

Clubbers' Attitude Toward Earplugs: Better with Use

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While earplugs have been identified as an effective way for patrons of loud music venues to mitigate the risks from noise exposure, such hearing protectors are rarely worn. Time and experience may change that, though, we showed in this study.

We gave regular music patrons (clubbers) earplugs and explored their experience of wearing them. By the end of the 16-week study, most participants had developed a positive view of the hearing protectors.

The results are encouraging because they suggest that experience with earplugs can lead to sustained positive attitudes toward the devices, which has the potential to reduce the chance of future hearing loss and tinnitus in this at-risk group of music venue patrons.



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LOW RATES OF EARPLUG USE

Earplug usage rates at concerts and other music venues are reportedly between 9.5 percent and 17 percent in the United States and Australia, though these statistics come from older studies (*Int J Audiol* 2006;45[5]:273-280; *Austr N Z J Audiol* 2008;30[1]:50-58).

In recent years, our laboratory has conducted in-depth interviews with members of the earplug-wearing minority to understand why they choose to wear them despite the prevailing negative attitudes (*Health Promot J Austr* 2010; 21[3]:215-221; *J Health Psychol* 2012;17[2]:237-246).

Our studies found that many experienced earplug wearers had undergone a period of trial and error during which they sampled different types of earplugs before settling on one that suited them.

Users preferred earplugs that alleviated noise exposure symptoms like ringing in the ears while having a minimal impact on

music sound quality. For many, it was also important that earplugs were discreet in appearance and comfortable enough to allow prolonged use.

A study in the United States showed that a brief experience with musician earplugs can result in more favorable opinions of them (*Int J Audiol* 2009;48[9]:661-670).

College students were presented with two short musical exposures at 96 dB to simulate a nightclub and were surveyed before, during, and after the presentation, as well as a week later.

The students reported that the music earplugs were easy to insert, but they found communication more difficult with earplugs than without them.

Importantly, after trying them out for a week, students rated the earplugs as more comfortable than they had at first, suggesting that attitudes toward earplugs can improve with experience.

MUSIC VENUE PATRONS RECRUITED

In the current study, we recruited regular music venue patrons, provided them with music earplugs, and sent follow-up surveys four and 16 weeks later.

The aims were: a) to explore participants' experience of wearing music earplugs in a variety of music venues, and b) to examine whether experience with wearing earplugs improved participants' opinions of them in relation to three dimensions: effect of earplugs on music enjoyment, ease of communication, and comfort.

Fifty-one participants responded to advertisements on Australian music websites.



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Dr. Beach is a research psychologist at National Acoustic Laboratories. Her main research focus is leisure noise, its impact on the overall noise exposure of young adults, and targeted prevention messages. She has a particular interest in noise exposure in the music and entertainment industry.



Dr. Gilliver is a researcher at National Acoustic Laboratories. Her work includes a focus on investigating factors that affect individual decisions to protect and maintain hearing health.

EARPLUGS

Asked and Answered: Survey Questions and Response Options

Comfort		
Pre	Earplugs are comfortable to wear.	Agree (1) - Disagree (5)
Post	I found the Earpeace earplugs uncomfortable.	Agree (1) - Disagree (5)
Music Enjoyment		
Pre	Earplugs have a negative impact on music.	Agree (1) - Disagree (5)
Post	I could enjoy the music with the Earpeace earplugs in my ears.	Agree (1) - Disagree (5)
Ease of Communication		
Pre	Wearing earplugs makes it difficult to chat with friends at music venues.	Agree (1) - Disagree (5)
Post	The Earpeace earplugs made it harder to communicate with others.	Agree (1) - Disagree (5)
Usability (fit and feel)		
Post	The Earpeace earplugs did not fit my ears.	Agree (1) - Disagree (5)
Post	I found it easy to insert the Earpeace earplugs into my ears.	Agree (1) - Disagree (5)
Post	The Earpeace earplugs began to feel more comfortable after I'd worn them a few times.	Agree (1) - Disagree (5)
Post	I had to take out the Earpeace earplugs to talk to others.	Agree (1) - Disagree (5)
Discreetness		
Post	A lot of people commented on the Earpeace earplugs.	Agree (1) - Disagree (5)
Effect on Volume		
Post	I preferred the volume of the music when I was wearing the Earpeace earplugs.	Agree (1) - Disagree (5)
Recommending to Others		
Post	I would recommend the Earpeace earplugs to my friends.	Agree (1) - Disagree (5)
Post 16	I have recommended the Earpeace earplugs to some of my friends.	Agree (1) - Disagree (5)
Relative Attitude Toward Hearing Protectors as a Strategy		
Post	I would rather do something else than wear earplugs to protect my hearing at music venues.	Agree (1) - Disagree (5)
Post	Wearing the Earpeace earplugs is a useful strategy to prevent hearing loss from attending music venues.	Agree (1) - Disagree (5)
Overall Attitude		
Post	What is your overall opinion of the Earpeace earplugs?	Positive (1), Neutral (0), Negative (-1)

