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# Hard-of-Hearing Residents in a Home for the Aged

## *Les résidents malentendants d'un foyer d'accueil pour personnes âgées*

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### **Abstract**

Subjective and objective measures of the communication function of 30 hard-of-hearing residents at a home for the aged were collected four times over a two-year period. These measures tapped scope of participation in activities at the home and quality of communication during activities. In a pilot study, groups of residents and staff identified about 30 common situations at the home in which they felt it was important to hear. The evaluation of communication function was keyed to these situations. Overall, fewer participated in "optional" activities (such as attending meetings) but those who did reported little handicap in these situations. In contrast, many more participated in "obligatory" activities (such as dining and chapel) and a much wider range of handicap was reported in these situations.

### **Abrégé**

*Des mesures subjectives et objectives de la fonction communicative de 30 personnes malentendantes ont été faites. Tous étaient résidents d'un foyer d'accueil pour personnes âgées. Les mesures, faites à quatre occasions et étalées sur deux ans, ont estimé le degré de participation des personnes malentendantes aux activités du foyer et la qualité de leur communication durant ces activités. Au cours d'une étude-pilote, des groupes de résidents et de membres du personnel ont dressé une liste des 30 activités pour lesquelles il est le plus important d'entendre. L'évaluation des résidents portait sur ces 30 activités. D'un côté, moins de participants ont pris part aux activités facultatives (par ex. présence aux réunions), mais ceux qui y prirent part n'ont pas éprouvé de difficultés dans ces situations. De l'autre côté, un plus grand nombre de participants ont participé aux activités nécessaires (par ex. repas, services religieux), mais ils ont éprouvé un éventail plus grand de handicaps dans ces situations.*

Two companion projects were conducted, one to implement (Head, 1990) and the other to evaluate (Pichora-Fuller, 1990) a hearing rehabilitation program for residents at St. Joseph's Villa (the Villa), a home for the aged in Dundas, Ontario. The projects were initiated by a sub-committee of

the Hamilton-Wentworth District Health Council, following the recommendations of a study conducted in the late 1980s in which about 60,000 seniors in the community were surveyed to find out what difficulties they experienced in activities of daily living (Regional Municipality of Hamilton-Wentworth and Hamilton-Wentworth District Health Council, 1988). About 1/5 of the seniors reported having difficulty hearing one-to-one conversation and fully 1/3 reported having difficulty when conversing with two or more people. Consequently, hearing services were identified as one of six health initiatives to be undertaken in the district. Although the survey included all seniors living in the community, a home for the aged was targeted for an audiological rehabilitation project because the rate of hearing loss among institutionalized elderly is estimated to be as high as 90% (for example, Hull & Griffin, 1989) and because existing clinic-based audiology services are typically inaccessible or ineffective for such elderly people. We sought federal funding for a program development and evaluation project because we wanted not only to develop a model program to fill a gap in service, but also to evaluate the effectiveness of the program in the hope of changing the system of hearing health-care delivery.

In the context of the meeting of the Canadian Anthropology Society (CASCA), I thought it would be interesting to reflect on how, departing from a clinician's conceptualization of impairment, disability, and handicap, we set about designing and then evaluating a new style of rehabilitation program for this special sub-population. How did our view of impairment, disability, and handicap in the hard-of-hearing residents influence the program design and the tools we chose to measure the outcome of the program? And, also of interest, of course, was what we found out about the lives of the residents and how their lives seemed to be affected by hearing or not hearing. With these questions in mind, I will first present an overview of the rehabilitation program, the design we chose for the evaluation, and the outcome measures that were designed for the evaluation. I will then present data on the residents, the baseline profile of

their communication experiences, and comments about some of the changes in their patterns of communication that could be attributed to the program.

## Method

### Design of the Rehabilitation Program

We adopted an ecological vision of rehabilitation, with the view that the goal of our program would be to reduce hearing-related communication handicap, or conversely, to improve the communication function of hearing-impaired seniors in their daily activities at the Villa. Following a simple definition of *communication* as the purposeful exchange of a message between a sender and a receiver in an environment, the elements of intervention can be organized to parallel the components of communication: listener, partner, message, and the communication environment or context (see Erber, 1988 for a discussion of models of this type; see Jennings & Head, 1994, for a discussion of how this model was applied in the present project). The three types of treatment options were aligned with this model of communication. The first treatment type included personal hearing aids, personal assistive technology, individual therapy, and drop-in or on-call audiological services, all of which were directed towards the hard-of-hearing resident as the listener. The second type included individual and group therapy, staff education, team conferences with staff, drop-in or on-call audiological services, mutual support networks, and assistive technology, all of which were directed towards the talker (both hard-of-hearing residents and their communication partners). The third type included institutional assistive technology and programmatic and acoustical modifications, all of which were directed towards the physical environment.

In preparing this presentation for the CASCA meeting, I became very aware of the extent to which audiologists usually focus on only a single component of the model—the hard-of-hearing listener. They typically work with individual hard-of-hearing clients rather than with groups of hard-of-hearing people or hard-of-hearing individuals as members of social groups. Even for the few audiologists whose practices allow them to work more fully within the communication model, although the model incorporates the role of the communication partner and the environment or context, most rehabilitative audiologists still probably think nonetheless in terms of individual communication partners (perhaps a spouse or nurse) rather than communication partners from a more general social perspective (for example, other residents in a care facility, co-workers at a work place, or classmates in an educational institution). Most audiologists are also probably better at considering the effects of the physical

environment or the specific pragmatic or linguistic context than they are at considering the broader social context and how it affects communication (for an exception to the general practice see Getty & Héту, this issue). In retrospect, it seems that in the program design for the Villa, we included treatment options (such as group therapy, mutual support networks, education of staff, and institutional assistive technology) that were likely to alter the social context in which communication took place, but whatever effects the program had on the social context were the result of implicit rather than explicit components of the program design.

