

Accelerating English Acquisition and Reading Development In Total Communication and Aural/Oral Programs

R. Orin Cornett

It is a sad commentary on the education of children with hearing deficiencies that after more than two and one-half centuries of organized effort educators still worship at the altars of separate methods, when no one method is sufficient to meet all the needs of a single deaf child, much less the needs of all deaf children. I am using the term "deaf" to mean persons with a prelingual PTA threshold of 90 dB or more.

In 1888 Alexander Graham Bell (Gordon, 1892) lamented the fact that of the then-existing three broad varieties of methods of instruction—the oral, the manual (fingerspelling), and the sign methods—each aimed primarily at remedying only one of the misfortunes of the congenitally deaf child. These he identified as lack of speech, lack of knowledge of written language, and lack of mental development which comes from intercourse with others. He affirmed the effectiveness of each of the approaches in remedying one of these misfortunes, but recommended taking what he called the resultant path, striving to solve all three problems through combinations of tools used within a single program.

Today the situation remains the same. Oral educators are now further divided into advocates of aural/oral, auditory-verbal, and cochlear-implant camps. Those who use the slogan Total Communication give lip service to speech and hearing, and include fingerspelling and the teaching of written language. The tragedy is that the results have not changed significantly in the last century.

The fact that both Total Communication and aural/oral methods have failed to produce acceptable levels of proficiency in English and reading is amply documented (Geers, Moog and Schick, 1984; Commission on Education of the Deaf, 1988). In fact, if one drops the designations Total Communication and aural/oral, and refers only to the manual, oral and combined methods dating back to the nineteenth century, the available data are appalling. Pintner and Patterson (1916) reported that the median scores of deaf students at any age never reached the median for hearing children eight years old. Studies 70 years later (Allen, 1986) showed the level of performance to be essentially the same.

The dismal results cited above do not imply that the basic concepts of either Total Communication or aural/oral methods are necessarily wrong, or that either should be replaced. They do suggest that something is missing in each of them. The basic strength of Total Communication lies in the easy, clear communication it produces among deaf children, between them and deaf people generally, and with hearing persons who learn enough signs to use English—pattern signing with deaf people who know both signs and basic English. The weaknesses of Total Communication lie in its failure to produce adequate English acquisition and reading development. The basic strength of aural/oral methods is that they teach and use language in the form known and used by hearing persons, including most parents of deaf children. Their weaknesses also lie in failure to produce adequate rates of English acquisition and reading development in profoundly deaf children.

Bell (Gordon, 1892) stressed four things: 1) the learning of language through an input clear to the child's senses; 2) leading the child to think in the language being learned; 3) the learning of language by using it for communication, without translation into any other language; and 4) the deferring of speechreading until a solid base of verbal language has been acquired. He stressed that these things can be accomplished only by using a combination of instructional tools and methods. He recommended that a deaf child learn English through written language, but only because no method of making spoken English clear, face-to-face and in real time, existed in his time.

What both Total Communication and aural/oral methods need is an additional tool that will make it possible to produce acceptable levels of competence in English and reading in most prelingually, profoundly deaf children. This paper suggests the addition of Cued Speech to the conventional methods, and asserts that it is capable of accelerating English acquisition by presenting English in a visually clear form, useable face-to-face for natural communication. Cued Speech can be used within the context of either a Total Communication philosophy or an aural/oral philosophy, without detracting from the advantages of the methods that presently characterize them.

Dr. Edward C. Merrill, Jr. president of Gallaudet College from 1969 through 1983, wrote as follows in the *Deaf American* monograph, *Perspectives on Deafness*:

Twenty years later, Cued Speech has substantial data showing that it enables deaf children to attain competency in English at the level of hearing students grade by grade. I know of no other system that enables this to happen—not oral, not combined, not ASL

(although the argument here will be that it has not been tried consistently) ...I do not predict often, but in this case I predict that the success of this system will present a "moment of truth" for the deaf community. As more and more young deaf persons achieve academically because of this system, deaf leaders will need to re-examine their options. (1991, 95-97).

