

# Auditory-Verbal Graduates: Outcome Survey of Clinical Efficacy

Donald M. Goldberg\*  
Carol Flexer†

## Abstract

This project is an update of an earlier study on American and Canadian graduates of auditory-verbal programs. Survey research was conducted to obtain information on a variety of topics. Overall, the current results again indicated that the majority of respondents were integrated into “regular” or “typical” learning and living environments. In view of the earlier identification of hearing loss and the early fitting of sensory aids and availability of cochlear implant technology, coupled with intervention that emphasizes auditory learning, it is suggested that today’s infants have the potential to become independent, participating, and contributing citizens in mainstream society.

**Key Words:** Auditory-verbal, aural (re)habilitation, clinical efficacy, clinical outcomes, deafness, hard of hearing, hearing impairment, hearing loss

Universal newborn hearing screening programs have ushered in a new era of possibilities for infants with hearing loss (Stredler-Brown and Arehart, 2000). In the United States, legislation mandating universal hearing screening prior to hospital discharge has passed in 33 states (JM Natus, personal communication, 2000). Prior to the institution of newborn hearing screening, the average age of identification in the United States was 15 to 30 months. In Colorado, a state with newborn hearing screening, the average age of identification is now between 2 and 3 months (Yoshinago-Itano and Sedey, 2000). The value of early identification is that infants can receive amplification technology and begin intervention by 6 months of age, as recommended by the National Institutes of Health consensus statement (NIDCD, 1993) and the Joint Committee on Infant Hearing (2000).

There are data to support the contention that infants who are enrolled in intervention programs before 6 months of age make significantly more gains in language and speech skills than

those infants who begin therapy later (Yoshinago-Itano et al, 1998; Calderon and Naidu, 2000).

Audiologists will likely be directing newborn hearing screening programs and certainly will be the professional specialty group that often first identifies the hearing loss. How families are advised about their infant’s hearing impairment, and how they are informed about the plethora of aural rehabilitative options, often heavily influences the parents’ decision about intervention (Goldberg and Flexer, 1993; Rousch and Matkin, 1994). Therefore, ethically, audiologists must provide information about all treatment options and must be knowledgeable about the effectiveness of the treatment strategies that they recommend.

Because a critical way of evaluating the efficacy of a program and a treatment strategy is to examine that program’s social validity (Test et al, 1987; Halpern, 1990), audiologists need to have outcome data from the programs to which families are referred. For example, if a family wants the child to become a student in a typical classroom and have speech, language, reading, and academic skills consistent with his or her normal-hearing peers, then the audiologist needs to have data to evaluate which intervention option(s) can lead to the desired outcome.

There are many intervention options, each one distinct in philosophy, methodology, programming, expectations, and assumptions (Gold-

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\*Department of Communication, The College of Wooster, Wooster, Ohio; †School of Speech-Language Pathology and Audiology, The University of Akron, Akron, Ohio

Reprint requests: Donald M. Goldberg, Department of Communication, The College of Wooster, Wishart Hall, University and Bever Streets, Wooster, OH 44691

**Table 1 Auditory-Verbal Principles**


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1.	Supporting and promoting programs for the early detection and identification of hearing impairment and the auditory management of infants, toddlers, and children so identified;
2.	Providing the earliest and most appropriate use of medical and amplification technology to achieve the maximum benefits available;
3.	Instructing primary care givers in ways to provide maximal acoustic stimulation within meaningful contexts and supporting the development of the most favorable auditory learning environments for the acquisition of spoken language;
4.	Seeking to integrate listening into the child's total personality in response to the environment;
5.	Supporting the view that communication is a social act and seeking to improve spoken communication interaction within the typical social dyad of infant/child with hearing impairment and primary care giver(s), including the use of the parents as primary models for spoken language development, and implementing one-to-one teaching;
6.	Seeking to establish the child's integrated auditory system for the self-monitoring of emerging speech;
7.	Using natural sequential patterns of auditory, perceptual, linguistic, and cognitive stimulation to encourage the emergence of listening, speech, and language abilities;
8.	Making ongoing evaluation and prognosis of the development of listening skills an integral part of the (re)habilitative process; and
9.	Supporting the concepts of mainstreaming and integration of children with hearing impairments into regular education classes with appropriate support services and to the fullest extent possible.

