Introduction

DONALD F. MOORES, KATHRYN P. MEADOW-ORLANS

In the past twenty years, there has been enormous progress in educational, social, and vocational opportunities for deaf children and adults. There has been a virtual revolution during this time, culminating, perhaps, in the selection of the first Deaf president of Gallaudet University in 1988. Some of the changes that both caused and reflect these positive changes include:

1. Earlier intervention for young deaf children.
2. Increased numbers and kinds of opportunities for advanced education.
3. Increased interest in sign language and manual communication.
4. Increased availability of sign interpreters.
5. Technological advances leading to closed captioning of television programs, new telephone communication possibilities, computer communication, etc.
6. Changing attitudes and growing acceptance of deafness as a social condition, not a pathology.

The authors have had the opportunity to be both participants in and observers of this revolution. We first met at a tumultuous session at an annual meeting of the Alexander Graham Bell Association in 1968, where the possible use of manual communication had been vigorously discussed and opposed by a majority of those in attendance. We had recently completed our Ph.D. dissertations—Meadow-Orlans at Berkeley and Moores at Illinois—and found common cause as part of a small minority in support of signing with deaf children. Meadow-Orlans' training in sociology, and Moores' experience as a teacher of the deaf and training in educational psychology, provided complementary perspectives on the needs of deaf individuals and their families.

We continued to interact for more than a decade through exchanges of preprints and joint presentations before such audiences as the American Speech and Hearing Association, the Council for Exceptional Children, and the Society for Research in Child Development, as well as at Gallaudet. Throughout this period we shared common interests, goals, and philosophies. Our individual research ef-

forts encompassed the life span from birth to old age as our studies were conducted in various settings in the home, the school, and the work place.

The opportunity for closer research interaction came in 1980 when Moores joined Meadow-Orlans at Gallaudet and we helped organize the Center for Studies in Education and Human Development (CSEHD), which was established in 1981. Since that time, we have had the opportunity to continue major lines of research, establish new initiatives, and interact with a stimulating group of colleagues within the Center, throughout the University, and with collaborators across the United States and abroad.

AGENTS OF CHANGE

Many of the developments in the past generation have been facilitated by federal legislation enacted because of perceived needs articulated by a range of advocates. The increase in opportunities for both undergraduate and graduate education in recent years is one of the most striking changes. Not too long ago, Gallaudet University was almost the only place where deaf persons might obtain postsecondary training. The creation of the National Technical Institute for the Deaf (NTID); the Leadership Training Program at California State University, Northridge; and the program at Seattle Community College are important additions. The most recent edition of *College and Career Programs for Deaf Students* (Rawlings 1988), published by Gallaudet University and NTID, lists almost 150 postsecondary opportunities.

As professionals who came to Gallaudet after establishing major programs of research elsewhere, we are perhaps more aware of the impact of the University than those who have spent their entire careers at the school. A great deal of legislation and many programs on behalf of deaf persons have been advanced through Gallaudet channels. Sign language training programs have provided a growing number of interpreters, thus giving many deaf persons broader access to many services and activities. Gallaudet itself is a microcosm of changes in attitudes about and opportunities for deaf persons. For example, in the late 1800s, Alexander Graham Bell testified before the U.S. Senate against establishing a teacher training program for students with normal hearing at Gallaudet College on the grounds that the college would also accept deaf students into the program (Moores 1987). Although this reasoning is so anachronistic as to seem laughable today, one of the authors (Moores) received an M.A. from Gallaudet in 1959, a time when deaf students were not allowed into the graduate school. Gallaudet did not accept deaf students into the graduate school until the 1960s, only twenty-five years before a deaf person was chosen to be president of the institution.

Enmeshed with the positive visibility provided by many Deaf community leaders has been the increasing visibility of sign language in the United States. Today there is hardly a junior college or adult education program that does not offer at least one course in sign language. Some high schools include sign language

in the curriculum. Presidential candidate Jimmy Carter used a Sign interpreter during his nationally televised acceptance speech at the Democratic national convention in 1976, and interpreters frequently have been used in national campaigns since. A number of universities accept sign language proficiency to fulfill a foreign language requirement for the Ph.D. Many television stations employ sign language interpreters for locally produced TV programs.

The work of the National Theatre of the Deaf (NTD) should be mentioned. Its use of American Sign Language (ASL) is seen as an art form, not only in the Deaf community but by hearing theatergoers as well. The NTD was funded by the federal government, through the creative leadership of one energetic and sympathetic friend of deaf people, Mary Switzer.

Another development contributing to change was the passage by Congress of Section 504 of the Rehabilitation Act of 1973, requiring equal access to public buildings and functions for all handicapped groups, which was interpreted successfully by Deaf people to mean that interpreters must be provided for them. Organizations of Deaf people joined together with representatives of other handicapped groups to form a large and powerful lobby to effect this law.

Thus, many interlocking strands lead to social change. These strands include increased opportunities for education, growing leadership by Deaf people, lobbying for legislative progress, and a spiral of achievement leading to more achievement. Of major importance are the ability and the willingness of Deaf people to lead the fight for themselves, and also their willingness to accept the support of hearing parents and friends in their struggle for more participation in social and community life.