I shall first describe a model for utilizing Cued Speech within the context of a Total Communication philosophy, then a model for its use within the context of an aural/oral philosophy. I will present the results of research that supports the conclusion that Cued Speech can, within either philosophy, secure the results in English acquisition and reading development that have thus far eluded both Total Communication and aural/oral programs, for the majority of children with a congenital or prelingual severe-to-profound hearing deficiency. I prefer the term *hearing deficiency* or *hearing deficit* because the terms *hearing impairment* and *hearing impaired* suggest that hearing existed and was impaired, which may not be the case. My awareness of this weakness in our terminology dates from being commissioned to make several presentations at a 1986 international symposium in Cartagena, Spain, sponsored by the Congreso Hispano- de Asociaciones de Padres de Deficientes Auditivos, that is, the Hispanoamerican Association of Parents of Auditory Deficients, or children with auditory deficiencies. It struck me that their terminology is much more appropriate than our use of terms such as *hearing impaired* and *hearing loss* in referring to children with congenital hearing deficiencies rather than acquired hearing deficits.

Cued Speech Within the Context of Total Communication

Reasons for Total Communication Problems

There are at least three reasons why Total Communication programs do not produce adequate rates of English acquisition and reading development. First, signs do not, of themselves, teach English words. In fact, it is impossible to teach an English word to a child through signs. Suppose the mother of a deaf child gives him or her, each morning at breakfast, a glass of that wonderful white liquid that comes from a cow, and identifies it with the appropriate sign. The child quickly learns to associate the sign with the substance. He/she can soon indicate that it is good, and ask for more. At this point, however, the child does not associate either the written word or the spoken word with the liquid. In order to teach the word, the mother or teacher must stop signing and either write or fingerspell m-i-l-k, or must teach the spoken word laboriously through many repetitions of the aural/oral input.

The implication of this situation is not that English words cannot be taught in Total Communication programs, but only that every word must be taught, through an interruption in communication. Children using signs learn signs easily through communication, without interruption in the communication. Hearing children, and deaf children with whom Cued Speech is used, learn *words and phrases* through uninterrupted communication. This makes English acquisition much faster and more natural.

The second problem in conventional Total Communication programs is that hearing parents of deaf children in those programs typically do not keep up with their children in signing. Fewer than five percent of such parents keep up with their signing children to the age of seven. My conversations with administrators of large Total Communication programs reveal that the majority of them agree that most hearing parents are unable to contribute significantly to their children's language acquisition or their knowledge of the world. Thus, the most under-used potential in Total Communication programs is probably that of the hearing parents. This is tragic, since abundant research results are available to show that the home is the best language development laboratory for young children.

The third problem in conventional Total Communication programs is that signed communication, though clear and satisfying, does not cause English words to happen in the mind. Thus, though the time spent in communication can be enjoyable and mind-expanding, it does not develop the ability to think in English. This being true, when are English words to become familiar and easy to use?

Before I went to Gallaudet as Vice President for Long-Range Planning in 1965, I was puzzled by three questions about signing programs: Why do most of the deaf children not become good readers? How are the deaf children expected to learn English? Why do the teachers sign and speak at the same time? By the time I reached Gallaudet I had, in my opinion, found the answers to the first two questions, but not to the third. One of the first things I did during my first two years was to visit many schools for the deaf. During those visits I interviewed 400 children in Total Communication programs, in groups of 10 to 50, in an effort to find out what happened in their minds when I signed and spoke to them simultaneously. To each group I explained that I wanted to communicate with them and ask them what happened in their minds. Then I made quote signs in the air, and signed and said: "I want you to work on your *notebook* now." I first asked: "Did you understand me?" All did. Then I asked: "As I communicated to you, in your mind did you hear the words I said?" All

answered in the negative. "In your mind, did you say the words?" All replied negatively. "Did you see the words?" Seven said yes, 393 said no. "Which words did you see in your mind?" All seven said: "notebook." That was the only word I did not sign. I had fingerspelled it, delivering a clear code for the written word. My final question was: "Did you write the words in your mind?" All replied negatively. What did I learn from all this? I had identified all four of the ways in which a person can think English words in response to receiving them: by hearing them mentally, saying them mentally, seeing them mentally, and writing them mentally. My conclusion was that speaking while signing does not cause the English words to happen in the mind. Then why do signing teachers speak when they sign? What is accomplished by doing it? The reason they do it is that they want the children to speak as they sign, that being the only opportunity the teacher has to learn whether the child is progressing in ability to speak.