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Adapted from Pollack et al, 1997.

berg and Flexer, 1993). Owing to early intervention and the availability of new generations of hearing aids, FM systems, and cochlear implants, infants with even the most profound deafness can have impressive auditory opportunities. That is, with modern technology, we can access the auditory brain centers of infants with virtually any degree of hearing loss (Flexer, 1999).

In 1993, Goldberg and Flexer published a study that used a consumer survey to descriptively document the status of graduates from one type of aural rehabilitative program, auditory-verbal. Ninety-three percent of the survey respondents were considered audiometrically deaf, and the vast majority were mainstreamed and were using spoken language to function independently in postsecondary education and in the hearing world (Goldberg and Flexer, 1993).

The purpose of this ongoing study of clinical efficacy was to document, through an updated consumer survey, the status of graduates of auditory-verbal programs. Families deserve to know how "it all can turn out." And audiologists must have data that document the programs and antecedent conditions that lead to the desired outcomes expressed by families. As originally stated in the 1993 document, neither project was designed to determine if one particular philosophy, method, or outcome of aural habilitation was superior to any other, nor was this article developed as a treatise to compare all intervention methods. Rather, this investiga-

tion addressed only the societal validity of the auditory-verbal method. Can auditory-verbal practice, in fact, reach its stated goals, as reported by its recipients?

### **Auditory-Verbal Practice**

The focus in auditory-verbal intervention is auditory brain development through stimulation of auditory neural centers (Flexer, 1999). The ultimate goal of auditory-verbal practice is that children who are deaf or hard of hearing can grow up in "regular" or "typical" learning and living environments that enable them to become independent, speaking, participating, and contributing members of mainstream society (AVI, 1991).

As defined by a position paper published by Auditory-Verbal International, the auditory-verbal philosophy follows a logical and critical set of guiding principles (AVI, 1991). These principles outline the essential requirements needed to realize the expectation that young children who are deaf and hard of hearing can be educated to use even minimal amounts of amplified residual hearing. Use of amplified (or, currently, cochlear implant) residual hearing, in turn, permits children who are deaf or hard of hearing to learn to listen, to process verbal language, and to speak (Estabrooks, 1994; Pollack et al, 1997).

The auditory-verbal philosophy is a model of intervention that incorporates the nine guid-

ing principles delineated in Table 1 (adapted from Pollack et al, 1997). It is important to note that auditory-verbal therapy is not merely a "technique" to be delivered 2 hours per week but rather is a way of life to be practiced on a daily basis. Consequently, professionals require specialized training and certification to deliver auditory-verbal services (Caleffe-Schenck, 1992).

## METHOD

Owing to issues of confidentiality and to identify as many graduates of auditory-verbal programs as possible, a comprehensive attempt was made to contact *all* known auditory-verbal centers (e.g., the Beebe Center in Pennsylvania, the Auditory-Verbal Center of Atlanta, the Bolesta Center in Florida, the Listen Foundation in Colorado, the former Listen, Inc. in Arizona, the Hear Center in California, the Hospital for Sick Children in Toronto, North York General Hospital in Toronto, and the Children's Hospital of Eastern Ontario in Ottawa) and all certified auditory-verbal therapists (approximately 200 certified auditory-verbal therapists registered with Auditory-Verbal International, Alexandria, Virginia) in the United States and Canada. The contact agency/therapist was requested to verify that his or her program followed the nine guiding principles of auditory-verbal practice. In addition, the cooperating contact individual was requested to notify the researchers about how many "graduates" of their auditory-verbal program met the additional criteria: (1) 18 years old or older and (2) participation in their program for at least 3 years. The investigators clarified that all graduates who met these criteria should be asked to participate versus inviting only the more "successful" graduates or "stars" to respond.

