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Portland State University

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<https://doi.org/10.15760/etd.6928>

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THESIS APPROVAL

The abstract and thesis of Carol I. Sayre for the Master of Science in Speech Communication: Speech and Hearing Science were presented February 6, 1995, and accepted by the thesis committee and the department

COMMITTEE APPROVALS:

[REDACTED]
Doug Martin, Chair

[REDACTED]
Thomas Dolan

[REDACTED]
William Fisher
Representative of the Office of
Graduate Studies

DEPARTMENT APPROVAL:

[REDACTED]
Stephen A. Kosokoff, Chair
Department of Speech Communication

* * * * *

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ABSTRACT

An abstract of the thesis of Carol I. Sayre for the Master of Science in Speech Communication: Speech and Hearing Science presented February 6, 1995.

Title: Using a computer program to influence the expectations senior adults have regarding hearing aids.

A disabling condition that is common for many senior adults is hearing impairment. Studies have shown that a substantial number of people who could benefit from amplification choose not to use hearing aid. Often the reasons may be because they have unrealistic expectations of what hearing aids can do. These unrealistic expectations are not necessarily from personal use, but the senior adult is often influenced by the media, acquaintances, or advertisements. The purpose of this study was to determine if a computer program developed with information about hearing aids and their use could be used to influence the expectations senior adults have regarding hearing aids.

Thirty - five subjects were involved in this study. Thirty - two subjects were volunteers from Portland First

Nazarene Church, two were from a local bank and one was a retired health professional. Seventeen of the subjects were selected to come to Portland State University to view a computer program about hearing aids. The other 18 were part of the control group and did not view the computer program. Ten days following the viewing a questionnaire was mailed to all thirty - five participants. The questions on the questionnaire related the expectations senior adults had about hearing aids in the following areas: cosmetic, acoustics, cost and upkeep, communication benefits, attitudes, acoustics, and comfort. The results were tabulated and percentages calculated.

The results of this study indicated that, in general, senior adults have unrealistic expectations in many areas. In some areas such as acoustics, comfort, and ease of use senior adults' expectations seemed to be influenced by the information in the computer program.

The information obtained in this study would indicate that senior adults' expectations could be influenced by information they received from a computer program. In many areas, such as the cosmetics, communication benefits, cost and attitudes the information provided by the computer program needs to be further developed and expanded in order for it to influence the expectations of senior adults about hearing aids.

USING A COMPUTER PROGRAM TO INFLUENCE THE EXPECTATIONS
SENIOR ADULTS HAVE REGARDING HEARING AIDS

by

CAROL I. SAYRE

A thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE
in
SPEECH COMMUNICATION:
SPEECH AND HEARING SCIENCE

Portland State University
1995

ACKNOWLEDGMENTS

To Becky Huffman for her help with the tabulation of the questionnaire.

To Dr. Martin as my thesis director for his assistance and constant encouragement to finish.

To my family and friends for their loving prayers, understanding spirit, and words of encouragement throughout the three years of graduate school and especially the months it took for completion of my thesis.

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CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

Hearing impairment is one of the most common disabling conditions for the senior adult population. (Hull, 1985; Ventry and Weinstein, 1982; Weinstein, 1991). The ability to communicate and interact in an efficient manner becomes more difficult with advancing age (Hull, 1985; Kaplan, 1992). Messages that were once clearly understood become misinterpreted due to crucial words being missed or because meanings conveyed through rising inflections, a pause, or an emphasis in a particular utterance are not perceived (Kaplan, 1992).

More than eight million senior adults suffer communication difficulties relating to their hearing impairment (Iler, Danhouer, Mulac, 1982; Kricos, Lesner, and Sandridge, 1991). While the use of hearing aids has been shown to help senior adults cope with their communication difficulties, a substantial number (67%) who would benefit from their use are either unwilling to try hearing aids, or purchase them, wear them briefly, and then put them aside (Fino, Bess, Lichtenstein, and Logan, 1992;

Franks and Beckmann, 1985; Iler, et al., 1982; Weinstein, 1991).

Often the hearing impaired senior adult's satisfaction with hearing aids is influenced not by personal experience, but by the attitudes and expectations communicated by the media, friends, family members, or advertisements prior to hearing aid fitting (Franks and Beckmann, 1985; Kricos, et al., 1991; Reber, 1989; Trychin, 1994). These unrealistic expectations about hearing aids may exceed the realities and they need to be recognized by the audiologist and the hearing impaired senior adult. Through counseling with the senior adult prior to fitting hearing aids, the audiologist may discover the client's unrealistic expectations (Weinstein, 1991). It behooves the audiologist to educate the hearing impaired senior adult as to what should be expected when obtaining amplification to insure satisfaction with the hearing aid fitting (Bebout, 1992; Franks and Beckmann, 1985; Garstecki, 1994; Kricos, et al., 1991; Reber, 1989; Scherr, Schwartz, and Montgomery, 1983; Weinstein, 1991).

When dealing with the unrealistic expectations that senior adults may have about hearing aids, the audiologist should focus on those issues and concerns that are important to the client (Weinstein, 1991). The audiologist also should emphasize the number of benefits that the

hearing impaired senior adult can receive from hearing aids, but also be honest about their limitations (Franks and Beckmann, 1985; Kricos, et al., 1991; Weinstein, 1991).

A way to determine the unrealistic expectations that hearing impaired senior adults have is by administering a survey or questionnaire (Franks and Beckmann 1985; Kricos, et al., 1991). One such questionnaire was used by Kricos, et al. (1991) to determine the expectations of senior adults regarding the use of hearing aids. The study showed senior adults, in general, appeared to have medium to high expectations for use of hearing aids and that overall their expectations were positive about hearing aid use. Some of the results may have indicated that these expectations were too positive.

The purpose of the current study was to determine if more realistic expectations regarding hearing aids would be demonstrated by a group of senior adults after they viewed a computer program about the benefits of hearing aids. The areas that were addressed in the computer program were the comfort and ease of hearing aid usage, the communication benefits provided by hearing aids, the cost of purchasing and maintaining hearing aids, the cosmetic considerations, the acoustics, and the attitudes towards hearing aid usage. Expectations of the subjects were assessed by using a questionnaire designed by Kricos, et al. (1991). The

questionnaire was mailed to the subjects ten days to two weeks after they viewed the computer program. In order to determine the effectiveness of the computer program, the questionnaire was also administered to a control group who did not view the program.

CHAPTER II

REVIEW OF THE LITERATURE

SENIOR ADULTS' REJECTION OF HEARING AIDS

Audiologists who work in a hearing aid dispensing practice will find on the average that 50% of their client base will be 65 years or older (Fino, Bess, Lichtenstein, and Logan, 1992). It has been estimated that 20% of the individuals over 65 years have some degree of hearing impairment (Ventry and Weinstein, 1982) and that there are nearly 6.25 million adults age 65 and older that have a binaural hearing impairment sufficient to justify use of hearing aids (Franks and Beckmann, 1985). However, studies have shown that only 22% of this population is actually benefiting from hearing aid use (Kochkin, 1991).

There are many suggested reasons as to why senior adults reject the use of hearing aids. Some of those reasons are psychosocial adjustment, personality and attitude, economics, and lack of education regarding hearing impairment and hearing aid use (Bebout, 1992; Fino et al., 1992; Franks and Beckmann, 1985; Garstecki, 1994; Kochkin, 1991; Reber, 1989; Trychin, 1994; Ventry and Weinstein, 1982; Weinstein, 1991). Probably the most

prominent factor relating to psychosocial adjustment is that hearing aids call attention to the hearing impairment which is seen as a human deficiency (Fino, et al., 1992; Franks and Beckmann, 1985; Iler, et al., 1982). This phenomenon has been called "the hearing aid effect" and is defined as "the negative attitude elicited by the presence of a hearing aid" (Surr and Hawkins, 1988, p.113). The implication of the "hearing aid effect" is that people who wear hearing aids are viewed in a more negative light than other people in attributes such as achievement, sociability and appearance (Surr and Hawkins, 1988).