In 1978 I wrote to 13 deaf teenagers who had grown up with Cued Speech, asking them to tell me what happened in their minds when they think. Eleven wrote back; using the identical words: "I hear myself talking." Another, who has no measurable hearing, wrote: "I feel myself talking." The other one, the most oral of the group, replied: "I see the words." All were reported by their parents to talk in their sleep. All confirmed that in their dreams they could lipread everyone perfectly, and everyone could understand their speech. These young people all think in the spoken language and use it as their base for reading.

Bell quoted Delgarno's suggestion "...that a deaf person should be taught to read and write in as nearly as possible the same way that young ones are taught to speak and understand their mother tongue" (Gordon, 1892, p. 38). He described Delgarno's idea as being "...that we should talk to the deaf child just as we do to the hearing child, with the exception that our words are to be addressed to his eye instead of to his ear." Of course, Delgarno was talking about conveying the written language through his manual-alphabet code. Cued Speech conveys the spoken message through vision, making Delgarno's idea apply to spoken language.

Advantages of Using Cued Speech in the Home

I claim three significant advantages for the use of Cued Speech in the home by hearing parents, and limited use of it in school for speech-and-hearing instruction, for introduction of new vocabulary and language patterns, and even in teaching high-verbal subjects, as confidence in its benefits grows.

First, the consistent use of Cued Speech by hearing parents in the home, as specified in the model, typically results in English acquisition rates and ultimate reading levels far superior to those achieved with other methods and, indeed, comparable to those of hearing children. As we look at research evidence, consider first the evidence that use of Cued Speech at home is much more important than its use at school, as users of Cued Speech have observed.

Hage, Alegría, and Périer (July, 1989) presented a study showing that children who receive Cued Speech both at home and in school demonstrate the greatest gain in performance over lipreading alone; that those who have Cued Speech only at home perform only slightly lower; and those who have Cued Speech only at school perform much lower. Use of Cued Speech at home is much more important than use at school.

Next, let us examine some of the evidence that profoundly deaf children can really learn and understand English through Cued Speech. Nicholls (1979) revealed that 18 prelingually deaf (ranging from 97 dB PTA to 122 dB) children at St. Gabriel's School (NSW), aged 9 to 16 years, scored 96% on key words in cued sentences, without sound. Thus, she demonstrated that Cued Speech is clearly and accurately readable to deaf, children who have had at least three years of Cued Speech experience, Nicholls' study was the only important research evidence at the disposal of Cued Speech advocates until about 1985. It was summarized in a journal article by Nicholls & Ling (1982).

Perhaps the most striking evidence of the ease with which deaf children learn new language through Cued Speech is contained in a study of 11 children carried out by teachers and parents in 1991 in several states, following my design. The results are summarized in *The Cued Speech and Resource Book For Parents of Deaf Children* (Cornett and Daisey, 1992). The eleven subjects, all of whom had received Cued Speech for several years in the home, were given a baseline test on 20 unfamiliar words in Spanish. They were tested first on auditory recognition, then on lipreading with sound, and then with Cued Speech. In the test they were asked identify the correct picture from a group of four of the pictures. They scored slightly below the chance level of 25% , since the words were totally unknown to them, and some of them were reluctant to guess. Then, they were taught the 20 Spanish words in 45 seconds each, with Cued Speech. There were three exposures of 15 seconds each, distributed over a period of 8 days. Each word was spoken and cued, and the associated picture was presented. Next, the test was repeated to determine the effect of learning the words through Cued Speech. The second test was identical with the baseline test administered before the words were taught. Each word was spoken with mouth covered, and the subject was asked to select the correct picture from a group of four of the pictures that had been used in the teaching process. Then each word was tested with mouth visible, and finally with Cued Speech. The results are given in Table 1. They show the dramatic effect of being taught the words with Cued Speech on their ability to

recognize the Spanish words through audition alone, through lipreading with sound, and through Cued Speech, after learning the words in three short exposures to each.

