

WIDEX ALLURE™ AI RIC WITH CLARITY BOOST

## SUPERIOR SPEECH UNDERSTANDING. LESS EFFORT. A BETTER LISTENING EXPERIENCE.

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**Widex Allure AI RIC introduces on-demand AI-based denoising in its Clarity Boost program. The deep neural network in Clarity Boost was trained to preserve perceptually important signal characteristics, like sound quality and naturalness, to stay true to the Widex philosophy of natural sound, even while performing AI-based denoising. In a comparative study with 30 experienced hearing-aid users, Clarity Boost delivered significantly better speech understanding than the Universal program and two other manufacturers with AI-based denoising. It also provided a better overall listening experience supporting a strong and consistent user preference. By combining advanced AI-driven denoising with natural sound, Widex Allure AI RIC with Clarity Boost helps users hear speech more clearly and with less effort in noisy environments, while preserving the natural listening experience that defines Widex hearing aids.**

### Key findings

- Widex Allure AI RIC with Clarity Boost delivered up to 20% better speech understanding with 13% less effort than other manufacturers with AI-based denoising.
- Preference for Widex Allure AI RIC was highly consistent, with 87.5% of participants who preferred Allure AI RIC maintaining a preference for AI RIC across repeated evaluations.
- Clarity Boost led to an improved listening experience of up to 30% across two realistic sound scenes.
- 5X more users preferred Clarity Boost than the closest competing manufacturer.

### Introduction

For decades, Widex hearing aids have been developed with a commitment to natural sound. This same principle guided how denoising based on Artificial Intelligence (AI) was developed and implemented in the Clarity Boost program of Widex Allure AI RIC. Rather than focusing solely on improving speech intelligibility, the Clarity Boost program aims to improve the listening experience *as a whole* in noisy environments, supporting the user in understanding speech while preserving those cues that are important for perception (e.g., sound quality, naturalness, awareness of surroundings; Bianchi et al., 2026a). By taking a holistic approach to listening in noise, Clarity Boost stays true to the natural sound signature that defines Widex hearing aids. The study presented in this paper evaluates both aspects, namely users' performance in *understanding speech* in complex sound environments (PART I), and the users' *listening experiences*

in noisy environments (PART II). The Clarity Boost program in Widex Allure AI RIC was evaluated on both aspects relative to the Widex gold standard for natural sound (i.e., the default Universal program; Balling et al., 2025a,b,c) and to hearing aids from two other manufacturers that also promote a natural sound approach to AI-based denoising.

### **How does Clarity Boost preserve a natural listening experience?**

In recent years, deep neural networks (DNNs) have become an increasingly common component of hearing-aid signal processing, supporting applications such as sound-scene classification, user-driven personalization, beamformer steering, and denoising. Clarity Boost introduces a new way of leveraging a DNN for denoising that not only operates directly in the time domain, in line with Widex' time-domain approach, but also utilizes AI architectures that are specific

### Clinical implications

Clarity Boost improves speech understanding in a conversation while delivering a significantly better listening experience than two other manufacturers with AI-based denoising.

to audio signals (see Bianchi et al., 2026a for a deep dive on Clarity Boost). The key factor enabling Clarity Boost to stay true to the Widex philosophy of natural sound, even while performing AI-based denoising, is the way the DNN is trained.

The training of the DNN in Clarity Boost relies on a Large Audio Foundation Model (LAM), which guides the DNN toward producing a denoised audio signal that preserves important signal qualities. The LAM belongs to a new class of self-supervised Generative Audio AI (e.g., Chen et al., 2022) trained on large-scale audio data, from which it learns perceptually relevant structures in sound. These are used to guide the DNN in Clarity Boost toward an output that better aligns with human perception. This allows Clarity Boost to preserve perceptually important signal characteristics (e.g., sound quality and naturalness), effectively balancing noise attenuation with natural sound quality and awareness of surroundings.

### Improved speech intelligibility with Clarity Boost

Two previous studies have demonstrated the benefits of the Clarity Boost program for understanding speech in noise. In the first study, Slugocki et al. (2026a) showed that Clarity Boost improved word recognition by 20.5% relative to the Universal program for speech presented from the sides in challenging cafeteria noise, while also reducing perceived listening effort and increasing comfort. In a second study, Bianchi et al. (2026b) demonstrated significant speech-intelligibility benefits of Clarity Boost over Universal in highly realistic sound environments, with target speech presented from either the front or side.

