



## Internet Usage and Loneliness in Older Hearing Aid Wearers



## Utilisation d'Internet et solitude chez les personnes âgées portant des appareils auditifs

### KEYWORDS

DEAF

HEARING AID

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### Abstract

This cross-sectional study examined the relationship between self-reported loneliness and Internet use in hearing aid wearers aged 65 years and over. Sixty-five participants completed the Global Internet Usage and Internet Activities survey (Landers & Lounsbury, 2006) as well as the UCLA Loneliness Scale (Russell, 1996). Results revealed that mean self-reported loneliness was correlated significantly with relationship and self-reported health status. Persons who self-reported they were healthy and in relationships used the Internet more frequently and self-reported to be less lonely than those that were single or with poor health. Results were interpreted to suggest that the hearing aid wearers that might benefit the most from social interaction through the Internet were also the ones that were less likely to use the Internet. We concluded that social interactions through the Internet may help reduce the social isolation of older adults with hearing loss.

### Abrégé

Cette étude transversale a examiné la relation entre la solitude, telle que rapportée par le participant, et l'utilisation d'Internet chez des personnes âgées de 65 ans et plus portant des appareils auditifs. Soixante-cinq participants ont complété le *Global Internet Usage Scale* (Landers et Lounsbury, 2006), le *Internet Activities Measure* (Landers et Lounsbury, 2006) et l'*UCLA Loneliness Scale* (Russell, 1996). Les résultats ont montré une corrélation significative entre la moyenne du score de solitude et le statut de couple, ainsi qu'entre la moyenne du score de solitude et l'état de santé rapporté par le participant. Les personnes qui ont déclaré es être en bonne santé ou être en couple utilisaient l'Internet plus fréquemment et se disaient moins seules que les personnes qui ont déclaré es être célibataires ou avoir une moins bonne santé. Les résultats ont été interprétés pour suggérer que les personnes portant des appareils auditifs qui pourraient bénéficier le plus de l'interaction sociale par le biais d'Internet étaient également celles qui étaient le moins susceptibles d'utiliser Internet. Nous avons donc conclu que les interactions sociales par le biais d'Internet pourraient aider à réduire l'isolement social des personnes âgées ayant des pertes auditives.

Social isolation and accompanying feelings of loneliness tend to be common experiences for people as they age (Burton-Shepherd, 2015; Jaremka et al., 2013; Price, 2015; Smith, 2012). Older adults are vulnerable to declining social networks due to various age-related changes, including declining health and changes in life circumstances, as well as impaired mobility and/or sensory impairments (Smith, 2012). In addition, the social supports that were once available to the elderly to mediate these effects have gradually degraded as social networks have become less cohesive, with people increasingly connecting at a distance or via electronic means (Berkman, Glass, Brissette, & Seeman, 2000; Price, 2015).

For older adults with hearing impairment, the loss of sensory ability increases the risk of experiencing loneliness due to the communication difficulties that result from the condition (Pronk, Deeg, & Kramer, 2013; Pronk et al., 2011; Sung, Li, Blake, Betz, & Lin, 2015). As a sensory deficit, hearing loss often correlates with decreased verbal communication ability, which is a significant aspect of human interaction (Chen, 1994). This restriction can result in older adults removing themselves from discussions and isolating themselves from family and friends in order to avoid feelings of discomfort (Chen, 1994).

The use of technology, via the Internet and social media, has often been suggested as a potential solution for overcoming the barriers of reduced face-to-face contact in certain populations. Certainly, for a vast majority, the Internet has become an essential component of everyday life (Amichai-Hamburger, 2002). Its usage has the potential to connect the individual to the wider community with studies finding regular Internet use to be associated with reduced perceptions of loneliness and social isolation (Cotton, Anderson, & McCullough, 2013; Cotton, Ford, Ford, & Hale, 2014; Dickinson & Hill, 2007; Khosravi & Ghapanchi, 2016; Nyman & Isaksson, 2015; Sum, Mathews, Hughes, & Campbell, 2008; Sum, Mathews, Pourghasem, & Hughes, 2009).