Analysis of Data

The data presented in Table 1 indicate the levels of confidence with which the null hypothesis can be rejected, for the differences of the means on the two administrations of the same test, for audition, lipreading, and Cued Speech. The probabilities that the improvements were the result of chance, rather than of having learned the words through Cued Speech, were less than 0.005 for audition, 0.001 for lipreading, and 0.001 for Cued Speech. The confidence levels were derived from repeated-measures, paired-sample *t*-tests.

The scores on the second test (labelled the pretest) show that the process of learning the Spanish words through Cued Speech prepared the subjects for unisensory auditory and aural/oral identification to a very significant degree, increasing performance over the baseline test by 74% and 162%, respectively. The scores on the Cued Speech presentation suggest that the time spent teaching the Spanish words should be increased to one minute instead of 45 seconds, with four exposures rather than only three, in order to secure Cued Speech recognition scores near 100%. This will be done in the next study, which will include more cochlear-implant recipients. Two of the 11 subjects in this study, A and G, use cochlear implants. PTA thresholds for the other nine ranged from 86 to 113 in the better ear, averaging 99.7 dB. Note that of the 11 subjects one of the two implant users showed the greatest improvement in use of audition from the Cued Speech exposure, though his intellectual ability tests within the average range.

Table 1 Scores on 20 Spanish Words. Auditory, Aural/Oral and Cued Speech Inputs

Subjects PTA	Baseline	Pretest	Posttest
A Impant	5-4-5	9-6-13	13-15-17
B 98	5-3-1	4-11-18	10-13-16
C 105	6-2-5	11-14-15	14-14-17
D 95	6-5-3	8-9-15	12-16-19
E 105	4-4-4	8-11-13	12-17-18
F 103	5-5-9	11-14-16	8-18-20
G Implant	4-8-4	14-18-20	18-20-20
H 113	3-5-4	7-9-10	9-19-20
I 87	6-4-3	9-15-15	14-17-20
J 86	2-2-3	5-5-3	14-19-20
K 105	5-3-4	3-6-6	6-20-20
Means 99.7	4.64-4.09-4.09	8.09-10.72-13.09	11.82-17.09-18.82
Δ		3.45-6.64-9.00	3.73-6.80-6.36
s.d.		3.24-3.59-5.25	2.90-4.94-6.28
t		3.54-6.14-5.68	4.26-4.35-3.36
P<		.005 .001 .001	.005 .005 .005

English Acquisition

We will now examine the additional evidence that exposure to Cued Speech produces rapid learning of English. Berendt, Krupnik-Goldman and Rupp (1990) reported that on the Rhode Island Test of Language Structure, their 36 Cued

Speech subjects ages 5 to 16 years averaged at the 92nd percentile of the hearing-impaired children their age on whom the RITLS was normed. On the Developmental Sentence Score, the expressive measure, Berendt et al found that the Cued Speech children produced correctly an average of 36.5 out of 50 sentences, a result comparable to that of hearing children.

Peterson (1991), on the basis of data on 36 children, 5 to 11 years old, evaluated at the Houston Ear Foundation, reported that the children receiving Cued Speech surpassed the majority of signing and oral children in verbal language skills. Peterson's 11-year background was in Total Communication.

The data collected were from three tests: an informal question test, the Maryland Syntax Evaluation Instrument (MSEI), and the Expressive One Word Picture Vocabulary Test (EOWPVT). Of the 36 children scored, 20 customarily received some form of signed English (most SEE-2), seven Cued Speech, and nine the speechreading (oral/aural) approach. Since the EOWPVT was normalized on children through 11 years old, older children were not included in this study. Table 2 presents the results tabulated for those children who met the following criteria on at least one of the three measures:

1. Answered the question forms with at least 85% accuracy;
2. Formulated at least six perfect sentences (of 10) on the MSEI; and
3. Achieved at least the 20th percentile on the EOWPVT.