In this study, we expand on the results of Slugocki et al. (2026a) and Bianchi et al. (2026b) to assess speech understanding in a conversation-like setup with two alternating talkers, comparing Widex Allure AI RIC with two other manufacturers claiming a natural sound approach to AI. The goal of this study was not only to evaluate speech-in-noise performance with Clarity Boost relative to the AI-based programs from other manufacturers but also to evaluate the overall listening experience in noisy sound environments.

### Methods

The study was conducted at Hörzentrum Oldenburg (Germany). Ethical approval was obtained (medical ethical committee 2026-136).

### Participants

Thirty participants (15 females, 15 males) with mild to moderately severe symmetrical sensorineural hearing

loss (pure tone average, PTA4 = 49.2 dB HL, standard deviation = 6.3 dB HL, range = 40.6-65.6 dB HL) were included in the study. Their mean age was 74.8 years (standard deviation = 7.9 years, range = 47-84 years). All participants were experienced bilateral hearing aid users with more than one year of experience (mean experience = 12.7 years, SD = 9.2 years, range = 1.5-46.5 years). Only two participants had own hearing aids from Widex. All participants signed an informed consent form before the start of the study.

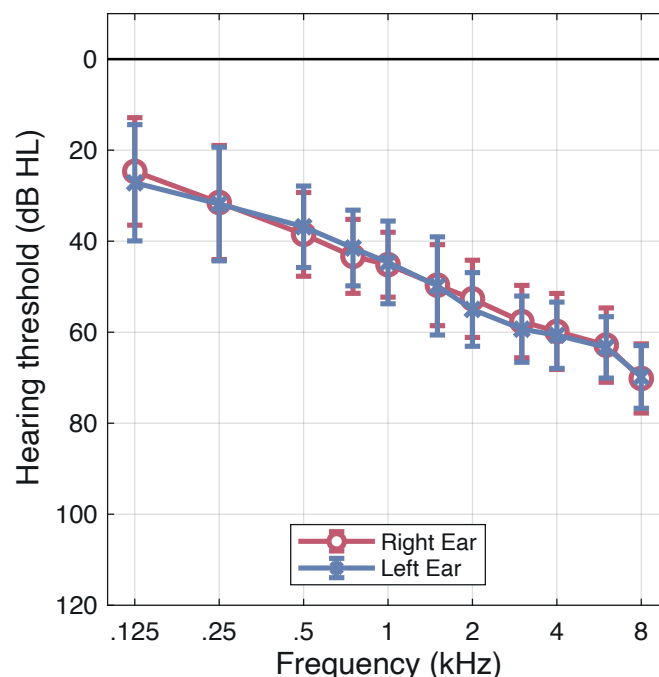


**Figure 1:** Hearing thresholds, averaged across the 30 participants (mean and standard deviations for right and left ear).

### Hearing aid fittings

Participants were fitted bilaterally with four pairs of hearing aids: two pairs of Widex Allure AI RIC and one pair from each of two comparator manufacturers offering AI-based denoising (see list in Table 1). The hearing aids were programmed for each participant's hearing loss according to the relevant proprietary fitting formula and coupled using closed power sleeves. Feedback tests were conducted for all fittings prior to testing.

Two pairs of Allure AI RIC aids were used, one configured with the default Widex Universal program and one with the new Clarity Boost program that activates a dedicated AI co-processor for denoising (Bianchi et al., 2026). The hearing aids from the other manufacturers were tested in their speech-in-noise

**Table 1:** List of the four hearing-aid conditions tested in the study. The three hearing-aid conditions highlighted in grey indicate the three programs with AI-based denoising.

| Manufacturer | Model             | ■ Fitting rationale | ► Program       | ◆ AI-based denoising |
|--------------|-------------------|---------------------|-----------------|----------------------|
| Widex        | Allure AI RIC     | Widex rationale     | Universal       | No                   |
| Widex        | Allure AI RIC     | Widex rationale     | Clarity Boost   | Yes                  |
| ReSound      | Vivia 9 microRIE  | Audiogram+          | Hear in noise   | Yes                  |
| Oticon       | Intent 1 miniRITE | VAC+                | Speech in noise | Yes                  |

programs, which includes AI-based denoising. The two hearing aids from the other manufacturers will be referred to as M-A and M-B (in no particular order) in the rest of the paper.

