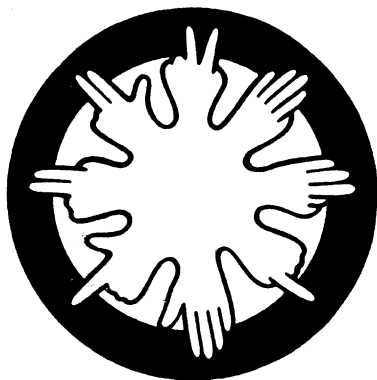


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Volume 2

Summer, 1986



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NATIONAL CUED SPEECH ASSOCIATION**

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Organized and incorporated in 1983, the National Cued Speech Association is committed to the educational development of Cued Speech. Specific goals of the Association include publications and research, Cued Speech program guidelines, certification, interpreting, new parent support, parents' rights and advocacy, and the additional concerns of hearing-impaired adults as well as children.

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Cued Speech Annual

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TEACHING WITH CUED SPEECH: THE MIDDLE YEARS

Barbara Lee, M.A., Deaf Education Coordinator
Ascension Parish Public Schools, Louisiana

In September, 1979, a deaf education program was started in Ascension Parish, Louisiana. In September, 1980, Cued Speech was added to the year-old program, making Ascension Parish the first school system in Louisiana to recognize Cued Speech as an intervention tool. It was decided to use Cued Speech for five years and to document carefully the progress of the students using this tool and of the students using oral-only intervention procedures. To do this, very specific goals were established to serve as objectives against which the results could be measured. The status of the children would be assessed at the beginning and end of each school year by giving them language tests standardized on hearing children. The present study describes the middle years (1981-1984) of the program.

Five years was selected for the time frame because Dr. R. Orin Cornett, the inventor of Cued Speech, had stated in a personal communication with the author that it would take approximately two years for the children to learn the system and to decode it rapidly. Dr. Daniel Ling had also advised in a personal communication with the author that the Ascension Parish program should allow children at least three years to finish the Ling speech program and six years to develop language. These two guidelines were compatible with the established fact that it takes a normal hearing child from birth to approximately five or six years of age to develop speech and language to a fluent level. Therefore, it was reasonable to give a deaf child a comparable amount of time. Finally, it was the author's judgment that to modify the program for a shorter time frame, such as one or two years, would not be in the best interests of total program development.

To study the children's progress, the following terminal and interim goals were established:

Terminal: The child will function linguistically on the level of his chronological age using intelligible speech as his expressive communication system.

Interim: 1. The child will function linguistically in the same range as his non-verbal intellectual capacity.

2. The child will function academically on the level of his hearing age.

3. The child will be mainstreamed for his academic classes with hearing children.

4. The child will make nine months progress during the nine months time of each school year as measured by language and academic tests standardized on normal hearing children.

Standardized language and/or developmental measures that were used to evaluate the progress of the children were the Learning Accomplishment Profile, the Boehm Test of Basic Concepts, the Vocabulary Comprehension Scale, the Peabody Picture Vocabulary Test (Form A and the Revised Form L), Test of Auditory Comprehension of Language, Test of Language Development (Primary and Intermediate Level), Developmental Sentence Scoring, the Grammatical Analysis of Elicited Language, and the Woodcock-Johnson Test of General Knowledge. The children were also given two academic achievement tests: the Stanford Achievement Test administered by the Office of Demographic Studies at Gallaudet College and the Comprehensive Test of Basic Skills administered by the parish.

With the time frame established, the goals firmly stated, and the evaluation procedures set, the Ascension Parish Cued Speech program was launched with one teacher, one teacher aide, seven children, a supportive administration, and involved parents. An accounting of the first year (school year 1980-81) was published in the **Cued Speech News** in December, 1982.

While the author recognizes that no two situations are exactly the same, the objective of this article is to provide information and encouragement to whoever may be involved in establishing a deaf education program in the future, so that the mistakes may not be repeated, problems avoided, and results improved upon.

Development of the Language Program

The language curriculum that evolved during 1981-84 was the product of teachers and children who became partners in teaching each other. The curriculum is still undergoing frequent revision and refinement, but the basic content has been established.

It is common knowledge that normal hearing children, who develop language so effortlessly, receive the following three essentials from their environment: (1) clear input, (2) appropriate input, and (3) a sufficient quantity of input. The reasoning that guided the development of the language program was that if deaf children who had no other handicapping conditions had the same three essentials, they could develop language in much the same way as a hearing child. In the Ascension Parish program, Cued Speech was used to provide the clear input. The Bloom and Lahey (1978) model of normal language development was used to provide the appropriate input. Active, involved parents assured continuity between home and school so that the child had the sufficient quantity of input. When the three components came together, the deaf child, like the hearing child had an environment that provided a sufficient quantity of clear, appropriate language input.

The philosophy of what was essential for language development, the intervention tools to provide the essentials, and teaching procedures based on learning theory from behavioral psychology comprised the foundation of the language curriculum. This paper will make no attempt to discuss in detail the Bloom and Lahey model except to state the timelines that were established for teaching its content. The five-year language program developed in Ascension Parish is as follows:

First year in training -- Phase I -- Single words:

The child will say, or cue and say, in spontaneous situations between 50 and 100 single words which will include at least one word from each of the categories on Phase I.

Second year -- Phase II & III -- Simple phrases:

The child will say, or cue and say, in spontaneous situations the words and/or short phrases from at least 80% of the categories on Phase II and III.

Third year -- Phase IV & V -- Phrases to sentences:

The child will say, or cue and say, in spontaneous situations the phrases and/or simple sentences from at least 80% of the categories on Phase IV and V.

Fourth year -- Phase VI, VII, & VIII -- Complex sentences:

The child will say, or cue and say, in spontaneous situations the complex sentences from at least 80% of the categories on Phase VI, VII, and VIII.

Fifth year in training:

This year is to be used at any of the above levels where the individual child does not, for whatever reason, make satisfactory progress and needs more time to achieve the goal for that level.

Using the above timelines, a deaf child is given five years to develop language -- the same as a hearing child. However, obviously, it is possible for a child to move through the program in less than the stated time. If an individual child reaches the goal for any phase before the allotted time, he then begins work on the next phase regardless of the time. Our experience has been that most (but not all) profoundly deaf children will need the full five years; however, hard-of-hearing children with good amplification frequently complete the program in less time.

We identified and implemented six language program principles during the middle years:

1. The primary responsibility of deaf education is to teach language.

With rare exceptions, all deaf children and most hard-of-hearing children have language problems. When these

children are preschoolers, they are too young to have a formally defined academic problem, but the language problem is usually already quite obvious to trained professionals and to casual observers. Because the preschool years are the critical age for language development, the first goal of intervention must be for language learning: (i.e., for learning what normal hearing children learn at that time); what words mean (semantics); how to put words together (syntax); and appropriate use of words in situations (pragmatics). The educational discipline initially responsible for these children during the preschool years is deaf education. Therefore, it is imperative that deaf education assume the responsibility for alleviating the language problem by developing comprehensive programs that address all aspects and levels of language learning.

In Ascension Parish, the main focus of deaf education is on facilitating the child's language development from the time he enrolls until he achieves the terminal goal of the program. Language goals are the first concern of intervention. In the classroom the child spends most of his time in situations and activities contrived to facilitate learning language. Other developmental areas are not ignored, but goals for motor and social development and science and math are secondary to the language teaching which occupies the majority of each school day in deaf education classes.

2. The program will follow as closely as possible the same developmental sequence that hearing children follow when learning language.

In the classroom deaf children are allowed to say, or say and cue, the same kinds of non-grammatical sentence fragments that hearing children say at the same level of development; to make the same kinds of grammatical errors that hearing children make at the same level of development; and to answer questions with the same kinds of incomplete sentences that hearing children use at the same level of development. While the non-grammatical sentence fragments and the grammatical errors would not be encouraged (and proper models would always be used), neither would they be punished. They would be considered normal and correct for that level of development.

An example of a non-grammatical sentence fragment that would be considered normal and correct is when a Phase II child picks up a clean sock and then a dirty sock and says, "no dirty...this dirty." An example of a grammatical error that would be considered normal and correct is when a Phase IV child who is drawing says, "I writing circles" and omits the auxiliary verb. An example of answering a question with an incomplete sentence that would be considered normal and correct is when a Phase VIII child is asked, "Why?" and answers, "because the zoo keeper closed it," (Bloom and Lahey, 1978).

3. In making program decisions, the frame of reference will be the normal-hearing child.

In the classroom the focus of the developmental language program will be on teaching spoken language before academics and before written language. Deaf children will not be given academic tasks until they are at the same level in spoken language as hearing children who are doing the same academic tasks. Deaf children will not be expected to decode written language (i.e. read) until they are at a comparable level of spoken language with hearing children who are learning to read. Deaf children will not be taught to write sentences until their spoken language levels are comparable to those of hearing children learning to write.

Our preschool classrooms became "talking rooms," not "paper and pencil rooms." Great time and emphasis was placed on setting up communication situations in all the classrooms and allowing the children to practice talking. The rooms do not have the trappings of typical deaf education classrooms. There are no slot charts and sentence strips, There are, however, a plethora of things in the classroom to encourage talk.

The sort of classroom described above is not common in deaf education. Frequent visitors have reminded us again and again that the focus of our classrooms and the procedures we follow are quite different from traditional deaf education. We came to recognize and accept these differences as a necessary part of the process in an innovative intervention system.

4. In writing a child's IEP, the most important consideration for language teaching is his language age and/or his functional language level -- not his chronological age.

The children are given a teacher-designed assessment to determine which phases of the Bloom and Lahey model they are using in their expressive language. If criteria for that phase are met, language teaching begins at the next higher level. If criteria for an expected phase are not met, language teaching for that phase begins, regardless of chronological age. Concessions are made for chronological age in the interactive style of the teacher, in the grouping of children (when possible), and in the choice of materials (i.e., teenagers enjoy talking about motorcycles and movies rather than toys and dolls). However, if an older child does not say, or cue and say, "ing" and "ed" endings, "s" or "z" sounds to indicate plurals and possessives, or "because" as a conjunction, it is our position that those are necessary language behaviors to be learned, regardless of chronological age.

Actually, at one time a six-year-old, a ten-year-old and a thirteen-year-old were all working on Phase VII. These three children happened to be in three different deaf education classes. However, at another time, this author had a six-year-old and a twelve-year-old working on Phase VIII in the same group. For this teacher it was far more efficient to group according to language level than according to chronological age.

5. When evaluating a child's progress, the two primary considerations will be his hearing age and his language age.

Hearing age refers to the length of time a deaf child has worn hearing aid(s) and/or been in a training program (Pollack, 1970). Language age refers to a language age score on certain standardized tests. Comparing language age to hearing age gives a reasonably valid measure of progress the child has made since entering training. For example, if a child has a hearing age of 3-0 and a language age score of 3-0, he would be considered to be making good progress -- regardless of his chronological age -- because he has achieved three years of language during the three years time he has worn hearing aids and/or been in a training program. Ultimately the child should function linguistically at his chronological age, but during the learning process his progress should be evaluated in terms of his hearing age.

6. Decisions regarding a child's placement and/or progress on the language learning sequence will be based on his performance.

One should always insure that decisions regarding a child are based on actual data and not on what a parent or teacher thinks the child knows or on what they think the child can do or say. Decisions must be substantiated by a child's performance, which could be non-verbal or verbal (receptive or expressive). Whatever the performance, it must be measurable. We recognize that a child's performance is subject to a great deal of variance which must be taken into consideration. Even so, performance is still likely to be a more reliable measure than an unsubstantiated opinion or "feeling" by either parent or teacher.

