

# Field Study News

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## Lyric™ shows significant psychosocial benefits

**This study aimed to investigate the qualitative impact of Lyric extended-wear hearing aids on patients' daily lives compared to daily-wear hearing aids. The hearing aids were evaluated using psychosocial and satisfaction measures. The results showed that Lyric provides enhanced psychosocial benefits in comparison to conventional hearing aids.**

### Introduction

Recent estimates from the World Health Organization (WHO) place the number of individuals with disabling hearing loss at over 360 million worldwide (WHO 2017). Each year, untreated hearing loss results in an annualized global cost of 750 billion international dollars (WHO 2017). Hearing aids are considered the gold-standard of care for the treatment of hearing loss, and can provide considerable benefits to the wearers across many different listening environments. In 2016, more than 3.65 million hearing aids were dispensed in the United States alone (Hearing Review 2017). Since the introduction of digital signal processing in the late 1990s, two styles comprise a significant majority of the hearing aid market: in-the-ear (ITE) and behind-the-ear (BTE; Hearing Review 2017). While each style has associated advantages and disadvantages, both styles require daily insertion and removal, battery changes several times per month, regular cleaning, and are typically not worn when showering or sleeping. The introduction of Lyric in 2007 brought a completely new and unique concept into the hearing aid market: an invisible device seated deeply in the ear canal that is worn 24 hours a day for months at a time.

Lyric is an FDA-approved hearing aid for individuals with mild to moderately-severe hearing loss. By limiting the space between Lyric and the ear drum, the wearer can take advantage of important acoustic cues provided by the outer ear. The deep fit also results in the need for less gain than a traditional hearing aid, minimizing issues related to feedback.

The purpose of this study was to determine the impact of Lyric on the self-esteem, competence, and adaptability of those people fit with the device. Anecdotal evidence collected prior to the study consistently showed that patients wearing Lyric devices felt 'normal' and wearers reported a significant 'wow' effect in response to the overall fitting and sound quality. Additional reports suggested Lyric patients typically exhibited high levels of satisfaction with their devices and reported fewer complaints than those not fit with Lyric (Sanford, Anderson, & Sanford, 2014). It was these reports that motivated an investigation of the psychosocial benefits of Lyric in contrast to those of conventional daily-wear hearing aids.

### Methodology

#### Participants

The sample comprised 10 (3 females; 7 males) older adult hearing-impaired participants (mean age = 66.1 years; SD = 6.7; MIN = 58 years; MAX = 77 years), 8 of whom were new users of hearing instruments and 2 of whom were experienced users of daily-wear hearing instruments. The results from pure-tone audiometric threshold testing at standard octave and inter-octave test frequencies are shown in Figure 1. The mean speech reception threshold (SRT) for the sample was 34 dB HL (SD = 11.2) and 36 dB HL (SD = 13.4) for the left and right ear, respectively. The mean word recognition score (WRS) for the sample was 93% (SD = 6.0) and 90% (SD = 9.3) for the left and right ear, respectively.

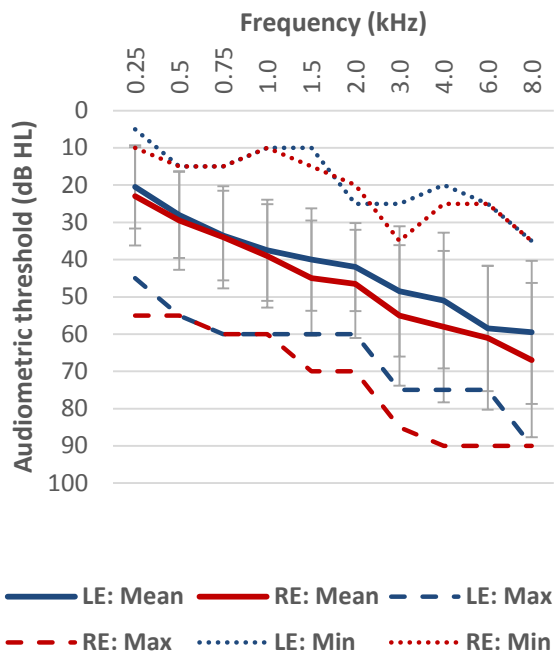


Figure 1. Mean (solid line; SD), minimum (short dash), and maximum (long dash) audiometric thresholds for the study sample for the left (blue) and right (red) ear.

### Hearing instrument fittings

All participants were fit with Lyric devices bilaterally according to the recommended best practice guidelines.

### Outcome measures

Two self-report psychosocial questionnaires comprise the primary outcome measures of the study. The Psychosocial Impact of Assistive Devices Scale (PIADS; Day & Jutai, 1996) examines the effect of assistive technologies on subjective perceptions of well-being and quality of life. Three sub-scales underlie the PIADS: (i) Adaptability (the influence of the assistive device on one's motivation to participate socially), (ii) Competence (the influence of the assistive device on one's self-perceived functional capability, independence, and performance), and (iii) Self-Esteem (the influence of the assistive device on one's self-perceived self-confidence, emotional well-being, and self-esteem). The PIADS is 26 items in length whereby participants rate items on a scale from -3 (maximum negative impact) to +3 (maximum positive impact). A score of zero (no impact) corresponds to a rating that reflects no perceived change associated with the assistive device intervention.