It has been suggested that individuals who experience loneliness seek out the Internet to compensate for the lack of social capital in their real-life environments (Song et al., 2014). The Internet provides a greater opportunity for these

persons to expand their social network and work on their communication skills in a non-threatening environment (Morahan-Martin & Schumacher, 2003). Moreover, Dickinson and Hill (2007) concluded that the Internet, which provides alternative ways of communicating without the relevance of the physical space, could benefit those with communicative difficulties or reduced mobility. In addition, Cotton and colleagues (2013, 2014) found that the Internet might be helpful in reducing loneliness and depression in older adults in assisted and independent living communities.

An opposing theory to Song et al.'s (2014) social compensatory model suggests that it is extroverted personalities and those with more social support who benefit the most from the Internet (Kraut et al., 2002). Proponents of this idea state that those who make good use of social resources in the non-virtual world are similarly well equipped to use these same skills in the online environment. Kraut et al. (2002) reported that the Internet provided another medium for individuals to keep in contact with existing family and friends but did not necessarily build new social networks.

Overall, many studies have found that use of the Internet has the potential to reduce feelings of loneliness, social isolation, and associated depressive symptoms, although the causal relationship is still unclear (Cotton et al., 2013, 2014; Khosravi & Ghapanchi, 2016; Nyman & Isaksson, 2015; Sum et al., 2008, 2009). While previous research has investigated the relationship between loneliness and Internet use for older populations, as well as the impact of hearing loss on loneliness, none to the authors' knowledge have investigated the interrelationship amongst the three factors. For those with hearing loss, it was surmised that the Internet could act as a complementary tool for social interaction, considering the barriers this population faces when interacting in person.

The present study investigated whether Internet use in older adults who wear hearing aids is associated with lower perceptions of loneliness. Based on the literature, it was hypothesized that older hearing aid wearers who use the Internet frequently would be more likely to report lower feelings of loneliness than those who use the Internet less frequently. The

study asked the following research questions: (a) In older adults with hearing aids, are there differences between perceived loneliness scores and time spent on the Internet? (b) In older adults with hearing aids, are there differences between perceived loneliness scores and the types of Internet activities in which they engage? (c) In older adults with hearing aids, do sociodemographic factors have a relationship to perceived loneliness scores and Internet use?

### Method

Hard copy survey packs were left at various locations around Melbourne, Australia. Locations included audiology clinics, medical centres, senior citizen groups, Returned and Services League Clubs, lawn bowls clubs, libraries, and neighbourhood houses. This study was approved by La Trobe University's Human Research Ethics Committee (ethics number S16-86).

### Participants

In order to be included in the study, participants were required to be aged 65 years or older and be Internet users or have access to the Internet. Hearing loss was assumed if participants answered yes to the question "Do you own hearing aids?" Only surveys completed by individuals who met the inclusion criteria were included in the final data collection and analysis.

A total of 65 participants were recruited from the older adult population of Melbourne with sociodemographic details shown in Table 1. There were more female ( $n = 35$ ) than male participants ( $n = 30$ ) in the sample. The majority of the sample was over 81 years of age ( $n = 26$ ). The remainder of the sample was spread fairly evenly between those aged 65 to 70 ( $n = 17$ ) and those aged 71 to 80 ( $n = 22$ ). For the majority of the sample, the highest level of education completed was high school ( $n = 30$ ). Just under a third of all participants had completed tertiary studies ( $n = 19$ ).

Over half of the sample ( $n = 35$ ) identified as partnered and/or married, with the remainder single. Just under half of participants felt their general health was "average," while 15% felt their health was "poor" or "very poor," and 40% reported that their general health was "above average" or "excellent."

Table 1. Sociodemographic Characteristics of the 65 Hearing Aid Wearers who Completed the Survey

Relationship status	<i>n</i> (%)
Married/Partnered	35 (54%)
Single	30 (46%)
Health status	
Very poor/Poor	10 (15%)
Average	29 (45%)
Above average/Excellent	26 (40%)
Gender	
Female	35 (54%)
Male	30 (46%)
Annual income	
<\$40,000	48 (75%)
\$40,000+	17 (25%)
Education	
High school	30 (46%)
Certificate/Diploma	14 (22%)
Tertiary	19 (29%)
Age (years)	
65–70	17 (26%)
71–80	22 (34%)
81+	26 (40%)

Note. Not all participants completed all questions.