Following the investigators being notified about how many graduates each contact person had taught, the therapists were forwarded the requested number of questionnaires and postage-paid return envelopes for distribution. The cooperating therapists were requested to mail out the surveys to all of their eligible graduates.

Similar to the 1993 study, each identified therapist served as the contact person to their former students and was encouraged to do as much as possible to ensure a high response rate. It was suggested, for example, that the therapist jot a note on the cover letter provided to strongly encourage their former students to participate in the current study.

The questionnaire was printed on blue paper (two pages, four-sided) and included both closed- and open-ended questions, addressing several areas. The areas included the degree and etiology of hearing loss, age of onset, use of amplification and other sensory aid technology, and education and employment history.

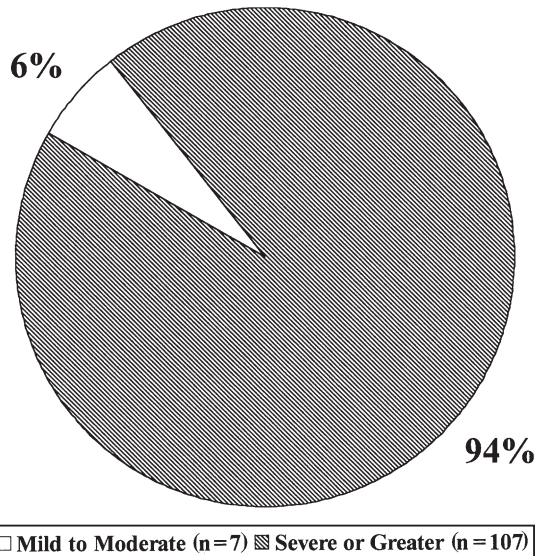
The original survey from 1993 was adapted for the current investigation to reflect current knowledge. Specific survey question changes addressed several areas, including the following: streamlining of hearing loss severity question owing to the previous respondents' difficulty detailing their audiogram; simplification of aided hearing threshold question, again owing to respondent confusion; an updating of the high-risk factor question because of changes in the listing (JCIH, 2000); addition of questions regarding middle ear infection history; expansion of questions regarding sensory aids and amplification specifically to address new assistive devices and cochlear implants; addition of questions regarding special education services in public schools; and clarification of the income range question to increase the response rate.

A total of 319 survey questionnaires were forwarded to American and Canadian auditory-verbal centers and therapists for distribution to their graduates. A response rate of 36 percent was achieved, with 114 usable forms returned. A follow-up request for information was attempted via the contact therapists. Owing to confidentiality issues, a completely accurate reminder system to nonrespondents was not possible because of the lack of names on some of the returned surveys. It should be noted that of the returned surveys from the current study and the original investigation, 23 (20%) of the current respondents recorded their names on each survey and were known participants in both investigations.

## RESULTS

### Hearing Loss

The majority of the survey respondents (94%) reported having either a severe to profound or profound hearing loss (Fig. 1). The remainder of participants noted having a mild to moderate hearing loss. Based on the responses to a question regarding the age of onset of the hearing loss, most of the graduates (95%) reported having had their hearing loss at birth ( $n = 40$ ) or before 3 years of age ( $n = 66$ ), that is, 106 of the respondents reported a prelingual hearing loss



