Self-Perceived Hearing Difficulty in Aging Adults with Acquired Hearing Loss

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Little is known about the emergence and manifestation of hearing handicap with acquired hearing loss in aging adults. Adults 56-92 years old with age-appropriate hearing ($n = 76$) and acquired hearing loss ($n = 124$) completed the short form of the Hearing Handicap Inventory for the Elderly (Ventry & Weinstein, 1983). Screening failures demonstrated significantly greater self-perceived handicap than those who passed the screening. Results indicated that hearing difficulty may go undetected in approximately 30% of those aging adults who pass a pure-tone screening and 20-25% of those who fail a hearing screening may not be handicapped by their hearing loss. Hearing handicap may first manifest itself as difficulty understanding whispered speech, ultimately having an *emotional* impact on aging adults before influencing their *social* behavior. Differences in responses to inventory items by each subject group are discussed.

Hearing loss in aging adults has been well documented (Bunch, 1929; Gilad & Glorig, 1979; Marshall, 1981; Newman & Weinstein, 1986). However, it is not known when acquired hearing loss in aging adults begins to create self-perceived hearing difficulty and how that difficulty may first manifest itself.

In the aging adult, hearing loss presents itself through physiological deterioration of the auditory system (Gilad & Glorig, 1979). This, coupled with other physical complications of aging, may result in heightened psychological stress. Evidence for this is gleaned from studies reporting frustration in attempts at everyday communication (Hull, 1978), difficulty managing group conversation situations (Meadow-Orlans, 1985), and stressful family communication (Beattie, 1981). Hearing loss can lead to embarrassment (Meadow-Orlans, 1985), and irritability (von der Lieth, 1972) from having to ask others to repeat. In addition, hearing loss associated with aging can lead to withdrawal and isolation from social situations and increasing emotional

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stress (Alpiner, 1979; Meadow-Orlans, 1985; Miller, 1975; Weinstein & Ventry, 1982).

Although these behaviors present themselves in clinical research findings and clinical observations, Wylde (1982) warned that behaviors accompanying hearing loss in aging adults may not necessarily be caused by the loss. She indicated that published works on this topic may be misleading in that generalizations often have been drawn from inadequate and inappropriate samples, including autobiographic and observational accounts. Also, empirical behavioral research often has failed to consider control group data and experimental research has not appropriately controlled important variables (Wylde, 1987).

Ventry and Weinstein (1983) suggested a procedure for identifying hearing problems among aging adults that incorporated both a pure-tone screening and a self-assessment of hearing handicap. They proposed use of the Hearing Handicap Inventory for the Elderly (Ventry & Weinstein, 1982), a hearing handicap assessment inventory designed for and standardized on aging adults. However, their pure-tone screening procedure did not include a measure of hearing sensitivity beyond 2000 Hz, nor did their pass-fail criterion of 40 dB hearing level accommodate expected decreases in higher frequency sensitivity with changes in age (Harford & Dodds, 1982). Maurer and Rupp (1979) indicated that hearing sensitivity in the 2000-4000 Hz range is important for understanding speech in noise. Spoor (1967) and others have demonstrated a systematic decline in pure-tone sensitivity, especially for higher frequencies, in aging adults.

The purpose of this study was to identify hearing-related difficulties experienced by aging adults and to determine if these difficulties may be exacerbated by mild to moderate hearing loss. Ventry and Weinstein's (1982) approach to hearing problem identification was employed with a modification of pure-tone screening procedures to include a measure of hearing sensitivity at 4000 Hz and a pass-fail criterion that accounted for expected change in hearing level with age.

METHOD

Subjects

Subjects were 200 volunteers from a hearing screening program held in four Chicago-area senior activity centers and one retirement home. They included 144 females and 56 males ranging in age from 56 to 92 years ($M = 74.9$ years; $SD = 7.3$).

Subjects were divided into two groups on the basis of their hearing screening results. The screening consisted of audiometric threshold measures at 500, 1000, 2000 and 4000 Hz. The pass-fail criteria were set at 25, 25, 45, and 50 dB hearing level for respective test frequencies to allow for age-appropriate

changes in pure-tone sensitivity. These criteria allow for average females through age 85 years and average males through approximately age 77 years to pass the screening when a measure at 4000 Hz is included (Spoor, 1967). Using a 40 dB pass-fail criteria as employed by Ventry and Weinstein (1983) when a measure is made at 4000 Hz would result in females over age 79 and males over age 69 failing the hearing screening when demonstrating age-appropriate hearing sensitivity.

