



Don't Fade Into the Background: A randomized trial exploring the effects of message framing in audiology



Ne te fonds pas dans le décor : un essai aléatoire qui explore les effets de la formulation du message en audiology

KEY WORDS
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Abstract

Importance: Eighty percent of people who might benefit from hearing aids do not use them. There are many potential reasons for this, including how we frame messages (advertisements) about hearing help and services.

Objective: To determine whether the attitudes and beliefs about seeking or recommending hearing services differs as a function of the type of message presented.

Design: We surveyed 769 adults (>18 years old) about their attitudes and beliefs around hearing loss and hearing aids. Individuals were randomly assigned to 1 of 4 messaging conditions: inclusionary, fact-based, exclusionary, and dissonant.

Results: Overall, there was a clear preference for the fact-based (average effect size = 0.52) and exclusionary messages (average effect size = 0.48) over the inclusionary message and the dissonant message. The dissonant message was considered to be neutral (subjects neither liked nor disliked it). In general, when considering hearing health, individuals would be more likely to seek or recommend services when presented with either a fact-based or exclusionary message compared to an inclusionary message.

Conclusions and Relevance: How we frame messages in audiology may have a substantial impact on the attitudes and beliefs around seeking or recommending hearing services. The results of this research help inform audiologists and other healthcare professionals about methods of framing messages regarding hearing services for those individuals who need, but have not yet sought, hearing help.

Abrégé

Importance : Quatre-vingts pour cent des individus qui pourraient bénéficier de prothèses auditives n'en utilisent pas. De nombreuses raisons peuvent expliquer cette situation, incluant la façon dont nous formulons les messages (publicités) à propos de l'aide et des services en audiologie.

Objectif : Déterminer si les attitudes et les croyances à propos de la recherche ou de la recommandation de services en audiologie diffèrent en fonction du type de message présenté.

Devis : Nous avons sondé 769 adultes (> 18 ans) à propos de leurs attitudes et de leurs croyances entourant la perte auditive et les prothèses auditives. Les individus ont été assignés de façon aléatoire à l'une des quatre conditions : message soulignant l'inclusion, message basé sur les faits, message soulignant l'exclusion et message dissonant.

Résultats : Dans l'ensemble, une préférence marquée a été notée pour le message basé sur les faits (moyenne de la taille de l'effet = 0,52) et celui soulignant l'exclusion (moyenne de la taille de l'effet = 0,48), lorsque comparés au message dissonant et celui soulignant l'inclusion. Le message dissonant était considéré neutre (les sujets y étaient indifférents). De façon générale, lorsqu'on considère la santé auditive, les individus seraient plus enclins à chercher ou à recommander des services lorsqu'on leur présente un message basé sur les faits ou un message soulignant l'exclusion, comparativement à un message soulignant l'inclusion.

Conclusion et pertinence : La façon dont nous formulons les messages en audiologie peut avoir un impact considérable sur les attitudes et les croyances entourant la recherche ou la recommandation de services en audiologie. Les résultats de cette étude contribuent à informer les audiologistes, ainsi que les autres professionnels de la santé, sur la façon de formuler les messages à propos des services en audiologie pour les individus qui ont besoin d'une aide auditive, mais qui n'ont pas encore été la chercher.

The fact that many people do not seek or adhere to one of the most common interventions in audiology (hearing aids) has been a long-term challenge for the field to understand. Twenty percent of Canadians between 19 and 79 years of age have some degree of hearing loss. As many as 70% are unaware that they even have hearing loss (Feder, Michaud, Ramage-Morin, McNamee, & Beauregard, 2015). Even if hearing loss has been identified, only one out of five people who need hearing aids actually use one (McCormack & Fortnum, 2013).

From a technology perspective, there have been consistent improvements in hearing aid features over the last 20+ years (Chisolm et al., 2007). Also, audiologists' understanding of how to prescribe, tailor, fit, and measure hearing aids continues to improve (Bagatto, Scollie, Hyde, & Seewald, 2010; Keidser, Dillon, Carter, & O'Brien, 2012; Scollie et al., 2005). However, in spite of these advances, uptake and adherence remain quite low (Kochkin, 2012). This seems almost paradoxical. If hearing aids are one of the primary treatment tools, and hearing aids have been improved, studied and shown to be capable and effective, why has the needle not moved on hearing aid uptake and adherence?

Kochkin (1989; 1998; 2005; 2012) and Hougaard and Ruf (2011) list some of the many factors that are known to influence the first time uptake of hearing aids. These include, recognizing one's own hearing decline, ear doctors, family doctors, audiologists, and family members urging people to seek services. Your family doctor is often the first person to whom someone mentions a health concern (like hearing loss). However, as would be expected, family doctors are less likely to recommend hearing aids compared to hearing care professionals, even though they are often the first point of contact (Kochkin, 2007). For example, of the approximately 2300 non-hearing aid users surveyed, 45% of them talked to their family doctor about hearing loss. Only 11% of these patients were recommended to get hearing aids and 17% were told that they did not need one. While these findings may partially explain poor market penetration, even in countries where hearing aids are made available to the public for free (e.g., National Health Service, United Kingdom; Hougaard & Ruf, 2011; Hougaard, Ruf & Egger, 2013), they still do not address the concern of why, of the 11% of patients who were recommended hearing aids, only one in five of these individuals were actually using one (McCormack & Fortnum, 2013). We believe that the type of message one receives when first considering their hearing concerns may have a significant impact on their likelihood to consider or recommend hearing services.

Message Framing

Message framing is a technique used to convey the same information to a participant using either a positive (gain-framed), negative (loss-framed), or neutral (fact-based) message. Message framing has been studied with respect to several health areas (see Gallagher & Updegraff, 2012 for a review) including vaccine misperceptions and uptake (Nyhan, Reifler, Richey, & Freed, 2014), sunscreen use (Rothman, Salovey, Antone, Keough, & Martin, 1993), and obesity (Dixon et al., 2015; see also Coulson, Ferguson, Hanshaw, & Heffernan, 2016). Common to each of these studies is the finding that the effectiveness of the message is in part due to the individual's attitudes and beliefs about the health condition of interest. For example, a fact-based message is likely to be less effective at increasing uptake for individuals who have a misconception about the topic. Nyhan et al. (2014) found that when individuals strongly agreed with the statement "vaccines cause autism", messages that were fact-based were the least effective at correcting the respondents' belief in the misinformation.

More recently, message framing has been explored in the hearing health domain. Specifically, de Bruijin, Spaans, Jansen, and van't Riet (2016) were interested in the impact message framing had on adolescent intentions to reduce headphone volume. They found that 'loss-framed' messages underscoring short-term consequences (e.g., sensitivity and pain in the ears over the next few hours and/or days) significantly changed adolescent's intentions to listen to music at a reduced volume. While this study reinforced the notion that message framing is important for modifying short-term preventive behaviours, Rothman and Salovey (1997) note that the impact of message framing is also dependent on the function of the advocated behaviour (preventive, detection, and recuperative). A related construct that may be influencing hearing service uptake is cognitive dissonance (Festinger, 1954). Cognitive dissonance refers to a state whereby individuals cannot hold two competing ideas at the same time. For example, people cannot smoke and be comfortable with the fact that there are negative health effects. Therefore, an individual either quits smoking or convinces themselves of an alternative idea that helps to resolve the dissonance, for example, that quitting smoking might lead to weight gain and subsequent heart disease. We speculate that certain individuals with hearing loss may have some dissonance if they have not sought service, and in turn, may be responsive to certain types of message framing.