CONTRIBUTIONS OF RESEARCH

It should be pointed out that there have been significant contributions by research to the field of deafness. The impact of research over the past generation on attitudes and practices has not received the attention it deserves. A very limited list of contributions would include work in demographics, ASL, postsecondary education, early intervention programs, and child development. Although each of these will be considered in detail later, it is instructive to look at these areas briefly in order to develop an appreciation of the impact of research.

Demographics

Deafness is the only field in special education with comprehensive demographic data. The Center for Assessment and Demographic Studies (formerly the Office of Demographic Studies) at Gallaudet University has gathered data since 1967 on a nationwide basis, and this information has contributed immeasurably to an understanding of the characteristics of deaf children, of their families, and of the programs serving them. These statistics have served to further many policy

changes at the national, state, and local levels. More recently, researchers in this group have contributed to the development and norming of achievement tests that have helped to improve the educational standards and expectations for deaf children.

Child Development

One overriding outcome of recent research in development of deaf children has been the emphasis on the essential normality of the growing deaf child. Although a deaf individual faces a considerable number of difficulties during childhood and in adult life, there has been a change in attitudes, with emphasis moving from the deficiency model toward the facilitation of optimal functioning.

Postsecondary Education

The need for a wider range of postsecondary programs for deaf students was identified by research in the mid-1960s. Following the establishment of programs, further research documented the benefits and cost effectiveness of the models that had been developed. The efficacy of educating deaf students in vocational technical programs designed for hearing students, with the addition of interpreters, notetakers, and special counseling, was established.

American Sign Language

American Sign Language has been accepted as a full-fledged language in every sense. It is agreed that ASL contains all the richness, expressivity, and power of a spoken language. Before 1960, many observers considered ASL to be a concrete system of gestures with a limited vocabulary and primitive grammar, incapable of expressing abstract ideas. Research by William Stokoe and his colleagues, beginning about 1960, lent to ASL a scientific respectability that previously it had been denied.

Early Intervention Programs

Researchers first identified the lack of impact of traditional early intervention programs for the deaf in the 1960s and suggested new techniques and emphases. Other researchers later documented the effectiveness of programs employing modifications such as use of manual communication, increased home visitation, and greater academic emphasis.

Invented Sign Systems

The work of Harry Bornstein, Gerilee Gustason, and others in creating pedagogical English-based sign systems helped overcome the resistance of hearing parents

and educators to the use of sign language with younger children. Again, research on the use of sign language with various populations was a factor contributing to increased acceptance, as was the political activity of hearing parents who wanted Sign as an option for their children.

THE CENTER FOR STUDIES IN EDUCATION AND HUMAN DEVELOPMENT

The Center for Studies in Education and Human Development was established in 1981 with the mission of conducting pragmatic and programmatic research of benefit to deaf individuals and their families. The Center was constituted from smaller existing units in child development, psychology, mental health, and educational research. Multidisciplinary teams have been organized around programmatic themes of research, including literacy, child development, family dynamics, educational placement, and academic achievement.

The term "program research" itself refers to the relating of many discrete research activities to a common well-defined goal or problem area within the context of a single theme. This program provides the investigators with the flexibility to shift gears to follow up new leads or drop approaches found to be nonproductive. A programmatic research activity differs from a research center in that the support is generally used to answer a broad particular question with a multifaceted approach, while a research center might involve one or more areas of programmatic research and/or several discrete research projects.

By definition, program research involves interdisciplinary cooperation. A sharing of knowledge and an integration of skills is mandatory. When conducted effectively, the whole of program research is definitely greater than the sum of its parts. Program research, then, is both longitudinal and interdisciplinary in nature. It has a focus that is developed and accepted by a team. The results must be beneficial to all concerned. Peer review, monitoring, and feedback are necessary. Mechanisms for incorporating new disciplines and strategies for phasing out activities must be established.

Special Considerations of Research Methodology in the Study of Deaf Persons

A major consideration for research involving deaf persons is the heterogeneous nature of any random group. When this is combined with low incidence (only one child per thousand has an early, severe to profound hearing loss), wide geographical dispersion, and widespread use of sign language, the difficulties of conducting research are sometimes overwhelming.

The diversity of groups of deaf children stems from the wide range of demographic and diagnostic characteristics that influence educational and developmental variables usually of interest to social or behavioral scientists. For example,

a child who is profoundly deaf is quite different from one with a great deal of residual hearing. Sometimes even apparently slight differences in hearing can mean a great deal in terms of defining the variety of experience for the two children. The use and comfort of hearing aids is important, plus the description of hearing loss when a hearing aid is being used. The nature of the hearing loss (that is, the sound frequencies at which children hear) may influence the child's ability to benefit from speech training, and to process speech sounds.

The child's age at the time of onset of deafness has major significance. For many years, the tradition has been to divide "prelingually deaf" research subjects from those who are "postlingually deaf." At first glance, this might seem a simple matter. However, the complexities begin to be apparent when we point out that the cut-off point customarily used twenty years ago was age three. Then the accepted dividing line shifted to eighteen months, then to twelve months. As more is learned about the process of language acquisition, more importance has been attached to an infant's receptive language skills, which develop long before expressive language.