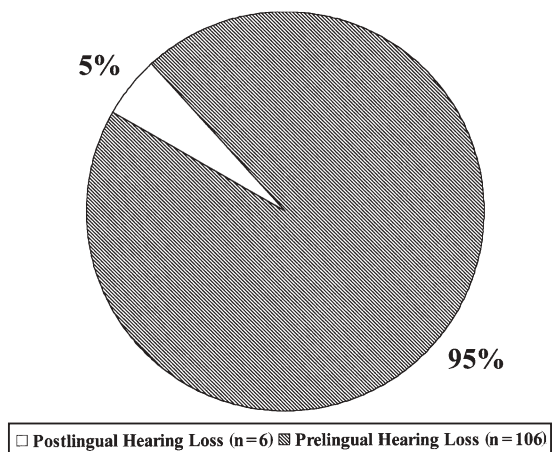
**Figure 1** Degree of hearing loss based on pure-tone averages of the auditory-verbal graduates.

(Fig. 2). Only 5 percent of the participants noted an onset of hearing loss after 3 years of age (postlingual).

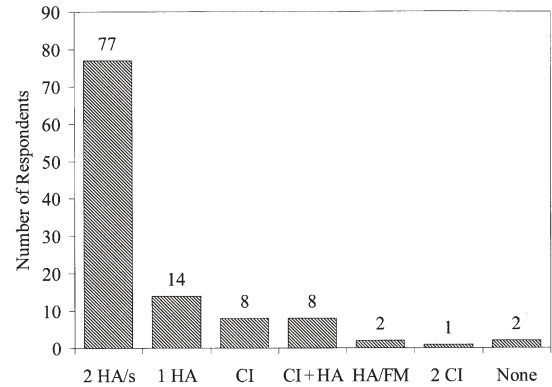
The average age of the respondents was 28.9 years old (ranging from 18 to 56 years old).

**Additional Sensory Aids**

The majority (66%) of the auditory-verbal graduates were amplified within 3 months, and 82% of the respondents were amplified within 6 months of the age of identification of the hearing loss, typically with binaural hearing aids. At the time of the survey, a variety of sensory aids



**Figure 2** Age of onset of hearing disability. Prelingual hearing loss was defined as at birth or before age 3 years, and postlingual hearing loss was defined as a hearing loss occurring after 3 years of age.



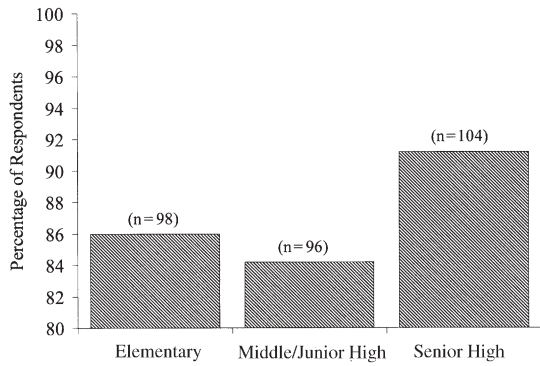
**Figure 3** Sensory aid(s) worn by the auditory-verbal graduates. 2 HA/s = binaural hearing aids; 1 HA = monaural hearing aid; CI = cochlear implant; CI + HA = cochlear implant and hearing aid on contralateral ear; HA/FM = amplification system consisting of a hearing aid and FM combination unit; 2 CIs = binaural cochlear implants; None = no sensory aid worn at the current time.

were being used. The majority of the graduates (69%) responded that they used two hearing aids, 14 used one hearing aid, 2 used an FM/hearing aid system, and 2 did not make use of any sensory aids (although these respondents did report consistent use of amplification during their auditory-verbal intervention as children), with the others using a variety of cochlear implant combinations. Specifically, 8 wore a cochlear implant alone, 8 used a combination of their cochlear implant and a hearing aid on the contralateral ear, and, interestingly, 1 graduate had binaural cochlear implants (Fig. 3).

