Field Study News

July 2016

Big Data

Insight into AutoSense OS™

Showing the benefits of contemporary hearing aid technology is becoming increasingly difficult as traditional outcome measures can produce ceiling effects. The automatic program is one example of technology that continues to be significantly improved and requires innovative approaches to measure benefit. Big Data is an innovational resource that is unique to Phonak and provides additional evidence to support traditional scientific studies. In this study, Big Data is shared for our latest generation of automatic technology, AutoSense OS, to illustrate its benefits.

Introduction

Our industry has experienced leaps in hearing aid technology over the past 20 years, and these have led to record-high client satisfaction ratings (Abrams et al., 2015). Hearing care professionals will likely recall their first open fittings when one of their seasoned hearing aid clients first experienced the joy of an open fitting. Other technological advancements, such as the automatic behavior of hearing aids, have had continued improvements over successive platforms, leading to a more uninterrupted experience while delivering comfort and improved speech understanding. Measuring the benefits of these particular advancements has been challenging, particularly in the real world.

Phonak is interested in demonstrating the benefits of new technologies to support our claims, as well as to benchmark the performance of latest inventions versus prior or competitor technologies. We have continually observed a ceiling effect when traditional measurement tools are used with the latest technological advancements, making it necessary to identify innovative approaches to assess benefit. A recent exciting perspective on evidence, unique to Phonak, is examining the changes made within Phonak Target software, across multiple participating clinics and with a vast number of clients. The amount of data available represents Big Data as there are millions of different data sets available for analyzing. By focusing on a specific area, we have been able to gain powerful insight (Biggins, 2013). In this study, we would like to share the data collected for the Phonak automatic technology, AutoSense OS, to show how this data can provide value for hearing care professionals.

Methodology

Approximately 500 participating hearing care clinics enabled a logging function in Phonak Target that allows data collection from client fittings. This data, with all personal information removed except age and gender, was transferred to a central database. Collected information contained audiogram, selected hearing aid, fitting and all fine-tuning changes across sessions, and data logging information. The following four queries were selected, and an explanation has been provided for the rationale:

Query 1: In how many fittings was frequency response adjusted at the first session?
Phonak Target software pre-calculates the gain needed to address your client`s hearing loss. This serves as the basis for the automatic program. Comparing fitting behavior across platforms can show evidence for first fitting acceptance.

Query 2: In how many fittings was a program added for premium technology at second session?
We use this query as a benchmark for our automatic program. The automatic program's capability to address every listening challenge expands with the introduction of each platform. This query allows us to benchmark automatic program performance.

Query 3: In how many fittings was a blending parameter adjusted for the Venture platform at second session?
We use this query to ensure "out of the box" default blending is appropriate. For example, this control would be adjusted for a timing-related complaint.

Query 4: How many hours did a client wear hearing aids across technology levels on the Venture platform?

In general, we have observed hearing aid usage to be on the rise with the introduction of new platforms. Although it is difficult to make conclusions on this data due to the high number of variables, hours of use do provide a performance benchmark.

Results

The first query identified 363,980 fittings, containing first session fitting data for either the Spice, Quest, or Venture platforms. This data was further subdivided based on whether the frequency response was adjusted. Results, provided in Figure 1, show a platform impact. Quest and Spice platforms were adjusted 5% to 7% more often than the Venture platform.

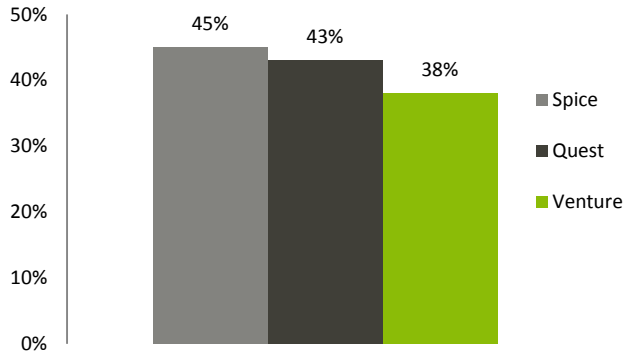

Figure 1. Percentage of fittings HCP adjusted frequency response across platforms. at first fitting (n=363,980).