In this paper, we consider message framing aimed at detection and recuperative behaviours in adults who

may or may not have hearing loss. Specifically, we are interested in the impact of message framing on willingness to seek or recommend audiological services and which message type people might prefer. We created four advertisements (messages) that vary in the presentation of information: 1) inclusionary (positive), 2) fact-based (neutral), 3) exclusionary (negative), and 4) dissonant. The following research question is of interest: Does the type of message presented to a subject have an impact on individual attitudes and willingness to seek or recommend hearing services?

Methods

Participants

A total of N = 769 adults provided complete surveys. Participants were recruited through electronic means (e.g., email, text, social media accounts, other electronic feeds, etc.). In addition, participants were recruited using existing distribution networks of large organizations such as Alberta Health Services, the Canadian Hard of Hearing Association, Covenant Health, the Hearing Loss Association of America, and the University of Alberta. Consent was inferred from the initiation and completion of

the survey and was stated up front to the participants. The demographics of respondents are reported in Table 1. The study was approved by the University of Alberta Research Ethics board.

Materials

Development of Message Framing Advertisements.

All images were created by an industrial designer with experience creating infographics. Several versions of each type of message were developed and the authors and industrial designer arrived at unanimous agreement that the four images used in this study represented the conditions of interest.

Inclusionary. The intention behind this image was to show a group of people in a meeting sharing in conversation. The message wording was intended to be positive and inclusionary: "Be a Part of the Conversation."

Fact-based. This message was an infographic intending to point out two key facts in Audiology. 1) "1 in 10 people have a hearing loss", and 2) "Only one in five people who could benefit from a hearing aid have one."

Table 1. Demographic summary for each of the four groups in the study.

Group	Inclusionary	Fact-Based	Exclusionary	Dissonant
Total N (769)	173	198	201	197
Sex (%)				
Female	73.4	72.7	71.1	69.5
Male	26.6	27.3	28.4	30.5
Age (%)				
<40	38.7	28.3	30.8	28.9
>=40	61.3	71.7	69.2	71.1
Education (%)				
Less than high school	0.0	0.5	1.5	1.0
High school	6.4	8.1	6.5	5.6

Trade/technical/vocational training	12.1	10.6	9.5	12.7
Some university/college	18.5	18.2	16.4	16.8
Bachelor's degree	30.6	27.3	25.9	28.4
Master's degree or higher	32.4	35.4	40.3	35.5
Marital Status (%)				
Single	26.0	18.7	17.4	17.8
Married	62.4	71.7	74.6	76.1
Separated	2.3	1.0	1.0	1.0
Divorced	7.5	5.6	3.5	3.6
Widowed	1.7	3.0	3.5	3.6
Professional or Employment Status (%)				
Student	4.0	5.1	4.5	5.6
Employed part-time	12.1	11.1	11.4	17.3
Employed full-time	56.6	48.0	51.7	46.2
Retired	19.1	29.8	24.4	21.3
Unemployed	2.9	1.5	3.0	2.5
Unable to work	1.2	1.5	1.0	2.0
Other	4.0	3.0	4.0	5.1
Annual Household Income (%)				
Under \$25,000	4.6	4.5	4.0	4.6
\$25,000 - \$39,999	8.1	6.6	7.0	5.6
\$40,000 - \$49,999	5.8	6.1	6.5	5.1
\$50,000 - \$74,999	23.7	19.7	15.4	18.3
\$75,000 - \$99,999	13.9	15.7	19.9	23.9
Over \$1000,00	43.9	47.5	47.3	42.6

Exclusionary. The exclusionary message was virtually the same as the inclusionary with three small changes to the image: the person at the end of the table was greyed out, his body posture changed, and there was a question mark placed above his head indicating that he was missing what was being said. The words also changed to “Don’t fade into the background.”

Dissonant. Cognitive dissonance (Festinger, 1954) is a cognitive state whereby individuals cannot hold two competing ideas at the same time. We speculated that

certain individuals with hearing loss (assuming they are aware of their hearing loss) may have some dissonance if they have not sought service to get help. This message was an attempt to display the struggle that people may have with holding two competing ideas that need to be resolved (e.g. “I have hearing loss” and “I don’t need help”). We attempted to invoke dissonance by the statement “Either you seek help or deny the hearing loss”.

All four messages contained the information “Book an appointment with an Audiologist.” (See Figure 1a-d)