### Design of the Program Evaluation

A typical method for evaluating the effect of a treatment would be to compare change in a treatment group to change in a control group. Because we wanted to implement a program that would have institution-wide impact (institutional assistive technology was provided, the physical environment was altered, and all sectors of the staff were educated), it was not feasible to identify a control group of residents within the Villa. Because there was no other home for the aged in the area that was a good match to the Villa, we could not use residents at another institution as a control group. Therefore, we adopted a design in which the treatment group served as its own control. To do this, we evaluated the same subjects twice, at a six-month interval, prior to beginning treatment, then we conducted a mid-treatment evaluation six months after the rehabilitation program began, and six months after that we conducted a final evaluation.

Our intention was to use the change we observed in a six-month pre-treatment interval as a baseline against which to judge whether or not there was a significant change due to treatment in comparable periods of time after the program was implemented. This was particularly important because we expected that the communication function of the residents might decline without treatment so that a finding of *no* change could actually indicate a positive effect of treatment. The baseline results provide a picture of communication function as it was before the rehabilitation program began.

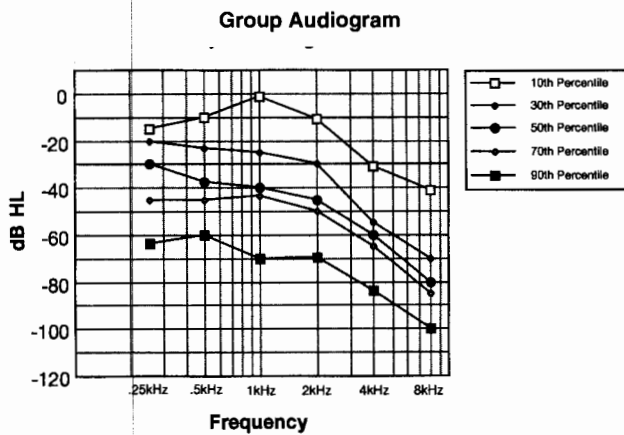
### Subjects

While a larger number of residents participated in the program, a core group of 30 residents participated in the rather demanding formal evaluation of the program; the evaluation group is the subset of residents who will be described here. The average age of the participants was 84 years ( $SD = 8$  years). The length of residency at the Villa ranged from 0 to 26 years (mean = 5 years;  $SD = 6$  years), with over half of the residents in the evaluation group having lived at the Villa for at least six years before the beginning of the project. Only 10% of the sample were men, a fact not too

surprising given the greater longevity of women. It seems safe to assume that none of the residents had normal hearing as we know it in young adults. The range of hearing impairments in the group is depicted by a group audiogram showing the hearing thresholds that were measured for percentiles of the group (see Figure 1). Most of the residents in the evaluation group exhibited some degree of presbycusis (age-related hearing loss). Using the rule of thumb that a person might derive some benefit from a hearing aid if he or she has a pure-tone threshold greater than 40 dB HL at 2 kHz, about half of the 30 residents could be considered to be impaired to a degree that they would be candidates for hearing aids. Interestingly, about half of the residents already had hearing aids when the project started. While the program helped those who already had hearing aids to use them more effectively and to keep them properly maintained, there was no noteworthy increase in the number of residents wearing hearing aids; virtually no residents opted to try a hearing aid for the first time. Furthermore, in most cases, those who did not already have hearing aids would not have been considered to be candidates for amplification on the basis of the level of their impairment as measured by standard pure-tone audiometry (see Pichora-Fuller and Robertson, 1994 for further information).

Figure 1.

Pure-tone air-conduction thresholds for the better ear for the 10th, 30th, 50th, 70th and 90th percentile of the group of evaluated residents (n=30).

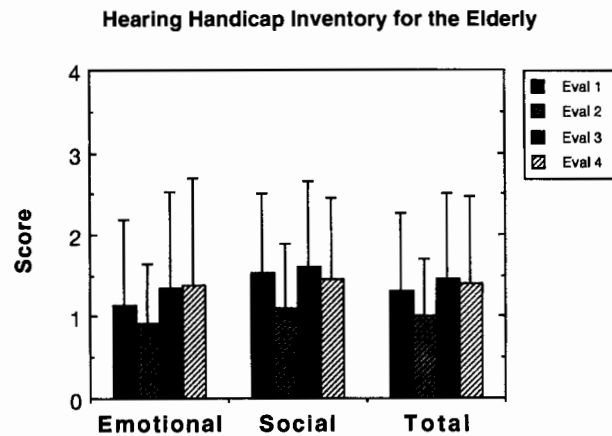


For the 22 subjects who did not have hearing in the normal range ( $\leq 25$  dB HL) in the speech frequency range ( $\leq 2$  kHz), little handicap was detected using a commonly used handicap questionnaire, the Hearing Handicap Inventory for the Elderly (HHIE) (Ventry & Weinstein, 1982). Using a four-point scale to score the HHIE, 4 would be the worst score. The average scores in the pre-treatment period indicate that the residents do not consider themselves to be very handicapped. The finding that the elderly report less

handicap than would be expected given their impairment has been reported by other researchers (for example, Lutman, 1991). Importantly, the HHIE scores were stable from the first evaluation to the second (see Figure 2), even with, surprisingly, a significant improvement (lower score) during the pre-program period on the social sub-scale score [ $t(21)=2.95, p=.008$ ] and therefore also on the total score [ $t(21)=2.22, p=.038$ ]. There was no significant change in this measure between the pre-program evaluation and the mid-program or final evaluation.

