Université de Montréal

Providing Internet-based audiological counselling to new hearing aid users

par

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Providing Internet-based
audiological counselling
to new hearing aid users

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Abstract and Keywords (in French)

Les personnes ayant une déficience auditive acquise ont habituellement de la difficulté à s'ajuster à un premier appareil auditif. Plusieurs recherches ont démontré qu'un counselling audiologique peut faciliter l'ajustement à un premier appareil auditif. En raison de sa nature interactive, l'Internet pourrait s'avérer un outil intéressant pour colliger les expériences d'une personne faisant l'acquisition d'un premier appareil auditif et pour répondre à ses besoins en matière de counselling audiologique. Un programme de counselling audiologique par Internet sous la forme d'un contact quotidien par courriel durant le premier mois suivant l'acquisition d'un appareil auditif a été proposé à trois personnes faisant l'acquisition d'un appareil auditif. Les données, de nature qualitative, étaient composées du contenu des courriels et d'entrevues semi-dirigées réalisées avec les participants et avec leur audiologiste et ont été analysées selon la théorie ancrée (*grounded theory*). De façon générale, le programme de counselling audiologique par Internet a offert une riche description des expériences vécues par les participants et a renforcé les comportements positifs d'ajustement chez les participants.

Mots clés: RÉADAPTATION, DÉFICIENCE AUDITIVE, COURRIEL, E-SANTÉ, TÉLÉ-SANTÉ, COMMUNICATION PAR ORDINATEUR, COMMUNICATION CLINICIEN-CLIENT

Abstract and Keywords (in English)

People with an acquired hearing loss typically show difficulties adjusting to a first hearing aid. Many research projects have shown that audiological counselling can facilitate adjustment to a first hearing aid. Because of its interactive nature, the Internet could be a valuable tool to gain information on the experiences of the new hearing aid user and to answer his or her needs for audiological counselling. An Internet-based audiological counselling programme in the form of a daily e-mail contact during the first month following the hearing aid fitting was offered to three new hearing aid users. The data, qualitative in nature, were comprised of the content of the e-mails and of in-depth interviews with the participants and their audiologist and were analysed according to *grounded theory*. Overall, the Internet-based audiological counselling programme provided rich descriptions of the experiences of the participants and reinforced positive adjustment behaviours exhibited by the participants.

Key words: REHABILITATION, HEARING LOSS, ELECTRONIC MAIL, E-HEALTH, TELE-HEALTH, COMPUTER MEDIATED COMMUNICATION, CLINICIAN-CLIENT COMMUNICATION

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CHAPTER 1
INTRODUCTION

Identification of the Problem

Audiology as a field has always relied on new technologies. Instruments of all sorts are used to screen, assess, and treat hearing loss and its consequences. Almost 25 years ago, an article on the applications of computers in audiology was published (Levitt, 1980). In those days, computers were mainly used for their great abilities to perform quick calculations. Adaptive testing was also a new application of computing that led to great expectations for changes in the practice of audiology. However, at that time it was not yet envisaged that computers could one day become a communication medium.

The physical environment of audiologists has changed a great deal over the last quarter century: audiologists can now count on computers to assist them in almost all of their clinical activities, from booking appointments to performing audiometry, electro-physiological measures, or hearing aid selection, verification, and adjustment. While audiologists are surrounded by computers, it seems they are not as inclined to acknowledge the fact that their clients are also using computers, and that the Internet is a new communication medium within their reach to communicate with an important part of their clientele.

The Internet is one of the most prominent innovations of the last century. An innovation can be described as an idea, pattern of behaviour, or technology perceived as new; but it is also first considered as anti-conformist and deviating from the social norms (Kincaid, 2004). The diffusion of information model proposed by Rogers in the 1950s (for a review, see Rogers, 2004) can very well be applied to the Internet. The critical mass described as “the point at which enough individuals have adopted an innovation that further diffusion becomes self-sustaining” (Rogers, 2004, p. 19) has probably been achieved for certain uses of the Internet. However, it has not in the researcher’s opinion been reached yet for the use of the Internet for the provision of routine health services. It is encouraging to see that some innovations proposing Internet-based health interventions are indeed being diffused successfully (Budman, Portnoy, & Villapiano, 2003).

Before further discussing the Internet, it is important to describe this communication and information technology in its current form. This research project, completed in the first two trimesters of 2004, used computer-mediated communication. This project focuses on Internet, and more specifically e-mail. The Internet can be described as a number of networks connected to each other (Ince, 2001). The most popular Internet technologies are e-mail (electronic messaging) and the World Wide Web (electronic documents linked with each other). E-mail is one of the most widely used, and also one of the first, Internet applications. It is a form of asynchronous text messaging: e-mails are sent via computer programs and are relayed by servers before reaching their recipients.

Now that more than 50% of Canadian households have Internet access at home (Statistics Canada, 2004a) and that 65% of them use the Internet to access health information (Statistics Canada, 2004b), it comes as a real surprise that the possibilities the Internet offers have been explored by relatively few audiologists. Some clinicians may say that the Internet is a Pandora's box that they would rather not open. However, ignoring the fact that more and more people use the Internet can be seen as denying or ignoring an important change in society. Instead, why not use the Internet to offer new services that would be developed and implemented by audiologists? Audiologists who are informed of the current trends in either new models of health care or marketing are probably considering the inevitable question: to e or not to e?

New hearing aid users are an important portion of the clientele of many audiology clinics. Figures on hearing aid benefits among this clientele raise concerns because dissatisfaction is prevalent and use could be improved (Kochkin, 2002). Furthermore, these figures have remained basically unchanged during the last decade, even though new hearing aid technologies became widely available during that period (Kochkin, 2003). Therefore, this population could be an interesting target for the provision of enhanced clinical services. Because of its highly visual nature, the Internet is a tool that is especially interesting and accessible to people who have a hearing loss (LeClaire, 1997).

Purpose and Rationale of this Study

The primary research question of this study is: "How can the Internet be used to provide audiological counselling to new hearing aid users?" More specific questions emerged as relevant literature was gathered and as the study was designed. These questions are: "How can an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist be used to gather information about the day-to-day experiences of new hearing aid users?" and "How can an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist be used to gather information about and respond to new hearing aid users' needs for informational and emotional counselling?"

The nature of the questions called for the use of a qualitative methodology. Qualitative research methods allow gathering data on the clinician's and client's thoughts related to the use of Internet in audiology rather than measuring the magnitude of an effect. It was believed that a qualitative methodology would be more suitable as the proposed treatment is new and because it has been almost unexplored before.

The general goal of this research project is to provide insights into the way audiology clients and audiologists perceive the use of the Internet as a clinical communication tool. Having a better knowledge of the acceptability, benefits, and limits of this new clinical tool could enable the audiologists to use the Internet more effectively in their daily practice.

Summary

This chapter introduced the broad context in which this research project was implemented and the questions to which answers were sought. A comprehensive literature review follows.

CHAPTER 2

REVIEW OF THE LITERATURE

Overview

This chapter will review the concepts relevant to the current research project. Rehabilitative audiology, the provision of hearing aids, and audiological counselling will be described. A presentation of e-health and its applications will follow, along with a possible bridge between e-health and audiology. The rationale for the current study will end the chapter.

Rehabilitation

The International Classification of Functioning, Disability, and Health (World Health Organization, 2001) offers a general framework to describe health. This bio-psycho-social model integrates views from the medical and the social realms. In fact, disability and functioning is seen in terms of interactions between the health condition of an individual and various contextual factors. In fact, disability involves disfunctionning at the level of the body or of the body part (impairment), at the level of the whole person (activity limitation), and at the level of the whole person in a social context (participation). Increasing *participation* is the ultimate goal of any rehabilitative programme. Therefore, rehabilitation can be seen as a client-oriented, problem-solving process (Danermark, 1998). The goal of rehabilitative audiology is to facilitate the participation of people who have a hearing loss.

Frameworks Relevant to Rehabilitative Audiology

The International Classification of Functioning, Disability, and Health is a general model that is relevant to various health conditions. The PRECEDE-PROCEED health promotion model (Green & Freuter, 1991), which is also a model that can be applied to the various health disciplines, is of interest to rehabilitative audiology as well. Various models are available to explain phenomena more specific to rehabilitative audiology. Two of these models will be described here: the coping with hearing loss model (Hallberg & Carlsson, 1981) and the ecological model (Borg, 1998, 2003; Borg, Danermark, & Borg, 2002).

The PRECEDE-PROCEED model (Green & Kreuter, 1991) constitutes a general framework for health promotion. The PRECEDE part of the model addresses the determinants of health and generates specific objectives in terms of health behaviour changes whereas the PROCEED part of the model deals with implementation and evaluation of the programme. According to this framework, a programme aiming at health behaviour changes should work on three different levels: predisposing factors, reinforcing factors, and enabling factors. Opportunities to apply this model to rehabilitative audiology have been discussed in greater details elsewhere (Carson & Pichora-Fuller, 1997). Theories of adjustment to communication problems due to hearing loss have been elaborated. Hallberg and Carlsson (1991) designed a model according to which people who are hard-of-hearing use coping strategies to maintain their normal identity when interacting with hearing people. These coping strategies were depicted in two embedded circles, the outer circle related to control of the social scene and the inner circle to the avoidance of the social scene. Individuals with a hearing loss have a preference for one of the types of coping strategies but can alternate from one type to the other. According to the authors, the coping strategies that aim to control of the social scene are the most constructive but the effort needed to do so can also be fatiguing. On the other hand, the coping strategies that aim to avoid the social scene can be less demanding for people who are hard-of-hearing but psychological consequences like isolation or withdrawal can also be important considerations. In a later publication, Hallberg, Påsse, and Ringdahl (2000) studied the coping behaviours of people in the work force and who had with a post-lingual severe-to-profound hearing loss. Once again, coping was seen as a means to maintain identity in the normal-hearing world. Hardiness and self-efficacy were identified as dispositions for successful coping. Another model, the ecological conceptual framework, uses an analogy to biological systems (Borg, 1998, 2003; Borg, Danermark, & Borg, 2002). The interaction between living organisms is compared to human communication. An ecological system tends to optimal energy consumption, with the corresponding notion in communication being an optimal use of cognitive resources. The authors advocate for the use of an ecological perspective in diagnostic and rehabilitative audiology. As the communication is seen as a system, a holistic perspective is more appropriate then an analytic one. Following this idea, a rehabilitation programme was designed where the intervention program aimed to increase the insight and knowledge of the individuals who were hard-of-hearing so that they could become more active in communication situations.

The first model describes how an intervention should target different factors in order to yield meaningful health behaviour changes. For example, the provision of a hearing aid is only a predisposing factor that can lead to improved communication. Interventions targeting reinforcing and enabling factor should also be proposed. From the two other models it is clear that rehabilitative audiology should focus on coping with the demands of the environment and that it therefore needs to be a personalised process.

Present Delivery of Services in Rehabilitative Audiology

In North America, audiology was first developed as a discipline focused on rehabilitation. Modifications of the acoustical environment or hearing loss awareness campaigns are interventions targeting environmental factors. Similarly, teaching speechreading, assertiveness regarding one's communication needs or other coping strategies can facilitate participation by changing personal behaviours. However, the provision of a hearing aid is still the most widely used strategy in rehabilitative audiology. A hearing aid, that provides an amplified sound signal to the damaged ear, is designed to somewhat restore lost body functions.

Provision of Hearing Aids

As the provision of a hearing aid usually constitutes the cornerstone of the services offered by rehabilitative audiologists, this research project focuses on the enrichment of this service by a more comprehensive counselling approach.

Current Practice

Each hearing aid centre has its own model of service delivery; however, there are also many similarities between centres. The American Speech-Language-Hearing Association, the American Academy of Audiology, and the U.S. Department of Veterans Affairs recently published guidelines regarding hearing aid selection and fitting. These guidelines suggest a model of service delivery, however: "Professional judgement and individual patient characteristics may substantially affect the nature, extent, and sequence of services provided" (Joint Committee on Clinical Algorithms and Statements, 2000, p. 12). It is worth noting that the model of service delivery described in this recent document is essentially unchanged from models of service delivery that have been implemented and described for over thirty years.

The assessment of candidacy for amplification is usually defined as a combination of hearing loss and personal factors. The Joint Committee on Clinical Practice Algorithms and Statements (2000) described the clinical indicators for amplification as self-reported and audiometrically demonstrated by a hearing loss to a degree that interferes with communication. In practice, the severity and configuration of hearing loss can give an idea of the potential benefits of amplification. Personal factors include, among others, hearing difficulties, motivation, visual acuity, dexterity, and financial resources.

After an initial appointment where the hearing function is assessed, the possibility of amplification is usually discussed. If the client chooses to pursue amplification, then the decisions related to the hearing aid (monaural or binaural fitting, size, type of circuit and features, etc) are made and the ear impression is taken. These two last steps are either done during the first visit or in a separate visit. A couple of weeks after, the hearing aid is fit and general instructions for its use and care are given. A follow-up appointment is scheduled after a 30-day period, which usually coincides with the end of the trial period. The visits are then usually scheduled on a yearly basis. Some audiologists will offer many follow-up visits, usually devoted to fine-tuning adjustments of the electro-acoustic characteristics of the hearing aid according to the specific reports of the client. Psychosocial adjustment to the hearing aid can also be assessed during these visits. Independently of the organisation of services, hearing aid outcomes must be measured.

Hearing Aid Outcome Measurement

When looking at the outcomes of hearing aid provision, one has to remember that hearing aid success is a multidimensional concept. In fact, it comprises hearing aid performance, benefit, satisfaction, and use (for reviews, see Dillon, 2000; Gatehouse, 1994; Humes, 1999; Noble, 1998). Performance, benefit, and use can be evaluated by the audiologist or by self-reported measures, while satisfaction is, by definition, a self-reported outcome. Each of the dimensions can be assessed with various tools. The real-ear aided response (REAR) and aided scores of monosyllables identification are common measures of performance. Benefit is the difference between aided and unaided performance. The real-ear aided gain (REAG) (Mueller, Hawkins, & Northern, 1992), the Hearing Handicap Inventory for the Elderly (HHIE) (Ventry & Weinstein, 1982), and the Abbreviated Profile of Hearing Aid Benefit (APHAB) (Cox & Alexander, 1995) are tools used to measure benefits. Satisfaction is “an internalized construct defined exclusively by the hearing aid wearer" (Humes, 1999, p.28) and is therefore an outcome that can only be assessed through self-report. In his MarkeTrak surveys, Kochkin decomposed hearing aid satisfaction into three different areas: product features, performance in various listening environments, and dispenser service (Kochkin, 2003). The Satisfaction with Amplification in Daily Living (SADL) broke down the concept of satisfaction in a slightly different manner: the subscales are positive effects, negative features, service and cost, and personal image (Cox & Alexander, 1999). Items surveying satisfaction are also incorporated into other questionnaires like the Glasglow Hearing Aid Benefit Profile (GHAPB) (Gatehouse, 1999). Finally, use, or amount of time spent wearing the hearing aid, can be estimated as the number of batteries used during a fixed amount of time or estimated via a daily logbook kept by the hearing aid wearer. When looking at reports of hearing aid use, it is important to keep in mind that empirical data shows that people tend to overestimate their hearing aid use (Humes, Halling, & Coughlin, 1996; Mäki-Torkko, Sorri, & Laukli, 2001). For example, Humes et al. (1996) found the average overestimation of daily use to be four hours. It is most likely that this inaccuracy is caused by the relative complexity of the concept of a mean. The daily use should also not be utilised as the only self-reported outcome as it may not capture important notions of success. Other specific issues arise from the self-report of hearing aid outcomes (for a review, Noble, 1999).

According to the International Classification of Functioning, Disability, and Health (World Health Organization, 2001), the outcome of the intervention can also be seen as the degree of change in participation. Because the factors related to participation vary from person to person, the intervention and the corresponding outcome measures should be tailored to the client's specific needs (Gagné, 1998, 1999; Gagné, Hétu, & Getty, 1995). It is known that people who are hard-of-hearing attribute a different degree of importance to the various listening situations that they encounter (Barcham & Stephens, 1980). Following this idea, the Client Oriented Scale of Improvement (COSI), is a pre- and post-treatment questionnaire that enables the client to nominate listening situations that are meaningful to him or her (Dillon, Birtles, & Lovegrove, 1999; Dillon, James, & Ginis, 1997). The client is asked to name up to five situations where he or she would most like the hearing aid to help him or her. A hierarchical rank is then given to the various needs and the benefits are monitored over time via self-reports. As a general recommendation, a group of experts suggested that clinicians use the COSI along with a satisfaction questionnaire when assessing self-reported hearing aid outcomes (Cox et al., 2000).

Hearing Aid Outcome Results

Typical hearing aid outcomes have been measured among hearing aid owners. For example, Kochkin conducted a series of surveys among the U.S. population. His perspective, at the junction of audiology and marketing, is enriched by the survey of massive cohorts: between 1990 and 2002, he surveyed over 15,000 hearing aid owners (Kochkin, 2003). Forty-one percent of the owners of hearing aids bought between 1996 and 2000 consider themselves as neutral or dissatisfied regarding their hearing aid (Kochkin, 2001). This figure has remained unchanged for at least the past 10 years (Kochkin, 2003). Also, 16% of the hearing aid owners never wear their hearing instrument (Kochkin, 2000). This also remained basically unchanged for the past 20 years (Alberti, Pichora-Fuller, Corbin, & Riko, 1984).

On a more positive note, the average daily use among all people surveyed (including those who reported no use) is 10.9 hours a day (Kochkin, 2003). Among the respondents who reported always using their hearing aid or using it most of the time, 66% indicated a positive impact on their overall quality of life (Kochkin, 2001). The respondents who consider themselves satisfied do not hesitate to state that their hearing aid improves their hearing (76% of respondents) and helps them in one-to-one communication environments (87% of respondents). Not surprisingly, more challenging communication situations yield lower rates of self-reported benefits: even among the respondents who reported being satisfied with their hearing aid, only 26% notice an improvement in large groups and 30% say their hearing aid is useful in noisy situations.

Factors that Influence Hearing Aid Outcomes

Many predicaments can influence the outcomes experienced by hearing aid owners. For the purpose of this review, these factors will be divided into four categories: technology-related, client-related, environment-related, and clinician-related.

Aided performance is influenced by emerging technologies. Hearing aids with digital signal processing, which were developed in the middle of the last decade, quickly gained their share of the market. Hearing aids are becoming less and less visible and some features like multiple programs, directional microphones, and automatic telecoils can be very helpful for some clients. New developments in fitting rationale and fitting software can also allow more flexibility to answer a client's needs.

The client can also have an impact on the outcome of a hearing aid fitting. The type and degree of hearing loss, perceived degree of participation restriction, visual acuity, dexterity, and personality traits are known to play a role in success (Brooks & Hallam, 1998; Cox, Alexander, & Gray, 1999; Humes, Wilson, & Humes, 2003; Upfold, May, & Battaglia, 1990; for a review of the impact of non-hearing-related variables, see Kricos, 2000). However, most of the above mentioned variables seem to have a small effect on hearing aid outcomes and these effects do not consistently influence all hearing aid outcomes (Mulrow, Tuley, & Aguilar, 1992).

Following the model of the World Health Organization (2001), the environmental factors that can have an impact on health are the following: products and technology, natural environment and human-made changes to the natural environment, support and relationships, attitudes, and services, systems, and policies. These factors are also critical to the outcomes of a rehabilitative audiology programme. For example, the physical listening environments (characterised in terms of environmental properties such as room acoustics, lighting, etc.) in which the client communicates will play a role in the relative benefits derived from a hearing aid. In a similar fashion, as part of the social environment, communication partners, either strangers or familiar people who are supportive and open to adjusting their behaviours to the person who is hard-of-hearing, will have an impact on the rehabilitation process. Environmental factors are also a major component of the ecological model (Borg, 1998, 2003; Borg, Danermark, & Borg, 2002) when the coping with hearing loss model describes how behaviours are altered to meet the demands of the environment among people who are hard-of-hearing (Hallberg & Carlsson, 1981).

Finally, the audiologist and other professionals in a hearing health care team can also make a difference. A good knowledge of the field of audiology, an empathic attitude, a comprehensive approach, and the provision of pre-fitting and post-fitting counselling are all factors that make a positive adjustment to a new hearing aid more likely. For example, Brooks (1989) reported a 50% increase of use and a significant increase in satisfaction ratings due to counselling. It is interesting to note that the improvements mostly occurred among people who at first attributed the hearing difficulties to external factors, who minimised hearing handicap, and who reported an important stigma related to hearing devices.

As mentioned previously, these interventions can also be described as predisposing, enabling, and/or reinforcing factors for health promotion (Green & Kreuter, 1991). For example, technical aspects of hearing aid fitting are mostly enabling factors, whereas the impact of social support mainly lies in the predisposition and reinforcement of health behaviour change.

Post-fitting Support

A new hearing aid user has to face many new situations and cope. The audiologist can usually act at two different levels to facilitate this adjustment process. Many audiologists will perform fine-tuning adjustments of the electro-acoustic characteristics of the hearing aid according to the specific reports of the client. The positive impact of these minor changes on objective and self-reported outcomes seems questionable (Cunningham, Williams, & Goldsmith, 2001). The clinician can also offer counselling using a problem-solving approach, a critical aspect of the hearing aid fitting (Mueller & Strouse Carter, 2002).

Counselling

Counselling is a general term encompassing the provision of information and of emotional support in a therapeutic intervention to facilitate adjustment to a potentially stressful situation. Rehabilitative audiologists use counselling on a regular basis, before, during, and after the hearing aid fitting.

Many comprehensive programmes of rehabilitative audiology have been proposed. They usually revolve around hearing aid fitting but also offer other strategies to better cope with the consequences of a hearing loss. It is usually acknowledged that many new hearing aid users would benefit from such counselling. However, it should be noted that at least one study concluded that a significant proportion of hearing aid users (95% in that case) do not feel the need of further counselling concerning their hearing and their hearing aids (Dahl, Vesterager, Sibelle, & Boisen, 1998). However, this conclusion is based upon findings in a particular population, namely adults and older adults who are experienced hearing aids users and who are fitted with new hearing aids. Their sample was therefore composed of satisfied hearing aid users. Moreover, they recorded a 63% level of participation to their survey. Among the main reasons for not participating was lack of motivation. Their sample is therefore different in nature to the heterogeneous caseload of new hearing aid users typical in a hearing aid clinic. The authors also reported that clients under the age of 70 years were more likely to express need for and interest in further counselling. It is possible that more hearing participation limitations as experienced by the young group could have yielded such results. An alternative explanation could be greater assertiveness among the clients in the younger group.

Counselling is usually divided into two subcategories, informational and emotional counselling (Erdman, 1993; Flahive & White, 1981; Sanders, 1975).

Informational Counselling

Informational counselling, also named behavioural counselling, is a form of teaching. The audiologist provides the client with information to help him or her gain a better knowledge of the hearing loss, its consequences, and other possible rehabilitative options. This form of counselling is the most widely used by audiologists (Flahive & White, 1981).

Examples of Audiological Informational Counselling Programmes

Ward (1980; 1981) showed that a one-hour hearing aid instruction session had a significant impact on hearing aid use. Many authors reported that difficulties with operating a hearing aid were at least partially caused by insufficient instruction (Warland & Tonning, 1991; Alberti et al., 1984).

Abrams, Hnath Chisolm, and McArdle (2002) presented a cost-utility analysis where they documented the positive impact of group audiological rehabilitation on mental and physical components of a quality of life scale. Their programme consisted of four 2-hour group meetings focusing on information on hearing, communication strategies, assistive technologies, and community resources available.

Emotional Counselling

Emotional counselling is "working with clients in a way that enhances their self-confidence, in order for them to adjust and to meet the demands of the social environment" (Backenroth & Ahlner, 2000, p. 225). It is also sometimes referred to as self-adjustment, personal-adjustment, or affective counselling. Showing attitudes of empathy, positive regard, and genuineness (Sanders, 1975), the audiologist providing emotional counselling guides the client in dealing with the psychosocial consequences of hearing loss. Audiologists seem to be using this form of counselling a lot less frequently than informational counselling (Flahive & White 1981). English, Rojeski, and Branham (2000) described how some audiologists who are focused more on informational counselling sometimes provided technical responses to emotionally charged client comments. According to these authors, emotional counselling must be recurrent in order to allow the adaptation process, “which requires time and follow-up” (Backenroth & Ahlner, 2000, p. 238).

Examples of Audiological Emotional Counselling Programmes

As mentioned, programmes focused on emotional counselling are less frequent in audiology. After reviewing the impact of hearing loss and its subjacent communication breakdowns on emotional well-being, Danermark (1998) also advocated for a model of rehabilitative audiology that would put more emphasis on the acceptance and the coping aspects as opposed to the compensatory aspects of living with a hearing loss. Backenroth and Ahlner (2000) found that experienced hearing aid users with moderate to severe hearing loss who received emotional counselling mentioned that they made more demands and gained courage to inform others of their hearing difficulties.

Examples of Audiological Informational and Emotional Counselling Programmes

More than two decades ago, Brooks (1979) showed that the provision of counselling defined as instruction and motivation was appreciated and welcomed among all participants of an experimental group. He also noted that the hearing aid users who received counselling made better and more effective use of their hearing aids. In this case, the counselling was mainly informational counselling in the form of additional instruction. Andersson, Melin, Scott, and Lindberg (1995) proposed a treatment composed of four two-hour group sessions of applied relaxation, video self-modelling, exposure, information, and discussions. All these activities were focused on behaviour changes. A very similar programme was proposed on an individual basis over three one-hour sessions (Andersson, Melin, Scott, & Lindberg, 1994). The sessions targeted difficulties reported by the individuals, such as using the telephone or group situations. Both of these programmes yielded greater improvements in the experimental group than in the control group. Abrahamson (1991) considered that one or two sessions of group client counselling as part of the hearing aid fitting were not sufficient to provoke lasting changes; therefore, she proposed the *Living With Hearing Loss* programme. It includes six group sessions where environmental management, principles of behaviour, assistive devices, stress management, cognitive therapy, and coping are presented and discussed.

As counselling needs to be adjusted to the progress and needs of each client, a face-to-face meeting one month after the hearing aid fitting may not be sufficient. Very frequent face-to-face meetings between audiologists and their clients would, however, require major resources that are most likely unavailable, unrealistic to provide, and/or not affordable. For this reason, other avenues have been explored.

Alternatives to Face-to-face Counselling

One of the goals of audiological counselling is a change in behaviour. For example, the goal of an audiologist explaining skills in handling the hearing aid is to see the client become more at ease when inserting and caring for the device. In the same way, a clinician talking about assertiveness with a client wishes to see the client disclose his or her hearing needs more readily. A communication medium that could easily reach a large number of people but that can also send personalised messages has often been described as an optimal medium to yield health behaviour changes.

Rubinstein and Cherry (1988) assessed the effectiveness of mailings as a means of communicating with clients to enable them to disclose needs. Letters were sent to new hearing aid users to encourage them to visit their audiologist if needed. Such initiatives did not lead to more visits even if some problems were present. In this project, 7 of the 33 subjects reported not contacting the centre because of difficulties getting to the centre and 6 because they assumed the problems they were experiencing could not be resolved. This study showed that many needs remained unaddressed. Therefore, the authors indicated two purposes to their mailings: “to educate the uninformed client about which problems are treatable and how to treat them and to remind unmotivated or passive clients of our commitment and our services, for when they are ready to take advantage of them” (Cherry & Rubinstein, 1995, p. 245).

The use of telephone calls for similar purposes was also investigated (Cherry & Rubinstein, 1994; 1995). Phones calls were placed to participants three times during the first three months following the hearing aid fitting. As more problems remained unaddressed in the control group at four months post-fitting, the authors concluded that it was important to further investigate this issue with more aggressive management approaches. The authors described one limit of the telephone as a means of communication in their study: “One drawback is that it cannot be used with clients whose losses preclude satisfactory telephone contact” (Cherry & Rubinstein, 1994, p. 256). They also noticed that a calling schedule that would be more flexible might be adequate and that the best frequency of the calls varied from one participant to another.

Computer applications could be interesting tools as they can both reach many people but also tailor messages to specific populations or individuals. Just like face-to-face counselling, computer programs can be used to send personalised messages to a client (Robinson, Patrick, Eng, & Gustafson, 1998; Skinner, Siegfried, Kegler, & Strecher, 1993). Cassell, Jackson, and Cheuvront (1998) suggested that Internet-based resources could be considered as a hybrid channel between interpersonal and mass communication media.

Internet

The Internet encompasses the transactional characteristics of one-to-one communication. But it also offers the opportunity to reach more people than through face-to-face encounters when confronted to a limited amount of resources like time, personnel, and space.

