible



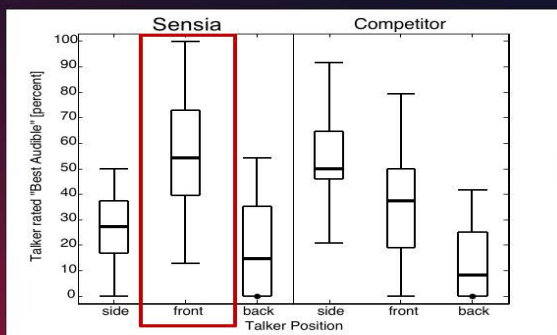
1 Jespersen & Rubachandran (2020); 2 Quiller, Heeren & Jespersen (2026)

Figure 7. Speaker layouts for the two real-world listening studies.

Across both studies, the frontal talker was rated best audible significantly more often with Sensia than with a competitor device ($p < 0.001$). Under a condition with louder distractors, listening with Sensia was reported as harder than the first condition, but listeners were still able to pick out the front talker 30% of the time — with visual and context cues, this represents a good outcome, since the competitor's approach enhanced the loudest talker rather than the frontal one.

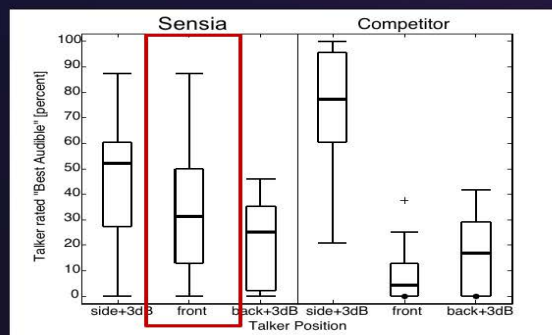
Results

Best audible talker with equal distractors



Frontal Talker was rated best audible significantly more than the competitor ($p < 0.001$).

Best audible talker with louder distractors



The loudest talker gets enhanced by the competitor. Listening with Sensia was harder in this condition than the first condition, but listeners were still able to pick out the front talker 30% of the time. With visual and context cues these are good results.

Figure 8. Best audible talker ratings, Sensia vs. competitor, under equal and louder distractor conditions.

Q4

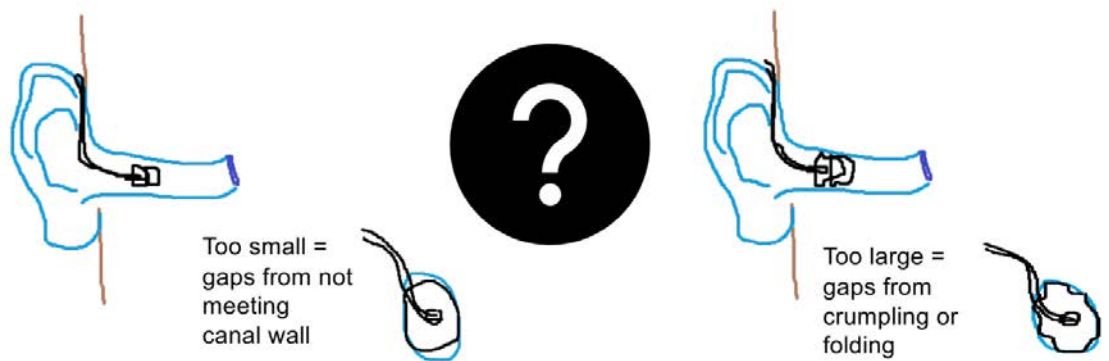
Quiz Hint: For a patient who manages well in quiet but becomes overwhelmed when several people are talking at once, the evidence supports evaluating the patient's real-world performance and experience in complex, multi-talker environments — rather than relying on audibility or pure-tone thresholds alone — to determine whether advanced DNN-based processing may offer additional clinical benefit.

Fit, Comfort, and AllFit Domes

Post-fitting outcomes depend heavily on correct dome sizing, since canal shapes and sizes vary. A dome that is too small leaves gaps from not meeting the canal wall; a dome that is too large creates gaps from crumpling or folding.

What Happens Post Fitting

Canal shapes and sizes vary therefore choosing the correct size ensures the correct function



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GN

Figure 9. Fitting outcomes when dome size is too small versus too large for the canal.

