
Measurement of Attitudes of Those with Unimpaired Hearing Towards the Hearing Impaired: A Critical Examination of the Available Scales

La mesure des attitudes des entendants à l'égard des malentendants: analyse critique des instruments disponibles

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Abstract

The attitudes of those with unimpaired hearing towards persons who suffer from auditory problems often constitute a major obstacle to the latter's rehabilitation. Before implementing a program to increase awareness of the problem and thereby modify these attitudes, it is necessary to understand people's opinions and knowledge about the hearing impaired, and their behaviour towards them. In order to carry out a survey of workers in industry, we have undertaken to identify a scale that will ensure reliable and valid measurement of attitudes towards individuals suffering from occupational hearing impairment. Our critical review of research in this field has enabled us to identify thirteen relevant studies and eight measurement scales. Although in general these studies contribute to a better understanding of the phenomenon under study, a closer inspection reveals serious deficiencies: (1) lack of data pertaining to the psychometric value of the scales used; (2) significant variations in means of measuring respondents' attitudes; (3) lack of data regarding different types of hearing loss or specific subgroups of the population; (4) use of samples from highly educated respondents; (5) absence of standardization in the measurement of individual characteristics that could influence attitude scores. This assessment has led us to conclude that it would be preferable to develop a new measurement scale that more specifically meets our needs. We are about to pretest such a scale on 300 industrial workers.

Résumé

Les attitudes qu'entretiennent les entendants à l'égard des personnes atteintes de troubles d'audition constituent très souvent un des obstacles majeurs à leur réadaptation. Toutefois, avant de penser à mettre sur pied un programme de sensibilisation qui viserait à modifier ces attitudes, il faut d'abord comprendre les opinions, les connaissances et les comportements qu'ils adoptent vis-à-vis des malentendants. Dans le but de mettre sur pied une telle enquête auprès de travailleurs industriels, nous avons entrepris d'identifier un instrument qui permettrait une mesure fiable et valide des attitudes manifestées à l'endroit d'individus atteints de surdité professionnelle. Notre recension des études effectuées dans ce domaine aura conduit à l'identification de treize recherches pertinentes et de huit échelles de mesure différentes. Bien que, de façon générale, les études recensées

contribuent à une meilleure compréhension du phénomène à l'étude, un examen critique de ces dernières a mis en lumière des lacunes importantes qui ont trait à: (1) un manque de données concernant la valeur psychométrique des échelles utilisées, (2) des variations importantes dans la façon de mesurer les attitudes des répondants, (3) un manque de données concernant certains problèmes spécifiques de surdité ou encore certaines populations particulières, (4) le recours à des échantillons de répondants hautement scolarisés et (5) une absence de standardisation dans la mesure des caractéristiques individuelles susceptibles d'influencer les scores d'attitudes. Suite à ce bilan nous avons conclu qu'il serait préférable d'élaborer un nouvel instrument de mesure qui répondrait davantage à nos besoins. Nous sommes sur le point de pré-tester ce dernier auprès de 300 travailleurs industriels.

Introduction

Hearing impairment not only constitutes a hindrance to perception, but also interferes with verbal communication, and for that reason, alters interaction between people. Adaptation to a problem of interaction requires action on the part of not only the hearing impaired person, but also those around him or her. In other words, use of a hearing aid or speech reading by a hearing impaired individual is not enough to restore communication; the person communicating with such an individual must be willing to face him or her, to speak more slowly, and to articulate more clearly. These adjustments necessarily mean that those dealing with a hearing impaired person must understand his or her hearing difficulties to some extent and accept and deal with the constraints they place on communication.

It is often the case that the persons who surround the hearing impaired individual do not understand his/her problems, particularly those related to sensorineural hearing loss that develops in a highly insidious manner, as is the case with occupational hearing impairment (Héту et al., 1988). The symptoms of loss of frequency selectivity are often described

by the expression, "He/she can hear when he/she wants to." Moreover, the effects of hearing impairment are often irritating to those in the person's social circle (Héту et al., 1987; Héту et al., 1988). For example, people complain about having to repeat things over and over and tolerate excessively loud speech. Hearing impaired people become aware of imposing a burden on those around them and often feel inept in situations involving social interaction. A third obstacle to communication, also stemming from the human environment, is that people stigmatize hearing impaired persons; almost all hearing impaired persons have had the experience of feeling that they are discredited by those around them because of their hearing loss. The consequences of this stigmatization are such that concealing one's hearing difficulties may be considered preferable in some situations (Jones, 1987; Jones et al., 1987). In the case of those with occupational hearing impairment, it appears that coworkers who do not suffer from hearing impairment are the most severe in their expressions of disparagement (Héту et al., 1989).