## Test setup and procedure

The study consisted of one visit of about 2.5 hours in duration. The study included two parts: a first part to evaluate speech understanding and a second part to evaluate the overall listening experience in two sound scenarios.

### PART I: Speech understanding

The first part of the study was designed to simulate a conversation with two alternating talkers in a realistic sound scene, using naturalistic sentences taken from the Göttinger Satztest (GÖSA test, Kollmeier & Wesselkamp, 1997). The participant was seated in a chair at the center of a horizontal loudspeaker array with 16 loudspeakers, evenly spaced every 22.5° (Figure 1). During the test, the target sentences were presented from either the front (0° azimuth) or the participant's right side (+90° azimuth). Within each 20-sentence test list, the target angles were randomized and balanced, with 10 sentences presented from the front and 10 from the right. The background scene consisted of an ambisonic recording of a busy food court (ARTE, scene 12; Weisser et al., 2019), which was ambisonically reproduced from the 16-loudspeaker array at an overall level of 70 dB SPL. The sentences were acoustically embedded in the sound scene to simulate a realistic conversation with two alternating talkers in a busy food court. The participant's task was to listen to the sentences and repeat each sentence as accurately as possible. The experimenter scored the number of words repeated correctly.

The test started with one training list presented at a fixed SNR of 1 dB, followed by one list where the speech level was adaptively varied to assess the participant's individual speech reception threshold (SRT), corresponding to 50% of words repeated correctly (referred to as SRT50). This adaptive list was performed with target speech from the front and with Allure AI RIC in the Universal program. Following the adaptive list, each participant was tested with the two alternating talkers presented at their individual SRT50 + 2 dB with each of the four hearing aid conditions (listed in Table 1), in a randomized order. After completing these four lists (Block 1), participants completed four additional lists (Block 2) with each hearing-aid condition. Hence, each hearing-aid condition was tested with two different test lists, for a total of eight test lists. The 2 dB were added to the individual SRT50 to ensure participants could perform the task

with all hearing-aid conditions. Participants were blinded to the hearing aid condition throughout the full test.

After each of the eight test lists, participants were asked to rate the effort to understand speech on a scale from 0 ("Not effortful at all") to 10 ("Very effortful"). After each block (four lists), participants were asked to rank the four hearing aids from "Most preferred" (#1) to "Least preferred" (#4).

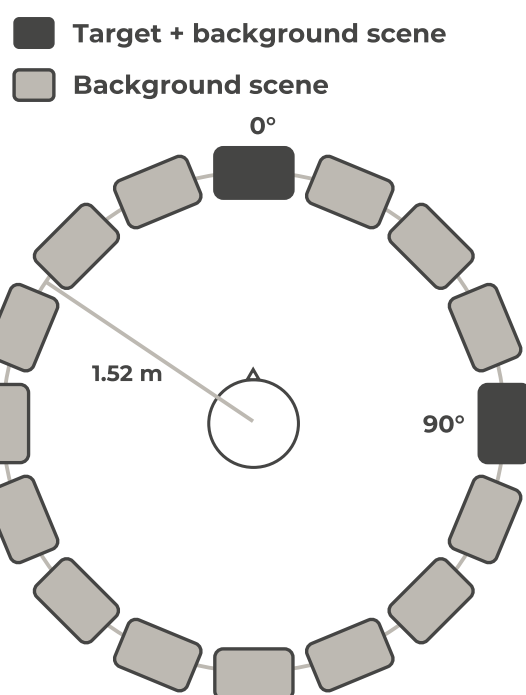


**Figure 2:** Illustration of the loudspeaker setup for the speech intelligibility test (PART I).

### PART II: Overall listening experience in noise

The second part of the study was designed to investigate the participant's overall listening experience with the four hearing-aid conditions listed in Table 1, i.e., a default hearing-aid program without AI (Allure AI RIC in the Universal program) vs. three hearing-aid programs with AI-based denoising (Allure AI RIC in the Clarity Boost program, M-A, M-B).