Internet Use in Canada

The use of the Internet has been increasing rapidly over the past years, especially in industrialised countries like Canada. In 2003, an estimated 64% of Canadian households had at least one of its members who used the Internet regularly, either from home, work, school, a public library, or another location (Statistics Canada, 2004a). Among other factors, a high income, a higher level of education, and a younger head of the household were correlated with the use of the Internet (Statistics Canada, 2004c; 2004d; 2004e).

More interestingly, 55% of all households had at least one member who regularly used the Internet from home in 2003 (Statistics Canada, 2004f). In 2003, among the households who had Internet access at home, 96% reported using e-mail and 65% mentioned searching for medical and health-related information (Statistics Canada, 2004g).

Internet Use for Health-related Purposes

The Internet is a resource that is now commonly used to access health-related information. In 2002, as many as 32% of Europeans and 43% of Americans were reported to have used the Internet to access health information (Eaton, 2002). Canadians also showed similar use rates, with 36% of all households using the Internet to gather health information (Statistics Canada, 2004f).

E-health

E-health is a relatively new area of interest that draws from all health professions.

Definitions and Types

E-health is described as follows: "e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services or information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology" (Eysenbach, 2001).

Tele-health, tele-practices, computer-based health communication, and interactive health communication are other terms commonly used to describe the use of new information and communication technologies to provide health services at a distance. In practice, the term tele-health is mainly used to describe synchronous communication (Bischoff, 2004).

Uses

The potential applications of new information and communication technologies in health care delivery are virtually endless. Applications can be classified in different ways. A major distinction is usually drawn between synchronous (or interactive or live) and asynchronous (or store-and-forward) techniques. Synchronous technologies include telephone, tele-conferencing, or *chatting*. E-mails and websites are examples of store-and-forward applications. Although e-health also encompasses the use of new technologies for clinician-to-clinician and for client-to-client communications, this manuscript will focus on e-mail as a clinician-client communication medium (for an excellent review of the clinical use of e-mail: Car & Sheikh, 2004a; 2004b).

E-mail has been used as a means of communication between clinicians and clients for many years (e.g. Johnston, 1996). It is important to make a distinction between clinician-client e-mail exchanged in the context of an existing clinical relationship or outside it (Kane & Sands, 1998). Unsolicited e-mail or e-mail consultation are usually received after a clinician publicises his or her e-mail address. Special issues arise from such clinical encounters that are not bounded into an existing relationship (Borowitz & Wyatt, 1998; Eysenbach & Diepgen, 1998).

One of the first scientific publications on the clinical use of e-mail reported the main points of a talk during which a psychiatrist shared his experience of e-mail counselling (Johnston, 1996). This anecdotal article is particularly interesting as it raised many of the topics that are still relevant to Internet-based clinician-client communication today. The number of articles and books published on the topic since then has grown exponentially. For example, Hobbs et al. (2003) showed that 68% of the 71 general physicians they surveyed used e-mail with some of their clients. It is interesting to note that this behaviour was correlated with neither physician age nor gender. Seventy-three percent of the respondents estimated that responding to an e-mail took less or a similar amount of time as did responding to other types of messages like voice-mail.

New Possibilities

An increasing body of literature aiming at evaluating e-health is also available. It was suggested by the American Medical Informatics Association that “e-mail follow-up allows retention and clarification of advice provided in clinic” (Kanes & Sands, 1998, p. 105). Psychologists also showed interest in behavioural tele-health applications (Murphy & Mitchell, 1998; Saab et al., 2004; for a review on e-therapy, see Castelnuovo, Gaggioli, Mantovani, & Riva, 2003). For example, two interesting cases of psychotherapy facilitated by e-mail suggested that a daily contact can help clients to focus on their treatment (Murdoch & Connor-Greene, 2000). A randomised controlled trial that compared an Internet-based behavioural therapy programme compared to an Internet education programme both aiming weight loss also showed the superiority of the first intervention (Tate, Wing, & Winett, 2001). Many Internet-based client education and support programmes have also been offered recently (for a review, see Nguyen, Carrieri-Kohlman, Rankin, Slaughter, & Stulbarg, 2004). Among other conclusions, studies that recruited participants without a first face-to-face meeting reported a higher attrition rate. The authors therefore concluded that "this medium should be considered a useful *adjunct or complement* to traditional care and support for patients with various conditions" (Nguyen et al., 2004, p.107). Other sources also have suggested that e-mail should not be used as a substitute for face-to-face contact (Baur, 2000; Kane & Sands, 1998).

Also, computer-based communication can be seen as somewhat more anonymous. It was found that some risk behaviours were more likely to be reported in computer-assisted questionnaires than in interviewer-assisted questionnaires (Riley, Chaisson, Robnett, Vertefeuille, Strathdee, & Vlahov, 2001). Computer applications could potentially be very useful in assessing sensitive behavioural data. On a similar topic, mental health topics were more frequently reported in an e-mail health counselling service offered in the workplace (Kurioka, Muto, & Tarumi, 2001).

Evidence suggests that at least a portion of the population would like to use e-mail for health purposes. In fact, over half of the clients that are already e-mail users showed interest in using e-mail to communicate with their physician but were not aware of his or her e-mail address (Sittig, King, & Hazlehurst, 2001). The willingness of the respondents to communicate with their physician via e-mail was highly related to their daily e-mail activity.

It is difficult to assess the financial consequences of e-health. Many argue that e-health can cut health services costs by minimising transport fees and time required travelling. However, others think that the cost related to the use of e-health (specialised training, support personnel, equipment costs, etc.) are also important. A systematic review of the socio-economic impacts of e-health was performed (Jennett et al., 2003). Evidence of benefit from e-health, defined as positive changes in the social determinants of health or in factors affecting the socio-economic performance of a population was found. However, the authors noted that the eclectic nature of the data published made it difficult to formulate generalised conclusions.

Obstacles and Limits

The clinical use of new information and communication technologies has yielded an increasing number of clinical, operational, and technical guidelines and standards (for a review, see Loane & Wootton, 2002). Most of them are related to privacy, confidentiality, and informed consent.

Another major concern for many authors is the potential amplification of pre-existing inequities in health care utilisation among socio-economic classes (Dickerson & Brennan, 2002; Rogers & Mead, 2004). This concept is sometimes called digital or technical divide or inverse information law. Also, the Internet requires a certain level of reading ability. It was shown that most of the health information available on the Internet requires a high school level or greater reading level (Berland et al., 2001). According to the penetration rate of computers and the Internet, it seems reasonable to expect that concerns related to unbalanced Internet access among socio-economic classes could be irrelevant in a couple of years (Nguyen et al., 2004). However, other factors linking a low socio-economic status and a reticence to use the Internet for health purposes, like literacy or self-efficacy, may still pertain. For example, many clients with a chronic disease refused the opportunity to learn how to use the Internet to gain more knowledge on their health condition (Rogers & Mead, 2004). Rogers and Mead (2004) also mentioned that the health information available on the Internet could induce anxiety in some clients as it can be seen as interfering both with usual coping mechanisms and with the traditional work of clinicians.

The implementation of new technologies on a larger scale may also be difficult because of questionable programme implementation tools. Pagliari, Gilmour, and Sullivan (2004) described a situation in Scotland where the costs of implementing new procedures may outweigh the benefits, at least from the clinicians' point of view. In fact, many did not feel that the new system would improve clinical efficiency or effectiveness. Other factors like the involvement of clinicians in all phases, tangible benefits to the population of interest, and reliability of the systems used are of paramount importance. Clinicians can sometimes be reticent to use e-mail because they are not currently reimbursed for such practices. As a physician reported, "if no one is going to pay you for the time, it is not cost-effective to use e-mail." (Patt, Houston, Jenckes, Sands, & Ford, 2003). The fear of an increased workload due to numerous e-mails was also present both among physicians (Hobbs et al., 2003; Kuppersmith, 1999; Patt et al., 2003) and other staff members of primary care clinics (Kittler et al., 2004). Physicians were also found to use specific candidacy criteria before disclosing their e-mail address to clients; however, these criteria remained unclear (Patt et al., 2003). A recent content analysis of over 3,000 e-mails exchanged between physicians and their clients suggested that potential clinician fears like reception of lengthy or irrelevant e-mails or the use of e-mail to ask urgent questions were in reality very uncommon (White, Moyer, Stern, & Katz, 2004). The authors concluded that clients were adhering to the e-mail guidelines proposed to them by their clinician.

Some also argued that e-mail, by instigating a technical and instrumental level to the clinician-client relationship, is likely to further handicap their already fragile communication: "There is a large gap between the deliberative ideal and the reality of patient-physician interactions, regardless of whether Internet technology is involved in the encounter" (Baur, 2000, p.255). This statement can certainly apply to audiology as well.

As an emerging field, e-health literature is sometimes described as lacking strong evidence and reliable measures. Research needs and tools in the field of *health technology assessment* are in development (Williams, May, Mair, Mort, & Gask, 2003).

Beyond Technology

Because the Internet offers an almost infinite amount of information for the client, e-health is redefining the clinician-client relationship (for a review, see Ball & Lillis, 2001). Current trends like managed care are also encouraging clients to assume greater responsibility for their health. However, the clients' participation in health care remains feared by some clinicians who historically played a dominating role in their professional relationships (Dickerson & Brennan, 2002).

Some physicians reported fearing the influence of the Internet on their daily practice. For example, 38% of the 1,050 physicians surveyed by Murray et al. (2003) mentioned that clients who brought information gathered on the Internet during a visit made the consultation time less efficient. Seventeen percent of the sample also thought that clients who brought information to a visit were challenging their authority. The Internet is a source of knowledge and a critical appraisal of the results of a search can provide up-to-date information that the average general physician may not possess. This mass of knowledge now available to the clients can shift the power from the clinician to the client, or from a traditional (or paternalistic or provider) approach to a managed care approach. A more participative and consumer-oriented model of health care is proposed and advocates for joint decision-making between clients, providers, and communities (Dickerson & Brennan, 2002). This new approach could obviously be applied to the audiologist-client relationship. For example, well-informed clients could ask for a more active role in the choice of the characteristics of their hearing aid and the frequency and content of follow-up appointments. They could also ask for specific rehabilitation programmes. It is worth mentioning that this egalitarian vision of health care certainly has some limits. Some clinical appraisal techniques and previous knowledge are needed in order to use Internet-based health information effectively.

Audiology and E-health

Audiology clients also use the Internet. In 2001, 34% of American hearing aid owners had access to e-mail (Kochkin, 2002). Tassone, Geaorgalas, Patel, Appleby, and Kotecha (2004) surveyed clients of a London Ear, Nose, and Throat clinic on their use of the Internet. Sixty-four percent of them reported having access to the Internet. It is reasonable to assume that these figures are similar among Canadian audiology clients.

Guidelines and Position Statements

Because e-health is quickly gaining popularity, various organisations felt the need to publish regulatory documents in order to protect both the clients and the clinicians. It is beyond the scope of this document to list all these guidelines and position statements. However, it is interesting to note that such documents were published (and many others are being developed) in the field of audiology. For example, a working group of the American Speech-Language-Hearing Association (ASHA) published a comprehensive report on e-health in the field of communication disorders (ASHA, 2001). This document contained recommendations, one being to conduct a survey of tele-practices among their members. The next section provides some of the main outcomes of this survey. The ASHA working group will also publish a position statement on the use of tele-practices by audiologists (ASHA, in press).

The Canadian Association of Speech-Language-Pathologists and Audiologists is also working on guidelines that will address the use of tele-practices and the College of Speech-Language-Pathologists and Audiologists of Ontario (2004) recently published a position statement named *Use of Telepractice Approaches in Providing Services to Patients/Clients.*

In general, these documents all start with the same premise, which is that new technology can overcome some of the barriers to access. Clinicians are usually required to conform to their code of ethics, laws, and the policies of regulatory bodies and associations when providing services at a distance. Also, particular attention is drawn to informed consent, confidentiality, and privacy issues.

Also, Meline and Mata-Pistokache (2003) warned audiologists and speech-language pathologists against the potential pitfalls related to the clinical use of e-mail. This article, written in an alarmist tone, encouraged clinicians to use some of the precautions suggested previously in more complete articles (Kane & Sands, 1998).

E-health Applications

A telephone survey that assessed the extent to which ASHA members provide clinical services via tele-practices was answered by 1,667 people (ASHA, 2002). The term tele-practice was defined as “the application of telecommunications technology to deliver professional services at a distance” (ASHA, in press). Twelve percent of the responding audiologists mentioned delivering services through tele-practice. Not surprisingly, the two most frequently used technologies were telephone (93%) and e-mail (74%). Forty-six percent of audiologists using tele-practice were working in a non-residential health care facility such as a private practice while 26% were practising in a hospital. The vast majority of the audiologists using tele-practice also reported that they usually used it to contact their clients while the clients were at home. The most frequent types of services provided were counselling (83%) and follow-up (68%).

Other applications of new information and communication technologies in the field of audiology have been published. Givens and Elangovan (2003) showed the reliability of audiometric results gathered from an audiologist using a computer, the Internet, and a remote computer to test people in another location. This application mainly targets under-served populations living in remote areas. Similarly, Krumm and Ribera (2003) described a research project in which the follow-up services of an early hearing detection and intervention programme were provided at a distance.

Cummings, Sproull, and Kiesler (2002) demonstrated how an online support group can offer help to people living who have a hearing loss. Beyond Hearing, a subscription distribution list, has been running since 1994. Like most online support groups, it is not sponsored, it is run by non-professionals, it has no entrance criteria except for online access, and does not identify its members. Interestingly, Cummings et al. (2002) noticed that the participants who lacked real-world support participated more, along with the people who felt more effective (defined as less disability, coping more effectively, and using real-world professional services). In other words, the online support group they studied seemed to gather people with various predicaments. The level of participation of the online support group members was also positively correlated to their reported benefits.

An Internet-based cognitive behaviour therapy was recommended to clients with tinnitus (Andersson, Strömgren, Ström, & Lyttkens, 2002). All treatment and contact with participants were performed via a website and e-mail. Although the outcomes for the experimental group were more favourable than the ones for the control group, a 51% dropout rate was observed in the experimental group. The most frequently reported reason for dropping out was lack of time. The absence of a face-to-face encounter with one of the investigators as reported in the article could also partially explain the high dropout rate.

As some information and communication technology applications have been successfully applied within audiology practice and as e-mail is widely used as a clinician-client communication tool, the use of e-mail for audiologist-client communication deserves further investigation.

New Possibilities

E-mail could be an interesting tool for the provision of timely and effective audiological counselling to new hearing aid users. As seen previously, this communication tool could yield behavioural changes. Clients may also be more at ease when communicating by e-mail when sharing thoughts about the psychosocial consequences of hearing loss. For example, it was concluded in an audiological rehabilitation study that "sending the patient a questionnaire which he could complete on reflection in his own home would give more realistic and valuable results than one administered in the sometimes stressful environment of a clinic or hearing aid centre" (Barcham & Stephens, 1980, p. 49). In fact, the Internet could allow clients to provide a self-report of hearing aid outcomes in the comfort of their homes, without feeling time pressure or the stress of being in an environment they do not control. Audiologists could also use this tool to provide both informational and emotional counselling to new hearing aid users.

Rationale for Approach to Current Study

The aim of this study is to explore how an e-health approach can be used to facilitate communication between a new hearing aid user and his or her audiologist. The communication can go from the audiologist to the client (for example counselling) or from the client to the audiologist (for example report of experiences with the hearing aid. This study is not attempting to guide the audiologist in the implementation and provision of Internet-based services. Readers who are interested in learning more about procedures should refer to the latest guidelines and position statements available (for specific guidelines on the clinical use of websites, see Winker et al., 2000; for specific guidelines on the clinical use of e-mail, see Kane & Sands, 1998; for an adaptation of the last guidelines to otolaryngology, see Kuppersmith, 1999; for a review of available guidelines, see Loane & Wootton, 2002).

Needs for Counselling

Since many new situations occur right after the hearing aid fitting, it was decided to provide an Internet-based audiological counselling programme to new hearing aid users in the first month following the hearing aid fitting.

Level of Technology Preferred

It was decided to use technology that is widely available and that would not necessitate extensive training, support personnel, or extra equipment costs. Accordingly, e-mail was chosen because it is the most widely available Internet-based option and its content can very easily be tailored to individual clients.

The Study Questions

This research project has two questions, both focused on adults who are new hearing aid users and the first month following the initial hearing aid fitting appointment:

- How can an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist be used to gather information about the day-to-day experiences of new hearing aid users?
- How can an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist be used to gather information about and respond to new hearing aid users' needs for informational and emotional counselling?

The Study Propositions

It was predicted that:

- An Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist would yield meaningful information about the day-to-day experiences of new hearing aid users. For example, *extreme* experiences (either positive or negative peaks of perceived benefit or satisfaction) that may determine the general satisfaction and adjustment of the clients will be more easily reported during a daily e-mail contact than at the typical one-month follow-up face-to-face appointment. These experiences will be related to meaningful situations for the clients such as communication with their significant others.
- Clients will differ in the type of benefit they receive from the Internet-based audiological counselling programme with an audiologist. In terms of informational counselling, the programme will enable some clients to share their experiences and/or to get answers to questions as they arise. In terms of emotional counselling, some clients' needs and predicaments for emotional counselling will arise and be addressed. Clients will differ in the degree of benefit they receive from the Internet-based audiological counselling programme with an audiologist. Some will consider it a time-consuming commitment, an intrusion in their privacy, and/or an inadequate way to answer their needs.

Summary

This chapter reported the relevant literature to this research project. The project rationale was then elaborated. The next chapter will describe the methodology in further details.

CHAPTER 3
METHODOLOGY

Overview

The present chapter provides a description of the specific methodology chosen. A rationale for the study design chosen is presented. The study design, types of data, and methods of analysis are explained. The chapter ends with a discussion of other concepts relevant to ethics and validity.

Rationale for Methodology

This section will describe the motives for the methodology.

Appropriateness of a Qualitative Methodology

As described earlier, the goal of this research project was to better understand how the Internet could be used as an audiologist-client communication medium. Various study designs could have been used to gain information on this new approach. However, as very few previous studies on this specific topic could be used to guide the design of this research, the study was designed with a view to discovering the general concepts relevant to this new model of service delivery.

Quantitative methodology is best suited to answer questions that can be answered by a yes or a no, or alternatively by a number. Quantitative research studies "emphasize the measurement and analysis of causal relationships between variables, not processes" (Denzin and Lincoln, 2003, p. 13).

In contrast, qualitative research is best suited to provide answers that explain the circumstances under which a phenomenon occurs. In general, qualitative research refers to the production of findings without the means of statistical procedures or other means of quantification (Strauss & Corbin, 1998). For example, "qualitative studies may pursue a variety of theory-generating aims, including to explore and describe social phenomena faithfully […], to identify potentially important variables or concepts, to recognise patterns and relationships, and to generate coherent theories and hypotheses" (Giacomini & Cook, 2000a, p.358). In general, findings generated by research projects using qualitative methods are becoming more and more valued in the provision of evidence-based health care (Barbour, 2000; Giacomini & Cook, 2000a, 2000b; Malterud, 2001).

Qualitative Research and Audiology

Qualitative research has been successfully used in audiology, mainly to explore the psychosocial consequences of hearing loss. For example, the experiences of people living with a hearing loss (Heine & Browning, 2004; Hétu, Riverin, Lalande, Getty, & St-Cyr, 1988; Karlsson Espmark & Hansson Scherman, 2003) and the impact of hearing loss on intimate relationships (Hétu, Jones, & Getty, 1993) were investigated using qualitative methods. Similarly, Russ et al. (2003) investigated the reactions of the parents of children diagnosed with a hearing loss following neonatal hearing screening. In another study, Backenroth and Ahlner (2000) interviewed thirty participants to an audiological counselling programme in order to gather their thoughts on their quality of life as hearing-impaired individuals. They presented their results as a series of case reports.

Qualitative Research and E-health

A qualitative analysis is well suited to the study of "health beliefs, common topics, motives, information, and emotional needs of patients" (Eysenbach & Wyatt, 2002, p. 211). Qualitative research can be used in e-health to investigate experiences and thoughts coming from the clients (Ralston, Revere, Robins, & Goldberg, 2004), as well as from the clinicians (McAlearney, Schweikhart, & Medow, 2004).

For example, beliefs that preclude the use of the Internet for health purposes have been disclosed using in-depth interviews. These beliefs would probably have been missed if other types of data had been collected. For example, a 62 year old retired participant with a chronic disease explained why she refused a free Internet and health orientation session: "My daughter's been left by my son-in-law and it was the Internet that did it, so I just don't want to know anything about it, you see" (Rogers & Mead, 2004, p. 105). Information that clients with cancer would have liked to find on the Internet were assessed using qualitative methodology (Rozmovits & Ziebland, 2004) as well as the consequences of accessing information on the

Internet on clients' experience with cancer (Ziebland, Chapple, Dumelow, Eans, Prinjha, & Rozmovits, 2004). The effect of Internet and e-mail on the quality of life of homebound older adults was also described using phenomenology (Nahm & Resnick, 2001). An investigation of in-depth interviews during which physicians were commenting on the use of e-mail with their clients also yielded very rich results (Patt et al., 2003). van't Riet, Berg, Hiddema, and Sol (2001) demonstrated how qualitative data can give information of paramount importance in the implementation of a new Internet-based intervention. In their study, data gathered during interviews helped explain why the website they designed for their clients, children with amblyopia, and their families was underused. Qualitative results help them conclude that their services were not answering their clients' needs for information and support.

Case Study Design

According to Yin (2003, p. 13), a case study "investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Case studies usually have many topics of interest, therefore using various sources of data. A case study is well suited for this research project as it makes it possible to compare the multi-dimensional context and experiences of new hearing aid users.

As Stake (2003) pointed out, case studies can be seen as a step towards generalisation. He described case studies according to different parameters, calling for a difference in purposes between intrinsic and instrumental case studies. Intrinsic case studies focus on the understanding of a particular case itself, whereas instrumental case studies investigate an issue or a generalisation through a case. An instrumental design suited the topic of interest as the research project bears an interest in both the general and the particular.

A prospective design was also chosen in order to be able to follow the time sequence of the various events that occur when a person acquires a first hearing aid and is offered Internet-based audiological counselling.

Multiple-case Study

The terminology used to describe the various case study designs varies from one author to another. When one study contains more than a single case, it is usually called a multiple-case design (Yin, 2003). It is also sometimes referred to as a comparative case study, collective case study, or case series. A multiple-case study is an instrumental case study extended to many cases. Such a design offers stronger evidence than a single-case design and is especially appropriate when cases are likely to show dissimilarities. It was therefore deemed preferable to use multiple cases for this experiment. A case series methodology gathering qualitative data to investigate the effect of audiological counselling was used before (Backenroth & Ahlner, 2000).

Yin (2003) and Stake (2003) both suggested that each of the multiple cases be considered as a single experiment. In other words, each case should be used as a way to assess replicability of the previous results. Yin (2003) warned against considering multiple cases as multiple respondents in a survey, following a sampling logic rather than a replication logic. Therefore, for each new case it should either be possible to predict similar results (a literal replication) or to predict contrasting results based on predictable reasons (a theoretical replication). A rich theoretical framework is used to predict results and later on to generalise to new cases. As Yin (2003) explained, "Each individual case study consists of a whole study [...]; each case's conclusions are then considered to be the information needing replication by other individual cases."

The number of cases deemed necessary depends on the number of literal and theoretical replications expected to solidify the framework. Theoretical replications support a strong external validity of the framework proposed (Yin, 2003). Multiple case studies allow the expansion and generalization of theories (analytic generalization) rather than a frequency count of a particular phenomenon (statistical generalization).

Study Design

A description and justification of the site and of the recruitment of the participants follow.

Site

The study was conducted in the Greater Toronto Area in the two first trimesters of 2004. With its 5.1 million inhabitants as of the last census (Statistics Canada, 2004g), the Greater Toronto Area constitutes the biggest urban centre of Canada. Also, an important portion of the audiologists of the country work in the Greater Toronto Area. The delivery of health services for people who have a hearing loss is also somewhat simplified in Ontario as audiologists can dispense hearing aids, which is not the case in all provinces of Canada. The potential situation of a single professional involved in the hearing aid dispensing, instead of the audiologist and hearing aid practitioner dyad, was thought to be a facilitator in the implementation of this study.

Moreover, the inhabitants of the Greater Toronto Area are among the highest Internet users of the country. In 2003, 74% of the households of the Greater Toronto Area had at least one of its members who used the Internet regularly, as opposed to 64% of Canadian households (Statistics Canada, 2004a). Ottawa, Halifax, and Calgary were the only metropolitan areas of the country that surpassed the Toronto region in terms of Internet use. For all these reasons, the Greater Toronto Area seemed to be an excellent Canadian location to conduct such a research project.

Recruitment of the Participants

Each case was constituted of a single client (a participant) and his or her audiologist. The participants of this study were restricted to adults (including older adults) who were new hearing aid users.

The participants were required to fulfil the following eligibility criteria:
- be aged 19 years or more;
- have a mild to moderately severe bilateral hearing loss;
- have one or two hearing aid(s) prescribed by an audiologist;
- have no extended previous experience with hearing aids;
- have sufficient cognitive, visual, and manual dexterity ability to potentially insert, remove and maintain their hearing aid autonomously and to use a computer to exchange meaningful information;
- communicate effectively in English and have basic literacy skills (estimated as at least one year of high school education);
- have daily access to a personal computer with an Internet connection and use electronic mail regularly (estimated as at least once a day);
- have no other aetiology that could compromise adjustment to a hearing aid.

Initially it was estimated that including 10 participants in the project would be sufficient to gather different experiences but also allow in-depth analysis of the data. As discussed previously, the optimal number of participants depends on the number of literal and theoretical replications expected to solidify the framework. In qualitative research, this technique is often referred to as "saturation of the data".

An information package was sent to all eligible audiologists listed in a database available from the College of Speech-Language-Pathologists and Audiologists of Ontario website. All audiologists of the Greater Toronto Area registered on the private practice list who mentioned that they have adults or children and adults as a clientele (as opposed to children only) received the information package. From the database, 28 audiologists mentioned they were practising in either Toronto or nearby communities (specifically, Don Mills, Etobicoke, Mississauga, North York, Oakville, Pickering, or Scarborough). The mailing was composed of an invitation letter (Appendix A), 15 recruitment notices (see Appendix B), the consent form for participants (Appendix C), and the consent form for audiologists (Appendix D). Audiologists were asked to contact the researcher if they had any questions or required any additional information; however, the information package allowed them to start recruiting participants without any further contact.

The audiologists handed out recruitment notices to potential participants. The content of the recruitment notices, contained on a single sheet, was simple and highlighted some general eligibility criteria. The potential participants were requested to contact the researcher, either by telephone or e-mail. After talking to some audiologists, it was apparent that not all recruitment notices led to a call or an e-mail. However, due to the nature of the recruitment method, it is impossible to know the percentage of clients who received a recruitment notice from their audiologist who actually decided not to contact the researcher. It is noteworthy that the same audiologist referred all potential participants who did contact the researcher. When a potential participant contacted the researcher, a short telephone interview followed to determine eligibility for the study (Appendix E).

If the client agreed to participate in the study, an electronic version of the consent form was then sent. The purpose of this e-mail was twofold. First, it allowed the participant to review the information on the research project that had just been shared with them. It was also a way to make sure that he or she had the required computer software and hardware to be in contact with the researcher. A meeting at the participants' preferred location was then scheduled (Appendix F). The written consent was completed at the start of the first visit.

Four potential participants contacted the researcher. One of them could not be included in the study because she had already been using her hearing aid for several weeks before she inquired about the study. All of the other three participants met the eligibility criteria and showed interest in participating in the study.

Internet-based Intervention

Apart from the usual audiological services provided by their audiologists, the participants were offered a daily Internet-based contact with the researcher (trained as a clinical audiologist) during the first month following the hearing aid fitting. The participants were aware that these daily e-mail contacts were a two-way exchange of information and that the researcher would be available to help in any way to support their adjustment to their new hearing aid. Feedback was provided on a daily basis to encourage the participants as they adjusted to using their hearing aid. The Internet-based contact consisted of an e-mail with a predetermined structure but with different content according to the previous comments, questions, or answers provided. A guide to e-mail contacts (Appendix G) was sent to each participant before the first e-mail contact in order to familiarise them with the procedure. Participants were invited to use the *reply* function of their e-mail software in order to create a copy of the e-mail and to answer directly into this copy.