In this context, it is impossible to design a complete, consistent program of auditory rehabilitation without providing for measures to deal with the people surrounding the hearing impaired. In other words, it is necessary to make people aware of the nature of hearing difficulties and encourage attitudes and behaviours that, instead of being intolerant and disparaging, are positive. However, the prerequisite to developing such a program is an understanding of people's spontaneous attitudes, beliefs, and behaviour with regard to the hearing impaired. We plan to carry out a survey for this purpose among workers in industry, so that we can design measures to further the rehabilitation of those with occupational hearing impairment (Héту & Getty, 1988). We have attempted to find a reliable, valid tool for measuring the attitudes of those with unimpaired hearing towards the hearing impaired. This article provides an analysis of already existing questionnaires in terms of their psychometric value and the available information on the factors that can influence answers to this type of question.

Methodology

Our critical review of studies dealing with the measurement of attitudes towards persons with hearing impairment was based on three separate approaches. First, by consulting the references cited in the articles we had at our disposal, we were able to establish an initial bank of articles going back to 1958. Secondly, we made a list of the most recent papers on the subject (1987-1988) by consulting the Index Medicus and the Psychological Abstracts. Since studies dealing specifically with measurement of attitudes of those with unimpaired hearing towards the hearing impaired were not in great supply, we used various key words to identify articles that might

prove pertinent. To the concept of attitude, we added those of perception, opinion, and knowledge, and to that of hearing impairment, we added those of hearing disorder, hearing disability, and deafness.

We completed our critical review of the studies with a computer search. Since the subject under investigation lent itself to study by a variety of disciplines, our last step consisted of calling on three separate, but not necessarily mutually exclusive, data banks: Medline, Psychinfo, and Eric, which deal respectively with medicine, psychology, and education, as well as related fields. We should mention that we limited the computer search to studies carried out since 1969.

Analysis Criteria

It is important to bear in mind that critical review of the literature was undertaken first and foremost for the purpose of identifying a scale that could be used to measure the attitudes of workers towards their coworkers suffering from occupational hearing impairment. In light of this objective, critical analysis of the individual studies we examined was based on three main criteria: (1) the psychometric quality of the scale used in the survey; (2) the population for which the measurement tool was designed; and (3) the sample population surveyed in the study.

Our study of the psychometric quality of the scales allowed us to determine to what extent the scale could be used for gathering information that was both reliable and valid. A scale is considered reliable if it gives consistent results, that is, if it produces similar results whenever it is used to measure the same phenomenon. A measurement tool is considered valid if it enables measurement of the concept under study. However, before a scale can be proven valid, its reliability must be demonstrated.

In our study of the reliability of the scales examined, we limited ourselves to two aspects: (1) their stability over time, that is, the degree to which they make it possible to obtain similar results when used on two different occasions on the same population; and (2) their internal consistency, that is, the degree to which the various statements comprising them lead to convergent results.

With regard to the validity of these scales, two main factors were considered: predictive validity and construct validity. The first of these two types of validity deals with the degree to which measurement of an attitude makes it possible to predict the behaviour of individuals in a given situation; construct validity deals with the degree to which the scale used seems to adequately represent the concept that it intends

to measure. To be valid from the point of view of its construct, a scale needs not be unidimensional; in fact, it may be attempting to measure various aspects of the same phenomenon and thus include several dimensions.

The second analysis criterion, examination of the population for which the measurement scale was designed, serves to evaluate the extent of modifications that must be made before the scale can be used in a study on occupational hearing impairment. The more changes to be made, the greater the necessity of carrying out further testing of its psychometric quality.

The third and last analysis criterion, examination of the population sampled, in part serves the same purpose as the preceding criterion. If it has already been shown that a tool is reliable and valid when used on a population whose characteristics are similar to those of the individuals whom one wishes to study, it is less necessary to verify its psychometric quality again; when a significant variation between the two groups is observed, on the sociodemographic level, for example, it is highly advisable to submit the scale to new reliability and validity tests. Moreover, this third criterion also makes it possible to examine the degree to which the conclusions drawn from the various studies examined can be generalized and extended to the population we are concerned with here. A majority of studies for example conclude that attitudes towards hearing impaired persons are generally favorable. On the other hand, it is known that hearing impaired respondents give more negative answers on attitude questionnaires than normal hearing people (Furnham & Lane, 1984, Schroedel & Schiff, 1972). When the knowledge of various dimensions of hearing problems is considered (Bunting, 1981, Horowitz & Rees, 1962, Lass & al., 1986) results show that respondents display ignorance on some of these dimensions or have misconceptions concerning the effectiveness of hearing aids, appropriate behaviors that should be adopted when interacting with hearing impaired persons, or services available to the hearing impaired. Finally, in some of the studies, socio-demographic characteristics such as age, gender, education, and the experience of contact with hearing impaired persons has been shown to influence respondents' answers to attitude questionnaires (Afrooz, 1978, Bunting, 1981, Furnham & Lane, 1984, Horowitz et al., 1965). However, considering the populations sampled in the above mentioned studies, one cannot assume that these results may be generalized to a population of workers who are themselves liable to become victims of hearing impairment.