For the second query, we identified 48,445 fittings containing second session data for a premium level product. Results provided in Figure 2 represent fittings where a manual program was added with the intended use of everyday listening environments.

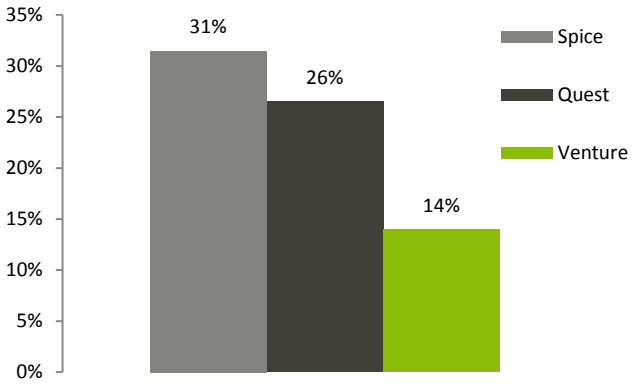

Figure 2. Percentage of fittings where an everyday listening program was added at the second fitting session for premium level technologies only (N=48,445).

Looking at Figure 2, HCPs were 12% to 17% more likely to add a manual program with previous platforms. This data suggests that AutoSense OS in Phonak Venture products better matches a client`s listening needs after real-world experience.

The third query, related to the blending parameter, included 183,331 second fitting sessions. This query showed that blending parameters were adjusted in only 1% of fittings after client's real-world experience.

The final query investigated average hours per day of wear-time across Venture platform technologies, and results are displayed in Figure 3. Looking at Figure 3, there is a clear trend for premium technology to be worn longer than lower technology levels. For example, the V90 technology level was worn, on average, 32 minutes more per day than V30.

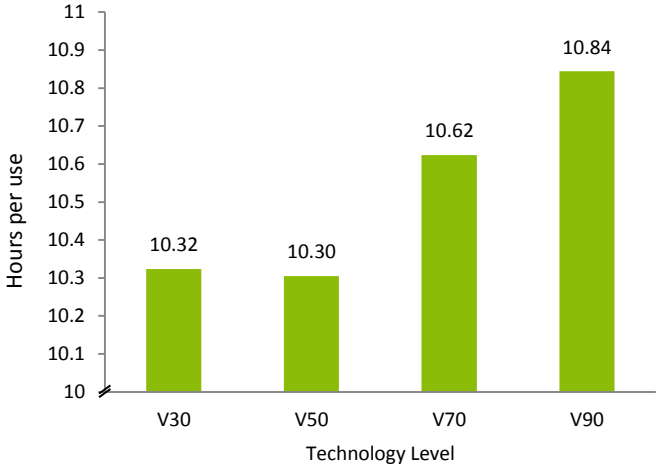

Figure 3. Average hours per use on Venture platform for V30 to V90 from 2nd to 10th session (n=80,568). Please note: Y scale is 10 hours-11 hours.

Conclusion

The availability of Big Data can provide a different perspective on evidence and this insight can instill confidence in the effectiveness of new technologies. The data presented in this study showed the Venture platform to be tuned less often, have fewer manual programs added after real-world experience and an acceptable 'out of the box' blending default. This means the pre-calculation, which serves as the basis for AutoSense OS, must have a higher acceptance rate than previous platforms, and that AutoSense OS must be outperforming in real-world listening environments. If not, we would see a similar number of manual programs and/or adjustments to its blending.

Data logging provides useful information on how clients use their hearing aids in their own environments. In this study, we shared data logging information related to hours of use and confirmed that there is an impact of technology level. Data showed that clients fitted with premium technology wear their hearing aids for longer. This finding highlights how Big Data can be a useful tool that can indicate the future direction of studies.

Measuring the benefit of ongoing technological advancements becomes increasingly more challenging with each technological advancement. This challenge means we must be innovative in showing the evidence of benefits. Big Data provides Phonak with an excellent powerful tool to support this goal.

References

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