Even though there are a few senior adults (10%) who may fear hearing aids will call negative attention to their hearing impairment, they also may experience feelings of nervousness or anxiety when they wear the hearing aids (Franks and Beckmann, 1985; Reber, 1989; Surr and Hawkins, 1988). Additionally, they may believe that they will not live long enough to adjust to the hearing aid use (Weinstein, 1991).

Besides the psychosocial adjustment factors, another reason for nonuse of hearing aids is the personality and attitudes of the potential hearing aid user (Franks and Beckmann, 1985; Garstecki, 1994; Reber, 1989; Ventry and Weinstein, 1982). Many senior adults deny they have a hearing impairment or if they admit to having one, they

feel hearing aids are not a logical solution (Franks and Beckmann, 1985; Garstecki, 1994; Iler, et al., 1982). In a study by Corso (1977) it was reported that at least 40% of the hearing impaired who could benefit from amplification refused to wear hearing aids because of personal reasons, such as pride, even if they were given quality hearing aids. The hearing impaired senior adult may believe that hearing aids will portray them as someone with less intelligence or as being weak, leading them to hesitate in obtaining the necessary amplification (Franks and Beckmann, 1985; Reber, 1989). Various studies show that senior adults lack motivation or desire for using hearing aids (Franks and Beckmann, 1985; Garstecki, 1994; Reber, 1989; Weinstein, 1991). They may have the attitude that hearing aids are not worth the effort required to use and maintain or that they are an inconvenience (Iler, et al., 1982; Reber, 1989).

While in some studies lack of motivation may be seen as the key factor in rejection of hearing aids, other studies indicate that cost of purchasing and maintaining the hearing aids is the primary factor (Bebout, 1992; Fino, et al., 1992; Franks and Beckmann, 1985; Garstecki, 1994; Kochkin, 1991; Kricos, et al., 1991). Often senior adults are not aware of what hearing aids cost to purchase or maintain properly. People with hearing impairment who have

received inadequate or incorrect information regarding the cost and care of hearing aids, or even where to obtain hearing aids, may reject hearing aid use (Franks and Beckmann, 1985; Kricos, et al., 1991).

Another cause for hearing aid rejection is that senior adults lack information or education about types of hearing loss and how much it affects communication (Kochkin, 1991). Senior adults may have the misbelief that the hearing can be restored to "normal" by hearing aids to the same degree that eye glasses correct vision problems (Trychin, 1994). Because of this misconception, senior adults may be dissatisfied after they are fitted with hearing aids and reject them (Trychin, 1994).

THE NEED FOR REALISTIC EXPECTATIONS

As stated above, the "hearing aid effect" implies how others may perceive the hearing aid user in a negative light. However, only 10% of the hearing impaired surveyed by Surr and Hawkins (1988) reported sensing this negative attitude. This suggests there are other reasons the hearing impaired, and particularly hearing impaired senior adults do not use hearing aids.

Often the expectations of perspective hearing aid users exceed realities (Kricos, 1991; Trychin, 1994). Trychin (1991) reported that the client who is to be fitted

with hearing aids, or perhaps already has been fitted, is dissatisfied because the hearing aids do not function up to the level of their expectations. The client often has high expectations about what they should understand in certain communication situations and experience disappointment as a result. Other studies have shown that hearing aid use is rejected because of dissatisfaction with either the level of or the interfering nature of background sound or because the quality of the sound being produced is not as natural as it was before the hearing impairment (Cox and Gilmore; 1990; Garstecki, 1994). Trychin (1994) also reported there may be times when the client may have low expectations of what they should be able to understand in communication. Therefore, they avoid communication situations that may be very rewarding.

Secondly, the older adult's expectations are often influenced not by personal experience with amplification, but by other sources such as the media, other associates, or advertising (Kricos, et al., 1991; Reber, 1989). Perhaps the senior adult has associates who have been poorly fitted with hearing aids, and those people may give a wrong impression regarding hearing aids, how they function or how expensive they are to purchase or maintain (Bebout, 1992; Kricos, et al., 1991; Reber, 1989). These preconceived expectations can influence the senior adult's

subsequent satisfaction with and use of hearing aids (Kricos, et al., 1991; Sanders, 1988).

It is necessary for the senior adult to form realistic expectations regarding hearing aids in order to benefit most from the amplification system (Garstecki, 1994; Kricos et al., 1991). A study by Kricos, et al., (1991) revealed that many senior adults have unrealistic expectations regarding hearing aids. Their study showed that when asked what the cost of a hearing aid was, many senior adults lacked that knowledge. Some estimated as high as \$1,500.00, others as low as \$20.00. The questionnaire also investigated what senior adults considered to be the life of a hearing aid before needing to be replaced. The results ranged from 2-3 years to 5 years. When asked about what their expectations were with regard to communication benefits, the majority anticipated significant help from hearing aids, but only one out of three expected to have no problem with loud sounds. Most senior adults expected to hear a natural quality through hearing aids. The majority of respondents expected hearing aids to be easy to use and comfortable to wear. Seventy-seven percent of those surveyed expected the hearing aid to be visible and easy to insert or remove, but only 41% expected experiencing difficulties with insertion or removal of the battery.

THE ROLE OF THE AUDIOLOGIST/COUNSELOR

The results from the questionnaire used by Kricos, et al., (1991) emphasize that the ultimate satisfaction the hearing aid user will receive from amplification could be influenced by several factors. These factors, as reported by various studies, are not only perceived benefits of amplification, but also factors such as how the hearing aid ear mold fits, the presence of feedback squeal, psychosocial aspects of the client, motivation of the client, and family supportiveness (Franks and Beckmann, 1985; Garstecki, 1994; Kricos, et al., 1991; Surr, Schuchman and Montgomery, 1978; Ventry and Weinstein, 1982; Weinstein, 1991).

For the audiologist fitting hearing aids on the senior adult, it is essential to determine what are the expectations the senior adult may have about hearing aids and the basis for these expectations (Weinstein, 1991). During the pre-fitting period the audiologist can discover what the client's expectations are about hearing aids with use of a questionnaire (Kricos et al., 1991). Questionnaires have often been used to reflect patients' hearing handicaps in daily life (Ewertsen and Birk-Nielsen, 1973; Giolas, Owens, Lamb, and Schubert, 1979; Ventry and Weinstein, 1982) or as a tool for self-reporting of benefits of and success with hearing aids (Cox, Gilmore,

and Alexander, 1991; Golabek, Nowakowska, Siwiec and Stephens, 1988; Malinoff and Weinstein, 1989; Newman and Weinstein, 1988; Oja and Schow, 1984; Tannahill, 1979; Walden, Demorest, and Hepler, 1984).

With the aid of the questionnaire such as the one Kricos, et al. (1991) used, the audiologist can take this information and counsel the senior adult about any unrealistic expectations they may have and help them develop realistic expectations. In this way the audiologist can reduce any subsequent frustration and disappointment or dissatisfaction the senior adult may have following the fitting (Kricos, et al., 1991).

THE COMPUTER PROGRAM - A COUNSELING TOOL

It is very common for a modern diagnostic audiological clinic to use computer-based equipment. Computer programs are used in many audiology clinics to help the audiologist select hearing aids with the appropriate electroacoustic characteristics (Smaldino and Smaldino, 1993). Computer programs can be useful also in advising the audiologist regarding the selection of the appropriate rehabilitative treatment approach and in analyzing treatment effectiveness (Smaldino and Smaldino, 1993). In some rehabilitative treatment settings computer programs have been used to assist with instructions and in teaching the hearing

impaired individual (Smaldino and Smaldino, 1993; Gagne, Dinon, and Parsons, 1991). For example, Gagne, et al. (1991) evaluated the Computer-Aided Speechreading Training Program (CAST) for using it as a client-directed activity to teach visual speech-perception. Results indicated that the subjects who participated showed improvements in visual speech perception (Gagne, et al., 1991). Still another area where computer programs could be useful would be in combination with a questionnaire during the pre-fitting counseling session to enhance education and inform the senior adult about what to expect from hearing aids and their use.

In a study by Palmer (1992) which investigated the effectiveness of using a computer program to administer the Hearing Performance Inventories, Palmer concluded that computers:

had the potential to save time, demand completion in one sitting, provide extremely large print, and reduce interviewer bias (pg. 14).