The second outcome measure is the Satisfaction with Amplification in Daily Life (SADL) questionnaire (Cox & Alexander, 1999) which provides a global measure of satisfaction as well as satisfaction scores across four sub-domains: (i) Positive Effect (improved psychoacoustic and

psychological functioning), (ii) Service and Cost (value for money and confidence in the hearing care professional), (iii) Negative Features (undesirable effects of hearing aids including background noise and feedback), and (iv) Personal Image (self-perceived appearance and stigma). Ratings on the SADL are made on a scale from 1 (not at all) to 7 (tremendously) with higher final scores reflecting more positive levels of satisfaction. Normative values on the SADL can be found in Table 1 (see Cox & Alexander, 1999).

### Statistical analysis

To determine if there were significant differences from a score of 0 on each sub-scale of the PIADS, one-sample *t*-tests were conducted (two-tailed,  $p < 0.05$ ). To determine if there were significant differences from normative values established by Cox and Alexander (1999) on the Global score and four sub-scales of the SADL, one-sample *t*-tests were conducted (two-tailed,  $p < 0.05$ ). All statistical analyses were conducted using IBM® SPSS® statistics software (version 24).

## Results

On the PIADS, it was observed that the group of participants reported significantly more positive scores on all three sub-scales. Specifically, participants provided a mean Adaptability rating of 1.3 ( $t[1,9] = 3.47$ ,  $p = 0.007$ ; SD = 1.2, Min = 0.2, Max = 3.0), mean Competence rating of 1.4 ( $t[1,9] = 4.02$ ,  $p = 0.003$ ; SD = 1.1, Min = 0.3, Max = 3.0), and a mean Self-Esteem rating of 1.4 ( $t[1,9] = 3.87$ ,  $p = 0.004$ ; SD = 1.1, Min = 0.1, Max = 3.0). Importantly, all participants reported positive ratings following the hearing instrument fitting.

On the SADL, significantly more satisfaction was observed with extended-wear devices compared with normative data collected with individuals wearing conventional hearing aids on both the negative features and personal image sub-scales (see Table 1). This suggests that participants fit with Lyric may be significantly more satisfied regarding undesirable side-effects associated with hearing instruments (e.g. background noise, feedback, etc) and significantly more satisfied with psychosocial self-perceptions associated with the device intervention (e.g., appearance, stigma, etc) than individuals fit with traditional hearing aids.

SADL (scale 1–7)					
	Global	Positive effect	Service & Cost	Negative features	Personal image
Mean Lyric	5.3 (0.7)	5.1 (0.9)	4.9 (1.0)	5.1 (1.2)	6.4 (0.8)
Min, Max Lyric	4.4; 6.1	3.3; 6.0	3.0; 6.0	2.5; 6.0	4.7; 7.0
Norm	4.9 (0.8)	4.9 (1.3)	4.7 (1.2)	3.6 (1.4)	5.6 (1.1)
t (dF)	1.82 (1,9)	0.55 (1,9)	0.65 (1,9)	3.87(1,9)	3.01(1,9)
p	0.10	0.59	0.53	0.01	0.01

Table 1. Mean (SD), minimum (Min), and maximum (Max) SADL global and sub-scale scores for the current study and mean (SD) SADL and global sub-scale normative (Norm) scores as reported in Cox and Alexander (1999). Differences between the current study and normative values are denoted by *p*-values. The highlighted box shows the results where there is a statistically significant difference between Lyric and normative data for daily wear.

## Discussion and conclusion

The results obtained in this study suggest that patients fit with Lyric show more positive outcomes than those who wear conventional daily-wear hearing aids on psychosocial measures assessing benefit. There are several possible reasons why more positive self-report outcomes were observed with Lyric fittings. Such effects may arise from eliminating the need for frequent intervention and maintenance of the hearing aids (insertion/removal, batteries, cleaning). Additionally, unlike conventional hearing aids, a first-time Lyric wearer does not have to adjust their habits to accommodate their hearing aids when holding the telephone, wearing a hat or glasses, or exercising. As a result, treatment with Lyric more closely resembles the experience of having normal hearing than treatment with a conventional, daily-wear hearing aid. The emotional impact of this benefit cannot be overlooked, especially for those patients who experience a significant negative emotional response to their hearing loss. While this study demonstrates positive psychosocial benefits of Lyric, further investigations are necessary to conclude advantage of Lyric fitting outcomes in comparison to conventional hearing aids. Due to the limitations of this preliminary study, SADL scores were evaluated by comparing performance against published normative values. One assumption is that the population included in this study is similar to that used to obtain SADL normative data; however, it is possible that the two populations differ in some systematic fashion that accounts for the differences observed in SADL scores. Future research

investigating Lyric outcomes should include a control group of participants of similar age and hearing losses fit with conventional daily-wear hearing aids. Such a study would provide more certainty regarding psychosocial benefits of Lyric observed in the current study.

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## Authors and investigators

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Anna is currently working as the global clinical development and training manager for the In-the-Ear team with a focus on Lyric. Anna joined Phonak headquarters in Switzerland in August 2008 and during this time has worked on many key projects representing audiology from the perspective of the hearing care professional and the end user. She has worked in the field of audiology and hearing aids for 25 years.

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Dr Gurjit Singh is also an Adjunct Professor in the Department of Psychology at Ryerson University and an Adjunct Lecturer in the Department of Speech-Language Pathology at the University of Toronto.

## Principal investigator



### **Helena Solodar AuD**

In 1983 Dr Solodar founded the Audiological Consultants of Atlanta, the first private Audiology and Speech pathology practice in Georgia which currently operates with six office locations, ten licensed audiologists, and eight audiology assistants. Dr. Solodar is licensed by the state of Georgia as an Audiologist. She has worked in the field of audiology and hearing aids for 42 years.