Results of the Critical Review of Research

Our efforts enabled us to find 19 studies devoted, in whole or in part, to the question of attitudes, opinions, or knowledge

regarding individuals with hearing disorders. Of these 19 articles, published over a span of 30 years (1956-1986), 13 were retained for more thorough analysis. Of the six articles that were not retained, two were essentially editorials on popular beliefs about the hearing impaired or about deafness (Greenmum, 1958; Holm, 1978). In addition, we had to disregard four studies dealing directly with the subject under study because two of them used a qualitative approach that called for content analysis (Horowitz & Rees, 1962; Woodward, 1978), while two others limited the measurement of attitudes to a classification of various types of impairment according to predefined criteria (Janicki, 1970; Murphy et al., 1960).

Table I presents the 13 studies that were retained and provides a brief summary of: (1) the country in which they were carried out; (2) the various subpopulations sampled; (3) the different types of hearing difficulties and/or populations investigated; (4) the measurement scales used; and (5) the reliability and validity tests carried out.

This table shows that the majority of these 13 studies, which cover a period of 19 years, were carried out in the United States. It also shows that our review of the literature found eight distinct measurement scales. Only the scale developed by the Cowen team, the Attitudes Towards Deafness scale (1967) was used on more than four occasions, while two others, the Attitudes Towards Disabled Person scale of Yunker et al. (1960) and the Disability Factor Scale of Siller et al. (1967), were each used in two studies. It should also be pointed out that since these last two scales originally were not designed specifically to measure the attitudes of respondents towards persons suffering from hearing impairment, the researchers who borrowed them had to adapt them to their research questions. Similarly, the Attitudes Towards Deafness scale had its origin in a scale that addressed the problem of blindness. In short, of the eight scales that we identified, only three were designed from the start with the explicit goal of evaluating respondents' attitudes towards the hearing impaired. Moreover, to our knowledge, none of these three scales was used in more than one project.

Psychometric Value of the Scales Reviewed

As mentioned above, five of the studies (Cowen et al., 1967; Darbyshire & Kraus, 1983; Emerton & Rothman, 1978; Galloway, 1973; and Schroedel & Schiff, 1972) used the Attitudes Towards Deafness scale (ATD) (Cowen et al., 1967). The original tool, which used a 4-point Likert-type rating scale (strongly agree to strongly disagree), consisted of 25 statements, 22 about deaf persons and three concerning, respectively, deafness, deaf children, and deaf adults. Attitudes of respondents towards hearing impaired persons are assessed

Table 1. Studies on the measurement of attitudes toward deaf people.

Author(s)	Country in which the study was carried out	Sampling	Population(s) addressed in the measurement scale	Measurement scale used	Testing of the psychometric quality of the measurement scale
Afroz, G.A. 1978	Iran	313 school teachers	Deaf Persons	Adaptation of the "Attitude-Behavior" scale developed by Jordon (1968)	Reliability testing
Bunting, C. 1981	England	537 adults drawn from the general public	Deaf people	Extensive survey questionnaire developed by the author	None reported
Cowen, E.L. et al. 1967	United States	160 university students	Most items pertain to deaf people	"Attitudes Towards Deafness" scale conceived by the authors and adapted from "Attitudes to blindness scale"	Testing of internal consistency, construct and predictive validity
Dampier, K. et al. 1985	United States	58 college students	Hearing-impaired elderly persons	Semantic-differential scale comprising 25 polar adjectives developed by the authors	None reported
Darbyshire, J.O. and Kraus, J. 1983	Canada	85 nurses and 95 adults drawn from the general public	Deaf people in general plus several statements pertaining to deaf children and deaf elderly people	Cowen's "Attitudes Towards Deafness" scale plus 33 new statements	None reported
Emerton, R.G. and Rothman, G. 1978	United States	62 college students on the first measurement and 30 on the second	Deaf people and deaf students	Cowen's "Attitudes Toward Deafness" scale with modification to 9 statements at the second measurement	None reported
Ferguson, L.T. 1970	United States	674 individuals drawn from the general public	The deaf	"Disability Factor-Scales" developed by Siller et al. (1967) plus 48 new items	Testing of internal consistency of each subscale and of the construct validity of the instrument
Furnham, A. and Lane, S. 1984	England	54 adults, 24 of which are deaf	Deaf persons	Adaptation of the "Attitudes Towards Disabled Person" scale developed by Yuker et al. (1960) plus 11 new items	Testing of the construct validity of the scale
Furnham, A. and Pendred, J. 1983	England	96 adults drawn from the general public: 50% are under- and post graduate students	Totally deaf person	Adaptation of the "Attitudes Towards Disable Person" scale developed by Yuker et al. 1960	Testing of the construct validity of the scale
Galloway, V.H. 1973	United States	467 rehabilitation counsellors	Deaf Persons	Cowen's "Attitudes Toward Deafness" scale	None reported
Horowitz, L.S., et al. 1965	United States	5 groups of 20 individuals each: Sixth grade students; High school students; College students; Graduate students; PTA members	Deaf persons	Measurement instrument developed by the authors consisting of 97 statements distributed in 4 categories: (1) treatment of the deaf; (2) training of the deaf; (3) personal characteristics of the deaf; (4) achievement characteristics of the deaf	None reported
Lass, N.J. et al. 1986	United States	140 special educators	People who must wear hearing aids	Measurement instrument developed by the authors consists of 20 questions measuring knowledge and opinions toward hearing aids and hearing aids wearers	None reported
Schroedel, J.G. and Schiff, W. 1972	United States	281 university students more than 50% of which have a hearing problem	Deaf people	Cowen's "Attitudes Towards Deafness" scale and an adaptation of Siller's "Disability Factor Scales"	None reported