During the test, the participant was seated at the center of the loudspeaker array shown in Figure 2. Two sound scenes were used for this test, namely the food court scene also used in

PART I (ARTE, scene 12; Weisser et al., 2019), as well as a busy train station sound scene (ARTE, scene 11; Weisser et al., 2019). The scenes were reproduced from all 16 loudspeakers at an overall level of 70 dB SPL. GÖSA sentences were concatenated to simulate a natural speech flow and were acoustically embedded to the first sound scene. The second sound scene already contained train station announcements and people talking in the surroundings. Participants first listened to each sound scene with AI RIC Universal and then with each of the three AI-based hearing aid conditions (Allure AI RIC in the Clarity Boost program, M-A, M-B), in randomized order (counterbalanced across participants). Participants rated their listening experience on five listening dimensions (sound quality, naturalness, comfort, awareness of surroundings, overall satisfaction). Each dimension was rated on an 11-point scale, from 0 (i.e., "Very poor quality", "Very unnatural", "Very uncomfortable", "Very unaware", "Very dissatisfied") to 10 (i.e., "Very good quality", "Very natural", "Very comfortable", "Very aware", "Very satisfied").

## Final preference

At the end of the visit, participants were asked to select one of the four hearing aid conditions, based on their experience from both parts of the study ("If you were to choose one of the 4 hearing aids to use in your everyday life, which would you choose?"). Participants were also asked about the main reason for preference.

## Statistical analysis

For the speech intelligibility test (PART I), a linear mixed model with hearing aid condition, block, target angle as fixed factors, and participants as random intercepts was fit to the data. For the ratings of effort (PART I), a linear mixed model with hearing aid condition and block as fixed factors and participants as random intercepts was fit to the data. As the interaction between block and condition was not significant, the effect of hearing aid condition is reported across measurement blocks (Figures 3 and 4). For the listening experience (PART II), a linear mixed model with hearing aid condition and question (five listening dimensions) as fixed factors and participants as random intercepts was fit to the data for each sound scene. As the interaction of condition and question was not significant, the effect of hearing aid condition is reported across the five listening dimensions.

Speech intelligibility advantages are reported in percentage points (difference between two percentages). Advantages in effort ratings and listening experience ratings are reported as relative percentages to the minimum or maximum rating (difference in rating/max-min rating). All advantages are rounded to the closest integer.

## Results

### PART I: Superior speech understanding with less effort

Figure 3 shows the mean speech understanding obtained in PART I for each hearing-aid condition, averaged across participants and across the two blocks (i.e., two lists, 40 sentences per condition). Speech understanding was measured at an individual fixed SNR (mean = -3.2 dB; standard deviation = 1.7 dB), which corresponded to the individual SRT50 + 2 dB obtained with the Universal program.

Speech understanding was significantly better with Widex Allure AI RIC in the Clarity Boost program than with all other conditions tested, namely the Universal program (advantage of 6 percentage points;  $p = 0.0009$ ), and the other two manufacturers (advantage of 11 percentage points vs. M-A,  $p < 0.0001$ , and 20 percentage points vs. M-B,  $p < 0.0001$ ). Speech understanding with the Universal program was also significantly better than with the two other manufacturers (advantage of 5 percentage points vs. M-A,  $p = 0.0046$  and 14 percentage points vs. M-B,  $p < 0.0001$ ). These results indicate that the AI-based denoising in Clarity Boost resulted in the best speech-in-noise performance among the tested manufacturers during a simulated conversation with two alternating talkers in a noisy food-court environment.

In addition to providing superior speech understanding, Widex Allure AI RIC was also associated with lower perceived listening effort (Figure 4). Clarity Boost was rated as 13% less effortful than M-B ( $p = 0.0004$ ), while the Universal program was rated as 11% less effortful than M-B ( $p = 0.0043$ ). Clarity Boost did not differ significantly from the Universal program or M-A in perceived effort.

