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THE DEVELOPMENT OF MANUAL SIGN LANGUAGE IN MENTALLY RETARDED DEAF INDIVIDUALS

By ROBERT J. HOFFMEISTER and ALVIRDO FARMER

Recent research indicates that work needs to be done in the area of deaf education for the multiply handicapped. The Babbidge Report (1965) suggests that a major problem is the inability of educators of the deaf to agree on good educational techniques. Other research reviewed shows that the deep division in the field concerning methodology has not been resolved, (Hester, 1963; Stone, 1968; Miller, 1970; Moores, 1970, 1971). Concern with methodology has resulted in forgetting the child. If we cannot teach speech to a particular child, the fault is assumed to be his. In a recent paper, Moores (1971) summarizes the plight of the deaf individual.

Instead of asking whether manual communication should be part of any instructional program, perhaps it would be more appropriate to consider which children in a particular population would benefit from it. If we are really concerned with fitting the method to the child, and not vice versa, it is logical that manual communication would benefit some children and not others. (p. 25)

Thus, the problems of the individual child should be considered in determining a future course.

The mentally retarded deaf pose unique problems depending on the severity of the mental retardation and the severity of the deafness. The most basic problem is that of acquiring a system of communication. The mentally retarded deaf learn, as do normal deaf individuals, through a visual medium. But the normal deaf individual has the adequate mental faculties to learn from both classroom experience and incidental events within his environment. The mentally retarded deaf individual has so great a handicap in the area of communication that incidental learning is almost nonexistent. All learning must be acquired through a painfully slow process.

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DEVELOPMENT OF MANUAL SIGN LANGUAGE

The failure of present techniques to deal with inadequate communication skills has led to the development of unique programs within institutions for the mentally retarded. A program considered "unique" by Adler (1971) used "manual English" to teach communication skills. Adler states that through the efforts of this program a "good percentage of adults advanced enough to qualify for vocational training, employment and restoration to the community." (p. 98)

A progress report from the Sonoma State Hospital indicates success with a group of mentally retarded deaf individuals using sign language as the method of communication. Communication was facilitated both on the wards and in the school (Butler, Griffing, Huffman, 1969). Sutherland and Beckett (1969) also have shown progress using sign language with low-level mentally retarded hearing-impaired adults. For the most part, individual's progress correlated with their IQ scores. Sutherland and Beckett reported, however, that the member with the lowest IQ was able to converse, while the others primarily imitated. This indicates that IQ scores may be inadequate for classification purposes. This also implies the need to develop a diagnostic tool for classifying mentally retarded deaf other than standard IQ tests. The basic problem with IQ tests is the heavy reliance on language competence and verbal performance. Recent research suggests that language and speech are not synonymous (Lenneberg, 1969; Moores, 1970). It is doubtful, therefore, that the mentally retarded deaf could acquire language through intensive speech training alone. The acquisition of language by the hearing child is facilitated directly by the auditory channel. The hearing child has no restrictions placed on his freedom to incorporate and use his language system. This freedom enhances his ability to acquire language easily. Auditory channel restrictions in the deaf child reduce the chances for good auditory input and language performance (Moores, 1970).

A finding in developmental psycholinguistics of considerable significance is the evidence that language does not develop slowly in a child solely by means of parental selective reinforcement (Moores, 1970). This leads to the basic difficulty of judging where to start the language training process for adults who are hearing impaired, mentally retarded, and chronologically beyond the optimal period of language acquisition.

No system of communication, other than gross pointing, has been developed at the present time for low-level hearing-impaired mental retardates. The manual sign language would appear to be a communication system uniquely suited to the needs of a non-verbal population. This population is at an age when their motoric abilities are fully developed. Only the prerequisite of motor co-ordination is necessary for development of a manual communication system. A large part of the deviance of this population might be eliminated if an expressive mode of communication were available.

A primary reason for proposing a sign language approach is that it is ideographic. Action words as well as nouns can be presented ideographically.

DEVELOPMENT OF MANUAL SIGN LANGUAGE

The signs for "put", "carry," and "arrange", for example, closely resemble the activity that is symbolized by the words. Realistic sign representation and motor training can easily be applied to pre-vocational training activities. The trainee can see and associate the instructions and directions given by the trainer. For example, the signs used to indicate "brush teeth" and "smoke cigarette" are the actual motions used to perform these acts. When an individual learns to brush his teeth, he is making the sign for "brush teeth", although he may still not be able to articulate the utterance.