The e-mail subject heading contained the e-mail contact number and the date on which it should be answered. Salutation and answers or comments to previous comments, questions, or answers were provided. Greetings and signature followed. The structured part, which contained three sections, followed. The first section, *The hearing fact of the day*, provided concise information relevant to communication, hearing, hearing loss, hearing aids, or assistive listening devices. The second part, *Questions*, consisted of several questions aimed at assisting the participant in identifying the benefits and limits of his or her hearing aid. The number of questions varied from three to seventeen. Most of the time, this section contained from four to six questions. The two first questions were always the same and were: 1) How many hours did you wear your hearing aids for today?, and 2) What activities did you do while wearing your hearing aids today? Some standardised questionnaire items were sometimes included. The last section *Your comments/experience* was designed as a journal for the participants to write any comments, experiences, or questions that were not elicited by the questions above.

The content of the e-mail contacts was chosen according to the clinical expertise of the researcher and a review of the available literature. A review of the e-literature was also performed in order to get a sense of the information available on hearing aid counselling and to insure that the e-mail contacts would provide a comprehensive coverage of the main topics related to hearing loss and hearing aids. Mrs Lan Cicily Zhang, a student in the University of Toronto at Mississauga undergraduate program in Communication, Culture, and Information Technology, assisted in the project by searching for relevant information that was already available on the internet. The information was collected into a database. The search engine Google was used during the first trimester of 2004 to retrieve pertinent information. Multiple searches were performed using key words such as *hearing*, *hearing loss*, *hearing aids, hearing aid users*, and *hearing aid counselling*. Specifically targeted sources such as known websites and other e-resources, for example the companion floppy disk distributed with the book *Counseling for hearing aid fittings* (Sweetow, 1999) were also included in the database. Searches were stopped when the information in the database became more and more repetitive, indicating that saturation had been reached.

After a thorough review, Mrs Zhang evaluated each document according to a number of factors: category, target population, language level, format, length, visual presentation, and general usability. Please note that a second rater did not evaluate the documents as this categorization was performed to facilitate retrieval of the available literature only. The category referred to the general type of document: it was either described as informational/academic or questionnaire/schedule/tips. The main target populations were potential hearing aid users, hearing aid users, communication partners of hearing aid users, and professionals. The language level was analyzed according to the type of vocabulary and grammar structure used. Its values varied from 1, a document that was easy to read, to 3, a document that was hard to read. The format referred to the file type; for example, .pdf, .doc, .html, or .ppt. when the length was described in pages. The visual presentation was assessed according to the use of images or illustrations, plain or attractive, effectiveness of design. Finally, the usability was a score that encompassed some of the previous factors. The highest usability score, five, was used for documents that were very useful when a score of one described a document that had many flaws. The main topics of each document were listed as well. All evaluative information was organized into an overview table to facilitate comparisons. The information covered similar topics were then brought together into Word files. Several of these files, for example communication tips for people who have a hearing loss, communication tips for communication partners, and hearing aid maintenance were created. These were later used to retrieve potential topics to cover during the e-mail contacts.

Data Collection and Analysis

The data was comprised of verbatim transcriptions of semi-structured interviews performed with the participants and their audiologists, of the content of the e-mail contacts between the participants and the researcher, and of the audiological files of the participants. The strategy used to gather and analyse the data is presented.

Interviews

Before the hearing aid fitting and after the participant met with his or her audiologist for the follow-up visit (usually after approximately 30 days), a one-to-one semi-structured in-depth interview was conducted by the researcher with each of the participants to document their expectations, experiences, and feelings regarding the hearing aid and Internet-based audiological counselling (Appendices H and I). Interviews with the audiologists were also conducted before the hearing aid fitting and after he met with the participant for the follow-up visit (Appendices J and K). Each interview lasted approximately one hour and a half. The interviews with the participants took place in the most convenient environment for them, in their homes, their work environment, or another suitably private location. The interviews with the audiologist took place in the most convenient environment for him, namely one of his clinics. Some interviews with the audiologist were also performed via telephone (Appendix F).

All the interviews were semi-structured in nature. Open-ended questions were preferred. The interviewee was made aware that some questions might be a little more challenging insofar as he or she may never have never thought of such questions. The interviewee was also reassured that he or she could take all the time needed to answer the questions. The interview started with more general questions to make the interviewee feel at ease. At the end of each interview, the researcher also synthesised the interview and asked the interviewee to interrupt if he or she wanted to add or clarify the summary of the interview. This step was a good way to ensure the validity of their answers. At the end, the interviewee also had the chance to comment on the questions. This allowed finishing the encounter on a more casual note. The researcher's training in counselling helped tremendously in conducting the interviews.

The participants and the audiologist were aware that the interviews would be audio-taped. The table microphone used was soon forgotten and gave good sound quality. The participants and the audiologist were assured that the audio-tapes would not be used for other purposes than the verbatim transcription. They were also warned that the researcher would be taking notes during the interview. These notes were particularly helpful in recording visual information like facial expressions and gestures. Some contextual information was also noted; for example, when the researcher would be introduced to a spouse during an informal conversation and would the interviewee would then use the spouse's first name during the interview, a description of the relationship between the person named and the participant would be noted.

E-mail Contacts

Each participant was asked to contact the researcher everyday during the month following the hearing aid fitting. All e-mails were recorded in a chronological order for further retrieval.

Standardised Questionnaires

Three standardised questionnaires were used either during the interviews or in the course of the e-mail contacts. The questionnaires were chosen according to ease of use, availability of norms, and themes covered. The Expected Consequences of Hearing Aid Ownership (ECHO) was sent to each participant on the first day of the e-mail contacts (Cox & Alexander, 2000) (Appendix L). This questionnaire is a companion of the Satisfaction with Amplification in Daily Living (SADL): it encompasses the same 15 statements to which the client has to record his or her agreement among 7 choices ranging from *not at all* to *tremendously*. Just as in the SADL, the final score is the combination of four satisfaction domains, designated as subscales: Positive Effects, Service and Cost, Negative Features, and Personal Image. In the ECHO, the statements are formulated as expectations. The norms used for the ECHO were measured on a population of experienced hearing aid users and are referred to as *reality norms* by the authors (Cox & Alexander, 2000). Most of the participants who contributed to the reality norms were aged between 60 and 89 years old.

The SADL is used to quantify overall satisfaction with amplification (Cox & Alexander, 1999, 2001) (Appendix M). Its global score is correlated with the questions of the MarkeTrak survey (Humes et al., 2002). It was administered to each participant during the e-mail contacts and again at the end of the period. Available norms measured on an elderly population of new hearing aid users were used to analyse the data of the SADL (Cox & Alexander, 1999).

The Client-Oriented Scale of Improvement (COSI) was used (Dillon et al., 1997; Dillon et al., 1999) (Appendix N). The COSI is a measure of benefit that is administered in two phases. In the first phase the client identifies listening situations that he or she would like to have improved. In the second phase, the change in hearing function for the identified listening situation is recorded. This change is noted descriptively among five choices ranging from *worse* to *much better.* The COSI was administered to each client during the first interview. Responses were later explored in the e-mail contacts and in the last interview as well.

Audiological Files

Each participant gave consent for the researcher to obtain a copy of his or her audiological file. Audiograms, along with hearing aid characteristics, were obtained.

Researcher Notes

Pages of notes were also taken at all phases of the research process. Discussions with supervisors in the discipline of audiology as well as colleagues from other fields of interest such as e-health, engineering, psychology, and social work, readings of relevant literature, and conduction, transcription, and reading of the interviews provoked thoughts that were written down. These notes were assembled by themes and used in the analysis. It also proved to be a good way to monitor the contribution of the researcher's own personality and preferences in the project.

Data Analysis Strategy

The data analysis is the act of "examining, categorizing, tabulating, testing, or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study" (Yin, 2003, p. 109). As pointed out by Yin (2003), it can be difficult to analyse the data gathered around case studies as the strategies and techniques used have not been well defined. A data analysis strategy tailored to the kind of questions asked was therefore needed.

Transcribing

Each of the twelve interviews lasted for about one hour and a half, resulting in approximately eighteen hours of material. Only ten of the twelve interviews were available in audio-taped format because of technical difficulties with recording. The two interviews that were not available on audio-taped were abstracted according to the notes taken during the interviews. The researcher performed a verbatim transcription of all ten available interviews. This task takes an average of eight hours per hour of interview. The transcription process proved to be useful in gaining a deeper understanding of the data. As data analysis influences data collection in qualitative inquiry, all interviews were transcribed as soon as possible. Therefore, the transcription of an interview was typically started the day after it was conducted.

Although a more precise transcription of the data was performed, quoting was simplified in this document in order to facilitate reading. Extreme precautions were taken not to distort or over-simplify the utterances while doing so. When quoting, meaningful portions that were not included in the quote are marked as [...]. They mainly indicate paraphrases of ideas already expressed or tangent ideas that were not directly pertinent to the quote. Verbal and non-verbal material that was not meaningful were also omitted. For example, many interjections *like you know* or hesitations that did not seem to be semantically charged were omitted in the citation form without using the [...]. Material in round brackets indicate either words that were not enunciated by the interviewee but that facilitate understanding of the reader or non-verbal transcribed material; for example, (Laughs) indicates that the interviewee was laughing. Readers who would like to get an unaltered version of the quotes may contact the author.

Also, each quote is followed by an identifier. Each identifier is composed of 10 characters and allows quick retrieval of the quotes from the raw data. The first entry of the identifier, one digit, corresponds to the participant identification number (1 for Janet, 2 for Henry, and 3 for Margaret). The second entry of the identifier, one letter, refers the mode of data collection (E for e-mail and I for interview). The third and fourth identifiers have a different format depending on whether the quote is part of an e-mail or of an interview. If the quote was taken from an e-mail, the third and fourth identifiers are two digits and are the day on which the e-mail was sent. For example, 01 refers to the first day of e-mail contacts, when 11 refers to the 11th day of e-mail contacts. Several quotes also have "X" as the third identifier. This identifies quotes that were taken from e-mails exchanged before or after the formal e-mail contacts. If the quote was taken from an interview, the third identifier, one letter, refers to the person with which the interview was conducted (P for participant and A for audiologist). The fourth identifier, one digit, identifies whether the interview took place before the e-mail contacts (1) or after the e-mail contacts (2). The fifth, sixth, and seventh identifiers are the line number in the transcription on which the quote begins. Similarly, the eighth, ninth, and tenth identifiers are the line number in the transcription on which the quote ends.

Coding

All e-mails and interviews transcripts were coded, even if coding is not routinely used in case studies (Yin, 2003). Coding refers to the use of labels, or names, to identify ideas present in the data. Table 1 shows an example of the open coding process on an excerpt of an interview with one of the participants.

Table 1. Example of the open coding process (1IP2-212-230).

Transcription of the interview	Codes
ALL: Now I would like you to describe me the trial period, since you've got this hearing aid. Would you say it was easy for you to wear it, to adjust to it, or did you have to do lots of efforts?	
Janet: Well, I have to remind myself. Because a lot of the time... And in fact, if it hasn't been for your e-mails, I mean, there would have been lots of time when I wouldn't even have bothered. So, yes, I would say I have to make quite a big effort.	Having to think about her hearing aid; Effort Forget about hearing aid E-mail as a reminder, a motivator Hearing aid as an effort
ALL: Was it sometimes, were you getting upset?	
Janet: Yes, oh yes! I get absolutely furious sometimes. (Laugh.) Yes, yes!	Frustration
ALL: In what kind of situations?	
Janet: Well, because I really don't find it easy. The first one (hearing aid) I had that didn't work, that was constantly cutting out, was ok, I could put it in quite easily. But this one I can't. Sometimes it just slips right in and other times I have to take it out and do it again and you know. And I get really, really frustrated trying to change the battery. So you know sometimes I just want to throw the whole thing out of the window and then I remember no, my God, this costs, you know, (Laugh.) more than a thousand dollars and. So I don't. But yes I find it very frustrating.	Insertion difficulties Intermittent difficulties Frustration because of problems changing the battery; Impatience High cost Frustration

Coding by a second person was also performed on excerpts of both interviews and e-mail contacts. The person who performed the second coding has an extensive experience with both hearing loss and qualitative research. The inter-coding level of agreement was initially of about 55%. Most of the discrepancies between the two coders were due to systematic differences in the interpretation of one code. After discussions and redefinition of that code, the level of agreement rose to over 90%.

These codes were then taken to a more abstract level and were brought together using axial coding (Strauss & Corbin, 1998). Table 2 shows an example of how the codes were grouped into concepts.

Table 2. Example of codes and concepts.

Concepts	Codes
Hearing loss	Very inconvenient Getting worse More difficult to cope Needed help
Difficult listening situations	Conversing at a distance Background noise Many people talking at the same time Going to the race tracks British television programs Conversing with people who do not have English as a first language
Negative feelings related to the use of the hearing aid	Disconcertion Annoyance Impatience Feeling furious Hate Panic Feeling mind-set against the hearing aid

The concepts were then organised into three different levels of abstraction: categories, properties, and dimensions. The various codes and concepts were sorted into broader properties. The properties were then put under categories in a table that constitutes the *framework*. From each framework a core category, or the general theme emerging from the data, was also presented. For each of the participants, the framework contains information gathered from the various sources of data (interviews, e-mail contacts, audiological file, and researcher's notes). The framework elaborated from axial coding for each of the participants as well as for the audiologist is presented in this manuscript. The frameworks are then systematically broken down into their different levels of abstraction to facilitate further explanation. Citations are also provided to facilitate the understanding of the concepts represented in the framework.

Ethical Considerations

The protocol of this research project was approved by the Research Ethics Board of the University of Toronto. Particular precautions taken to assure the protection of the participants are reviewed here.

Informed Consent

Ethical issues of informed consent were addressed as mentioned in the consent forms that were signed by all participants and the audiologist. The audiologist approached the potential participants who met general eligibility criteria, gave them a one-page description of the research project along with the study contact information, and suggested them to contact the researcher if they were interested in participating in the study. The researcher then discussed the project with the potential participants over the phone. It was made clear to the participants who decided to be part of the study that they would receive the same services from the audiologist as were received by other clients. The potential participants were prompted to ask questions about the research project if they were to have any at any point. The consent forms were sent to them prior to the visit, which allowed them enough time to read it and ask questions about it before meeting. The consent form was then signed at that meeting. Before, during, and after the project, any questions were answered immediately.

Confidentiality and Privacy

This research project asked for specific precautions regarding confidentiality and privacy. First, it was explained to all participants that the information shared with the researcher was not going to be revealed to their audiologist. At no point in the study did information regarding a client was shared with the audiologist unless a participant explicitly asked so.

All dispositions were taken to make sure the Internet exchanges conformed to the guidelines published in the field of the clinical use of electronic mail (Kane & Sands, 1998). In order to ensure the confidentiality of the e-mail contacts, depersonalised e-mail accounts were created by the Computing Services of the University of Toronto at Mississauga. Accounts were offered to the participants, allowing them to have an e-mail address other than their usual personal e-mail address for use in the research project. The participants could access their depersonalised e-mail account using a web browser like Windows Explorer or Netscape Navigator as the e-mail accounts set by the Computing services of the University of Toronto at Mississauga were web-based. The accounts were secure as they were depersonalised: only the researcher could identify the participants according to their e-mail accounts. Also, the password authentication process was encrypted with the 128-bit Secure Sockets Layer (SSL) protocol. The interface used was Internet Message Program. Even though it is an intuitive interface, *a help to new users* and a *tips and issues* sections were available on the website and the researcher was available to help with the e-mail accounts as well.

Only one of the participants preferred to use the depersonalised e-mail accounts available. Both remaining participants chose to use their personal e-mail account. Also, none of the participants expressed concerns related to privacy or confidentiality.

The content of the e-mail contacts were stored on one single computer using codes to depersonalise the information. The audio-tapes and the verbatim transcriptions of the interviews were also depersonalised using codes. All the raw documents (consent forms, e-mail contacts, audio-tapes, and transcriptions) will be destroyed five years after the end of the study.

"Off the Record" Comments

Many comments were made outside of the recording period. The way these comments were treated depended on their content. If they were relevant to the topic of interest, they were noted.

However, some comments were personal and were therefore omitted. In a similar way, comments made during the interviews or in the e-mail contacts that were considered by the researcher as very personal were not included during the coding process.

Roles of Researcher vs. Clinician

It was sometimes difficult for the researcher to combine the various roles in this research project. The researcher was presented to the participant as both an audiologist and a student conducting a research project. In fact, the researcher was in charge of the design of the study, the collection of the data (including conducting the interviews), the e-mail contacts, and the interpretation of the data. During the e-mail contacts, the researcher mainly adopted a role of clinician, providing counselling just as a clinician would do. The role of researcher was mainly adopted when presenting the research project and meeting for interviews, therefore not deliberately elicit clinical questions. When it happened, the researcher usually answered briefly, as not doing so would not have been consistent with the nature of the relationship built with the participants.

Assessing Validity

Validity can be broken down in its various components to facilitate further description.

Construct Validity

In order to ensure the validity of the construct, one needs to select the specific phenomena to be studied and determine how to measure them in an appropriate manner (Yin, 2003). In this study, a mixture of standardised and non-standardised measures were used in an attempt to cover the major phenomena related to adjustment to a new hearing aid and Internet-based audiological counselling. The standardised tests were described earlier. The other questions were derived from three different sources. First, previous knowledge and clinical experience gave the researcher insight on the issues that may be of importance. An extensive review of the literature also allowed the researcher to grasp the major themes reported in relevant studies. Finally, the design of the study permitted a constant refinement of the best measures in order to address the relevant phenomena. In other words, lessons were learned from the previous case(s).

The use of multiple sources of evidence is one of the advantages – and necessities- when conducting a case study. "The development of converging lines of inquiry" (Yin, 2003, p.98) is of paramount importance in case studies. Also called data triangulation, corroboration of results coming from different measures ensures their validity. Here, interviews with the participants, Internet-based contacts, interviews with the audiologist, and content of the audiological files allowed the assessment of the relative convergence of the data.

A chain of evidence was also followed. This principle advocates for a transparent data collection procedure that an external observer can follow to extract his or her own conclusions according to the data. This procedure will be followed throughout the results section. The data was also organised in a simple fashion to facilitate later retrieval as suggested in many case study methodology textbooks (Yin, 2003).

Internal Validity

Internal validity refers mainly to the degree of certitude with which one formulates a causal relationship. Obviously, causal relationships that do not encompass an element of doubt are rare in clinical research. In this particular study, one could want to question the *degree of truth* of the data. As all data was self-reported in nature, precautions were taken to insure that the data would reflect the truth and would not be biased. First, all participants were volunteers and did not receive any major incentive to participate in the study. They were made aware that the information disclosed to the researcher would not be revealed to their audiologist, therefore decreasing the likelihood of a bias for socially acceptable reports. It was also mentioned many times over the experimental phase that questions asked had no right or wrong answers. Before all interviews, the researcher also reassured the participants that they could take all the time needed to answer the questions and that the researcher had no time constraint. This was done to make the participants feel at ease with taking a pause to think about a question before answering it. The interviews were also semi-structured in nature, therefore allowing the expansion of topics to relevant ones for the participants. The use of open-ended questions instead of multiple-choice or yes-no questions also allowed a richer description of each participant. Areas of uncertainty in the interpretation of the data were also identified. All these measures increase the internal validity of both the data and the conclusions.

External Validity

The results of a study are externally valid when they can be generalised. One may point out that the small number of participants is likely to impair generalisation. However, as mentioned earlier, a multiple case study design lies on analytical generalisation rather than statistical generalisation. In this study, the use of multiple cases increases the likelihood that the inferences made truly happened. This issue will also be discussed in the last chapter.

Reliability

In case study research, reliability refers to the replication of similar results when using the same procedure with the same cases (Yin, 2003). Such an outcome attests of few measurement errors and biases. The level of agreement between two independent coders was over 90%, suggesting excellent replicability of the coding process. As the methodology is well documented and the interview guides are available, other investigators who would want assess the replicability of the results could easily do so.

Summary

This chapter provided an outline of the use of qualitative methodology in audiology and in e-health. A multiple case study design using qualitative data was chosen. The data and the participants were discussed along with ethical and validity considerations. The next chapter will introduce the audiologist.

CHAPTER 4
THE AUDIOLOGIST

Overview

This chapter will describe the audiologist who participated in this study. It was deemed important to gather and analyse the thoughts of the audiologist involved in the process in order to better understand what a clinician thinks of an Internet-based counselling programme.

General Description

The audiologist was first interested in audiology because of an elementary school friend who became an audiologist. He graduated with a Master's in audiology from a Canadian university in 1999 and he has been working in the same six clinics in the Greater Toronto Area since then. His caseload is very varied: he sees children from the age of three years old as well as older adults. His practice is centred on hearing aid fitting, but he also provides other types of audiological services such as central auditory processing disorders assessment and management. His main clinical interest is amplification and, more specifically, new technical developments in digital hearing aids.

In terms of his amplification practice, the audiologist reports a low hearing aid return rate. He usually schedules a follow-up appointment about a month after the hearing aid fitting and then suggests a yearly appointment. He likes to use the material provided by the hearing aid manufacturers: "Most hearing aids come with a little diary or a user response book. And so (the clients) go through it and they answer the questions after they've been using (the hearing aid) for a while. And I get people to fill that out because it provides quite useful information for fine-tuning" (1IA2-164-167). Regarding self-reported hearing aid outcomes, the audiologist also asks his clients about their average daily use. However, other than the questionnaires provided by the hearing aid manufacturers, the audiologist does use self-report questionnaires to evaluate hearing aid outcomes.

The audiologist is an avid computer user. He likes to work on his home computer in his leisure time and he created a website for one of his clinics. He does not share his e-mail address with clients except for the few who explicitly ask if they can contact him via e-mail. Also, the audiologist does not plan to further integrate the Internet in his practice in the near future.

Experiences and Opinions on the Clinical Use of the Internet

Two interviews were conducted with the audiologist for each of the three participants, hence a total of six interviews. These interviews were mainly centred on one particular participant but general thoughts were also gathered.

An overview of the audiologist's experiences and opinions for each of the participants is embedded in each of the following chapters. On a general note, the audiologist considered the three participants as relatively successful hearing aid users. He explained how the three participants were not representative of the usual array of clients: "All of your clients are actually going to come out to be pretty similar in a lot of ways. So it will give you kind of one perspective on hearing aid fit. It would have been good to have the opposite or somewhat, like a client that was having difficulties and having significant issues" (3IA2-195-198).

For the audiologist, technology is the cornerstone of audiology intervention: "If (a client) is experiencing an issue in a particular area, you want to attempt to address that issue to the best of what current technology can do" (1IA2-390-391). He also described the qualities of a good audiologist: "It's picking the appropriate device, giving a really good fit, making sure the aid is comfortable, and also being able to respond to feedback. So when the patients have a complaint, knowing what to adjust. They'll say: "I'm having issues with that." But what does that mean in terms of settings of the hearing aid, what do I adjust to fix that, what ranges, what controls do I need to do to make that better?" (3IA2-293-298).

When asked to share his predictions on the outcomes of the proposed Internet-based audiological counselling programme, the audiologist mentioned that participation to the project could potentially yield a lower satisfaction level. He explained that, having to spend more time thinking about their hearing, hearing loss, and hearing aid, clients might be more prone to negative observations.

Only answers and comments provided by the audiologist that were related to the clinical use of the Internet were analysed here.

Audiologist's Theoretical Framework

The core category or theme that emerged from the interviews conducted with the audiologist is "the Internet as an audiologist-client communication tool". The three categories were: "client-specific predictors of benefits from the clinical use of the Internet", "limits of the clinical use of the Internet", and "benefits of the clinical use of the Internet". The following table enumerates the categories, properties, and dimensions based on the audiologist's interviews.

Table 3. Framework related to core category: The Internet as an audiologist-client communication tool

Categories	Properties	Dimensions
Client-specific predictors of benefits of the clinical use of the Internet	Experience with Internet	Estimated by occupation
	Psychological dimensions	Cognitive style Approachable clinician Potential benefits
Limits of the clinical use of the Internet	Technical limits	Bandwidth Software
	Superiority of face-to-face communication	Role of the audiologist Hands-on demonstrations Placebo effect of face-to-face communication
Benefits of the clinical use of the Internet	Communication tool	Sharing specific issues

The category “client-specific predictors of benefits of the clinical use of the Internet” has two different properties. First, the audiologist systematically linked the estimated experience the client had with the Internet with the potential benefits of Internet-based audiological counselling: “If I was going to offer that service, she would be one that would benefit more, again because of her habits, because of her patterns of daily life. She already benefits from the use of the Net. She likes using e-mails, she uses e-mails to contact her sons as I recall. So she would be a good candidate for Internet follow-up because it’s a tool that she is comfortable with and that she uses regularly anyway” (1IA2-344-348). The audiologist also estimated the degree of familiarity of clients with the Internet according to their occupation: “He, because of his position, uses the Net at work. He’s familiar with that tool and I think that he would definitely take advantage of it” (2IA2-144-145).

Psychological dimensions were also referred to as a predictor of the success of the Internet-based audiological counselling programme. The audiologist speculated that the cognitive style of a client was predictive of the expected benefits of an Internet-based audiological counselling programme: “He’s a fairly savvy individual. So I think (the Internet would be) a little more potentially helpful than the average client, in this case” (2IA1-073-075). On a similar topic, the audiologist noted that clients who use the Internet are also likely to get more benefits from a hearing aid: “The subjects for your project typically would be probably a little higher on the curve of people that are more likely to adjust well. I guess they’ve got capacities or they’ve got abilities that perhaps other people do not... They’re a little bit more savvy, they may be more professional-style people, etc. So those people are probably going to adapt to something new such as a hearing aid a little bit easier than potentially some others” (3IA1-016-020).

According to the audiologist, the fact that the clinician clearly offers the Internet-based audiological counselling programme to the client and that the client can visualise the potential benefits of such an intervention can also influence benefits of such an intervention. In this situation, the audiologist referred to the way the researcher introduced the programme to the clients: “I would assume that they would be willing to contact you, assuming that they feel that you’re approachable and that you don’t mind and that you’re going to be helpful for them” (3IA1-084-086). He also described this same idea in other words: “The only barriers could be potentially, simply psychological. If (the participant) is not as open to that as (the participant) potentially could be, that might be a barrier...” (2IA1-096-098).

The next category is "limits of the clinical use of the Internet". According to the audiologist, the current bandwidth that most people have access to is an important limit to the clinical use of the Internet: "I think bandwidth in general will be a factor in going to the next step. As far as using the Internet as a communication tool, I think a modem is fine. If we're getting into areas of multimedia presentations or things where you're gonna be using webcams and doing dialogues on a one-to-one immediate basis, bandwidth is definitely an issue" (1IA2-416-418). He also added: "But if you're going from one to another and you're looking at this video and you wanna look at the next one and it's a long waiting period it's not practical" (1IA2-440-442). He also talked about possible difficulties inherent to software needed for audio-video presentations, for example aiming at the insertion of the hearing aid: "You could have a video to demonstrate this issue so that (the participant) can see it in practice. (The participant) would have to have broadband, (the participant) would have to have (Windows) Media Player, lots of prerequisites to use the Net to sustain that" (3IA2-236-238).

When describing pros and cons of the clinical use of the Internet, the audiologist often referred to his role as an audiologist in the fitting of hearing aids. He seemed to focus his follow-up services offered to new hearing aid users on fine-tuning of the electro-acoustic properties of the hearing aid: "For most digital hearing aids, you can't do anything without connecting them to your computer. So if the patient has a complaint you ain't going to change anything without connecting it to Noah, to Hi-Pro" (2IA2-156-158). When discussing about expectations that a client can have, the audiologist added: "Expectations lead to changes in the program or buffing of the mould. If (the client) is experiencing an issue in a particular area, you want to attempt to address that issue to the best of what current technology can do. [...] And I'm usually fairly successful at getting a good, I guess the word would be frequency-response, at matching the hearing aid program to an individual's personal needs" (1IA2-390-395). He also mentioned the inadequacy of the Internet in the case of hands-on demonstrations of how to manipulate the hearing aid: "Regarding instructions on how to insert and remove the hearing aid, there is no substitute for one-on-one, currently. I definitely would not be going webcam for (a client) and showing (the client) how to take the aid in. [...] Obviously I think that it's better to get immediate feedback, to show people first hand how to put the device in" (1IA2-363-371). In another occasion, he added: "I think that the biggest thing that may be difficult to address (via the Internet) would be issues related to insertion and removal, instructions on how to do that. 'Cause often showing the person and actually doing it is actually more helpful than talking about it or writing about it" (2IA1-088-090). According to the audiologist, a face-to-face meeting with minimal intervention can also improve satisfaction, phenomena that he relates to the placebo effect: "Most times it's better to see (the clients) anyway, just for psychological reasons. They feel better when they can come in and see you even if you do an adjustment that may not be that much of a difference, psychologically it's better for them because it's been adjusted. We definitely have a little bit of a placebo effect going on" (2IA2-153-156).