by means of statements such as, "It is impossible to get 'close' to a deaf person," "On the whole deaf children seem to be less intelligent than hearing children," "The deaf adult is not quite as mature or 'grown up' as the hearing adult."

Within the range of tools used to measure people's attitudes towards deaf persons, the Attitudes Towards Deafness (ATD) scale certainly is one whose designers were the most concerned with its psychometric value. Actually, it is the main reason why this scale was used in various subsequent studies. In fact, during its development, Cowen and his team used total item score correlation analyses to check the reliability of the scale. In addition, they studied its construct validity by examining its degree of relationship with other measures of attitude and personality that were postulated as being related to it. Finally, in examining to what degree a high or low score on their scale made it possible to predict the responses of the subjects in a particular situation, Cowen et al. (1967) also dealt with the predictive validity of the ATD. Although the results obtained tend to support the psychometric quality of this scale, we must express certain reservations. For example, in regard to its reliability, we should mention that the authors retained certain statements that had only a weak relationship with the total score ($r < 0.17$), and this lessened the internal consistency of the scale. Moreover, the authors did not attempt to determine the ATD's degree of stability over time. As for the scale's construct validity, it would have been interesting had the authors used factor analysis to check its unidimensionality and thereby justify the computation of a single score. In the authors' own opinion, before postulating that a tool has a high predictive validity, it would be necessary to test it in a variety of situations that differ from the one used in their study. At present, this has not been done.

Darbyshire and Kraus (1983) used the ATD scale to assess the attitudes of a group of nurses as compared to adults selected from the general population. The authors do not describe their testing procedure, but they indicate that 33 new statements dealing more specifically with children and the elderly were added. Thus, items such as, "Children with hearing impairment are a joy to be with" and "For an old person, there's nothing worse than deafness," have been added to the 25 original statements to become a 58 item scale. Emerton and Rothman (1978) using the ATD scale, tested twice, in a six month interval, a group of hearing students from a hearing and deaf college. In the first instance, the original questionnaire was mailed to the respondents. On the second occasion, it served as a structured interview comprised of nine new items which "reflected campus stereotypes of deaf students" (p.589). Given the above mentioned changes, it would have been advisable to make sure that the psychometric quality of the original scale had not been diminished.

The study carried out by Schroedel and Schiff (1972) used the ATD scale to assess the attitudes of three groups of respondents, namely, hearing impaired and hearing college students and professionals. The original statements were administered as such, but the authors mention adding a "no opinion" category as a midpoint to the Likert-type scale, which was self administered. It would have been preferable if its authors had carried out new reliability and validity tests since the sample used by the Cowen team for validation of their scale was made up only of persons with normal hearing. In Galloways' study (1973), the ATD scale was mailed to four different populations of rehabilitation counselors. The only change from the original version was to substitute the generic term "the deaf" for the term "deaf persons." Although Galloway (1973) was concerned in his study with the internal consistency of the tool he used, it would, in our opinion, have been preferable if he had paid more attention to its validity. Since his sample was made up of rehabilitation counselors (some of which were hearing impaired and others had considerable exposure to hearing impaired persons) we may postulate that they had very different backgrounds from those that would be found in the population studied by Cowen and his team.

Both studies conducted by Furnham (Furnham & Lane, 1984; Furnham & Pendred, 1983) used the Attitudes Towards Disabled Person (ATDP) scale (version 0) developed by Yaker et al. (1960). These investigators choose the ATDP scale for its appraised metric values, namely, that "it has been demonstrated to be a reliable and valid instrument for measuring attitudes towards the handicapped" (Furnham & Pendred, 1983, p.181). The ATDP scale is a 7-point Likert-type scale (totally disagree to totally agree) comprised of 20 items divided in two sections of an equal number of statements. In the version used by Furnham and Pendred (1983), the term "disabled person/people" was removed from each item and replaced by the term "totally deaf person." In the version used by Furnham and Lane (1984), it was replaced by the term "deaf person." In the first section of the questionnaire, bearing on the characteristics of deaf persons, statements like this can be found: "Totally deaf people are often cross," "Totally deaf people are just as sensible as other people." The second section probes into how deaf people should be treated by means of statements such as, "Totally deaf people are the same as anyone else" and "It is up to the government to take care of totally deaf persons." In Furnham's first investigation, the ATDP was administered to 96 adults drawn from the general public, 50% of which were under- and post- graduate students. The second study (Furnham & Lane, 1984) was conducted with 54 adults, 24 of which were deaf.