The manual sign language presents another advantage in training methods. It is easier to train motor imitations than verbal imitations because one can (manually) move the subject's arms through the required motions. Manually guided behavior can be reinforced, and these reinforcements can be phased out gradually until the subject initiates the motion himself. This has been the rationale for using motor imitation initially in some verbal language development programs for establishing positive reinforcement (McReynolds, 1970).

The nature of manual sign language, when used in this context, lends itself to a behavior modification program. A program can begin with manual manipulation or guidance in reference to physical objects or actions which approximate the actual use in the signs. Signs so often approximate the actions they represent that self-care habits and daily living skills may become a real part of the language training program.

The primary goal of this study was to investigate the extent to which institutionalized hearing-impaired non-verbal mental retardates can acquire communication skills through the use of sign language. A secondary goal was whether the acquisition of such skills might enable them to become more self-supporting by providing a medium through which the activities of daily living, pre-vocational and vocational skills could be taught.

METHOD

Subjects

Sixteen subjects took part in the program. Table 1 presents information on the subjects. The IQ's scores were obtained from the institutional records.

Two subjects entered the program with a strong foundation in using sign language expressively. Their expressive vocabulary contained more than 200 signs at the beginning of the project. Two individuals were considered autistic and are included in the data only because of consistent weekly attendance. One subject did not complete the project.

DEVELOPMENT OF MANUAL SIGN LANGUAGE

**TABLE 1
DESCRIPTION OF SUBJECTS**

SUBJECT	AGE	I.Q.	HEARING LOSS (average across speech range)
1.	12	56	73 _R 72 _L
2.	13	21	75 _R db 85 _L
3.	14	25	untestable
4.	25	44	25 _R 43 _L
5.*	16	12	untestable
6.	27	79	100 _R 100 _L @500 no response @ 1000, 2000ht
7.	26	56	60 _R 85 _L
8.	29	50	80 _R 75 _L
9.	31	37	93 _R 93 _L
10.	41	65	95 _R 92 _L
11.*	17	22	untestable
12.	42	78	no response
13.	62	88	95 _R No Response _L
14.	19	18	no response
15.	26	55	102 _R 95 _L
16.	12	26	untestable
X		43.6	

*These individuals were considered to be autistic

R = Right ear

L = Left ear

Procedure

The training program consisted of 24 two and one-half hour weekly sessions. Tutors from the University of Connecticut were assigned to subjects

DEVELOPMENT OF MANUAL SIGN LANGUAGE

to teach a means of communication based on the American Sign Language (ASL). The assessment of prior language ability was taken at the beginning of the program from the institution's audiological records.

The first three sessions concentrated on familiarity with the material to be learned. A social basis was established, and a rapport was gained on a one-to-one basis between the tutor and the resident. The next three sessions introduced drill and recall and provided opportunities for some spontaneous sentences or words.

In the second three weeks two subjects, judged to know a large number of signs, were given reading materials to determine a level of reading comprehension. The Peabody Picture Vocabulary Key was used to expand vocabulary.

The next six weeks were employed in striving for spontaneous expression, and an increase in vocabulary. The final twelve weeks concentration was on the expansion of the receptive and expressive language of the residents using operant conditioning techniques. Each subject was given a series of pictures to which he must respond with the correct manual sign language symbol. The conditioning procedure consisted of using food as a primary reinforcer. The secondary reinforcer, praise, gradually replaced the use of food.

Advancement to a criteria of forty-five pictures and signs moved the subjects to the reading program. Four out of sixteen residents successfully reached this level. The reading program consisted of reading and translating the essence of a children's story into manual language. The four subjects were able to translate the stories with help, and a structured program was set up to continue weekly practice outside of the tutorial program.