The group that passed the screening consisted of 76 individuals (63 females; 13 males) ranging in age from 56 to 90 years ($M = 71.5$; $SD = 7.0$). Mean four-frequency threshold results (Table 1) revealed hearing sensitivity within limits appropriate for this age group. The group that failed the hearing screening included 124 individuals (81 females, 43 males) ranging in age from 64 to 92 years ($M = 77.0$; $SD = 6.7$). Their thresholds for the four test frequencies (Table 1) demonstrated mild to profound hearing loss, extending beyond age-appropriate levels, but generally following the same audiometric configuration as is characteristic of the aging adult population. All measures were made in rooms that were in compliance with noise level requirements for audiometric screening (ANSI S3.6-1969).

Table 1

Better-Ear Pure-Tone Thresholds (in dB HL) for Aging Adults who Passed ($n = 76$) and Failed ($n = 124$) a Hearing Screening

	Frequency (Hz)			
	500	**1000**	**2000**	**4000**
Passing Group				
M	18	17	20	32
SD	5	6	10	12
Range	5-25	5-25	0-45	5-50
Failing Group				
M	30	33	40	59
SD	13	14	15	16
Range	5-80	5-85	10-85	20-100

Material and Procedure

The short form of the Hearing Handicap Inventory for the Elderly (HHIE-S) was selected for use in this study (see Appendix). The HHIE-S was designed by Ventry and Weinstein (1982) from a lengthier clinical version for screening self-perceived hearing handicap in aging adults. It contains 10 items, 5 social/situational items and 5 emotional response items. The short form is of comparable reliability to the clinical form. Its internal consistency, measured by Chronbach's alpha, is .87, whereas the clinical form's internal consistency is .95. Responses to items on the HHIE-S are weighted as follows: *yes* = 4 points,

sometimes = 2 points, and *no* = 0 points. Thus, possible scores may range from 0 points indicating no handicap to 40 points indicating maximum self-perceived handicap.

The project audiologist administered the HHIE-S to each participant immediately following the hearing screening. Subjects were instructed to read each inventory item and, using the response checklist provided (see Appendix), to indicate whether or not they perceived themselves to be handicapped by hearing difficulty at all times or only sometimes in the conditions described. They were instructed to leave no item unanswered. All subjects responded to all items on the inventory checklist.

RESULTS

Table 2 lists mean HHIE-S scores. On the average, higher scores were obtained by the group that failed the hearing screening than by the group that passed the screening. As expected, subjects with hearing sensitivity levels that were poorer than those demonstrated by subjects with age-appropriate hearing perceived themselves as experiencing hearing difficulty more often and/or to a greater extent than those with age-appropriate hearing sensitivity. Independent t-tests (Edwards, 1967) indicated a statistically significant difference between groups for the total scores ($p < .0001$), social/situational sub-scale scores ($p < .0001$), and emotional sub-scale scores ($p < .0001$).

Table 2

Hearing Handicap Inventory for the Elderly — Short Form Scores for Aging Adults who Passed ($n = 76$) and Failed ($n = 124$) a Hearing Screening

	Passing Group	Failing Group	*t*
Total Scale (maximum score = 40)			
M	7.00	15.94	6.8883*
SD	7.13	9.83	
Range	0-26	0-40	
Emotional Sub-Scale (maximum score = 20)			
M	2.53	6.52	5.6467*
SD	3.76	5.41	
Range	0-14	0-20	
Social Sub-Scale (maximum score = 20)			
M	4.47	9.53	7.1732*
SD	4.09	5.25	
Range	0-14	0-20	

*$p < 0.0001$

To examine item-by-item differences between groups in their responses to the HHIE-S, the percentages of *no, sometimes,* and *yes* responses for each item were compared. Ideally, if no hearing difficulty is perceived, all responses would be *no*. However, because individual circumstances and personal tolerance for hearing difficulty will vary, it is likely that a few normal-hearing respondents will report hearing difficulty in some of the conditions listed in this scale. As such, individuals with essentially no self-perceived handicap are likely to demonstrate a response pattern in which no difficulty is reported for most situations, some difficulty for substantially fewer situations, and great difficulty for only one or two situations. Figure 1 illustrates a probable response pattern (A) that would emerge in plotting the HHIE-S results for a "non-handicapped" group of individuals, a group of predominantly hearing-handicapped individuals (C), and a hypothetical transition group whose members experience no problem in some situations, definite problems in other situations, and occasional problems in other situations (B).