Figure 2.

Mean score (standard deviation shown as error bars) on the total score and scores for the emotional and social subscales of the Hearing Handicap Inventory for the Elderly (Ventry & Weinstein, 1982) at four evaluations conducted at six-month intervals over a two-year period (evaluations 1 and 2 pre-program, evaluation 3 six months after the program began, and evaluation 4 six months later) for the 22 residents in the evaluated group who did not have pure-tone air-conduction thresholds in the better ear  $< 25$  dB HL for frequencies  $\leq 2$  kHz. Responses were assigned values as follows, with high values indicating greater handicap: yes (problem experienced) = 4; sometimes = 2; no = 0; non-applicable items were not included in the average.



Even though we obtained measures of impairment and handicap in the evaluation group, the subject selection criteria were, in fact, based on neither impairment nor handicap, at least not as these constructs are measured with formal clinical tools. Our criteria, therefore, fell into a domain that makes sense within our ecological approach, but which would be unusual in traditional clinic-based audiology programs. Specifically, a chart review was conducted to determine if there were any indications of other reasons for communication problems, including such things as known aphasia or psychological disorders. Of the 370 residents of the Villa, the chart review yielded a total of 110 candidates for the rehabilitation program for whom there was no other known etiology that could account for communication difficulties. In addition, the care nurse and the audiologist

reported their clinical impression of whether or not each resident would be able to participate in and might benefit from rehabilitation; this filter left us with 95 residents who were considered eligible for rehabilitation. Of these, 78 residents consented to participate in the evaluation, and 48 dropped out over the two-year period of the project, leaving 30 in the evaluated group. About 3/4 of those who dropped out did so for reasons that were unrelated to the evaluation; 21 had changes for the worse in mental or physical health; nine died; three moved out of the Villa (for further details see Pichora-Fuller & Robertson, 1994, in press).

The *Standardized Mini-Mental State Exam* (SMMSE), a test that is used to screen for dementia (Malloy, Alemayehu, & Roberts, 1991), turned out to be a surprising but excellent indicator of a resident's ability to participate in rehabilitation. Over the two-year period of the project, SMMSE scores remained high (an average of 27 where 30 would be a perfect score) in the group who underwent the evaluation. It is important to note that, of the residents who were not in the evaluation group, about a quarter dropped out of the evaluation because of deterioration in mental health. Ability to participate in hearing rehabilitation is clearly affected by other mental and physical conditions. Regardless of the residents' level of hearing impairment, their cognitive status was perhaps an even more important variable in determining candidacy for the kind of rehabilitation program we provided. Conversely, of course, trouble communicating may undermine other aspects of care and health. We are not recommending that rehabilitative services should be withheld from seniors with cognitive deficits; however, it is apparent that those with co-occurring auditory and cognitive pathologies would definitely need an alternative approach and not the more participation-demanding program we provided that required self-initiated behaviours. In addition, the nature of program evaluation would have to be altered to include individuals with cognitive impairments.

## Outcome Measures

We assumed that hearing handicap reduces participation in activities and the quality of communication during activities. Therefore, given an overall goal for rehabilitation to reduce hearing handicap, it made sense to try to measure the impact of intervention on the scope and quality of participation in communication-demanding activities. Assessment of communication function during participation in activities called for new measurement tools. A battery of measures was developed, including resident and staff questionnaires to measure communication function, observational measures of communication function, and tests to measure the residents' and staff's knowledge of and skill in solving communication problems. Data collected using the resident questionnaire

will be reported here (see Pichora-Fuller and Robertson, 1994 for further information on the other outcome measures).

*Questionnaire.* Existing questionnaires (such as the HHIE, Ventry & Weinstein, 1982) were too general to serve as outcome measurement tools for evaluating our program, so we developed our own questionnaire that was keyed to specific situations that were important to the residents. Prior to developing the questionnaire, a pilot study was conducted to identify the key communication situations at the Villa. We held two group meetings, each with 15 participants: 5 residents with hearing loss, 5 residents with good hearing, and 5 staff. Using the nominal group process (Delbecq, Van de Ven, & Gustafson, 1975; for examples of how this method has been applied to develop tools to measure change in communication function see Lomas, Pickard, Bester, Elbard, Finlayson, & Zoghaib, 1989; Lomas, Pickard, & Mohide, 1987), participants were asked "When in your everyday life at the Villa is it important to hear?" Each person generated a situation and we compiled a list on a flip chart. The meeting continued until no further situations could be generated. The lists generated by the two groups were later reviewed by four experts, including two audiologists, a speech-language pathologist who works with the elderly, and the nurse in charge of the clinic at the Villa. The experts determined the final list of situations, excluding those that were considered to be duplicates or irrelevant. We arrived at a list of 33 key communication situations. Ultimately, we divided these into 17 primary and 16 supplementary situations (see Table 1). A list of nine questions was developed: four concerned scope of communication, three concerned quality of communication, and two concerned the use of and benefit from prostheses (see Appendix). Each of the questions was asked with respect to each of the primary situations. A sub-set of questions was asked about the supplementary situations. Results for the primary situations will be summarized here (for further details see Pichora-Fuller & Robertson, 1994, in press).