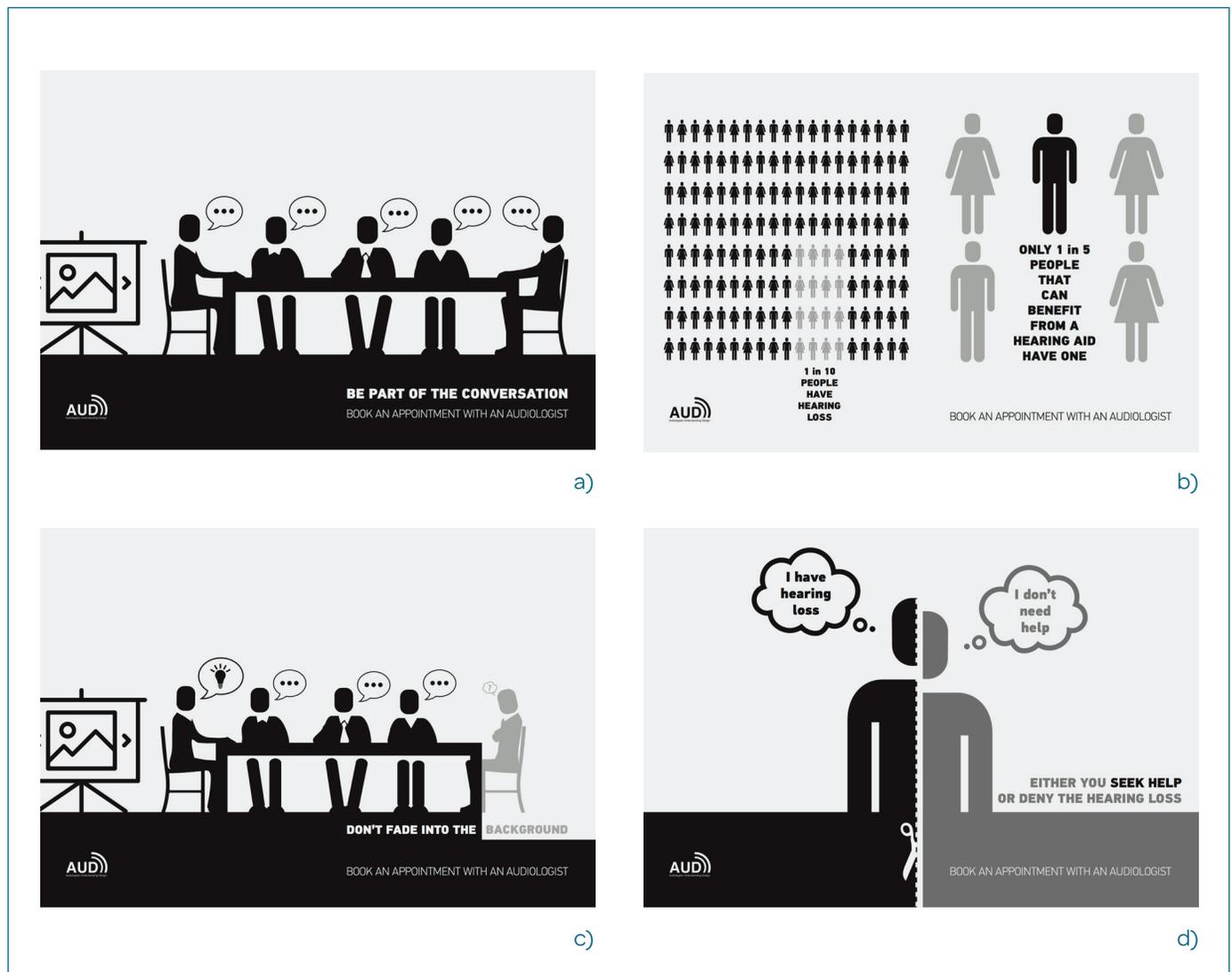


Figure 1a-d. The four advertisements/messages used in the investigation. a) inclusionary, b) fact-based, c) exclusionary, and d) dissonant. Each Survey respondent viewed only one of these four messages at random.

Survey. An online survey of 26 questions was created by the authors using the web application, Research Electronic Data Capture (REDCap™) (See Appendix A for the complete survey; see Appendix B for the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach, 2004)). The pre-exposure section was completed by respondents before the message was presented and included questions on demographics (i.e., year of birth, gender, and marital status), hearing abilities in different environments (using a visual analog scale (VAS) from bad to excellent where individuals provided their responses on a scale that ranged from 0 - 100), and current and/or past experience with wearing hearing aid(s). Finally, respondents answered several “disagree - neutral - agree” statements (again on a VAS of 0-100) about attitudes toward hearing and hearing aids. The five post-exposure questions asked participants about their intentions to behave and general liking of the message presented in the advertisement they viewed (see below).

Procedures

An online link to access the survey was generated by REDCap May 10, 2016. Participants received the link through one of the mechanisms mentioned above. The initiation and completion of the survey was taken as consent. Upon completion of the demographic questions, each respondent was then randomized (via a computerized algorithm in REDCap) into one of four groups (inclusionary, exclusionary, fact-based, and dissonance) and shown the corresponding advertisement message. Following this exposure, participants were asked to answer five additional questions measuring attitudes about the print material and willingness to seek intervention.

1. If you had hearing loss, would seeing this advertisement encourage you to seek services?
2. If you believed you needed a hearing aid, would seeing this advertisement influence you?
3. If a friend or loved one had hearing loss, would seeing this advertisement encourage you to recommend they seek services?
4. How does this advertisement make you feel toward hearing aids?
5. How much did you like the message in the advertisement?

Analysis

Our main independent variable was type of message, which had four levels (inclusionary, fact-based, exclusionary, and dissonant). There were five questions of interest. Therefore, we ran five one-way ANOVAs to determine if there were differences between the messages in general. In order to minimize the risk of making a type-1 error we adjusted our alpha level for ANOVA significance to $p < .01$. Within each significant ANOVA we ran a Tukey’s post hoc analysis to determine where any potential significant differences were revealed. Because the Tukey’s test already controls for type-1 error for multiple comparisons within each ANOVA, the alpha level of comparison for these pairs was $p < .05$.

Results

The respondents in the current study were primarily female, over the age of 40, had some post-secondary education, and were employed full time (see Table 1). Given the randomization, the demographics of the sample were similar across all messaging conditions. Using a series of independent samples t-tests, we tested for differences on self-reported hearing status and attitudes and beliefs among the four groups. The groups did not differ significantly on any of these questions ($p > .05$ corrected for multiple comparisons). As such, Figure 2 shows the self reported hearing status of the participants in this study, collapsed across groups. Figure 3 shows the attitudes and beliefs of the respondents regarding hearing and hearing aids, collapsed across groups. The rating for each question was entered as the dependent variable and the message framing (with four levels) was the independent variable. The means (and standard deviations, SD) for rated likeliness to encourage, influence, and recommend hearing services, in addition to attitudes and preferences as a function of message framing are presented in Table 2. The main results are presented in Figure 4.

Question 1: If you had hearing loss, would seeing this advertisement encourage you to seek services?

There was a significant main effect of message framing ($F(3,795) = 15.99, p < .001$). We found that the inclusionary message was rated lower (less likely to seek services) than the fact-based message ($p < .001$, Cohen’s $d = 0.57$) and the exclusionary message ($p < .001$, Cohen’s $d = 0.54$), and that the dissonant message was rated lower than the fact-based message ($p < .001$, Cohen’s $d = 0.41$) and the exclusionary message ($p = .001$, Cohen’s $d = 0.38$).

Table 2. Means (Standard Deviations, SD) for rated likeliness to encourage, influence, and recommend hearing services, in addition to attitudes and preferences as a function of message framing.

		Questions				
Message Framing		Encourage	Influence	Seek	Attitude	Preference
	Inclusionary	41.94* (30.84)	43.52 (30.21)	43.89 (30.21)	54.95* (19.30)	53.53 (28.14)
	Fact-Based	58.66* (27.40)	59.56* (25.43)	63.64* (24.98)	59.87* (19.88)	60.44* (24.79)
	Exclusionary	57.66* (27.60)	57.62* (28.13)	59.03* (27.84)	62.91* (20.55)	65.76* (24.37)
	Dissonant	47.27 (28.03)	50.37 (27.09)	52.42 (27.70)	54.83* (17.51)	48.83 (25.43)

*Rating was significantly different from 50 (neutral point on the rating scale) using a bonferroni corrected *p*-value of 0.002.