Teachers are instructed to verify their feelings with hard data from test scores and tally sheets. Parents are asked to verify their ideas or opinions of the child's knowledge or performance with examples which can be replicated and scorable in the classroom. When feelings and opinions are accurate, it isn't difficult to secure data or performances to confirm them. However, when feelings and opinions are not confirmed by data and performance, their accuracy should be subject to review and to question. The most appropriate decisions made about the children are those based on

feelings substantiated by data and opinions verified by performance.

Determining Which Children Should Use Cued Speech

In reality, the initial decisions regarding the six children who started using Cued Speech in 1980 were based on one simple condition: the parents either requested it or agreed to it when given a choice by the professional staff. However, as the years progressed, more definite guidelines were developed which related directly to the individual child's hearing age, chronological age, and his rate of progress.

Quite simply, if the child's language age scores on language tests standardized on normal hearing children were approximately the same or better than his hearing age, he was judged to be making adequate progress in learning language with oral/visual input and did not need additional help from Cued Speech to make the input clear. The resulting recommendation would be to continue with an oral/visual intervention program.

If, on the other hand, the child's language age scores on language tests standardized on normal hearing children were considerably below his hearing age, he was judged not making adequate progress in learning language with oral/visual input and, therefore, in need of additional help from Cued Speech to make the input clear. The resulting recommendation was to include Cued Speech in the intervention program.

If at any time a child who was judged to be making adequate progress in learning language with oral/visual input did not continue to learn at his previously acceptable rate, he was judged to need additional help from Cued Speech. The resulting recommendation was to add Cued Speech to his intervention program.

If at any time the child on Cued Speech did not continue to learn at his previously acceptable rate, a special conference was called and parents were made aware of the situation. Parents and teachers then attempted to devise an even more intense intervention program to insure that the child was getting a sufficient quantity of clear, appropriate input.

The professional staff only made recommendations about whether a child should cue at home or not. Parents made the final decision. Sometimes the parents elected to follow the recommendations, sometimes not. These guidelines, like others discussed in this paper, were not always strictly adhered to, but in retrospect they do appear to be valid educational criteria on which to base recommendations regarding the use of Cued Speech.

Development of Guidelines for Mainstreaming

The LeBlanc Special Services school where the Ascension Parish preschool and elementary deaf education program is housed serves every exceptionality in special education except the gifted and talented. It is located on the same campus as Gonzales Primary School, a regular elementary school, which has kindergarten through fourth grade. While each school is administratively separate, having its own principal, faculty, and staff, the two schools are geographically adjacent, which allows a deaf child to go from a special education facility to a regular education facility by simply walking across the playground or out of one building and into another. The physical arrangements were ideal for mainstreaming of students who did not have to be bussed from one school to another; for the teachers who could confer with each other at a moment's notice; and for the parents who could come to one location for a conference with a regular education teacher, a special education teacher, a speech clinician, an occupational or physical therapist, and a principal -- if necessary. By definition in Public Law 94-142, LeBlanc would have to be considered a very restrictive environment because it is a day school serving only handicapped students. In reality it was not a restrictive environment at all due to the proximity of Gonzales Primary School. This physical proximity also provided the deaf educators with an everpresent frame of reference of normal hearing children which helped to keep the expectations for deaf children on a par with their hearing peers.

The guidelines that follow apply mostly, but not exclusively, to developmental children rather than to remedial children. Developmental children are those whose functional language levels are close to their hearing and chronological ages. Remedial children are those whose functional language levels are well below their hearing and chronological ages. Developmental children need to keep up. Remedial children need to catch up.

During the middle years the guidelines were not always adhered to for a variety of reasons. In retrospect, the children who were most successfully mainstreamed were the ones who met, or came very close to meeting, the guidelines. It was much easier to follow the guidelines for developmental children than for remedial children. For remedial children, the mainstreaming guidelines were considered, but the decisions were almost always made on an individual basis.

The guidelines apply only to academic mainstreaming. The term refers to a deaf child being placed in a regular education class for primary instruction in a given academic area. Social mainstreaming refers to a deaf child being placed in situations with hearing children which are strictly social, with no academic constraints. Social mainstream-

ing at recess, lunch, in the library and at assemblies was readily available at Gonzales Primary School. Social mainstreaming was not a primary concern of deaf education, and the parents were encouraged to mainstream their children socially away from school through scouting, team sports, and church youth groups.

Academic mainstreaming was of paramount concern in our deaf education program because one of the major goals of the program was that the deaf child would get his academic education in regular classes. This author recognizes that for some children such a goal is unrealistic, and it is necessary for academic instruction to be provided by deaf education personnel. However, that fact did not warrant changing the goal of the program; it only brought about the availability of two placement options for academic education.

Guidelines for Academic Mainstreaming

There are three types of academic mainstreaming: (1) complete, meaning the child goes to regular classes for all academic subjects on the same grade level; (2) basic, meaning the child goes to regular classes for, let's say, reading and math, which may or may not be on the same grade level; and (3) partial, meaning the child goes to at least one regular class for whatever subject on whatever grade level is deemed appropriate.

We keep certain basic considerations in mind for all types of academic mainstreaming:

1. The child's language age is a far more important consideration than chronological age when selecting a grade level placement.
2. The child's language age on language comprehension tests should be within one year of the chronological age of the class into which he is mainstreamed.
3. The child should have completed the language program based on the Bloom and Lahey model before academic mainstreaming is considered. (An important exception to this is the preschool, developmental child who is socially mainstreamed to be in an environment with normal models for language stimulation. This is not academic mainstreaming.)
4. The child must maintain a "C" grade or get approximately 75% of the information in all academic subjects for which he is mainstreamed when graded on the same standards as the hearing children in the class.

For complete mainstreaming or basic mainstreaming on the same grade level:

5. The child's chronological age should be no more than two years older than the chronological age of the hearing students in the class. A three year age difference is the maximum advisable for complete or basic mainstreaming on the same grade level.

For partial mainstreaming:

6. The child should be mainstreamed into a class where he is successful (i.e., maintain a "C" grade or better regardless of his chronological age). If his chronological age is more than three years older than the chronological age of his hearing classmates, he may not be a candidate for mainstreaming. It's an individual decision.

Monitoring the Mainstream Placement

Almost as important as the initial decisions regarding mainstreaming is the on-going monitoring of the mainstream placement by the child's deaf education teacher. Monitoring is extremely time-consuming for the teacher, but it is an essential part of the process and can usually be accomplished by a combination of the procedures described below.

Deaf education teachers could receive daily feedback if necessary from either the regular education teacher for an oral child or from both the Cued Speech interpreter and the teacher in the case of a Cued Speech child. Teachers and interpreters at Ascension Parish were "in-serviced" regarding the most likely potential problems, and they became very sophisticated in identifying and analyzing difficulties -- which were almost always language problems -- and reporting critical information to the deaf education teacher. That teacher could then address the problem as a language problem in the vocabulary or sentence structure lesson and/or ask the parents, who received a note about each day's activities, to provide more input at home in a specific area. Because it was virtually impossible for the deaf education teacher to monitor personally every class every day, this feedback system became the primary means of communication between regular education and deaf education. The deaf education teacher could then personally monitor the problem areas.

Another monitoring procedure that was utilized particularly when the placement was tentative was for the deaf education teacher or the interpreter to ask five comprehension questions following a lesson taught by the regular edu-

cation teacher. This was most often done after the reading lesson or, in the case of kindergarten, after the social living lesson. After listening to the classroom teacher during the lesson, the deaf education teacher or interpreter would ask the deaf child five of the same questions that were asked during the lesson. The criterion was 80% accuracy or four out of five correct answers. When this was done over an extended period of time, a pattern emerged that gave highly useful information regarding the appropriateness of the placement.

Another technique used particularly with a hard-of-hearing preschooler who was mainstreamed in the morning to a private preschool was to say to the child when he came to LeBlanc in the afternoon, "Tell me what you did this morning." The teacher could then tally the number of communication attempts, compute the mean length of utterance, note new vocabulary words, and judge whether the complexity was what the teacher would expect the child to be using.

In no other area of program development are there more difficult decisions, more anxiety, more controversy or more difference of opinion than there are regarding mainstreaming. In spite of all the guidelines and the monitoring procedures, there is one factor that has the potential to override all others -- what the parents requested for their child. A child can be placed in a mainstream class contrary to all professional recommendations if the parents vehemently insist on such placement. However, the parents have to take the responsibility for such placement on the IEP. Therefore, the above guidelines are only that -- guidelines. They still undergo frequent scrutiny and revision in Ascension Parish because they are directly related to the goals of this program. For this reason they may or may not be applicable in another situation.

Development of Evaluation Procedures

As stated earlier, the children are all given a language test battery at the beginning and end of each school year. The scores from these tests are the measure against which the staff evaluate the effectiveness of the intervention procedures in meeting the goals of the program. Four charts were developed for evaluation purposes which do two things: (1) compare the child's progress to his personal goals and to the goals of the program, and (2) display the information so it is easily understood by parents and professionals. Three charts use language age scores, and one chart uses scores that are given in percentages. The charts represent objective, concrete measures which cannot be ignored or rationalized away by either parents or teachers. Thus, the evaluation procedures and the charts on which the results are displayed provide extremely valuable information which is used in the following ways:

1. to assist the teachers in being accountable for meeting the goals for each child and the program;
2. to provide the parents with realistic information about where the child is functioning in language development and the progress he has (or has not) made; and
3. to provide both teachers and parents with data on which to base recommendations and decisions about continuing or modifying the child's current intervention procedures and placement. This has particular relevance for recommending whether to use Cued Speech or not.

The first chart to be developed (see Figure 1) was one which compares the child's language age scores to his chronological age (C.A.) and to his hearing age (H.A.) This is related to the goal of the program that the child would function linguistically on the level of his chronological age and academically on the level of his hearing age. To display this, a chart that had "ages" on the abscissa and "dates" on the ordinate was used. Vertical lines divided the calendar year into a nine month segment for the school year and a three month segment for the summer. Two parallel lines were drawn diagonally across the chart. The top line represented the child's C.A. at the time he entered the Ascension Parish program, and the bottom line represented the child's H.A. at the same time. Both of these lines went up at an even, constant rate. Obviously, the child got older every day, regardless of his language or academic progress. Language age scores were then plotted on the vertical line indicating the date on which he took the test. By comparing the child's test scores to his C.A. and H.A., there was objective visual information showing whether he was linguistically above his C.A. or H.A. level, on these levels, or below C.A. or H.A. level. By plotting these relationships for several years, it was possible to determine if the child was keeping up with his C.A. or H.A. as developmental children would be expected to do, or catching up as remedial children would need to do.