**Table 1. List of Key Communication Situations (Based on Responses to the Question: "When in your everyday life at the Villa is it important to hear?")**

Situations
Primary
1. Talking to familiar people
2. Talking to hard-of-hearing people
3. Telephone
4. Chapel
5. Meetings
6. Exercise class

7. Teas in the solarium
8. Teas in the auditorium
9. Teas in the tuck shop
10. In the dining room
11. Dining in floor-specific areas
12. Watching TV
13. Radio talk shows
14. Taped books
15. Taped music
16. At movies at the Villa
17. At therapy

**Supplementary**

1. Talking to strangers
2. Talking in the lobby
3. Talking to staff
4. Talking to nurses about pills
5. Informal/small group discussions
6. Listening to live music
7. Dinners in the Villacourt Lounge
8. Card games
9. Bingo
10. Bowling
11. At the beauty parlour
12. Outings
13. Public address system messages
14. Fire drill
15. Identifying someone by voice
16. Hearing that someone is approaching

**Results**

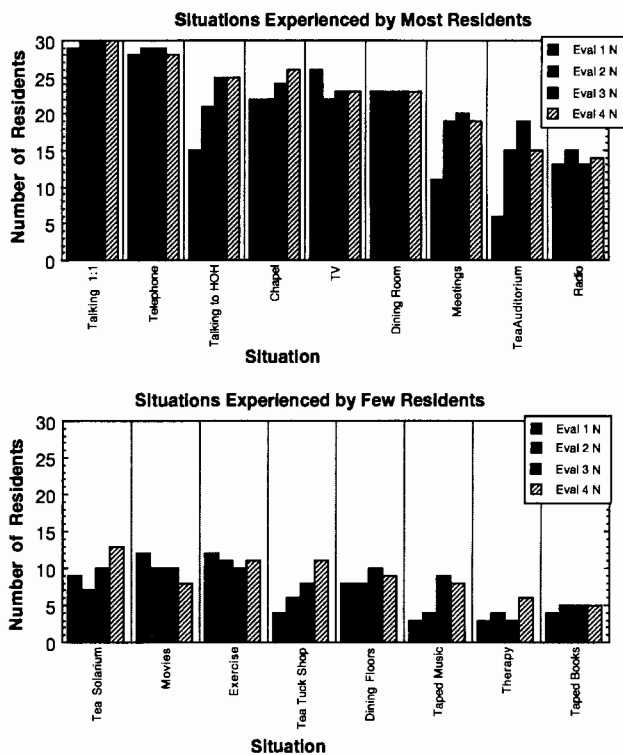
**Scope of Communication**

To measure scope of communication, residents were asked if they had experienced each of the situations in the last six months and, if so, to tell us how much time they had spent in the situation. If a resident had not experienced a situation during the six-month period being evaluated, he or she was asked if hearing loss had been a factor that prevented participation. Surprisingly, very few residents reported that hearing loss prevented participation in activities. In fact, during the pre-program evaluation period, the primary situation for which the most residents (n=6) reported that hearing loss prevented participation was talking to hard-of-

hearing residents. Fewer residents reported that hearing loss prevented them from listening to taped music (n=3), going to meetings (n=3), going to chapel (n=2) or going to movies (n=2). Hearing loss was rarely reported (n=1) as preventing talking to a familiar person, attending exercise class, attending teas in the solarium, watching television, or listening to the radio. No residents reported that hearing loss prevented using the telephone, listening to taped books, or attending teas in the auditorium or the tuck shop.

**Figure 3.**

Number of residents who participated in each key situation at four evaluations conducted at six-month intervals over a two-year period (evaluations 1 and 2 pre-program, evaluation 3 six months after the program began, and evaluation 4 six months later). Figure 3a. shows situations experienced by most residents; figure 3b shows situations experienced by few residents.