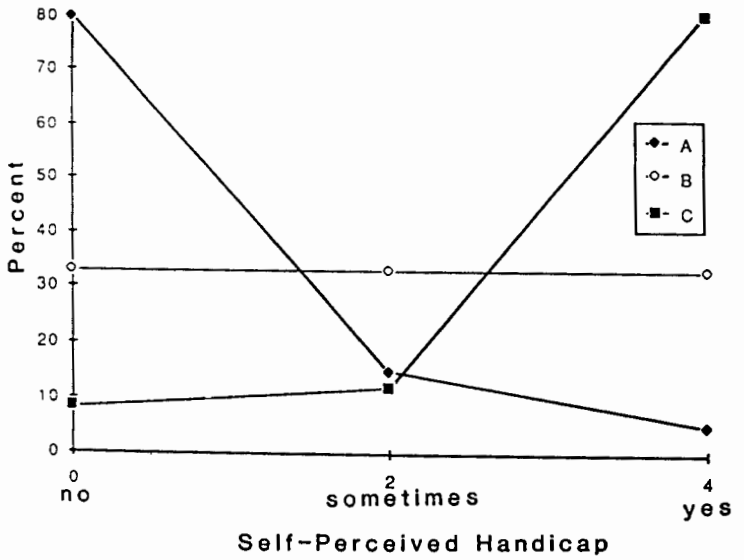

Figure 1. Hypothetical HHIE-S response patterns for a group demonstrating no hearing handicap (A), a group demonstrating hearing handicap (C), and a mixed group of individuals, some with and some without hearing handicap (B).

The percentage of *no, sometimes,* and *yes* responses to the five HHIE-S emotional sub-scale items for those who passed the hearing screening is presented in Figure 2. Without exception, responses to these items follow hypothetical pattern A. Figure 3 shows the pattern of response for the same items for those who failed the hearing screening. Note a pattern A response only for

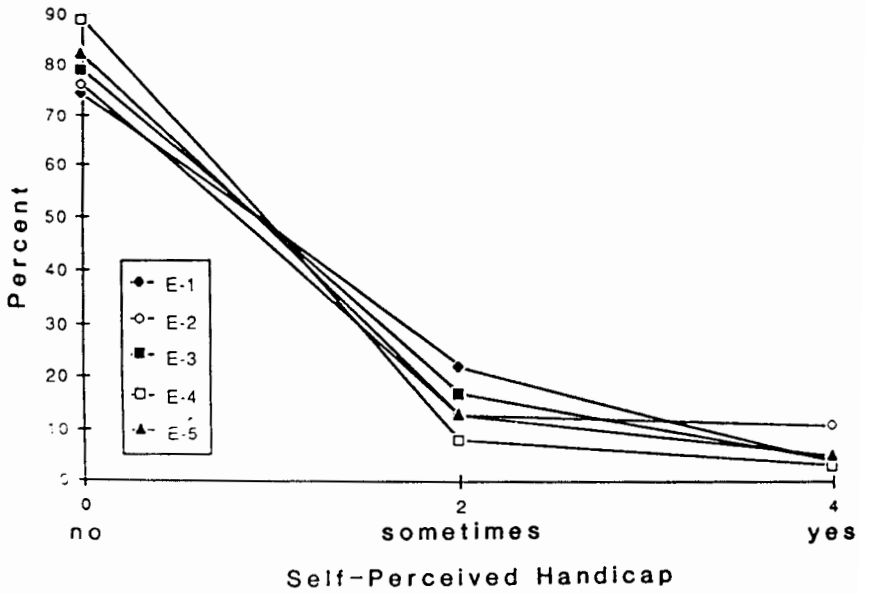

Figure 2. HHIE-S: Emotional (E) sub-scale response pattern for subjects who passed the hearing screening.

