CHAPTER TWELVE

The Challenge of Non-Audiological Variables

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Introduction

The focus of the panel titled "Are Current Audiologic Approaches for Older People Meeting Their Needs?" was to determine some of the unique challenges in meeting the needs of older adults with hearing loss. One of the ways to address this question is to go beyond the typical audiologic considerations, such as audiometric findings, speech-in-noise recognition, and electroacoustic parameters, and instead, focus on the question of whether audiologic evaluation and treatment outcomes for older adults are affected by non-audiological variables. Non-audiological variables that may impact outcomes include age; psychological variables, such as motivation, personality, and self-efficacy for audiologic rehabilitation; gender; and other sociological variables such as education, lifestyle, social support, and race/ethnicity. These variables may account in part for the tremendous variability in treatment outcomes that result from the provision of hearing aids and other forms of audiological rehabilitation to adults.

The focus in this paper will be on several of these non-audiological variables, including (1) psychosocial considerations, namely personality, life experiences, and age; (2) vision impairments and their impact on the older adult with hearing loss; and (3) the patient's awareness of hearing loss and readiness for treatment, such as hearing aids, other assistive devices, and auditory training. Practical suggestions will be offered for managing these variables in the practice of audiology.

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Psychosocial and Sociological Considerations

Just over ten years ago, Gatehouse (1994) provided research evidence of the powerful impact that psychological variables may have on adjustment to hearing loss, as well as hearing aid benefit, use, and satisfaction. Using a regression model analysis, Gatehouse found that none of the audiological variables that he included in his study actually entered into the equation for social and psychological effects of hearing disability, whereas over 20% of the variance was explained by age and aspects of personality, particularly anxiety, and to a lesser extent depression. Gatehouse found that four psychological variables accounted for over 30% of the variation of hearing aid satisfaction ratings: hysteria, depression, sickness, and anxiety. Perceived help from hearing aids was also strongly influenced by certain aspects of personality. Thus, it appeared from Gatehouse's analyses that psychological and social variables may be more closely linked to hearing aid success than audiological and electro-acoustic parameters.

Since Gatehouse's groundbreaking research study, there have been a number of other research efforts regarding psychosocial and sociological effects on treatment outcomes (Kricos, 2000; Kricos, 2006a). For example, the following personality traits have been linked to successful hearing aid use: external locus of control (Cox, Alexander, & Gray, 1999; Cox, Alexander, & Gray, 2005; Garstecki & Erler, 1998); anxiety/neuroticism (Gatehouse, 1994; Saunders & Cienkowski, 1996; Cox, Alexander, & Gray, 2007); introversion/extroversion (Cox et al., 1999; Saunders & Cienkowski, 1996); self-esteem (Saunders & Cienkowski, 1996); and lethargy/depression (Garstecki & Erler, 1998), and other personality traits, such as openness and conscientiousness (Cox, et al., 2007).

In this paper, the focus will be on three psychosocial and sociological variables: optimism, life events, and age. All three of these variables were addressed in a large-scale study called the Long Term Follow-Up of Patients in the National Institute of Deafness and Other Communication Disorders/Veterans Affairs (NIDCD/VA) Hearing Aid 418-A Clinical Trial (Kricos, Erdman, Bratt, & Williams, 2007). The NIDCD/VA Hearing Aid 418-A clinical trial was designed to follow up on the earlier clinical trial known as NIDCD/VA Hearing Aid 418 Clinical Trial. This earlier clinical trial was conducted between 1996 and 1998 to determine the efficacy of various hearing aid circuits. The general goal of the NIDCD/VA Long Term Follow-Up was to determine hearing aid usage, benefit, and satisfaction in the original 418 cohorts. This study also afforded the possibility to compare a number of potential psychosocial influences on outcomes for individuals, as well as to compare some of the psychosocial and sociological variables that might affect whether a research participant continued use of hearing aids or stopped using them.