The second chart that was developed compared the child's rate of progress to the goal of making nine months progress in the nine months of each school year, or twelve months progress during the calendar year. This chart looked exactly like the C.A./H.A. chart except that it had numbers which represented progress in years on the abscissa and numbers which represented time in years on the ordinate (see Figure 2). A single diagonal line drawn across the chart represented nine (or twelve) months progress in comparable time frames. A child's initial score was plotted on the chart as zero (0), and nine months or one year later the initial score was subtracted from the current score to determine the months of progress. This number was then

CHRONOLOGICAL AGE / HEARING AGE

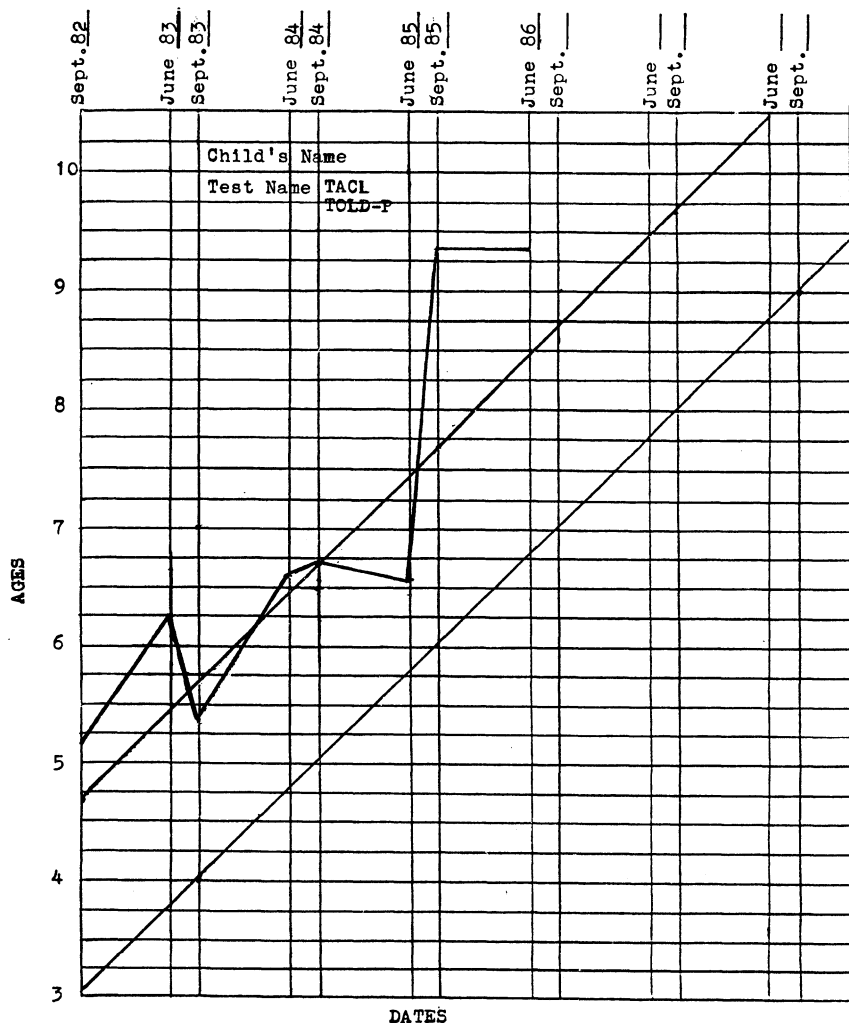


Figure 1. Language age scores on the TACL and the Grammatical Understanding subtest of the TOLD-P are compared to the child's chronological age (top line) and to his hearing age (bottom line).

RATE OF PROGRESS

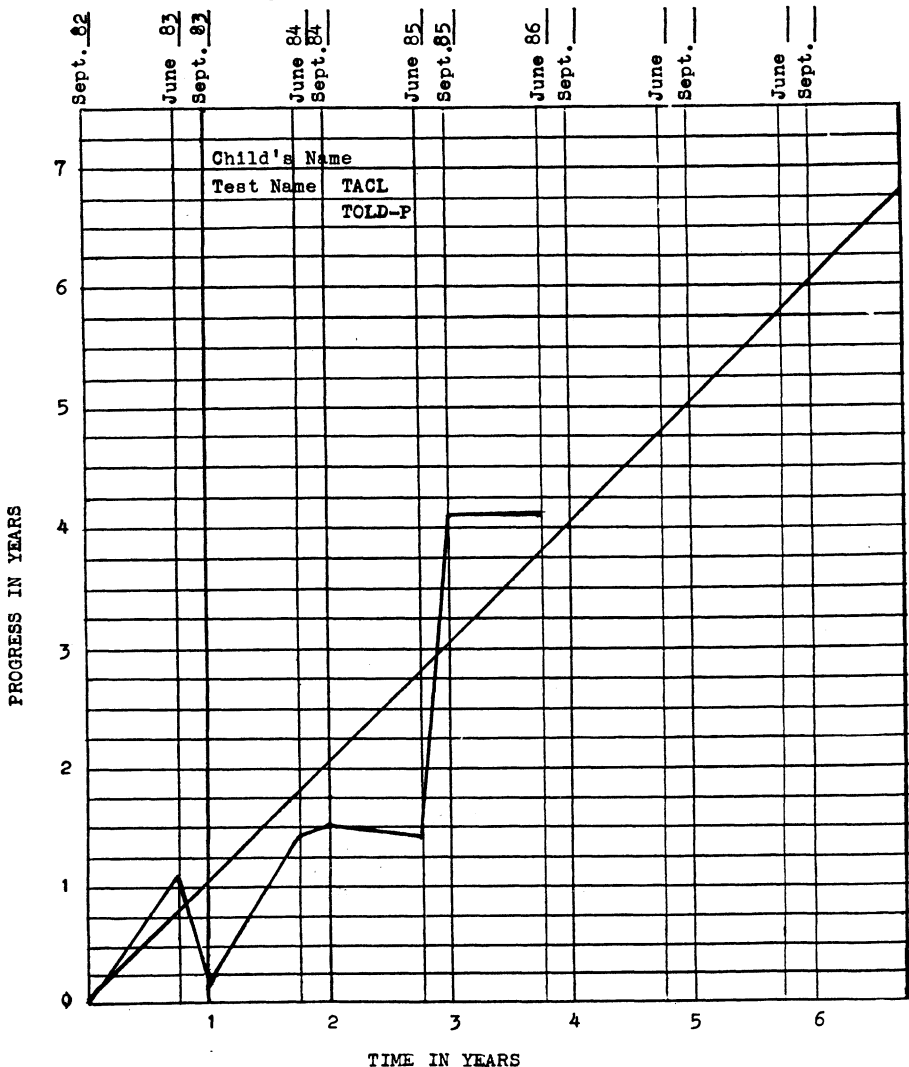


Figure 2. Language age scores on the TACL and the Grammatical Understanding subtest of the TOLD-P are compared to the average rate of progress of a hearing child..

plotted on the appropriate vertical line. By plotting the child's rate of progress against a standard rate of progress, there was objective visual information about whether a child was making an acceptable gain of progress. By plotting this type of information for several years, it was possible to determine if the child was consistently learning at the same rate as hearing children, which was acceptable; faster than hearing children, which was desirable for remedial children; or slower than hearing children, which was not desirable for any child. It was also possible to determine if there was a significant difference in the child's rate of progress during the school year and during the summer.

The third chart (see Figure 3) compares the child's language age scores to the appropriate age for the grade into which he is mainstreamed or for which mainstreaming is being considered. It relates to the guidelines of having the child's language age within one year of the appropriate age for the grade which is being considered for mainstreaming. The chart looks exactly like the C.A./H.A. chart except that it has ages and grade equivalents on the abscissa and dates on the ordinate. A grade of 2-0 was assigned an age equivalent of 7-0; a grade of 4-0 was given an age equivalent of 9-0. The two diagonal parallel lines were drawn across the chart. The top line represented the lower extremity that could meet the guideline for appropriate mainstreaming. The lines went across the chart at an even, constant rate. The language age scores were then plotted on the appropriate vertical line, and parents and teachers had objective visual information indicating whether the child was linguistically within one year of the grade level which is being considered for mainstreaming. Even though all the language age scores were plotted on this chart, the tests of syntactical or grammatical comprehension were the ones most predictive of successful mainstreaming.

The last chart that was developed (see Figure 4) was one to display the percentages correct on tests which did not give language age scores, such as the Vocabulary Comprehension Scale and the Boehm Test of Basic Concepts. Numbers for the percentages are on the abscissa, and dates of testing are on the ordinate. The percentage correct is plotted on the appropriate vertical line. The child should continue taking the tests until he meets the criterion of 80% correct on two consecutive test dates. This type of chart gives the parents and the teachers objective visual information about the progress the child is making, the consistency of that progress, and how close he is to meeting the criterion.

While the final evaluation has not been made nor the five year program completed, it is the opinion of this author that the guidelines for teaching language, for mainstreaming, and for evaluating the effectiveness of interven-

PERCENT CORRECT

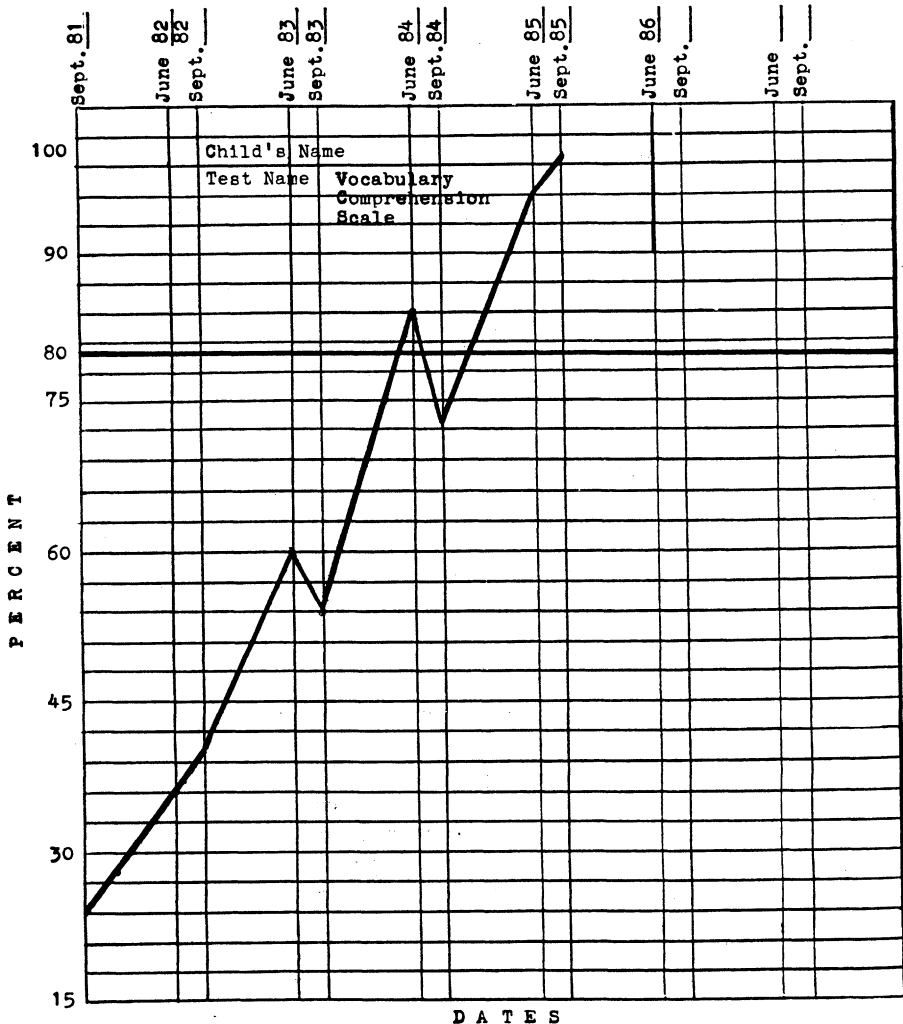


Figure 4. Percent correct scores are shown in relation to the criterion of 80% correct.