**Education History**

Similar to the findings in the 1993 study, the data relating to the education history of the auditory-verbal graduates were most impressive. The graduates' degree of "full" mainstreaming resulted in the findings that 86 percent had been fully mainstreamed in elementary school; 84 percent experienced "full" mainstreaming in middle and junior high school; and the largest percentage, 91 percent, were fully mainstreamed during their senior high school years (Fig. 4). All respondents were either high school graduates or about to graduate from high school. When asked their age at the time of high school graduation, it was noted that of the 111 respondents to this question, all but 3 participants had graduated from high school between the ages of 16 and 19 years (Table 2). Similarly, all but 3 of the auditory-verbal graduates continued their education fol-





**Figure 4** Educational placement with “full” or complete mainstreaming at the elementary, middle school/junior high school, and senior high school levels.

lowing high school, with the majority of the respondents going to college, university, junior college, or vocational school programs. Most postsecondary programs were at “typical” colleges or universities (78%); moreover, 14 respondents reported enrolling at the National Institute for the Deaf, and 3 enrolled at Gallaudet University (Fig. 5).

**Auditory-Verbal Therapy**

The auditory-verbal graduates were queried regarding how long they had been enrolled in auditory-verbal therapy. The average duration of participation in therapy was 11.7 years. It should be noted that several

**Table 2** Age Distribution of Auditory-Verbal Graduates at Time of High School Graduation

Age (yr)	Number (N = 111)
16	1
17	19
18	57
19	31
20	3

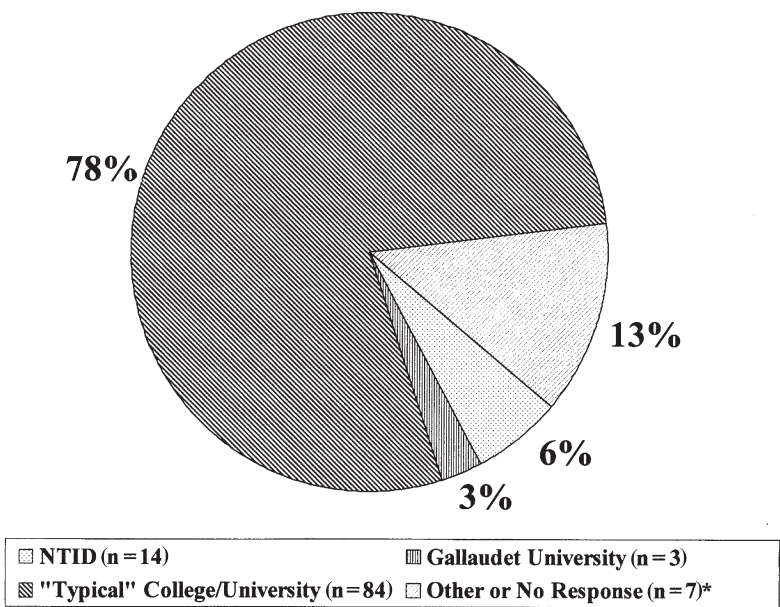
respondents had been in therapy for long periods of time, which subsequently skewed the data to what appeared to be excessively lengthy therapy enrolment.

**Familial History**

As was the case in the 1993 report, almost universally, the auditory-verbal graduates had a parent, commonly the mother, who had dedicated much time to the development of the child. A variety of extended family members also participated, including fathers and siblings.

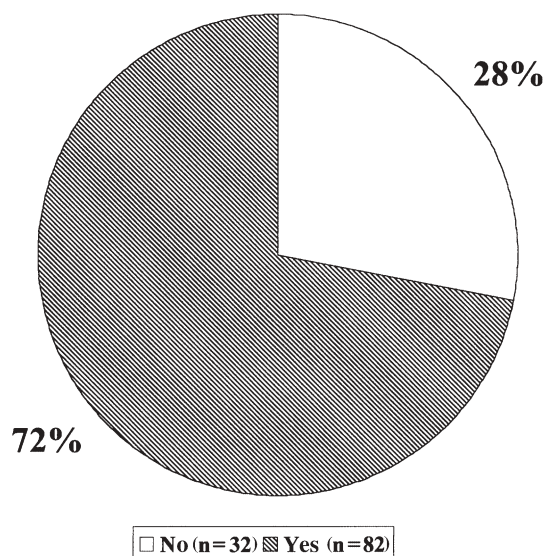
**Telephone Communication**

Approximately three-quarters of the respondents (72%) reported making some use of voice telephones; however, a large number also reported using text telephones (62%) (Figs. 6 and 7).