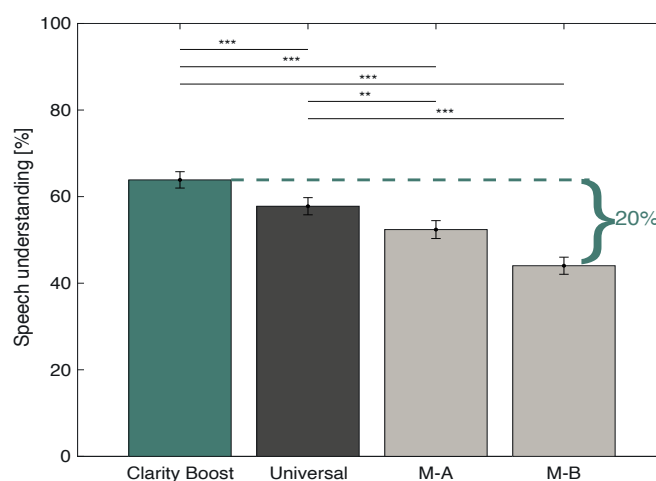


**Figure 3:** Mean speech understanding (% of correctly repeated words) for each hearing-aid condition, averaged across participants and across the two test blocks. Widex Allure AI RIC (both in the Clarity Boost and Universal program) provided significantly better speech understanding than the AI-based speech-in-noise programs from the other two manufacturers, M-A and M-B (\*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ). Error bars depict standard error of the mean.

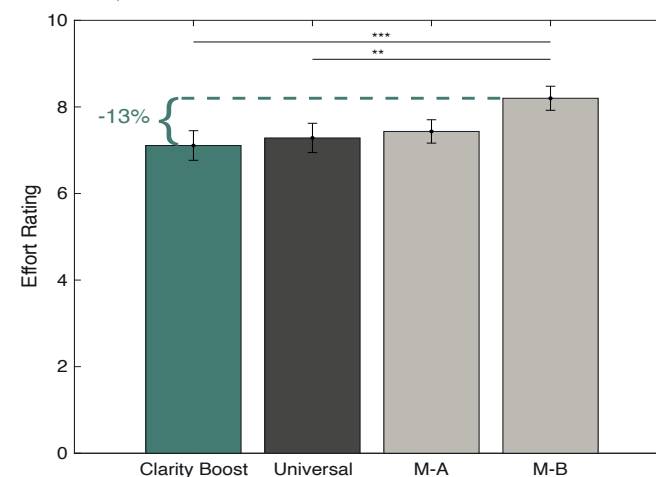


**Figure 4:** Mean effort ratings for each hearing-aid condition, averaged across participants and across the two test blocks. Widex Allure AI RIC (both in the Clarity Boost and Universal program) was rated as significantly less effortful than M-B (\*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ). Error bars depict standard error of the mean.

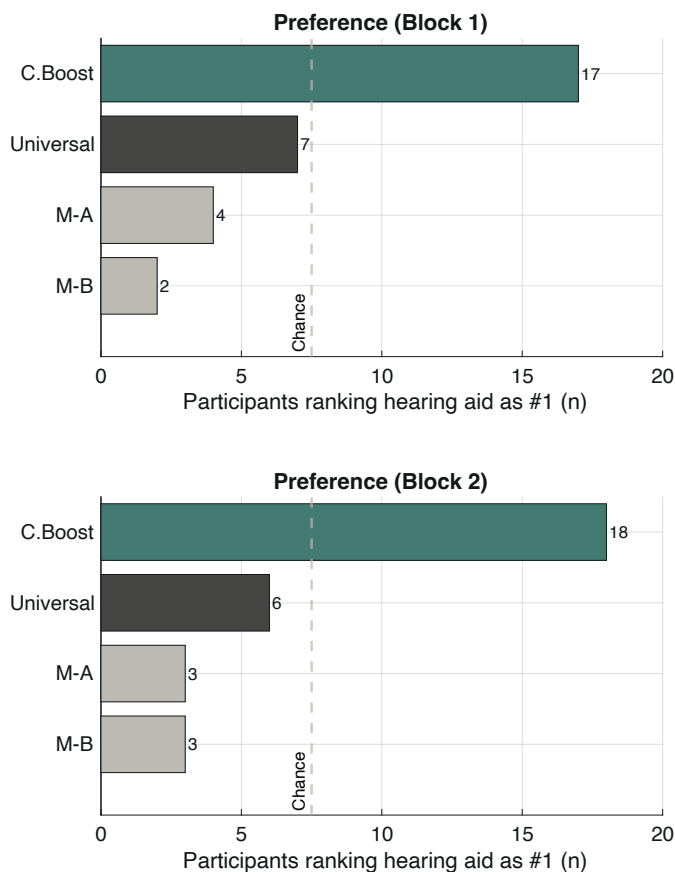


**Figure 5:** Number of participants who ranked each hearing-aid condition as most preferred after speech-understanding test block 1 (upper panel) and 2 (lower panel). Widex Allure AI RIC in the Clarity Boost program was the only condition selected significantly above chance level in both blocks.