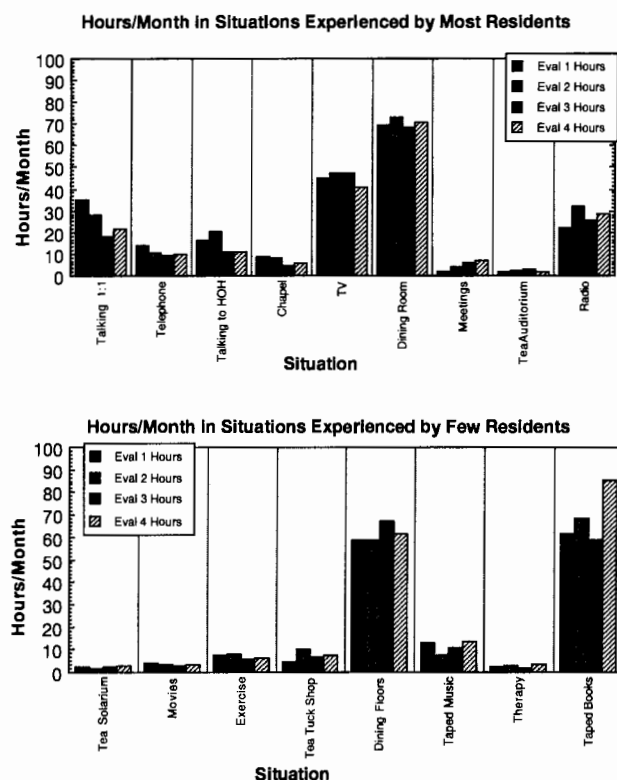


The number who attend each activity at the four evaluations that took place in the two-year period are shown in Figure 3. Most residents talked to familiar partners, used the telephone, went to chapel, watched television, and ate in the main dining room. Fewer attended meetings or teas in the auditorium. Far fewer engaged in activities such as attending teas in the solarium, going to movies, or listening to taped books. The number of residents attending activities increased over time, with significant gains after the program began in the following situations: meetings, teas, talking to hard-of-hearing people, and listening to taped music.

Figure 4 shows how many hours per month residents spent in situations. Clearly it is important that, when audiologists set priorities for service delivery, they consider both the number of participants and the number of hours spent in activities. For example, while most residents go to chapel, few hours/month are spent there. In contrast, few residents listen to taped books, but those who do are blind individuals who spend many hours at it.

**Figure 4.**

**Mean number of hours per month spent by residents in each key situation at four evaluations conducted at six-month intervals over a two-year period (evaluations 1 and 2 pre-program, evaluation 3 six months after the program began, and evaluation 4 six months later). Figure 4a shows situations experienced by most residents; figure 4b shows situations experienced by few residents. The number of hours per month that a resident reported spending in each situation was included in the calculation of the mean if the resident reported participating in the situation in any of the four evaluation periods; therefore, for a resident who only participated in an activity in the fourth evaluation period, a value of 0 hours/month would have been included in the calculation of the group average for the first three evaluation periods.**



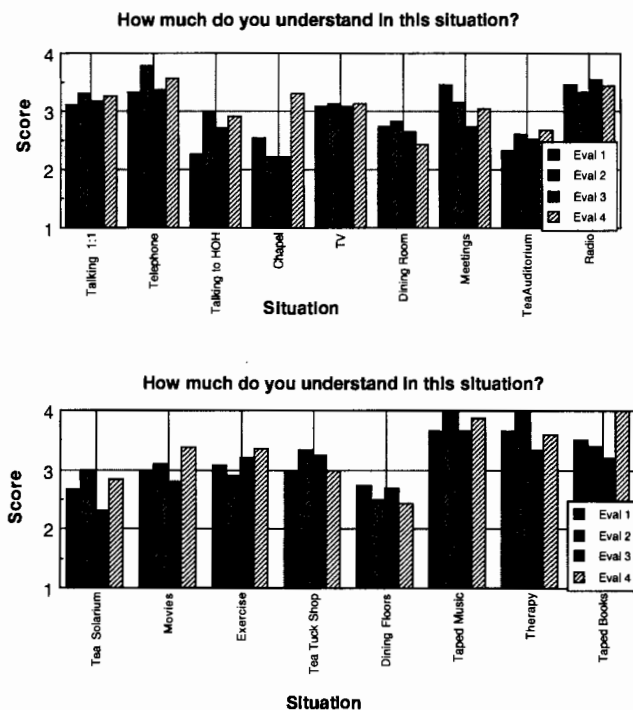
There were significant effects of treatment on the number of hours/month spent in meetings, talking to familiar people, and chapel. While there was a steady increase in the number of hours/month spent at meetings, for the other two

situations there was a decline in time spent during the pre-program period, with a rebound after the program began.

**Quality of Communication**

Those who attended an activity usually reported that they understood most of what was said in the activity (see Figure 5). Note that there are even reports of perfect understanding (a score of four) for listening to taped books and taped music and in therapy — situations experienced by few residents. On the other hand, for the activities that many residents attended, for example, dining and chapel, the residents reported considerably more difficulty understanding what was said. The only situation for which we found a significant improvement in the amount that residents felt they understood was in the chapel situation. The chapel was also one of the situations in which the hours/month spent had begun to decline prior to the implementation of treatment, and where we found a rebound in the number of hours/month spent after the rehabilitation program was implemented.

**Figure 5.**



**Mean score on the question "How much do you understand in this situation?" for each key situation at four evaluations conducted at six-month intervals over a two-year period (evaluations 1 and 2 pre-program, evaluation 3 six months after the program began, and evaluation 4 six months later). Figure 5a shows situations experienced by most residents; figure 5b shows situations experienced by few residents. Values were assigned to responses as follows: all = 4; most = 3; half = 2;**

less than half = 1. The amount that a resident reported understanding in each situation was included in the calculation of the mean if the resident reported participating in the situation in any of the four evaluation periods; therefore, for a resident who only participated in an activity in the fourth evaluation period, a value of 0 would have been included in the calculation of the group average for the first three evaluation periods.

A fuller picture of quality of communication emerges if we look at how satisfied residents say they were with communication in the key situations (see Figure 6). The scores are near or at ceiling pre-program and, not surprisingly, there is no change evident on this measure in any situation.

Figure 6.