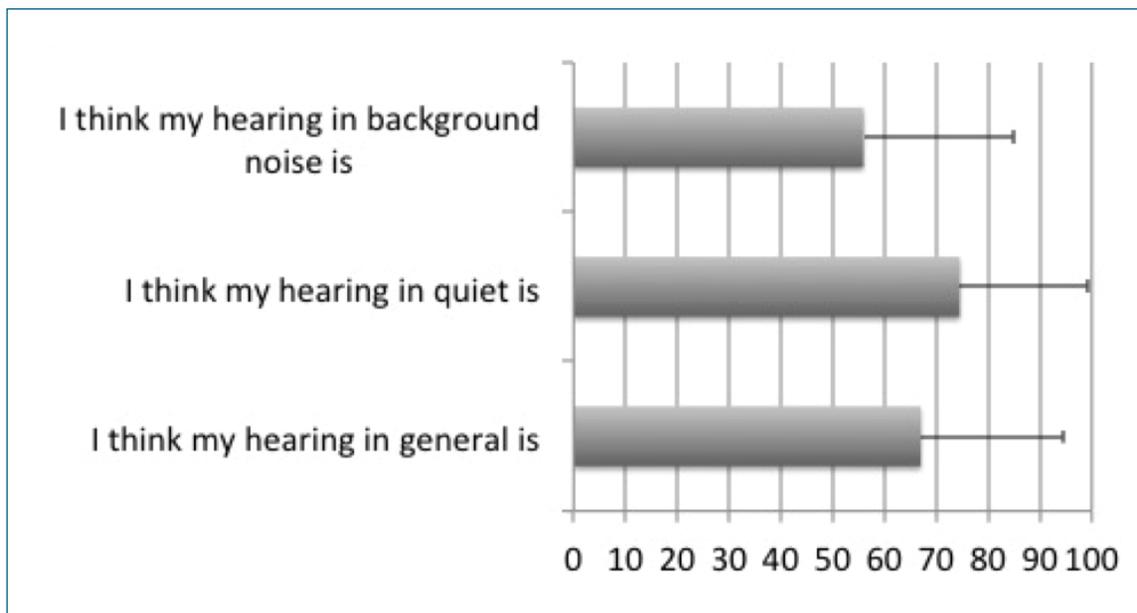


Figure 2. Self-reported hearing status for all 769 subjects. Higher scores indicate better hearing.

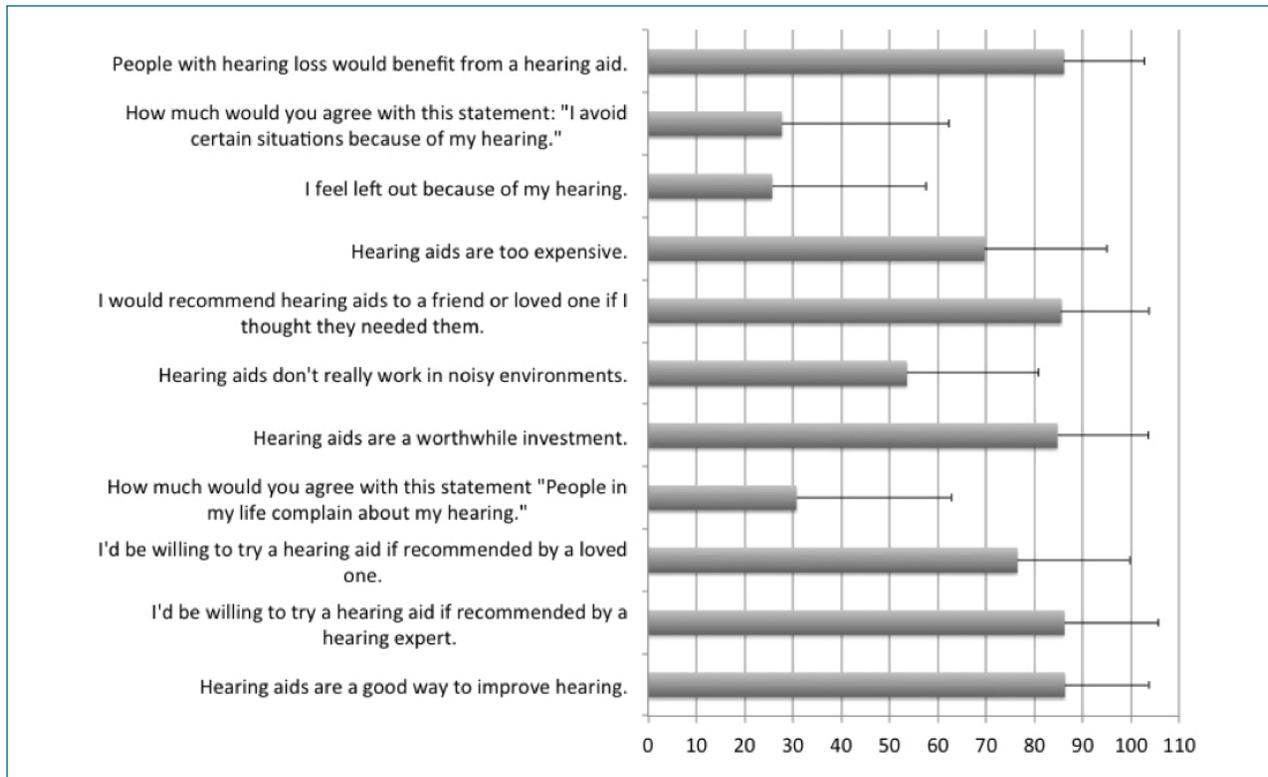


Figure 3. General attitudes toward hearing loss, hearing services, and hearing aids for all 769 subjects. Higher scores indicate more positive attitudes for each question.

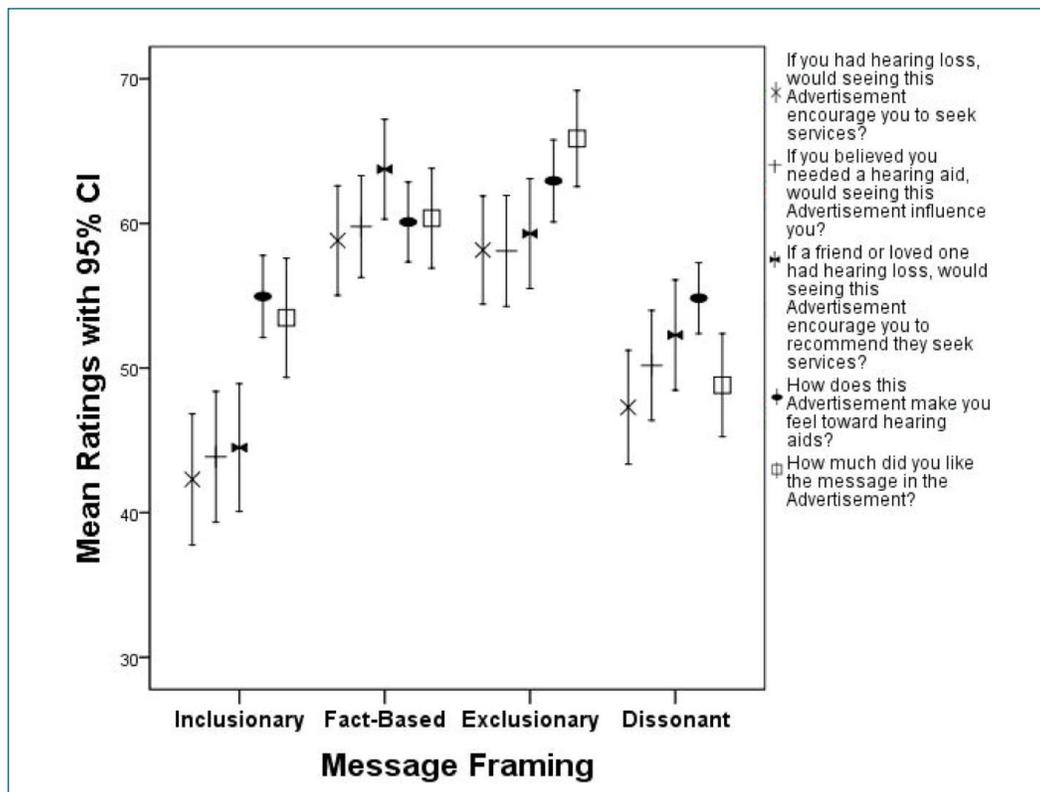


Figure 4. Means and 95% confidence intervals for the main results from the study across the four message types and five questions of interest.