MAINSTREAMING

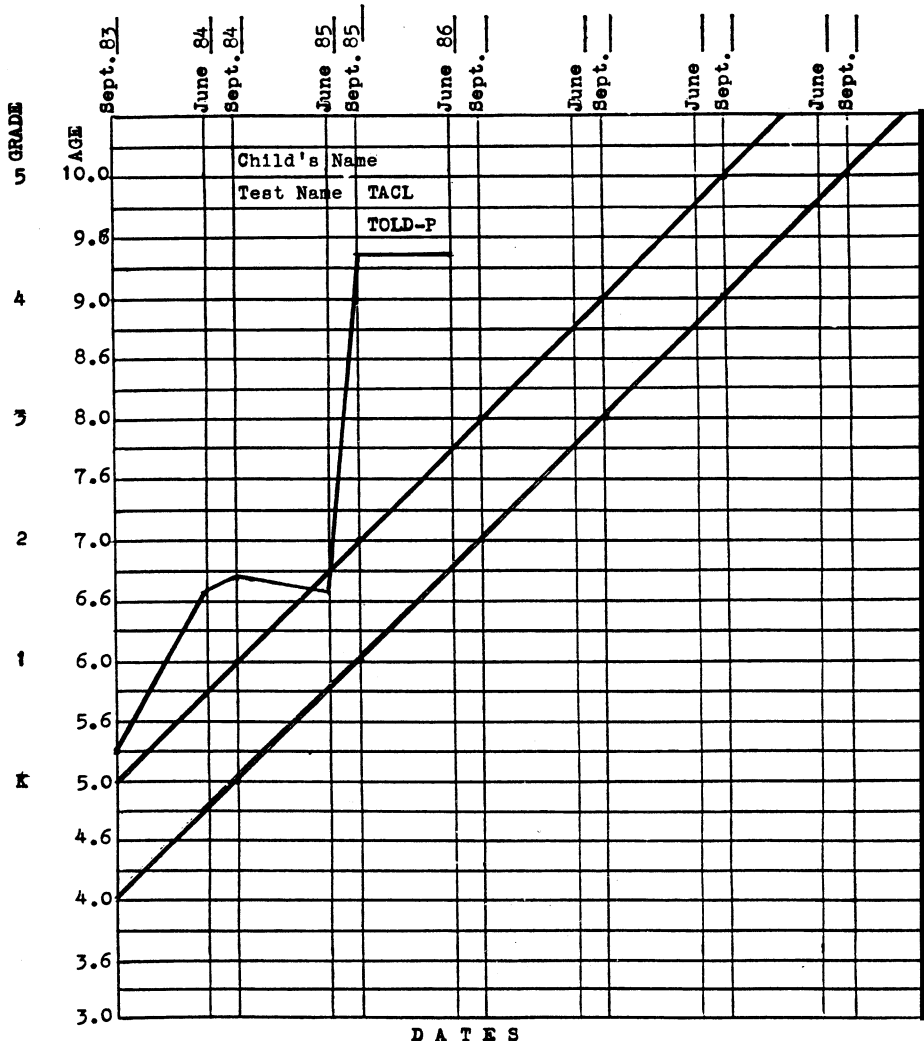


Figure 3. Language age scores on the TACL and the Grammatical Understanding subtest of the TOLD-P are compared to the age/grade of the child's mainstream class. The bottom line shows the one year allowance which is the lowest age/grade that meets the guideline for mainstreaming.

tion tools as described above are valid and worthy of serious consideration. Even now, after extensive revisions, the guidelines may be changed; but when they are, it will be because of substantial supporting data.

Discussion

Although this article has related the facts of program development, it is far from the entire story of the middle years at Ascension Parish. However, there were several outstanding events which marked the middle time and made significant contributions to our endeavors. In February, 1983, after a written review and an on-site observation by the Louisiana State Department of Education, the Ascension Parish program was identified as exemplary. Also in the spring of that year Dr. Daniel Ling conducted a workshop on teaching speech to deaf children on our campus and individually assessed the speech of our children. A month later Gaye Nicholls observed our program and presented a seminar on language development. Both of these presentations were extremely stimulating and beneficial.

In October, 1983, Dr. R. Orin Cornett conducted a Cued Speech workshop at our school which was attended by people from Louisiana and three surrounding states. In March, 1984, Dr. Thomas Field, a language consultant formerly of Louisiana State University, came to evaluate the development of the Bloom and Lahey language program and to give us valuable direction for continued development. Also during that school year three families who were already using Cued Speech moved to Ascension Parish from out of state for the express purpose of enrolling their children in a Cued Speech program. While that created a great deal of excitement, it also made the ever-present sense of responsibility even greater.

The highly stimulating and motivating conferences and workshops were a part of the middle years, but they were not the entire story. These "highs" were offset by days of intense discouragement and depression, especially during the early months of mainstreaming, when every day the deaf children struggled so hard to learn what seemed to come so easily for the hearing children they sat beside. There were days when the only thing that kept teachers and parents trying was an attitude of determination to see it through: to "hang in there" regardless of how many more new vocabulary words there were in the social studies lesson.

To summarize, the middle years of building a deaf education program had moments of intense emotional "highs" and "lows," but neither of these epitomize the overall emotional climate that was constant throughout the three years, and that made such a significant, if intangible, contribution to the hard work of program development. In retrospect, the single most important characteristic of the mid-

dle years was the unity of purpose and commitment shared by the parents and professionals who were all doing far more than was expected to assist in reaching the goals of the program. The parents and teachers became a team, each making his/her own contribution, but united in a Herculean effort for the education of the children. This unity of purpose, which we all experienced and to which we all contributed, was more than anything else the single most important factor in the story of program development during the middle years.

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CUED SPEECH AS A PHONOLOGICAL MODEL

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Cued Speech (Cornett, 1967; Henegar & Cornett, 1971; Beaupre, 1976; and Nicholls & Ling, 1982) is a strategy for supplementing with hand positions, hand shapes, and hand movements, oral language information not visually available from coarticulations of the lips, tongue, and jaw of the speaker. It was devised by R. Orin Cornett of Gallaudet College primarily for use with the hearing impaired who cannot be expected to acquire oral language models and the resulting receptive language efficiently through auditory channels alone. If one accepts the definition (Bronstein, 1960) of "phonemics" as "that area of linguistic study concerned with the identification of the significant sounds of a given language [or language dialect]," then Cued Speech is a phonemic system which functions at the syllabic level of utterance. It is not phonetic in the sense that allophonic variations of individual speech sounds are readily distinguishable.

The present study attempts to answer three questions: (1) How phonemic is Cued Speech on segmental and suprasegmental levels? (2) How efficiently does Cued Speech allow for dialect differences in oral American English? and (3) How can Cued Speech aid the speech/language pathologist in clinical interventions with expressive speech skills? The study is limited primarily to a consideration of the General American dialect version (Cornett, 1979a; Cornett, 1979b), because this is the widely available published form of Cued Speech in the U.S. Audiotape lessons and printed supplementary instructions are also available for English language dialects outside the continental USA, such as Southern British, Australian, etc., but not for other regional American dialects. Both Beaupre (1984) and Jones (1985) have addressed strategies for coping with dialect differences in recent publications.

As more speech-language pathologists and audiologists consider Cued Speech as a viable alternative to traditional approaches for ensuring maximum oral speech/language development for hearing-impaired children, these clinicians should be aware of the strengths and limitations of the General American dialect version as a phonological model. On the practical level, what help can Cued Speech be expected to provide in the learning of **expressive** oral language?

A brief explanation of phonology may be in order. When, for example, a hearing child learns the spoken

language of his community the child discovers that a set of speech sounds (about 41 of them in English) are meaningfully different from each other. These 41 speech sounds are phonemes. The child also learns that some differences within phonemes do not affect the meaning of words but do affect how one produces such sounds in the mouth. These variations in production are called allophones. In addition, the child learns that certain phonemes can occur in sequence but others cannot (/str/, /spr/, skr/, but not /slr/ or /smr/). There are rules governing such things. In most cases the child seems to learn these rules without formal instruction and also learns that factors other than the phonemes themselves affect the meaning of spoken language. These factors are called "suprasegmentals" and include intonation patterns, stress patterns, and juncture.

The hearing child not only gets to process the complete phonological model, s/he also gets to compare his or her own spoken utterances with the model. The deaf child with no residual hearing has only that information about speech visible on the lips -- a very sketchy model to say the least. If the child also has access to Cued Speech s/he has more information available concerning the phonological model, but it is by no means complete.

The Segmental Aspects

Other than the fact that vowels and diphthongs are clearly differentiated through hand positions and movements from consonants which are hand shapes, Cued Speech is not a "distinctive feature" based system. The hand positions for vowels have no bearing on whether the tongue carriage is high or low, front or back, whether the lips are rounded or unrounded, or whether the speech musculature is tense or lax. Nor do the hand shapes for consonants indicate where in the mouth the sounds are articulated, whether a consonant is voiced or voiceless, nor are there any visual clues as to the manner (or mode) of articulation. Although there are exceptions which will be noted later, the speech clinician should not expect the hand cues to act as an aid to correcting expressive production of individual phonemes at the feature level. Cued Speech can be a powerful tool for monitoring and correcting phoneme omissions, substitutions, and additions; however, the cues themselves should not be expected to monitor and/or correct phoneme distortions. Demonstrating substitutions with hand cues is not always possible. For example, the speech sounds /w/ and /l/ share the same hand shape. Unfortunately, /w/ is often substituted for /l/, so the hand shape would be of little visual help. Of course, /w/ and /l/ appear different on the lips. A less common substitution is /h/ for /s/, and both phonemes share

the hand shape III. In this instance articulation visual clues are less helpful.

Phoneme distortions have no cue counterparts, although in some instances distortions could be visualized by the clinician. For example, to show visual contrast between a correctly articulated /s/ and a lateral /s/ or an overaspirated /s/, one might use a modification of handshape III. Instead of three fingers extended, one could use only two extended fingers (the fourth and pinkie fingers) to indicate a sound different from the target phoneme /s/. Or suppose a child is being taught vowels and nasal resonance is present. The clinician might show nasal resonance by spreading the fingers in the V hand shape as a visual contrast. Distortions from target phonemes could also be indicated using signals via the non-cueing hand. Very little clinical exploration of additional cues for speech correction has been done to date. Of course, any verbal directions the clinician ordinarily uses to remediate phoneme distortions with hearing children are also readily accessible to deaf children who can decode the Cued Speech of the clinician. This is no small advantage.

All of the twenty-five consonant phonemes of oral American English are accounted for in the eight different hand shapes (or hand configurations). Not every consonant requires a visually distinctive, separate hand shape because certain groups of consonants are assumed to be visually distinctive when articulated by the oral mechanism. To illustrate, consonant groups are transcribed in IPA as assigned to the various hand shapes (designated here by Roman numerals):

- /d/-/p/-/ʒ/ = I (extended index finger)
- /k/-/v/-/z/-/ð/ = II (index and middle fingers extended)
- /h/-/s/-/r/ = III (middle, ring, and pinkie fingers extended)
- /b/-/n/-/m/ = IV (four fingers extended but not the thumb)
- /m/-/f/-/t/ = V (all fingers and thumb extended)
- /l/-/w/-/ʃ/ = VI (thumb/index finger extended in "l"-shaped configuration)
- /g/-/dʒ/-/θ/ = VII (thumb extended at right angle to extended index and middle fingers)
- /j/-/ɥ/-/tʃ/ = VIII (index and middle finger spread and extended: "v" for Victory configuration)

The plosive (stop) consonants /p/(I), /b/(IV), /t/(V), /d/(I), /k/(II), and /g/(VII) are either visually distinctive because of the hand shapes or, as in the

case of /p/(I), /d/(I), clearly different on the lips/tongue-tip. Allophonic placements of /k/ and /g/ are not indicated in the cues nor are relative degrees of aspiration. Cued Speech does not signal to the deaf child that the initial /p/ in "pool" is aspirated differently from the /p/ in "spoon" or the /p/ in "lamp." Such subtleties are not critical to receptive skills, but these same expressive skills for the deaf individual must be addressed in other ways by the clinician or teacher. It should be noted that in other languages such as Hindi, Bengali, and Marathi in which degree of aspiration is phonemic, cues do exist to show degree of aspiration.

The nasal consonants /m/(V), /n/(IV), and /ŋ/ (VIII) each have differentiating hand shapes, but the General American version of Cued Speech does not allow for visualizing nasalized vowels or nasally emitted consonants. As mentioned before, the cues are not sufficiently complex to show distortions. The French version of Cued Speech does have distinctive hand locations for nasalized vowels which are phonemic to that oral language.