Table 2 Verbal Language Skill Performance

Communication Method	Question Test	EOWPVT	MSEI
Cued Speech	6/7 (86%)	4/5 (80%)	5/7 (71%)
Oral/aural	1/8 (13%)	2/9 (22%)	1/9 (11%)
Signed English	3/18 (17%)	2/20 (10%)	1/20 (5%)

Reading Development

Wandel (1989) reported that, on the 1982 reading sub-test of the Stanford Achievement Test, carefully matched groups of profoundly deaf Cued Speech children and hearing children scored at statistically equivalent levels. Oral and Total Communication groups scored much lower. She used four groups of 30 subjects each, carefully matched.

Alegría, Dejean, Capouillez and Leybaert (1990) on the basis of sophisticated research procedures, reported that Cued Speech develops in a deaf child an internal phonological model of the spoken language equivalent to that of hearing children. They concluded that:

Present work strongly suggests that the lexicon developed by the deaf with Cued Speech has properties which are equivalent to the phonology of hearing subjects. In both cases the internal representations of the words are compatible with their orthographic representations. This allows the use of phonological coding to identify unfamiliar words and, as said before, can prime the whole process of reading acquisition.(p. 8)

Their conclusion implies that the child who can identify written words the first time he sees them (if they are in his internal phonological lexicon) can quickly become an autonomous reader.

In the same paper the authors reported on the first of a series of studies they have planned on the effects of Cued Speech on mastery of grammar. This report was on the effects of Cued Speech on mastery of grammatical gender in the French language, which the Cued Speech subjects had mastered. They point out that it is generally conceded that this is a feature to which deaf children have limited access through traditional oral methods.

The presently under-utilized potential of hearing parents can become major aid to success of Total Communication programs in English reading acquisition through their use of Cued Speech at home. In addition, their use of Cued Speech in the home can produce a normal, communicating atmosphere, with resultant family relationships similar to those in families in which the parents are deaf. Such a situation can be in direct contrast to the presently typical pattern of simplistic communication with the deaf child in an otherwise hearing family.

Freedom for Increased Benefits from Signed Communication

Through this model for use of Cued Speech within Total Communication programs, signed communication is freed from the burden it typically carries inappropriately and unsuccessfully, that of teaching English. Signing can then be used most effectively and naturally for what it is best for: communication, explanation, stimulation, social development,

and general learning. After the model has been followed for two or three years, if English acquisition and reading are showing hoped-for gains, educators in a Total Communication program can make an unhurried decision as to whether they wish to move into ASL/English bilingualism, phasing out Signed English, or whether they prefer to continue with what they have. If the decision is to move to ASL, this can be carried out with relative ease, without abrupt changes. They can also give careful consideration to the advisability of increasing use of Cued Speech at school to include instruction in high-verbal subjects such as language arts and social studies.

The practicability of a move to ASL/English bilingualism is supported by 13 years of experience in achieving BSL/French bilingualism in L'Ecole Intégrée and Centre Comprendre et Parler, in Brussels, Belgium. This program was described in a paper delivered by Olivier Périer at the International Congress on Education of the Deaf in 1985 (paper published in 1987) in Manchester, England. In the preschool of the Centre Comprendre et Parler, everything is taught in both Cued Speech and Signed French. As the children approach first grade, in L'Ecole Intégrée, the teachers stop using Signed French and begin providing exposure to deaf role models in Belgian Sign Language. They conduct class work in Cued Speech in French and instruct the parents to use only Cued Speech at home. The authors reported no serious problems in making the children bilingual in Belgian Sign Language and spoken/written French. They also showed that Cued Speech in French is clearly readable, as Nicholls did for English. When the students reach the age of 12, they are taught a third language, Flemish, through Cued Speech.