**Figure 5** Enrolment of auditory-verbal graduates following high school graduation at the National Technical Institute for the Deaf (NTID), Gallaudet University, a “typical” or “regular” college/university, or some other postsecondary setting or no response reported.

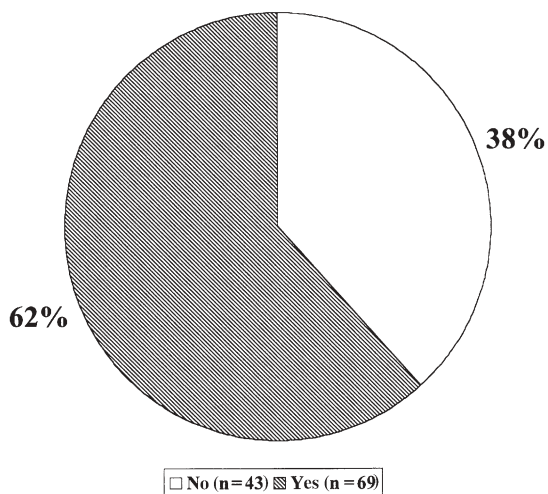
\* 3/7 were still in high school



**Figure 6** Auditory-verbal graduates' self-report of use of voice telephones.

**Societal Integration**

The marriage and divorce rates for these auditory-verbal graduates included 23 of the participants recording that they married. Ten of these 23 marriages, however, had reportedly ended in divorce. A variety of community activities were noted as important in the graduates' lives. Examples included the following: Scouting, athletic clubs and sports teams, religious organizations, volunteer activities, and musical and artistic endeavors. All graduates but 6 reported participating in 1 to 14 different community activities while growing up and/or currently.



**Figure 7** Auditory-verbal graduates' self-report of use of text telephones.

**Employment History**

Although many of the auditory-verbal graduates reported being students or homemakers (n = 48, 44%), with personal income levels below \$5000, another 41 percent of the respondents to this question had personal incomes from \$20,000 and above (Table 3). Examples of the types of employment positions and areas or specific job titles the graduates held included the following: teachers, computer software positions, hotel management, janitor, graphic designer, mail carrier, cook, physician, administrative assistant and secretary, nonprofit agency executive director, insurance agent, attorney, bank teller, editorial assistant and copywriter, deaf activist, financial planner and investment consultant, laboratory technician, physical therapy assistant, data analyst, and auditory-verbal therapist and part-time audiologist.

**Additional Disabilities**

Approximately two-thirds of the auditory-verbal graduates (67%) reported having additional disabilities, with the most commonly reported additional challenge being learning disabilities. Specifically, 49 percent noted having a learning disability, and 5 percent reported being learning disabled and presenting with attention-deficit disorder (Fig. 8).

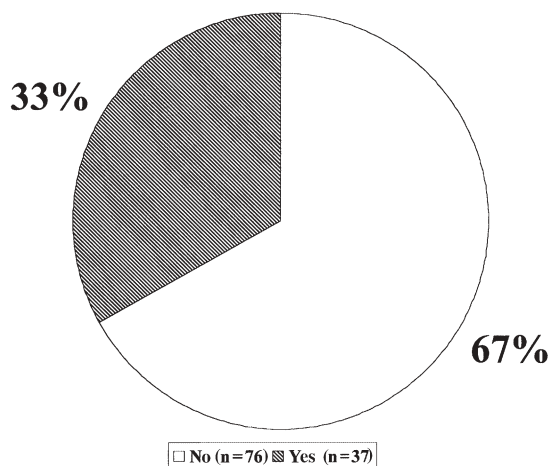
**Overall Perceptions**

Arguably, the most important question addressed in the survey was overall perceptions of membership in the "hearing" versus the "deaf" worlds (or some combination) (Fig. 9). The largest number of respondents indicated that they func-