The same advantage is believed to be possible when a computer program is used by hearing impaired senior adults to influence the expectations they may have regarding the use and benefits of hearing aids. With the use of a computer program, the audiologist can allow the senior adult to take the time to become educated about hearing aids and their use during the pre-fitting counseling

period. The computer program can have incorporated into it information to enhance the senior adult's knowledge about such things as what types of hearing aids are available (ITE vs BTE), how visible the hearing aids may or may not be, what the senior adult should expect from the acoustics of the hearing aid, what communication benefits there would be, what to expect when it comes to the ease of use of the hearing aid and the batteries, and the cost of purchasing and maintaining the hearing aid. This enhanced education would then enable the senior adult to develop more realistic expectations about hearing aids.

SUMMARY AND RESEARCH QUESTION

The computer program developed and used in this study was one example of a program that could be used to counsel and educate senior adults about hearing aids. The program was used in an attempt to influence senior adults' expectations and to help them have more realistic expectations regarding hearing aids and their use.

CHAPTER III

METHODS AND PROCEDURES

SUBJECTS

The criteria used for subject selection were consistent with the criteria used in the Kricos et al. (1991) study which looked at senior adults who based their views not on experience with hearing aids but from experience with the media, advertisements, and reports from acquaintances. The population for this study consisted of 35 subjects (19 males and 16 females). Their ages ranged from 55 through 87 years with a mean age of 69.1 years. Thirty-three of the subjects who volunteered were from a senior citizens group from Portland First Church of the Nazarene, two were senior adults who worked for a local bank, and one was a retired health care professional. The subjects reported no previous hearing aid experience and did not have a spouse who wore hearing aids. The subjects were randomly divided into two groups and referred to as Group A which consisted of 10 males and 7 females and Group B which consisted of 9 males and 9 females.

INSTRUMENTATION

The computer program the subjects viewed was authored using the HyperCard Software Development System (D. Martin, personal citation, January 10, 1995) (See Appendix D for program content and format). The program consisted of narration adapted from material supplied by G. N. Danavox, Inc. (1991). The narration discussed different types of hearing aids (ITE vs BTE), batteries, insertion and removal of hearing aids from the ear, removal of the battery from the hearing aid, where and from whom to purchase hearing aids and batteries, communication benefits of hearing aids (monaural vs binaural), and the acoustics of hearing aids (quiet vs background noise).

Viewing of the computer program was conducted at Portland State University in the Learning Lab in Neuberger Hall. A Macintosh Centris 605 computer was used to administer the computer program. The subjects controlled the progression through the program using an Edmark Touchwindow interface. The Touchwindow allows the computer user to control the program by touching "hot-spots" on the screen.

The questionnaire used in this study (Appendix A) was developed by Kricos et al. (1991). The questionnaire consists of 53 questions regarding hearing aid expectations. It was obtained from Sharon Lesner at

University of Akron, Akron, Ohio. This questionnaire was designed by Kricos, et al. (1991) to investigate senior adults' expectations in the following areas: cosmetic consideration, acoustics, communication benefits, comfort, ease of use, cost and upkeep, and attitudes towards hearing aid use. Since this particular questionnaire had been used before it was felt to be an appropriate tool for use in this study. Additionally, its use allowed comparisons to be made between the results from this study and the Kricos et al. (1991) study.

PROCEDURES

Subjects were randomly placed into one of two groups: group A (17 subjects), who viewed the computer program; and group B (18 subjects), the control group, who did not view the computer program. The subjects in group A were scheduled for thirty minute sessions at Portland State University Audiology Clinic to view the program. The time it took to view the computer program ranged from 5 to 18 minutes with the average time being about 10 minutes. Each subject was given a consent form (Appendix B) to read and sign and then instructed how to operate the computer in order to read the script. The following instructions were given:

You will be shown a script to read on a computer monitor. As you finish reading a page, press the

button on the screen that says "next". This will change the screen to the next page. Take your time and if you have any questions, please feel free to ask. A questionnaire will be sent to you in the mail in ten days to fill out and return as soon as possible.

Upon completion, the subjects were thanked for their participation.

The questionnaire was mailed 10 days following viewing of the computer program and was administered by paper and pencil. The questionnaire was mailed out to both groups with instructions to complete and return it in the self-addressed postage paid envelope provided. In order to assure participant confidentiality a number was assigned to each questionnaire for identification purpose. Subjects in both groups were instructed to complete the questionnaire to the best of their abilities and to avoid discussion with anyone else regarding the questions.

CHAPTER IV

RESULTS

In this study, as in the study by Kricos et al. (1991), the 53 questions were grouped into seven categories regarding hearing aids and their use. These seven categories consisted of: cosmetics, acoustics, communication benefits, comfort, ease of use, cost and upkeep, and attitudes. As in the Kricos et al. (1991) study, percentages were calculated for each question.

Cosmetic Factors

The responses of the subjects from both groups about the cosmetic factors were similar and were consistent with the results from the Kricos et al. (1991) study (See Table I). Seventy-two percent of the control group felt the size of a hearing aid would be appropriate, as did 76% of Group A. The majority of both groups (76% Group A and 78% Group B) believed the hearing aid would be somewhat noticeable. And even though 94% of Group A and 83% of Group B thought others would notice if they were wearing a hearing aid, only 18% of Group A and 11% of Group B felt this would influence their decision to purchase the hearing aid.

TABLE I
COSMETIC FACTORS

Question	Group A	Group B	Kricos, et al. Study (1991)
1. Would you expect the size of a hearing aid to be?			
Too little	0%	0%	**
Too big	12%	6%	**
Just right	76%	72%	**
No expectations	6%	22%	**
2. How noticeable do you think the hearing aid would be?			
Very noticeable	6%	6%	**
Not noticeable	18%	17%	**
Somewhat noticeable	76%	78%	77%
Invisible	0%	0%	**
3. Do you think others would notice if you were wearing a hearing aid?			
Yes	94%	83%	**
No	6%	17%	**
4. If the hearing aid were visible to others, would this influence your decision to purchase the aid?			
Yes	18%	11%	29%
No	82%	89%	**

** Specific values for this question not reported

Acoustic Factors

For the questions related to acoustics, Group A seem to have more of a tendency towards realistic expectations than Group B (See Table II). Sixty-four percent of Group A responded that hearing aids made noise even when the user was listening in quiet, but only 39% in Group B responded this way. The results about whether feedback would be a problem with the hearing aid were similar to the Kricos, et al. (1991) study. Ninety-four per cent of both groups agreed that feedback might be a problem, at least some of the time. The groups were comparable in their response to the question "would your own voice sound natural when heard through the hearing aid." Forty-seven percent in Group A said yes as did 44% in Group B. But when asked if other people's voices would sound natural when the subjects listened through the hearing aid, 59% of Group A answered yes, as compared to 78% in Group B. The expectations exhibited by Group A about hearing soft sounds with a hearing aid, hearing sounds that are too loud through a hearing aid, hearing sound with more natural quality through a hearing aid, and whether the hearing aid would sound tinny, seemed to be realistic when compared to the responses given by Group B. When asked "would sound have a natural sound quality through the hearing aid", 78% of Group B indicated yes as compared with 64% of Group A.

TABLE II
ACOUSTIC FACTORS

Question	Group A	Group B	Kricos et al. Study (1991)
5. Do hearing aids make noise even when the user is listening in a quiet place?			
Yes	18%	6%	**
No	18%	44%	**
Sometimes	64%	39%	**
6. Would feedback (squealing) be a problem with the hearing aid?			
Yes	35%	50%	**
No	6%	0%	**
Sometimes	59%	44%	85%
7. Would your own voice sound natural when heard through the hearing aid?			
Yes	47%	44%	53%
No	47%	39%	**
8. Would other people's voices sound natural when listening through the hearing aid?			
Yes	59%	78%	75%
No	29%	17%	**
9. Would you be able to hear soft sounds with the hearing aid?			
Yes	71%	94%	67%
No	24%	0%	**
10. Would sounds ever be too loud through the hearing aid?			
Yes	94%	78%	69%
No	0%	17%	**
11. Would sound have a natural sound quality through the hearing aid?			
Yes	64%	78%	68%
No	24%	17%	**

** Specific values for this question not reported.

TABLE II
ACOUSTIC FACTORS
(continued)

Question	Group A	Group B	Kricos et al. Study (1991)
12. Would the hearing aid sound tinny?			
Yes	6%	33%	**
No	71%	67%	**
13. Would the hearing aid have a good bass sound?			
Yes	41%	67%	**
No	24%	22%	**

** Specific values for this question not reported.

Thirty-three percent of Group B responded yes when asked if the hearing aid would sound tinny, but only 6% of Group A selected yes.