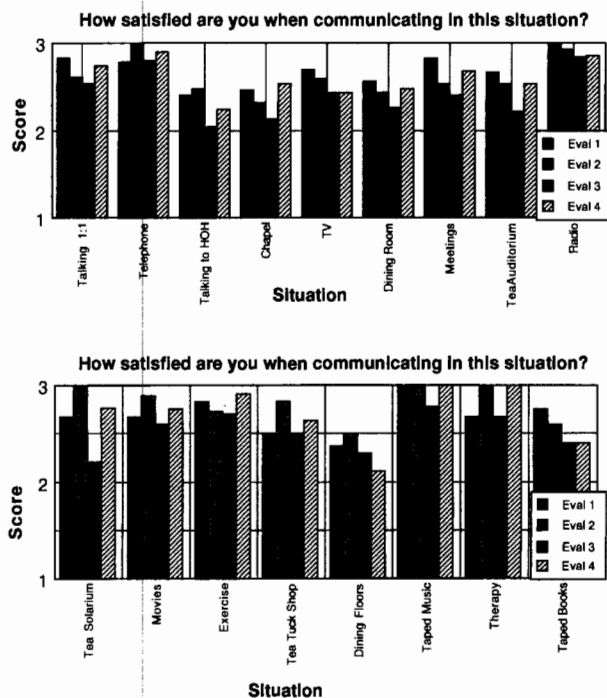
Mean score on the question "How satisfied are you with how well you hear and understand in this situation?" for each key situation at four evaluations conducted at six-month intervals over a two-year period (evaluations 1 and 2 pre-program, evaluation 3 six months after the program began, and evaluation 4 six months later). Figure 6a shows situations experienced by most residents; figure 6b shows situations experienced by few residents. Values were assigned to responses as follows: yes = 3; sometimes = 2; no = 1. The degree of satisfaction that a resident reported in each situation was included in the calculation of the mean if the resident reported participating in the situation in any of the four evaluation periods; therefore, for a resident who only participated in an activity in the fourth evaluation period, a value of 0 would have been included in the calculation of the group average for the first three evaluation periods.

## Discussion

In many care facilities, especially those dedicated to extended care, audiologists and speech-language pathologists may encounter circumstances that are not conducive to rehabilitating elderly residents with communication disorders (for example, Alberti, 1977; Lubinski, Morrison, & Rigrodski, 1981). Importantly, residents may not be motivated to communicate because they do not feel that they are part of a community. Establishment of a sense of community (or any intimate or significant interpersonal relationship) that would foster communication within the institution is likely to be severely hampered by a number of factors: the abrupt termination or diminution of prior lifelong relationships with members of the outside community (sometimes geographic distance from the prior community also becomes a factor); lack of opportunity for social interaction with others living or working at the institution; lack of desire to communicate with other residents or staff who do not fit within a familiar, accepted, or understood social context; competing health demands related to the poor mental and/or physical health of the residents; a high turnover of residents and staff.

While the circumstances may not be conducive to communication or the rehabilitation of communication disorders at many care facilities, this did not seem to be the case at the Villa. Although the group we evaluated could be described as including many "old-old" individuals, they were in relatively good physical and mental health. Most residents in the evaluated group had lived in the Villa for at least 6 years, so they had already had time to establish relationships and settle into the community there with the view that they would continue to live there for years to come. Furthermore, prior to coming to the Villa, most had lived much or all of their lives in the local geographic area and were already familiar with the town of Dundas. Since Dundas is not a large urban centre, it seems likely that the residents arrived with some feeling of community and some possibility of retaining prior relationships and contexts. This feeling of community was strongly reinforced by the nuns who defined the management philosophy of the Villa. Indeed, upon first entering the Villa, we were struck by the warmth and lively interpersonal interactions that were obvious amongst the residents and staff. Villa residents also had a wide selection of programs and activities in which they could participate. Given that there seemed to be plenty of motivation and opportunity for communication, it was of interest to us to determine the extent of participation by residents in communication-demanding activities and how their participation was or was not affected by hearing status.

It is noteworthy that there were almost no reports that hearing loss prevented participation in activities. The



situation in which participation was most often prevented by hearing loss was talking to hard-of-hearing people. In this particular situation, hearing loss in the other communicator, rather than the resident's own hearing loss, was perceived to be the obstacle. It is also interesting to note that some residents were obviously driven to participate in the rehabilitation program because they wanted to improve communication with a hard-of-hearing communication partner. A striking example of this was a blind woman who wished to participate in lipreading training so that she could learn to be more intelligible to her hard-of-hearing roommate. Importantly, the number of residents reporting that they talked to hard-of-hearing people increased with the implementation of the rehabilitation program. Unlike other sub-groups of hard-of-hearing people (see Dahl, this issue; Getty & Héту, this issue; McCormick, Pichora-Fuller, Paccioretti, & Lamb, this issue; Warick, this issue), the majority of residents at the Villa were known by each other to have problems hearing, and thus they did not have to decide whether or not to disclose their hearing problems (or a wide range of other health and personal problems) to others. To illustrate that the hearing status of residents was common knowledge, at one of the group meetings where we elicited the set of situations in which residents thought that hearing was important, one resident (who was considered by others to have good hearing) informed us with certainty that 80% of the residents had a hearing problem. The Villa sub-group also differs from some of the other sub-groups of hard-of-hearing people described at the CASCA meeting (for example, Getty & Héту, this issue) because they were probably immune from some of the negative connotations of hearing loss: the possible association of hearing loss with aging was of little importance to the residents of the Villa because they were clearly defined as old on many other grounds; the possible association of hearing loss with decreased sexual potency was unlikely to be important to the residents because 90% were female. Although we had begun the project with the idea that it would be important to improve the communication between residents and staff, it turned out that resident-to-resident communication and rehabilitation of residents as talkers rather than listeners was far more important than we had anticipated. Mutual support was already important to the residents; the program was able to build on that pre-existing social condition.