“Pre” refers to the pre-survey, “Post” to the post-surveys at four and 16 weeks, and “Post 16” to the post-survey at 16 weeks.

The study sample comprised regular attendees of music venues, such as nightclubs, festivals, concerts, pubs, and bars. There were 14 females and 37 males, with an average age of 27.1 years (median age, 26; age range, 20-39).

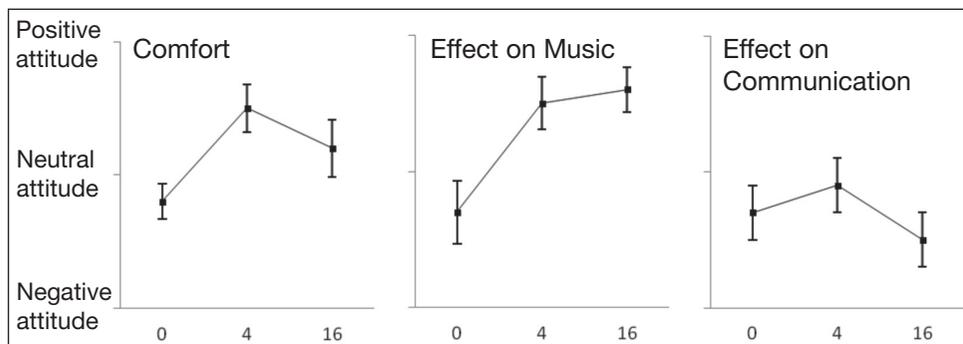
Participants received a set of filtered one-size-fits-all music earplugs. The flesh-colored earplugs are designed to be discreet and are marketed specifically for patrons of music events.

The frequency response chart provided by the earplug manufacturer shows a relatively steep increase in attenuation between 125 Hz and 2 kHz, with relatively flat attenuation in

the upper frequencies. The overall attenuation range is 11 to 17 dB.

At a typical nightclub, the average noise level is around 98 dB LAeq (*Noise Health 2010;12[48]:155-158*). According to noise exposure standards, the safe exposure time in such a venue is just 30 minutes.

However, if the earplugs were worn, the effective noise level would be lower—between 81 and 87 dB LAeq. This drop would significantly increase the safe exposure time to five hours or more.



Attitudes toward earplugs' comfort, effect on music, and effect on communication, at zero, four, and 16 weeks after the initial interview.

THREE SURVEYS

Participants had a face-to-face interview, during which they completed an online pre-survey asking about attendance at music venues, frequency of earplug use, symptoms of hearing loss, and noise and hearing damage.

They also were presented with the earplugs. The first author, an audiologist, showed participants how to insert and remove the earplugs, and she cautioned them that the earplugs should not be used in a workplace because the attenuation may be insufficient for the particular circumstances.

A follow-up online survey was e-mailed to participants four weeks after the initial interview, and a second was sent 12 weeks after that.

The follow-up surveys asked participants about their earplug use and explored their experience with them, particularly in terms of how the earplugs affected comfort, communication, and music enjoyment.

The surveys also asked about participants' attendance at music venues, perceived risk of hearing damage, and intended future use of earplugs.

Of the 51 participants, 43 (84%) completed the first follow-up survey. Two participants withdrew because of dissatisfaction with the earplugs, and the remaining six did not complete the follow-up survey for unknown reasons.

The second follow-up survey was completed by 39 participants (76%). Since two of the 39 participants had not completed the first follow-up survey, the sample size for comparisons of responses from all three surveys is 37.

Responses to 17 questions from the surveys were analyzed in relation to nine key concerns (see table). Analysis of variance (ANOVA) was performed to examine changes over time in participants' opinions of the earplugs' effects on comfort, music, and communication. For all other questions, descriptive statistics are reported.