Optimism

Several studies have shown that dispositional optimism plays a role in influencing whether a person persists in goal-directed behavior (Strack, Carvery, & Blany, 1987). Iwanaga, Yokoyama, and Seiwa (2004) used the Life Orientation Test (LOT; Scheier & Carver, 1985), a measure of dispositional optimism, to show that optimists generally tend to deal with stressful events by using active coping strategies and problem-focused coping strategies, whereas pessimists tend to adopt denial and avoidance coping strategies. Thus, Kricos et al. (2007) were interested in whether a measure of dispositional optimism, namely the LOT, might predict whether a person is more likely to continue use of their hearing aids after the initial fitting, and whether optimism is correlated with adjustment to hearing loss. The Communication Profile for the Hearing Impaired (CPHI; Erdman and Demorest, 1994) was used to determine adjustment to hearing loss. It was determined that there were no significant differences between users and non-users in level of optimism. However, none of the CPHI scales yielded significant correlations for the nonusers, whereas for the hearing aid users, there were a number of significant, although weak correlations between the LOT results and the following CPHI scales: Self-Acceptance; Acceptance of Loss; Anger; Discouragement; Stress; Withdrawal; and Denial. These findings are similar to those of Scott, Lindberg, Melin, and Lyttkens (1994), who found a significant correlation between the LOT and coping skills, tension, and security for a group of adult hearing aid users. Based on these results, Kricos et al. (2007) concluded that, whereas hearing aid use in their sample was not related to degree of optimism, the hearing aid users' adjustment to hearing loss in areas such as self-acceptance and psychosocial reactions (e.g., discouragement, withdrawal, stress) was weakly correlated to dispositional optimism.

Life Events

Older adults are often confronted with a multitude of challenging life events such as loss of spouse and friends, health issues, and increasing dependence on others to enable activities of daily living and to facilitate social participation. Kricos et al. (2007) created an inventory of common life events experienced by older adults, such as retirement, health issues, etc., with a space for respondents to list other events they felt impacted use or disuse of their hearing aids. The authors did not find a significant difference between nonusers and users in the number of life events reported by their research participants. However, the nonusers reported a significantly greater number of events that impacted their use of hearing aids. These findings are in agreement with a study by Sherbourne, Hays, Orday, DiMatteo, & Kravitz (1992), in which a relationship was shown between adherence to treatment regimen and life events for a number of chronic medical diseases. Kricos et al. (2007) found that life event categories (e.g., retirement or loss of employment, increased dependence on others, death of spouse or partner, damaged hearing aids) had the most negative impact on hearing aid use, rather than health-related issues.

Approximately half of the research participants indicated an "Other Experience" as increasing their hearing aid use, while a similar proportion of respondents indicated an "Other Experience" as decreasing their hearing aid use. Experiences cited as increasing hearing aid use were comments related to the ability to understand grandchildren and wanting to understand people better. Not surprisingly, then, motivation to hear better is likely a major factor in hearing aid use. On the other hand, nonusers were more likely to report negative life events, particularly hearing aid damage: These findings highlight the importance, prefitting, of determining the patient's desire to hear better and the importance, post-fitting, of providing audiolog-

ical follow-up care, even for individuals who have worn hearing aids for a number of years.

Age

The CPHI scores of participants in the NIDCD/VA Hearing Aid 418-A Clinical Trial (Kricos, et al., 2007) were analyzed to determine age effects on adjustment to hearing loss and hearing aid use. Similar to other studies (Garstecki and Erler, 1998; Erdman and Demorest, 1998), the mean CPHI scores of adults ages 80 years or more revealed that they placed significantly less importance on social communication and perceived fewer communication demands than the mean CPHI scores of adults less than 80 years of age. Although many older adults in their 80's and beyond continue to value communication and participate in social activities, significantly fewer are likely to value communication and to perceive as many communication demands compared to adults less than 80 years of age. Thus, it is important for audiologists to consider the lifestyle and communication needs of older adults. Tye-Murray (2009) offers a number of suggestions for determining these needs, using structured and/or unstructured interviews. The audiologist may query the patient regarding the kinds of communication difficulties he is encountering at home, work, and/or social encounters; what other people may have commented to him regarding his hearing difficulties; what difficulties he may have with understanding voices on the telephone, hearing warning signals such as door bells and emergency vehicles, etc. (Tye-Murray, 2009). An open-ended inquiry such as "Can you briefly describe activities you are involved in on your typical day?", "Do you perceive your hearing loss as influencing participation in these daily activities?", "Has your hearing loss caused you to stop participating in any activities you were engaged in before the onset of your hearing loss ?"can be helpful.