**Table 3** Personal Income Levels of Auditory-Verbal Graduates

Personal Income Range (in U.S.\$)	Number (N = 109)
Student, homemaker, under 4999, or no response	48
5000-9999	5
10,000-14,999	6
15,000-19,999	5
20,000-24,999	9*
25,000-29,999	7*
30,000-39,999	16*
40,000-49,999	4*
Above 50,000	9*

\*45/109 (41%).

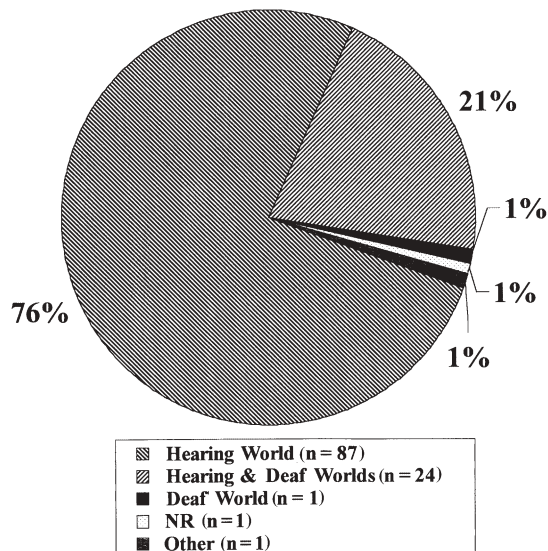


**Figure 8** Additional disabilities. Auditory-verbal graduates answered “Yes” or “No” to the question, “Do you or did you have any other ‘challenges’ in addition to your hearing loss?” Choices included the following: learning disabilities, attention-deficit disorder, asthma, heart (cardiac) problems, kidney problems, legally blind (with correction), and other.

tioned in the “hearing” world (76%). A smaller number (21%) felt that they were in both the “hearing” and “deaf” worlds, whereas only one respondent selected being exclusively in the “deaf” world. This graduate had learned sign language at age 10 years and went on to a “typical” college/university program. Examples of comments from members of the “hearing” world included the following statements: “I am well adjusted, happy, and I’m functioning extremely well in the hearing world. I’m grateful to my parents and my teachers as I am living in the ‘world of sound’”; “It is a hearing world and we have to live by it. No one orders a Big Mac by signing to the microphone outside McDonald’s”; and “I live, breathe, and participate in the hearing world, but I feel that I have respect and admiration for those deaf people who promote their own potential as a human being, NOT a deaf human being!”

### DISCUSSION

The purpose of this update study was to present data from a survey completed by graduates of auditory-verbal programs in the United States and Canada. The survey attempted to provide answers to questions that would determine if auditory-verbal practice does, in fact, lead to its stated goal. As noted previously, the targeted outcome of the auditory-verbal philosophy is that children with hearing impairments grow up in regular learning and living environments



**Figure 9** Overall perceptions of membership in the “hearing” versus “deaf” world. Auditory-verbal graduates were asked to describe themselves in regard to their hearing loss. Each respondent selected one of the following and was asked to comment or fill in the “Other” line in their own words: “I am a person with a hearing loss who participates essentially exclusively in the hearing world,” “I am a person with a hearing loss who participates essentially exclusively in the deaf/deaf world,” or “I am a person with a hearing loss who participates in both the hearing and deaf worlds.” NR = no response.

that enable them to become independent, participating, and contributing citizens in mainstream society.