Question 2: If you believed you needed a hearing aid, would seeing this advertisement influence you?

There was a significant main effect of message framing ($F(3,797) = 13.46, p < .001$). We found that the inclusionary message was rated lower (less likely to be influenced) than the fact-based ($p < .001$, Cohen's $d = 0.57$) and the exclusionary message ($p < .001$, Cohen's $d = 0.48$), and that the dissonant message was rated lower than the fact-based message ($p = .005$, Cohen's $d = 0.35$) and the exclusionary message ($p = .040$, Cohen's $d = 0.26$).

Question 3: If a friend or loved one had hearing loss, would seeing this advertisement encourage you to recommend they seek services?

There was a significant main effect of message framing ($F(3,791) = 18.54, p < .001$). We found that the inclusionary message was rated lower (less likely to recommend) than the fact-based message ($p < .001$, Cohen's $d = 0.71$), the exclusionary message ($p < .001$, Cohen's $d = 0.52$), and the dissonant message ($p = .014$, Cohen's $d = 0.29$). In addition the dissonant message was rated lower than the fact-based message ($p < .001$, Cohen's $d = 0.43$).

Question 4: How does this advertisement make you feel toward hearing aids?

There was a significant main effect of message framing ($F(3,783) = 8.30, p < .001$). We found that the inclusionary message was rated lower (more negative) than the exclusionary message ($p < .001$, Cohen's $d = 0.40$). Further, the dissonant message was rated lower than the fact-based message ($p = .047$, Cohen's $d = 0.27$) and the exclusionary message ($p < .001$, Cohen's $d = 0.42$).

Question 5: How much did you like the message in the advertisement?

There was a significant main effect of message framing ($F(3,789) = 17.21, p < .001$). We found that the inclusionary message was rated lower (less likeable) than the fact-based message ($p = .043$, Cohen's $d = 0.26$) and the exclusionary message ($p < .001$, Cohen's $d = 0.46$). The dissonant message was rated lower than the fact-based message ($p < .001$, Cohen's $d = 0.48$) and the exclusionary message ($p < .001$, Cohen's $d = 0.70$).

Discussion

We demonstrate here that message framing has a potential impact on willingness to seek or recommend audiological services. The largest discrepancy in ratings occurred between the inclusionary and exclusionary (and

fact-based) messages, with the exclusionary message being more effective than the inclusionary message. The only difference between these two messages was the individual being "greyed out" with a question mark above his head and the message changing from a positive: "Be a Part of the Conversation" to a negative: "Don't Fade into the Background." This seemingly small difference in message framing was associated with nearly a 20% difference in respondent's reported willingness to seek or recommend hearing services. In the sections that follow, we provide several possible reasons for these findings and discuss how message framing may impact uptake and adherence to audiological services with a view towards encouraging further research in the area.

Inclusionary vs. Fact-based Messaging

While much work has explored the impact of message framing on attitudes around health conditions (see Gallagher & Updegraff, 2012 for a review), uncertainty remains with respect to which framing perspective (e.g., positive vs. negative) should be taken to target the health condition of interest. In the current study, the largest differences (and effect sizes) in attitudes amongst messages occurred between the inclusionary and the fact-based messages, which, as noted above, was comparable to the exclusionary message. Interestingly, the "positive" message that was designed to be inclusionary was rated the lowest with respect to 'liking' in the study, whereas, the fact-based message was rated the highest (along with the exclusionary). This finding runs counter to those of Nyhan et al., (2014) who found that providing a fact-based message was the least effective way to approach a group, particularly a group of individuals who possess an opinion about a healthcare issue that is not based on scientific evidence.

We have several possible explanations for why the fact-based message was rated higher (with respect to liking) over the inclusionary message. First, our sample was skewed toward individuals with higher education, who work full time and whose household income exceeded \$100,000/year. Although our sample demographics are consistent with previous work (Balls-Berry et al., 2016), many organizations that we targeted to help promote the survey may have had some ties to hearing loss. However, only 142 subjects (18.5%) actually had hearing aids so we suspect that this is a fairly representative sample in that regard. We have no way of knowing what percentage of respondents may have had knowledge of hearing loss, however, even if they did have knowledge of hearing loss, it is unclear how such information might influence

their reported intentions to seek/recommend services and general liking of the message they viewed. Given the combination of education and employment, it is possible that our sample may be reflective of one that simply preferred to “know the facts”.

Further, we must consider the nature of the inclusionary message and the potential interpretations of this advertisement. While the message was designed and intended to represent a group of individuals around a table sharing in a discussion, it is conceivable that some respondents perceived the image to be several people talking simultaneously. Even for those who do not have hearing loss, it is not difficult to imagine that several people talking at once might be disruptive instead of inclusionary. However, while individuals indicated that seeing the inclusionary message would not make them inclined to seek or recommend hearing services, they did indicate that they ‘liked’ the message (question 5). An alternative explanation for the discrepancy between seeking/recommending services and liking the message might be a reflection of a linguistic bias to prefer positive/happy language even if they may not be considering the words to be influential. Dodds et al., (2015) recently analyzed the frequency and preference for 100,000 words on a scale from negative to positive from 24 different languages. They concluded that “the words of natural human language possess a universal positivity bias”. On a societal level, we may also be measuring a self-serving universal bias in attributions. Positive messages tend to be easier to internalize than negative ones and this effect is applicable across age, health condition, mental condition, and culture (Mezulis, Abramson, Hyde, & Hankin, 2004). While these two points might help partially explain why, within the inclusionary message, there was a difference between the apparent liking of a message and its influence, the fact remains that other messages (fact-based and exclusionary) were “liked” (question 5) considerably more.

Fact-based vs. Exclusionary

We did not find any differences between the fact-based and exclusionary messages: both were rated high with respect to recommending and seeking hearing services and with respect to general ‘liking’ of the message. The similar ratings for these two messages might be related to commonalities in their images, which were potentially more salient than the information/message that was provided. More specifically, in both the fact-based and the exclusionary advertisements, an individual was greyed out/isolated from a surrounding group of individuals. It is possible that while viewing these images,

respondents took the perspective of being ‘left out’. Such a perspective is relatively easy to imagine, while the counter inclusionary message requires individuals to take the perspective of having hearing loss or needing to seek hearing services. This potential difference in perspective taking may be one reason the fact-based and exclusionary messages were rated higher with respect to encouraging to seek or recommend hearing services. Further, while our study is a first step in understanding how individuals perceive messages related to hearing loss, additional work needs to determine the impact of message framing on actual behaviour towards seeking and recommending hearing services.

Dissonant Message Framing

Across all analyses, the dissonant message framing condition did not appear to impact individuals’ intentions to seek/recommend hearing services, nor did they ‘like’ or ‘dislike’ the message. This seemingly ambivalent response to the dissonant message might be a result of several factors, including but not limited to, a neutral perspective taking, a lack of understanding the message, and/or ambiguity in the information. Unfortunately, the current study does not allow us to disentangle these possibilities, and thus, further work is needed to determine how a dissonant message-framing potentially influences behaviours aimed at prevention, detection, and recuperation of a health-related condition.