Given that the residents claimed that hearing loss was not usually an obstacle to participation in activities, it is interesting to consider the nature of the activities where they spent their time and how those activities might have been affected by hearing status. In the pre-program period, at least 3/4 of the residents reported that they talked to familiar people in one-to-one conversations, used the telephone, attended services in the chapel, watched television, and ate in the main dining room. Of those situations, on average,

residents reported that they understood most of what was said (score  $\geq 3$ ) and that they were satisfied (score  $\geq 2.5$ ) with how well they heard and understood when talking to familiar people in one-to-one conversations, talking on the telephone, and watching television. They reported that they understood less and were less satisfied with how well they heard and understood when talking to hard-of-hearing people, at services in the chapel, or when eating in the main dining hall. The chapel and dining-room situations are, of course, noisy and reverberant situations where we would expect that even elderly listeners with normal audiograms might experience difficulty understanding what was said.

In contrast to the activities in which most residents participated, it is also interesting to consider activities in which a minority of residents participated. In the pre-program period, less than half of the residents attended teas (in the auditorium, solarium, or tuck shop), attended meetings, listened to the radio, went to in-house movies, took exercise classes, ate dinner in floor-specific dining areas, attended therapy, or listened to taped books or music. Of those activities, on average, residents reported that they understood most of what was said (score  $\geq 3$ ) and were satisfied (score  $\geq 2.5$ ) with how well they heard and understood at meetings, when listening to the radio, at movies, at exercise classes, at tea in the tuck shop, at therapy, and when listening to taped music or books. They reported that they understood less at teas in the auditorium or solarium and when dining in floor-specific areas; however, they reported less satisfaction only with how well they heard and understood in the dining situation. Like the activities in which many residents participated, for the activities in which few residents participated, the situations where they had difficulty communicating featured noisy and reverberant environments. However, there were also noisy and reverberant situations (movies, exercise class, teas) in which residents either reported little difficulty understanding or that they were satisfied with how well they heard and understood.

It stands out that, in the pre-program period, regardless of whether or not situations were noisy and reverberant, residents reported that they were satisfied with how well they heard and understood in all situations except talking to hard-of-hearing people, attending services in the chapel, and during dining. It seems that if activities were unavoidable on social (encountering hard-of-hearing people), physical (dining) or spiritual (chapel) grounds, then residents participated even if they were handicapped. More optional situations (teas, movies, exercise class, etc.) seem to be attended only by residents who understand well or are satisfied with how well they hear and understand in the situation. Obligatory activities, such as eating and worshipping, are attended by many residents and self-reported handicap is high. In contrast, few participate in most



optional activities but those who do report little disability or handicap.

The fact that we observed a decline during the pre-program period (followed by a rebound after the implementation of the program) in the number of hours/month that residents spent talking to familiar people and at services in the chapel, combined with the fact that only a small number of residents reported hearing loss to be an obstacle to participation in activities, suggests that there may be only a narrow time window in which residents might realize that their participation in activities is affected by hearing loss. Our guess is that, having dropped out of optional activities, residents may, shortly thereafter, no longer believe that hearing loss was a reason for discontinuing participation, even if this loss did play a role. It may be that more residents would participate in optional activities if they heard and understood better, but we cannot assess the degree of their handicap in a situation after they have ceased participation. It seems then that, at least for our purposes, scope rather than quality may be a better index of the impact of hearing loss on communication function in everyday life except for obligatory kinds of activity. The effectiveness of the program should, therefore, be reflected by an increase in the residents' ability to understand and satisfaction with hearing and understanding during obligatory activities, and at least a stabilization of the number of residents dropping out of optional activities, if not an increase in the number attending optional activities.

For the optional situations that were attended by a minority of residents in the pre-program period, there were significant increases in the number of residents who listened to taped music, attended meetings, and attended teas after the program was implemented. There was also a significant increase in the number of hours/month spent at meetings. There was no significant decrease in the number of hours/month spent in any situation after the program was implemented. There was no change in how well residents understood or in how satisfied they were with communication because those who attended always reported little disability or handicap.

For the obligatory situations that were attended by the majority of the residents even in the pre-program period, there was a significant improvement in the residents' ability to understand in the chapel situation, although no significant improvement was observed in the dining situations.

Importantly, there was a significant increase, on the part of both residents and staff, in knowledge of and ability to operate assistive listening devices following the implementation of the program. The most dramatic effect was seen in the use of an FM system in the chapel, where no

resident had used this equipment pre-program and fully 80% used it in the chapel post-program. About half of the residents who came to use an FM system were those with such mild pure-tone threshold losses that they were not considered to be candidates for a hearing aid, even though we can assume that they did experience age-related difficulties in understanding speech in noise due to sub-clinical changes in auditory processing (for reviews see CHABA, 1988; Willott, 1991). The high rate of adoption of the FM system may be caused by several factors: (a) while the residents had many beliefs about hearing aids, they had no prior knowledge or pre-formed beliefs about FM systems; (b) the FM technology was introduced within a short space of time to a group of users who shared a common new experience; (c) the audiologist provided on-site support to assist the new users; (d) the residents considered attendance at services in the chapel to be of spiritual importance and the use of the FM was reinforced by the priest who used the transmitter portion of the device; (e) the assistive technology is effective in overcoming the signal-to-noise and reverberation problems that interfered with the ability of residents to understand what was said.