The current results bear an incredible similarity to the original findings from 1993 (Goldberg and Flexer). This major finding is, in fact, one of the most important results of this updated study. In both investigations, this sample population of persons with severe and profound binaural hearing loss of congenital or prelingual origin was identified early, amplified quickly, and enrolled in early intervention programs that emphasized an auditory-focused, family-centered communication habilitative approach (Pollack et al, 1997). The common result of this early detection and intervention methodology led to a high degree of complete or full mainstreaming, “typical” high school graduation milestones, and continued education, often at “mainstream” colleges and universities. The auditory-verbal graduates who completed their postsecondary education routinely moved on to a variety of impressive employment opportunities and were integrated into “mainstream” communities and society in general. In summary, in both 1993 and 2001, what is most impressive is the high degree of consistency of these remarkable findings.

Although a person's worth should not be determined by his or her income level, it is important to highlight the personal income of the auditory-verbal graduates compared with the current data of other persons who are deaf or hard of hearing. Blanchfield et al (2001) recently noted that most of the severely to profoundly deaf and hard of hearing population are, on average, poorer than other Americans. These researchers reported that 53 percent of their study population had a family income of less than \$25,000 compared with 35 percent of the general U.S. population. Similarly, Balkany (1996) reported that the unemployment rate of deaf adults is high. Tucker (1998) stated that deaf adults who are involved in the work force are making, on average, 30 percent less than the hearing population. She also noted that because of a lack of English skills in many deaf adults, they usually have "manual jobs such as kitchen workers, janitors, machine operators, tailors, and carpenters" (p. 13). In contrast, the results from the current study suggested that after eliminating homemakers and students, approximately 60 percent of the auditory-verbal graduates had a personal income of \$25,000 or more.

The differences from the study by Blanchfield et al (2001) and the current data regarding education are also noteworthy. Blanchfield and colleagues reported that about 44 percent of the severely to profoundly hearing-impaired population did not graduate from high school, in contrast to 19 percent of the general U.S. population. In this study, all respondents graduated from high school (or were graduating at the end of the academic year). In addition, for this sample population, over 98 percent went on to college or university education. This latter finding is in contrast with 60 percent of the general U.S. population of students reporting some college attendance and 46 percent of students who are deaf or hard of hearing (Blanchfield et al, 2001). In addition, only one of every five deaf students entering college actually gets a degree (Balkany, 1996).

A critique of the current study would include the authors' acknowledgment that survey research can be influenced by the self-selection of respondents who choose to participate. The potential bias of only "happy" consumers electing to return their surveys existed. At the same time, this is an inherent limitation of any self-administered survey design. Also, because of issues of confidentiality and the lack of informed consent to survey graduates directly, the investigators were limited to making use of auditory-verbal centers and therapists for distribution of the documents versus

direct solicitation of participants. All graduates who met the participation criteria established by the authors were reportedly contacted; however, a bias in survey distribution may have influenced the results. These two limitations regarding the overall effectiveness of data collection were noted by the researchers.

## CONCLUSIONS

Graduates of auditory-verbal programs appear to become the "anonymous deaf." They are in our local schools and blend into higher education and various jobs, professions, and careers. In view of the current trend of early identification of hearing loss in children, the resultant improvement in speech and language development possible (Yoshinaga-Itano et al, 1998), along with the incredible advances in cochlear implant and other sensory aid technology, the "sky is the limit" for future auditory-verbal enrollees, as well as other infants and toddlers who are deaf or hard of hearing. Mohr et al (2001) concluded that "aggressive and early intervention to reduce the level of hearing impairment may produce savings to society." They appeared to be referring to reducing the "impact" of hearing impairment. Our findings similarly suggest that graduates who began their auditory-verbal program in the late 1940s through the current date have indeed achieved the stated goal of auditory-verbal practice: independence in today's mainstream society.

**Acknowledgment.** This study was supported in part by The Geoffrey Foundation, Kennebunkport, ME. The authors express their sincere thanks for the Foundation's support.

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