

# Consumer Responses to the Oticon Opn™ Hearing Aid

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Earlier this year, Oticon introduced its Opn hearing aid which offers new technology designed to exceed and supplant traditional directionality and noise reduction protocols. This article looks at initial responses from consumers who are wearing Opn.

Oticon's newest addition to its product line, Opn™, has been described as representing a "paradigm shift" with regard to facilitating a better understanding of speech in noise.<sup>1</sup> The foundation of this paradigm shift lies in the OpenSound Navigator™ (OSN). OSN is a new proprietary speech enhancement algorithm which operates on the Velox™ platform. The OSN is designed to exceed and supplant traditional directionality and noise reduction protocols.<sup>1</sup>

Within OSN, three main modules work in tandem and are designed to create an extraordinary listening experience. The three main modules of the OSN include: Analyze, Balance, and Noise Removal.<sup>2</sup> The Analyze module is a multi-microphone algorithm that creates two acoustic "views," each of which is updated 100 times per second. The first view is from an omnidirectional 360° microphone, the second is from a back-facing cardioid beam (to facilitate a spatial estimate of noise). Speech sounds from the back and sides are preserved via the Voice Activity Detector, allowing multiple microphone estimates of spatial characteristics and loudness levels of noise.

The Balance module improves signal-to-noise ratios (SNRs) by mixing and balancing acoustic information from each microphone. Speech is made clearer by attenuating noise

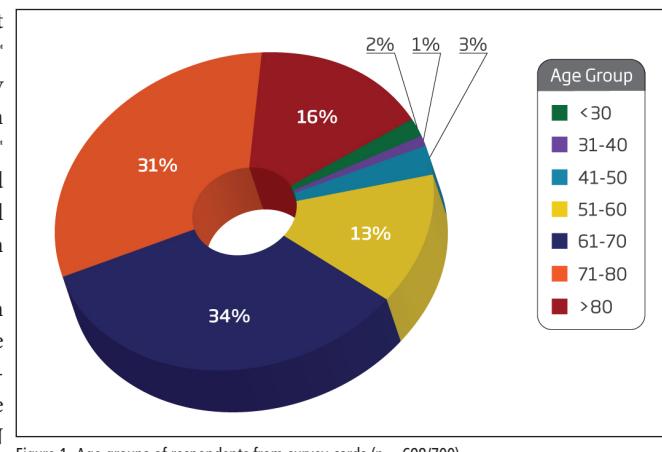


Figure 1. Age groups of respondents from survey cards (n = 698/700).

sources between speech sounds. The algorithm subtracts the noise signal 100 times per second per band, across 16 frequency bands.

The Noise Removal (NR) module operates as a very fast NR system, capable of accurately removing noise between words (up to 9 dB attenuation) without altering the fundamental properties of the speech signal.

TwinLink™ is another unique technology found in Oticon Opn. TwinLink features two communications systems in one, providing the advantages of wireless binaural processing, as well as direct (Streamer-free) connectivity with electronic devices. Near-Field Binaural Communication provides faster and better binaural processing through a 200% increase in

communication capacity (compared to Inium Sense instruments) without compromising instrument size and battery efficiency. The result is a richer and more accurate spatial sound experience, supporting the brain in sound orientation and localization. Powerful 2.4 GHz connectivity provides the second component in the TwinLink technology—giving the user the benefit of hassle-free connectivity with audio devices and rich stereo streaming.

## Verification

Multiple studies verified the efficacy of Opn. In particular, pupillometry, a measure of pupil dilation as a reaction to stress, revealed a significant 20% reduction of listening effort for subjects wearing Opn as compared to Alta2 Pro. The SWIR Test (Sentence-Final Word Identification and Recall) demonstrated a significant 20% improvement with OSN engaged, indicating the OSN algorithm frees up cognitive resources and significantly improves memory for speech heard in noise. The study on speech recognition revealed participants wearing Opn have 30% greater speech understanding in noise as compared to Alta2 Pro.

## Validation

For over 10 years, Oticon has been enclosing postage-paid consumer response cards in the product packaging of all premium hearing instrument shipments. Completion of the response card is voluntary. The end user is instructed to complete the card and mail it back after wearing their devices "a week or so." There is no involvement of the hearing care professional.

This "Tech Topic" article reports the responses of the first 700 people who mailed back their response cards. Of note, each card has 10 questions including multiple queries as to age of user, overall satisfaction, self-perceived hearing improvements, streaming ability and overall experience.