### Design

The survey pack given to participants comprised three questionnaires relating to loneliness, Internet usage, and Internet activities. Each questionnaire is described in more detail below.

**UCLA Loneliness Scale.** Participants' loneliness was assessed using the University of California, Los Angeles (UCLA) Loneliness Scale (Russell, 1996). The measure aims to subjectively evaluate an individual's feelings regarding loneliness and social isolation. The scale consists of 20 statements that relate to social health, for example, "I feel as though nobody really understands me." Participants were asked to rate the degree to which they believed these statements reflected their own personal thoughts and feelings using a 4-point Likert scale, as follows: (4) I often feel this way, (3) I sometimes feel this way, (2) I rarely feel this way, and (1) I never feel this way. Overall loneliness scores ranged from not lonely (20 points) to very lonely (80 points).

**Global Internet Usage Scale.** Frequency of Internet use was measured using the Global Internet Usage Scale (Landers & Lounsbury, 2006), a subjective scale that determined the duration of time that is spent on the Internet. Participants were asked to rate the amount of time spent on the Internet using a 6-point scale, with options being (1) several times a day, (2) once a day, (3) 3–5 times a week, (4) 1–2 times a week, (5) once every few weeks, and (6) less often.

**Internet Activities Measure.** Landers and Lounsbury's (2006) Internet Activities Measure was selected to determine what participants primarily used the Internet for. The measure classified Internet use into the following categories: leisure, communication, and academic behaviour. Mark and Ganzach (2014) modified the survey and added a fourth classification relating to economic activity. Participants were asked, "Have you used the Internet to do any of the following activities?" Activities included (1) send or read emails, (2) instant message with friends, (3) download music and/or video clips, (4) play games, (5) work on research for education or occupation, (6) pay bills or use online banking, (7) partake in an online class, and (8) shop online. They were then required to select all options that applied to them.

### Statistical Analysis

One-way analysis of variance (ANOVA) was used to assess which factors were significantly related to the average loneliness score, with Fisher comparisons to compare individual means. Factors of significance

were further analyzed using a multivariate ANOVA to determine which remained of interest once adjusting for all other factors. All statistical analyses were performed in Minitab 17, with statistical significance set at .05.

### Results

Univariate ANOVA results are presented together with means and 95% confidence intervals in Table 2. The following univariate factors were found to have a significant impact on mean loneliness scores: amount of Internet usage, relationship status, self-reported health status, using the Internet for communication activities, using the Internet for academic activities, and using the Internet for economic activities. Amount of hearing aid usage, using the Internet for leisure activities, gender, annual income, level of education, and age were not found to be significant factors of interest.

On average, those who reported using the Internet less than once a week had significantly higher mean loneliness scores than those who used the Internet more than once per week,  $F(2, 62) = 5.90, p = .005$ . In other words, hearing aid wearers who used the Internet more frequently were also more likely to report a lower perception of loneliness. Those who were married or partnered felt significantly less lonely on average than those who were single,  $F(1, 63) = 9.68, p = .003$ . In addition, those who reported their health status to be very poor, poor, or average had significantly higher mean loneliness scores than those who reported their health as above average or excellent,  $F(2, 62) = 12.21, p = .001$ . Finally, those participants who indicated that they used the Internet for communication, academic, and economic activities reported significantly lower mean loneliness scores than those who did not use the Internet for these purposes,  $F(1, 63) = 13.68, p = .001$ ;  $F(1, 63) = 11.43, p = .001$ ; and  $F(1, 63) = 13.31, p = .001$ , respectively.

Multivariate ANOVA results carried out while adjusting for relationship status and self-reported health status are shown in Table 3. Amount of Internet usage, using the Internet for communication activities, using the Internet for academic activities, and using the Internet for economic activities were no longer found to be significant factors after adjusting for self-reported health and relationship status. The relationship between Internet usage and self-reported health and relationship status is represented in Figure 1.