In response to market feedback on legacy dome wax issues, the AllFit dome lineup has been expanded from 10 to 19 sizing options across five dome styles: Open (5 sizes), Vented (5 sizes), Power (4 sizes), Tulip (2 sizes), and Sleeve (3 sizes). The Sleeve dome is designed for wearer comfort as an instant custom-tip style dome, optimized for M&RIE with up to +20dB maximum stable gain, and is positioned as the best choice for balancing openness and feedback margin.

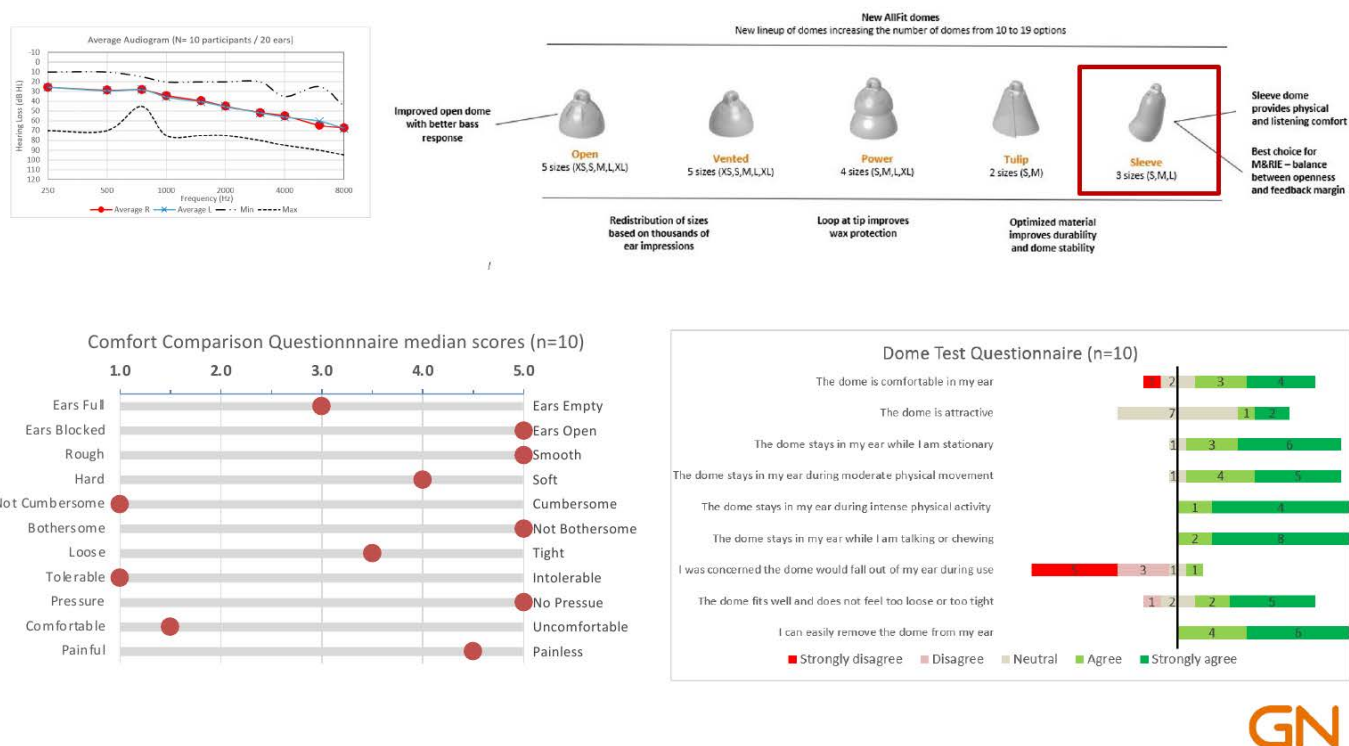


Figure 10. Audiogram, AllFit dome lineup, and comfort/fit questionnaire results.

Comfort testing (n=10) showed generally favorable ratings across comfort dimensions and dome retention, fit, and ease of removal, supporting the redesigned dome lineup's comfort and stability goals.

Conclusion

- ReSound Sensia combines AcoustIQ real-time sound sensing, narrow 4-mic beamforming, and automatic DNN denoising to reduce the manual burden on patients in complex listening environments.
- Independent and internal research supports meaningful benefits in environmental classification accuracy, feature engagement accuracy, and frontal-talker audibility compared to competitor devices.
- Correct dome selection remains an important factor in achieving both comfort and acoustic performance for patients fitted with these devices.