The psychometric value of the ATDP scale was exhaustively documented in a monograph published in 1970 (Yaker, Block, & Young, 1970) and confirmed by other researchers (see Furnham & Pendred, 1983). Nevertheless, analysis car-

ried out by Antonak (1980) tends to show that some statements would have been better left out of the scale because they do not distinguish between individuals obtaining high and low scores. Moreover, it seems that doubt was raised about the construct validity of the scale because a factor analysis carried out by Antonak shows that the scale is not unidimensional, as suggested by Yuker et al. (1970). This would be an argument against developing a global score by summing up of individual scores on the 20 statements comprising the scale. Furnham's research, moreover, would tend to confirm this last finding since his first study (Furnham & Pendred, 1983) highlights four factors, while the second (Furnham & Lane, 1984) identifies five. In addition, the scale designed by Yuker's team was for "disabled persons" and did not specify the nature of the problem, while those used by Furnham dealt with, among others, hearing impaired individuals. Given this change, it cannot be assumed that the results obtained by Yuker et al. concerning the reliability and validity of their scale may be generalized to those used by Furnham. This is of greater concern in their 1984 study in which Furnham and Lane added, to the original scale, 11 statements dealing specifically with the deaf.

Two studies (Ferguson, 1970; Schroedel & Schiff, 1972) used a scale developed by Siller et al. (see Ferguson, 1970), the Disability Factor Scale (DF), that was originally made up of 98 statements unequally distributed in seven subscales: (1) inferred emotional consequences, (2) authoritarian virtuousness, (3) imputed functional limitations, (4) distressed identification, (5) rejection of intimacy, (6) interaction strain, and (7) generalized rejections. Since this tool initially had been used to measure respondents' attitudes towards amputees, the blind, or the cosmetically impaired, Ferguson attempted to verify to what degree the scale was reliable and valid when used in a study on the hearing impaired. More specifically, Ferguson's study "was designed to establish the factorial structure of attitudes towards the deaf and place the findings within the context of prior results bearing on a variety of other disabilities" (p.693). To achieve this, Ferguson administered the DF scale to 285 male and 389 female subjects in the New York City area. Although the questionnaire is not reproduced in the paper, Ferguson mentions having significantly modified the original scale by adding 48 new statements dealing exclusively with deafness. Although her study made it possible to confirm the construct validity of the tool and to verify the internal consistency of each of the subscales, over 25% of the statements retained demonstrated strong loading on more than one factor, and, in the opinion of the author herself, two of the obtained factors proved difficult to interpret. Finally, we should stress that although at the end of her article Ferguson mentions that she was in the process of testing a revised version of her scale in order to proceed with a final selection of statements, we have not been able to find such an improved version of the scale.

Schroedel and Schiff (1972) report that they used an abridged version of the DF scale ($n = 65$ statements) developed by Ferguson "to meet criteria of brevity, objective scoring, and reliability" (p.61). Altogether, 93 deaf undergraduates and 54 hearing undergraduates were asked to complete the DF scale. The 93 deaf undergraduates were asked to mark each scale item as they truly believed and also as they felt a hearing person would. Their article does not, however, provide any information about the statements making up this abridged version of the DF scale and does not report any data that might enlighten us as to its psychometric value.

In five of the studies that we examined, researchers used an instrument that was employed on only one occasion. These are the studies carried out by Afrooz (1978), Bunting (1981), Dampier et al. (1985), Lass et al. (1986), and Horowitz et al. (1965). Afrooz (1978) borrowed Jordan's (1968) Attitude - Behavior Scale to question 313 Iranian school teachers. The scale in question is made up of 20 statements, and the answers are given on a 4-point Likert-type scale. At the "stereotypical level" respondents were asked to indicate how other people compare deaf persons to those who are not deaf, while at the "hypothetical level" they indicated how they personally compare deaf persons to those who are not deaf. The self administered questionnaire, which was mailed to the participants, contains statements such as: "Deaf persons have less energy and vitality than others," "Deaf persons should not have children," and "Deaf persons can usually benefit from hearing aid." As for Bunting (1981), she designed an extensive interview questionnaire. The questions fall into several groups ranging from knowledge of the nature of deafness and the aids to help or overcome it to perception of social and functional difficulties including work, parenthood, and contact with others. It includes a scale on attitude to contact and communication with deaf people comprising 12 statements answered on a 5-point Likert-type scale and also a profile of deaf people scale which is a 7-point semantic differential scale involving 10 polar adjectives. In the attitude scale on contact and communication, one can find statements such as, "I find it embarrassing to talk to deaf people in public," and "I feel inadequate in dealing with deaf people." The semantic differential scale relies on adjectives such as, "withdrawn-sociable," and "noisy-quiet." A total of 537 adults drawn from the general public were interviewed with this questionnaire.