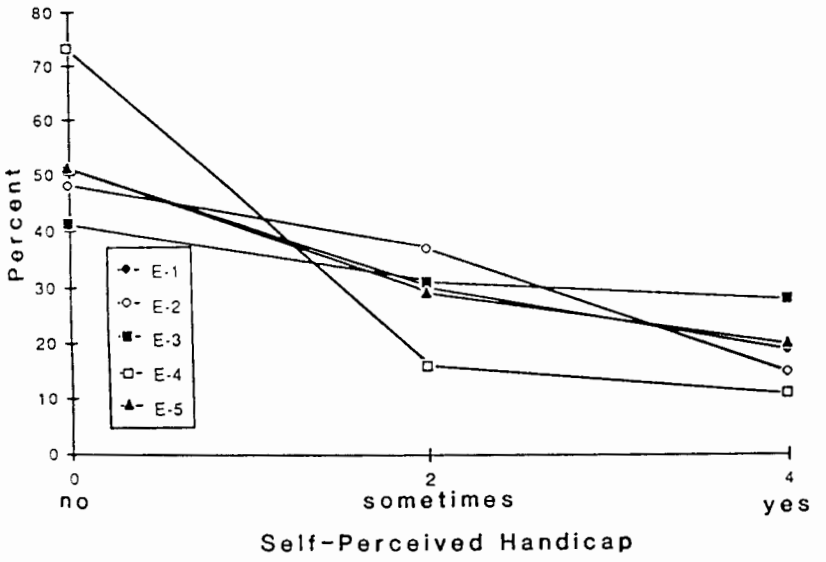

Figure 3. HHIE-S: Emotional (E) sub-scale response pattern for subjects who failed the hearing screening.

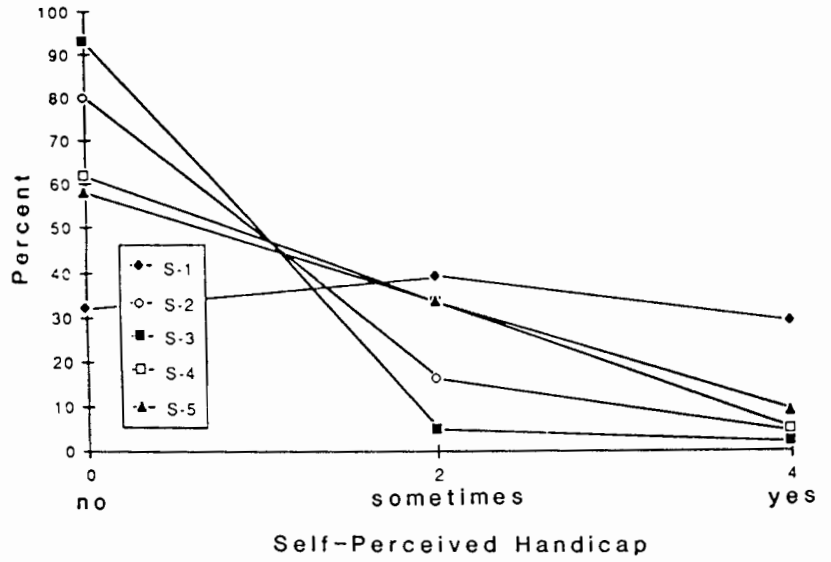

Figure 4. HHIE-S: Social (S) sub-scale response pattern for subjects who passed the hearing screening.

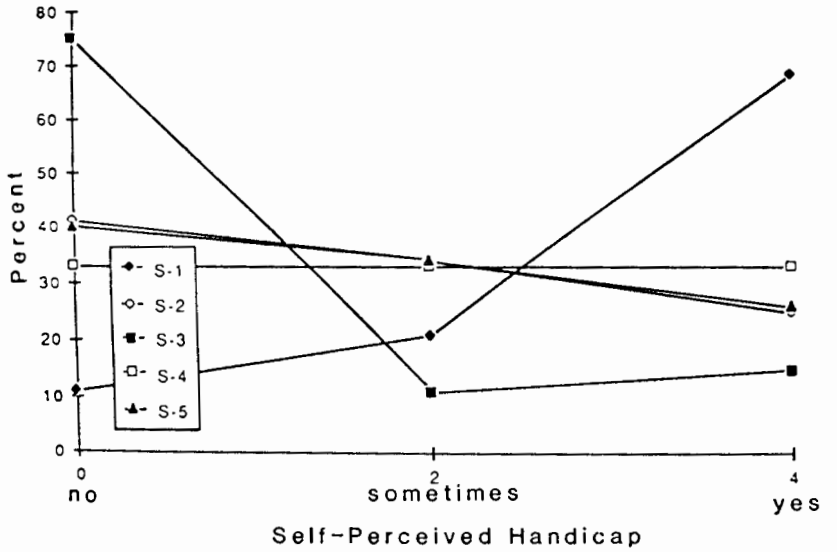

Figure 5. HHIE-S: Social (S) sub-scale response pattern for subjects who failed the hearing screening.

item E-4. Responses to the remaining items (E-1, -2, -3 and -5) begin to resemble pattern B, the transition group pattern.