The category "benefits of the clinical use of the Internet" is composed of the property "the use of the Internet as an audiologist-client communication tool". The audiologist experienced one particular situation in which he thought the Internet was used efficiently by one of his clients: "I think from my perspective the main value of the Internet in its current form, with the amount of bandwidth that the average person has, is primarily at this point in time a communication tool. It would be useful for (the client) to be able to communicate to me specific issues that (the client) was having. For example if (the client) didn't write them all down at the time that they happened as (the client) mentioned to me the first time when (the client) sent me the e-mail regarding the (first hearing aid). Something that had happened and it was fresh in (the client's) mind and (the client) sent me an e-mail because (the client) was able to explain exactly what it was. (The client) would be able to, I guess, communicate more effectively to me what the exact issue was. So that would be a potential benefit" (1IA2-356-363). In short, the audiologist sees asynchronous uses of the Internet more interesting because of the current level of technology.

Summary

The audiologist shared his clinical insights regarding the use of the Internet for each of the participants in this study. He also described his general thoughts on the clinical use of the Internet in audiology. It is interesting to note that, even when prompted, the audiologist did not discuss any client-specific predictors of Internet-based audiological counselling benefits in terms of the predicted needs of the client for counselling. He usually described the same potential difficulties for all clients and was not comfortable predicting needs: "Who knows what else could be an issue? […] There's lot of potential (issues)…But that's what we'll find out along the way I guess!" (2IA1-042-044). This could mean that the assessment of candidacy for an Internet-based audiological counselling programme is not intuitive to audiologists. Also, the audiologist did not discuss issues related to privacy, time, or billing as potential constraint for the clinical use of the Internet. However, according to the audiologist, the potential use of the Internet in its current form is mainly as a communication tool between the audiologist and the client via e-mail.

CHAPTER 5

PARTICIPANT 1: JANET

Overview

This chapter is devoted to Janet, the first participant who enrolled in the study. A description of Janet and of her hearing loss precedes a summary of the information she shared with the researcher during the interviews and the e-mail contacts. The point of view of her audiologist is then presented. Finally, the framework of results derived from the data will be presented, along with a discussion.

General Description

Janet was 69 years old at the time of the study. She spent her first years in a small country town in Québec and then moved to Montréal as a child. She was educated in a Catholic boarding school and completed high school. She became interested in the theatre in high school, and worked in a summer stock for a couple of summers. She met her husband at a playhouse in Montréal. Janet and her husband moved to the Greater Toronto Area in 1964, raising a family of four children. She still lives in a house with her husband. She is an avid reader and takes care of a cat and a dog. She walks her dog every morning and attends aqua fitness lessons for older women every week. She and her husband enjoy horse races. Her daughter and grandchildren who live in the Greater Toronto Area sometimes visit during the weekend. Janet usually spends part of her weekend days on the phone, chatting with family members and friends. She has been a long-time Internet user. She sends an average of one e-mail per day, mainly to family and friends. She also subscribes to daily e-newsletters. She uses the Internet to visit the Toronto Public Library website, where she can check the availability of books and make reservations. She also gets races schedules and background information on horse races on the Internet. She had looked for health-related information over the Internet before, but not for hearing-related information. She uses a dial-up connection and relies mainly on her children to help her when she has questions regarding her computer.

Hearing and Hearing Aid History

Janet's audiometry results reveal normal hearing sensitivity in the low frequencies up to 1000 Hz and a mild to moderately severe sensori-neural hearing loss bilaterally. Her speech recognition threshold is of 30 dB HL bilaterally.

Janet reports a progressive hearing loss. She mentions that "people have been telling me about it for about a year and a half but that her hearing loss has had a very gradual onset. Her main hearing difficulties are with listening to television, talking to store clerks, and when she is in the pool when attending her weekly aqua fitness classes. She mentions not having a lot of social activities or engaging in a lot of verbal communication during an average day. She listed watching television (especially British programs) and talking to store clerks as the two situations where she would most like the hearing aid to be helpful.

She described her hearing loss as very inconvenient. When she started her aqua fitness lessons in the fall after the summer break, she noticed that she did not hear as well as she used to and that it was becoming more and more difficult to cope with her hearing loss. This is what triggered her to consult her audiologist.

She tried a first hearing aid shortly before the beginning of the study. She had many problems with the first hearing aid. She and her audiologist later realised that the amplification provided by the hearing aid was intermittent. Therefore, she was returning to get another new hearing aid of a different brand. The replacement hearing aid is a digital mini-canal device. The hearing aid does not have any volume control and the battery door functions as the on-off control. Janet wears her hearing aid in her left ear because she is left-handed.

E-mail Contacts

Janet was extremely devoted to the research project. She answered all e-mails diligently and she even agreed to pursue the e-mail contacts during a religious holiday. She could not answer one e-mail because she accidentally deleted it, an incident for which she excused herself numerous times: "I'm terribly sorry but I got a little over-zealous with my housekeeping on my e-mail and accidentally DELETED Saturday's message so I couldn't reply" (1E17-004-005).

She quickly added the e-mail contacts to her daily schedule. She mentioned: “I would read it first thing in the morning to get an idea of what you wanted to know so I could pay attention to what was going on […]. And then I would reply after supper” (1IP2-501-503). She added it would take her less than five minutes a day in total to read the e-mail and reply to it.

Most of the interventions were responses to comments on adverse listening situations. For example, after the e-mail on day 3 in which Janet discussed background noise, it was suggested to start using the hearing aid in mainly calm situations first. Information on fit of the hearing aid was also given to her as she mentioned soreness. She was made aware when her comments, for example that group situations are more difficult to manage than one-on-one situations, were typical and that her difficulties were the kind that many new hearing aid users experience. Information on feedback, closed-captioning, and communication strategies was also given.

Janet’s Experiences

Janet has had a negative experience with her first hearing aid. The hearing aid was not working properly and was sent for repair. It was still intermittent when it came back from repair. Janet explained that she did not realise it was not working: “I just kept saying: “Oh well, I’m not getting anything out of this, I won’t ever bother to wear it”, not even realising that the darn thing wasn’t even functioning” (1IP2-556-557). She said about her first hearing aid: “I gave back my hearing aid because it’s been driving me crazy” (1EX1-006-006). So although she did not have an extensive experience with amplification with her first hearing aid, she was probably apprehensive about her second try in a way that differed somewhat from the typical new user.

At the initial interview, Janet had two diverging views on her planned use of her hearing aid. On one hand, she was afraid of damaging it. She described her hearing aid as costly and fragile and said she would be afraid to forget to take it off when needed. So she anticipated preferring not to wear it all the time. On the other hand, Janet realised it would be best to wear it often in order to get as much benefit as possible. She then mentioned that perhaps she did not try hard enough with her first hearing aid and mentioned that she would be ready to try harder this time.

In terms of cost, Janet, like the two other participants, acquired her hearing aid through the Assistive Devices Program of the Ontario Health Insurance Program. This program covers 75% of the cost of the hearing aid, or up to $500. The client pays the balance.

Janet's score at the ECHO was of 4.1, which is lower than the 20th percentile (Cox & Alexander, 2000) (Appendix O). This means that Janet had lower expectations than those of the average hearing aid user. All her subscale scores were lower than the average, except for the Personal Image subscale on which she scored between the 50th and the 80th percentile, meaning that she had high expectations regarding her appearance with her hearing aid.

Most of the experiences that Janet reported in her e-mail contacts were more negative than positive. On day 2, when asked to share her first impressions and reactions, she wrote: "I HATE IT, it's intrusive I don't know if what I'm hearing is proper noises, or if the hearing aid is defective" (1E02-039-040). This comment may have been triggered by her first experience where the hearing aid was later found out to be intermittent. On that same day, she also wrote in the section devoted to general comments: "Keep trying!" (1E02-056-056). It is therefore most likely that she had a high level of motivation even though her first feelings were somewhat negative. These comments also suggest that she felt comfortable disclosing information over the Internet right from the beginning no matter whether her observations were positive or negative.

In an attempt to make sure the hearing aid was working properly, Janet put her hearing aid in and out often during the first week. She also mentioned that she had difficulty with insertion: "I have trouble getting it in properly, and I have irritated the inside of my ear. If I leave it in all day, it's not too bad" (1E07-065-067). Later, she explained the reason why she wore her hearing aid less on Tuesdays: "I do an aqua-fit program in the early afternoon. Because I'm not adept at inserting the hearing aid, I don't put it in until I come home" (1E13-076-078). The audiologist buffed the shell of the hearing aid on day 28 and, on day 33, Janet wrote this comment: "It is a little easier, and it doesn't hurt so much to insert" (1E33-047-047).

On day 4, Janet could not think of any situation where the hearing aid was helpful but she was finding it difficult in situations where there were many sound sources: "When there is more than one person beside myself present, I feel quite confused, and I think I'm hearing far too much background noise" (1E04-128-129). Later, she also mentioned: "I don't like it at all when there is more than one person (talking)" (1E07-065-065). Janet also mentioned that wearing her hearing aid impaired her ability to locate sounds. When asked how she did in situations where she had to find where a sound is coming from, she wrote: "I go crazy! The noises sound so weird, and I can NEVER figure out where they are coming from!" (1E11-055-056).

Janet noticed low intensity background noises: “Maybe my husband is right, and our fridge should be replaced” (1E07-048-048). On day 14, Janet added: “I don't really think it helps a great deal, because although everything is louder and I hear things I didn't before, it doesn't seem to be anything I WANT to hear. Things are not plainer at all” (1E14-066-068). She also wrote: “I have NO patience! The things I'm hearing now are of no interest to me” (1E08-090-091). Negative feelings were also reported at the end of the trial period: “I get absolutely furious sometimes! (Laughs)” (1IP2-221-221). She also joked about her feelings: “Sometimes I just want to throw the whole thing out of the window. And then I remember: “No, my God, this costs more than a thousand dollars! (Laughs)” (1IP2-228-229).

On day 9, when asked about positive consequences of the Internet-based audiological counselling programme, she noted: “I am more conscious of what is good and bad about the hearing aid, and I try to use it more than I did before” (1E09-068-069). Her response to negative consequences was also interesting: “Only negative in the sense that I wonder if the hearing aid is worth the trouble and expense” (1E09-074-075).

On day 11, Janet shared this experience: “Tonight I was watching TV and the hearing aid kept cutting out. Then it would beep 3 times and come on again. Then it would repeat the process. I finally decided that I needed a new battery. Right???” (1E11-063-065). Daily e-mail contacts were an easy way to check such questions. Regarding the battery, she also mentioned: “I had a very hard time dislodging the old battery” (1E14-053-053). She made similar comments later during the e-mail contacts and again at the end of the trial period: “You practically have to pry it out. (The audiologist) did show me a couple of ways to try to make it easier… And that makes me very crossed, indeed, ready to throw the whole thing in the toilet! (Laughs)” (1IP2-317-320).

On day 16, Janet completed the SADL questionnaire (Appendix P). Her scores on the Positive Effect and Service & Cost subscales were well below the 20th percentile, her Negative Features score was well above the 80th percentile (largely because she did not experience feedback), and her Personal Image score was above average. Her global score was slightly under the 20th percentile, meaning that she was not as satisfied as most of the new hearing aid users. The SADL triggered interesting comments. For example, to the question asking how getting a hearing aid was in her best interest, she chose *not at all* and explained: “I really don't feel it's all that beneficial” (1E16-143-143). She also answered *not at all* when asked about how the cost of the hearing aid was reasonable: "It seems VERY expensive to me! Of course, I realize all that itsy-bitsy technical stuff is terribly expensive to produce, but for the average person I think it is very hard to find that kind of money!" (1E16-306-308). At the end of the questionnaire, she added: "I think it must be a disappointment to you, because I don't go out a lot, and I socialize very little, so it's hard for me to find any advantages to this appliance. Especially since it doesn't make sounds clearer to me, just louder!" (1E16-331-334).

On day 20, when asked about her follow-up appointment with her audiologist, Janet wrote: "The appointment was scheduled when I got my hearing aid. It was a mutual decision. If I wanted to come in earlier, I was to call, but I'm far too lazy, and I didn't want to reschedule. Also, I wanted to give the appliance a good chance to perform" (1E20-107-110). In the same e-mail, she also mentioned: "I'm more and more not at all sure whether (the hearing aid) is a help or a hindrance!" (1E20-114-115).

On day 22, when asked to think of her satisfaction with her hearing aid since the beginning of her trial period, Janet said: "I don't think I have ever been really pleased with it. I guess I was expecting too much" (1E22-066-067). On the last interview, she added: "I really didn't realize that it wasn't going to basically restore my hearing. [...] I never understood that, as an abstract thing" (1IP2-184-194). She also added: "Even after I knew that it wouldn't restore my hearing, I was still expecting a more significant difference than I perceived. [...] I still feel that way, that I expected it to help more than I feel it does" (1IP2-272-274).

Janet mentioned the first advantage of her hearing aid on day 34: "I can hear people a little bit better than without it" (1E34-055-055) and "It is helpful in watching TV" (1E34-062-062). Her final appointment was on day 43 and she could have wanted to act consistently with her decision to keep her hearing aid. On day 42, she wrote: "The main reason I'm pursuing the hearing aid business is I'm aware that my hearing loss will likely get worse. Therefore, I would like to get accustomed to one for when I REALLY need help, and "I beg your pardon?" doesn't cut it!" (1E42-077-080). She confirmed this thought in the last interview: "What I have to do is ask people to repeat themselves at the present time. [...] I thought it would be a good idea to become accustomed to it and see if I couldn't learn to live with it" (1IP2-190-192).

On day 43, Janet still was unsure about whether or not she would keep her hearing aid. She seemed to feel ambiguous about her hearing aid and reported many negative feelings that were triggered by her hearing aid. For example, she explained during the last interview: "I don't want it, of course, so therefore it's going to take a… You know, I'm terribly, terribly, terribly stubborn… (Laughs) And so I might have trouble realising that it is actually helping. I may be sort of mind-set against it" (1IP2-085-086).

Janet noticed a certain improvement when listening to the television: "I don't have the volume three-quarters of the way, it's more like just under a half or maybe even only a third" (1IP2-70-71). But she was disappointed by the performances of her hearing aid when in a noisy environment: "I wanted to be able to hear the cashier better if we're chatting or something like that. And I really haven't noticed a great improvement" (1IP2-077-078). The COSI reported no difference in terms of frequency of communication problems in the two situations that were most important for Janet (Appendix Q). However, she mentioned that she could hear "slightly better" in both situations that she found most important.

Her daily use of her hearing aid varied from 0 to 12 hours for an average of 6 hours a day. As noted in a previous chapter, self-reported use tends to be overestimated (Humes et al., 1996). Some of the error in estimating hours of use seems to occur in the relative complexity of the concept of a mean for the lay people. Because the question was asked on a daily basis in this study, it is less likely to suffer from the common inflation. On the first day that she reported not using her hearing aid, Janet added: "I will be good, and wear it tomorrow!" (1E10-090-090). Janet seemed to feel as if she was going to disappoint me if she was not wearing her hearing aid.

After her trial period, Janet mentioned: "I don't think I'll EVER get used to it in a crowd situation. I find it MOST disconcerting" (1IP2-008-009). At that point, Janet also noted that she was wearing her hearing aid less. She said she found it hard to remember to put it in and added: "(I wear the hearing aid) mostly because I want to see if it's going to make a difference rather than it really does" (1IP2-036-036).

Janet suffers from osteoporosis and arthritis and mentioned she was never good at dexterity tasks. After the trial period, she still had major difficulty taking the battery out of the hearing aid.

Janet also mentioned a feeling of stress when wearing the hearing aid, which may have been a factor in her satisfaction. She described her satisfaction on a scale from 1 to 5 or *from very dissatisfied* to *very satisfied* as 3, which is labelled as *neutral*.

On the SADL questionnaire, her scores on the Positive Effect and Service & Cost subscales were still well below the 20th percentile, when her Negative Features score was on the 80th percentile and the Personal Image score was slightly above average. Her global score was below the 20th percentile. The results are not highly different from the answers she provided on day 16: neither the global score nor the various subscale scores differences meet the critical difference criteria of 0.90 (Cox & Alexander, 1999). Once again, the statements triggered interesting comments like: "I' am still very ambivalent about (the hearing aid's) value" (1EX2-101-101).

Four months after the end of the project, Janet wrote the researcher an e-mail with a final comment on her hearing aid: "I loathe wearing a hearing aid, not because of vanity or anything like that, but because I find it very intrusive, and I don't find it helps a great deal. I think I'd rather go through life saying "I beg your pardon"!" (1EX4-021-023).

Janet liked the idea of e-mailing her audiologist when she experienced problems: "When I have an appointment it may have been two days since I have had a problem. And of course I may not even think about it. When I've had a problem, I've e-mailed him and then HE brings it up when I see him. So that works better. Because I would go for the appointment and I would forget one of the things" (1IP2-367-371). She found Internet-based communications interesting as she could write about a situation or a problem as soon as it would happen.

Janet was also very enthusiastic about receiving and sending an e-mail everyday as part of the research project. When asked about her use of her hearing aid, she commented: "If it hasn't been for your e-mails, there would have been lots of time when I wouldn't even have bothered" (1IP2-215-216). The content of the e-mail contacts seemed to have influenced her use of her hearing aid: "Since your first question was always how long did you wear your hearing aid, I had to do something about it and not say 10 minutes! (Laughs)" (1IP2-467-469). It also helped her being attentive to her hearing: "It made me focus more on what was going on here [...]. So it forced me to think about it" (1IP2-450-456). She thought it was important for her to read the e-mails in the morning in order to be able to give realistic answers to the questions: "If I have read it at night I might not have paid attention to what was going on" (1IP2-509-510).

She contrasted her unsuccessful trial period with her first hearing aid and the second trial period during which she participated in the Internet-based audiological counselling programme: "I didn't wear (my first hearing aid) hardly at all, because why should I? So (the Internet-based audiological counselling programme) made me take a different approach" (1IP2-458-459).

When asked about audiologists providing such a counselling service, she commented: "I think it would be helpful, but I don't see it as a practical thing, because an audiologist doesn't have just a handful of patients. [...] But maybe you could work something like maybe once a week" (1IP2-537-540).

Audiologist's Experiences

The audiologist was asked to predict Janet's adjustment to her new hearing aid to see if potential candidates for an Internet-based audiological counselling programme could be screened by the audiologist. The audiologist described Janet as being a good candidate. He also said that according to his initial impressions, her expectations were reasonable and she had the abilities needed to deal with issues that may arise.

After the trial period, the comments of the audiologist were mainly oriented towards technology. He first mentioned: "I think it was a disadvantage that we had to switch between two aids in her case. [...] Because there was some advantages of (the first) aid that are not in the aid that actually did work" (1IA2-007-010). He also described the interventions he performed: "If she is experiencing an issue in a particular area you want to attempt to address that issue to the best of what current technology can do" (1IA2-007-010).

He described the degree of satisfaction he perceived from his discussions with her: "On the whole I would say she is relatively satisfied. I don't think she is very satisfied" (1IA2-012-013). When asked to comment further on the benefits she reported, he added: "I forget (the participant)'s exact age but [...] over time her hearing will gradually decline. [...] As her hearing declines the hearing aid will become more and more useful" (1IA2-225-227). He also saw another area of potential improvement: "I suspect that as with anything practice makes perfect, once she gets good at inserting the aid [...] that issue will become less and less pronounced" (1IA2-256-259).

Regarding the appearance of the hearing aid, the audiologist commented: "I don't think for (the participant) visibility is a big issue. Obviously we went to the smallest, one of the smallest sizes we could get. Because there is no reason we couldn't get the amount of gain that we were looking for in a really small product" (1IA2-182-184). He attributed Janet's difficulties with insertion to the hearing aid that was larger than the first one she tried: "This aid is a little bit harder to put in, in the sense that there is more of a bend. So when you put it in it's basically a two-step process. So you kind of start it in and you kind of finish at the very end until it's nice and snug. She doesn't like that as much as she did on the first one" (1IA2-013-016).

He noted that self-reported benefit in groups was a remaining issue with Janet: "I think that is an issue of expectations as to what hearing aids can do and what they can't do" (1IA2-027-028). He also described his sense of her expectations: "I think she was probably going into it with a little higher expectations that the aid would allow. But it's certainly possible that with a different product or we would have been successful with the first aid her expectations may have reached a little better than they ended up being" (1IA2-036-039).

As he routinely asks his clients to report the average daily use, he recalled Janet stating she used her hearing aid about 10 hours a day. It is interesting to note how this amount is higher than the arithmetical mean of the Janet's daily reports of use.

The audiologist described his goal when providing fine-tuning adjustments: "What I'm looking for is an ease of listening or a clarity of listening. Things should be sharper and clearer but not necessarily perceptibly louder" (1IA2-107-108).

He rated Janet as a good potential client for an Internet-based audiological counselling programme: "She would be a good candidate for Internet follow-up because it's a tool that she is comfortable with and that she uses regularly anyway" (1IA2-347-348).

Summary of Experiences

Janet seems to have been ambivalent on the benefits of her hearing aid from the start. This attitude is most likely to be at least partially related to the first experiences she had with an intermittent hearing aid. She appreciated the e-mail contacts as it was motivating her to wear her hearing aid and was helping her direct her observations to various benefits and limits of the hearing aid.

The audiologist described Janet as less satisfied than his average client, mainly because of high expectations and, once again, because of the disappointing experience she had with her first hearing aid.

Framework Derived from Janet's Experiences

The core category that emerged from Janet's interviews and e-mail contacts was "Internet-based audiological counselling as a means to regain control". The three categories were "knowing and the feeling of control", "not knowing and the disruption of the feeling of control", and "regaining control". The framework that follows illustrates the concepts associated with these categories.

Table 4. Framework related to core category: Internet-based audiological counselling as a means to regain control

Categories	Properties	Dimensions
Knowing and the feeling of control	Mastering how to self-assess the consequences of hearing loss	Severity Difficult listening situations Progressive nature
Not knowing and the disruption of the feeling of control	Learning how to self-assess hearing aid outcomes	Resolved hearing difficulties Remaining hearing difficulties New hearing difficulties Handling difficulties Use Cost-benefit analysis
	Having negative feelings	Disconcertion Impatience Panic Effort Being “mind-set”
Regaining control	Learning and adjusting	Observing Gaining experience Learning to live with the hearing aid
	Benefiting from Internet-based audiological counselling	Facilitating self-assessment of hearing loss consequences and hearing aid outcomes Facilitating communication with audiologist Adopting a more positive attitude

The first category, described by the feeling of control, is emerging from the property of "mastering how to self-assess the consequences of hearing loss". In fact, Janet was able to describe the way she was experiencing her hearing loss and its consequences. She could easily name the situations where she was more likely to show hearing difficulties. She was also aware of the progression of her hearing loss: "In the time frame where I started to wonder if I was loosing my hearing and now it had definitely got worse" (1IP2-188-189). Janet seemed to have a feeling of control over her hearing capacities, which might have been jeopardised by the acquisition of a hearing aid.

The second category, the disruption of the feeling of control, encompasses two properties: "learning how to self-assess hearing aid outcomes" and "having negative feelings". Janet obviously experienced the consequences of wearing a hearing aid on her listening abilities. She talked about situations where the hearing aid was at least partially beneficial, for example when watching television: "I don't have the volume three-quarters of the way, it's more like just under a half or maybe even only a third. So if you're watching TV with someone else it's better" (1IP2-070-071). She was also able to describe situations where she did not find the hearing aid beneficial, like: "I wanted to be able to hear the cashier better if we're chatting or something like that. And I really haven't noticed a great improvement. Maybe there is some… I'm not sure (Pause) about that" " (1IP2-077-079). She also mentioned hearing difficulties that she did not use to have before, like localisation: "The noises sound so weird, and I can NEVER figure out where they are coming from!" (1E11-055-056). She also reported handling difficulties and talked about her use of the hearing aid. She also performed her own analysis of the cost-to-benefit ratio that she was getting from her hearing aid: "I wonder if the hearing aid is worth the trouble and expense" (1E09-074-075). Janet learned how to self-assess her new hearing capacities by cumulating experiences while wearing her hearing aid. However, doing so was done at a cost, the exhibition of negative feelings. In fact, as mentioned earlier, Janet used many terms to describe her reactions like disconcertion, annoyance, feeling furious or panicky, and going crazy.

The last category of the framework, an attempt to regain control, is also created from two properties: "learning and adjusting" and "benefiting from Internet-based audiological counselling". Janet often talked about how she was testing the hearing aid: "(I wear the hearing aid) mostly because I want to see if it's going to make a difference rather than it really does" (1IP2-036-036). She also often described her acquisition as a process and, even after the end of the trial period, was referring to some of the problems she was experiencing as situations that she could get accustomed to. She also described her goal when getting a hearing aid: "I thought it would be a good idea to become accustomed to it and see if I couldn't learn to live with it" (1IP2-191-192).

Janet also shared many comments regarding her participation in the Internet-based audiological counselling programme. She mentioned how her participation made her more aware of the benefits and limits of her hearing aid: "I am more conscious of what is good and bad about the hearing aid" (1E09-068-068). She was also very thankful of being able to communicate with her audiologist via the Internet: "When I've had a problem, I've emailed him and then he brings it up when I see him. So that works better. Because I would go for the appointment and I would forget one of the things or something" (1IP2-370-371). Finally, the Internet-based audiological counselling programme made her adopt a more positive attitude towards her hearing aid. She mentioned that the daily e-mail contacts made her wear her hearing aid more than when she previously tried another hearing aid but was not participating in an Internet-based audiological counselling programme: "It made me take a different approach" (1IP2-458-459).

Summary

Janet participated very actively in the Internet-based audiological counselling programme and saw various positive aspects to her participation. However, she remained unsure about the benefits of her hearing aid. During the e-mail contacts, Janet often exhibited negative feelings. From there two outcomes could have occurred. The frequency and intensity of the negative feelings that she experienced could slowly have decreased, as she kept on adjusting and learning how the hearing aid works and its effect on her hearing abilities The negative feelings that she experienced could also have discouraged her to use her hearing aid and she could progressively abandon the idea of using her hearing aid. The later situation seemed to have occurred as Janet wrote approximately four months after the end of the Internet-based audiological counselling programme: "I loathe wearing a hearing aid, not because of vanity or anything like that, but because I find it very intrusive, and I don't find it helps a great deal. I think it'd rather go through life saying: "I beg your pardon"!" (1EX4-021-023) This comment supports the concept of the Internet-based audiological counselling programme as a tool to provide reinforcement of positive adjustment behaviours: Janet discontinued her use of the hearing aid when the provision of reinforcement stopped.

CHAPTER 6

PARTICIPANT 2: HENRY

Overview

This chapter is focused on Henry, the only male participant in this study. First, a short description of Henry and of his hearing loss will be presented. An overview of the content of the interviews and the e-mail contacts exchanged will follow, along with the thoughts of the audiologist on this participant. The framework that emerged from the data will then be presented and explained.

General Description

Henry was 73 years old at the time of the study. He was born and raised in Western Europe. He went through very difficult times during the Second World War. He attended the medical school of La Sorbonne University in Paris for a year before having to join the army because of the conscription. He worked as an officer in the artillery for two and a half years before working for a year as an instructor in Germany and then for a Dutch airline. Henry moved to Canada in the early fifties. He first worked in a travel agency in Niagara Falls and then had different small jobs before working in Northern Ontario. Henry moved to the Greater Toronto Area in 1958 and soon started working in the travel business, occupation that he still does on a full-time basis. He usually works at his office in Toronto for about ten hours a day. He and his wife drive every morning and night from their home in the outskirts of the Greater Toronto Area to their office, which cumulates to a 3-hour drive during which he mentioned finding difficult to converse. On a typical day, Henry spends a couple of hours on his computer, browsing the web for information related to travel after dinner. He also stills works as a tour guide, mainly in Europe. He likes to listen to classical and jazz music. He also enjoys gardening and cycling and attends weekly religious services. He has five children and five grandchildren.

Hearing and Hearing Aid History

Henry has noticed hearing difficulties for the past 8 to 10 years. He mainly notices his hearing loss when communicating during his work activities. When prompted, he also reported difficulties hearing at church. The audiometric data suggest normal hearing in the low frequencies and a mild to severe sensori-neural hearing loss bilaterally. His speech recognition threshold is 30 dB HL bilaterally. Henry seemed to be highly interested in understanding the cause of his hearing loss, as it is a question that he asked numerous times during the interviews.

E-mail Contacts

During the first meeting, Henry stated that he could not write everyday because of his busy schedule. He agreed on three e-mails a week (Monday, Wednesday, and Friday). During the trial period, he replied to 9 of the 17 e-mails that were sent to him. It is also interesting to note that Henry did not seem to approach the Internet-based audiological counselling programme as an opportunity for him to learn or get help if needed. During the last interview, when explaining the time of day when he was usually answering the e-mails, he added: "Sometimes even a little work that you have to do, you say: "I have no time for that" and leave it until, until you know, very, very late in the day or so, like you know, 10 o'clock at night or something" (2IP2-348-349).