Dampier et al. (1985) also made use of a semantic differential scale made up of 25 polar adjectives to assess the "perceptions/feelings" of two groups of students towards older persons with hearing loss. For each adjective pair such as, "pleasant-unpleasant" or "optimistic-pessimistic," students were asked to assign a rating from +3 to -3, 0 representing neutrality. The aim of the study was to test whether an audiotape designed to enhance empathy, significantly influences students' perceptions. The

group of students was asked twice to answer the questionnaire individually in the presence of the investigator. As for Lass et al. (1986), the main interest of their study was "hearing aids and hearing aid wearers" (p.89). In the absence of any instrument specifically designed for this kind of issue, the authors developed a 20 item questionnaire that was administered to 140 special educators. Most of the items were designed to assess respondents' knowledge of various aspects of hearing aids or their attitudes towards hearing aids and hearing aid wearers. Attitudes such as, "Hearing aids are a worthwhile expense" or "People look older when they wear hearing aids," were assessed with a 6-point Likert-type scale. As for respondents' knowledge, it was evaluated using true-false questions.

Finally, Horowitz et al. (1965) designed a questionnaire comprising 97 statements "that reflected common attitudes and ideas within four major categories: (1) treatment of the deaf, (2) training of the deaf, (3) personal characteristics of the deaf, and (4) achievement characteristics of the deaf." The questionnaire was not reproduced in the paper. However, the authors state that respondents were instructed to indicate their reactions to each item by placing a checkmark anywhere along a 90 millimeter line. This questionnaire was administered to 100 respondents equally divided into five groups, namely: sixth grade students, high-school students, college students, graduate students, and members of a PTA group.

With the exception of the measurement instrument borrowed by Afrooz, Jordan's Attitude-Behavior Scales, the four other studies mentioned above made use of original tools. Unfortunately, among these five studies, only Afrooz reports results concerning the psychometric value of the scale used. It can be said that with the exception of the studies conducted by Cowen et al. (1967) and Ferguson (1970), and to a lesser degree, those of Afrooz (1978) and Furnham (Furnham & Lane, 1984; Furnham & Pendred, 1983), the majority of researchers who have dealt with measurement of attitudes towards the hearing impaired have not been particularly concerned with the psychometric value of their evaluation scale. This does not imply that we should reject out of hand most of the past results obtained in this field. In fact, many of the studies that we examined, such as Bunting's (1981), were conducted very rigorously and have made it possible to gather data that constitutes an important contribution to the field. However, if these same researchers had been more careful to ensure the psychometric quality of their measurement scale, the credibility of their results would be much greater, and other researchers would be able to confirm them.

Populations Addressed in Measurement Tools

In most of the studies we examined, the authors did not attempt to provide respondents with an explicit definition of the phenomenon under investigation, but rather treated hearing impairment in the broadest sense of the word. Moreover, there are few studies in which the subjects were given information on the type or seriousness of the problem being examined or even on the population addressed by the survey. Although this approach may be justified, it makes it difficult to interpret the data gathered, since the researcher cannot assert that all the respondents were referring to essentially the same type of hearing problem or even the same subpopulation when they completed the measurement scale. The findings of Bunting (1981) are very revealing in this respect, tending to show that people's answers to certain questions vary according to the seriousness of the hearing impairment presented to them.

A few studies are exceptions to this rule. Darbyshire and Kraus (1983) used Cowen's scale (1967) but added thirty-three statements, the majority of which concerned deaf children and deaf elderly people. The study conducted by Dampier et al. (1985) focused strictly on the elderly, while Lass et al. (1986) concentrated on individuals who had to wear a hearing aid. In Furnham and Pendred (1983), respondents were told that they should answer in terms of people with total hearing loss.

It should be mentioned that Bunting (1981) conducted a feasibility study that suggested that a sample of individuals drawn from the general public may not be able to make a distinction between partial and complete deafness or between people who are born deaf and those who become deaf after they have learned to speak. While this may be true, the presumption cannot be made that people would answer in the same way regarding hearing impaired children, adolescents, and elderly persons. Moreover, when people dealing almost daily with hearing impaired individuals are surveyed, they can be expected to distinguish between various categories of hearing impairments. Be that as it may, very little information is currently available on people's attitudes towards various types of hearing impairments or even towards specific subgroups such as workers, children, or adolescents. Any researcher interested in documenting any of these aspects would have to develop a new measurement scale or adapt one presently available to his or her research question. Either way, the researcher would have to demonstrate the psychometric value of the scale used.