Vision Problems in Older Adults

Older adults face a number of unique challenges, including changes in residence, lifestyle, and independence, as well as chronic and acute health issues, physical changes such as manual dexterity problems, financial changes, changes in mobility, cognitive changes (Kricos, 2006a), and sensory changes, including changes in the senses of taste, hearing, and vision (Kricos, 1995; 2006b; 2007; 2009). Because people with hearing loss often compensate for their hearing difficulties by using their visual sense to lipread and to pick up facial cues, consideration of changes in the older adult's vision is critically important. Older adults with dual sensory losses often experience seclusion, anxiety, and distress. Normal changes in the aging eye, such as presbyopia (reduced ability to focus on objects that are close, which is caused by loss of elasticity of the crystalline lens after age 45) can usually be overcome through the use of eyeglasses, magnifiers, and closed-circuit television systems. Abnormal changes in the aging eye, however, can be debilitating and can severely affect the individual's activities of daily living and negatively impact their quality of life and independence (Kricos, 2007). Examples of abnormal changes in aging include cataracts, age-related macular degeneration, diabetic retinopathy, and glaucoma (for more detail about the nature and effects of these eye disorders, see Brabyn, Schneck, Haegerstrom-Portnoy, & Lott, 2007).

Because of the significant role that vision can play in helping older adults cope with hearing difficulties, it is important for the audiologist to consider the patient's vision when determining candidacy for hearing aids. Some simple tools include near and far vision acuity charts, vision screening instruments such as the Titmus Vision Screening (http://www.titmus.com/iseries/index.html), as well as questionnaires. The Eye-Q is a short pencil-and-paper self-assessment tool for screening vision that was created by Lighthouse International (http://www.lighthouse.org/accessibility/q/).

Erber (2003) urges audiologists to consider the importance of vision to older adults with hearing loss. Because many older adults can, to some degree, avail themselves of visual cues during their everyday communication interactions, Erber suggests that audiologists include auditory-visual presentation of materials, such as word and sentence lists, to obtain a more accurate representation of how well the patient understands speech in typical face-to-face conversations.

There are a number of considerations when providing hearing assistive technology (HAT) to older adults with dual sensory loss (Kricos, 2007). The size and color contrast of hearing aids may present problems for the older adult with vision difficulties. Many older adults with vision and/or manual dexterity problems may benefit from hearing aids with automatic features for directionality, volume, and telecoils usage. Other means of insuring maximum success with hearing aid use include design of patient education materials (e.g., appropriate font, color contrast, and line spacing) that are appropriate for individuals with low vision; office set-up to protect the safety

of individuals with vision difficulties; fluorescent lighting to reduce glare; and use of magnification for clearer vision of hearing aids and written materials (Kricos, 2007).