Participants received a \$20 iTunes gift card at the completion of the study. The study was approved by the Australian Hearing Human Research Ethics Committee.

TRACKING PARTICIPANT EXPERIENCE

At the first follow-up survey, 53 percent of respondents agreed that the earplugs were "easy to insert." This percentage increased

to 68 percent in the follow-up survey, suggesting that the earplugs became easier to use with practice. A minority in each survey—12 percent and 16 percent, respectively—reported that the earplugs did not fit into one or both ears.

In both post-surveys, 19 percent of respondents reported that the earplugs were uncomfortable, and about half of respondents—49 percent and 46 percent, respectively—agreed that the

earplugs "began to feel more comfortable" after they had been worn a few times.

The earplugs appeared to be discreet. A minority in both surveys—seven percent and 11 percent, respectively—reported that they received comments about the earplugs from "a lot of people."

Communication while wearing the earplugs seemed to be problematic for many participants.

At the first follow-up survey, 44 percent agreed that the earplugs made it harder to communicate with others, and 35 percent said they needed to take the earplugs out to talk to others.

Negative views of the earplugs' effects on communication prevailed despite ongoing experience with the earplugs.

At the second follow-up survey, 43 percent found communication difficult, with 49 percent now reporting that they needed to take out the earplugs to talk.

At both surveys, 49 percent of participants agreed that they preferred the volume level when wearing the earplugs, while 19 percent and 16 percent disagreed. Similarly, about half the participants—58 percent and 49 percent, respectively—agreed that they could "enjoy the music" with the earplugs.

An analysis of comments showed that while most participants were satisfied with the earplugs, some found the sound quality unacceptable. Others with asymmetric ear canals had difficulty fitting the earplugs, a problem also noted in the U.S. study of musician earplugs (*Int J Audiol* 2009;48[9]:661-670).

Several participants commented on the convenience of the carry case. In one case, the earplug components became separated, and this was cause for concern.

CHANGING ATTITUDES

In the first follow-up survey, 58 percent of participants reported positive responses to the earplugs, 33 percent had neutral responses, and nine percent had negative responses.

EARPLUGS

In the second post-survey, the proportion with positive responses increased to 65 percent, and those with neutral ratings dropped to 24 percent. The percentage with negative responses remained steady at 11 percent.

Responses from participants with a negative opinion of the earplugs were examined to ascertain the reasons behind this perception. The main problem areas were related to communication and music enjoyment.

The vast majority of participants in both surveys—91 percent and 86 percent, respectively—agreed that wearing the earplugs was “a useful strategy to prevent hearing loss from attending music venues.”

In both follow-up surveys, most participants indicated that they would recommend the earplugs to their friends—63 percent and 59 percent, respectively—and, in the final survey, 57 percent reported that they had already done so.

Importantly, attitudes toward earplugs in general remained positive. That is, a minority of participants in each survey—19 percent and 14 percent, respectively—agreed with the statement “I would rather do something else than wear earplugs to protect my hearing.”

To evaluate how participants' attitudes toward earplugs had changed relative to their baseline attitudes, we examined responses on the pre-survey and follow-up surveys across three dimensions: comfort, effect on music, and effect on communication.

The results showed a significant improvement in comfort ($F[2, 70] = 4.9; p = .01$) and music enjoyment ($F[2, 70] = 7.4; p = .001$).

However, there was no significant change in attitudes regarding the effect of earplugs on communication ($F[2, 70] = 1.8; p = .17$; see figure).

TRIAL AND ERROR

Overall, participants gave positive responses about the earplugs, saying they would recommend them to others and that they regarded them as a useful hearing protection strategy. Most users found them comfortable, discreet, and easy to insert.

After trying out the earplugs over a period of 16 weeks, users showed sustained improvements in their opinions of earplug comfort and the effect of earplugs on music enjoyment.

A minority of participants had problems fitting the earplugs, and communication was difficult for many users. Negative views of the earplugs' effects on communication prevailed despite ongoing experience with the earplugs.

The results show that individual differences affect people's experience with earplugs. Thus, those who wish to use earplugs as a protective measure should expect to undergo a process of trial and error before finding a style that is best for them in terms of fit, communication, and music enjoyment. 