Table 2. Univariate ANOVA Results for Average Mean Results on the UCLA Loneliness Scale

Hearing aid use	<i>n</i>	Mean	95% CI		<i>F</i>	<i>df</i>	<i>p</i>
Never use	1	31.00	(7.96, 54.04)	ab	2.42	4, 60	.058
Rarely	7	30.86	(21.15, 39.56)	b			
Occasionally	11	47.45	(40.51, 54.40)	a			
Often	18	41.28	(35.85, 46.71)	a			
Always	28	40.25	(35.90, 44.60)	ab			
<b>Internet usage</b>							
At least once a day	34	37.59	(33.75, 41.43)	b	5.90	2, 62	.005
1-5 times a week	8	35.13	(27.22, 43.03)	b			
Less than once a week	23	46.96	(42.29, 51.62)	a			
<b>Purpose of Internet usage</b>							
<b>A) Communication</b>							
No	26	46.77	(42.47, 51.07)	a	13.68	1, 63	<.001
Yes	39	36.49	(32.97, 40.00)	b			
<b>B) Leisure</b>							
No	33	43.27	(39.17, 47.38)	a	3.44	1, 63	.068
Yes	32	37.84	(33.68, 42.01)	a			
<b>C) Academic</b>							
No	50	43.16	(40.01, 46.31)	a	11.43	1, 63	.001
Yes	15	32.07	(26.32, 37.82)	b			
<b>D) Economic</b>							
No	42	44.29	(40.89, 47.68)	a	13.31	1, 63	.001
Yes	23	33.87	(29.28, 38.46)	b			
<b>Education</b>							
High school	30	39.70	(35.28, 44.12)	a	1.21	2, 60	.305
Certificate/Diploma	14	45.14	(38.67, 51.61)	a			
Tertiary	19	39.11	(33.55, 44.66)	a			
<b>Income</b>							
Under \$40,000	48	41.96	(38.53, 45.39)	a	2.40	1, 63	.127
\$40,000+	17	36.76	(31.00, 42.53)	a			
<b>Relationship</b>							
Married/Partnered	35	36.57	(32.76, 40.38)	b	9.68	1, 63	.003
Single	30	45.30	(41.19, 49.41)	a			
<b>Age</b>							
65-70	17	35.65	(29.92, 41.38)	a	2.11	2, 62	.130
71-80	22	41.59	(36.56, 46.63)	a			
81+	26	43.00	(38.37, 47.63)	a			
<b>Gender</b>							
Female	35	38.49	(34.47, 42.50)	a	2.40	1, 63	.126
Male	30	43.07	(38.73, 47.40)	a			
<b>Health</b>							
Very poor/Poor	10	47.30	(40.76, 53.84)	a	12.21	2, 62	<.001
Average	29	45.21	(41.37, 49.05)	a			
Above average/Excellent	26	32.88	(28.83, 36.94)	b			

Note. Higher scores indicate a higher perception of loneliness. Means that do not share a lowercase letter are significantly different. \*Not all participants responded to all questions.

Table 3. Multivariate ANOVA to Assess the Impact of Internet Use on Average Mean Results on the UCLA Loneliness Scale, Adjusting for Relationship Status and Self-Reported Health Status

Variable	<i>F</i>	<i>df</i>	<i>p</i>
<b>Internet usage overall</b>			
Internet usage	2.14	2, 59	.126
Health status	6.28	2, 59	.003
Relationship status	4.58	1, 59	.036
<b>Communication Internet use</b>			
Internet for communication	0.29	1, 60	.591
Health status	5.12	2, 60	.009
Relationship status	3.01	1, 60	.088
<b>Leisure Internet use</b>			
Internet for leisure	2.25	1, 60	.139
Health status	8.55	2, 60	.001
Relationship status	3.56	1, 60	.064
<b>Academic Internet use</b>			
Internet for academic	2.33	1, 60	.133
Health status	5.46	2, 60	.007
Relationship status	3.75	1, 60	.057
<b>Economic Internet use</b>			
Internet for economic	2.63	1, 60	.110
Health status	5.56	2, 60	.006
Relationship status	3.04	1, 60	.086