Further Considerations

We believe that message preference may also vary with demographic factors (e.g., income, age), and personal experience (e.g., perceived hearing ability, previous/current hearing aid use). In a review by Rothman and Salovey (1997), several processes were argued to contribute to how receptive an individual was to a particular message, one of them being the individual’s past experience and current situation. In addition, although little research has reported an impact of age on message framing (Gallagher & Updegraff, 2012), hearing loss uptake and adherence is a unique health condition, whereby individuals may be exposed to the belief that degrading hearing ability may be acceptable as an inherent and unavoidable part of aging without the need for intervention. While the current study was not specifically designed to address this notion, an exploration of our data showed that our results were in line with these claims. For example, individuals who were less than 40 years of age rated their liking of the inclusionary message higher than individuals who were greater than 40 years of age ($p = .022$). Similarly, individuals

who had less perceived trouble hearing in background noise, rated their liking of the inclusionary message higher than individuals who indicated they had trouble hearing in background noise ($p = .020$). Finally, individuals who did not own hearing aids rated their liking of the inclusionary message higher than individuals who owned hearing aids ($p = .019$). These relationships are not simply a result of the number of people that fell into a "lumped" category: 40+, trouble hearing in background noise, and hearing aid user (or owner) as the proportion of individuals who met these criteria was quite small (e.g., 12.8%). These factors undoubtedly differentiate between individuals' experiences and subsequent perspectives with respect to hearing loss, and are potentially impacting individuals' receptivity to message-framing (Rothman & Salovey, 1997).

The application of prospect theory (Kahneman & Tversky, 1979) to a population with hearing loss has been discussed in the literature with respect to prevention in adolescents (de Bruijn et al., 2016). Prospect theory is well-known descriptive framework that is useful for describing how individuals make decisions around probabilistic scenarios that weigh potential losses and gains with respect to some reference point (Kahneman & Tversky, 1979). In the first three questions of this study, the participants retrospectively assessed their action as a response to a hearing problem. The corresponding real decisions may be described through prospect theory and the decision process would be influenced by multiple factors including estimated social and financial cost of hearing aids (losses) and the gains in using hearing aids. When comparing the responses to different messaging frames, although "not being included" and "being excluded" are logically equivalent, the probability of "being excluded" may be perceived higher than "not being included". Further, the losses may be estimated to be worth more in the exclusionary situation than the potential gains in the non-inclusionary situation. This 'weighing' of potential losses and gains with respect to exclusion/inclusion may contribute to the observed response pattern. Similar to framing, the estimated probabilities and values associated with exclusion/inclusion may be influenced by age, presence of hearing problems, and hearing aid ownership. Indeed, these factors influenced the responses in question five of this study (i.e., how much did you like the message?). Unfortunately, this question is not well suited to a straightforward prospect theory analysis since no clear gains or losses can be associated with aesthetic preferences for the message. Ultimately, further work is needed to determine the impact that demographic variables and personal experiences may have on message framing preference as such

findings could potentially shape how we further educate individuals and clinicians with respect to adherence and uptake of hearing services.

Another consideration for future research is the interaction between message-framing and self-efficacy. Recent work has reported that individuals with high self-efficacy are more likely to report changes in intended behaviour (i.e., intentions to participate in health-related research), whereas individuals with low-self efficacy are not (Balls-Berry et al., 2016). However, the advantage associated with high self-efficacy is not as strong in gain-framed messages as it is in loss-framed messages. To further complicate matters, Balls-Berry et al., (2016) reported no impact of message framing on actual behaviour (i.e., completed registration in a health-related research registry), but a large impact of self-efficacy on actual behaviour, whereby individuals with high self-efficacy were two times more likely to complete registration than individuals with low self-efficacy. While the results of the current study cannot demonstrate changes in actual behaviour (i.e., uptake of hearing services), we provide preliminary evidence for differences in intention to behave. Further research is needed to determine if these stated intentions lead to actual behaviours. Moreover, although we found measurable differences between the messages, the extent to which the intended message-framing goal (i.e., an inclusionary-framed message) was the sole source of these reported intentions needs further investigation as the messages were not tested for intended meaning beyond our own intuitions as researchers and clinicians. Additionally, with respect to hearing loss, more work is needed to understand the role that self-efficacy plays in seeking, recommending, and/or adhering to hearing services at each stage of behaviour including prevention, intention, detection, and actual seeking of services (Ferguson, Woolley, & Munro, 2016; Saunders, Frederick, Silverman, Nielsen, & Laplante-Lévesque, 2016; Smith & West, 2006).

Conclusion

The fact remains that only one out of five people who need hearing aids actually use them (McCormack & Fortnum, 2013). Here, we discuss how framing the message around hearing loss can have a marked impact on an individual's intention to seek and/or recommend hearing services. Specifically, we found that the exclusionary message (and fact-based message) was associated with nearly a 20% difference in respondent's reported willingness to seek or recommend hearing services as compared to the inclusionary message. Such

findings are a step towards understanding the importance of the initial conversations around potential hearing care concerns. It is sometimes not just *what* you say, but *how* you frame it that really matters.

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Appendix A:

Confidential

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Audiology Messaging Survey

We know surveys can be a pain. But they can be extremely helpful. There are many attitudes and opinions about hearing loss and hearing aids. We have created a brief survey to help us explore some of these attitudes and opinions. The survey will take approximately ten minutes to complete.

We are interested in anyone 18 and older for this survey. All information that we gather will remain confidential and is completely anonymous - it cannot be linked to you in any way. If you do participate, you will be given 1 of 4 images with a message on it. After you complete the background questions, we want you to review the image with the message and then answer 5 brief questions about the image.

You will not personally benefit from participating in this study. Participation in this study is voluntary. You may choose not to participate in this study. You can withdraw at anytime up to the point you click the "Submit Survey" button at the end of the survey. You will not be required to explain your decision to withdraw. This study does not present any risk or inconvenience associated with participating in it, other than the time spent to complete the survey.

You understand that by completing and submitting this electronic survey you are giving your consent to participate in this study.

If you have any questions or concerns about any aspect of this study or your rights as a research subject, you may contact either investigator at the contact information provided below or the University of Alberta Research Ethics Office at 780.492.2615.

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Thank you!

11-08-2016 07:50

www.projectredcap.org



Please complete the survey below.

Date Completed _____

Are you over 18 years of age?

- Yes
- No

Year of Birth
(may need to tap twice on mobile devices)

- 1998
- 1997
- 1996
- 1995
- 1994
- 1993
- 1992
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- 1929

11-08-2016 07:50

www.projectredcap.org



- 1928
 - 1927
 - 1926
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 - 1919
 - 1918
 - 1917
 - 1916
 - 1915
 - 1914
 - 1913
 - 1912
 - 1911
 - 1910
 - 1909
 - 1908
 - 1907
 - 1906
 - 1905
 - 1904
 - 1903
 - 1902
 - 1901
 - 1900
- (YYYY)

Eligibility

This survey is only open to individuals over 18 years of age.