In conclusion, the present investigation provided us with insights into how the concepts of impairment, disability, and handicap apply in a particular sub-group. In this sub-group, we found that there was a discontinuity between measures of impairment (pure-tone thresholds) and measures of disability (ability to understand what is said), and between measures of disability and measures of handicap (satisfaction with hearing and understanding). Not surprisingly, pure-tone audiometry and even generic questionnaires to probe handicap failed to detect the specific communication disabilities experienced by the residents. Specifically, difficulty understanding speech in noisy and reverberant situations was experienced by residents with only mild high-frequency pure-tone hearing impairments, and even by residents who were assessed as having little handicap when the generic questionnaire was used.

One reason for the uninformative nature of the traditional clinical measures is that pure-tone audiometry provides a measure of peripheral hearing loss but age-related hearing loss is often characterized by more central auditory processing and cognitive deficits that are not detected by the test. One reason for the lack of sensitivity of the generic questionnaire is that it did not adequately survey the particular communication-demanding activities that were of importance to the residents. Another reason for the insensitivity of the generic questionnaire was that it could not detect handicap in individuals who had ceased participation in activities where difficulty was encountered. This latter reason highlights the discontinuity that we found between measures of disability and measures of handicap.

When activities were obligatory (eating or worshipping) then residents maintained their participation even when they experienced disabilities and felt handicapped in the situation; however, when activities were optional, the residents who participated reported either that they were not disabled or that they did not feel handicapped. We suggest that the residents may have dropped out of optional activities when they began to experience difficulty communicating in the situation, but shortly thereafter did not attribute their lack of participation to hearing loss. One interpretation of this pattern would be that, because the disability of the residents is obvious, they must be "under-reporting" or "denying" their real handicap. The alternative interpretation that we favour is consistent with the notion of *successful aging*. According to this notion, it would not be adaptive for elder individuals to lament their failing abilities; rather, it would be adaptive for them to focus on their continued enjoyment of preserved abilities. In this light, residents who accept their failing abilities are not handicapped even though they may be disabled.<sup>1</sup> If the elderly residents accept their disabilities and little handicap is reported, it becomes difficult to measure changes in handicap. Specifically, if a resident were disabled but satisfied with his or her communication abilities pre-program, then any improvement in performance (reduction in disability) due to rehabilitation would be undetectable because the reported level of satisfaction would remain at or near ceiling.

Following the notion of successful aging, it seems important for audiologists providing rehabilitation to emphasize the enhancement and also the preservation of communication abilities, so that participation in as many activities as possible can be maintained in an enjoyable fashion. On the one hand, enhancement of communication abilities would be important in obligatory situations and could be detected by changes in measures of disability and possibly by measures of handicap. On the other hand, preservation of communication abilities would be important in optional situations and would be evidenced by no decrease in scope of participation. It is reasonable to expect that if communication is enhanced (disability is reduced) in obligatory activities where participation has been maintained, generalization of enhanced abilities might result in an increase in the scope of activities in which residents participate. When satisfaction with communication is at ceiling or it is not possible to measure situation-specific handicap because residents have ceased participation in activities, changes in the scope of activities in which residents participate may be an important way of demonstrating improvement.

#### End Note

<sup>1</sup>In a family, family members may become effectively handicapped because the scope and quality of their activities

are limited when their hard-of-hearing family member opts out of shared activities.

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### Appendix

#### Key Communication Questionnaire

Name: \_\_\_\_\_ Room/Dept. \_\_\_\_\_ Evaluation: \_\_\_\_\_ Date: \_\_\_\_\_

Situation: \_\_\_\_\_ Partner: \_\_\_\_\_ Evaluator: \_\_\_\_\_

#### A. Scope

1. How often are you/the resident ever in this situation?

A. Regularly \_\_\_\_\_ hrs/day \_\_\_\_\_ days/wk \_\_\_\_\_ wks/month

B. Less regularly Range \_\_\_\_\_

2. How often does a hearing problem prevent you/the resident from being in this situation?

Never Sometimes Comment \_\_\_\_\_

3. When were you/the resident last in this situation? \_\_\_\_\_

4. How many people do you/the resident have conversations with in this situation?

NA Number \_\_\_\_\_ Partner? \_\_\_\_\_

#### B. Communication Handicap

1. Is it important for you/the resident to hear well/understand in this situation?

No Sometimes Yes Comment \_\_\_\_\_

2. How much do you/the resident hear/understand in this situation?

Less than half Half Most or all Comment \_\_\_\_\_

3. Are you/the resident satisfied with how well you/the resident hear/understand in this situation?

No Sometimes Yes Comment \_\_\_\_\_

C. Usage and Benefit from Protheses NA Type \_\_\_\_\_

1. How often do you/the resident use a hearing aid or other device in this situation?

Never Sometimes Always

2. How much does the hearing aid or other device improve your/the resident's hearing/understanding in this situation?

Not much So-so Very much Comment \_\_\_\_\_