Responses to the five items comprising the social sub-scale of the HHIE-S for those who passed the hearing screening are illustrated in Figure 4. Note a pattern A response to items S-2 and S-3, a definite pattern B response to item S-1, and a response pattern midway between patterns A and B to items S-4 and S-5. Figure 5 illustrates the response pattern for the same items for those who failed the hearing screening. Responses to item S-3 follow pattern A. Item S-1 responses changed from a pattern B configuration for the group with age-appropriate hearing levels to a pattern C configuration for the hearing-screening failures. Responses to the remaining items (S-2, -4 and -5) follow pattern B.

DISCUSSION

This study supported Ventry and Weinstein's (1983) findings demonstrating that older adults with age-appropriate hearing sensitivity experience relatively few instances of hearing difficulty. Applying an HHIE-S score categorization scheme in which total scores ranging from 0 to 8 indicate no handicap, 10 to 22 indicate mild handicap, and 24 to 40 indicate severe handicap, Ventry and Weinstein studied the relationship between hearing screening results and HHIE-S scores. Of 100 individuals aged 65 years and older, 69% of those who passed a 40-dB hearing screening reported no handicap. In the present study, 71% of those who passed the hearing screening reported no handicap. Of those who failed the hearing screening in Ventry and Weinstein's study, 80% reported some hearing handicap, whereas 73% of those who failed the hearing screening in the present study reported some handicap. Together, these results suggest that, in general, hearing screenings for aging adults with acquired hearing loss using a pass/fail criterion of 40 dB hearing level for a 500-2000 Hz test frequency range, or age-appropriate threshold levels for a 500-4000 Hz test frequency range, may miss about 30% of those who experience some self-perceived hearing difficulty. Also, 20-25% of those who fail a hearing screening may not experience self-perceived hearing difficulty.

Ventry and Weinstein (1982) found that total, emotional sub-scale, and social sub-scale scores on the HHIE (long version) increased with increasing hearing loss. The same relationship was demonstrated when comparing the HHIE-S results of those who passed with those who failed the hearing screening in the present study. This finding suggests that both the long and short forms of the HHIE generally are sensitive to changes in hearing difficulty concomitant with worsening of hearing thresholds beyond what is expected with the process of aging.

Finally, differences were noted between average group scores for selected inventory items. Those who passed the hearing screening often indicated *no* handicap on items for which the screening failures experienced *some* handi-

cap. For one item, the change was from some handicap for those who passed the screening to definite handicap for those who failed the screening. For other items, no group differences in performance were noted. This finding suggests that certain inventory items may be more helpful than others in identifying potentially handicapping situations.

Examination of responses to each sub-scale by both subject groups revealed that most of the group that passed the hearing screening demonstrated no handicap on the emotional scale items (Figure 2). Most screening failures demonstrated no handicap in response to item E-4 which refers to the influence of hearing difficulty on family relationships (Figure 3). However, for items E-1, -2, -3, and -5, the response pattern was worse for the hearing-screening failures than for the group that passed the screening. These items refer to embarrassment and frustration experienced with hearing difficulty, as well as to feelings of being handicapped by hearing loss and hampered by the effect that hearing loss has on an individual's personal and social life.

The emotional impact of hearing loss depends on the hearing-impaired person's personal feelings, as well as on the reactions of others. It has long been reported that hearing handicap creates feelings of embarrassment (Jackson, 1902). It also is not uncommon for others to become irritated with hearing-impaired individuals because of their hearing loss. This can lead to feelings of being handicapped by hearing loss (Gilhome Herbst, 1983) and eventually to loneliness and depression. The individual often reacts by withdrawing from situations which will expose hearing loss-related problems (Wylde, 1982). The fact that those with as minimal average hearing loss as those who failed the hearing screening in this study already perceive some of these emotional problems suggests that clinical intervention may be appropriate quite early during the years that aging adults begin to experience hearing loss.