Gender

- Female
- Male
- Other

Education

- Less than high school
- High school
- Trade/technical/vocational training
- Some university/college
- Bachelor's degree
- Master's degree or higher

Marital Status

- Single
- Married
- Separated
- Divorced
- Widowed

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I would recommend hearing aids to a friend or loved one if I thought they needed them.

Disagree Neutral Agree

=====

(Place a mark on the scale above)

Hearing aids are too expensive.

Disagree Neutral Agree

=====

(Place a mark on the scale above)

I feel left out because of my hearing.

Disagree Neutral Agree

=====

(Place a mark on the scale above)

How much would you agree with this statement: "I avoid certain situations because of my hearing"

Disagree Neutral Agree

=====

(Place a mark on the scale above)

People with hearing loss would benefit from a hearing aid.

Disagree Neutral Agree

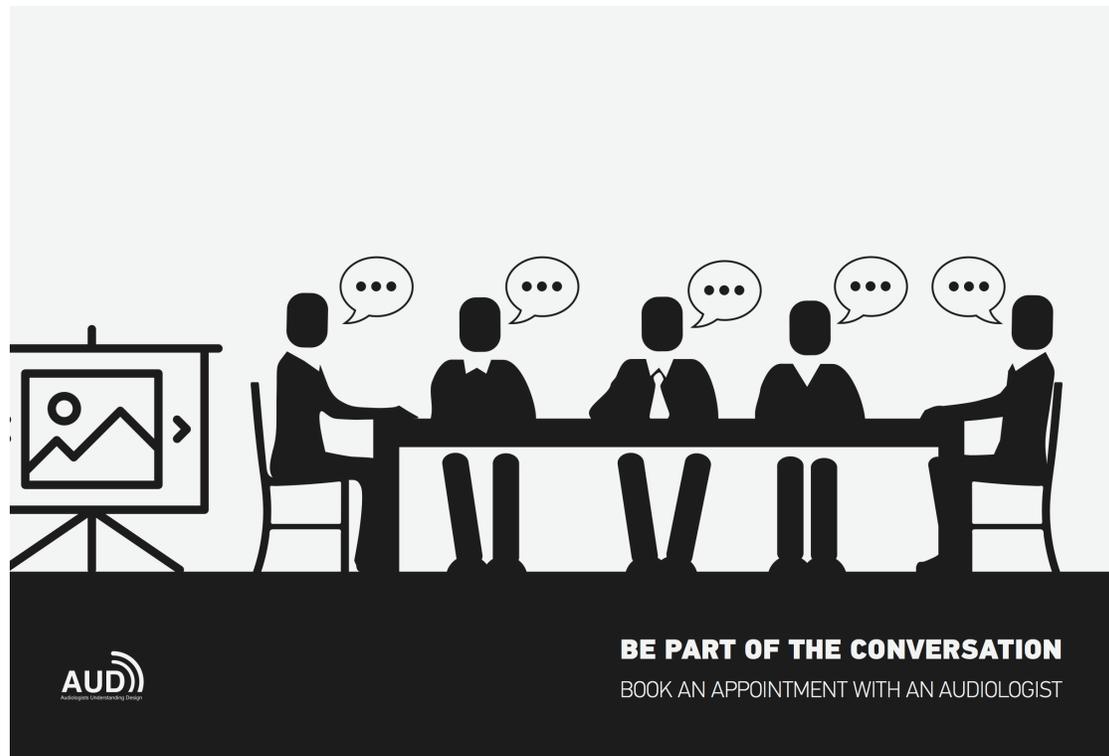
=====

(Place a mark on the scale above)

Please take a moment to review the image below before answering the final 5 questions.