The format of Henry's replies were also different to the other participants' e-mails insofar as for five of the nine e-mails he preferred to write his messages in a letter format, using complete sentences and paragraphs. It is interesting to note this difference because all participants received the same instructions that suggested using the *reply* function of his e-mail software to write their responses as points in the body of the messages that were sent to them. Although Henry's replies were usually elaborated, the information gathered is also different from the information provided by the other participants in that his replies were relatively sparse and his e-mails were usually a free form of diary, reporting his general experiences more than answering the specific questions.

In Henry's case, most of the researcher's interventions were focused around background noise, telephone use, communication strategies, and the specific purposes of the different programs of his hearing aid. When Henry was reporting background noise difficulties, the researcher informed him that they were situations that many new hearing aid users find difficult. The researcher suggested him tips on how to use the telephone and encouraged him to practice his telephone skills with a friend or a family member. He was reminded him the situations in which one program of his hearing aid is likely to be more appropriate over the other ones and communication strategies both for Henry and for his communication partners were shared with him.

Henry's Experiences

In the first interview, Henry described his hearing loss: "I would consider it minimal. In other words if I make an effort and if I'm wide-awake I think I could hear most people. But it's when there's a cacophony, when there is people talking all over the place. But one to one, I don't think I have that much of a problem" (2IP1-146-148). On day 15, when asked if he had the feeling he was sometimes missing out in not hearing some sounds, he replied: "Yes, now I know I do" (2E15-058-058).

He reported one of the situations where he would most likely want the hearing aid to help: "I take a lot of people on tour all around the world. And I'm in a bus then and I sit at the front. And they're all behind me and they ask questions and slowly but surely I realised that I didn't hear too much of what they were saying" (2IP1-011-013). Henry is also a big fan of classical and jazz music and was hoping to gain better clarity when listening to music.

Henry's wife acts as his secretary and he shares his office with her. He explained how his wife is always paying attention to his discussion with his clients to make sure he does not answer their questions incorrectly when he does not hear: "And she looks at me… (Laughs) And then I know I said something wrong. (Laughs) So then I have to say: "Well, look, I'm sorry, I didn't hear this, could you please repeat?" (2IP1-019-020). Henry faces his clients when meeting with them and the radio is sometimes playing in the background: "But I don't like it because it is disturbing to me. […] My wife puts it on; I never put it on…" (2IP1-187-188). When asked about his reasons for deciding to go and see the audiologist, he explained: "I guess mostly the fact that my wife (Laughs) is getting very annoyed with me when I didn't hear what she was talking about" (2IP1-070-071).

Henry also shared comments on how he felt comfortable wearing a hearing aid: "When you see other people coming in and having hearing aids, there is no stigma attached to it! If you've got those big things that hang out of your ears, you know… (Laughs) They look terrible! But the small ones, you don't even know you have them, I think" (2IP1-087-089). In a similar way, on day 25 he noted: "There is no stigma attached to having a hearing aid especially since they are so small nowadays and hardly noticeable" (2E25-071-073).

At the beginning of the trial period, Henry mentioned: “I find it a little difficult to take (the hearing aid) out but these things need a bit of time, and patience” (2IP1-249-250). On day 22, this issue seemed to be at least partially resolved: “I don’t seem to have much of a problem inserting and removing (the) hearing aid now. (It) is easier than in the beginning” (2E22-018-019). On day 32, he explained: “I believe that the middle size, which mine is, probably is best because when you have big hands and strong fingers you have to have something to hang on to and if it would be smaller than mine, I would have difficulty grabbing it” (2E32-024-026).

A major change was seen in the benefits reported by Henry during the course of the project. He was first highly motivated and optimistic about the hearing aid: “The most striking revelation is the clarity of the bird song” (2E01-010-010). He also made a similar comment on day 11: “I worked in the garden for the rest of the day and still enjoy the sound of the birds more than before” (2E11-025-025). On day 19, he reported benefits while watching television: “Saw a movie on home TV and for the first time I could pretty well follow what went on without turning the volume up from where my wife usually has it” (2E19-017-018).

However, he reported on day 1 background noise that he described as “quite irritating” (2E01-015-015). On day 11, he wrote: “There still is the unpleasant ringing with running water, flushing toilets, sound of boiling water, computer noises, etc.” (2E11-033-034). He also noticed the sound of the wind: “I was on my bike yesterday and I went down a fairly steep hill and I think I hit about 70 km/hour, it’s a funny sound” (2IP1-256-257).

Having a three-program hearing aid, Henry had to get used to the various conditions of use of the different settings: “I still don’t know when there’s one ring, two rings, three rings. I think one is for if you’re sitting across from somebody, two is for when there’re other people, and three is… But the telephone, I really don’t know what to do with the telephone” (2IP1-331-333). On day 25, he reported he still needed to try more the various programs.

Henry also mentioned numerous times that he had difficulty using his hearing aid with the telephone: “Half the day I’m on the telephone. Today for instance, I was speaking to somebody and I didn’t know what the hell she was talking about, you know! I had to ask her four times, I said: “How do you spell it?” And she was spelling it and I didn’t know!” (2IP1-339-342). On day 11, he added: “I still have not managed the telephone- when I hold it close to my ear there is a constant beep. […] I must read up on that. I know that (the audiologist) explained it to me”

(2E11-036-039). Because it is an issue that he reported in almost every e-mail, the researcher reminded him which program was for which listening situations and suggested to him ways to practice his telephone skills. However, he did not answer the researcher's questions when followed-up on tips to learn how to use the telephone with his hearing aid. On day 39, he wrote: "I still have great difficulty with the telephone and although I try to use the phone on the side of my hearing aid I almost always have to switch to my other ear and press the phone against my ear" (2E39-223-225). When asked about the features of the hearing aid of his dreams, Henry wrote: "I would like to see a hearing aid that self-adjusts to the sounds we're bombarded with daily so that (it) is no longer necessary to keep on switching from 1 to 2 to 3 depending on the situation" (2E32-022-024).

Henry noted on day 11: "Went to church and still have a problem hearing especially female voices, high pitched" (2E11-021-022). At this point, he did not notice a difference in his appreciation of music since he started using his hearing aid.

On day 25, Henry reported: "I don't think that my wife is overly impressed with the results since she feels that she still has to repeat often" (2E25-087-088). The researcher then told him about general communication strategies and sent him a list of communication guidelines, 11 of them being directed to the listener and 11 of them to the speaker. It was suggested that he talk about them with his wife to facilitate communication. However, he did not comment on them. On day 39, when asked to report his satisfaction on a scale from 1 (*very dissatisfied*) to 5 (*very satisfied*), Henry chose 3 (*neutral*). He then added as a comment: "It seems that my wife who is also my secretary and with whom I spend about 10 hours a day in the office, still feels that there is not much of an improvement. I don't agree completely because I hear things now that I did not hear before" (2E39-057-060).

Henry did not complete the ECHO questionnaire and only replied to the first SADL questionnaire sent to him. The SADL results he shared are from day 39. His Positive Effect subscale score is lower than the 20th percentile, indicating that he experienced less benefits than the average new hearing aid user. His Personal Image was higher than average (around the 80th percentile), an indicator of a low perceived stigma. His Service & Cost, Negative Features, and global score all fall close to the average.

During the last interview, although Henry reported using his hearing aid for twelve to fourteen hours on a typical day, he proved to be disappointed by the results with his hearing aid: "I still have hearing difficulties. And if anybody would ask me, you know, "Is it a great improvement?" I would have to say no. There is an improvement in the hearing, but it is actually less than I expected. And obviously less than some other people expected, especially my wife" (2IP2-007-009). He noted an improvement in one-to-one communication settings: "But again it's an improvement, but it's not a phenomenal improvement, that all of a sudden you understand and hear everything. I still think that most of it depends on how people speak. A lot of people slur their language, and that is difficult to follow" (2IP2-041-044). This topic, the fact that speech intelligibility varies from one speaker to another, was raised many times by Henry during the course of the interview. He seemed to notice more benefit when listening to music: "The music is definitely an improvement, oh yeah, yeah. I think I hear more of the higher tones that I was missing. So it's more balanced" (2IP2-076-077).

The audiologist told Henry to call him if he had any problem: "It's up to me, to give him a call. I bet you I will, in a couple of months or so" (2IP2-303-303). Later on, he added: "I'll wait for a while, to see what's going on, and how it works. It's almost, and I don't know why, it's almost as if even if you take it out now, that you hear slightly better than you usually do before, which is possible" (2IP2-322-325). This comment, combined with the fact that he attributed part of his hearing difficulties to temporary sinus problems and that he asked the researcher several times about the cause of his hearing loss, suggests he may be hoping for an improvement in his hearing. However, the audiologist did not note an air-bone gap. Henry seemed to have not come to terms with the permanent condition of his hearing loss. Later on in the interview, he added about his audiologist: "No hesitation, if something REALLY goes wrong, I'll give him a shout" (2IP2-680-680).

When asked to describe specific situations where he felt the hearing aid was helping and when it was not really helping, Henry paused. The researcher then prompted him to go through a typical day and the various listening activities he is usually involved in. He replied: "It's difficult to say… I really would not know how to answer it" (2IP2-126-126). It seemed like Henry was either reluctant to share his thoughts on that matter or that he had not really had a chance to pay enough attention to the changes that he was experiencing since getting the hearing aid to be able to describe its benefits and limits.

Henry reported almost always wearing his hearing aid on the noise reduction setting, the second program, because surrounding noises disturbed him when using the first program. For example, when participating in the interview while in a calm office, he preferred to use the noise reduction program because of the noise of the computer fan that was next to him and of the air conditioning system. He described the first program of his hearing aid as "almost useless" (2IP2-018-018). He explained his perceptions of the second program, which was adjusted by the audiologist to provide less gain when Henry reported background noises: "It's good in a way but also the person that is speaking to you, you don't hear him as clearly" (2IP2-441-441). He described the third program, the telecoil, as: "Three is for when you are, well you know, for when sounds are all around you, all over the place" (2IP2-453-453). Regarding the telephone, he said: "I'm still not comfortable with it. I know it may be a question of learning it, or knowing how to hold it" (2IP2-023-024).

Henry's wife was present during the last interview and shared her thoughts with Henry and the researcher. A lack of informed consent prevents from quoting her, but her general thoughts are here reported. She spoke of feeling handicapped by the consequences of her husband's hearing loss and reported feeling embarrassed and truly concerned when he does not respond correctly to the questions that his clients ask him. Henry replied: "Sometimes I shut people off because I don't want to talk about what they are talking about. Because they're going to talk about it for an hour and I'm not interested in that!" (2IP2-547-548). Henry's wife acknowledged that the volume of the television did not have to be as high as before now that he has his hearing aid. Henry added: "And I think people might expect that all of a sudden, you can hear everything. And that's not true either" (2IP2-497-498). When the researcher tried to give Henry and his wife some tips to facilitate communication, they generally allied to find reasons why the solutions would not be appropriate to their particular problems. Henry concluded: "I know there's an improvement, regardless of what she says. I know it, because I hear sounds that I haven't heard before, or haven't heard for a long time. Especially pure high sounds, in music, in bird songs, these things are REALLY greatly improved. So for the rest, people can better speak clearly when they talk to me. I'll put a sign: "Speak clearly! (Laughs)" (2IP2-527-537). When his wife started to explain that many colleagues were teasing him about his hearing aid, Henry seemed uncomfortable and asked his wife to leave. She left the room and talked to him softly while turning her back. He obviously did not hear her, offered a confused smile, and quickly asked the researcher to continue the interview.

When asked about the Internet-based audiological counselling programme, he said: “Oh, it's fine, it's just that I get so many e-mails. I have sometimes 180 in the morning” (2IP2-338-338). As mentioned previously, he mainly answered the e-mail contacts at night, when he felt that he had more free time to do it. He agreed that his pattern of response was mainly caused by his schedule, and added: “And don't forget, we're on the thing the whole day, we're on the computer looking at things…” (2IP2-356-356). It sounds like Henry did not really like to have to use the computer more than his work already obliged him to. He mentioned it would usually take him about 20 minutes to reply to one of the e-mail contacts. He would usually quickly look at it in the morning and then answer it later: “Quick look in the morning, and then say: “Ah, I've got no time to answer that now!” and then whenever I found time. You know, there are some things that were more urgent that than that! (Laugh)” (2IP2-613-616).

He did not see any positive aspect to being able to communicate with his audiologist via the Internet: “I can't visualise a situation where I would have to call him, or something. Because I can still hear without (my hearing aid). That is unchanged. Or as I said, it's maybe even a little bit more acute now than it was before” (2IP2-705-707). He would decline the offer of an Internet-based audiological counselling programme with his audiologist because of his busy schedule: “Yes, I'm a very, very busy person. And I'm busy from you know seven o'clock in the morning until one (at night). And I'm always doing something” (2IP2-721-722).

At the end of the interview, he also brought up a situation where he is hoping the hearing aid would help: “I'm taking a group of people to England for three weeks in September. And that will be a good test. Because when you're in a coach and I sit up front because I talk about whatever there is to see and to learn. And then people ask you questions. And sometimes I have two or three at the same time. So I'll see whether there's an improvement there” (2IP2-683-686).

Audiologist's Experiences

When ask to predict the success of the intervention with Henry, the audiologist referred to Henry as a very good hearing aid candidate: “He was quite positive on his initial fit […]. I think that he should do pretty good. I would say he would be better than the average” (2IA1-019-024). The audiologist based these impressions on his clinical expertise: “I think he is a good candidate overall for amplification, I think his expectations are pretty reasonable. And he's also pretty intelligent! He's going to be able to figure things out if there is any issue. He's indulgent" (2IA1-028-031).

He predicted Henry would use the hearing aid regularly, but: "I don't think he's gonna use it all day long. I don't think it's going to be like 8 in the morning to like 12 o'clock at night, as some clients do" (2IA1-114-115). This prediction was mainly based on the degree of his hearing loss. He also expected him to be experiencing notable benefits and to describe his overall satisfaction as somewhere between satisfied and very satisfied.

He considered Henry a good candidate for an Internet-based audiological counselling programme: "I assume he uses the Internet for his work. I know he works for a travel agency and they probably do a fair number of e-mails. So he's probably quite accustomed to doing that" (2IA1-059-061). His thoughts were basically unchanged after the trial period: "I'm assuming that, because of his position, he uses the Net at work. He's familiar with that tool and I think that he would definitely take advantage of it" (2IA2-144-145).

After the end of the trial period, the audiologist reported: "I've met him once, and I've not seen him since. Usually I like to meet with people at least twice, but he did not seem to feel the need to come back! Now he said: "I will call you if I have any problems." So, essentially I believe that his perception of his hearing aid is very positive" (2IA2-007-009). He also described Henry's attitude: "I think that he has the ability to meet and to deal with problems if they arise" (2IA1-174-174).

The audiologist reported that Henry is wearing his hearing aid for about 14 to 16 hours every day: "So if he's using it that much obviously he's quite pleased with it, he's finding it very comfortable and he's getting a significant benefit from it. So he's been a very successful patient" (2IA2-013-014).

The audiologist was also at least partially made aware of the thoughts of Henry's wife: "He did mention a couple of incidents where his wife said she didn't notice as big of a difference as she thought" (2IA2-019-020). He further described his perceptions: "At least on one occasion that's what she felt. But I don't think I would necessarily really attribute that to her feelings as a whole" (2IA2-235-236). He also described how the situation was dealt with: "He tested it by taking the hearing aid out and then listening to her with and out and putting it in. He said he noticed a big difference. So…" (2IA2-020-022).

The audiologist also reported that Henry told him about noise and that he adjusted the electro-acoustic characteristics of the hearing aid by mainly turning down the gain on the second program: "It is nice to have a multi-memory […]. Because you can't always have everything the way you want on a single program. If you've got three programs to work with, you've got a lot more options" (2IA2-061-062). He also addressed Henry's difficulties on the phone by changing the setting from the use of the microphone to the use of the telecoil: "I assume it's certainly a lot better than it was because he hasn't called me back. But the phone may be an ongoing issue" (2IA2-075-076). The audiologist concluded: "My perception is that he seems relatively satisfied or otherwise he would have been back" (2IA2-243-244).

Summary of Experiences

It is surprising to see how Henry's first reactions and his last thoughts were very different. The reaction of his wife certainly played a role in his overall satisfaction. Henry's wife showed signs of difficulties related to her husband's hearing loss. However, since she was not present when Henry met with his audiologist, her needs were probably not really addressed from the start.

The audiologist did not seem to be aware of the final level of satisfaction that Henry demonstrated. A more frequent contact between Henry and his audiologist could potentially have given the audiologist a better picture of the needs of both Henry and his spouse. However, it is impossible to know if Henry and his wife were really ready to engage into a rehabilitation process. Their reactions suggested that they may not yet be willing to put effort into improving their functional communication.

Framework Derived from Henry's Experiences

The core category that emerged from Henry's interviews and e-mail contacts was "Internet-based audiological counselling and hearing aid outcomes as a result of fragile bases to rehabilitation". The framework that follows illustrates the categories, properties, and dimensions associated with the core category.

Table 5. Framework related to core category: Internet-based audiological counselling and hearing aid outcomes as a result of fragile bases for rehabilitation.

Categories	Properties	Dimensions
Bases for rehabilitation	Help-seeking process pressured by significant other	Significant other and participant have different goals Goals difficult to achieve Negative feelings
Outcomes	Participation in Internet-based audiological counselling	No perceived benefit Low assiduity
	Hearing aid outcomes	Background noise Difficulty with hearing aid programs Low satisfaction from the significant other Low satisfaction
Rethinking hearing loss and its consequences	Shifting perceptions	Blame others Minimise hearing loss and its consequences
	Hoping	Recovery Cure

The first category, the bases for rehabilitation, seemed mainly associated with the fact that Henry decided to seek help because of complaints expressed by his wife. It quickly became obvious that Henry and his wife had different goals in terms of rehabilitation. Henry mainly had as a goal an increased appreciation of music. It is only when prompted that he formulated a rehabilitation goal related to his clients. On the other hand, Henry's wife seemed mainly concerned by the fact that he could not hear his clients and that he could not detect the sound produced by her car when the direction indicators are on, a source of tension between the couple. Some of the goals formulated by Henry were also difficult to achieve, for example when hearing questions asked simultaneously by different people on tour while in a bus: "I'm taking a group of people to England for three weeks in September. And that will be a good test. [...] So I'll see whether there's an improvement there. But that is where I personally occasionally get annoyed that I couldn't hear before I got the thing, or didn't answer the right thing or something" (2IP2-683-688). The hearing loss, its consequences, and differences in terms of difficulties and goals triggered negative feelings both from Henry and his wife. Henry said his spouse was annoyed by his hearing difficulties when she mentioned that he was sometimes mad at her for reminding him to turn off his direction signals. She also said she felt embarrassed by her husband's hearing difficulties with his clients and was very worried about the way he would be able to communicate when she is not close to him to ensure comprehension.

This predicament, topped by a busy daily schedule, impeded Henry to fully participate into an Internet-based audiological counselling programme. He did not seem to have perceived any benefit from such a programme, hence rating this activity low on his list of priorities: "You know, there are some things that were more urgent than that! (Laughs)" (2IP2-616-616). This probably explains why he showed a questionable assiduity. Henry asked the researcher not to be in contact everyday. Even though he agreed in three e-mail contacts a week, he responded to less than 60% of them. This pattern of response did not seem to have been related to his ability to complete the task as he said the task was not difficult.

Despite a relatively good start, the final outcomes that Henry reported were not consistent with a resounding success. Henry noted from the first day of e-mail contacts that background noise, mainly amplified continuous environmental noise like air conditioning or computer fan noise, was perceptively loud and disturbing. This observation remained throughout the course of the project, being slowly more and more accompanied by negative feelings such as impatience and annoyance. After having the level of amplification adjusted by the audiologist, Henry seemed to be dissatisfied by the fact that he would either be disturbed by background noise or not have enough amplification of the signals of interest. Henry also had difficulty learning to use the three programs of his hearing aid. He was still confused during the last interview about the use of the third program, which was dedicated for the telephone. For example, when completing the SADL at the end of the Internet-based audiological counselling programme, he rated his hearing aid as not helpful at all on the telephone and commented: "I still have great difficulty with the telephone and although I try to use the phone on the side of my hearing aid I almost always have to switch to my other ear and press the phone against my ear" (2E39-223-225). Both Henry and his wife were finally not very satisfied with the hearing aid. From a scale from one to five, Henry rated his overall satisfaction as three, or neutral. He added as a comment: “It seems that my wife who is also my secretary and with whom I spend about 10 hours a day in the office, still feels that there is not much of an improvement. I don't agree completely because I hear things now that I did not hear before” (2E39-057-060). In fact, his wife said she did not notice any improvement in his communication abilities.

This experience seemed to have made Henry rethink his hearing loss and its consequences. In fact, he seemed to feel like he had done his part by getting a hearing aid and it was now his communication partners' turn to be accommodating: “So for the rest, people can better speak clearly when they talk to me. I'll put a sign: “Speak clearly!” (Laughs)” (2IP2-536-537). He also mentioned that he did not think that his colleagues or other communication partners were communicating any differently with him even though they knew he had a hearing loss. Henry also minimised his hearing loss and its consequences. For example, he noted: “I can still hear without (my hearing aid). That is unchanged. Or as I said, it's maybe even a little bit more acute now than it was before” (2IP2-705-707).

Henry indeed showed signs of hope. He seemed to have linked wearing his hearing aid to improvement in his hearing: “It's almost, and I don't know why, it's almost as if even if you take it out now, that you hear slightly better than you usually do before, which is possible” (2IP2-324-325). He also partially attributed his hearing loss to chronic sinus obstruction, even though his audiometry results do not show any sign of conductive component to his hearing loss. He reported hope in the future of hearing loss rehabilitation. After talking about the limits of his hearing aid, he added: “Science is such that everyday there is something new. And it comes quicker and quicker and quicker, it's exponential. In three years from now, there's probably entirely different” (2IP2-597-599).

Summary

If faced to a similar situation, Henry would now have preferred not to participate in an Internet-based audiological counselling programme. First, he suggested that he was not as interested in the programme because his occupation already required him to be at the computer all day. This comment would warrant a deeper evaluation in order to determine if it can be generalised to most people who's occupation involve spending many hours at their computer each day. Henry also reported his schedule was such that he was too busy and did not seem to see any benefits of such an Internet-based audiological counselling programme. Henry did not seem to be completely ready to engage into audiological rehabilitation, either via conventional means or Internet-based. This case reinforces the assumption that the outcomes of an Internet-based audiological counselling programme are prone to similar influences as more traditional approaches, including readiness and motivation.

CHAPTER 7

PARTICIPANT 3: MARGARET

Overview

Margaret will be the focus of this chapter. A short description of the last participant and of her hearing loss will be presented before a report of the information shared during the interviews and the e-mail contacts. The thoughts gathered with her audiologist will follow. The chapter concludes with the framework derived from the data along with its description.

General Description

Margaret was 62 years old at the time of the study. The second oldest of six children, she was born in Western Europe. Her family immigrated to Canada when she was 15 years old. She has lived in Southern Ontario since then, except from 1995 to 2002 when she and her husband lived in Japan and then in Germany where she worked as a teacher. She now lives in a house in the outskirts of the Greater Toronto Area with her husband. Earlier on, she earned a degree at teacher's college and took some university courses in education. She taught for a short period of time before getting married and having children. She stayed home for 13 years, raising her two sons and daughter. She now has three grandchildren. She spends a day every week with two of her grandchildren, one aged five years and the other aged three years. At the beginning of the study, Margaret was just coming back from a two-month vacation spent abroad with her husband, visiting family and friends. Even though she and her husband have been retired for the past two years, Margaret does supply teaching in elementary schools. She usually spends two to three days at school, an activity she did not give up, as she loves it. She has various other interests: she is fond of arts and crafts (pottery, sewing, quilting, and cross-stitching), playing music (violin and piano) and going to symphony concerts, reading, and she also enjoys sports (swimming and cycling). One of her retirement goals is to go back to university.

Hearing and Hearing Aid History

Margaret visited an Ear, Nose, and Throat (ENT) specialist about three years ago because of dizzy spells. She was then made aware of a sensori-neural hearing loss, which surprised her at first because she never noticed experiencing hearing difficulties. She then started to realise how her hearing loss might explain some of her behaviours. At that point she was living in Germany so she decided to wait until her return to Canada before engaging in any rehabilitation services. After her return, when she started doing some supply teaching and found herself asking the children to repeat, she decided to go see an audiologist. The audiometric results show a high-frequency sensori-neural hearing loss. In the right ear, the hearing sensitivity is within normal limits up to 2000 Hz and she has a mild to moderately severe hearing loss at higher frequencies. In the left ear, her hearing sensitivity is within normal limits up to 3000 Hz and she has a mild-to-moderate hearing loss at higher frequencies. Her speech recognition threshold is 25 dB HL in the right ear and 10 dB HL in the left ear. Margaret was fitted with a digital completely-in-the-canal hearing aid in her right ear. The hearing aid has no telecoil and has two different programs.

E-mail Contacts

Margaret is the only participant who preferred not to use her own e-mail account for the research project. She mentioned that she had taken courses on the use of new information and communication technologies in classrooms. The researcher briefly instructed Margaret on how to use the e-mail account that was offered to her for the research project. This short tutorial that was done on her home computer lasted approximately 10 minutes. She was then able to use her e-mail account and did not have any major problems with it during the course of the project. She sometimes checked with the researcher to make sure she was following the right order when answering the e-mails and she once replied to the same e-mail two days in a row. Overall, she learned very quickly how to use the e-mail account effectively. Margaret participated very actively in the Internet-based audiological counselling programme.

The researcher focused her intervention on the reinforcement of Margaret's comments and efforts. The researcher also answered some questions and concerns Margaret had about her hearing in her left ear (the opposite ear to the hearing aid), occlusion, and on waxguards. Margaret was also given some communication strategies and was informed that some of the situations where she initially had more difficulty were environments in which many new hearing aid users experience problems.

Margaret's Experiences

During the first interview, Margaret mentioned that she mainly experienced hearing difficulties when at work: "I called the boy Ryan for the longest time when he said: "Mrs (Margaret), my name is Brian!" (3IP1-037-038). She also mentioned that the television and the radio had to be louder so that she could hear them and that she sometimes had to ask people to repeat when talking on the phone.

She considered her hearing difficulties to be rather minor and not very handicapping: "I think maybe a lot of people really don't have a dying problem with (hearing loss), so they don't bother. I think I would probably have just gone on merrily had I not decided to do a little bit of teaching on the side" (3IP1-145-147). She also compared her hearing abilities to her late mother's and her grandfather's, who both had a more severe hearing loss than she does: "I remember my grandfather, I would come in and if he would be standing in front of the window, just looking out over the water, he wouldn't hear me come in. And if I greeted him he wouldn't hear. Not until I was right there. I think THAT's profoundly deaf. Oh, I can hear anybody coming in!" (3IP1-316-319).

She did not really realise all the consequences of her hearing loss until the audiologist listed the situations where she was most likely to have difficulties. She seemed comforted to hear him and commented:" "That's right, that's what I'm missing!" So I needed somebody to actually put it into words..." (3IP1-040-041).

She joked about her hearing aid: "In the pamphlet that came with it, it's called a hearing computer. (Laughs) Don't I love that! Not being a housewife, but a household executive, I like that part too, especially when I can delegate! (Laughs)" (3IP1-056-062). In fact, she mainly used the acronym HC (for hearing computer) to refer to her hearing aid in her e-mail contacts.

She said she did not hesitate to talk with others about her hearing and the hearing aid she was soon going to acquire. She explained how the students in her class generally reacted: "The children were VERY accommodating (to my hearing loss). And I finally said to them: "Oh, I'm really sorry to ask you, but I ordered a hearing aid, and it's just coming." Oh, they laughed! And I said: "I'm serious!" (Laughs) I believe in being very truthful with kids as well, because then they will accommodate" (3IP1-115-119). She also told some of her friends and family members: "My friends all think it's a little bit of a laugh, and I think so too! (Laughs) I graduated to the next step in life! (Laughs)" (3IP1-149-151). She also said she felt supported by her siblings who were congratulating her on getting a hearing aid. Later on, she added: "My family and friends are my greatest support system. We seem to talk about everything, including my "hearing". They all "cheered" on me when I got my hearing aid" (3E12-045-046).

Margaret showed an extremely high level of self-efficacy and pro-activity. She often spoke sentences like: "I don't believe in walking around with something that can be fixed" (3IP1-111-112). Commenting on the statement of the SADL questionnaire asking about feeling less capable when wearing her hearing aid, she said: "I think a person who is wise enough to get help when needed is a capable one" (3E15-274-275). She was also very positive and determined from the start. On the first interview, she was expecting to wear her hearing aid all day: "I think I would rather do that because I imagine I would get used to it much quicker than if I were to take it out, put it in, take it out..." (3IP1-368-369).