Communication Benefit Factors

The responses given by both groups about the questions related to communication benefits were consistent with the responses obtained by the Kricos, et al. (1991) study. The majority of both groups had very positive expectations about gaining significant assistance from the hearing aid in communication situations (See Table III). Where the two groups differed in the communication benefits was when asked "would the hearing aid improve the ability to hear in noise". Forty-four percent of Group B indicated yes and 50% said no, but for Group A, 76% said yes and 18% said no.

Comfort Factors

The control group (Group B) agreed with the results from the Kricos, et al. (1991) study in that the majority (78%) expected hearing aids to be comfortable (See Table IV). One hundred percent of Group A indicated the hearing aid would be comfortable. The percentages for both groups were lower (41% for Group A and 33% for Group B answering sometimes) when the subjects were asked if wearing the hearing aid would result in a plugged-up sensation. In comparison, (54%) of senior adults in the Kricos, et al.

TABLE III
COMMUNICATION BENEFIT FACTORS

Question	Group A	Group B	Kricos et al. Study (1991)
14. Would the hearing aid allow the user to hear better on the telephone? Yes No	88% 6%	89% 6%	** **
15. Would the hearing aid improve the ability to hear in noise? Yes No	76% 18%	44% 50%	** **
16. Would the hearing aid make speech easier to hear? Yes No	100% 0%	94% 6%	100% 0%
17. Would the hearing aid make speech easier to understand? Yes No	88% 6%	94% 6%	98% **
18. Would the hearing aid allow the user to hear better? Yes No	100% 0%	100% 0%	** **
19. Would the hearing aid allow the user to hear better in church? Yes No	100% 0%	94% 6%	94% **
20. Would the hearing aid allow the user to hear better in a noisy restaurant? Yes No	59% 35%	56% 39%	58% **
21. Would the hearing aid allow the user to hear better during group conversations? Yes No	88% 12%	89% 11%	** **

** Specific values for this question not reported.

TABLE III
COMMUNICATION BENEFIT FACTORS
(continued)

Question	Group A	Group B	Kricos, et al. Study (1991)
22. Would the hearing aid allow the user to hear better while listening in the car? Yes No	88% 6%	100% 0%	** **
23. Do you expect that a hearing aid would improve the user's ability to communicate with friends and family members? Yes No	100% 0%	100% 0%	** **
24. Would you expect that the wearing of a hearing aid would make the user feel: More confident Less confident Nervous No different	88% 0% 0% 12%	72% 0% 6% 17%	92% ** ** **

** Specific values for this question not reported.

TABLE IV
COMFORT FACTORS

Question	Group A	Group B	Kricos, et al. Study (1991)
25. Would the hearing aid feel comfortable? Yes No	100% 0%	78% 17%	78% **
26. Would wearing the hearing aid result in a plugged-up sensation? Yes No Sometimes	6% 41% 41%	11% 44% 33%	** ** 54%
27. Will you be aware of having something in your ear while you wear the hearing aid? Yes No	71% 24%	61% 22%	** **

** Specific values for this question not reported.

(1991) study responded they would expect to experience a plugged-up feeling sometimes when wearing a hearing aid. When asked if they would be aware of having something in their ear while wearing a hearing aid, 61% of Group B said yes and 71% of Group A said yes.

Ease of Use Factors

Both groups showed similar tendencies in most questions when it came to ease of use (See Table V). There were two of the questions where differences were noted. One was would the battery be easy to see. Only 39% of Group B said it would be difficult to see the battery, but 47% of Group A felt the battery would be difficult to see. A second question was would you expect that the batteries would be difficult to insert into the hearing aid. Twenty-eight per cent of Group B felt it would be somewhat difficult, but 53% of Group A said that it would be somewhat difficult.

Cost and Upkeep Factors

When it came to estimating the cost of purchasing and maintaining a hearing aid, the results from Group B were similar to the Kricos, et al. (1991) study (See Table VI). Group B estimated the cost of a hearing aid to be from \$50 to \$1500. Group A was slightly more conservative; their estimates ranged from \$400 to \$2000. The larger portion of

TABLE V
EASE OF USE FACTORS

Question	Group A	Group B	Kricos, et al. Study (1991)
28. Would it be easy to put the hearing aid in and take it out?			
Yes	94%	89%	77%
No	0%	6%	**
29. Would the battery be easy to see?			
Yes	41%	56%	**
No	47%	39%	62%
30. Would you expect that the batteries would be difficult to insert into the hearing aid?			
Very difficult	0%	0%	**
Somewhat difficult	53%	28%	**
Not very difficult	47%	67%	41%
31. Would controls on the hearing aid be easy to see?			
Yes	59%	72%	**
No	24%	22%	**
32. Would the controls on the hearing aid be easy to use?			
Yes	88%	89%	**
No	12%	6%	**
33. Would use of the aid be easy with the telephone?			
Yes	77%	89%	**
No	18%	6%	**

** Specific values for this question not reported.

TABLE VI
COST AND UPKEEP FACTORS

Question	Group A	Group B	Kricos et al. Study (1991)
34. About how much do you think a hearing aid will cost? ++ Mean	\$ 730	\$ 500-700	**
Range	\$ 400-2000	\$ 50-1500	\$ 20-1500
Is this:			
Too much	59%	44%	36%
Too little	0%	0%	0%
Just about right	24%	39%	45%
35. About how long will the hearing aid's batteries last? ++ Mean	3 mo.	3 mo.	**
Range	2 wks. to 1 yr	2 wks to 1 yr	a few hrs. to 2yrs.
36. Where do you expect that you could buy batteries for a hearing aid? (Choose all that apply.)			
Grocery store	1	6	**
Drug store	14	15	**
Department store	4	4	**
Hardware store	3	4	**
Hearing aid dealer	15	14	**
Other	1	3	**
37. How much would you expect a package of batteries to cost?			
Less than \$3.00	6%	22%	42%
\$3.00 to \$5.00	71%	44%	32%
More than \$5.00	18%	28%	19%

** Specific values for this question not reported.

++ Appendix C includes full test of all responses.

TABLE VI
COST AND UPKEEP FACTORS
(continued)

Question	Group A	Group B	Kricos et al. Study (1991)
38. How often would you expect to replace the batteries in hearing aids?			
Daily	0%	0%	**
Weekly	0%	6%	**
Every 2 weeks	29%	6%	**
Monthly	29%	22%	**
Every 2 months	29%	33%	**
Yearly	12%	28%	**
Never need replaced	0%	0%	**
39. About how long will the hearing aid last before it must be replaced? ++			
Mean	5 yr	4.1 yr	4.3 yr
Range	2mo. to indef- inite.	3 yr. to never	6 mo to for- ever
40. About how often will the hearing aid need to be repaired? ++			
Mean	1.75 yr	1.8 yr	**
Range	1yr to 5 yr	yearly to never	6mo to never

** Specific values for this question not reported.

++ Appendix C includes full text of all responses.

both groups felt these prices were too high (Group A 59% and Group B 44%). None thought the prices were too low.

The answers given for how long the hearing aid's batteries will last ranged from two weeks to one year with the greater number of Group A picking 1-3 months and of Group B selecting 1-6 months. The majority of Group A (71%) said they expected a package of batteries to cost between \$3.00 to \$5.00, but only 44% of Group B chose this answer. Eight-eight percent of Group A expected to replace the batteries in hearing aids somewhere between every two weeks to every two months and 83% of Group B said monthly to yearly.