Widex Allure AI RIC in the Clarity Boost program was also ranked as the most preferred hearing aid by 17 of 30 participants in Block 1 and by 18 of 30 participants in Block 2 (Figure 5), making it the only condition selected significantly above chance level in each block (binomial test, Block 1:  $p = 0.0002$ , Block 2:  $p = 0.00005$ ). Preference for Widex Allure AI RIC was

also highly consistent across blocks. Of the 24 participants who ranked either Clarity Boost or Universal as their most preferred condition in Block 1, 21 (87.5%) maintained a preference for a Widex Allure AI RIC condition in Block 2. Only 3 participants (12.5%) changed their preference to a different manufacturer. In contrast, among participants who initially preferred one of the other manufacturers, 50% changed their preference to Allure AI RIC in Block 2 (2 of 4 participants for M-A; 1 of 2 participants for M-B), indicating a much weaker and more inconsistent behavior across test blocks. This suggests that preference for Widex Allure AI RIC was not only statistically stronger, but also more consistent across repeated evaluations.

## PART II: Significantly better listening experience

Figure 6 shows the mean listening experience ratings obtained in PART II for each hearing-aid condition, averaged across the five listening dimensions: sound quality, naturalness, comfort, awareness of surroundings, and overall satisfaction. For the food court sound scene (left panel in Figure 6), Widex Allure AI RIC - both in the Clarity Boost and Universal programs - received significantly higher ratings than the AI-based programs from the other manufacturers ( $p < 0.0001$  for all contrasts, except for Univ. vs M-A:  $p = 0.012$ ), indicating that the improved speech-in-noise performance observed in PART I was accompanied by a better overall listening experience in realistic noisy environments. The listening experience with Clarity Boost was not rated significantly different than with the Universal program ( $p = 0.481$ ), confirming that the Widex approach to AI-based denoising preserves a natural listening experience. For the train station scene (right panel in Figure 6), Clarity Boost received significantly higher ratings than the other two manufacturers (vs. M-A:  $p = 0.0013$ ; vs. M-B:  $p < 0.0001$ ), as well as higher ratings than Universal ( $p < 0.0001$ ). The main driver of the difference between Clarity Boost and Universal in such a noisy sound environment was comfort. Universal was also rated significantly better than M-B ( $p = 0.0021$ ) and on par with M-A ( $p = 0.665$ ).

Overall, listening to two realistic noisy sound scenes with Clarity Boost led to an improved listening experience of up to 32% in Scene 1 and up to 29% in Scene 2, for an average improvement across the two scenes up to 30% (vs. M-B).