Populations Sampled

Table I clearly indicates that the results of the few reliability and validity tests conducted and the findings of the studies reviewed really cannot be generalized to a population of industrial workers exposed to noise. Of the five studies that endeavoured to verify the degree of reliability and/or validity of the measurement scale used, two relied on a sample consisting primarily or exclusively of university students (Cowen et al., 1967; Furnham & Pendred, 1983), one concentrated on schoolteachers (Afrooz, 1978), and another (Furnham & Lane, 1984) relied on a very limited population of 54 subjects, only 30 of whom were adults without hearing problems. Thus, only the results of Ferguson's study (1970), based on answers from a sufficiently large and diversified sample, may be reasonably thought to apply to a population of workers.

Many of the observations and conclusions that can be drawn from the reviewed studies apply strictly to highly educated subpopulations. In fact, of the thirteen studies we examined, six were exclusively or partially conducted on college or university students (Cowen et al., 1967; Dampier et al., 1985; Emerton & Rothman, 1978; Furnham & Pendred, 1983; Horowitz et al., 1965; Schroedel & Schiff 1972), and another four strictly on professionals such as special educators (Galloway, 1973; Lass et al., 1986), teachers (Afrooz, 1978), and nurses (Darbyshire & Kraus, 1983). Moreover, it would seem that only two (Bunting, 1981; Ferguson, 1970) of the five studies, which use a diversified sample of adults from the general population, included enough subjects to allow the results to be generalized, with a certain degree of confidence, to the entire population from which they were drawn.

It should be emphasized that Furnham and Lane (1984) and Schroedel and Schiff (1972) were the only ones who deliberately included individuals with a hearing impairment in their sample. These two studies reveal significant differences in attitudes towards deafness between those with unimpaired hearing and those with impaired hearing. As a result, it can be concluded that these two groups need to be treated separately when the data are analyzed.

While it is known that a hearing impairment most likely will have an impact on a subject's attitude towards deafness, the impact of different variables such as sex, age, education, and familiarity with the phenomenon under study have not yet been very well documented and are somewhat mitigated. Of the five studies that examined the effect of the respondent's sex, two (Afrooz, 1978; Bunting, 1981) found differences in the responses of men and women, whereas the other three (Furnham & Lane, 1984; Furnham & Pendred, 1983; Schroedel & Schiff, 1972) observed no differences. Contact with hearing impaired people seems to have a noticeable influence in four of the studies reviewed (Afrooz, 1978;

Bunting, 1981; Furnham & Lane, 1984; Furnham & Pendred, 1983), but not in the other two (Emerton & Rothman, 1978; Galloway, 1973). Moreover, in the research conducted by Afrooz (1978), Bunting (1981), and Horowitz et al. (1965), the responses of subjects vary according to age; this does not seem to be the case in the studies carried out by Schroedel and Schiff (1972). Finally, two studies (Afrooz, 1978; Bunting, 1981) found that the level of education had an effect on subject's attitudes, whereas the surveys conducted by Galloway (1973) and Schroedel and Schiff (1972) did not find this.

Thus, from the studies conducted to date, it is impossible to draw any clear conclusion as to effects of different variables on the attitude scores of respondents. This can be explained, in part, by the fact that the dependent variable studied differs appreciably from one study to the next, so that none of the results obtained could really be confirmed by a subsequent study. For example, while Schroedel and Schiff (1972) examined the extent to which the overall attitude score, as measured by the Attitudes Towards Deafness scale, varied according to respondents' sex, Bunting studied, among other things, the impact of this variable on knowledge of available services for the hearing impaired. Moreover, except for the sex variable, there is a lack of uniformity in the actual measurement of independent variables such as frequency of contact, education, and age of respondents. This makes it difficult to generalize the results to populations other than those directly involved in the studies. In the investigation conducted by Afrooz (1978), measurement of contact is limited to one question that evaluates the number of times the respondent was required to interact with a hearing impaired person during his or her career, whereas in the study conducted by Emerton and Rothman (1978), this variable was controlled by sampling only students who had been living for six months in a university residence primarily occupied by hearing impaired people. Thus, in the absence of clearer data, it would be preferable for any new study undertaken in the field to attempt to verify, or at least control, the potential effect of certain characteristics such as age, sex, education, and familiarity with the subject under study on respondents' answers.