Margaret had expectations falling between the mean and the 80th percentile for the global score and all subscales of the ECHO questionnaire except the Negative Features. Her Negative Features subscale score could not be analysed because she failed to respond to at least two-thirds of the items (Cox & Alexander, 2000). It was therefore considered as missing. Although Cox & Alexander did not explicitly described why subscales where less that two-thirds of the items are not available should be considered as missing, it is most likely that this was done in order to insure that the internal validity of the global score would not be altered by subscale scores that would only depicts part of the relevant concept and would also be less robust because of generated by a fewer number of items.

Margaret added to the ECHO item tapping in hearing aid appearance: "No one will say that my HC looks pretty, but the other option is not hearing well, so I may as well make the best of it" (3E01-182-183). Like the other participants, Margaret shared interesting thoughts on hearing aid appearance and stigma: "I'm not at all self-conscious about it, not in the least. You can tell I have very short hair. And one of my friends said: "Oh, you can always let your hair grow!" And I'm: "Wait, I won't have long hair just to accommodate this hearing aid!" And I won't!" (3IP1-155-157). However, later on, when asked to describe her perfect hearing aid, she wrote: "My perfect hearing aid would be even smaller than the one that I have" (3E25-056-056).

During the trial period, Margaret's experiences and comments were consistent with a very positive attitude, a quick adjustment to her new hearing aid, and a constant increase in her report of benefit. At first, when asked to comment on a statement saying that a hearing aid produces a natural sound, she mentioned: "In time, I'm sure that's what it will be like. Right now, I'm still getting used to hearing my own voice" (3E01-212-213). On day 7, she also added a comment to a question regarding her perception of her own voice: "It's one of the things I'm trying to get used to: the sound of my own voice. I find myself purposely speaking softer" (3E07-072-073). On day 15, she reported: "It appears more natural each day" (3E15-228-228). On day 22, the day before her follow-up appointment with the audiologist, Margaret wrote: "At this point in time I think that I'm used to wearing my hearing aid" (3E22-228-228). On day 26, she added: "My HC is fast becoming a regular asset. Today, I was quite pleased to have it in when I was getting technical instructions at the home store, and didn't once have to ask the salesman to repeat himself" (3E26-065-067). According to Margaret, watching television and listening to the radio also became easier: "The volume doesn't need to be pumped up anymore" (3E07-067-067).

She quickly reported a major improvement in one-on-one situations. She also brought up several challenging situations were she coped in an assertive and efficient way: "While at the restaurant, the relative loud background music made me crazy, because I was trying to have a conversation at the same time. My dinner partner and I just huddled a little close, and had a wonderful time" (3E04-044-046).

However, Margaret mentioned that some teaching situations were still difficult: "I taught a rather noisy class, but it wasn't until I had to teach a phys. ed. class that I ran into trouble. I found it quite difficult to distinguish individual voices during a basketball game, and I found the sound of my own voice rather disturbing" (3E02-030-034). She also described her attendance at a christening during which she was "so pleased to be able to turn (her) HC to the mute mode at one point during the service" (3E13-056-057). Despite her initial expectations that were relatively high, she seemed to have been able to quickly adjust to the various limits of the hearing aid: "The fact that I can actually hear myself chew and swallow is a new experience; however, it doesn't bother me" (3E07-077-078). When faced with a limitation of her hearing aid, she adopted a positive attitude: "When I was in the gym with all those kids, two classes, definitely it was not a good thing. I put it on mute and it worked perfectly! (Laughs) It did, I loved it! That's what is so neat about these things!" (3IP1-268-269). She also quickly started to realise the extent of benefit that she could expect from her hearing aid: “There are times when I expect my hearing to be perfect. How presumptuous of me” (3E22-044-045). On day 10, when asked about the fact that some people are more intelligible than others, she replied: “That is a definite fact in many cases. I think, however, that those who do not articulate well are difficult to understand, whether one is wearing a HC or not” (3E10-090-092).

On day 6 and 8, she asked the researcher about a concern she had: “I have noticed that I seem to hear less with my “good” ear. Is that an illusion?” (3E06-047-048). The researcher was able to explain to Margaret the results of her last audiometric test and to reassure her that she was most likely only noticing her hearing loss more in her left ear now that her right ear was aided. The researcher still suggested talking about it with her audiologist if she had more concerns. She seemed to have felt reassured as she thanked the researcher and added that she would address the issue if she were to feel the need.

The telephone was also a situation that she mentioned not totally mastering. On day 17, she wrote: “From force of habit I still use my right ear to answer the phone. With my HC it sometimes is difficult to hear because of the “squeeking”, for lack of a better word. However, today, when I was on the phone, I held the phone a little away from my ear, and I was able to hear very well. Before this I took out my HC” (3E17-080-084).

Margaret inadvertently answered the same e-mail containing the SADL questionnaire two days in a row (days 16 and 17). Since all scores fell within the 0.9 critical difference used to determine significant change, the scores on the two days were averaged. All subscale scores and the global score fell between the mean and one standard deviation above it. Therefore, Margaret was consistently slightly more satisfied than the average new hearing aid user.

Margaret also seemed to use her experience with a hearing loss and a hearing aid to have a positive influence on her social network: “Three of my (former work colleagues) have decided to get their hearing checked as well, since they also have hearing difficulties. Imagine, three of them!” (3E10-116-117). This comment may also have been triggered by the fact that she now realised she was not the only person of her social network who had hearing difficulties.

Margaret shared constructive comments when the question of stigma was raised: “I have had nothing but positive reactions, and hope that, as a society, we’re past the point of being embarrassed about needing help with our infirmaries" (3E12-056-058). On day 16, to the SADL statement about the fact that people may notice her hearing loss more when she wears her hearing aid, she commented: "It's probably just as noticeable when I keep asking people to repeat themselves" (3E16-106-106).

On day 17, Margaret dislodged the wax guard of her hearing aid while cleaning it. The day after, she described the incident: "When I was cleaning my hearing aid yesterday a tiny little gadget came out, and now I'm a little hesitant about wearing it in case something else comes out – in my ear! I immediately phoned the clinic, but the answering machine "told" me that the clinic is closed on Fridays" (3E18-036-040). The researcher then explained to her about wax guards and how easy it was to put one back in place. As the researcher was not aware of the extent to which the audiologist taught Margaret about wax guards, she did not attempt to completely resolve the issue without the intervention of the audiologist.

When asked about her meeting with the audiologist, Margaret replied: "My appointment with the audiologist went fine. I was a bit annoyed, because he has yet to be on time, and I was his first appointment at the clinic" (3E24-023-024). It is of interest to note that she felt comfortable discussing this issue with the researcher via the Internet.

On day 28, Margaret mentioned an episode during which the hearing aid did not work reliably: "Strangely enough, my hearing aid didn't work for a little while today; however, it kicked in again by itself later. If it happens again I'll take it in to the clinic" (3E28-054-056).

Margaret's general curiosity was reflected by her attitude towards the Internet-based audiological counselling programme: "I've been meaning to tell you how much I enjoy your Hearing Fact of the Day section. As a matter of fact I was thinking about it again when I was driving this morning. [...] Some of the facts are fascinating" (3E06-053-056). In another e-mail, she added: "I find it interesting to be made so aware of the possibilities for people with hearing handicaps. It's also a wonderful way of becoming part of the world of technical aids" (3E17-089-091). She also described how the e-mail contacts influenced her behaviours: "Your daily emails made me stop and think about the whole hearing loss situation" (3E30-119-120). She added: "Emailing with you has taught me about hearing loss, made me read up on the ear and its workings, made me more aware of the technology that's being developed, and made me an advocate in encouraging others to have their hearing checked" (3E30-137-140).

At the end of the trial period, Margaret reported being very pleased with her hearing aid. Her final SADL score was not significantly different from the previous, with most of the subscale scores close to the 80th percentile except for the Negative Features subscale that was higher than the 80th percentile. Her global score was 5.8, which is above the 80th percentile. Her general satisfaction was therefore greater than the average hearing aid user. She summarised the benefits of her hearing aid by saying that she was now able to hear better in most situations. When asked about disadvantages, she wrote: "It's just another thing to do and remember; although having that, it's really no big deal" (3E29-060-061). She also added later on: "This HC is a good thing, just like glasses, dentures, and a host of other devices that help enhance the quality of life" (3E31-154-155).

When discussing the COSI, she mentioned: "Being able to hear the students better was certainly my main motivation to get the hearing aid, yet now I find that my hearing aid is helpful in my general day to day activities" (3E30-053-055). She then described the improvement she experienced in the classroom as much better.

During the last interview, very similar topics were brought up. Margaret mentioned noticeable improvement, saying her hearing was definitely better. This seemed to have been especially noticeable in one-on-one situations and for the television and the radio: "When I watch TV, the volume is way down, I used to have it up, and it's way down again (Laughs)" (3IP2-219-220). She attributed the difficulties that still remained to situations in which people with normal hearing would also have a hard time: "I think they're the kind (of hearing problems) that everyone would experience. Just going to the restaurant when there's loud music; when I had good hearing, I found it difficult to understand people as well" (3IP2-074-076). She had similar thoughts about some noisy classroom situations: "In a regular classroom when the kids are doing something where they have to talk, and then I'm trying to listen to somebody who's calling me from there, then that's still difficult. But that would be difficult even if I had perfect hearing" (3IP2-155-158). She reported again sometimes turning her hearing aid to mute when the noise level was too high, option that she seemed very pleased with. She also mentioned that she had difficulty with the distorted perception of her own voice: "I said: "Am I speaking loudly?" I've asked this several times to people now. Because I cannot quite judge the volume of my own voice" (3IP2-120-121). She was also still learning how to use the telephone: "I think I just have to get used to that.

Because I do turn it to the telephone program but then I still have to hold it away from my ear and that's really no big deal" (3IP2-633-634).

Margaret also shared with the researcher a moment during which she felt a connection with another person with a hearing loss. She described a situation where a hard-of-hearing student asked her to use a FM system. Margaret told her: "Ah, good for you! You and I will have to talk!" and pointed her hearing aid to the student. The girl, surprised, gave her two thumbs up: "So there was an instant connection there. And I thought that was cute. And how wonderful that these children are actually being integrated" (3IP2-381-385).

Just as she had expected during the first interview, Margaret reported wearing her hearing aid constantly: "When I first got it I thought "Ok, I may as well just get used to it and not…" At first I had that little box with me and I thought: "Ok, if I take it out I can put in there." That's ridiculous, I'm not planning to take it out! So obviously I'm not carrying that with me anymore. Yeah, I wear it all the time" (3IP2-269-272). She also reported wearing her hearing aid for an average of 16 to 17 hours a day and carrying batteries in her purse. The report of use is consistent with the amount of time she would use her hearing aid daily as written in the daily e-mail contacts.

Margaret also discussed the fact that her hearing aid was sometimes intermittent: "Every now and then it conks out on me. And it has nothing to do with the batteries" (3IP2-022-023). She added: "So I'm going to take it in and have them check it out for me. Because it's obviously a technical difficulty and they may as well fix it for me" (3IP2-269-272). Margaret noted that this problem happened during the interview with the researcher.

During the last interview, Margaret reiterated her reaction when having to wait for her appointment with the audiologist. She explained she was the first client scheduled for the day and therefore expected to be seen on time. The waiting period discouraged her from bringing up some issues she wanted to have addressed: "I wanted to speak to him about this thing and the thing that doesn't work and this and that and… But by then I was so annoyed I didn't feel like talking. And that was not a good thing for me. I'm sure he couldn't care less" (3IP2-047-049). The problems she wanted him to address were the fact that the hearing aid programs are interchanged (the program for most situations is not the default program on her hearing aid) and that the control button used to scroll from one program to the other is loose. In the interview, Margaret then rationalised her reaction: "I didn't really get too much out of that appointment. And it was my first follow-up appointment after having it put in which was a shame. But it's my own fault, I should just forget about those things. Really, I can't, at least I couldn't at that point" (3IP2-062-065). Her self-efficacy was also apparent: "I'm fine with that now. So I'll make an appointment and just ask to speak to him and have this fixed" (3IP2-067-068)." She added: "I mean, there's no sense having (a hearing aid) that doesn't function properly" (3IP2-071-071).

Margaret described how she had learned more about hearing and hearing loss since she had her hearing aid: "I'm backtracking, but I remember the first time I got pregnant. All of a sudden half the world is pregnant! (Laughs) It's true! All of a sudden, I notice this. [...] So with this, all of a sudden, I'm clued to it. My eyes fall on books that talk about hearing and this and this and this. It's fantastic! It's interesting. So I read it, of course! And you gave me all kinds of information that validated the other stuff that I've read" (3IP2-341-349). She described how she liked recognising her behaviours, along with her mother's behaviour (most particularly hearing loss denial) in both the literature she found and read and the information the researcher gave her through the Internet-based audiological counselling programme.

Being very articulated, Margaret was able to describe how she appreciated the Internet-based audiological counselling programme for confirming some observations she made: "Sure, it was (helpful), just to know a little bit more about what's going on. And all those little facts of the day, really interesting! Many of them were not new but it's just written down, black and white and: "Yeah, that's right, that's what it is!", that's interesting!" (3IP2-391-395).

She said she enjoyed the e-mail contacts and added: "I think everybody who gets a hearing aid should go through something like that. It's almost like getting a driver's license. Most of those things you know: you know the rules of the road. But there are just little bits and pieces that make you stop and think. And it's the same with the e-mailing that we did. You just made me stop and think about a whole lot of things that were most natural and logical. And I think that was a good thing" (3IP2-425-429). She thought a daily e-mail contact was adequate as it allowed her to be serious about learning to use her hearing aid: "I looked forward to it, I really did. I liked that sort of, it's almost like an immersion. This is a project for now, and I thought everyday was absolutely fine" (3IP2-518-519).

She contrasted her participation to the hypothetical participation of people who would not be as satisfied with an Internet-based audiological counselling programme: "I like to think that whatever one puts in, one gets out of it. And I think it has to do with that. If you're interested and you want to bother, then it will be a good experience. If you're not interested and you don't want to bother, then forget it. I think that's the way it works" (3IP2-539-542). She also named time constraints as a potential impediment for the participation of some people: "I'm sure it has to do with each individual person. Some people just don't have the time. And I'm guilty of that too. I will say: "Oh, I just didn't have time." But I had time to sit and read for an hour. [...] That's my human weaknesses. I have many of them, many! (Laughs)" (3IP2-549-553).

She usually read and replied to the e-mail contacts at the same time, as opposed to the two other participants who would usually first read the e-mail and later responded to it. Margaret usually read and replied in the evening. Reading and answering one e-mail took her a maximum of 10 to 15 minutes: "It certainly didn't infringe upon a great piece of my time at all" (3IP2-639-640). She thought the content was adequate: "The hearing fact of the day, I was looking forward to that. And that was excellent. And from the questions, of course, that makes one think of certain situations that I would otherwise not have stopped and think about" (3IP2-574-576).

She noted that she had to adjust to many new situations while learning how to use her hearing aid. She then gave the example of some people who might be more insecure about new situations: "So in other words there were a lot of things that I just: "Mmm, maybe I have to do this and that", I had to figure out. Everything worked fine for me. But wouldn't it be neat to have people to have a contact? Even if it's just for the first two weeks. So that they can find out..." (3IP2-453-457). She explained how she felt about the Internet-based audiological counselling programme: "It was almost comforting for me. Although I didn't feel insecure about it at all. But at the same time I knew if anything I would be able to let you know. "Help!" (Laughs)" (3IP2-466-467).

On a final note, she added that she now felt that her hearing aid belonged to her ear and said: "I really think the whole thing has been an excellent introduction for me to using the hearing aid for the rest of my life, I guess! (Laughs)" (3IP2-620-621).

Audiologist's Experiences

The audiologist was also positive about the way Margaret would adjust to her hearing aid. Once again, his reasons were mainly focused on technology: "I think that she will adjust fairly well.

She's got a pretty good aid, it's actually a brand new device, it's a CIC (completely-in-the-canal) so they tend to be fairly well tolerated. I don't really see any major obstacles in her adjustment apart from the typical type of occlusion things, background noise again and things like that are always potential issues" (31A1-021-023). He added: "I think she would fall in the average category when it comes to difficulties" (31A1-073-074).

The audiologist also described Margaret's good candidacy for an Internet-based audiological counselling programme in these terms: "I would assume that because she's a teacher she is very familiar with the Internet" (31A1-090-091). Later on, he added he was confident that she would be a good candidate "because of her academic-type of environment, 'cause I'm sure she's accustomed to using the Net already, it's a known tool, a resource, and it could easily translate to the Internet for hearing aid use as opposed to academic use" (31A1-177-179).

He predicted that Margaret would probably be using her hearing aid mainly at work: "I would be really surprised if she's not wearing it at work, so there's like an eight hour period there. Whether or not she wears it at home all the time, watching television or whatever, that would depend on how helpful she finds it" (31A1-119-121).

During the last interview, the audiologist had only good words to describe Margaret's adjustment to her hearing aid: "Very well, exceptionally well. I'll go out on a limb on that one, exceptionally! (Laughs)" (31A2-096-096). He described his appointment with Margaret: "I didn't do any adjustment to her aid when she came back. The only real issue that she had was that program two was louder than program one. And that seemed odd to me. […] So instead of just switching the programs around we just decided to change the order, so that she uses program two when she wants to hear things louder and that she uses program one when she is in a loud environment and needs less background noise" (31A2-048-054).

He described the outcome of the follow-up appointment: "She had essentially no complaints. And that's what I like to see!" (31A2-068-068). Later on, he added: "She did not mention any difficulties at all! So I am not aware of any difficulties that she's having" (31A2-128-128). He discussed the perceived benefits she mentioned to him: "It was significantly better! She was able to hear quite clearly, she wasn't asking for repetition. And I don't recall issues regarding background noise" (31A2-089-090). Also, he noted that she did not report some common difficulties among new hearing aid users: “No issue reported regarding the phone, which is interesting. I don’t know if I asked her that specifically but she didn’t mention it” (31A2-130-132).

Just like in the first interview, he discussed the type of hearing aid in relation to her perceived benefits: “And she actually has a relatively inexpensive hearing aid. The interesting thing about the CIC (is that) the two programs are not really independent programs […]. So program two is a little bit limited. But it didn’t seem to affect her perception of her quality of the sound” (31A2-070-073).

Finally, he reported an average use of about 14 hours a day.

Summary of Experiences

Margaret can probably be described as a very successful new hearing aid user. She faced some problems: her hearing aid’s wax guard fell out, her hearing aid started to display intermittent amplification, her program switch was loose and her programs are interchanged. Despite that, she is satisfied with her hearing aid and feels that her hearing aid is helping her in many situations. The audiologist also had similar positive comments about Margaret’s adjustment. It is interesting to note that at the end of the research project some of the problems that Margaret experienced had not yet been shared with the audiologist. This was at least partially caused by Margaret’s reaction to the waiting time before the start of her follow-up appointment.

Framework Derived from Margaret’s Experiences

The core category that emerged from Margaret’s interviews and e-mail contacts was “Internet-based audiological counselling as a means to reinforce positive adjustment behaviours”. The four categories were “bases for rehabilitation”, “attitudes”, “adjusting”, and “Internet-based audiological counselling”. The framework that follows illustrates the concepts associated with these categories.

Table 6. Framework related to core category: Internet-based audiological counselling as a means to reinforce positive adjustment behaviours.

Categories	Properties	Dimensions
Bases for rehabilitation	Conviction of her need	Specific goal
	Support system available	Family members Friends
Attitudes	Self-efficacy	Comfortable with having sought help Assertive in her listening needs Take action when facing hearing aid-related difficulties
	Curiosity	Motivation to learn
Adjusting	New situations	Own voice Noise Telephone
	Expectations revision	Difficult listening situations
Internet-based audiological counselling	Reinforced naturally occurring behaviours	Learning and validating Developing curiosity Provoking observation and reflection Advocating

Margaret showed solid bases for rehabilitation by being convinced of her need to seek help and the availability of an extended support system. Because several years had passed between her first hearing test and her decision to acquire a hearing aid, Margaret seemed to have come to a point where she truly felt that she needed help. The decision of acquiring a hearing aid seemed to have been taken by Margaret only and was no directly triggered by communication partners. Her specific goal was to hear better in classrooms when doing supply teaching. She constantly referred back to this goal when describing the hearing aid benefits she was experiencing and, on day 30, added: “Being able to hear the students better was certainly my main motivation to get the hearing aid, yet now I find that my HC (hearing computer) is helpful in my general day to day activities” (3E30-053-055). Her support system, composed of her family members and friends, were also an asset in Margaret’s eyes. She described how she could talk about everything with them and how they all cheered up on her when she told them she would get a hearing aid.

Margaret constantly showed two attitudes that can facilitate coping with a hearing loss, namely self-efficacy and curiosity. First, Margaret had an extremely high level of self-efficacy. Her comment to the SADL questions on the feeling of incapability when using a hearing aid was self-explanatory: “On the contrary. Someone who has gone and found help for a deficiency appears to be a competent person” (3E31-269-270). Margaret never mentioned pretending to hear or withdrawing from a conversation when having difficulty hearing. She often talked about noisy situations in which she turned her hearing aid to mute, but she did not seem to do so in an attempt to withdraw from the social situation she was in: “As I said, I truly turned it to mute. And when I would have to speak to (the students) I got their attention, spoke to them, and they heard me fine” (3E31-115-116). She was also assertive in her listening needs, either asking her communication partners to repeat or using other active ways of coping, like in a noisy restaurant: “My dinner partner and I just huddled a little closer, and had a wonderful time” (3E04-045-046). Her self-efficacy was also reflected by the way she did not hesitate to take action or plan to take action when facing difficulties with her hearing aid: “When I was cleaning my hearing aid yesterday a tiny little gadget came out, and now I'm a little hesitant about wearing it in case something else comes out - in my ear! I immediately phoned the clinic” (3E18-036-039). Margaret was also very curious. She was motivated to learn, reading the booklet that came with the hearing aid and looking for other information on hearing, hearing loss, and hearing aids: “I’ve just become more well versed in this whole situation.” She was also a quick learner, never mentioning difficulties with insertion and removal or care (3IP2-360-360).

Margaret adjusted very quickly to most situations. The sound quality, the loudness of her own voice, and some noisy situations were somewhat problematic to her at first. She approached these situations with patience, saying on day 15: “(The sound quality of my hearing aid) appears more natural each day” (3E15-228-228). She also had to learn to use her hearing aid with the telephone, which she found challenging. However, she was still patient and optimistic, describing during the final interview how she was doing on the phone: “I think I just have to get used to that. Because I do turn it to the telephone program but then I still have to hold it away from my ear and that’s really no big deal” (3IP2-633-634).

As she got accustomed to her hearing aid, Margaret also revised her expectations. She noted on day 22: “I’m actually quite satisfied with my HC, except that there are times when I expect my hearing to be perfect. How presumptuous of me” (3E22-044-046). In fact, starting on day 8 she started to note situations where she could not hear perfectly with her hearing aid, but she wondered if it would not be as difficult even for people with normal hearing. She mentioned five of these situations during the final interview. These situations included social activities, namely communicating when at a big table in a wedding reception, when in a noisy restaurant, or with someone across the room during a family gathering. Work activities were also mentioned, namely communicating in a busy gymnasium or over a classroom when the other children are doing teamwork.

Margaret seemed to have appreciated the Internet-based audiological counselling programme. Her comments suggested that it reinforced behaviours that she was already exhibiting. It allowed her to learn new information and validate information she learned elsewhere and difficulties she was experiencing. It also sparked her desire to gather more information on hearing, hearing loss, and hearing aids. Some of the e-mail contacts also provoked observations and reflections: “Your daily e-mails made me stop and think about the whole hearing loss situation. And am I not lucky that technology has advanced so much that with this tiny apparatus in my ear I can hear so much better. I vaguely remember, in a tiny little country church, seeing a man with a huge megaphone in his ear. I must have been three or four years old” (3E30-119-123). Finally, she encouraged her friends and family members who had hearing difficulties to seek help. She summarised the outcomes of the Internet-based audiological counselling programme: “E-mailing with you has taught me about hearing loss, made me read up on the ear and its workings, made me more aware of the new technology that's being developed, and made me an advocate in encouraging others to have their hearing checked” (3E30-137-140).

Summary

Margaret experienced many benefits related to the Internet-based audiological counselling programme. It also seemed very important for Margaret that her audiologist would be punctual. It is most likely that Internet-based clinical encounters also need to follow basic rules in terms of time to response in order to be accepted by the clients.

CHAPTER 8

COMPARING AND CONTRASTING THE CASES

Overview

This chapter will present the converging and diverging predicaments, experiences, and perceptions of the three participants. These can be considered as main conclusions emerging from the process of bringing together the results of each participant into a multiple-case study. It is obviously beyond the scope of this chapter to compare all the information gathered during the course of this study or presented in the previous chapters. Only comparisons and contrasts that seemed particularly related to the goal of the study, namely the potential applications of an Internet-based audiological counselling programme, are presented here.

Converging Predicaments, Experiences, and Perceptions

The participants in this study were similar in many ways. Although no exclusion criteria precluded young adults participating in this study, all participants were adults of middle to older age. In fact, all participants were over 60 years old. This goes along with the new evidence showing that older adults do in fact use the Internet (Statistics Canada, 2004e) and are willing to try new health information and communication technologies (Wagner & Wagner, 2003). The participants of this study also all had a bilateral progressive sensori-neural hearing loss. This profile is in accordance with an important proportion of the typical hearing aid clinic clientele.

All three participants opted for one in-the-ear digital hearing aid even though their hearing loss was bilateral. The input of the audiologist could have influenced this decision. However, a study recently suggested that opting for a bilateral fitting could be a stronger predictor of long-term use than the degree of hearing loss (Gianopoulos & Stephens, 2002). The investigators proposed that new hearing aid users who decided to opt for a unilateral fitting “should be targeted for post-fitting follow-ups and counselling” (Gianopoulos & Stephens, 2002, p.525). In that sense, it is possible that the participants of this study were somewhat more at risk for an unsuccessful hearing aid fitting than clients who would have opted for a bilateral hearing aid fitting.

All participants also seemed to have a similar attitude towards their hearing difficulties. They acknowledged and described their limitations due to their hearing loss right from the first interview. When asked to describe their hearing, none of them qualified it as normal, but they tended to depict the consequences of their hearing loss as being minimal or mild. Only with Henry was information on the extent of his hearing difficulties provided by communication partners. In this case, discrepancies between the self-reports were evident, Henry describing the magnitude of his difficulties as milder than did his spouse. According to Brooks and Hallam (1998), minimisation of hearing difficulty is a factor that can lead to less satisfying self-reported hearing aid outcomes. However, the gradual onset of hearing loss could have explained why Henry did not consider the daily implications of the participants' hearing loss to be severe, or perhaps that he did not realise them.

All participants described the audiologist as very competent. Interestingly, the various observations that supported the participants' judgements differed. Janet described the audiologist as very patient, while Henry noted that the audiologist spoke clearly, and Margaret was satisfied with the way he answered her questions. The nature of these observations is probably related to the qualities they usually expect from health care professionals.

The stigma related to the use of technical devices has been a long-time topic of interest in the field of audiology. In 1979, Brooks noted that the arrival of the new then called post-aural (behind-the-ear) hearing aids would probably lead to a more frequent use than had been common for the body-worn style of hearing aids. Similarly, a survey of hearing aid dispensers and audiologists reported that the category stigma, cosmetic features, and vanity were the most frequent reasons for not purchasing a hearing aid (Kochkin, 1991). In his comprehensive description of the psychosocial consequences of noise-induced hearing loss, Hétu (1996) also outlined stigma as a major concept. The audiologist in the present study reported: "Society has changed, people are much more accepting, or hearing aids are a lot less stigmatising as a rule then perhaps 10 years ago" (1IA2-408-409). He later explained the rationale behind the choice of which hearing aid size to recommend: "I don't think for (the participant) visibility is a big issue. Obviously we went to the smallest, one of the smallest sizes we could get. Because there is no reason we couldn't get the amount of gain that we were looking for in a really small product" (1IA2-182-184). This quote suggests that the audiologist recognises stigma as an important factor when choosing the size of the device. It is interesting to note that all three participants also seemed to be ambivalent regarding the visual appearance of their hearing aid. They all mentioned not planning to keep secret the fact that they acquired a hearing aid. When interviewed, Janet said: "Just judging from some of the questions you asked me it sounds like some people would still be embarrassed that they have to use a hearing aid, which I never even gave a thought to…" (1IP2-458-460). In a similar fashion, Margaret described how some of her friends seemed more worried about the appearance of the hearing aid than she was: "I have very short hair. And one of my friends said: "Oh, you can always let your hair grow!" And I'm: "Wait, I won't have long hair just to accommodate this hearing aid!" And I won't! So, (the appearance of my hearing aid) is really no problem for me whatsoever" (3IP1-155-158). In a way, this suggests that perceptions may have changed and that the stigma related to the use of a hearing aid may somewhat be less of a concern than before. At the same time, all participants opted for in-the-ear hearing aids and mentioned they would not want to wear more visible hearing aids. For example, Henry said: "Those big things that hang out of your ears (behind-the-ear hearing aids), you know… (Laughs) They look terrible! But the small ones, you don't even know you have them, I think" (2IP1-087-089). Margaret, who chose a completely-in-the-canal device, wrote: "My perfect hearing aid would be even smaller than the one that I have" (3E25-056-056). Therefore, the apparent change in hearing aid stigma could easily be caused by the miniaturisation of hearing aids rather than because of changes in the societal conceptions of hearing loss and hearing aids.