The one lateral phoneme /l/(VI) is grouped with the /w/ and /ɹ/ phonemes which are clearly different on the lips. There is no way to show the dark /l/ allophone commonly found in postvocalic positions, nor the labialized /l/ in the speech of some children. As stated previously, the system is not "distinctive feature" oriented.

Certain fricatives in American speech (/v/, /z/ and /ð/ = II; /h/, /s/ and /r/ = III) share the same hand shapes because the phonemes themselves appear distinctively different on the speech mechanism. Again, the speech clinician must call upon other resources to correct expressive distortions, although Cued Speech can be very helpful in monitoring substitutions or omissions.

The /r/(III) phoneme poses no problems when initial to a syllable or part of a consonant cluster. However, the post-vocalic /ɹ/ is cued in most instances as /r/(III-side) regardless of dialect. True, it is possible to cue such spoken words as "ear," "air," "for," "poor," and "car" with /ɹ/ rather than /r/ as in the examples below:

- /ɪɹ/ (V-throat, V-mouth)
- /ɛɹ/ (V-chin, V-mouth)
- /fɔɹ/ (V-chin, V-mouth)
- /pʊɹ/ (I-throat, V-mouth)
- /ɪ r/ (V-throat, III-side)
- /ɛ r/ (V-chin, III-side)

/fə r/ (V-chin, III-side)
/pu r/ (I-throat, III-side)

but the training tapes prescribe the second alternative. Always cueing /r/ in post-vocalic positions poses no problems for parents or teachers who are not concerned with correction of expressive speech skills. This practice does pose problems for the clinician and phonetics student who realizes that articulation movements are not the same for initial /r/ and post-vocalic sounds spoken in words such as "rare," "roar," "friar," etc. It is only fair to point out that our phonetics textbooks also differ (Bronstein, 1960; Kantner & West, 1960; Cartier & Todaro, 1983; Calvert, 1980; and others) as to conventions for transcribing "r" in post-vocalic positions.

The cues for /tʃ/ and /dʒ/ do not take into account the fact that the two affricates are combinations of other phonemes. The affricates /tʃ/ (VIII) and /dʒ/ (VII) pose no phonemic or phonetic problems where cueing is concerned, nor do the traditional glides (semi-vowels) /j/ (VIII) and /w/ (VI).

Although the voice/voiceless feature is not addressed directly via a single hand shape, all of the voiced/voiceless pairs are differentiated by separate hand shapes: /p/ (I) - /b/ (IV), /f/ (V) - /v/ (II), /t/ (V) - /d/ (I), /θ/ (VII) - /ð/ (II), /s/ (III) - /z/ (II), /ʃ/ (VI) - /ʒ/ (I), /tʃ/ (VIII) - /dʒ/ (VII), /k/ (II) - /g/ (VII).

Placement of consonants is served primarily by visible oral clues but not by hand shapes, except that those phonemes which are not visible during speech are clearly differentiated on the hand. For example, four different points of articulation are covered in the single handshape (II) for /k/, /v/, /z/, and /ð/.

With the exception of what happens among various regions of the U.S. to /r/ phonemes, American dialect differences are served remarkably well by the Cued Speech consonant hand shapes. Allophonic variations which cut across all dialects are another matter, but it should be reiterated that Cued Speech makes no pretensions to being phonetic -- only phonemic. As such it enjoys a receptive oral language semantic integrity at the syllable level which is most impressive. Meaningful differences are clear.

From a phonemic standpoint, the cues for identifying the vowels and diphthongs of oral American English are less precise than the consonant cues in a few instances. To illustrate the strengths and limitations of the General American dialect version for other regional

dialects in the U.S. we will examine the cues as they correspond to IPA symbols and then compare these to a traditional inventory of American vowels and diphthongs. First the vowels:

/i/, /ɜ/ = mouth position (beside the lips)
 /ɔ/, /u/, /ε/ = chin position (just below the lips)
 /ɪ/, /æ/, /ʊ/ = throat position
 /ou/, /a/, /ʌ/ = side position (*arbitrarily designated a vowel)

The diphthongs:

/aɪ/ = side - throat
 /aʊ/ = side - throat
 /eɪ/ = chin - throat
 /ɔɪ/ = chin - throat

It will soon be apparent that although most of the vowels and diphthongs have phonemic integrity within the constraints of the General American version of Cued Speech, there are some inconsistencies with traditional phonemic transcriptions. See detailed comparisons below:

/i/ as in "beat" = cued at the mouth
 /ɪ/ as in "bit" = throat
 /e/ as in "bait" = NO SEPARATE CUE (for this initial phoneme in diphthong /eɪ/
 /ε/ as in "bet" = chin
 /æ/ as in "bat" = throat
 /a/ as in "bite" and N.E. dialect "father" = NO SEPARATE CUE
 /ʌ/ as in G.A. dialect "father" = side/forward
 /ɒ/ as in N.E. dialect "hot" = NO SEPARATE CUE
 /ɔ/ as in "bought" = chin
 /o/ as in some pronunciations of "hotel" = NO SEPARATE CUE
 /ʊ/ as in "bullet" = throat
 /u/ as in "boot" = chin
 /3/ as in N.E. dialect "Bert" = NO SEPARATE CUE in General American version; Southern British = side/forward
 /ɜ/ as in G.A. dialect "Bert" = mouth
 /ɝ/ as in G.A. dialect "mother" = NO SEPARATE CUE, but cued at the mouth with /ɜ/ /
 /ʌ/ as in "butt" = side/down
 /ə/ as in "sofa" = NO SEPARATE CUE, but cued side/down with /ʌ/

Diphthongs and vowel-plus-schwar phonemes (V+ɚ):

/eɪ/ as in "bay"	= /ɛ/ + /ɪ/ (chin + throat)
/aɪ/ as in "buy"	= /a/ + /ɪ/ (side + throat)
/aʊ/ as in "brown"	= /a/ + /ʊ/ (side + throat)
/ɔɪ/ as in "boy"	= /ɔ/ + /ɪ/ (chin + throat)
/oʊ/ as in "boat"	= side/forward (cued as a vowel)
/ɪə/ as in "ear"	= throat + III-side /ɪ + r/
/ɛə/ as in "air"	= chin + III-side /ɛ + r/
/ɑə/ as in "car"	= side/forward + III-side /ɑ + r/
/ʊə/ as in "sure"	= throat + III-side /ʊ + r/
/ɔə/ as in "shore"	= chin + III-side /ɔ + r/

Although the missing /e/ cue produces no semantic problems among American English dialects, it does pose some minor difficulties for phonetics students who are instructed to reserve the "pure" /e/ for foreign dialect pronunciations. Receptively, the /ɛ + ɪ/ diphthong in Cued Speech is a reasonable simplification.

The Italian /a/ (or "broad" /a/) used predominantly in Northern New England and parts of the South has no exact counterpart in Cued Speech. Expressive instruction must rely upon visual jaw/lip/tongue configurations and residual hearing. Fortunately /a/ has a low second formant and may be distinguished from /ɑ/ by those with some residual hearing who know that /ɑ/ has a separate cue position. This is only the writer's speculation based upon anecdotal evidence.

There is no separate cue for the /ɒ/ phoneme (there is in the Southern British version) which is used primarily in the dialect of Northern New England to differentiate "heart" /hɑt/ from "hot" /hɒt/ and "cot" /kɒt/ from "caught" /kɔt/, or "cart" /kɑt/ from "cot" /kɒt/. People in this dialect region are usually instructed to cue the "closer" adjacent sound. General American dialects have no problem because the /ɒ/ does not exist as a phoneme for them. Again, however, the second formant of these vowels is relatively low Hz so that those with minimal residual hearing may be able to differentiate receptively with auditory cues. The semantic confusions resulting on the receptive level are probably minimal for those who can't hear the difference.

The lack of a pure /o/(as in the case of the pure /e/) only produces transcription problems for phonetics students and perhaps some difficulties for clinicians working with foreign dialects. At first glance Dr. Cornett's representation of /ou/ with a single cue (side/forward) may seem strange, but on the practical level it clearly distinguishes /ou/ from the other diphthong /aʊ/ which looks very similar on the lips.

The /ɜ / does exist in regional speech north of Boston as well as in British dialects. No separate cue exists in the General American version of Cued Speech to accommodate this, but semantic confusion is unlikely. Clinicians in the Northeast experiencing problems might well consult the British version which does include a cue position for /ɜ/.

Both the stressed /ɜ/ and the unstressed "schwar" /ɜ/ are served by the same cue position at the mouth. Dr. Cornett asserts that the hand movements vary sufficiently to differentiate the stressed/unstressed phenomenon. This writer agrees that with experienced cuers this is probably true. For students just learning Cued Speech along with phonemic transcription and analysis this is not true, because the novice tends to stress every syllable. Ironically, this /ɜ/-/ɜ/ confusion was also a hurdle for phonetics students before the introduction of Cued Speech as a learning aid!

The stressed /ʌ/ and the unstressed "schwa" /ə/ are also served by the same cue position (side/down). When the primary difference between them is stress, the act of learning to cue does little to help the phonetics students with phonemic analysis until they can break away from plodding syllable-by-syllable. If, as is claimed, Cued Speech is most transparent to the deaf at a deliberate pace, then one wonders if the difference between /ʌ/ and /ə/ is ever perceived with total clarity -- unless there is some residual hearing for stressed/non-stressed syllables.

Although the practice of cueing /V + ɜ/ diphthongs as /V + r/ causes some confusion for phonetics students, one cannot quarrel with the economy of movement which places the /r/ at the side rather than a "schwar" /ɜ/ at the mouth. Incidentally, this practice actually solves problems of cueing the intervocalic /r/ in the Northeast where people say "far" /fɑ/ in isolation or when followed by another consonant, but "far away" /fɑweɪ/ is totally consistent phonemically with cueing instructions. For the same dialect region, however, another problem emerges. New Englanders make a phonemic distinction when pronouncing "merry" /mɛrɪ/, "Mary" /mɛɪ/, and "marry" /mæɪ/. The "merry-Mary" distinction is not possible if one follows the instructions in the General American version for cueing. It is quite possible, however, with additional instruction.

Cued Speech at the Syllable Level

Single consonants initial to syllables are cued in the vowel position (or the first vowel position of a

diphthong). In the event of initial consonant clusters (/st/, /skr/, etc.) all but the last consonant in the cluster are cued at the side. This causes no phonemic problems even though proper execution takes a bit of practice in coordination and synchronization. Consonants and consonant clusters which are final to the syllable (i.e., postvocalic) are cued at the side --with one important exception. When natural liaison occurs with the next syllable beginning with a vowel, the consonant in question assumes the position of the vowel. For example, "It is easy." is cued /ɪ-tɪ-zɪzɪ/ and "That's easy." is cued /æt-sɪzɪ/. In this writer's opinion the liaison aspects of Cued Speech which promote the flow of syllables in oral phrases or sentences are a major factor in facilitating more natural speech patterns in deaf children.

Because Cued Speech is a syllable-based system, and because the syllable -- in this particular system -- always assumes a vowel present, there would seem to be no room in the current General American version for distinguishing syllabic consonants such as /l/ as in "table" /teɪbl/, /n/ as in "listen" /lɪsn/, or /m/ as in "chasm" /kæzm/ from the pronunciations /teɪbəl/, /lɪsən/ and /kæzəm/. Actually the cueing of some syllabic consonants is possible by treating them as consonant clusters, and Cornett (personal telephone conversation) states that he demonstrates this during workshops. Recent videotaped instructions add a "flick" in side positions to cope with syllabic consonants.