Summary and Conclusions

The results of this review of studies that measure attitudes towards the hearing impaired are generally quite encouraging. The research suggests that, regardless of the subpopulation of hearing subjects sampled, respondents tend to have positive attitudes towards people with hearing impairment. However, despite the fact that these studies have contributed substantially to our knowledge of people's reaction to the hearing impaired and have pointed out different variables likely to influence this reaction, a careful analysis of these

studies revealed: (1) lack of data on the psychometric quality of the scales used; (2) lack of a clear, explicit definition of the phenomenon being investigated; (3) lack of data on some specific hearing problems and/or on particular subgroups; (4) use of samples of subjects who are often highly educated; and (5) a lack of standardization in the measurement of individual intrinsic and extrinsic characteristics likely to influence attitude scores. As previously mentioned, these shortcomings do not mean that the studies conducted to date are of no value or that the scales developed are of little use. Rather, they suggest that the limitations of the research conducted in the field need to be examined and solutions that can produce the necessary changes need to be found.

The scales that researchers plan to use need to be pre-tested so that their psychometric quality can be assessed and any necessary adjustments can be made before they are used in surveys. Furthermore, future research should take advantage of the efforts made to date and develop scales which adequately reflect the phenomenon under study by borrowing from existing instruments. Some scales deserve special attention because they focus on original themes (Afrooz, 1978; Bunting, 1981), address several subpopulations (Darbyshire & Kraus, 1983), or deal with different dimensions of the issue (Furnham & Lane, 1984; Ferguson, 1970). Of the existing instruments, the most thorough and sophisticated is definitely that developed by Bunting (1981). Bunting's questionnaire goes far beyond measuring attitudes towards the hearing impaired and explores a variety of themes such as respondents' familiarity with the population concerned with in the study, their reaction when required to interact with hearing impaired people, their knowledge of hearing aids, their opinions on the education of deaf children, and so forth.

When developing a measurement tool, it would also be advisable to avoid using statements which convey a strongly unfavourable bias against the hearing impaired. When respondents are confronted with a statement like, "deaf people should not have children" (Afrooz 1978), it can be expected that they will tend to give the researcher a socially desirable answer, so the majority will strongly disagree, whether or not they actually do. As a general rule, such statements do not make it possible to distinguish between individuals who have a positive attitude towards the hearing impaired and those whose attitude is negative. As a result, they are of little use.

Most of the scales developed and used in this field to date have dwelled almost exclusively on the emotional aspect of attitudes and have neglected the behavioural and cognitive aspects. However, when the knowledge of respondents is examined, certain deficiencies can sometimes be observed that could cause significant prejudice to the hearing impaired (Darbyshire & Kraus, 1983; Furnham & Lane, 1984; Horowitz & Rees, 1962). This lack of knowledge could be re-

flected in the behaviour of these individuals when they interact with the hearing impaired or react to the latter's presence.

On the basis of the model proposed by Triandis (see Rosenbaum et al., 1986), we strongly suggest that a multidimensional approach be used to measure attitudes towards the hearing impaired. Any measurement scale used ideally should include a number of statements evaluating respondents' knowledge and behaviour that is more or less equivalent to the number of items used to evaluate their opinions, in terms of emotional response, about the hearing impaired. According to Béland (1987), these three components, which go together and follow along the same lines, are an integral part of attitude and should all be measured. Adopting this more comprehensive and "holistic" model should make it possible to identify any aspects of respondents' attitudes that could cause prejudice to hearing impaired individuals.

It would also be useful for such a tool to provide an operational definition of the phenomenon being addressed or at least an unambiguous description of the population to which respondents should refer when completing the scale. By focusing on a single problem, such as occupational hearing impairment, or on a particular subpopulation, such as industrial workers, some of the ambiguities that make interpretation of results different can be clarified. If a researcher wishes his or her survey findings to be valid for a significant portion of the hearing impaired population (i.e., children, adults, the elderly), it would be preferable to design a group of statements appropriate for each subpopulation concerned and to treat them separately when analyzing the data.

We are currently developing a measurement scale that will enable us to evaluate the attitudes of industrial workers towards their coworkers suffering from occupational hearing impairment. This tool, which for the moment is made up of 45 statements distributed equally over three subscales, should make it possible to measure respondents' behaviour, opinions, and knowledge with regard to the subject under study. The statements found in each of the scales are from three main sources: (1) existing instruments; (2) information provided by workers suffering from occupational hearing impairment and their spouses during surveys (Héту et al., 1987), interviews (Héту et al., 1988; Héту et al., forthcoming), and rehabilitation sessions (Héту & Getty, 1988); and (3) the actual experience of the research team members with occupational hearing impairment and the problems it creates in the work environment.

In addition to providing sociodemographic information, the questionnaire examines any hearing problems the respondents themselves may have, as well as the frequency and nature of their contact with hearing impaired workers. We are about to submit this attitude scale to 300 factory workers.

This pretest will be helpful in validating the three subscales developed and in verifying their degree of internal consistency. The pretest will enable us to select the statements that will comprise the final version of the questionnaire, which is to be used in a survey of a larger sample of industrial workers. These data then will serve as a guide in the preparation of an information campaign on the main consequences of hearing loss due to noise.

Acknowledgement:

This work was financially supported by the Institut de recherche en santé et sécurité du Travail du Québec.

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