Interactive Worksheet	
Evidence-based Technology: The Research Behind ReSound Sensia	
Presenter: Megan Quilter, Au.D., Lead Audiologist, GN Hearing	Event ID: 42448

This worksheet accompanies the course content above. Complete each section to apply what you've learned to your own clinical practice.

Module 1: Understanding DNN-Based Processing & AcoustIQ

Key Terms — write a brief definition for each:

Term	Definition
DNN (Deep Neural Network)	Click here to enter text.
AcoustIQ	Click here to enter text.
Directionality	Click here to enter text.
SNR (Signal-to-Noise Ratio)	Click here to enter text.
Multi Bandsplit Directionality	Click here to enter text.

The three frequency-based directional strategies used in multi bandsplit directionality are:

Click here to enter text.	Click here to enter text.	Click here to enter text.
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Explain how DNN-based noise reduction differs from traditional (perceptual) noise reduction in terms of when each one activates:

Click here to enter text.

If a patient reports understanding speech well in quiet but struggling whenever multiple people are talking, then I will:

Click here to enter text.

Module 2: Clinical Evidence for Speech Understanding in Noise

Key Terms — write a brief definition for each:

Term	Definition
CCOLSA	Click here to enter text.

Term	Definition
Selective Attention	Click here to enter text.
Divided Attention	Click here to enter text.

List the two real-world study population sizes and hearing loss types described in the research:

Click here to enter text.	Click here to enter text.
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Explain how the CCOLSA test captures cognitive listening effort differently from a single-talker speech-in-noise test:

Click here to enter text.

If I want to explain to a patient why frontal-talker audibility improved significantly in the research, then I will:

Click here to enter text.

Quiz Summary

The following quiz hints appeared throughout the course content. Use this section as a quick study reference.

Q1

Quiz Hint: DNN-based noise reduction is activated automatically in very loud, complex environments, where it reads the environment in real time and focuses on the speaker in front rather than simply the loudest voice — a more adaptive approach than fixed, always-on traditional processing.

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Quiz Hint: AcoustIQ is the technology in ReSound Sensia that reads the listening environment in real time and engages the optimal combination of directionality, noise reduction, and gain settings — helping the device make the right decisions right away.

Q4

Quiz Hint: For a patient who manages well in quiet but becomes overwhelmed when several people are talking at once, the evidence supports evaluating the patient's real-world performance and experience in complex, multi-talker environments — rather than relying on audibility or pure-tone thresholds alone — to determine whether advanced DNN-based processing may offer additional clinical benefit.

Q5

Quiz Hint: The DNN in ReSound Sensia refers to Deep Neural Network processing. It is the technology the hearing aid uses to recognize and process complex sound scenes, combined with 4-mic beamforming, to help the wearer focus on the speaker in front rather than just the loudest voice.

References

- Bentler, R., Wu, Y. H., Kettel, J., & Hurtig, R. (2008). Digital noise reduction: Outcomes from laboratory and field studies. *International Journal of Audiology*, 47(8), 447–460.
- Heeren, J., Nuesse, T., Latzel, M., et al. (2022). The Concurrent OLSA Test: A method for speech recognition in multi-talker situations at fixed SNR. *Trends in Hearing*, 26. <https://doi.org/10.1177/23312165221108257>
- Jespersen, C. T., Heeren, J., & Quilter, M. (2025). *Reducing off-axis talker distraction with combined spatial and denoising processing in hearing aids* [Whitepaper]. GN Hearing.
- Quilter, M., Heeren, J., & Jespersen, C. T. (2026). *Performance of advanced noise reduction strategies in premium hearing aids in complex listening conditions* [Whitepaper]. GN Hearing.
- Yellamsetty, A., Ozmeral, E. J., Budinsky, R. A., & Eddins, D. A. (2021). A comparison of environment classification among premium hearing instruments. *Trends in Hearing*, 25. <https://doi.org/10.1177/2331216520980968>

Additional Information

Presenter Bio

Megan Quilter, Au.D., is a Lead Audiologist with GN Hearing's Global Audiology team and primarily focuses on research and hearing amplification. Her background includes clinical adult and pediatric, neuro-vestibular audiology, and equipment manufacturing. Dr. Quilter effectively communicates with a variety of levels of key opinion leaders, customers, colleagues, and patients. She currently holds a Doctorate of Audiology and resides with her family in Chicago, Illinois.

Presenter Disclosure

Financial: Megan Quilter is employed by ReSound.

Non-financial: Megan Quilter has no relevant non-financial relationships to disclose.

Additional Information (continued)

Handout Information

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- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

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