The Role of Hearing Parents in the Total Communication Model

In this model the role of hearing parents is to do what they can do best; and what comes naturally to them. They can use the language they already know and can deliver it in a form that is clear to their deaf children. The child then learns English the way hearing children learn it, through natural communication in the course of living, with a maximum of interaction a minimum of teaching. Consequently, the problem is only for hearing parents and siblings to spend enough time with the deaf child, allowing encouraging the child to participate fully in the activities and communication of the home. Participating fully is possible only through knowing what is happening, and being able to interject one's own personality. Only one simple tool is needed to assure this-Cued Speech. Most hearing parents can learn the basics in a one-week workshop, and then continue to practice each day after they start using it with their child. Even while they are slow at cueing, parents can express anything they know in English.

After learning the basic system in 10 to 20 hours, parents have no more lessons to take. They can profit by taking advantage of intermediate and advanced instructional opportunities, but many proceed to proficiency on their own. As they continue increasing their cueing skill, their primary task is to use this means of communicating consistently with their child, making extensive use of new experiences and situations that bring up new language, without limit.

Recommended also for use by hearing parents of children in Total Communication programs is the Auditory/Visual Model for maximum enhancement of skill in use of audition. It is described below. There is no reason why a Total Communication program should not live up to its name and produce persons capable of communicating orally, or through signed communication, at will.

Use of Cued Speech in Oral Programs

The most significant advantages of Cued Speech can be obtained with only minor changes in procedures followed at school in an aural/oral program, an auditory/verbal program, or with children using cochlear implants. Consistent use of Cued Speech at home by hearing parents is the most important feature, designed to accelerate English acquisition. At school, new language should be taught initially with Cued Speech. In addition, both parents and therapists should make use of the Auditory/Visual model for enhancement of auditory skills.

The Auditory/Visual Model

The Auditory/Visual Model was designed by Cornett and Walker in 1989 to increase development of skill in use of audition. The rationale for it is based on two basic assertions. First, English acquisition is very inefficient and slow, for most profoundly deaf children, if the children are expected to learn new words and patterns through aural/oral input. A good command of spoken language is essential for maximum use of audition in communication. Second, skill at auditory and auditory/oral recognition of new language is developed most rapidly when the child knows the target, that is, when the new word or pattern is either introduced in Cued Speech before auditory/oral exposure to it, or it is clarified through Cued Speech immediately after the exposure. Auditory and aural/oral practice should, insofar as possible, be carried out with familiar language, already learned through Cued Speech. In the recommended model, this practice is followed both at home and in therapy at school.

The experiment involving the teaching of 20 Spanish words to 11 deaf subjects was conceived and carried out to evaluate the auditory/visual model recommended for aural/oral programs. The baseline and pretest data presented earlier were relevant to the Total Communication model, since they demonstrate the effects of learning new language through Cued Speech, an ability to recognize that material through auditory and aural/oral inputs, without any actual training other than the learning of the words through Cued Speech. The final step in the experiment was to evaluate the effects of the auditory/oral training procedure recommended in the model, for use by hearing parents at home. The training protocol involved a total of about 5½ minutes per word over a period of eight days. After the training the post-test was administered, following exactly the same procedures as in the baseline test and the pre-training tests. In summary, the baseline test was to establish that the children had no familiarity with the 20 Spanish words; the pre-training test was to evaluate the effect of learning Cued Speech on ability to recognize the words through audition, aural/input, and Cued Speech, respectively; and the identical post-training test was to evaluate the effect of the coordinated training procedure on ability to recognize the words through each of the inputs.

Training Procedure A of the experimental study involved first presenting each picture and giving the word in Cued Speech, then asking the child to repeat it. Next, the same word is repeated aural/orally without cues, the picture is shown again, and the child is again asked to repeat it. Finally, the word is presented through audition alone, the picture is shown and child is asked to say the word again. This procedure, Training Procedure A, is repeated for each of four words. Notice that the progression is from easy to difficult: Cued Speech, then lipreading with audition, then auditory-only.