Concerning the clinical use of the Internet, some people postulated that this tool could be seen as intrusive for some clients as it reaches them directly in their private environments and somewhat facilitates breaches in privacy via forwarding e-mails to other recipients or printing (Baur, 2000; Spielberg, 1998). By the high frequency of the e-mail contacts and the questions asked that often targeted psychosocial aspects of hearing loss and hearing aid use, this Internet-based audiological counselling programme could have been more likely to provoke such feelings among the participants. However, they all seemed comfortable with the programme proposed. Janet said that none of the questions made her feel uncomfortable: "No. If I've had, I would've answered! (Laughs)" (1IP2-570-570). All the participants also felt that they would not have had any problem if their audiologist had been the one who would had contacts with them, and that they would have been as sincere with him as they were with the researcher. This question would obviously deserve more investigation, but it is interesting to note that the participants of this research project did not seem to consider the Internet-based audiological counselling programme proposed to be intrusive or to interfere with their private life.

Although many of the participants' predicaments, experiences, and perceptions were similar, important discrepancies between the cases were also discovered along the way.

Diverging Predicaments, Experiences, and Perceptions

All participants seemed to understand that the benefits they might derive from their hearing aid were likely to increase over time. This was potentially reinforced by both the audiologist's intervention and by their participation in the research project. In fact, increasing benefit over time was an idea that was stressed both by the audiologist and by the researcher in at least some of the e-mail contacts. For example, in the guide to e-mail contacts that was sent to the participants (Appendix G), the researcher mentioned: "I may ask you similar questions over the month. I am not trying to test your memory or your frankness by doing so. I am interested in changes that may occur during the period. Therefore, please answer the questions concerning how you feel at that moment, without feeling that you should look back to compare your previous answers. " At the time of the last interview, Janet and Henry still had expectations of increased benefits over time. However, Margaret did not. This difference may be explained by the fact that Margaret had fewer unmet expectations.

Janet and Henry were also similar in the sense that they both felt disturbed by environmental sounds amplified by their hearing aid. Both seemed to be very affected by this phenomenon. Janet expressed it well in words: "The things I hear now are no interest to me" (1E08-090-091). They also both had difficulty identifying some of the sounds they were now hearing, a situation that Henry described as annoying.

According to Brooks (1989), the attribution of one's hearing difficulties to external factors can have a negative impact on hearing aid use. Even though they did not express this belief constantly, Janet and Henry sometimes mentioned that their hearing difficulties were at least partially due to the way people enunciated. Janet wrote in an e-mail: "I don't seem to hear TV programs more clearly, but I can hear them set at a lower volume. I can only assume that no TV actors learn to enunciate properly" (1E08-092-093). For both Janet and Henry, this thought seemed to become more apparent after they started realising they were disappointed with the level of benefit from the hearing aid they were experiencing. They seemed to feel that if communication problems were still present after they started using their hearing aid then the cause of these problems had to be external to them. Henry said in the last interview: "I hear sounds that I haven't heard before, or haven't heard for a long time. [...] So for the rest, people can better speak clearly when they talk to me. I'll put a sign "Speak clearly!" (Laughs)" (2IP2-

531-537). It can be hypothesised from these comments that new hearing aid users can sometimes shift their perceived locus of responsibility for impaired communication from themselves to their social environment after considering that the hearing aid is not as helpful as expected. This could explain why Margaret did not have, or at least did not exhibit, thoughts about the cause of her hearing problems being her communication partners.

The participants also differed in their reported ability to manipulate their hearing aid. Janet, who was using an in-the-canal hearing aid and who was suffering from arthritis, mentioned that she found it difficult to insert the hearing aid and change the battery. During the last interview, she tried to show me how to change the battery and could not do it even though she could describe perfectly well how it should be done. During the first interview, Henry also had great difficulty inserting his hearing aid. However, it seems like practice helped Henry to acquire this new skill. In contrast, Margaret did not seem to have any difficulties handling her completely-in-the-canal device.

Henry did not achieve the same mastery of the vocabulary related to hearing aids. For example, feedback, interference, racket, static, and whistling were words that he used interchangeably to describe either a disturbing environmental sound amplified by the hearing aid or acoustic feedback. In contrast, both Janet and Margaret quickly learned how to describe their perceptions, using consistently the terms used by audiologists (for example, feedback or background noise). Janet and Margaret sometimes also used their preferred term (for example, whistling or surrounding noise). This ability could be very useful for efficient client-audiologist communication about the hearing aid. A frequent e-mail contact in the case of Janet and Margaret probably helped them to use clear and consistent vocabulary to describe their experiences with their hearing aid.

Both Margaret and Janet also mentioned how they appreciated the fact that a face-to-face encounter with the researcher was planned before the start of the e-mail contacts. This comment is in accordance with the conclusions of other authors, Johnston (1996) for example: “E-mail does not diminish the need for personal contact, but is simply another way for physicians to communicate with patients.”

In terms of Internet experience, Janet seemed to have somewhat integrated the Internet in her daily activities to a greater extent than the two other participants. She relied more than Margaret or Henry on e-mails to communicate with the researcher for purposes other than the daily e-mail contact. For example, Janet was the only one with whom the interviews were scheduled via e-mail. She was also the only participant to periodically e-mail the researcher after the end of the research project, who had subscription to daily e-newsletters, and who had contacts with her audiologist over the Internet. That being said, Henry and Margaret also appeared to be very comfortable with the use of the Internet, but seemed to use this resource in a less extensive manner than Janet. Interestingly, Cummings et al. (2002) did not report a correlation between the degree of use of the Internet and level of participation in an online support group for hearing loss.

It is impossible to state with certainty all factors that facilitated or impeded each participant's full involvement in the Internet-based audiological counselling programme. Cummings et al. (2002) reported participation in a online support group was predicted from less real-world support from family and friends, but also from a higher feeling of effectiveness, from using professional medical help and counselling, and from participating in another electronic support group. Janet is the participant who seemed to meet the most of these criteria, while Margaret and Henry's profiles corresponded somewhat less to that description, but for different reasons. Henry's attitude towards the e-mail contacts, namely that he considered them to be of no benefit to him but that they were rather a daily chore, certainly played a role in his low level of participation. In contrast, Margaret's curiosity and self-efficacy surely triggered her exemplar involvement in the daily e-mail contacts. The time schedules of each participant could also have played a role in their level of participation. Janet did not work, Margaret worked part-time, and Henry worked full-time. Cummings et al. (2002) noted that the level of participation in an online support group predicted the amount of self-reported benefits. This trend seemed to have been observed in all of the participants.

General Conclusions

This study aimed at answering two main questions. First, it explored how an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist could be used to gather information about the day-to-day experiences of new hearing aid users. In this research project, a daily e-mail contact provided the researcher with a very rich description of the experiences of the participants. The collection of the information presented in the last chapters provides evidence according to which an Internet-based audiological counselling programme enabled the researcher to reach a better understanding of the participants' changes in self-reported outcomes over time and meaningful experiences with their communication partners that the audiologist who did not have daily e-mail contacts with the participants. The frequency of the e-mail contacts allowed the development of a strong relationship of trust between the participants and the researcher.

The second question was related to the use of an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist to gather information about and respond to new hearing aid users' needs for informational and emotional counselling. The main potential application of an Internet-based audiological counselling programme in the form of a daily e-mail contact seemed to be the potential reinforcement of positive adjustment behaviours, leading to a healthy adaptation to a new hearing aid. This finding, namely that older adults who use the Internet frequently mention a feeling of reinforcement of involvement in their daily activities, was also found in another research study using the grounded theory (White & Weatherall, 2000). In fact, the e-mail contacts enabled Janet to use her device more and to learn through self-assessment how to regain control in the listening situations that she encountered. As mentioned previously, participating in this Internet-based audiological counselling programme also made Janet use the hearing aid more: "Since your first question was always how long did you wear your hearing aid, I had to do something about it and not say 10 minutes! (Laughs)" (1IP2-467-469). It also made her more attentive to the potential benefits and limits of her new hearing aid: "It made me focus more on what was going on here [...]. So it forced me to think about it" (1IP2-450-456). The daily questions also helped her focus on specific aspects of the hearing aid every day: "If I have read it at night I might not have paid attention to what was going on" (1IP2-509-510). For Margaret, the e-mail contacts reinforced positive adjustment behaviours that she was already prone to demonstrate: "Your daily emails made me stop and think about the whole hearing loss situation" (3E30-119-120). She added: "Emailing with you has taught me about hearing loss, made me read up on the ear and its workings, made me more aware of the technology that's being developed, and made me an advocate in encouraging others to have their hearing checked" (3E30-137-140). In Henry's case, his low participation did not lead to such outcomes; however, he did not engage in as many e-mail contacts as the other two participants during the period of the research. As predicted, the daily e-mail contact was appreciated by some participants but was also considered like a time-consuming commitment that yielded no tangible benefit by one participant. For Janet and Margaret, the Internet-based audiological counselling programme had a broad impact: predisposing, enabling, and reinforcing factors as mentioned in the PRECEDE-PROCEED health promotion model were areas of improvement reported by the participants (Green & Freuter, 1991).

Summary

This chapter reviewed the major similarities and disparities among the three participants. This represents the extra information gathered by the case series. The last section presented the main results of this study. A thorough discussion on the benefits and limits of this research project follows.

CHAPTER 9

DISCUSSION AND IMPLICATIONS

Overview

This last chapter presents the potential applications of this research project. Its strengths and limitations will be discussed. Finally, potential future research directions will be explored.

Key Conclusions

Although each participant exhibited different behaviours and shared various thoughts regarding the use of the Internet to provide audiological counselling, it can be concluded from this study that:

- An Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist is a powerful communication medium to explore the day-to-day experiences of new hearing aid users. It also allows the observation of changes in behaviours and perceptions of new hearing aid users during the period following the hearing aid fitting.
- An Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist is an interesting communication medium to provide timely audiological counselling to new hearing aid users. More specifically, it broadens the scope of rehabilitative audiology. When the provision of a hearing aid mainly improves enabling factors, the addition of an Internet-based audiological counselling to the provision of a hearing aid offers predisposing, enabling, and reinforcing interventions as defined by the PRECEDE-PROCEED health promotion model (Green & Freuter, 1991).
- The level of benefits and participation related to an Internet-based audiological counselling programme in the form of a daily e-mail contact with an audiologist is not constant among all new hearing aid users.

Significance

The results of this study are tentative but they are nevertheless significant both at a theoretical and at a practical level.

Theoretical Implications

Because of its qualitative nature, this research project unveiled many interesting issues related to Internet-based audiological counselling. The results can also be generalised to other types of Internet-based health counselling or education programmes. The themes that were highlighted in the preceding chapters provide insights into the processes taking place both at the clinician level as well as at the client level. This study also provides strong evidence for the use of the Internet when gathering a thorough description of adjustment behaviours.

Practical Implications

This project is also anchored in the daily challenges of audiology. As it was mentioned in a previous chapter, the figures of low hearing aid satisfaction, coupled with the high prevalence of Internet use among the population in general and the hearing aid users in particular, open the door to a different intervention medium that could improve hearing aid outcomes. The conclusions of this research project will be helpful for audiologists willing to implement such a service in their clinics. The general template of the Internet-based audiological counselling programme that was developed for the purpose of this research project can also be used as a starting point by clinicians.

Reflections on the Study

Through a multiple-case study, this project amalgamated a need for a more comprehensive model of audiological counselling for new hearing aid users and a now widely available communication medium, the Internet.

Strengths

An audiologist with professional interest in audiological rehabilitation, and more specifically adjustment to hearing aids among adults and older adults, was involved in all steps of this research project. Continuity between the different portions of the study was therefore ensured.

The research project was designed according to the results of an extensive literature review in both rehabilitative audiology and e-health. One of the conclusions of a published review in the field of e-health was taken as one of the central points of this project: “At present there is probably too much emphasis on technology in telemedicine rather than on health-care itself”

(Loane & Wootton, 2002, p.69). Therefore, this project mainly focused on the circumstances surrounding the provision of Internet-based audiological counselling rather than on technology issues per se. A better understanding of the interactions between clients, technology, and context of clinical use of the Internet, which is said to be needed in medicine (Baur, 2000), was the central point of this research project. The focus was put on the interactive aspect of Internet-based communication: the emphasis was put as much on what the participants could learn from the researcher as what the researcher could learn from the participants via daily e-mail contacts.

A qualitative multiple-case study allowed in-depth analysis of each of the cases. Such thorough understanding of the experiences of each participant could not have been obtained with a different methodology. This depth was considered necessary in order to answer the research questions and because a new type of service was proposed. It was also shown in another study that qualitative research methods can lead to more meaningful results than quantitative methods when proposing a new Internet-based clinical intervention (van't Riet et al., 2001).

The decision to provide daily e-mail contacts, and therefore build a strong relationship with the participants and gather information on a regular basis, is one of the biggest strengths of the project. For example, it allowed the researcher to see how Henry's reported outcomes changed drastically along the way. Particular feelings, reactions, and experiences would also probably have been missed with a different frequency of contacts. This frequent communication was combined with the fact that the interview also facilitated the development of a climate of respect, openness, and trust between the participants and the researcher. The contents of the information gathered during the last interviews were especially rich, filled with deep and personal comments. The nature of the Internet, which allowed the participants to reflect on their experience in their natural environment, was also one of the strengths of this study. The interviews were also performed in the participants' preferred environments. Moreover, opting for two different media of data collection, namely via both e-mail and interviews, and choosing to have both structured questions and questionnaires (ECHO, SADL, and COSI), as well as open-ended questions and opportunities to share thoughts about any topic, allowed for a thorough and valid investigation of the different themes related to the research questions.

Although the inclusion criteria for the participants were rather broad, all participants showed certain similarities in terms of age and nature of the hearing loss. It is most likely that these factors are representative of the average clientele of a typical hearing aid clinic. In terms of age and audiological counselling needs, it was stated that clients under the age of 70 years were more likely to express need for and interest in further counselling (Dahl et al., 1998).

Limitations

The method chosen to recruit the participants was not optimal. More initiatives could have been undertaken to build partnerships with audiologists in order to increase recruitment. Although audiologists can dispense hearing aids in Ontario, many hearing aids are still dispensed by hearing aid practitioners. As hearing aid practitioners were not targeted when recruiting audiologists, it is possible that many partnership opportunities were missed. It would also have been better to ask the potential participants for permission for the researcher to contact them rather than asking them to contact the researcher. Many potential participants probably forgot to contact the researcher, and this scheme did not allow the researcher to know how many potential participants decided not to make contact and why. The reasons for non-compliance could have been important information in order to document the acceptability of an Internet-based audiological counselling programme.

As it is well known that hearing loss has an impact on both the hearing-impaired person and his or her communication partners (Hétu et al., 1993), it would have been good to involve the willing communication partners in the Internet-based audiological counselling programme. Physicians who use e-mail in their daily practice noted that family members and caretakers of their clients have used e-mail to communicate with them (Patt et al., 2003). This is most likely applicable to audiologists' clients as it was found that people who have a hearing loss who were participating in an online support group reported more benefits if they had significant others observing or posting replies in the group discussions (Cummings et al., 2002).

Some people might argue that the participants did not represent the average population of their age. One has to keep in mind that one of the inclusion criteria was that the participants had to have previous experience with using the Internet. In fact, older Internet users report a higher income, more years of formal education, and a better health status than their non-Internet users counterparts (Chen & Persson, 2002). Interestingly, they also score higher than non-users on the personal growth, purpose of life, and intellect/openness aspects of psychological well-being. However, this inclusion criterion was chosen in order to target the clients to whom an audiologist would be most likely to offer Internet-based services. In fact, it is unlikely that an audiologist will want to train clients to use the Internet in order to use this communication medium for clinical purposes. However, associations of consumers, elderly centres, and other not-for-profit organisations may want to explore the idea of coupling Internet-based health services and introduction courses to the Internet. Such a goal would obviously deserve its own research programme.

Other aspects related to the volunteer effect could have been observed (for a famous example of the volunteer effect, see Lindsted, Fraser, Steinkohl, & Beeson, 1996). In general, research volunteers are known to be more educated, have more self-efficacy, and be more extroverted than those who do not volunteer. Special attention to these factors would be especially pertinent for a study with a larger number of participants in which the goal of the study was to directly apply the quantitative measures taken from their sample to the general population.

On a final note, the ECHO and the SADL questionnaires were found to lack construct validity when administered to the participants of this study. In fact, although the scores were reproducible, they did not seem to capture very well the essence of expectations and satisfaction. For example, Janet's last SADL global score fell between the 20th percentile and the mean. However, the negative features and personal image subscales inflated her global score as she scored far below the 20th percentile in both the positive features and the service and cost subscales. In this example, the fact that Janet did not experience stigma issues or negative features like feedback did not seem to impact on her satisfaction. She showed signs of major dissatisfaction both in e-mails and in the last interview: "I loathe wearing a hearing aid, not because of vanity or anything like that, but because I find it very intrusive, and I don't find it helps a great deal" (1EX4-021-022). In this case, the relative weighting of each subscale did not translate into her global satisfaction. As another example, Margaret answered medium to the question How content are you with the appearance of your hearing aid? However, during the same administration of the SADL, she answered Not at all to the question Do you think people notice your hearing loss more when you wear your hearing aid? Although these two items have the same weight on the personal image subscale (0.33 each), it is unlikely that Margaret's medium satisfaction with the appearance of her hearing aid have an impact on her overall personal mage satisfaction as she considered that people do not notice it her hearing aid anyway. In the future, the standardised tools to measure self-reported hearing aid outcomes should be chosen more carefully. Another option would be to avoid the use of standardised self-reported hearing aid questionnaires and to rely on personalised measures as suggested in the literature (Gagné, 1998, 1999; Gagné et al., 1995). However, as the ECHO and the SADL tools were used more as a trigger for comments than to compare over time or between participants, the impact of the poor validity of these tools on the overall quality of the data gathered was minimal.

The design of this study prevents from using the results as definitive measures of efficacy or effectiveness of an Internet-based audiological counselling programme. First of all, although it was deemed important for this research project to offer a daily e-mail contact, it is unlikely that an audiologist would offer an identical Internet-based audiological counselling programme to his or her clients. Also, the sample size of this study is not large enough to be able to insure that the participants were similar to the overall population to which this service could be offered. The absence of a control group, a placebo group, or both also prevents attributing the observed outcomes to the intervention only.

Directions for Future Research

The findings of this study unveiled numerous questions for which future research is required. For this project, the choice was made to offer a daily e-mail contact. It is unlikely that a more frequent contact as part of an Internet-based audiological counselling programme would be appropriate; however, a less frequent Internet-based contact might have yielded similar outcomes. This issue is particularly important as an increase in workload was reported as the primary reason for physicians not to use e-mail communication with their clients (Hobbs et al., 2003). Evidence also suggests that clinical e-mails could be answered by support personnel without any change in satisfaction (Sittig et al., 2001). This approach could also be explored in rehabilitative audiology where support personnel could be trained to provide Internet-based services.

Other types of rehabilitative audiology Internet-based interventions deserve investigation. This project focused on adults and older adults who are new hearing aid users; however, other populations could potentially benefit from similar services. The work of Cummings et al. (2002) on online support groups for hard-of-hearing individuals studied a possible application of the Internet that seems very promising. Internet-based rehabilitation programmes in which the communication partners can participate and that integrate means to actualise the information retrieved online into daily activities would be particularly welcome. For example, could practical assignments, interactive features, or review of the concepts during face-to-face meetings enhance the benefits offered by an Internet-based intervention?

When designing new Internet-based services, it is of paramount importance to insure that such services are meaningful to the clients. It was said that the key predictor of clients' interest in using the Internet was "the degree to which they felt that using the Internet would help them to deal better with their health" (Rogers & Mead, 2004). Similarly, a rehabilitation and health education programme that did not answer the clients' needs in mind failed (van't Riet et al., 2001).

Clinically meaningful changes also need to be demonstrated by explicitly comparing emerging interventions with the present services being offered. Efficacy, effectiveness, cost-effectiveness, cost-benefit, and/or cost-utility analysis will ultimately be needed to better document the possibilities that the Internet can offer in the provision of rehabilitative audiology services. These analyses will also have to consider clinical measures of candidacy for such services.

Concluding Remarks

When asked to share their thoughts on e-health, clinicians often initially focus on technology. Many prefer to ignore the fact that over half of their clients use the Internet, as the clinical use of the Internet is often seen as an area that can be frightening and that lacks guidelines and years of applications. It is interesting to note that clinicians had exactly the same feeling towards the clinical use of the telephone about a century ago (Spielberg, 1998). Nowadays, one cannot imagine a clinician who would refuse to use the telephone in his or her daily functions.

There is currently "a large gap between the deliberative ideal and the reality of patient-physician interactions, regardless of whether Internet technology is involved in the encounter" (Baur, 2000, p. 255). Such a statement can also be applied to other clinicians, including audiologists. Our focus as audiologists is healthy communication, and it should start with a thorough self-examination at the way we as a profession interact with our clients. We also need to review the way we answer our clients' rehabilitative needs and use all tools available to enhance the impact of our interventions. Rather than focusing on technology, discussions around e-health should focus on quality health care by improved communication (Loane & Wootton, 2002). Having this premise in mind, the opportunities of e-health will become more evident.

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APPENDIX A

LETTER TO AUDIOLOGISTS

UofTM
UNIVERSITY OF TORONTO at MISSISSAUGA
A GREAT UNIVERSITY FOR A GREAT COMMUNITY

Wednesday, March 31st 2004

Dear [First name_Last name],

RE: HEARING AIDS AND THE INTERNET

We obtained your contact information from the audiologists in private practice directory of the College of Speech-Language Pathologists and Audiologists of Ontario. Please let us introduce ourselves.

Ariane Laplante-Lévesque obtained a Master's degree in Audiology from the Université de Montréal in 2003 and is now pursuing a M.Sc. in Biomedical Sciences from the Université de Montréal while on exchange at the University of Toronto. Her Master's research project is being co-supervised by Jean-Pierre Gagné (UdeM) and Kathy Pichora-Fuller (UofT).

Kathy Pichora-Fuller is presently a Professor of Psychology at the University of Toronto at Mississauga. Before coming to the University of Toronto, she taught Audiology at the University of British Columbia for over 10 years and she also worked for many years as a clinical audiologist in Toronto. She is currently on the Board of the Canadian Academy of Audiology.

Have you ever wondered how the Internet is changing your work as an audiologist?

For her MSc in Biomedical Sciences, Ms Laplante-Lévesque is conducting a research project called "Adjustment to hearing aids by first-time wearers: Examining everyday listening experiences and providing audiological follow-up through the Internet". In this project we explore the experiences and needs of first-time hearing aid users and examine how the Internet can be used to provide audiological follow-up during the first month following the hearing aid delivery. The participants, all new hearing aid users, will be asked to contact Ms Laplante-Lévesque using the Internet, either daily during the first month, or only when they have questions or comments regarding their hearing aid. Ms Laplante-Lévesque will personally meet each participant twice, once at the beginning of the study and once at the end of the study. It will also be required for Ms Laplante-Lévesque to meet with the participant's audiologist twice, once at the beginning of the study and once at the end of the study. The interviews with the audiologists will last up to half an hour in duration and could be conducted at your convenience, either at your clinic, at the University of Toronto in Mississauga, or over the phone.

We are requesting your valuable help in recruiting potential participants. All e-mail correspondence will be conducted by Ms Laplante-Lévesque, so a participating audiologist will not be required to offer e-mail services to their clients in order to help recruit potential participants. We appreciate that you run a busy practice, so we will ensure your involvement in the research project does not take too much of your precious time. This research project was approved by the Ethics Review Committee of the University of Toronto, and it is not expected to interfere with your regular treatment of clients.

We are looking for participants who are first-time hearing aid clients and who use the Internet on a regular basis. We will provide them with a secure university webmail account for the purposes of the study, but they should already be familiar with using the Internet.

We would appreciate your help in bringing this study to the attention of potential participants. Enclosed are flyers that could be posted in your office or distributed to interested clients. Also enclosed are copies of the consent form that will be given to potential participants and copies of the consent form that will be given to their audiologist. If you have any questions, we would be delighted to discuss the project with you.

Yours sincerely,

Ariane Laplante-Lévesque, Graduate Student
[redacted]

Kathy Pichora-Fuller, Professor of Psychology
[redacted]
[redacted]

APPENDIX B

RECRUITMENT NOTICE

UofTM
UNIVERSITY OF TORONTO at MISSISSAUGA
A GREAT UNIVERSITY FOR A GREAT COMMUNITY

CAN THE INTERNET HELP YOU HEAR?

Goal of the research project: Explore how audiological follow-up during the first month after you receive your hearing aid(s) can be done using the Internet.

You could participate in the research project if you:

- Are aged 19 years or older,
- Use Internet / e-mail daily,
- Are getting one or two hearing aid(s),
- Have never used hearing aid(s) before, and
- Do not have any major health problem.

As a participant in the study, you will be asked to contact the researcher, Ms. Laplante-Lévesque, using the Internet during the month after you receive your hearing aid(s). All the information shared will be confidential. In addition, you will meet twice with Ms. Laplante-Lévesque for an interview at a time and place that is convenient for you. If you complete this study you will be offered monetary compensation in appreciation of your time and input. Your participation is strictly voluntary. Your participation or lack of participation will in no way affect the service you receive from your audiologist.

Please contact the researchers,
Ariane Laplante-Lévesque, Masters student,
and Kathy Pichora-Fuller, Ph.D., Professor of Psychology,
at [redacted] [redacted]
to get more information on this research project.

3359 Mississauga Road North, Mississauga, Ontario L5L 1C6
www.utm.utoronto.ca

APPENDIX C

CONSENT FORM - PARTICIPANT

UNIVERSITY OF TORONTO *at* MISSISSAUGA
A GREAT UNIVERSITY FOR A GREAT COMMUNITY

Consent form

Title of project:

Adjustment to hearing aid by first-time wearers: Examining everyday listening experiences and providing audiological follow-up through the Internet.

Investigators:

Ariane Laplante-Lévesque, M.P.A., M.Sc. student
[redacted]
[redacted]

Kathleen Pichora-Fuller, Ph.D., Professor,
Department of Psychology, University of Toronto at Mississauga
[redacted]

Jean-Pierre Gagné, Ph.D., Professor
École d'orthophonie et d'audiologie, Université de Montréal
Tel.: (514) 343-6111 #1256

Description:

In this project we explore how the Internet can be used to provide audiological follow-up during the month following hearing aid delivery. Ms. Laplante-Lévesque, who has completed her training as an audiologist, is conducting this study in her work towards a Masters degree. She is a student at the Université de Montréal who is on exchange at the University of Toronto as part of an inter-university Canadian Institute for Health Research Strategic Training Program.

As a participant in the study, you will be asked to contact Ms. Laplante-Lévesque using the Internet daily during the next month. Precautions will be taken so that all the information shared with Ms. Laplante-Lévesque will not be revealed to any other individual. For instance, the information you share with Ms. Laplante-Lévesque will not be revealed to your audiologist.

In addition, you will meet with Ms. Laplante-Lévesque twice over the next month. Each meeting will last approximately one hour in duration. You will be informally interviewed in conversation to find out your thoughts about your hearing aid and the use of the Internet as an audiological follow-up tool. These meetings will be scheduled at a time and place that is convenient for you. All conversations will be audio-taped by Ms. Laplante-Lévesque, so that a written version can be used in later analysis.

As a participant, you agree to allow Ms. Laplante-Lévesque to consult your audiological file. Ms. Laplante-Lévesque will in no way be involved in the decisions you or your audiologist make regarding your hearing health care.