Cued Speech and the Suprasegmentals

The suprasegmental aspects (Bronstein, 1960; Cartier & Todaro, 1983) of stress, pitch and intonation, and juncture should also be addressed. Primary syllable stress within a word, phrase, or sentence can be visualized if the cuer is fluent enough to vary the speed of hand movements accordingly. The chances of showing subtle gradations beyond primary stress are unlikely. Secondary, and tertiary stress signals would be questionable. Cued Speech is said to function best at a deliberate pace, slower than the usual informal rate of oral utterance. This deliberateness tends to rule out subtle differences in syllable stress. All but the most sophisticated cuers tend to alter syllable rate and stress patterns to accommodate their current manipulative skills.

To indicate exact pitch of the speaker's voice through cues alone is impossible, but for those with enough residual hearing to perceive fundamental frequencies this poses no serious problems. The profoundly deaf child who does have pitch-range perception difficulties will need intervention for this expressive

skill other than cueing. Relative intonation patterns (rising or falling pitch) can be indicated grossly by slightly elevating or lowering vowel positions while cueing. This skill requires special training and practice which is not provided in the taped lessons available from the Office of Cued Speech at Gallaudet.

Open and closed juncture are incorporated very nicely into the hand movements of Cued Speech. The fluent cuer should have no difficulty in visualizing these two aspects of juncture: "a nice man" looks slightly different on the hand than "an ice man." Rising and falling juncture pose problems in some cue positions but not in others. In the utterance "One..two..three...Go!" the pitch lift can be shown clearly on the /n/ in "One" (IV-side/lift slightly), less clearly on the "two" (V-chin); while the falling juncture on "go" because of its side position (VII-side/forward and slightly lowered) could be indicated. These subtleties, however, go beyond "basic training" in Cued Speech as presently conducted.

Cued Speech and American Dialect Variations

The General American version of Cued Speech as presented in the training tapes obviously favors that dialect. In this writer's opinion it tends toward the Educated Formal (Bronstein, 1960) level of oral utterance (rather than Informal Colloquial), and is most transparent and effective when it is used accordingly. There will be some valid objections to this interpretation on the grounds that learners are repeatedly urged to "cue exactly as you speak." The Southern or New England parent or clinician is exhorted to cue /mɔɪ/ rather than /moʊr/ if he/she talks that way. But there are no phonetic accommodations for nasalized and lengthened vowels, for retracted vowels and consonants, for elevated or lowered vowels, for syllabic consonants, and for other variant phonemes mentioned elsewhere in this study.

For those hearing impaired children with some useable hearing in the low frequencies many of the vowel-based dialect differences will be perceived through audition in a meaningful context. This has already happened clinically, so we know it's true. But, for the profoundly deaf, Cued Speech cannot be expected to be a sensitive and subtle mirror of dialect (other than General American, Educated Formal) unless regional variations in cueing are published and made available to parents, teachers, and clinicians.

One should hasten to add the obvious fact that regional dialects are not the domain of phonology alone. Semantic, morphologic, and syntactical aspects

of regional language can be accurately transmitted via Cued Speech. If these are not transmitted, it is not the fault of the system.;

Implications and Recommendations

This preliminary analysis of the General American version of Cued Speech as a phonological system suggests that the present model as distributed to parents, clinicians, and teachers of the hearing impaired does essentially what its advocates claim it can do on the syllable level of utterance. Consonant cues are perhaps more faithful to traditional phonemics than vowel/diphthong cues. The system accommodates syllable structure rules on the segmental level remarkably well. Those who cue fluently can also transmit some -- if not all -- of the suprasegmental features. It is not a phonetic system with allophonic variations of individual phonemes. Nor is Cued Speech a "distinctive feature" based system which might give visual clues (other than from speech-reading alone) as to how individual phonemes are articulated. There is little in the hand cues which indicates actual phoneme production. Speech pathologists and teachers still have their work cut out for them with hearing-impaired children. However, as a receptive model for correct pronunciation of words and as a mental model for the acquisition of receptive oral language, there would seem to be only one superior instrument at the present time -- normal hearing.

In areas of the U.S. where General American, Educated Formal speech is not the ideal model, considerable careful study should be given to dialect variations on the phonologic level, especially if Cued Speech is to be a primary source of oral language stimulation. Some supplementary instruction specific to various dialect regions would help to resolve current gaps in information available to those learning Cued Speech.

Minor changes (Cornett, 1981) in Cued Speech techniques have occurred over the years. These changes have been in the direction of greater visual clarity of vowels within syllables. As might be expected, the changes are also in the direction of greater complexity and sophistication. This writer suggests that at some point we take a long, hard look at what modifications hearing-impaired individuals may be initiating who use Cued Speech among themselves for social communication. While visiting the Barnes School in London where Cued Speech had been employed consistently by teachers, clinicians, and deaf children for some years, this observer noted that although the younger children cued vowel positions with broad hand excursions, older children who were very familiar with the system were

compressing vowel hand excursions almost to extinction when cueing to each other. In some instances these older deaf children seemed to be cueing only consonants. Although this isolated observation should not be generalized, further systematic study may show that once the visual redundancy of Cued Speech has established a phonologic model of oral language for the hearing-impaired child, modifications in the support system may be desirable.

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THE TEACHING OF CUED SPEECH TO HEARING-IMPAIRED ADULTS

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Teaching Cued Speech to hard-of-hearing or deafened adults presents special challenges, but also special rewards. This article will discuss why the Cued Speech solution to the perennial problem of adult hearing loss deserves greater consideration, and it will also attempt to provide some practical hints on classroom procedures in adapting Cued Speech to our needs. Special techniques and approaches for teaching cue-reading along with speechreading will be dealt with in a later article. Both will be written from the perspective of one who is herself severely hearing-impaired, a long time speechreader, but a relatively recent student and teacher of Cued Speech.

The great majority of hearing-impaired adults are people who have had the benefits of the spoken language all their early lives, but have suffered a hearing loss as they grew older. However, some have experienced a sudden devastating loss of hearing in adulthood or in their teens through accident or illness. Still others have been deaf since birth and have made their adjustment to deafness, but want a clearer picture of the spoken word to improve their speech or their understanding of speech.

Cued Speech was designed originally to help the child deaf from birth or early childhood to break the "code" of the spoken language, of which speechreading alone gives them only an imperfect picture. In the same way, it can help the adult who loses his or her hearing to receive a more complete picture of the spoken sounds of language than he or she is able to receive from watching the movement of the lips alone. Letters I have received at the Cued Speech Center in Raleigh, North Carolina, as well as many personal verbal statements make it abundantly clear to me that, try as they may, many people with a hearing loss find the combination of hearing aids and speechreading are simply inadequate for their needs. They are desperately seeking a clearer route to reestablish receptive communication through the spoken word.

This is precisely where Cued Speech can help so much if its benefits become better known and its use more widespread. Speech pathologists and others working with hearing-impaired adults should be thoroughly conversant with Cued Speech and should give serious consideration to the teaching of cues simultaneously with the teaching of speechreading, especially in the more severe cases¹ of deafness or when the deafness is known to be progressive.

Unfortunately, many people turn to Cued Speech hoping for an instant "Open, Sesame!" to the hearing world they so

desperately want to become part of again, because that is the community to which they belong. When it becomes apparent to them that learning to benefit from Cued Speech takes much patient practice, some resort to wishful thinking for some technological breakthrough, or, like my mother, declare: "I'll be dead before I'm deaf." (How wrong she was.) Still others attempt to learn sign language, but give up when they find that it requires a far greater time commitment than Cued Speech, and does not open the door of the hearing world for re-entry into the richness and subtlety of the spoken thought.

Those of us who have stayed with cueing in the firm conviction that it will benefit us in direct proportion to the amount of time and effort we put in are now beginning to reap the rewards of receiving a complete and unambiguous "picture" of a spoken message even when no sound is present. Letters to the Cued Speech Center from Frankie Wandall of Yorktown, Virginia, who lost her hearing totally five years ago, bear eloquent witness to her joy at understanding speech fully again through the medium of Cued Speech, having tried speechreading alone and found it sadly wanting: "For the million and a half of us who've become deaf after age 19, it's the **only** means of communication that makes any sense. We are products of the hearing world....Cued Speech offers the hearing world again!"²

Another profoundly deaf adult cuer, Bill Paschell, from Wheaton, Maryland, and founder of the Consumers' Organization for the Hearing Impaired (COHI), writes: "Your analysis is correct. Persistence which is born of conviction that Cued Speech will help is the major ingredient for success with the system. When we organized our Cued Speech Club here, even I, a perennial optimist, as you know, never thought that some of the members in our group would ever become proficient. How wrong I was! And how glad I am that I was!"³

The benefits of learning speechreading through Cued Speech or of adding it to a traditional speechreading program are many. First, Cued Speech, being a phonemically based system, is an excellent analytical device to break down the speech sounds of language into simple units. This makes it an extremely useful teaching tool for explaining and clarifying the visual relationships between look-alike consonant sounds, such as /m/, /b/, or /p/, all of which have differently cued handshapes. Consider another example: most adults have never made any mental link between the sounds /sh/ (as in "shoe"), /ch/ as in "chair"), /j/ (as in "jug"), and /zh/ (as in "Zhivago"), so they have little or no idea that these different sounds are all virtually identical in purely visual terms. Without hearing these, some adults cannot tell whether the speaker said "Shane," "Jane," or "chain," (or even perhaps "shade," "shake," "jade," or "Jean"). This leads to frequent embarrassment,

immense frustration and misunderstanding, and often to withdrawal and despair, as the speechreader begins to feel increasingly confused and stupid and to equate his or her failure with personal deficiencies instead of blaming it on a very deficient supply of information.

Second, Cued Speech makes visible through a simple handshape the consonants that are invisible, or virtually so, on the lips. Initial /h/, and in all positions /k/ and /g/ cannot be seen, and /t/, /d/, and /n/ are barely visible. As these all have different cues, one learns with practice to tell them apart. It then becomes quite simple to decode even a message as visually ambiguous as "Kate ate eight eggs," which appears on the lips as a meaningless blur. "Fried eggs" and "Fridays" also become clearly distinguishable; so do "prison" and "Bristol," "thick" and "thin." "Did you have a nice Christmas?" is no longer misread as "Did you have Rice Krispies?"

Third, Cued Speech forces hearing-impaired adults to think about the difference between the way words are written and the way they are actually said. The vowel a is a perfect example. Very few adults are consciously aware that this one printed letter can be pronounced in four or even five distinct ways, not counting its use in conjunction with another vowel. (Try saying the following sentence aloud: "What a wacky way Pa walks.") When people learn Cued Speech, they learn four different hand positions or placements for the different sounds of the letter a, so they learn to look for different lip shapes for these sounds.

Fourth, if the deafness is very severe, Cued Speech can be used in conjunction with speech therapy to correct mispronunciations and it also serves as a constant reminder of correct speech so that mispronunciations, slurred language and so on are less likely to slip in. In the same way, Cued Speech can be used as a tool with prelingually deaf adults to correct mispronunciations or misconceptions about the pronunciation of words seldom heard but met in a reading context. It also gives them a "picture" of the rhythm of language, the elisions that occur, the accentuation of syllables, and so on. It can also be used to accompany foreign words or a foreign language.

The fifth benefit for hearing-impaired adults is largely psychological. Self-esteem is restored as the hearing handicapped come to realize that their inability to grasp what is being said is generally not their fault (even though inattentiveness is a universal failure!) but simply due to the very imperfect nature of unaided speechreading. An additional bonus is that if the hearing-impaired person is accompanied to classes by hearing friends or family members, they too are exposed to the problems and pitfalls of speechreading and begin, sometimes for the first time, to

realize that the person with the hearing loss is not just making insufficient effort but is genuinely unable to make out the sense accurately from the lips alone. One man with a severe loss said to me at the conclusion of the class that he and his wife attended: "You don't know how much this has meant to me. It's helped my wife understand my problem much better. She didn't realize before how hard it was for me. She didn't understand how serious my loss was. She thought I could just try harder to hear. Since coming to the classes she has changed her attitude."