For social sub-scale responses, it is interesting to see the difference in difficulty experienced by the two groups for item S-1 which relates to understanding of whispered speech. Twenty-nine percent of the group that passed the hearing screening experienced difficulty understanding whispered speech (Figure 4) and 68% of the group that failed the screening indicated a problem (Figure 5). Bergman (1980) reported that presbycusic-like hearing loss contributed significantly to difficulty in understanding whispered speech. The results of this study suggest that difficulty in hearing whispered speech is likely to be one of the first indicators of hearing difficulty for aging adults.

Inventory item S-3 questions whether hearing difficulty influences attendance at religious services. No difference was noted between the two groups' responses. One conclusion might be that the level of hearing difficulty experienced by the hearing-impaired group was not substantial enough to interfere with participation in religious services. However, it should be noted that, while religious attitudes and feelings increase with advancing age (Kuhlen, 1962), ritualistic behavior outside the home decreases in the aging adult population (Moberg, 1968). It may be that the participants in this study experienced

relatively little difficulty in attending religious services because they generally did not attend such services. For this reason, it would be helpful in comparing the influence of hearing difficulty in decisions to engage in activities outside of the home to sample problems experienced in a variety of religious service-like settings such as public meetings, lectures, and theatrical productions.

Inventory item S-4 relates to difficulty listening to a television or radio, and this was not perceived to be a handicapping situation for most subjects. Inventory item S-5 focuses on difficulty in hearing in a restaurant. This was perceived to be somewhat of a problem for both groups, regardless of hearing sensitivity. Difficulty hearing in noise is one of the most common complaints made by aging adults. According to Blumenfeld, Bergman, and Millner (1969), there is considerable variation in ability among aging listeners in hearing in noise. Age-related decrement in performance is marked after age 65 years because of the aging adult's decreasing ability to deal with the disruptive effects of masking noise on speech perception (Bergman, 1980). In this study, the problem is noted in both groups, but not exacerbated by decrease in hearing sensitivity.

Inventory item S-2 relates to hearing difficulty while visiting relatives, friends, and neighbors. Some self-perceived handicap was noted by members of both groups, but there was not a major difference between groups. Sussman and Burchinal (1968) described the American kin system as one in which aid and services are linked to a functioning family network. The network is supportive rather than coercive in dealing with personal problems experienced by aging members. Thus, communication with members of the family network, while hindered by hearing difficulty, may actually be enhanced by the family bond.

In sum, hearing handicap in aging adults with acquired hearing loss can be identified through use of the HHIE-S. Regardless of whether a pure-tone screening incorporates a 40-dB pass/fail criterion for a 500-2000 Hz test frequency range or an age-appropriate hearing level criterion for a 500-4000 Hz test frequency range, approximately 30% of those who experience hearing difficulty will go undetected and 20-25% of those who fail the screening may not be handicapped by their loss.

The greatest single problem that appears to be linked with emerging hearing handicap is understanding whispered speech. Responses to this item (S-1) were considerably different for each group. Inventory items that did not serve to identify differences between groups included E-4 and S-3. Differences were observed in response patterns for both groups for all other inventory items. Finally, it can be hypothesized for further testing that emerging hearing difficulty is first likely to have an *emotional* impact on aging adults, followed by a negative influence on their *social* behavior.

ACKNOWLEDGMENTS

This research was supported by a grant from The Retirement Research Foundation. The author wishes to thank Jennifer Marrer Black, MA, for her assistance in carrying out this project.

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APPENDIX

HEARING HANDICAP INVENTORY FOR THE ELDERLY — SHORT FORM

		Yes (4)	Some-times (2)	No (0)
E-1.	Does a hearing problem cause you to feel embarrassed when meeting new people?	_____	_____	_____
E-2.	Does a hearing problem cause you to feel frustrated when talking to members of your family?	_____	_____	_____
S-1.	Do you have difficulty hearing when someone speaks in a whisper?	_____	_____	_____
E-3.	Do you feel handicapped by a hearing problem?	_____	_____	_____
S-2.	Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	_____	_____	_____
S-3.	Does a hearing problem cause you to attend religious services less often than you would like?	_____	_____	_____
E-4.	Does a hearing problem cause you to have arguments with family members?	_____	_____	_____
S-4.	Does a hearing problem cause you difficulty when listening to TV or a radio?	_____	_____	_____
E-5.	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	_____	_____	_____
S-5.	Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	_____	_____	_____