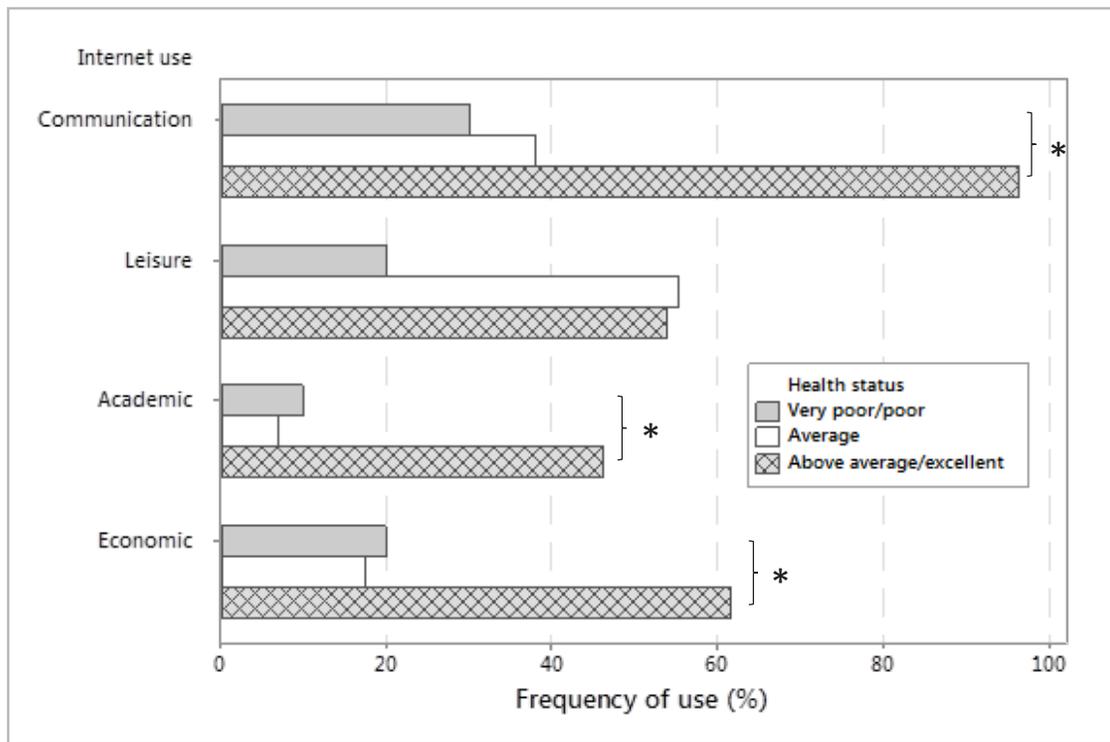
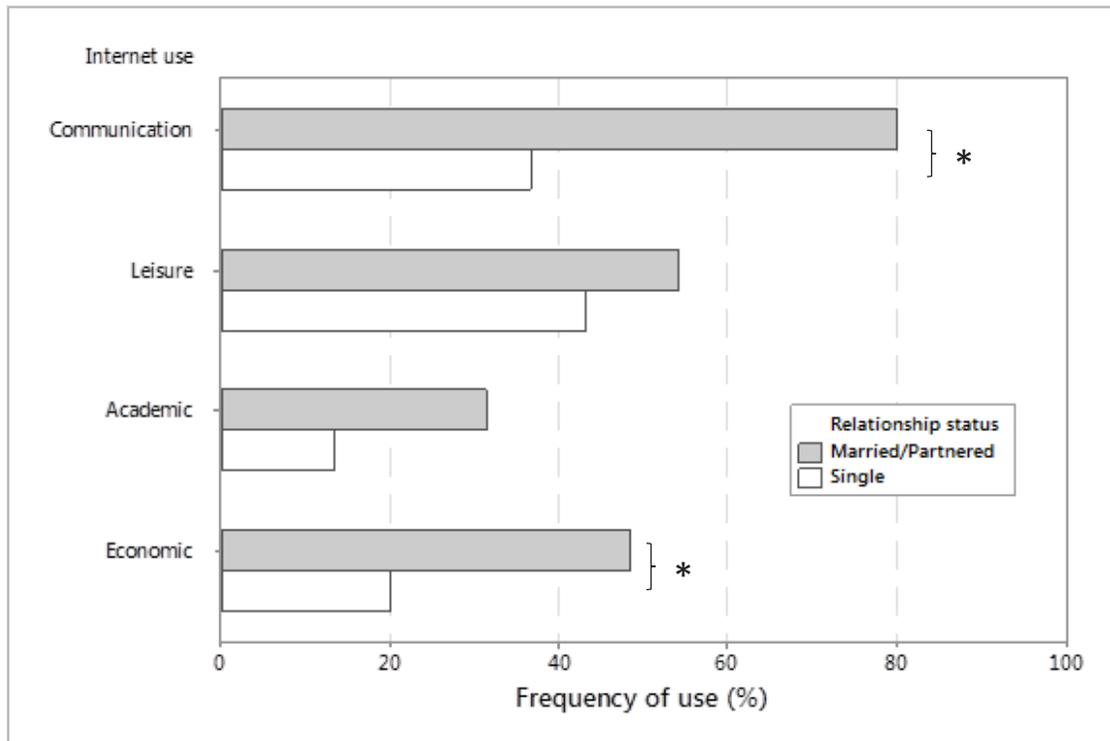