The presence or absence of handicaps in addition to deafness is an important variable in differentiating between individuals in a group of deaf children. It is estimated that one-third of all deaf children have additional handicaps of a physical, cognitive, or emotional nature. Depending on the research problem to be addressed, this may be an important characteristic in a research population. (Etiology of deafness is sometimes investigated for possible clues to problems related to disorders of the central nervous system.)

The age at which children are exposed to sign language can be an important control variable for some kinds of research. Often, the hearing status of the child's parents is used as a shorthand determination of this characteristic. For some studies, it may be important to know the variety of Sign used by the child's parents and/or teachers, and the Sign proficiency of others in the child's environment.

All of these demographic and linguistic factors can have an important effect on the child's performance on a series of tests or research procedures, or can influence the child's developmental course. They can contribute more to the outcome being investigated than do the experimental procedures applied by the research investigator. Thus, it is of the utmost importance that a researcher understand which factors are important for a particular study and control for them either through subject selection or by statistical means after the data collection has been completed.

One of the important aspects of The Education for All Handicapped Children Act of 1975 (PL 94-142) was the inclusion of a clause prescribing that all instruments used in deciding the school placement of handicapped children be normed for children with their particular handicap. In many cases, these specialized instruments did not exist. This example illustrates the importance of making sure that a research instrument is appropriate for the groups of deaf children being studied. Often, the language of an instrument previously utilized with hearing

children may be inappropriate for deaf children. Sometimes an instrument must be translated to Sign, and skilled interpreters must be trained in the standardized presentation of the material. In any case, the researcher must address this issue.

Another problem of research methodology is the small numbers of deaf children distributed through the population. This means that subjects who fit research criteria may be difficult to find. The research process may thus take much longer than it would if the subjects were to come from a different population. A good example of this problem can be seen in some of the research of the Center's Infancy Research Group. In 1984, the group began to recruit deaf and hearing infants with hearing and deaf parents who could be videotaped during their first year of life. In a three-year period, only four deaf infants with deaf parents were located in the Washington, D.C., area, plus ten hearing infants with deaf parents, and three deaf infants with hearing parents. As a result of this experience, a grant proposal was submitted to a federal agency, allowing the recruitment of infants in four other metropolitan areas in the United States. The research design prescribed that infants were to be studied first at the age of six months. After nine months of an intensive recruitment effort, only three six-month-old deaf babies with hearing parents had been located. For this group, the problem not only is one of low incidence, but also includes the difficulty of early diagnosis.

DEAF CHILDREN AND THEIR FAMILIES

We have been concerned throughout our careers with the lack of attention that has been devoted to the families of deaf children. It is almost as if deaf children have been thought of as living in a vacuum outside the educational setting. This is especially worrisome because most deaf children are born into families with hearing parents who have had no prior exposure to deaf individuals and who have no idea of the linguistic, psychological, social, and educational implications of early childhood deafness. Thus the paucity of family-oriented research is even more disturbing.

Perhaps the most significant aspect of research with families of deaf children is its historical absence prior to the late 1960s. In fact, educators have taken over for parents, either at the parents' implicit or explicit request, or because there seemed to be no educational alternatives. It is relatively recently that residential schools stopped accepting three-year-old deaf children as live-in students. Most researchers interested in deafness focused on students' academic achievement or on their performance on standardized tests of one kind or another. The place where most research with deaf children took place was on the campus of residential schools for the deaf.

One of the first research studies with deaf children that included work with parents in their homes was completed in the late 1960s (Meadow 1967, 1969).

Interviews with both deaf and hearing parents of deaf children were completed. This work set the stage for later studies, but research studies involving the families of deaf children remain few in number.

SUMMARY

This book is designed to present the state of the art in several areas of research on education and human development in the area of deafness. It is written by individuals with training in a variety of disciplines, including anthropology, education, linguistics, psychology, and sociology. All the contributors have participated in program research with deaf individuals in the areas under consideration. The emphasis will be both programmatic and pragmatic; that is, research is not seen as an end in itself but rather as an instrument to foster better understanding of the needs and characteristics of deaf individuals and of the programs designed to serve them. For each area, we will try to explicate in terms of research not only where we have been and where we are at present, but also what the practical implications of the work might be and where they may lead us.

Although this volume covers a wide range of topics, it cannot be considered a complete and comprehensive overview of research in the field. Rather, it represents the efforts of an identifiable group of experts who, we believe, have made significant and far-reaching contributions to the field.

From our experience, it is absolutely clear that there are no major sources dealing with applied research in educational and developmental aspects of deafness. There are, of course, some excellent texts in education, human development, and psychology that are addressed to professional trainers and that utilize research in the field. Those texts, by the nature of their audience, are practitioner oriented. We believe that there is also a need for a research-based text that can serve as a reference point for researchers and research consumers. In this volume we have taken the perspectives and experiences of our careers and attempted to mold them with a presentation of major activities conducted by members and affiliates of the Center for Studies in Education and Human Development, perhaps the largest identifiable group of researchers currently engaged in developmental and educational research in deafness.

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