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HEARING LOSS IN THE BUILT ENVIRONMENT: THE EXPERIENCE OF ELDERLY PEOPLE

W.J. Davies*, T.J. Cox*, A.T. Kearon**, B.J. Longhurst***, C.L. Webb*

* University of Salford, School of Acoustics and Electronic Engineering, M5 4WT, Salford, United Kingdom

** Manchester Metropolitan University, Dept of Sociology, M15 6LL, Manchester, United Kingdom

*** University of Salford, Institute for Social Research, M5 4WT, Salford, United Kingdom

Tel.: +44 161 295 5986 / Fax: +44 161 295 5427 / Email: w.davies@salford.ac.uk

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ABSTRACT

A qualitative social survey has been conducted on a group of 207 elderly people with a hearing loss. The aim of the study was to determine the extent to which acoustic problems in the built environment affect this subject group. It was found that the speech communication of elderly people was significantly affected by the presence of background talkers in a reverberant environment. Considerable evidence of subjects adapting their behaviour to acoustic problems was found. For example, a large number of subjects experienced poor reception with hearing aids. This prompted them to use the aid selectively. Also, poor sound insulation in domestic dwellings gave a strong disincentive for some subjects to use their television sets at a sound level audible to them. Design consequences based on these results will be discussed.

1 - INTRODUCTION

The built environment is largely designed for the able-bodied [1]. Though there are no doubt cultural reasons for this, it is also true that designers have little data available to them on the needs of various disabled groups or on the ways in which these groups use the built environment. One such group consists of elderly people with a hearing loss. It is a large section of the population – the average hearing loss for speech increases by 5 to 8 dB per decade of age [2]. Most of the readers of this paper will become a member of it at some point. However, most buildings seem to be designed for users with normal hearing. It is known that inappropriate room acoustics can affect the listening experience of those with age-related hearing loss. For example, older adults experience more difficulty understanding reverberated speech than do younger individuals [3]. Elderly individuals are also greatly affected by background noise; for example, a signal-to-noise boost of more than 10 dB was needed to improve speech discrimination in noise for a group of elderly listeners [4]. Comparatively little attention has been paid to modification of the acoustics of rooms where the hearing-impaired may experience problems. The only study to address this problem directly [5] predicted that reverberation times should be reduced to improve the speech-reception threshold of elderly listeners. However, the effects of doing so were not directly measured. This project aimed to answer the following questions: To what extent are elderly individuals with a hearing loss affected by acoustic problems in the built environment? What problems are perceived, in what environments and what activities are interfered with? Can a multi-disciplinary research approach offer advantages in this kind of study?

2 - METHOD

The choice of research method was crucial to the outcomes of this study. It was decided that the project aims would be best achieved by allowing the respondents to express acoustic problems in their own language and in a naturalistic social context. This desire oriented the study away from quantitative methods and towards qualitative ones.

The sample consisted of 250 elderly people with a range of self-reported hearing loss. The modal age was 83 and the gender balance 76% female. The views of the sample were researched using several different techniques. First, a short questionnaire was used to extract brief socio-economic data. Then a sub-sample was asked to complete a diary with details of incidents involving hearing or acoustic problems. Sixty completed diaries were analysed. Patterns of behaviour were identified from the diaries and these were explored further in two ways. Thirty individual semi-structured interviews were conducted and four focus groups were held, each with an average of six participants. Each technique was piloted. Thus the earlier, simpler stages funnelled through into more detailed and specific investigations. The patterning of respondent behaviour using diaries followed by exploration of trends and hypotheses in focus groups was thought to be an efficient and novel methodology that would provide significant data.