Figure 1. Frequency of Internet use plotted against type of Internet

As shown, participants who were married/partnered and those who reported themselves to be healthy were also those who used the Internet more, which was correlated with reduced mean self-reported loneliness scores.

### Discussion

The present study investigated whether perceptions of self-reported loneliness are influenced by Internet usage in older hearing aid wearers. Across the 65 participants, relationship and self-reported health status were sociodemographic factors of significance with married/partnered participants and those who reported themselves to be healthy also amongst those who used the Internet more frequently, which was correlated with lower mean self-reported loneliness scores. A number of limitations are worth acknowledging. Firstly, the measures used in the current study were all subjective in nature. Objective measures of hearing loss and health would have added strength when interpreting the results. Secondly, the sample size was small and not randomly selected. Finally, the cross-sectional design of the study limits the ability to draw any conclusions about the causal nature of loneliness perceptions.

The significant factors of self-reported health and relationship status found in the current study support previous research. Age-related bereavement, such as the death of a partner and/or friends, brings with it a reduction in both the quality and quantity of social networks and is therefore associated with greater risk of feeling lonely (Dykstra, van Tilburg, & de Jong Gierveld, 2005; Pinquart, 2003). Aging can also bring with it changes to mobility, activity levels, and general health, with a meta-analysis on the factors having an impact on loneliness in the elderly finding that low mobility and sensory deficits limited social networking opportunities and therefore increased the possibility of feeling lonely (Pinquart & Sorensen, 2001).

Surprisingly, hearing aid usage was not found to have a significant impact on self-reported loneliness scores. Mean scores for those who rarely wore their devices were comparable to those who always wore their devices. It is possible that the age range of participants in the current study may have contributed to this result. Mick, Kawachi, and Lin (2014) found self-reported social isolation to increase

with severity of hearing loss for women aged 60 to 69, whereas no such correlation was found for men and those over the age of 70. Mick et al. (2014) surmised that women aged 60 to 69 were also most likely to be newly diagnosed with hearing loss and therefore still adjusting to the condition's impact on their lifestyle, whereas older individuals would have had some time to adapt their social settings to suit their hearing loss. Similarly, individuals in the current study would most likely have been living with hearing loss for several years and have settled on what device usage works best for them, which may account for the non-significance of device usage as a factor in the current study.

To further determine if hearing aids have a role in alleviating self-reported loneliness, it would be worthwhile to compare hearing aid wearers with non-wearers in future research. Weinstein, Sirow, and Moser (2016) and Contrera, Sung, Betz, Li, and Lin (2017) found that hearing-impaired participants who initially reported that they experienced loneliness showed a positive shift away from feeling lonely following the fitting of hearing devices. In addition, Gonsalves and Pichora-Fuller (2008) reported that seniors who wore hearing aids were more likely to be users of communication technologies when compared to seniors with poor hearing ability who did not wear hearing aids. Considering that hearing aids can contribute and alter the relationship between hearing loss and loneliness, it would have been worthwhile to compare participants with no known hearing loss, participants with hearing loss who chose not to wear hearing aids, and participants with hearing loss who chose to wear hearing aids.