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How satisfied are you with your Opn™ devices

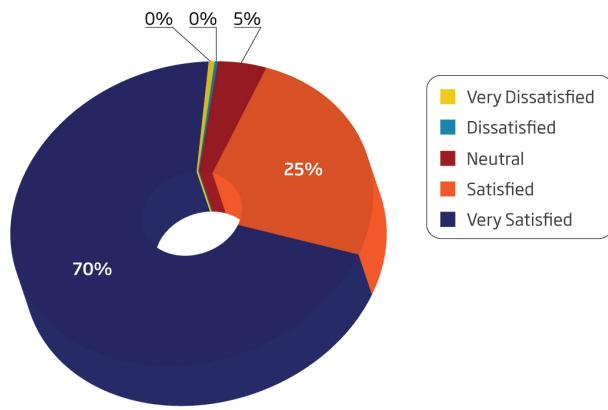


Figure 2. Survey results from the question, "How satisfied are you with your Opn devices?"

How well do you hear with your Opn™ devices compared to before you had them

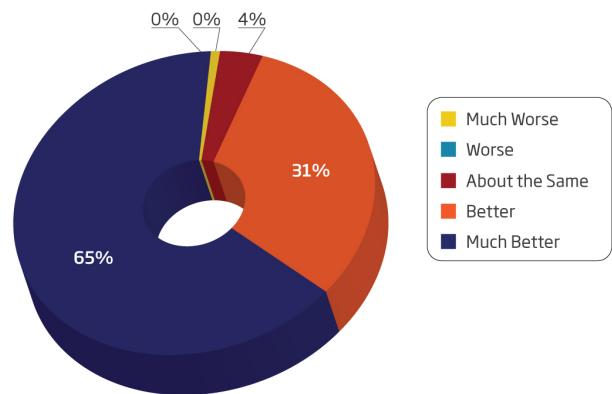


Figure 3. Survey results from the question, "How well do you hear with your Opn devices compared to before you had them?"

## Results

Figure 1 shows that, of the first 700 respondents, the reported ages ranged from “less than 30 years” (2%), to “31 to 40 years” (1%), “41-50 years”(3%), “51 to 60 years” (13%), “61 to 70 years” (34%), and “71 to 80 years” (31%). Additional age segmentation reveals people ages 71 years and older comprised 47% of all respondents, as does the age range 51 to 70 years (also 47%). The average age category is 61 to 70 years. All respondents had been wearing Opn for 12 weeks or less.

With regard to satisfaction, Sockalingam, Beilin and Beck<sup>3</sup> reported multiple and various combinations of attributes combine to provide “satisfaction.” That is, there are several factors which often impact satisfaction, yet each patient uses their own intrinsic and extrinsic measures and observations to arrive at their definition of “satisfaction.” Several studies have indicated positive correlations between sound quality and user satisfaction. Kochkin<sup>4</sup> identified three measures of sound quality which most often are related to satisfaction: clarity of sound, natural sounding, and richness or fidelity of sound.

Abrams and Kihm<sup>5</sup> reported in MarkeTrak 9 (MT9) the majority (81%) of hearing aid users are satisfied with their devices and confirmed hearing aids positively impacted relationships, work performance, general ability to communicate, overall quality of life, and the ability to participate in group activities. Age of hearing aid was a significant factor, as reported satisfaction rose to 91% for owners of hearing aids less than 1 year old.

In our sample, 655 Opn wearers responded

that they were satisfied or very satisfied (Figure 2). Of note, the higher percentage (70%) of users who reported “very satisfied” surpasses the 47% who reported “very satisfied” in the Marketrak 9 study and also surpasses the 54% who reported being “very satisfied” with Alta2.

Of 690 participants responding to the query “How do you hear with your Opn devices compared to before you had them?” another unusually positive and impressive response was recorded (Figure 3). A total of 499 respondents (65%) reported “much better” and 211 respondents (31%) reported “better.” The combined results of these two categories yields 660 respondents (96%) reporting “better and much better” hearing while wearing Opn hearing devices. Of patients reporting being satisfied or very satisfied, 97% also reported hearing “better or much better.” These reports suggest a strong link between satisfaction and better hearing, and supports the findings of the verification studies.

A new and noteworthy trend was reported regarding the use of streaming with electronic devices. Understanding and use of streaming technology tends to be low among hearing aid wearers. MT9 reported a sample of 752 hearing aid wearers where only 20% were aware of their device’s capability to stream audio

from a cell phone, TV, or computer via an additional accessory. Only 2% were aware of the ability to stream audio directly into the hearing aid.