Awareness of Hearing Loss by Older Adults

One of the most important factors affecting whether an individual will have successful outcomes with a hearing aid fitting is their awareness of their hearing loss and its effects on their communication abilities and quality of life. Audiologists often lament that older adults deny their hearing losses. And indeed, older adults often resist admitting that they have a hearing loss by saying "I can hear what I want to hear," or "Who me? I don't have a hearing loss. The problem is that people just don't speak clearly." Similarly, many older adults acknowledge that they have a hearing loss, but say things such as, "I know I have a hearing loss, but it's not causing me any problems." Thus, it is important for audiologists to assess not only the older adult's hearing abilities, but also to ascertain her awareness of the presence of a hearing loss, its effects on her and her family and friends, as well as her readiness for treatment (Babeu, Kricos, and Lesner, 2003). Interestingly, Smith and Kricos (2003) found that most of the older adults in their study are aware of hearing difficulties. In the Smith and Kricos study of 91 older adults, 56 participants responded "yes" to the question, "Do you think you have a hearing loss?" and 35 participants responded "no". Of the 56 participants who perceived hearing loss, 37 passed the hearing screening and 19 failed. Of the 35 participants who did not perceive hearing loss, 31 passed the hearing screening and four failed. Thus, only four of the 91 participants who had hearing loss did not admit to having hearing difficulties. However, although the majority of respondents with hearing loss acknowledged their hearing loss, the participants on average reported a relatively low level of hearing handicap as measured by the Hearing Handicap Inventory for the Elderly (Ventry & Weinstein, 1983). These results indicated that although older adults may acknowledge hearing loss, they do not necessarily acknowledge that the hearing loss is affecting them in any way. Perhaps this accounts in some way for the fact that many older adults return their hearing aids because they do not notice improvement. It may be difficult to perceive assistance from hearing aids if one does not acknowledge the effects of hearing loss.

It is important to consider what level of acknowledgement the patient appears to have and to plan treatment options based on the degree of this acknowledgement. Three levels of acknowledgement that may be held by older adults who come to the audiology clinic include:

1. *Complete Acknowledgement:* Self-report of the hearing problem and its impact on the person
2. *Partial Acknowledgement:* Self-report of hearing loss with patient disregard or unawareness of its impact
3. *Non-Acknowledgement:* No self-report of hearing loss and/or hearing problems when hearing loss is present

Treatment options for older adults who appear to be in the "Complete Acknowledgement" category might include the following: hearing aid fitting, counseling, referral to consumer organizations such as the Hearing Loss Association of America, group support programs, communication strategies training, speechreading, hearing assistive technology beyond hearing aids, and auditory training.

For partial acknowledgers, that is individuals who state that they know they have some degree of hearing loss but that it is not affecting them, the treatment options might include: counseling on how hearing loss may impact their physical and mental health, quality of life, and relationships with family and friends; information on the effects of hearing loss such as missing the punch line when listening to jokes, inappropriate responses, difficulty hearing in noise, and the perception that communication partners are mumbling.

Similarly, the non-acknowledger may benefit from education and counseling regarding the signs, symptoms, and effects of untreated hearing loss. It is important to provide information to partial and non-acknowledgers to increase their awareness of how their hearing losses may be affecting them. Although family members who are hoping their loved ones will obtain hearing aids may be disappointed, it may be more productive to delay the fitting of amplification temporarily until patients show more awareness of the effects of hearing loss. The audiologist might provide examples of situations for the patient to self-monitor over a period of several weeks or months, such as the following:

1. Do you have difficulty hearing in situations where other people appear not to be experiencing problems?
2. Do you have difficulty understanding conversations in a moving automobile?

3. Do people often appear to be speaking gibberish, yet others seem to understand what they are saying?

From results of their research, Jacobson, Newman, Sandridge, and McCaslin (2002) identified motivation as a key factor influencing hearing aid rejection. In terms of motivation to use hearing aids, patients with significant hearing loss must want the hearing aids, believe that they will help, and appreciate the potential benefits of amplification.

Summary

Along with consideration of audiological and electroacoustic parameters, the dispensing audiologist should give careful thought to non-audiological variables that may affect hearing loss adjustment and outcomes. This presentation has focused on a number of non-audiological variables that may influence hearing aid uptake and outcomes. These have included the patient's age, degree of optimism, occurrence of major life events, and readiness for hearing aids. The best outcomes for hearing aid use are likely to depend significantly on consideration of these non-audiological issues during the pre-fitting, fitting, and post-fitting stages of hearing aid fitting.

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