3 - RESULTS AND DISCUSSION

3.1 - Speech communication problems

Many of the respondents described having particular problems when socialising in groups where there are voices in the background which prevent effective hearing. This was anticipated, following several laboratory studies in which elderly participants were found to have difficulty in understanding speech in reverberation [3], in background noise [4] and in background speech [6]. The present results confirm that background speech problems occur routinely in the lives of the respondents. To take one example of many:

I think it is because there are too many voices at once. I can concentrate on one person and one voice, but if there are a few then it is distracting and I cannot really hear any of them. *Female, 81.*

3.2 - Behaviour change and individual adaptation

Respondents reported many different strategies for managing hearing problems. In some cases, crowded spaces are avoided. Some respondents use their hearing aids selectively (to avoid background noise or reverberant sound), while others lip read. Some elderly people rely on verbal strategies, such as asking someone to repeat themselves, while others rely on a particular person to indicate what has not been heard:

Just hope for the best. Hope it goes away eventually. When it is very bad like as I said on that boat, I switched it off but you just say to people you know I am sorry I did not catch that. Have to begin again and hope that it does not matter too much. *Female, 75.*

3.3 - Specific environments

Relatively few respondents mention specific environments, especially as a perceived cause of their problem. It appears that the biggest difficulties arise in large rooms, although this may be as much due to the presence of background talkers as to the acoustics of that particular space. Churches seem to cause a particular problem, although the respondents did not necessarily attribute this to their own hearing but sometimes to the person preaching:

I can never hear the sermon properly but really should go right to the front and I do not. But then again it is because our parish priest does not speak clearly and I do not want to say 'please put that microphone in front of your mouth'... He has got a beard and I am sure it goes in his beard, his voice. *Female, 73.*

3.4 - Poor sound insulation inhibits television use

Several respondents referred to difficulty when listening to reproduced sound, especially that of the television. Many reported problems centred on the signal itself. Some, however, specifically identified limited dynamic range caused by their own inhibition to increase the sound level:

I am very aware, living in a flat, that the noise is going to go up or down as the case may be and annoy people... I find quite often that I have [the television] reasonably low – as low as I can stand it because I think you ought to think about other people in here. *Female, 68.*

It is possible that elderly people may feel a greater sense of social responsibility than younger groups in society so they would be more likely to feel inhibited in this way. Thus, poor sound insulation can be a problem for those with a hearing loss as well as for those with none.

3.5 - Reflections on the methodology

One of the objectives of this project was to test the novel methodology of diaries funnelled into qualitative interviews and focus groups. It was found that the qualitative techniques allow respondents to describe their experiences in their own language and in their own environment. Very little is assumed by the researcher other than that the respondent may have a view to express. In this respect, qualitative

methodology seems well suited to the kind of exploratory project described here. It is suggested that other areas of human response to sound could benefit from this approach.

One significant outcome is that using the three different techniques of diaries, interviews and focus groups helped to validate the results. The three methods each have different strengths and provided data with different emphases. Diaries are an efficient way to obtain initial information on behaviour patterns for a sizeable group of respondents. The interviews allowed the researcher to probe the responses of an individual respondent and follow a line of thought to its conclusion. Focus groups provide a way for the researcher to observe and record natural interaction between respondents.

4 - CONCLUSIONS

This paper has reported the results of a qualitative survey of elderly people to reveal acoustic difficulties that the elderly have in the built environment. Many of the elderly respondents in this study were found to have experienced acoustic problems in the built environment. The most common problem reported was poor speech communication and the main causes were background speech, reverberant conditions and background noise. It seems likely that the effects of poor speech communication could be reduced by more appropriate room acoustic design in the built environment. An unexpected finding was that poor sound insulation can affect people with a hearing loss. This happens when they feel inhibited about using a television loudly enough to disturb a neighbour. This finding should be taken into account in the design of housing for elderly people.

The utility of a novel qualitative methodology involving diaries, interviews and focus groups has been successfully tested. This was found to be an efficient way to capture naturalistic responses from the respondents. In particular, the use of three methods rather than relying solely on interviews was found to provide different views of the data and to give confidence in its validity. It is suggested that the application of such techniques could be extended to studies in other areas of acoustics.

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