The responses to how long the hearing aid will last before it must be replaced ranged from two months to indefinite for Group A, with a greater percentage indicating 2-5 years. Group B believed 2-5 years to indefinite, with the greater number choosing 2-5 years. Group A responded that a hearing aid would need to be repaired after one year, after two years, seldom or never, with seldom being the most popular answer (18%). The responses from Group B were similar, with the greatest number of answers being evenly split between one year, seldom, and never (17% for each).

Attitude Factors

The attitudes of both groups were consistent with the positive attitudes that the subjects in the Kricos, et al. (1991) study exhibited with 94% of both groups thinking hearing aids would be beneficial to people with hearing losses (See Table VII). When asked at what level their expectations concerning hearing aids would be a greater number of Group B responded with high (44%) and the majority of Group A was medium (59%). The subjects were asked if they felt they had a hearing loss and, if so, how long they felt they have had the loss. The majority of both groups felt they had a hearing loss (Group A 29% yes, 35% maybe and Group B 17% yes, 44% maybe) and had believed they have had this loss for at least 1 year. But when asked if they thought they were a candidate for a hearing aid the majority of both groups (Group A 76% and Group B 83%) responded no. When the subjects were asked what would be the greatest concern about obtaining a hearing aid, cost was most often stated. The most often stated concerns by Group B when asked what would be the biggest concern about using a hearing aid were adjusting to the hearing aid and the visibility of the hearing aid. Group A was also concerned about adjustment, but most responded with "no concern". Almost everyone knew of someone who had worn or currently wore a hearing aid (94% of Group A and 83% of Group B). When asked what their acquaintances' reactions

TABLE VII
ATTITUDE FACTORS

Question	Group A	Group B	Kricos et al. Study (1991)
41. in general, do you think hearing aids are beneficial to people with hearing losses?			
Yes	94%	94%	95%
No	0%	0%	**
Maybe	0%	0%	**
42. My expectations concerning hearing aids are:			
High	35%	44%	45%
Medium	59%	39%	42%
Low	0%	6%	5%
None	6%	11%	1%
43. How many hours a day would you expect hearing aids to be worn:			
Less than 4 hours	6%	6%	**
Between 4 and 8 hours	12%	6%	**
Between 8 and 12 hours	41%	50%	**
More than 12 hours	41%	39%	**
44. What would be your greatest concern about obtaining a hearing aid? (Number responding to each category). ++			
Cost	3	8	**
Improved hearing	2	1	**
Proper fit	3	2	**
Quality and serviceability	2	1	**
Latest technology	1	1	**
Expertise of seller	0	1	**

** Specific values for this question not reported.

++ Appendix C includes full text of all responses.

TABLE VII
ATTITUDE FACTORS
(continued)

Question	Group A	Group B	Kricos et al. Study (1991)
45. What would be your biggest concern about using a hearing aid? (Number responding to each category). ++			
No concern	4	0	**
Becoming adjusted to aid	2	2	**
Background noise	1	1	**
Effectiveness	1	1	**
Visibility	0	2	**
46. Do you feel that you have a hearing lose?			
Yes	24%	17%	34%
No	35%	39%	55%
Maybe	35%	44%	18%
47. If so, how long do you feel that you have had a hearing problem? ++			
Mean	1 yr	2.4 yr	**
Range	1 yr.	1 yr to 20 yr	**
48. Do you feel that you need a hearing aid?			
Yes	6%	0%	21%
No	76%	83%	58%
Maybe	18%	17%	8%
49 a. If yes to 48, how long do you feel that you have needed one? (Number responding to each category). ++			
1 yr	1	0	**
1-1.5 yr	0	1	**

** Specific values for this question not reported.

++ Appendix C includes full text of all responses.

TABLE VII
ATTITUDE FACTORS
(continued)

Question	Group A	Group B	Kricos et al. Study (1991)
49 b. Why have you not purchased a hearing aid sooner? (Number responding to each category) ++			
Cost	1	0	**
Did not feel needed one	1	0	**
50. Do you know of any one who has worn or currently wears a hearing aid?			
Yes	94%	83%	85%
No	6%	17%	**
51. What has their reaction been concerning the hearing aid? (Number responding to each category). ++			
Satisfied	4	5	**
Expensive	1	0	**
Not wearing it	1	1	**
Pleased with availability	0	1	**
52. Have you ever been discouraged from using a hearing aid by a physician, audiologist, or hearing aid dealer?			
Yes	12%	0%	**
No	88%	94%	**
53. If yes, what was their reason for discouraging you? (Number responding to each category).			
Hearing aid was not needed	1	0	**

** Specific values for this question not reported.

++ Appendix C includes full text of all responses.

have been concerning the hearing aid both groups responded with negative comments ("dissatisfied with feedback", "disliked wearing it", and "too expensive") and positive comments ("satisfied", "helpful", "pleased with availability"). Twenty-four percent of Group A and 28% of Group B said their acquaintances were satisfied with their hearing aids.

The last questions asked if they had ever been discouraged from using a hearing aid by a physician, audiologist, or hearing aid dealer, and if so what the reason was for discouraging them. Of the 17 in Group B who responded, none said they had been discouraged. All participants in Group A responded, with 88% stating no and 12% responding yes. Of those who responded yes, one of the subjects said they were discouraged from using hearing aids was because of questionable need.

CHAPTER V

DISCUSSION AND IMPLICATIONS

DISCUSSION

The purpose of this study was to determine if a computer program designed to educate senior adults about hearing aids, and their use, could have information that would influence senior adults to have more realistic expectations. Overall, their expectations were very positive. In general, the results from this study showed that participants from both groups had a tendency towards medium to high expectations about hearing aids which was consistent with what Kricos, et al. (1991) found in their study. There were specific factors where the senior adults had their expectations influenced to be more realistic. These factors were in regard to acoustics, comfort, and ease of use. The lack of change in expectations in the factors of cosmetics, communication benefits, cost, and attitudes would indicate that more information may be needed in the computer program in order for the program to have an influence on the senior adult's expectations in these areas.

The responses from both groups about the cosmetics of the hearing aid seemed to be similar to the Kricos, et al. (1991) study, with neither group having unrealistic expectations about the size of the hearing aid or if the hearing aid would be noticeable by others and how noticeable. This would seem to indicate that the portion of the computer program that pertained to size of the hearing aid and how conspicuous it would be would not have much influence on senior adults' expectations, as they generally appeared to have realistic expectations in this area.

The senior adults in both groups of this study, as in the Kricos, et al. (1991) study, seemed to have high expectations about the quality of the sound heard through the hearing aid. The majority of both groups expected sound, in general, to have a natural quality. A greater percentage of subjects in this study thought they should be able to hear soft sounds, with Group B having a higher tendency. This may indicate that the senior adults in Group A did have their expectations influenced by the information that was in the computer program as their responses were more similar to the Kricos, et al. (1991) study.

The material in the computer program dealing with how natural or unnatural the senior adult's own voice would

sound appeared to be of limited effectiveness. A lower percentage of Group B than Group A responded that their own voices would sound natural, as well as fewer percentage of Group B than those in the Kricos, et al. (1991) study. The opposite was true when asked if others' voices would sound natural. Group B responses were similar to the Kricos, et al. (1991) study, with expectations being high, whereas Group A appeared to have more of a tendency towards realistic expectations. This would indicate the information in the computer program was more informative about how others' voices would sound.

As in the Kricos, et al. (1991) study, both groups had realistic expectations about feedback problems. When asked if they thought the hearing aid would sound tinny or if the hearing aid would have good bass sound, Group A showed a lower tendency in expectations than Group B. This may indicate the senior adults in this study did not receive adequate information from the material in the portion of the computer program dealing with the acoustics of the hearing aid.

The results obtained from both groups relating to communication benefits were, again, similar to the responses reported by the Kricos, et al. (1991) study. The majority of both groups showed a tendency towards positive expectations about the benefits of using hearing aids in

various communication situations. A difference between Group A and Group B existed when asked whether the hearing aid would improve the ability to hear in noise. The tendency of Group A was that the hearing aid would improve the ability to hear in noise. Group B did not show as great a tendency. This would indicate the senior adults in Group A did have their expectations influenced by the material from the computer program.