Training Procedure B is carried out on the same four words. In Procedure B the first word is presented through audition alone. The child is then instructed: "Show me _____" and is allowed to choose from four pictures, one of which is the correct one. If he selects the correct picture he is directed: "Say _____". If he selects the wrong picture, the word is presented with the mouth visible, and the child is then asked again identify and say the word. Finally, the word is presented in Cued Speech and the child is asked to identify the word and say it. Notice that the progression in Training Procedure B is from difficult (unisensory) to intermediate (aural/oral) to easy (Cued Speech).

The training phase of the project was carried out in a total of 108 minutes (under 5½ minutes per word) spread over a period of eight days. The children were then given a post-test identical with the baseline and pretraining tests. This test reflected their progress in unisensory and aural/oral identification of the 20 Spanish words as a result of the training procedures. The results of the three tests appear in Table 1.

Discussion of Results

The data in the last line of Table 1 indicate the levels of confidence with which the null hypothesis can be rejected, for the differences of the means on the pretest results versus the corresponding baseline test results, and on the means of the post-test results versus those of the pretest. The probabilities that the mean pretest gains in unisensory, aural/oral and Cued Speech decoding are due to chance, rather than being taught the Spanish words, are less than 0.005, 0.001, and 0.001, respectively. The probabilities that the further gains in unisensory, aural/oral and Cued Speech decoding on the post-test were due to chance, rather than to the training protocol, are all less than 0.005. Confidence levels were derived from repeated-measures, paired-sample *t*-tests.

The scores on the pretest show that the process of learning the Sp words through Cued Speech prepared the subjects for unisensory aural/oral identification to a very significant degree, increasing performance over the baseline test by 74% and 162% ,respectively. The effectiveness the training procedure is shown by further improvements in unisensory and aural/oral identification of the words on the post-test, of 46% and 59.4%, respectively, in comparison with the pretest performances. Unisensory performance on the post-test could probably be increased by increasing the amount of coordinated training to somewhat more than 5½ minutes per word.

The room for gain in Cued Speech performance on the post-test was not anticipated. It was expected that performance with Cued Speech would be near perfect on the pretest, since all four subjects in a 1989 pilot study scored 100% with Cued Speech on the pretraining test on both aural/oral and Cued Speech decoding, and 79% with unisensory input. However, the four subjects in the pilot experiment were all accustomed to auditory training with Cued Speech. The results with 11 subjects suggest that the time spent teaching the Spanish words should be increased to one minute instead of 45 seconds, with four exposures rather than only three. This will be done in the next study, which will be on cochlear-implant recipients. Two of the subjects in this study, A and G, use cochlear implants. PTA thresholds for the other nine ranged from 86 to 113 in the better ear, averaging 99.7 dB.

We know of only one published study on the effects of Cued Speech on use of residual hearing. Charlier and Paulissen (1986) summarized:

The subjects of this research were effectively able to utilize the support of the cues to improve their auditory recognition. And far from diverting the auditory attention of the

children, the presence of the cues of Cued Speech was able to support in them a better phonetic discrimination through audition. (as quoted in Cornett, 1990, p. 83)

Summary

No single method—Total Communication, auditory/verbal, aural/oral, or Cued Speech, is adequate to meet all the needs of a deaf child, much less of all deaf children. Their needs should be met through the use of a combination of instructional and communication tools that complement each other and address all his/her needs.

Both Total Communication and oral methods are inefficient in producing acquisition of verbal language and in reading development, for a majority of profoundly deaf children. Verbal language and reading comprehension levels have not improved significantly in the last 100 years. Both Total Communication and oral programs need to include appropriate use of Cued Speech to meet these crucial needs.

The potential of hearing parents of children in Total Communication programs is sadly underused. Their contribution to the development of their deaf children is woefully less than it could be if they used Cued Speech home.

Development of skill in use of audition and in speech production can be enhanced substantially, in both Total Communication and oral programs, through the appropriate use of Cued Speech, as outlined in the training procedures of the aural/oral model.