All information gathered on all participants in this study will remain completely confidential. No individual will be identified in any presentation, written or oral, relating to this study. Information gathered during the project will be identified by a code known only by Ms. Laplante-Lévesque and her advisors, Drs. Pichora-Fuller and Gagné. No one else, except perhaps a typist hired to transcribe the audio-tapes, will ever listen to the audio-tapes or read the transcripts. If a typist is hired, he or she will agree to maintain participants' confidentiality and will not know the names or other personal information of the participants that is not part of the taped interviews.

The total time required of you as a participant over the next month will be of about 10 hours for all interviews and Internet contacts. If you complete this study you will be offered $20 in appreciation of your time and input. Also, every Internet communication will entitle you to one virtual dollar. At the end of the research project, the virtual amount will be converted into a donation of the same amount to a charity related to people having hearing loss. According to your preference, the donation will either be done in your name or anonymously.

Your participation is strictly voluntary. You may refuse to participate in this study, or at any time after agreeing to participate in it, you may withdraw from the project without any consequence. Your participation or lack of participation will in no way affect the service you receive from your audiologist regarding your hearing or your hearing aid.

E-mail account policies:

As a participant in the study you will be given a University of Toronto in Mississauga (UTM) e-mail account. This e-mail account will be depersonalised. Therefore, only the researchers will be able to identify you by your e-mail account.

In order to access your e-mail account, you will need to go to the following website using your usual web browser (e.g. Netscape Navigator or Microsoft Explorer).
http://webmail.utm.utoronto.ca

You will need your username and password to access your e-mail account. These will be given to you by Ms. Laplante-Lévesque.

Please note you can click on the “New User Introduction”, “Tips and Issues”, or “Security” features available on the above mentioned website to learn more about how to use your e-mail account. Ms. Laplante-Lévesque will also be available to help you.

Please read the following conditions of use of your e-mail account carefully. Your e-mail account is to be used for research project purposes only. Please use the e-mail account to contact researchers only. Other uses, including use for commercial or personal gain, for software or other copyright infringement, or for any illegal or disruptive purpose, are not authorised. Your e-mail account may not be given to or shared with any other person. Your e-mail account will remain active only for the duration of the research project. Afterwards, the information contained in your e-mail account will be retrieved and stored by the researchers.

Failure to adhere to these guidelines may result in the suspension of access privileges as well as other action as deemed appropriate by the user's division, University of Toronto Computing, and/or the University of Toronto.

I, ______________________________, wish to participate in this study and permit Ms. Laplante-Lévesque to consult my audiological file. During the following month, I will either be contacting Ms. Laplante-Lévesque daily or only when I have questions or comments, depending on which group I am assigned to. Ms. Laplante-Lévesque will make sure the information I share will not be revealed to any other individual. My audiologist will also be briefly interviewed by Ms. Laplante-Lévesque twice within the next month.

If I have any questions or require any information that is not provided in this consent form, Ms. Laplante-Lévesque or her advisors, Drs. Pichora-Fuller and Gagné, will be pleased to provide me with further information to be sure that I fully understand and agree with this project.

In signing below I acknowledge that:
a) a copy of the consent form has been given to me; and
b) I have read this document and received answers to my questions; and
c) I have read and accepted the e-mail account policies; and
d) I consent to participate in the research project described above.

Printed Name: ______________________________
Signature: ______________________________
Date: ______________________________

APPENDIX D

CONSENT FORM – AUDIOLOGIST

UNIVERSITY OF TORONTO at MISSISSAUGA
A GREAT UNIVERSITY FOR A GREAT COMMUNITY

Consent form

Title of project:

Adjustment to hearing aids by first-time wearers: Examining everyday listening experiences and providing audiological follow-up through the Internet.

Investigators:

Ariane Laplante-Lévesque, M.P.A., M.Sc. student
[redacted]

Kathleen Pichora-Fuller, Ph.D., Professor
Department of Psychology, University of Toronto at Mississauga
Tel.: (905) 828-3865 # 4049

Jean-Pierre Gagné, Ph.D., Professor
École d'orthophonie et d'audiologie, Université de Montréal
Tel.: (514) 343-6111 #1256

In this project we explore how the Internet can be used to provide audiological follow-up during the month following hearing aid fitting. Ms. Laplante-Lévesque, who has completed her training as an audiologist, is conducting this study in her work towards a research Masters degree. She is a student at the Université de Montréal who is on exchange at the University of Toronto as part of an inter-university Canadian Institute for Health Research Strategic Training Program.

As an audiologist you will be asked to discuss the research project with clients that meet general eligibility criteria. Ms. Laplante-Lévesque will gather a written consent from each participant which allows you to share their audiological file with Ms. Laplante-Lévesque. You will also meet with Ms. Laplante-Lévesque twice for each of your clients who will be participating in the study. Each meeting will consist of an interview up to half an hour in duration. You will be informally interviewed in conversation to find out your thoughts about your clients' needs of audiological follow-up, adjustment to hearing aid, and the use of the Internet as an audiological follow-up tool. These meetings will be scheduled at a time and place that is convenient for you. Alternatively, these interviews could be conducted over the phone. All conversations will be audio-taped by Ms. Laplante-Lévesque, so that a written version can be used in later analysis.

All information gathered will remain completely confidential. Information provided by you will not be disclosed to your client(s) nor will information provided by your client(s) to the researcher be disclosed to you. In the event that information shared by your client suggests that a follow-up contact with you may be required, the researcher will strongly urge the client to make such an appointment and to share the relevant information directly with you. No individual will be identified in any presentations, written or oral, related to this study. Information gathered during the project will be identified by a code known only by Ms. Laplante-Lévesque and her advisors, Drs. Pichora-Fuller and Gagné. No one else, except perhaps a typist hired to transcribe the audio-tapes, will ever listen to the audio-tapes or read the transcripts. If a typist is hired, he or she will agree to maintain participants' confidentiality.

The total time required of you as a participating audiologist over the next month will be up to one hour for each of your clients who participate in the study. If you complete this study you will be offered $10 for each of your clients who participate in the study in appreciation of your time and input.

Your participation is strictly voluntary. You may refuse to participate in this study, or at any time after agreeing to participate, you may withdraw from the project without any consequence.

I, ________________________________, wish to participate in this study as an audiologist. I will meet with Mrs. Laplante-Lévesque twice for each of my clients that participate in the study. Ms. Laplante-Lévesque will ensure the information shared will not be revealed to any other individual.

If I have any questions or require any information that is not provided in this consent form, Ms. Laplante-Lévesque, or her advisors, Drs. Pichora-Fuller and Gagné, will be pleased to provide further information so that I fully understand and agree to this project.

In signing below I acknowledge that:

e) a copy of the consent form has been given to me; and
f) I have read this document and received answers to my questions; and
g) I consent to participate in the research project described above.

Printed Name: ______________________________
Signature: ______________________________
Date: ______________________________

APPENDIX E

TELEPHONE INTERVIEW GUIDE FOR POTENTIAL PARTICIPANTS

Hello [name of the potential participant], I am [name of the researcher] from the University of Toronto. [Name of the audiologist], your audiologist at the [name of the audiology clinic] clinic, gave me your name and phone number because you were interested in our research project on hearing aids and the Internet. Do you remember him or her talking about the research project?

The purpose of our research project is to better understand what happens when people like yourself get a hearing aid for the first time. I have completed my training to be an audiologist and now I am doing this research project for my Master's degree.

If you agree to participate in the study, I would like to find out what you have to say about hearing loss and hearing aids. To do so, I would like to meet you twice, once the day you get your hearing aid and once one month later. These meetings would last approximately one hour each. I may also contact you or you may contact me using e-mail during the first month with your new hearing aid. In the project, there will be two different groups of people who are getting their first hearing aid. You would be randomly assigned to one of the two groups. Depending on which group you are in. If you are in one group I will e-mail you everyday and ask for a reply even if you have nothing new to report. If you are in the other group then I will give you my e-mail address so that you can e-mail me in case you have any questions or comments about what it is like to get used to a hearing aid. I will be able to give you some information and advice that might be helpful. If you have problems that I think should be discussed with your audiologist then I will suggest that you do so. No information you provide to me will be shared by me with [name of the audiologist], your audiologist. Would you be interested in participating?

In order to be included in the study, I would like to ask you some questions to make sure you would be the type of participant we are am looking for in this study:

1. What is your date of birth?
   Must answer before 01/01/1984: 19 years old or older

2. Will you agree to give me the right to access your file at the audiology department so that I can obtain information about your type and degree of hearing loss and other information related to your hearing aid prescription and fitting?

Must answer yes: To verify the degree of hearing loss (must be at least mild bilaterally) and take into account audiological variables that could affect the adaptation to the hearing aid

3. Do you have problems hearing in both ears?
   Must answer yes: Bilateral hearing loss

4. Have you ever had a hearing aid before?
   Must answer no: First-time hearing aid user

5. Do you have any visual problems that are not corrected by glasses?
   Must answer no: Potentially able to insert, remove, and maintain his or her hearing aid autonomously and communicate via the Internet

6. Do you have any manual dexterity problems?
   Must answer no: Potentially able to insert, remove, and maintain his or her hearing aid autonomously

7. Do you have any health problems that might affect how easily you get used to your hearing aid?
   Must answer no: No other aetiology that could compromise the adjustment to the hearing aid

8. How would you describe your English skills?
   Must answer that they can communicate effectively in English both orally and in writing

9. What is the highest degree of education you achieved?
   Must answer at least one year of high school: Basic literacy skills

10. Do you have daily access to a personal computer with the Internet?
    Must answer yes

11. How often do you use the electronic mail (e-mail)?
    Must answer at least daily

A. If the person cannot be included in the study:
I am sorry. Unfortunately you do not fit the description of type of person we need for the study. I truly appreciate your taking the time to answer my questions. Would you like me to keep your contact information in case we have other studies in which you may be able to participate?

B. If the person can be included in the study:
Your answers fit well to the type of person we need for the study. What I would like to do is check some information on your file at the [name of the audiology clinic] clinic. Then I could send you a sheet explaining the research project for you to look at. Would you please provide me your e-mail address so that I could send you this document?

I will call you the day after I send you the files by e-mail. The next time you and I will meet will be on the day you return to the audiologist to obtain your hearing aid. At that time, I would like you to sign a consent form, which you should only sign when you understand and are comfortable with the project. Is this ok for you? Do you have any questions?

APPENDIX F

SCHEDULE AND LOCATION OF INTERVIEWS

			With the participant	With the audiologist
Janet	Pre	Date	12/03/2004	16/03/2004
		Location	Participant's home	Audiologist's office
	Post	Date	05/05/2004	20/04/2004
		Location	Participant's home	Audiologist's office

			With the participant	With the audiologist
Henry	Pre	Date	31/05/2004	22/06/2004
		Location	Participant's office	Over the phone
	Post	Date	20/07/2004	14/07/2004
		Location	Participant's office	Audiologist's office

			With the participant	With the audiologist
Margaret	Pre	Date	01/06/2004	24/06/2004
		Location	Participant's home	Over the phone
	Post	Date	15/07/2004	14/07/2004
		Location	Participant sister's home	Audiologist's office

APPENDIX G

GUIDE TO E-MAIL CONTACTS

We will be having a daily e-mail contact for the next month. It should take approximately 5 to 15 minutes of your time to read the daily e-mail and answer it. If you take a considerably longer than 15 minutes to read the daily e-mail and answer it, please let me know so that I can adjust its length. Also, if you were not able to read the daily e-mail and answer it then it would help me if you would let me know as soon as possible so I know whether or not there is a problem that I need to address (e.g, you might have trouble with your computer, be sick, travelling, ...).

The daily e-mail will include some questions and some information. Please do not hesitate to share with me any information, questions, or problems relating to your hearing and your hearing aid. I will try to provide answers, tips, and solutions to your hearing or hearing aid problems. Also, the information you share will not be revealed to anybody. For example, your audiologist will not be aware of the information you share with me nor will he or she be aware of the number of e-mail contacts we will have.

Our daily e-mail contact will be similar to a diary. When writing a diary, you sometimes have a lot to say, while at other times you do not have much to say at all. You usually describe your day while writing a dairy. However, sometimes you may want to talk about events that happened in the past and events that you think will happen in the future. That is fine.

You will be asked to share your experiences concerning your hearing and your hearing aid. Your experiences may be positive, neutral, or negative. Experiences may include: how an activity you were involved in was affected by your hearing or your hearing aid, and whether your hearing or your hearing aid contributed to how you felt when you interacted with a friend, a family member, or a stranger.

I may ask you similar questions over the month. I am not trying to test your memory or your frankness by doing so. I am interested in changes that may occur during the period. Therefore, please answer the questions concerning how you feel at that moment, without feeling that you should look back to compare your previous answers.

The -> symbol means I would like to hear from you on that issue. I suggest you use the « reply » function to write down your answers besides the -> symbol.

Here is an example of a daily e-mail I may have with a participant in the study. My comments are in brackets.

***

DAY 1-

HEARING FACT OF THE DAY

There are many possible causes of hearing loss including aging, noise exposure, illness, heredity, injury or accident, infections, and toxic medications. [The "Hearing fact of the day" is for your information only. Please let me know if you have questions or comments regarding the hearing fact.]

QUESTIONS

How many hours did you wear your hearing aid today?
-> Answer. 4

What are your first impressions regarding your new hearing aid?
-> Answer. I don't know if I'll be able to get used to taking it on or off. It's so small! But when I tried it in the audiologist's office and I listened to his voice, I was pretty happy about the sound quality. I'll wear it tomorrow and try to notice more of what I can hear.

YOUR COMMENTS/EXPERIENCE

-> Answer. I don't have much to say right now. I just got it! Oh, I have a question. I bought a pack of batteries. How long does a battery last?

***

As you can see, feel free to write anything you have in mind. Also, let me know if you feel my questions are not clear. And mainly, let's have fun! Remember that everything we learn together in this study could help others who will try hearing aids in the future to adjust more quickly and easily to this change in their life. I will e-mail you tomorrow morning. Please answer by the end of the day, reflecting your experiences of the day. I am looking forward to reading your answers!

APPENDIX H

INTERVIEW GUIDE WITH PARTICIPANT (1ST INTERVIEW)

How long have you had hearing difficulties?

When do you have hearing difficulties?

What do you do when you have hearing difficulties?

Do you talk about your hearing difficulties with your family, friends, or colleagues?

What do your family, friends, or colleagues think about your hearing difficulties?

What made you decide to go and see an audiologist?

So far, how would you describe the services you received from your audiologist?

How would you describe your hearing loss?

Did you talk about getting a hearing aid with your family, friends, or colleagues?

What do your family, friends, or colleagues think about you getting a hearing aid?

In which situations are you expecting your hearing aid to help you?

How are you expecting your hearing aid to help you on the first day you wear it?

Are there any situations when you think the hearing aid will not help you?

When do you think you will wear your hearing aid?

How many hours a day are you expecting to wear your hearing aid?

Do you know anyone else who has a hearing aid?

Have you ever looked for information about hearing loss or hearing aids on the Internet?

APPENDIX I

INTERVIEW GUIDE WITH PARTICIPANT (2ND INTERVIEW)

How many hours a day do you wear your hearing aid? When do you usually put your hearing aid in the morning?

When do you wear your hearing aid? Did you try the close-captioning option on your television?

In which situations is your hearing aid helping you?

In which situations is your hearing aid not helping you?

According to you, what are the pros and cons of using a hearing aid?

Is your hearing aid meeting your first expectations?

Please describe how it was for you to try your hearing aid. Would you say it was easy or rather difficult? What kind of questions or comments did you mainly have?

Which problems did you encounter while using your hearing aid?

How have you tried to solve them?

Did you contact your audiologist for any of these problems? If so, how helpful was he?

Did you tell me about any of these problems? If so, how helpful was I?

Did you try to get help from anyone else? Is so, how helpful was it?

How would you describe the information/support/services you received from your audiologist?

How could the audiologist have helped better to get used to your hearing aid?

How would you describe the information/support you received from me?

How could I have helped you better to get used to your hearing aid?

What did you think of the format of our daily e-mail contacts (time-consuming, not comprehensive enough, too structured, not structured enough, too often, not often enough, too long period, too short period, …)?

Did you have any problems (technical, personal, or others) with our daily e-mail contacts?

Think of your experience with our daily e-mail contacts. Imagine if your audiologist would have asked you if you wanted to have such e-mail contacts with him during your trial period. Would you have been interested? Why? How does your trial period would have been different if you would have accepted?

Did trying a hearing aid lead you to talk more about your hearing difficulties with your family and friends?

APPENDIX J

INTERVIEW GUIDE WITH AUDIOLOGIST (1^{ST} INTERVIEW)

According to your experience, how do you think he or she feels regarding the idea of acquiring a hearing aid?

According to your experience, how do you think his or her communication partner(s) feel regarding the idea of him or her acquiring a hearing aid?

How do you think he or she will adjust to his or her new hearing aid?

What do you expect will be his or her main difficulties?

Do you think that he or she be willing to contact you if he or she experiences problems or has questions?

Do you think he or she will be willing to contact the researcher if he or she experiences problems or has questions?

How much do you think an Internet-based follow-up might be helpful for him or her?

What could be barriers to the use of an Internet-based follow-up for him or her?

After one month, how many hours a day are you expecting him or her to wear his or her hearing aid?

After one month, how do you think he or she will be satisfied with his or her new hearing aid?

How confident are you that he or she will decide to keep his or her hearing aid after one month?

APPENDIX K

INTERVIEW GUIDE WITH AUDIOLOGIST (2^{ND} INTERVIEW)

How do you think he or she now feels regarding the idea of wearing a hearing aid?

How do you think his or her communication partner(s) now feel regarding the idea of him or her wearing a hearing aid?

How do you feel he or she adjusted to his or her new hearing aid?

What were his or her main difficulties?

Did he or she contact you when he or she experienced problems or had questions?

Do you think he or she contacted the researcher when he or she experienced problems or had questions?

Are you aware of any other help that he or she sought during the trial period?

How was an Internet-based follow-up helpful for him or her?

What were the barriers to the use of an Internet-based follow-up for him or her?

After one month, how many hours a day do you think he or she wears his or her hearing aid?

After one month, how do you think he or she is satisfied with his or her new hearing aid?

Did he or she decide to keep his or her hearing aid? Why?

APPENDIX L
ECHO QUESTIONNAIRE

ECHO

NAME:________________________ **Birth Date:**________ **Today's Date:**________

INSTRUCTIONS

Listed below are statements about hearing aids. Please circle the letter that indicates how much you agree with each statement. Use the list of words on the right to determine your answer. ⟶

A	**Not At All**
B	**A Little**
C	**Somewhat**
D	**Medium**
E	**Considerably**
F	**Greatly**
G	**Tremendously**

How much do you agree with each statement?

1.	My hearing aids will help me understand the people I speak with most frequently.	A B C D E F G
2.	I will be frustrated when my hearing aids pick up sounds that keep me from hearing what I want to hear.	A B C D E F G
3.	Getting hearing aids is in my best interest.	A B C D E F G
4.	People will notice my hearing loss more when I wear my hearing aids.	A B C D E F G
5.	My hearing aids will reduce the number of times I have to ask people to repeat.	A B C D E F G
6.	My hearing aids will be worth the trouble.	A B C D E F G
7.	Sometimes I will be bothered by an inability get enough loudness from my hearing aids without feedback (whistling).	A B C D E F G
8.	I will be content with the appearance of my hearing aids.	A B C D E F G
9.	Using hearing aids will improve my self-confidence.	A B C D E F G
10.	My hearing aids will have a natural sound.	A B C D E F G

(Continued on next page)

A	**Not At All**
B	**A Little**
C	**Somewhat**
D	**Medium**
E	**Considerably**
F	**Greatly**
G	**Tremendously**

How much do you agree with each statement?

11. My hearing aids will be helpful on most telephones without amplifiers or loudspeakers. (If you hear well on the telephone *without* hearing aids, check here ☐)	A B C D E F G
12. The person who provides me with my hearing aids will be competent.	A B C D E F G
13. Wearing my hearing aids will make me seem less capable.	A B C D E F G
14. The cost of my hearing aids will be reasonable.	A B C D E F G
15. My hearing aids will be dependable (need few repairs).	A B C D E F G

Please respond to these additional items.

LIFETIME HEARING AID EXPERIENCE (include all old and current hearing aids)	**DAILY HEARING AID USE**	**DEGREE OF HEARING DIFFICULTY** (without wearing a hearing aid)
☐ None ☐ Less than 6 weeks ☐ 6 weeks to 11 months ☐ 1 to 10 years ☐ Over 10 years	☐ None ☐ Less than 1 hour per day ☐ 1 to 4 hours per day ☐ 4 to 8 hours per day ☐ 8 to 16 hours per day	☐ None ☐ Mild ☐ Moderate ☐ Moderately Severe ☐ Severe

APPENDIX M

SADL QUESTIONNAIRE

SATISFACTION WITH AMPLIFICATION IN DAILY LIFE

NAME ____________________________ DATE OF BIRTH ___/___/___ TODAY'S DATE __/__/__

INSTRUCTIONS

Listed below are questions about your hearing aids. For each question, please circle the letter that is the best answer for you. The list of words on the right gives the meaning for each letter. ⟶

Keep in mind that your answers should show your general opinions about the hearing aids that you are wearing now or have most recently worn.

A	**Not At All**
B	**A Little**
C	**Somewhat**
D	**Medium**
E	**Considerably**
F	**Greatly**
G	**Tremendously**

1.	Compared to using no hearing aid at all, do your hearing aids help you understand the people you speak with most frequently?	A B C D E F G
2.	Are you frustrated when your hearing aids pick up sounds that keep you from hearing what you want to hear?	A B C D E F G
3.	Are you convinced that getting your hearing aids was in your best interests?	A B C D E F G
4.	Do you think people notice your hearing loss more when you wear your hearing aids?	A B C D E F G
5.	Do your hearing aids reduce the number of times you have to ask people to repeat?	A B C D E F G
6.	Do you think your hearing aids are worth the trouble?	A B C D E F G
7.	Are you bothered by an inability to get enough loudness from your hearing aids without feedback (whistling)?	A B C D E F G
8.	How content are you with the appearance of your hearing aids?	A B C D E F G
9.	Does wearing your hearing aids improve your self-confidence?	A B C D E F G
10.	How natural is the sound from your hearing aids?	A B C D E F G
11.	How helpful are your hearing aids on MOST telephones with ***NO*** amplifier or loudspeaker? (If you hear well on the telephone *without* hearing aids, check here ☐)	A B C D E F G
12.	How competent was the person who provided you with your hearing aids?	A B C D E F G (Continued on back page)

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Hearing Aid Research Lab.
August 24, 2000

A	**Not At All**
B	**A Little**
C	**Somewhat**
D	**Medium**
E	**Considerably**
F	**Greatly**
G	**Tremendously**

13. Do you think wearing your hearing aids makes you seem less capable?	A B C D E F G
14. Does the cost of your hearing aids seem reasonable to you?	A B C D E F G
15. How pleased are you with the dependability (how often it needs repairs) of your hearing aids?	A B C D E F G

Please answer these additional items.

EXPERIENCE WITH CURRENT HEARING AIDS	**LIFETIME HEARING AID EXPERIENCE** (includes all old and current hearing aids)	**DAILY HEARING AID USE**	**DEGREE OF HEARING DIFFICULTY** (without wearing a hearing aid)
		☐ None	☐ None
☐ Less than 6 weeks	☐ Less than 6 weeks	☐ Less than 1 hour per day	☐ Mild
☐ 6 weeks to 11 months	☐ 6 weeks to 11 months	☐ 1 to 4 hours per day	☐ Moderate
☐ 1 to 10 years	☐ 1 to 10 years	☐ 4 to 8 hours per day	☐ Moderate- Severe
☐ Over 10 years	☐ Over 10 years	☐ 8 to 16 hours per day	☐ Severe

Other Comments: ____

____

FOR AUDIOLOGISTS USE ONLY

HEARING AID FITTING:

Right Ear	**Left Ear**
Make ____________	Make ____________
Model ____________	Model ____________
Ser. No. ____________	Ser. No. ____________
Fitting Date ____________	Fitting Date ____________
Style CIC ITC ITE BTE	Style CIC ITC ITE BTE

HEARING AID FEATURES (check all that apply)

☐ Directional Microphone
☐ Multiple Microphones
☐ Multi-channel
☐ Remote Control
☐ Multi-program

☐ Peak Clipping
☐ Compression Limiting
☐ TILL
☐ WDRC
☐ BILL
☐ T-Coil

☐ Other ____________________
____
____

APPENDIX N
COSI QUESTIONNAIRE

Categories

1. Conversation with 1 or 2 in quiet
2. Conversation with 1 or 2 in noise
3. Conversation with group in quiet
4. Conversation with group in noise
5. Television/Radio @ normal volume
6. Familiar speaker on phone
7. Unfamiliar speaker on phone
8. Hearing phone ring from another room
9. Hear front door bell or knock
10. Hear traffic
11. Increased social contact
12. Feeling less embarrassed
13. Feeling less isolated
14. Feeling less upset or angry
15. Church or Meeting
16. Other

COSI

The NAL Client Oriented Scale of Improvement

Name: ____________________

Client Number: ____________________

Oticon

COSI

The NAL Client Oriented Scale of Improvement

The Human Link

Name: ______________________

Audiologist: ______________________

Date: 1. Needs established ______________________

2. Outcome assessed ______________________

SPECIFIC NEEDS — Indicate Order of Significance

______________________ ☐

______________________ ☐

______________________ ☐

______________________ ☐

______________________ ☐

	Degree of Change "Because of the new hearing instrument, I now hear..."						Final Ability (with hearing instrument) "I can hear satisfactorily..."					
CATEGORY	Worse	No Difference	Slightly Better	Better	Much Better	SCORE	Hardly Ever 10%	Occasionally 25%	Half the time 50%	Most of time 75%	Almost Always 95%	SCORE
	1	2	3	4	5		1	2	3	4	5	
						AVG.						AVG.

oticon

APPENDIX O

ECHO SCORES

Table O1. Scores ECHO The norms were taken from Cox and Alexander (2000). (No ECHO scores were available for Henry as he failed to respond to the e-mail that included the questionnaire.)

	Janet	Margaret	Norms (20th, mean, and 80th percentile)		
			20th	Mean	80th
Global	4.0	5.4	4.4	4.8	5.5
Positive Effect	3.8	5.2	4.2	5.0	5.8
Service and Cost	3.3	5.7	4.0	5.1	6.0
Negative Features	2.5	NA*	2.3	3.5	4.7
Personal Image	6.3	5.7	5.0	5.6	6.7

* Less than two-thirds of the answers were provided, therefore the subscale score could not be recorded.

APPENDIX P

SADL SCORES

Table P1. Scores SADL – Norms (Cox & Alexander, 1999)

	Norms (20th, mean, and 80th percentile)			Critical difference (0.90)
	20th	Mean	80th	
Global	4.3	4.9	5.6	0.9
Positive Effect	3.8	4.9	6.1	1.3
Service and Cost	4.0	4.7	5.7	1.3
Negative Features	2.3	3.6	5.0	2.0
Personal Image	5.0	5.6	6.7	1.6

Table P2. Scores SADL - Janet

	Day 16	Day 54
Global	3.9	4.4
Positive Effect	2.5	2.8
Service and Cost	3.0	3.3
Negative Features	5	6.0
Personal Image	6.3	7.0

Table P3. Scores SADL - Henry

	Day 39
Global	4.5
Positive Effect	3.3
Service and Cost	5.5
Negative Features	3.7
Personal Image	6.7

Table P4. Scores SADL - Margaret

	Day 16	Day 17	Day 31
Global	5.4	5.1	5.8
Positive Effect	5.2	5.4	6.0
Service and Cost	4.7	4.7	5.0
Negative Features	6.0	4.5	6.0
Personal Image	6.0	5.3	6.0

APPENDIX Q

COSI SCORES

Table Q1. Scores COSI – Janet (Day 41)

	Without hearing aid	With hearing aid	Degree of change
Need #1: Listening to British shows on the living room television at night	Can hear most of the time (75%)	Can hear most of the time (75%)	Better
Need #2: Being able to understand clerk or cashier at the shop	Can hear most of the time (75%)	Can hear most of the time (75%)	Slightly better

Table Q2. Scores COSI – Henry (Day 54) (Note: the COSI questions were sent to Henry on day 39. As he did not reply to the questions, the degree of change was explored during the last interview.)

	Without hearing aid	With hearing aid	Degree of change
Need #1: Listening to a jazz or a classical music radio station at night while working on his home computer	-	-	Better
Need #2: Understanding his clients' questions while sitting at his desk in his office	-	-	Slightly better

Table Q3. Scores COSI – Margaret (Day 30)

	Without hearing aid	With hearing aid	Degree of change
Need #1: Listening to the elementary-level kids in her class while in a teaching situation	Can hear half the time (50%)	Can hear most of the time (75%)	Much better