In comparing the results for the question that pertained to whether the subject expected the hearing aid user to feel more confident, there was a difference between Group B and the Kricos, et al. (1991) study. Only 72 percent of Group B expected the hearing aid user to feel more confident as compared to 92 percent of the Kricos, et al. (1991) study. The results from Group A were more in agreement (88%) with the Kricos, et al. (1991) study. When compared to Group B, this would indicate that the information provided in the computer program to the senior adults in Group A did have an influence on their expectations.

The information provided in the computer program seemed to have an influence in the area of comfort factors. Group A appeared to have a tendency towards more realistic expectations than Group B when asked if they expected to have a plugged-up sensation when wearing a hearing aid.

The results were perhaps too positive when asked if they expected the hearing aid to feel comfortable. This appeared to be an area that the senior adults in Group A did not have their expectations influenced by the material provided in the computer program.

Expectations were less realistic for Group A when asked if the hearing aid would be easy to insert and remove, but more realistic when asked if they thought the battery would be difficult to insert. Also the expectations of the senior adults in Group A tended to be more realistic when asked if the controls would be easy to see. Fifty-nine percent of Group A responded that the controls would be easy to see, but 72 percent of Group B responded the controls would be easy to see. These results would indicate the senior adults received adequate information from the computer program about the insertion of batteries, but more information was needed about the difficulties the subject may have with insertion and removal of the hearing aid itself and the visibility of the controls on the hearing aid. Both groups showed a tendency toward high expectations about the ease of use of the controls. This is another area in which the senior adult could benefit from more information being provided by the computer program material to educate them about the difficulties in using the controls.

The results from the questions about cost factors were as surprising in this study as they were in the Kricos, et al. (1991) study. The senior adults in both Group A and B appeared to lack knowledge when it came to knowing the cost of purchasing and upkeep of a hearing aid. The results from Group A for how much a hearing aid should cost tended to be more realistic than Group B or the Kricos, et al. (1991) study, but were still high. The expectations about the life of a battery were tended to be unrealistic for both groups, as was the expected time element for how often a hearing aid needed to be repaired. This would indicate the senior adult would need more information in these areas than was provided by the computer program in order for the information to effectively influence the senior adult's expectations. Group A tended to have more realistic expectations about what should be the price of batteries (\$3.00 - \$5.00) which would indicate the material that was provided in the computer program about this area was more informative.

Both groups, as in the Kricos, et al. (1991) study, showed very positive attitudes about the benefits that would be derived from wearing a hearing aid. In general, the majority of Group A (59%) showed a tendency towards medium expectations concerning hearing aids, whereas, the

larger number of Group B (44%) showed a tendency towards high expectations. This could be an indication of the overall positive effect the material in the computer program had on Group A.

Of the senior adults in Group A (29%) who indicated they felt they had a hearing loss, only six per cent believed they needed a hearing aid. In Group B there were seventeen per cent that felt they had a hearing loss and none indicated they felt they needed a hearing aid. Cost seemed to be the greatest deterrent to obtaining a hearing aid and adjusting to the hearing aid was stated as a major concern for using the hearing aid. It would appear that adequate information which pertained to obtaining and how to use a hearing aid was lacking in the computer program. This information would be very beneficial to have in the program in order to educate the senior adult and influence their expectations about hearing aids and their use.

IMPLICATIONS

The data gathered in this study would suggest a need for further development and expansion of the information contained in this computer program. The possibility to enhance and educate senior adults about what realistic expectations should be regarding hearing aids and the use of them would be greater with this further development and expansion. This study also reaffirms the fact that senior

adults tend to have unrealistic expectations, as shown by the Kricos, et al. (1991) study, but that these expectations can be changed with use of a computer program to be used during the pre-fitting counselling period.

The audiologist can use the computer program to educate the senior adult about the positive aspects of using a hearing aid to overcome any initial apprehensions they may have about hearing aids in general. The program can also be used to inform the senior adult about the use, cost to purchase and the upkeep of a hearing aid. As was shown in the Kricos, et al. (1991) study, as well as this study, the senior adult lacks education in these areas and often has unrealistic expectations. By educating senior adults and influencing them to have a tendency towards more realistic expectations, this will insure a greater acceptance of the hearing aid and greater chance for satisfaction with the amplification after fitting.

Further research is needed to determine the effectiveness of this computer program in an upgraded form. As indicated above, this program is lacking in necessary information that could be beneficial in educating the senior adult about hearing aids and their use. It would also be advantageous to administer the questionnaire again to the group who viewed the computer program, 3-6 months

following this study, to determine if they had retained information or if their expectations had changed.

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APPENDIX A

QUESTIONNAIRE

HEARING AID EXPECTATIONS QUESTIONNAIRE

Facility/Organization) _____

Age _____

Male/Female (circle one)

ALTHOUGH IT MAY BE LIKELY THAT YOU DO NOT NEED A HEARING AID, WE WOULD LIKE YOU TO FILL OUT THIS QUESTIONNAIRE UNDER THE ASSUMPTION THAT IF YOU DID, THIS IS WHAT YOU THINK A HEARING AID WOULD BE LIKE.

1. Would you expect the size of a hearing aid to be?
Too little _____
Too big _____
Just right _____
No expectations _____
2. How noticeable do you think the hearing aid would be?
Very noticeable _____
Not noticeable at all _____
Somewhat noticeable _____
Invisible _____
3. Do you think others would notice if you were wearing a hearing aid?
Yes _____
No _____
4. If the hearing aid were visible to others, would this influence your decision to purchase the aid?
Yes _____
No _____
5. Do hearing aids make noise even when the user is listening in a quiet place?
Yes _____
No _____
Sometimes _____
6. Would feedback (squealing) be a problem with the hearing aid?
Yes _____
No _____
Sometimes _____
7. Would your own voice sound natural when heard through the hearing aid?
Yes _____
No _____

8. Would other people's voices sound natural when listening through the hearing aid?
Yes _____
No _____
9. Would you be able to hear soft sounds with the hearing aid?
Yes _____
No _____
10. Would sounds ever be too loud through the hearing aid?
Yes _____
No _____
11. Would sound have a natural sound quality through the hearing aid?
Yes _____
No _____
12. Would the hearing aid sound tinny?
Yes _____
No _____
13. Would the hearing aid have a good bass sound?
Yes _____
No _____
14. Would the hearing aid allow the user to hear better on the telephone?
Yes _____
No _____
15. Would the hearing aid improve the ability to hear in noise?
Yes _____
No _____
16. Would the hearing aid make speech easier to hear?
Yes _____
No _____
17. Would the hearing aid make speech easier to understand?
Yes _____
No _____
18. Would the hearing aid allow the user to hear better?
Yes _____
No _____

19. Would the hearing aid allow the user to hear better in church?
Yes _____
No _____
20. Would the hearing aid allow the user to hear better in a noisy restaurant?
Yes _____
No _____
21. Would the hearing aid allow the user to hear better during group conversations?
Yes _____
No _____
22. Would the hearing aid allow the user to hear better while listening in the car?
Yes _____
No _____
23. Do you expect that a hearing aid would improve the user's ability to communicate with friends and family members?
Yes _____
No _____
24. Would you expect that the wearing of a hearing aid would make the user feel:
More confident _____
Less confident _____
Nervous _____
No different _____
25. Would the hearing aid feel comfortable?
Yes _____
No _____
26. Would wearing the hearing aid result in a plugged-up sensation?
Yes _____
No _____
Sometimes _____
27. Will you be aware of having something in your ear while you wear the hearing aid?
Yes _____
No _____
28. Would it be easy to put the hearing aid in and take it out?
Yes _____
No _____

29. Would the battery be easy to see?
Yes _____
No _____
30. Would you expect that the batteries would be difficult to insert into the hearing aid?
Very difficult _____
Somewhat difficult _____
Not very difficult _____
31. Would controls on the hearing aid be easy to see?
Yes _____
No _____
32. Would the controls on the hearing aid be easy to use?
Yes _____
No _____
33. Would use of the aid be easy with the telephone?
Yes _____
No _____
34. About how much do you think a hearing aid will cost?
\$ _____
- Is this:
Too much _____
Too little _____
Just about right _____
35. About how long will the hearing aid's batteries last?
-
36. Where do you expect that you could buy batteries for a hearing aid?
Grocery store _____
Drug store _____
Department store _____
Hardware store _____
Hearing aid dealer _____
Other _____
37. How much would you expect a package of batteries to cost?
Less than \$3.00 _____
\$3.00 to \$5.00 _____
More than \$5.00 _____

38. How often would you expect to replace the batteries in hearing aids?
Daily _____
Weekly _____
Every 2 weeks _____
Monthly _____
Every 2 months _____
Yearly _____
Never need replaced _____
39. About how long will the hearing aid last before it must be replaced?