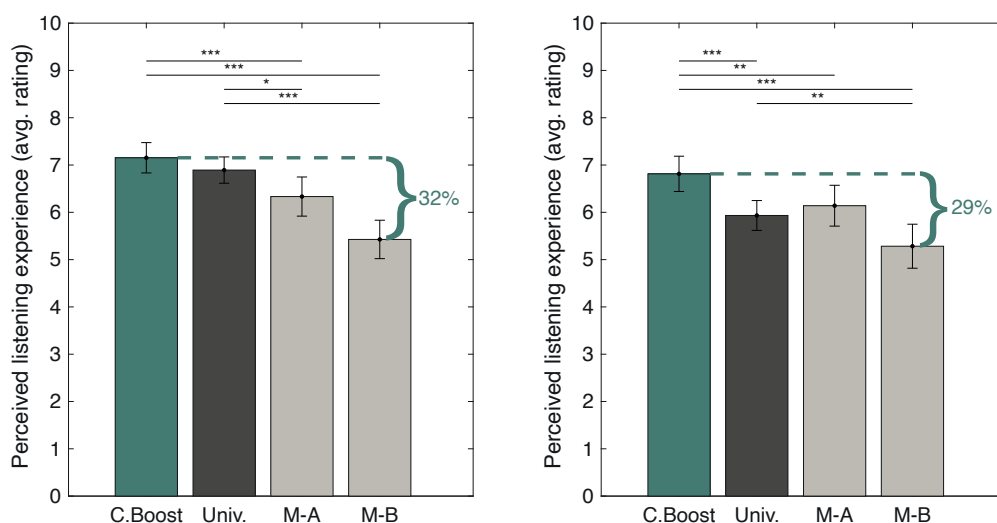


**Figure 6:** Mean listening experience ratings for each hearing-aid condition in the food court scene (left panel) and train station scene (right panel), averaged across the five listening dimensions: sound quality, naturalness, comfort, awareness of surroundings, and overall satisfaction. Widex Allure AI RIC in the Clarity Boost program provided significantly higher ratings than the AI-based programs from the other two manufacturers in both scenes (\*\* $p < 0.01$ ; \* $p < 0.05$ ). Error bars depict standard error of the mean.

## Final preference and user perception

Figure 7 shows the final hearing-aid preference collected at the end of the visit, after participants had completed both the speech-understanding test (PART I) and the listening-experience evaluation (PART II). Widex Allure AI RIC in the Clarity Boost program was selected by the largest number of participants (20 out of 30, 67%) as the hearing aid they would choose for everyday use. Clarity Boost was the only condition selected significantly above chance level (binomial test,  $p < 0.0001$ ). In particular, Clarity Boost was preferred by five times as many participants as M-A and ten times as many as M-B. These results indicate that the benefits observed for speech understanding in noise, listening effort, and overall listening experience translated into a clear final user preference.

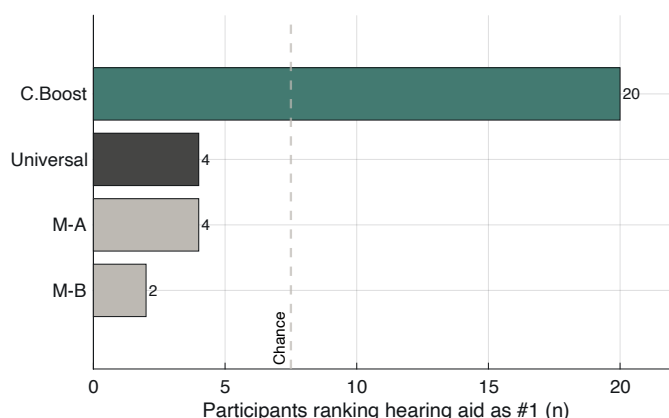


**Figure 7:** Number of participants who ranked each hearing-aid condition as most preferred at the end of the study. Widex Allure AI RIC in the Clarity Boost program was the only condition selected significantly above chance level.

Participants were also asked to describe what made them choose a specific hearing aid. Quite consistently, users reported to prefer Clarity Boost for speech clarity, better speech understanding, as well as better sound quality. Figure 8 provides examples of participants' own descriptions of why they preferred Clarity Boost at the end of the study. The quotes illustrate that preference for Clarity Boost was driven by a combination of clearer and more understandable speech, better sound quality, and a more pleasant listening experience. This highlights how participants valued not only improved performance in noise, but also the comfort and naturalness of the sound (i.e., "the entire package!").

## Discussion

The present study provides evidence that Widex Allure AI RIC with Clarity Boost delivers significant benefits across several

dimensions of listening in noise. In a conversation with two alternating talkers in a realistic background scene, Clarity Boost provided the highest speech understanding among all tested conditions, outperforming both the Universal program and the AI-based speech-in-noise programs from two other manufacturers. Widex Allure AI RIC in the Universal program also performed significantly better than both the other manufacturers, confirming the previous finding (Korhonen et al., 2026) that the Widex natural sound processing alone can outperform several premium manufacturers with DNN-based denoising. These findings therefore reinforce the idea that the presence of AI-based denoising alone does not determine benefit. Rather, the design philosophy, signal-processing implementation, and preservation of perceptually relevant sound cues appear to be critical for achieving both strong speech understanding and a positive listening experience.