No wonder the hard of hearing fear to seem stupid or ridiculous, and learn defensive techniques such as withdrawal or constant "faking" (i.e., pretending to understand). Deafness can lead to changes of personality and very real psychological problems. Often the hearing impaired become deeply upset when they find that they are only of marginal importance to people whom they thought cared for their friendship or affection. Increasing deafness is one of the truest tests of human relationships; it strips away the veils of social or personal considerations and shows who really cares.

Deafened people should try any and all solutions that will help them stay in the social mainstream where their friendships have presumably been formed. Cued Speech is one such solution that is being tried by an increasing number of hard-of-hearing or totally-deafened adults. It works in direct proportion to the amount of time and persistence the individual and his or her immediate family circle or friends are prepared to devote to it, provided there are no secondary problems such as loss of memory, severe arthritis in the hands, poor eyesight and, in a few people, total inability to divorce the sounds of words from their spellings.

This last factor, non-existent in young deaf children before they have learned to read, is present to a greater or lesser degree in all hearing-impaired adults. But the advantages of already knowing the language are enormous: adults are much better able to make informed guesses as to what is being said. The amount of cueing needed depends largely on the degree of loss and the ability to speechread, which varies so much from one individual to another and has little to do with intelligence.

Sometimes selective cueing, rather than total cueing, is what is needed. For instance, I can often get the message from my residual hearing (supplemented by the use of hearing aids) and speechreading only. When I do not, I have often discovered subsequently that it was a name, a change of subject, a word or words beginning with an "invisible" consonant sound or a "look-alike" sound that floored me. If a cuer understands my problem areas, he or she may find that repeating the sentence or message and cueing only the

likely problem words is all that is needed. This selective approach to cueing is also particularly helpful to Bill Paschell, who admits he and his wife do not use cues all the time, but says:

"When we do, it can be of tremendous help, and also prevents some of those awful blow-ups that can happen when communication is impaired. Such analysis as I have done leads me to the following general statements. We will use Cued Speech whenever I just don't understand, and I can tell you that involves both vowels and consonants. An /ee/ sound is just about murder for me, and I do find Dot resorting to Cued Speech when that sound predominates in a sentence. Cued Speech is of inestimable help when I am introduced to people. Dot almost invariably cues me in. During group conversations when I don't have my assistive devices around, Dot will cue me in on subject matter, and sometimes, particularly if some telling point is made (it might even be the punch line of a joke), then she will cue."⁴

What are the practical differences in teaching Cued Speech to hearing-impaired adults as opposed to hearing people? It is easy to lose sight of rather obvious factors, especially if the teacher has established patterns of teaching developed chiefly for use with parents and other teachers -- normally hearing people -- in mind.

First, it must constantly be borne in mind that the primary purpose for which these people are learning is for **reading** the cues rather than cueing themselves. The main emphasis should therefore be given to the receptive **understanding** of cues, though faster progress is made if the cue-readers themselves learn to cue, since this fixes the handshapes and positions in their minds more vividly and lastingly. It is best to allow these learners to use the more comfortable hand. At a later age it is sometimes very difficult to transfer right-hand skills to the left hand (or vice versa in the case of a left-handed person). A good point in favor of cueing is that if there is stiffness in the finger joints, Cued Speech, like piano playing, helps stiff fingers to become more supple, provided the fingers are not actually crippled with arthritis.

The second point to remember is that one is dealing with people whose hearing (but hopefully not vision) is impaired! Have all explanations available in a written or printed form, and have a chalkboard ready. The eyes of the class are better focused on a chalkboard or an overhead projector screen than on hand-held materials. It is easier to get people's attention for speechreading when they are al-

ready looking up. My approach is to give out an outline at the start about the origins of Cued Speech and its purpose, and then to use a board to write down anything that presents a problem thereafter. A sheet with the entire cueing system on it is not handed out until we have had one or two days of classes. This is because people tend to be lazy about committing the system to memory if they have it in front of them, and also because the sheet emphasizes the tendency to think in terms of spelling rather than sound, and this is the main problem that has to be overcome.

The amount of information that can be imparted by word of mouth is largely dependent on the degree of hearing loss. Remember, this may be the first time that most individuals have had a chance to learn in a situation where the teaching is being geared to their loss. Some will continue to pretend they have heard, so as not to appear stupid, or will get instructions wrong if one does not carefully and tactfully check that they have understood each step before going on to the next. A nod or a smile does not always indicate understanding. It is up to the instructor to make people with a hearing loss feel comfortable in stopping the class whenever they have not heard or are not sure whether they have understood correctly.

Third, give them confidence! As the old saying goes, nothing succeeds like success. If your learners feel successful, they will continue to increase their skills. If, however, they are in a class with much faster, younger learners who have no hearing loss, then the older ones tend to get discouraged. They usually need to be taught separately, differently, and at a slower pace, with more repetition and drill. Give them things to do in which they can succeed. If there is a hearing family member or friend who wishes to learn in the same group, insist that the class and the pace be geared to the needs of the hearing-impaired person. If an older person is accustomed to rest or sleep after lunch, arrange "mornings only" classes spread out longer.

Fourth, since decreased ability to retain information may be an important factor in most older people's make-up, insist firmly on the importance of a definite amount of practice out of class every day, preferably at a set time, and spell out specific practicing skills as well as setting homework to be done for the next class. After the basic set of classes is over, there must be constant follow-up and encouragement, and practice at home should continue daily, indefinitely, to keep skills sharp and increase speed of cueing and reading. If at all possible, intermediate classes should be held to correct errors which always creep in when inexperienced cuers are left to their own devices for too long. These classes can be fun times as well as learning times, though they should always contain a mixture of serious learning along with games. They are also an oc-

casion for cuers of all ages and skill levels to come together. Groups of hearing-impaired adults and their supporters should be encouraged to meet and form their own cue clubs in large metropolitan areas, such as the "Adult Cuers" group formed in the Washington, D.C., area in 1984.

The main ingredient for success in teaching a class or a practice session with hearing-impaired adults is **enthusiasm**. Nothing else matters so much. If you yourself are fired up about your subject, and if you can impart some of your excitement and conviction to your participants, they will learn much faster and more effectively. Remember, it is much harder for older people to learn something new. One speech pathologist, Carol Schilp, from Albany, New York, who has recently been teaching a mixed group of hearing-impaired adults went so far as to say she believes "an elderly adult's resistance to learning something new is directly proportional to a child's eagerness to learn." While this is sometimes true, alas, such people often simply need more time to learn, as they learn at a slower pace and tend to forget things more easily. Grandparents of hearing-impaired children have learned to cue successfully, as have several retired hearing-impaired adults within my teaching experience, so it is largely a question of motivation, severity of loss, determination and perseverance.

For those of you who are still not sure whether Cued Speech is the answer, let me quote another remark of Carol Schilp's taken from her letter of November 22, 1985:

"I had to learn the system for myself to understand its potential. All the people and books in the world would never have convinced me. And, what is most gratifying, my dear deafened elderly adults are becoming convinced as well."⁵

¹ Professional research is at present being conducted in this approach by Dr. Donna Wayner, Director of the Hearing Rehabilitation Center in Albany Medical Center, New York, and Carol Schilp, speech pathologist. However, personal statements by hearing-impaired adults and my own observations have already convinced me of the need to "marry" the teaching of speechreading to the teaching of Cued Speech. Teaching people how to cue is not enough. If they have not already taken speechreading lessons, they must be taught to read cues and lips. The primary focus is on the lips; cues are taken in peripherally.

² Unpublished letter from Frankie Wandall to the Cued Speech Center, January 4, 1985. Quoted with her permission.

³Unpublished letter from Bill Paschell to Alison Turner, February 14, 1986. Quoted with his permission.

⁴Unpublished letter from Bill Paschell to Alison Turner, November 26, 1985. Quoted with his permission.

⁵Quoted with author's permission.

READING DEVELOPMENT IN HEARING-IMPAIRED CHILDREN

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(The substance of this article will appear as a chapter in the forthcoming book, **Cued Speech Source Book for Professionals**)

Introduction

As infants we learn first about the world by feeling it, listening to it, looking at it, smelling it, and tasting it. Soon we begin to learn through the input of spoken language, which becomes and remains our principal avenue of learning until and unless it is exceeded by our learning through the printed word.

The impact of congenital profound deafness on learning is catastrophic in a vast majority of cases, since it typically limits severely two of the three primary ways of learning about the world and what is in it: observation, learning through receiving spoken language, and learning through reading. The effect of the deprivation or limitation of these inputs is largely lost on the general public, despite the increasing public awareness of the hearing impaired and their needs.

Pintner and Patterson (1916) reported, on the basis of several national studies, that "...the median scores of deaf students at any age on reading measures never reached the median for 8-year-old hearing children." Studies sixty years later (Trybus and Karchmer, 1977) showed "...essentially the same level of performance." Allen (1986) reported the reading comprehension level of 15-year-old youngsters in programs for the hearing impaired of the United States, in 1983, at grade 3.1. The research of R. Conrad (1979) revealed that in England the reading comprehension level of 16-year-old deaf children was about equal to that of a 7-year-old hearing child. There is no evidence that the results are better anywhere else in the world. About ninety percent of persons born profoundly deaf never read well enough to look up a word in the dictionary and learn its meaning, or to infer the meaning of a word themselves. They have to be taught every word they ever know.

The normal child learns more language before starting to school than he/she learns during the rest of life, and learns more language out of school than in school after school years begin. Thus, the normal child learns several times as much language as he/she is taught. The deaf child, limited largely to what can be taught, tends to be severely deficient in language, spoken and written, and, as a result, in reading and information.

Reading is the only avenue of learning that, theoretically, should not be limited by lack of hearing. It is certainly not limited in the case of those who lose hearing in adulthood, who in fact compensate to some extent by reading more than hearing persons do. So, the limited learning through reading that characterizes most prelingually hearing-impaired persons is not due directly to their hearing impairment, but to the failure of the educational process to develop their reading abilities. It is hardly an oversimplification to say that the child who becomes a good reader can educate himself, and usually does. Nor is it an oversimplification to say that solution of the reading problem is necessary to success in the education of deaf children.

Theories of Reading

Reading ability is the resultant effectiveness of strategies and skills used in combination in the process of relating text to one's background and knowledge in such a way as to understand what was intended to be conveyed by the writer, or to experience something different from the writer's literal message because of the reader's own individuality.

There are several major theories of reading: bottom-up, top-down, interactive, and schematic. These are, of course, models of the reading process, highly simplified because the process itself is far too complicated to describe in full. Not only does it vary widely from individual to individual; in each individual it varies with the progressive development of skills. Most importantly, it varies within the reading of a single sentence, because fluent reading is as much a process of prediction as of encoding. The time-honored example of a sentence beginning with the words: "The cat..." will serve to illustrate this point and at the same time underscore one of the most serious limitations to reading shared by most born-deaf persons. After the reader decodes the first two words, the remainder of the sentence is restricted heavily -- that is, it is restricted to material that is in some way related to cats. All that the reader knows about cats, all his/her experience with cats, comes into play to help predict the rest of the sentence and thus speed up the process of comprehending it. One of the most prevalent characteristics of prelingually deaf persons is a severe deficiency in general knowledge, which is essential in skillful reading because of its role in prediction.