40. About how often will the hearing aid need to be repaired?

41. In general, do you think hearing aids are beneficial to people with hearing losses?
Yes _____
No _____
Maybe _____
42. My expectations concerning hearing aids are:
High _____
Medium _____
Low _____
None _____
43. How many hours a day would you expect hearing aids to be worn:
Less than 4 hours _____
Between 4 and 8 hours _____
Between 8 and 12 hours _____
More than 12 hours _____
44. What would be your greatest concern about obtaining a hearing aid?

45. What would be your biggest concern about using a hearing aid?

46. Do you feel that you have a hearing loss?
Yes _____
No _____
Maybe _____
47. If so, how long do you feel that you have had a hearing problem?

48. Do you feel that you need a hearing aid?
Yes _____
No _____
Maybe _____
49. a. If yes to 48, how long do you feel that you have needed one?

- b. Why have you not purchased a hearing aid sooner?

50. Do you know of any one who has worn or currently wears a hearing aid?
Yes _____
No _____
51. What has their reaction been concerning the hearing aid?

52. Have you ever been discouraged from using a hearing aid by a physician, audiologist, or hearing aid dealer?

53. If yes, what was their reason for discouraging you?

THANK YOU SO VERY MUCH FOR YOUR
TIME AND INFORMATION! !

APPENDIX B

CONSENT FORM

PORTLAND STATE UNIVERSITY
INFORMED CONSENT

- 1) I, _____, give permission to use the results of the questionnaire administered to me, by Carol Sayre and the Audiology Department, in a research project pursuant to a Master's thesis.
- 2) I understand that this study involves completing a questionnaire twice, during two separate visits to the clinic and possibly viewing a computer program during the first visit only. Both the questionnaire and the computer program pertain to expectations about hearing aids. The time for completing the questionnaire and viewing the computer program will take approximately 20-25 minutes and an additional 10 minutes on the second visit.
- 3) It has been explained to me that the purpose of the study is to learn if the computer program would be a useful tool to be used in the clinic during pre-fitting counseling.
- 4) It is understood that there will be no direct benefits to me by allowing my questionnaire to be included in the study, nor are there any risks to me associated with this study.
- 5) I have been given the opportunity to ask questions of the researcher about the study.
- 6) I understand that participation is of a voluntary nature and the decision regarding whether to participate will not affect my relationship with the PSU Audiology Clinic or any other person or agency.
- 7) I understand that the results of my evaluation will be confidential and that my name will not be associated with the test results and in any reports.

I have read and understand the foregoing information and agree to participate in this study.

Date: _____

Signature: _____

If you have any concerns and questions about this study, please call the Chair of Human Subjects Research and Review Committee at 725-3417.

APPENDIX C

FULL TEXT OF RESPONSES

- #34. Group A responses: \$400 - 1000; 1500; 2000
 Group B responses: \$50; 150 - 200; 300; 350 - 400; 500 - 700; 1000; 1500.
- #35. Group A responses: 2 wks.; 1 mo.; 1 -3 mos.; 1 yrs.
 Group B responses: 2 wks.; 1 mo.; 2 mos.; 3 mos.; 3 - 6 mos.; 6 mos.; 12 mos.
- #39. Group A responses: 2 mos.; 2 - 5 yrs.; 5 - 8 yrs.; indefinite
 Group B responses: 3 - 5 yrs.; 4 - 5 yrs.; 5 - 10 yrs.; several years; never.
- #40. Group A responses: 12 mos.; 2 yrs.; seldom; never; depends.
 Group B responses: 12 mos.; 2 yrs.; 4 - 5 yrs.; 10 yrs.; seldom; never; depends.
- #44. Group A responses: Whether hearing would really improve; proper fit of hearing aid; would hearing aid be the latest technology; quality of hearing aid; serviceability of the hearing aid; cost/price; comfort; reliability; clarity of the hearing aid; having trouble adjusting to the hearing aid.
 Group B responses: Quality of the sound; would the hearing aid be the latest technology; squeaking (feedback); cost; appearance; would hearing aid improve hearing; getting the proper fit; getting a reliable product; expertise of seller; would the hearing aid function properly; weight and size of hearing aid; the durability; background noise.

- Kricos, et al. (1991): Cost; finding the "best" hearing aid; whether the aid would be beneficial; finding the right professional to select the aid.
- #45. Group A responses: Would hearing be improved or would it be effective; would the hearing aid be a reputable one; becoming adjusted to the hearing aid; background noise; no concern.
- Group B responses: Comfort; losing the hearing aid; getting the hearing aid wet; the visibility of the hearing aid; effectiveness; adjusting to the hearing aid; feeling it was a nuisance or bother to wear after purchasing; proper fit; the hearing aid would be and inconvenience; performance; background noise.
- Kricos, et al. (1991): getting used to it; whether it would function properly; comfort; vanity; annoying noise.
- #47. Group A responses: 1 yr.
- Group B responses: 1 yr.; 2 - 3 yrs.; 5 yrs.; 20 yrs.
- #51 Group A responses: Helpful; okay; satisfied; nuisance; expensive; not wearing the hearing aid.
- Group B responses: Positive; pleased with availability; disliked wearing; dissatisfied; did not like feedback.
- Kricos, et al. (1991): Took time to adjust but now she loves it; disappointed; bothered by background noises; squealing.

APPENDIX D

COMPUTER PROGRAM CONTENT AND FORMAT

Slide 1

Title: Introduction

Text: People who have never used hearing aids often misunderstand some of the capabilities and limitations of modern hearing aids. The purpose of this presentation is to acquaint you with basic information regarding sound amplification and hearing aids. After viewing this presentation you should have a more realistic idea of how hearing aids can help the individual with a hearing loss.

After reading the information on a page, touch the "Next..." button to move on.

Slide 2

Title: What Is A Hearing Device

Text: A hearing device is simply a miniaturized sound system that receives, amplifies and transmits sound to a hearing-impaired ear. The diagram shows how a hearing device works:

- 1) Sound is received by the microphone which converts it into electrical energy.
- 2) An amplifier increases the strength of the electrical signal.
- 3) The receiver converts the electrical energy back into sound energy.
- 4) The battery provides the power .

Slide 3

Title: Types of Hearing Devices

Text: The In-The-Ear Style:

There are two basic styles of hearing aids commonly used today. In - the - ear (ITE) hearing devices fit entirely within the ear, and account for over two thirds of the hearing instruments fitted today. Originally designed for overcoming mild hearing losses, ITE devices can now be used successfully even with severe hearing loss, thanks to improvements that help reduce feedback.

Slide 4

Title: Types of Hearing Devices

Text: The In-The-Ear Style:

The casing on ITE hearing devices is custom - made to fit the exact contours of your ear. Which, together with their compact size, and light weight, helps make in - the - ear hearing devices the most comfortable and inconspicuous solution for a lot of people.

Slide 5

Title: Types of Hearing Devices

Text: The Behind - The - Ear Style:

The electrical components of behind - the - ear (BTE) hearing devices are housed in a case that hangs behind the ear. The sound travels through a tube over the top of the ear, and into the earmold inside the wearer's ear.

Slide 6

Title: Types of Hearing Devices

Text: The Behind - The - Ear Style:

Behind - the - ear devices are almost a requirement for profound hearing losses, because they can deliver a lot of power without feedback. For many years these were the hearing device of choice, and they are still preferred by a lot of people. Behind - the - ear devices are durable, easy to handle and maintain, and can be easily adapted for use with a variety of assistive devices.