The benefit of Clarity Boost over Universal for speech-in-noise performance is consistent with earlier evidence. Slugocki et al. (2026a) showed that Clarity Boost improved word recognition by 20.5% over Universal for speech presented from the sides in challenging cafeteria noise. Bianchi et al. (2026b) further demonstrated significant speech-intelligibility benefits of Clarity Boost over Universal in highly realistic sound environments, for speech presented independently from either the front or side. The present study extends these findings by demonstrating the benefit of Clarity Boost in a dynamic speech-understanding task, in which target speech alternated between talkers located in front of and to the side of the listener, thereby simulating a conversation with two people. In such a realistic and demanding listening scenario, Clarity Boost delivered the best speech-in-noise performance among all tested conditions, outperforming both the Universal program and the competing AI-based hearing-aid programs.

Importantly, the benefit of Widex Allure AI RIC was not limited to speech understanding. Participants also reported significantly lower effort while performing the speech-in-noise task with either Clarity Boost or Universal over one other manufacturer. While reported listening effort was on par between Clarity Boost and Universal in the current study (at SRT50 + 2 dB), previous findings (Slugocki et al., 2026a) showed that listeners rated Clarity Boost as less effortful and more comfortable than Universal in challenging sound environments (SRT50; speech from the sides) as well as in more realistic listening conditions (SRT90; speech presented either from the front or sides). In the current study, the test lists comprised speech presented from randomly interleaved front and side locations, and listeners compared Widex Allure AI RIC with hearing aids from two other manufacturers, which may have reduced the sensitivity



“

Speech was **clearer**, and thus easier to understand. There was less background noise which was more **pleasant**.”



“

The **entire package!**”



“

More **pleasant** sound, speech was more **understandable** and [sic] could also hear the speech in the background noise.”



“

The sound was very **pleasant**, and speech intelligibility was **better**”

**Figure 8:** User quotes from four participants that indicated to prefer Widex Allure AI RIC with Clarity Boost.

of the effort ratings to detect differences between Clarity Boost and Universal. Supporting this interpretation, a recent study using electrophysiological recordings of brain activity during a speech-in-noise task with speech alternating between two side locations demonstrated significantly lower alpha-band power with Clarity Boost than with Universal, consistent with reduced listening effort (Slugocki et al., 2026b).

The outcomes of this study also showed a better overall listening experience with Widex Allure AI RIC. This pattern aligns with previous findings that Clarity Boost can reduce perceived effort and increase comfort even when speech understanding approaches ceiling performance (Slugocki et al., 2026a), suggesting that the user value of AI-based denoising extends beyond intelligibility alone. In the present study, the listening-experience ratings across sound quality, naturalness, comfort, awareness of surroundings, and overall satisfaction further showed that Clarity Boost improved listening in realistic noisy scenes without sacrificing the qualities that are central to the Widex sound philosophy.

Finally, the preference results demonstrate that the objective and subjective benefits of Clarity Boost translated into a clear user-relevant outcome. Clarity Boost was preferred by five times as many participants as the nearest competing manufacturer. Importantly, this strong preference was observed despite only two participants being existing Widex users, indicating that the benefits of Clarity Boost were compelling even for listeners who were not previously familiar with the Widex sound. Together with participants' own descriptions of clearer speech, better sound quality, and a more pleasant listening experience, these findings suggest that Clarity Boost successfully complements the Universal program: it preserves the Widex commitment to natural sound while giving users an on-demand option for improved speech clarity and comfort in noisy sound environments.

## Clinical implications

For hearing care professionals, these findings suggest that Clarity Boost can serve as a valuable option for patients who struggle in noisy listening environments. These results indicate that improved speech clarity does not need to come at the expense of a natural and comfortable listening experience. By combining stronger speech understanding with a listening experience that remains true to the Widex sound philosophy, Clarity Boost may help clinicians address one of the most common challenges reported by hearing-aid users: understanding speech in noise while maintaining a comfortable, natural, and enjoyable listening experience.

## Conclusions

This study demonstrates that Widex Allure AI RIC with Clarity Boost improves speech understanding in realistic noisy environments while maintaining the natural listening experience that characterizes Widex hearing aids. Across objective speech-understanding measures, subjective ratings, and user preference outcomes, Clarity Boost consistently outperformed the AI-based speech-in-noise programs from the competing manufacturers. With up to 20% better speech understanding, 13% less effort, and up to 30% better listening experience, this study demonstrates the effectiveness of the Widex approach to AI-driven denoising.

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