Randomization _____

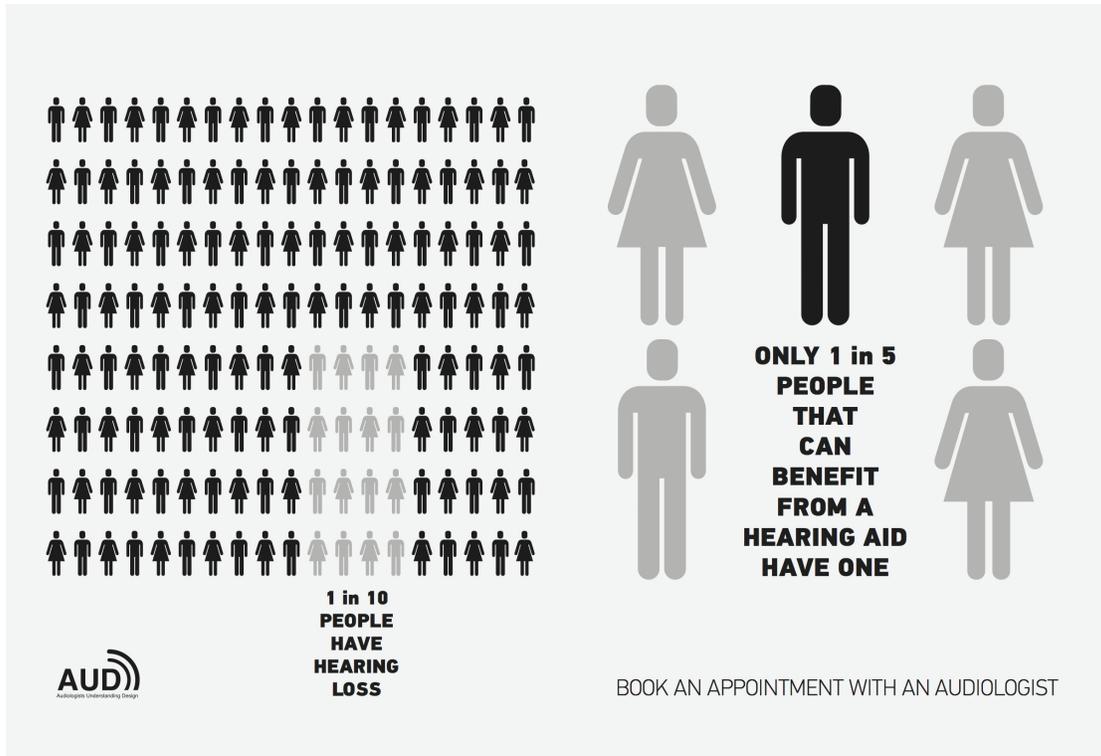
Image



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Image



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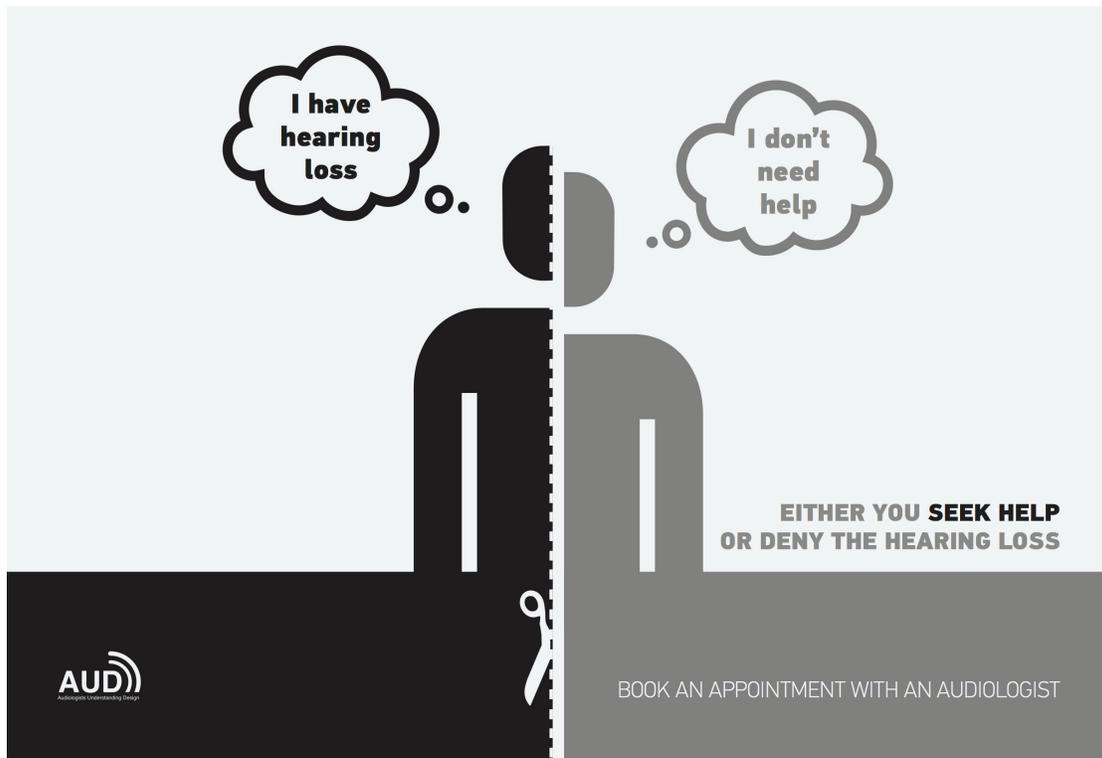
Image



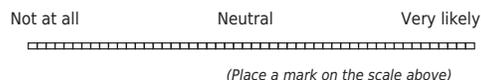
Confidential

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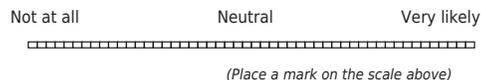
Image



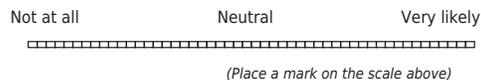
If you had hearing loss, would seeing this Advertisement encourage you to seek services?



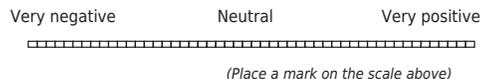
If you believed you needed a hearing aid, would seeing this Advertisement influence you?



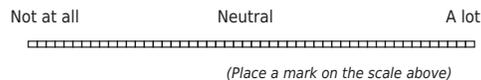
If a friend or loved one had hearing loss, would seeing this Advertisement encourage you to recommend they seek services?



How does this Advertisement make you feel toward hearing aids?



How much did you like the message in the Advertisement?



Appendix B: Checklist for Reporting Results of Internet E-Surveys (CHERRIES).

Item Category	Checklist Item	Explanation	
Design			
	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	This was a convenience sample and we wanted a broad range of Canadian respondents.
IRB (Institutional Review Board) approval and informed consent process			
	IRB approval	Mention whether the study has been approved by an IRB.	Yes, approval from University of Alberta ethics board
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	Participants could read about the survey, its purpose, how their data would be stored and used, who the investigator was, and call a number for further information. After this, respondents had to consent by clicking "approve" at the bottom of the consent screen.
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	No identifiable information was collected beyond the demographics of the respondent. The data was stored on a secure database (REDCap) at the University of Alberta
Development and pre-testing			
	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	The survey went through multiple stages of development. We employed an industrial designer to develop the four posters. The questions were developed together as a team and it was piloted on members of the team. Once we made revisions we piloted the survey on a few family members and friends before going live.
Recruitment process and description of the sample having access to the questionnaire			
	Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	The survey was open.

Contact mode	Indicate whether or not the initial contact with the potential participants was made on the internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	The initial contact was made through multiple online sources including email, listservs, organizations, and eblasts. We also shared the survey through multiple social media sites.
Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	We included the entire survey as well as the survey announcement in Appendix A. Ostevik made multiple contacts to organization asking them to consider forwarding the link to their members for broader dissemination.

Survey administration

Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered?	Web survey
	Manually into a database, or was there an automatic method for capturing responses?	Automatic through REDCap.
Context	Describe the website (for mailing list/newsgroup) in which the survey was posted. What is the website about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the website could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization website will have different results from a web-survey conducted on a government website	N/A

Mandatory/voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the website, or was it a voluntary survey?	Participants could choose to complete the survey or not, and could leave at any time.
Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	No incentives offered and no gains implied. This was stated up front.
Time/Date	In what timeframe were the data collected?	The data was collected over 6 weeks during May to June 2016.
Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	The questions were not randomized
Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	Adaptive questioning (employed as branching through REDCap) was not used.
Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	The questions were all on one form and the subject scrolled down the form to answer them all.
Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	One screen.

Completeness check	<p>It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JavaScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection of one response option should be enforced.</p>	<p>All questions were assigned as mandatory within REDCap. If a respondent tried to submit a survey that was incomplete, he or she would have received an error message with visual alerts signaling him or her that the survey was not complete.</p>
Review step	<p>State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).</p>	<p>Respondents were able to go back and review questions.</p>

Response rates

Unique site visitor	<p>If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.</p>	<p>Neither IP addresses nor cookies were utilized (this is not an available feature within REDCap); therefore, unique visitors cannot be determined.</p>
View rate (Ratio of unique survey visitors/ unique site visitors)	<p>Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.</p>	<p>Neither IP addresses nor cookies were utilized (this is not an available feature within REDCap); therefore, unique visitors, and consequently view rate, cannot be determined.</p>

<p>Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)</p>	<p>Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.</p>	<p>Neither IP addresses nor cookies were utilized (this is not an available feature within REDCap); therefore, unique visitors, and consequently participation rate, cannot be determined.</p>
<p>Completion rate (Ratio of users who finished the survey/users who agreed to participate)</p>	<p>The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate “informed consent” page or if the survey goes over several pages. This is a measure for attrition. Note that “completion” can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word “completeness rate”.)</p>	<p>N/A as there was no separate “informed consent” page.</p>

Preventing multiple entries from the same individual

<p>Cookies used</p>	<p>Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?</p>	<p>Cookies were not utilized. REDCap (according to the administrators) does not allow for the identification of duplicate responses when using an open public survey link. Duplicate responses can only be eliminated using known email addresses as the identifier.</p>
<p>IP check</p>	<p>Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same</p>	<p>IP addresses were not utilized. REDCap (according to the administrators) does not allow for the identification of duplicate responses when using an open public survey link. Duplicate responses can only be eliminated using known email addresses as the identifier.</p>

	IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	
Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	N/A
Registration	In "closed" (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	N/A as this was an open survey.

Analysis

Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	Yes.
Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	N/A
Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	We had no reason to expect differences weightings or propensity scores to be used.