The authors hypothesized that older hearing aid wearers who used the Internet frequently would be more likely to report lower feelings of self-reported loneliness than those who used the Internet less frequently. This trend was true in the current study only for self-reported healthy and partnered participants, opposing Song et al.'s (2014) social compensation theory. Rather, the results found support for the mechanism proposed by Kraut et al. (2002), which states that individuals who have more social support and who are extroverted tend to obtain more benefit from Internet usage than those who are socially isolated and lonely. Such individuals are

in a better position to take advantage of the social applications of the Internet to maintain and further develop their existing relationships. For these people, the Internet may be a convenient way of keeping in touch with family and friends, without physical and time restraints.

This may be due to older adults facing a number of barriers when it comes to engagement with online technology (Leist, 2013). Many seniors can be resistant toward the Internet, especially social media websites like Facebook (Chang, McAllister, & McCaslin, 2015; Leist, 2013; Nyman & Isaksson, 2015). Reported concerns surrounding social media usage included issues like privacy, uncertainty about codes of social conduct, perceived lack of control, and perceived lack of benefit (Chang et al., 2015; Leist, 2013; Wagner, Hassanein, & Head, 2010). There appears to be access gaps as well, with Chang et al. (2015) also finding that individuals more likely to use the Internet included older adults with higher education levels, those who were married or living with someone, and those who already had access to a computer. However, groups who could potentially benefit the most from Internet use—such as ethnic minorities, disabled persons, and those with lower income and education levels—were far less likely to be users (Chang et al., 2015).

This does not negate the potential benefits the Internet could provide for older adults with hearing loss. The Internet provides a means of communicating with others non-verbally through email and instant messaging. It is also an environment free from the constraints and potential anxieties that face-to-face contact may hold. Those who identify as deaf have long been found to make use of the advantages the Internet can bring as shown by surveys in Australia (Deaf Australia Online, 2001) and the United Kingdom (Pilling & Barrett, 2008) in which deaf participants were found to make intensive use of the Internet for social reasons. In a survey sent to hearing-impaired and non-hearing-impaired teenagers, it was found that hearing-impaired teens used the Internet more intensively than their peers (Barak & Sadovsky, 2008). In addition, hearing-impaired teens who used the Internet had higher well-being scores than hearing-impaired teens who did not (Barak & Sadovsky, 2008). Hearing-impaired teens have also been found

to use the Internet for peer support by choosing to chat with others with hearing loss when feeling lonely (Ghiamatyoon, Nesayan, & Movallali, 2016). The Internet then appears to have the potential to provide a supplementary tool for social interaction for this population, which in turn could lead to a reduction in experiencing loneliness.

Moreover, the way people use the Internet is an important component of how effective it may be at reducing feelings of social isolation. Many authors have found that using the Internet for communicating with family and friends is associated with lower levels of perceived loneliness (Khalaila & Vitman-Schorr, 2018; Sum et al., 2008, 2009). In contrast, seeking connections with strangers on the Internet has been found to be associated with higher levels of loneliness (Sum et al., 2008, 2009). For older adults, using the Internet for connecting with family and friends was beneficial, while using the Internet to communicate with unknown people was associated with greater feelings of isolation (Sum et al., 2009). Computer-mediated support should therefore be considered as an additional means of alleviating the social isolation adults with hearing loss can experience.

## Conclusions

Self-reported relationship and health status were associated with lower self-reported loneliness scores, such that married individuals and those who self-identified as having at least above average health reported greater use of the Internet and reported less loneliness than single participants and those with self-identified average or worse health, respectively. Results suggest that for older adults with hearing loss, it is those with established support networks who benefit most from Internet usage. Although the Internet, when used in a meaningful way, may be beneficial to the lives of older adults with hearing loss, work needs to be done to improve accessibility for singles and those with poorer subjective health ratings.

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