References

- Alegría, J., Dejean, K., Capouillez, J., & Leybaert, J. (1990). Role played by the Cued Speech in the identification of written words encountered for the first time by deaf children. *Cued Speech Journal*, 4, 4-9.
- Allen, T. (1986). A study of the achievement patterns of hearing-impaired students, 1974-1983. In M. Karchmer & A. Schildroth (Eds.), *Deaf children in America* (pp. 161-206). Boston: Little Brown & Co.
- Berendt, H., Krupnik-Goldman, B., & Rupp, K. (1990). *Receptive and expressive language abilities of hearing-impaired children who use Cued Speech*. Unpublished master's thesis, Colorado State University, Fort Collins.
- Charlier, B. L. (1992). Complete signed and cued French: An original signed language-Cued Speech combination. *American Annals of the Deaf*, 137, 4, 331-337.
- Charlier, B. L. & Paulissen, D. (1986). Audiometrie Vocale et Language Parlé Complete (L.P.C.) [Speech audiometry and Cued Speech]. *Otica*, 10(19). Abstracted in *Cued Speech Journal*, 4, 82-83.
- Commission on Education of the Deaf. (1988). *Toward equality, education of the deaf*. Washington, DC: U.S. Government Printing Office.
- Cornett, R. O. (1990). Annotated bibliography of research on Cued Speech. *Cued Speech Journal*, 4, 77-99.
- Cornett, R. O., & Daisey, M. E. (1992). *Cued Speech Resource Book For Parents of Deaf Children*. Raleigh, N.C.: National Cued Speech Association.
- Geers, A., Moog, J., & Schick, B. (1984). Acquisition of spoken and signed English by profoundly hearing impaired children. *Journal of Speech and Hearing Disorders*, 49, 378-388.
- Gordon, J. C. (Ed.) (1892). *Education of deaf children: Evidence of Edward Miner Gallaudet and Alexander Graham Bell presented to the Royal Commission of the United Kingdom on the Condition of the Blind, the Deaf, and Dumb*. Washington, D. C.: Volta Bureau.
- Hage, C., Alegría, J., & Perier O. (1989). *Cued Speech and language acquisition*. Paper presented at the Second International Symposium on Cognition, Education and Deafness, Washington, D.C. (Reprinted in *Cued Speech Journal*, 4, 1990).
- Merrill, E. C., Jr. (1991). Perspectives on deafness. In *Perspectives on Deafness, A Deaf American monograph*, 41, 95-97.
- Nicholls, G. & Ling, D. (1982). Cued Speech and the reception of spoken language. *Journal of Speech and Hearing Research*, 25, 262-269.
- Périer, O., Charlier, P., Hage, C., & Alegría, J. (1987). Evaluation of the effects of prolonged exposure to Cued Speech practice upon reception of spoken language. In I.G. Taylor (Ed.), *The Education of the Deaf – Current*

Perspectives, 1, 1985. International Congress on the Education of the Deaf. pp.616-628. Beckenham, Kent, UK: Croom Helm, Ltd. (Reprinted in *Cued Speech Journal*, 4, 1990).

Peterson, M. (1991). Data on language of profoundly deaf children with oral, signing and Cued Speech backgrounds. Unpublished data and analysis supplied by correspondence. Annotated in Cornett, R. O., & Daisey, M. E. (1992). *The Cued Speech Source Book for Parents of Deaf Children*. Raleigh, N.C.: National Cued Speech Association.

Pintner, R. and Patterson, D. (1916). A measure of the language ability of deaf children. *Psychological Review*, 23, 413-436.

Wandel, J. (1989). *Use of internal speech in reading by hearing and hearing-impaired students in oral, total communication and Cued Speech programs*. Unpublished doctoral dissertation, Columbia University, New York. An extended annotation is in the *Cued Speech Journal*, 4, 1990, pp. 1-3.

An earlier version of the previous paper was presented at the convention of the Texas chapter of the Alexander Graham Bell Association for the Deaf Austin, Texas, October 2, 1993.

Permission to copy: The National Cued Speech Association, Inc, the copyright owner of this document allows single copies to be made for personal use, or multiple copies for classroom use. This consent does not extend to other kinds of copying including (but not limited to) copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.