Of our respondents, 48% (336 responses), and 43% (242 responses) of those 61 years and older reported using streamed audio information from at least one electronic device. Not surprisingly, cell phone streaming was the highest at 92% of “Direct Streamers,” followed by tablet (24% of “Direct Streamers”) and those streaming TV (22% of “Direct Streamers”). These results show a dramatic increase in users’ interest in streaming while using Oticon Opn.

In response to a query about general benefits and experience with Opn, of which the respondents could select one or more statements (Figure 5), 566 respondents (81%) reported “I understand more with less effort,” and 431 respondents (62%) noted “I can keep up with the conversation.” More than half (377 users,

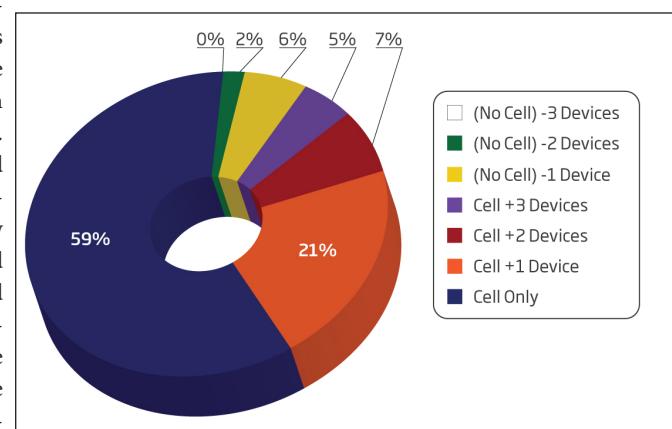


Figure 4. Number of electronic devices used in streaming to Opn, as reported by survey respondents.

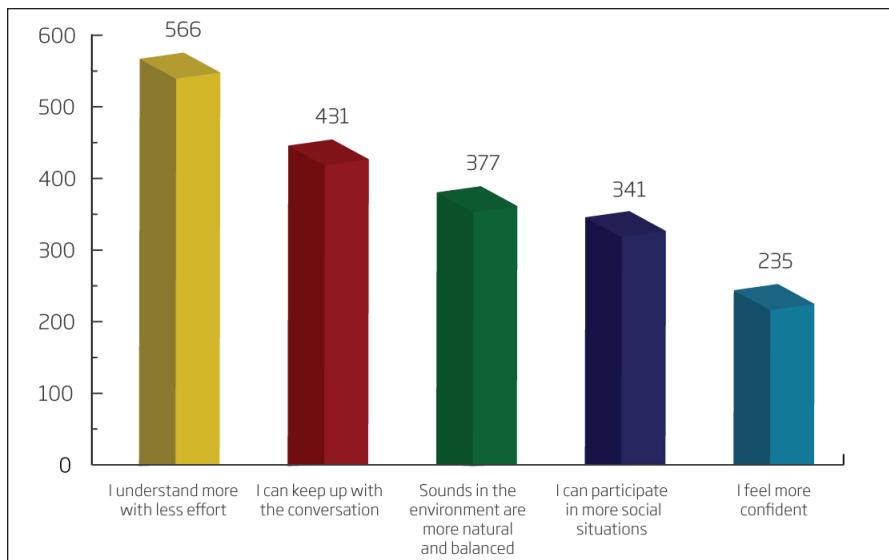


Figure 5. Respondents who chose selected statements about general benefits and experience wearing Opn.

54%) noted “sounds in the environment are more balanced and natural,” and 341 respondents (49%) selected “I can participate in more social situations.” More than one-third (235) of respondents noted they are more confident while wearing Opn. These results support the findings of the verification studies with respect to reduced listening effort, increased recall and improved speech understanding.

With regard to why 700 respondents purchased Opn, the collected response cards indicated the most significant reasons were “direct streaming” (410 users, 33%), “comfort” (329 users, 27%), “appearance” (167 users, 13%), and recommendation (151 users, 12%).

### Conclusion

The trends revealed here, based on our first

700 respondents with Oticon Opn hearing aids, indicate unusually positive and noteworthy results. Opn appears to facilitate an increased trend towards very satisfied users who readily stream cell phone and other applications. That is, the effect of less effort, better recall, and better speech understanding in noise present a real-world, pragmatic, and significant impact, resulting from the “paradigm shift” delivered in Oticon Opn.

### References

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