Slide 7

Title: Can A Hearing Device Help?

Text: Terms such as speech discrimination, tolerance level, comfort level, and nerve loss are frequently used to describe hearing test results.

Nerve loss simply means a hearing loss is not caused by a medical problem that can be corrected with medical or surgical intervention. It does not, however, mean that hearing devices can not help as many people with nerve hearing loss were once told. Indeed, thousands of people suffering nerve hearing loss have experienced significant improvement thanks to hearing devices.

Slide 8

Title: Can A Hearing Device Help?

Text: The term speech discrimination describes our ability to understand speech at a comfortable volume. Some people have difficulty understanding speech, regardless of volume. Reduced speech discrimination means that you will have more difficulty understanding speech. But again, this does not mean amplification won't help.

Slide 9

Title: How Well Will You Hear?

Text: The specific type of hearing loss, as well as the listening environment has a great effect on how much hearing aids can enhance ones ability to hear. The individual's speech discrimination score (noted on the audiogram) is a good indicator of your potential ability to understand speech with the help of hearing devices. A lower score indicates that you might still have some difficulty understanding speech - even with the help of hearing instruments. A higher speech discrimination score suggests that you should experience significant improvement in understanding.

Slide 10

Title: How Well Will You Hear?

Text: Since most hearing instruments cannot distinguish between speech and background noise, your listening environment can affect your ability to understand. You will find it more difficult to understand speech in noisy surroundings than you would in a quiet environment. However, you should still be able to understand more than you would without your hearing instruments.

Slide 11

Title: How Well Will You Hear?

Text: It is important to note, however, that no hearing instrument can restore lost hearing ability, or give you perfectly normal hearing. Nor can hearing devices prevent or reverse a hearing impairment caused by organic conditions. What hearing devices can do is help you make the most of the hearing you still have through sound amplification. By making sounds louder, your hearing instruments make it easier for you to hear them. As a

result, your ability to interpret these sounds and understand speech will improve.

Slide 12

Title: Benefits of Binaural Sound

Text: The single most effective way to improve your understanding with background noise is by wearing two hearing devices. Known as binaural listening, using two hearing devices also enhances your ability to determine where sounds come from.

For example, imagine you are playing cards, and that you're only wearing a hearing device in your left ear. You might be able to understand the player on your left, but not the player on your right. What's more, if another player at the table spoke, but you didn't see who it was, with just one hearing device it would be difficult to tell who was talking.

Slide 13

Title: Benefits of Binaural Sound

Text: Similarly, if you were standing on a busy street corner and a car's horn beeped, you would not be able to tell if the car was to your left, right, in front, or behind you if you were only wearing one hearing instrument. Thankfully, balanced binaural hearing helps preserve your natural ability to locate sounds.

Slide 14

Title: Using a Hearing Device

Text: From the time someone first starts wearing hearing devices, they begin the process of "re-learning" how to hear sounds in a whole new way. Although some people adjust immediately, it usually takes patience and practice to become a skillful and successful hearing instrument user.

It will take time before one becomes accustomed to certain noises. At times, some noises might be overpowering. In some situations, one will want to adjust the volume on their hearing devices.

In short, hearing devices alone will not help you hear better... the user has to do their part, too.

Slide 15

Title: Using a Hearing Device

Text: Since all sounds are new, the new hearing aid user's brain is working hard to learn them. Before long, the new user may feel themselves getting anxious or tired. Not to worry, this is normal. It is also why one should start out slowly and progress gradually to wearing the hearing devices for longer periods and listening to more complex sounds.

Generally speaking, it's best to begin by only wearing hearing devices for one or two hour periods. Then, slowly increase the amount of time they are worn each day.

Slide 16

Title: Using a Hearing Device

Text: In addition to learning how to listen with new hearing devices, the new user must also become comfortable with putting the hearing aids in the ear, removing the hearing aid, adjusting the volume, and replacing the battery.

Placing and removing the hearing device can be difficult for the new user as the device is quite small and it is difficult to see what one is doing. After a few days of fumbling with the device, most users become very adept at putting the aid on and removing it from the ear. The new user must remember that this will take some time and not get frustrated too quickly.

Slide 17

Title: Using a Hearing Device

Text: As with inserting and removing the hearing device, adjusting the volume control will take some getting used to. Again, it is difficult to see what one is doing and the volume control wheel is very small on modern hearing devices. If the device is properly fitted to the user's hearing loss they will, hopefully, not be adjusting the volume control too often. However, a little time is usually all that is necessary to master this skill.

Slide 18**Title: Using a Hearing Device**

Text: All hearing aids require a battery in order to power the amplifier. The batteries used in modern hearing aids are necessarily very small and can be difficult to handle. The situation is made more difficult in that the battery must be placed in the device in a particular fashion or it will not work correctly. The new user can expect to spend some time with their Audiologist in learning how to properly replace the hearing aid battery. One can expect a new battery to last about 2 to 3 weeks Although the time will vary depending on the power of the devices and how many hours it is worn per day. A package of batteries costs between \$3.50 and \$5.00.

Slide 19**Title: Buying a Hearing Device**

Text: As has been stated in the preceding pages, the modern hearing device is an amazing piece of electronic equipment considering all of the capabilities 'stuffed' into such a small package. One must realize, however, that these devices, as amazing as they are, are not perfect and cannot replace the human ear. But for the individual that needs help hearing the sounds of life, there is no substitute for a well-fitted hearing device.

Slide 20**Title: Buying a Hearing Device**

Text: Obtaining a well-fitted hearing device involves a number of steps. First, the individual's hearing must be fully assessed by a qualified Audiologist. An Audiologist is a licensed professional holding a Masters or Doctoral degree in the sciences of hearing, hearing assessment, and hearing rehabilitation. The hearing assessment will measure the ability to hear tones of many pitches, the ability to hear and understand speech, and a measurement of the function of the listener's outer and middle ears.

Slide 21**Title: Buying a Hearing Device**

Text: The second step involves a review of the assessment results and an evaluation of the individual's hearing needs. The amount of hearing loss is very important in determining the need for a hearing device. However, the

communication needs of the individual must also be determined. To accomplish this the Audiologist will spend considerable time discussing with the individual the results of the hearing assessment as well as their listening needs.

Slide 22

Title: Buying a Hearing Device

Text: Once the decision has been made to fit hearing devices, the Audiologist will present options available for achieving the best fitting. Decisions must be made as to the type of hearing device most appropriate for the individual as well as the various options necessary to fit the user's needs.

After the hearing device is delivered, the Audiologist will undertake a number of tests aimed at determining if the device is capable of achieving the individual's listening needs. Often, adjustments will need to be made to fine-tune the device to the user's specific needs.

Slide 23

Title: Buying a Hearing Device

Text: After the fitting of the device, the Audiologist will spend considerable time with the new user discussing the use of the device, care and maintenance of the instrument, and steps to go through to become fully acquainted with and comfortable with the new world of hearing. The user may need to return to the Audiologist for additional adjustments or counseling as they become accustomed to their new devices. Many Audiologists ask that the new user return to their office three or four times following fitting as the device to assure the individual receives the most benefit possible from their investment.

Slide 24

Title: Buying a Hearing Device

Text: The modern hearing device is a highly sophisticated instrument. The technology involved in building a hearing device is all the more advanced due to the desire to create a high fidelity device in a case smaller than a thimble. Because of the sophisticated engineering involved in the manufacturing of hearing devices along with the time commitment required of the Audiologist quality hearing devices are not inexpensive instruments. BTE style devices generally cost \$400 to \$600 while ITE style will cost from

\$500 up to \$1000 per aid depending on the size and sophisticated circuitry necessary.

Slide 25

Title: The End

Text: This completes the introduction to hearing devices. Should you have any questions or wish to pursue a hearing assessment, please contact an Audiologist at the Portland State University Audiology Clinic at 725-3070.

Thank You.

What Is A Hearing Device

A hearing device is simply a miniaturized sound system that receives, amplifies and transmits sound to a hearing-impaired ear. The diagram shows how a hearing device works:

- 1) Sound is received by the microphone which converts it into electrical energy.
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Next...

Can A Hearing Device Help?

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Next...