RESULTS

Two subjects came to the project with a good working knowledge of sign language, as reflected in the number of signs at the beginning of the program (see Table 2, S's No. 12, 13). Four of the remaining 14 subjects increased their receptive and expressive vocabulary by over two hundred signs. Three subjects increased their receptive and expressive vocabulary by one hundred and fifty signs. One subject increased his receptive and expressive vocabulary by one hundred signs. Two subjects increased their receptive and expressive vocabulary by seventy-five signs. One *S* learned only ten signs. The remaining two subjects did not increase their knowledge of signs at all. These subjects were considered to be autistic or brain damaged to such an extent that their learning of the signs was inhibited. They consistently failed to attend to the stimulus used for teaching the signs. Primary reinforcement did not help increase their attention to the learning situation or enable the instructor to start some type of conditioning procedure.

DEVELOPMENT OF MANUAL SIGN LANGUAGE

Observations during the program yielded some pertinent information. Those who had increased their vocabulary to two hundred signs (four) were observed putting two and three signs together for spontaneous communication. Phrases such as: "give me cigarette", "me go bathroom", "watch broke", "go home now", "boy cry", and "time finish" were observed.

One subject was administered the PPVT at the beginning and at the end of this program. This subject increased her PPVT score from four years seven months to five years one month.

At the end of the project, as shown in Table 2, the fifteen subjects showed an increase in their ability to communicate.

**TABLE 2
NUMBER OF SIGNS TABULATED AS RESULT OF PROGRAM**

Subject	Beginning of Program	TENTH WEEK		TWENTY-SIXTH WEEK	
		Receptive	Expressive	Receptive	Expressive
1.	0	175-200	125-150	200 +	200 +
2.	0	75-100	50	100-150	50-75
3.	0	100-150	50-75	150-200	100-150
4.	0	50-75	50	50-75	50-75
5.*	0	1	1	1	1
6.	0	100-150	100-125	150-200	150-200
7.	0	100-150	75-100	150-200	150-200
8.	0	200 +	200 +	200 +	200 +
9.	0	75-100	50-75	100-150	100-150
10.	0	50-75	50	75-100	75-100
11.*	0	2	0	0	0
12.	200 +	200 +	200 +	200 +	200 +
13.	200 +	200 +	200 +	200 +	200 +
14.	0	75-100	75-80	100-150	100-150
15.**	0				
16.	0	5	2	20	10

*Considered autistic.

**Did not complete project.

One year later the authors returned to the institution where this study was conducted. As a result of the efforts of a few people within the institution the program had been carried on for this past year.

A number of significant results were observed. Classes have been set up on a daily basis. A dormitory had been altered to accommodate a unit for mentally retarded and deaf individuals. Many reports of self-sufficiency and reduced behavior problems reached us. Finally, the most encouraging result was that four members of the original project had been going out to a

DEVELOPMENT OF MANUAL SIGN LANGUAGE

community sheltered workshop. One of the four now works at a retail store in a realistic job situation.

DISCUSSION

The improved communication skills demonstrated by this population warrant further investigation into the possible use of sign language with deaf retardates. Project results showed that a substantial gain was acquired in a short period of time. The spontaneous phrases exhibited by those in the program are similar to the language of a two to three year old normal child. With these phrases as stepping stones to build from, an intensive training program may increase the linguistic skills of this group considerably.

Evidence from the field of developmental psycholinguistics suggests that initiation of a structured program at an earlier age might have given the subjects a means of communication from childhood. Such communication might have helped to make them self-sufficient human beings and thereby would have reduced the chances of institutional confinement. The failure of traditional educational methods with these individuals should direct those in the field to pursue additional or alternate means for establishing a communication system. Although this study was done with a severe and profound mentally retarded hearing impaired population, the increase in socialization and communication skills shown should increase efforts to re-examine the traditional teaching of language and academic subjects to all those who carry the label of multiply handicapped deaf. Other educational disciplines should be examined for materials and products in order to supplement the teaching of multiply handicapped deaf children and adults.

Due to the advances stated in the results, the possibility of providing the services of a half-way house in a community where deaf individuals congregate may be a deterrent to institutionalization. This half-way house could be maintained and supervised by deaf adults from the community at large. Classes and programs for multiply handicapped deaf could be set up coordinating vocational, psychological and social services with a nearby residential school. The need for this type of program can be seen as the numbers of children diagnosed as multiply handicapped deaf increase.

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DEVELOPMENT OF MANUAL SIGN LANGUAGE

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