Bottom-up theories of reading portray reading as recognition of words at sight or by phonic decoding to the corresponding spoken word, and combining the meanings of words into larger units to comprehend the meanings of phrases and sentences, then developing recognition of familiar phrases without specific attention to the meanings of specific

words, and finally the acquisition of higher-level skills in putting together combinations of ideas in comprehending the meanings of paragraphs and even larger segments of text.

Top-down theories of reading discount the importance of specific recognition of sounds denoted by letters, or even sequential recognition of words. The views of Goodman (1967; 1976) are typical. He pictures reading as involving primarily an interaction between thought and language, in which the text is systematically "sampled" in the process of arriving at progressively more accurate "guesses" at meaning until the reader is satisfied with what he takes to be the meaning, and moves on. As speed and skill in reading increase, there is decreasing dependence on graphic clues to meaning.

Interactive models of reading, which in recent years have gained favor in comparison with the bottom-up and top-down theories, portray the reader as putting together a model of what the written text might mean. Two major elements dominate the model created by the reader: his background knowledge, including both his personal background and what has been read to the specific point; and his strategies for processing text. These latter range from strategies for decoding (word recognition, phonic decoding) to the reader's own monitoring of his processing of text. Actually, the interactive theory combines bottom-up and top-down and perceives them as alternating in the process, with one and then the other assuming the dominant role. Major proponents of interactive theories include Anderson and Beh (1968), and Rumelhart (1977).

Schematic theories of reading envision "schema" as frameworks for organizing knowledge, acquired by a reader through experience with language and reading, and used as hypothetical frameworks into which readers fit, or attempt to fit, the ideas they pick up from text in the interactive process. Thus, schematic theories represent elaborations on the interactive theories, and are closely related to them. The schema are thought to facilitate and speed up the processes of acquiring, storing and retrieving knowledge in the process of communication as well as in reading.

One of the most striking differences between good readers and poor readers is the difference in their abilities to get information from the order in which the words appear, that is, from syntax. Prelingually deaf persons tend to be weak in knowledge of grammar, idioms, colloquialisms, vocabulary and other aspects of language that affect reading ability. There is one surprising exception: deaf children at the start of first grade often have a larger sight vocabulary than normal children, although the advantage disappears very quickly. The reason is that sight words are

easy to teach, and in programs in which the deaf children are learning language very slowly there is almost always an effort to compensate by teaching the children a large sight vocabulary.

A Special-Purpose Model of Reading Development

This writer served for nearly three years as chairperson of a ten-member Gallaudet College Committee on Reading, Language Development, Cognition, and Comprehension, a subcommittee of the Gallaudet Research Committee. The committee's assignment was to develop models of the processes of language development and reading development that would facilitate identification of the differing types of difficulties deaf children would be likely to have because of their differing communication backgrounds. The ultimate goal was to identify specific questions and problems on which research should be done in order to lead to better ways of teaching deaf children to read. We will now examine an expanded form of the reading development model and point out some of its most important implications. Remember that it is not a model of the process of reading, but a model of the process of and the stages in the development of reading ability. We used more than a hundred different models of reading in arriving at the reading development model.

Two views of the reading difficulties of prelingually deaf children were represented within the committee and the reading specialists with whom the committee conferred. One view of the primary cause of these difficulties is that the easiest way of learning to read presupposes knowledge of the spoken language, and regards written language as a coded, visual representation of spoken language. This, the prelingually deaf child's failure to learn spoken language (distinguished from articulation skills as such) is at the heart of his reading problem. The other view is that reading development is possible if the child has adequate cognitive skills, a prior knowledge of a different language, such as ASL or PSE, and familiarity with visual materials such as pictures, drawings, and other representations which can be used to support the early reading process. Those who hold the second view agree that lack of prior knowledge of spoken language is the primary factor in making it difficult for deaf children to be taught to read by the same methods used with hearing children. They suggest, however, that there is perhaps more hope in developing methods of teaching which fit the second view than to depend on giving the deaf child an adequate background in spoken language before he/she starts learning to read. They base their belief that deaf children can be taught to read without knowledge of the spoken language on the fact that hearing children learn to read a second language without first learning to speak it. Those preferring the first view point out that when hearing children learn to read a second language they learn some of the spoken form in the process

and probably make substantial use of phonic decoding and other strategies depending on knowledge of spoken language as their command of the spoken language grows.

Since Cued Speech was developed for the express purpose of enabling deaf children to learn spoken language in the early years, the treatment of reading development will be based primarily on the first of the two views described above. In the specific analysis of the model, however, both views will be represented, and the implications for communication methods will be discussed in detail. Specifically, the model is designed to pinpoint the differences in the reading problems of deaf children that are associated with the two approaches, one depending on prior knowledge of spoken language, the other not.

Reading Development Model

The model reproduced in Figure 1 is a modification of the model developed by the Gallaudet committee, incorporating refinements which came out of the National Conference on Reading in Relation to Deafness at Gallaudet College, May 25, 1978. This invitational conference was sponsored by the College to bring together specialists in reading and deaf education to furnish relevant ideas and react to the report of the committee.

Blocks 1 and 2, left to right, in Figure 1 represent the endowment the child brings with him/her to the reading process. Block 1, labeled "Background Factors," represents the knowledge and experience of the child: awareness of the world and things in it, attitudes, behavioral patterns and habits, and his/her self-image. Included in this block also are the child's existing language knowledge and capabilities: auditory, signs, gestures, labial familiarity, finger-spelling, facial expression, Cued Speech, kinesthetics, etc. In Block 2 labeled "Enabling Skills," are specific capabilities needed in reading: perception skills, short-term memory for both auditory and visual elements and sequences, and cognitive skills.

Blocks 3 through 9 identify specific processes associated with reading, all of which are needed and used by the fluent, mature reader. These tend to develop in a normal reader in approximately the order in which they are numbered. They are used in different amounts by different readers, and are acquired by different readers at different stages of reading development. They are used by the mature reader in a complex but coordinated fashion in which each is used as it is appropriate for contribution to comprehension of the written text. Of course, the efficiency with which these different processes are coordinated and used will presumably be in proportion to the overall reading skill of the reader.

Block 3, representing use of sight vocabulary, is dominant in the early stages of reading and is an important factor in all reading. The normal child who is read to in early childhood usually picks up a stock of words, and perhaps a few short phrases, which he recognizes at sight. The development of reading skill is expedited if many of the words in the first materials the child is directed to read are recognizable at sight.

Block 4, labeled "Phonic Reference," represents the decoding of written words by use of phonics and/or sight recognition of short morphemes which are parts of words (ly, ed, etc.). This tends to be dominant in the reading of the normal child during the "one-word-at-a-time" stage in reading, which should be as short as possible. It becomes less dominant as reading skill develops, but is still important in the mature reader. The term "decoding" as used here refers to the mental "sounding-out" of the word and comprehension of its meaning by identifying it with the spoken word already familiar to the reader, or the recognition of a word already in the sight vocabulary. We regard reading as reading only if there is comprehension. Sounding out a word without comprehension has been aptly described by Sir James Pitman as "barking at print."

If a child cannot utilize phonic decoding, as identified in Block 4, he cannot identify directly the meanings of words outside his sight vocabulary. In order to understand written material containing such words, therefore, he must either be assisted with each one or deduce its meaning from context through the strategies identified in Blocks 5 through 9. In other words, if a child does not know the spoken language he cannot use it as the primary base for reading, as does the hearing child. Among prelingually deaf children only those who have grown up (successfully) on Cued Speech and a very small fraction of those taught with traditional aural/oral approaches can learn to read the way hearing children learn to read. Thus, it is at Block 4 in the model that the two views (represented within the committee) of methods for teaching reading to deaf children diverge.

Block 5, "Grammatical Closure," represents use of one's knowledge of grammar to narrow the range of possibilities in the text and thus expedite the process of comprehension. For example, if a child reads and understands (by sight recognition or phonic decoding, or both): "In the...." he is prepared for the next word to represent something that things can be in. This narrows the range of choices and operates in conjunction with the other tools at the child's disposal, such as sight vocabulary and phonic decoding. If the last word has three letters and begins with "b," the child's recognition of the word is speeded by the probability that it is box, or bag, or bin, if these are the

only familiar three-letter words that begin with the letter "b" and can contain things.

So-called grammatical closure is not really closure, but a contributor to closure. Closure on meaning, except through sight recognition or phonic decoding, always entails the combined use of situational and/or linguistic context. This should be kept in mind as we describe different strategies that contribute to closure (reading comprehension) and are thus involved in the development of reading skill. None of these strategies develops or takes place in isolation. Skill at grammatical closure, which is presumably proportional to knowledge of grammar, is crucial.

Ling (1978) wrote that a child, deaf or hearing, cannot be taught grammar, that grammar must be absorbed and internalized as a result of "...intensive and extensive exposure to language." This idea argues strongly for the learning of language through face-to-face interaction, not through formal teaching, insofar as possible. Studies show that deaf children are prone to memorize rules of grammar without internalizing them. As a result they may be able to pass grammar examinations requiring only direct application of the rules, but cannot write or speak in correct grammar. They are also severely limited in reading.

The point made in the above paragraph would seem to argue against the use of structured language curricula with deaf children, even those with severely delayed language. Actually, for late starters probably both intensive, structured instruction and copious amounts of face-to-face, informal interaction are necessary to insure adequate progress.

Block 6, "Idiomatic Closure," is really a part of grammatical closure, mentioned specifically here because deaf children as a rule have so much trouble with idioms. Idioms are specific phrases or sentences that, through common usage, have come to have a special meaning quite different from what the words used (and the way they are put together) would seem to mean according to the rules of semantics. "I'm at the end of my rope" doubtless originated because one tied with a rope can go no farther when he gets to its end. A child who learns this idiom does not ordinarily understand its origin, but simply learns it through repeated exposure in context, usually without any verbal explanation. The multiple meanings of the function words are largely idiomatic, since most of their meanings are unique to single patterns. On edge, on guard, and on call are among the scores of patterns in which the word on has specifically different, generally understood meanings. These function words are typically very difficult for deaf children, whereas the hearing children simply pick them up -- so much so that idioms are not ordinarily taught in school except in remedial programs. The reason that deaf

children do not learn them without being taught is that they do not repeatedly encounter these patterns in meaningful discourse in a form which permits them to know the exact content of the message. Yet, if they are not familiar with the vast majority of common idioms, they will have great difficulty in reading fourth-grade material.

Block 7, "Semantic Closure," is essential in the learning of new language through reading, as well as in expediting the process of reading familiar oral language.

"Inference," Block 8, functions in reading in essentially the same way as in comprehending spoken or signed language. It is critically important in reading. Many hearing children do not develop much ability at inference until fourth grade, so it is often taught at that level. The child to whom it must be taught is seriously delayed in language development. Inference, like some of the other abilities listed here, is probably even more important to a child's reading than to his understanding of spoken language, because one cannot conveniently ask questions of a writer when one fails to understand.

"Prediction," Block 9, in reading is the progressive narrowing of possibilities for upcoming text through the combination of all the preceding elements that are applicable in a given text, so that closure on meaning is expedited. Blocks 1 and 2, as well as Blocks 3 through 8, contribute significantly to this process. Although prediction is crucial to an understanding of language, it is even more important in reading, where assistance in understanding content may not be immediately available.

Blocks 10, 11, and 12 are intended to call attention to the coordinated effects of the separate reading skills denoted by blocks 3 through 9, along with the background factors and enabling skills of blocks 1 and 2, respectively. These skills and background factors, with the possible exceptions of sight reference and phonic reference, cannot be used separately from the others. Reading employs interacting strategies.

Prediction in the fluent reader extends far ahead of the words in the immediate field of vision, and even beyond the sentence one is reading, as the probabilities for the rest of the paragraph, the chapter, or even an entire novel begin to form in the mind. As one reads about a certain character, one's idea of that character begins to influence the way one expects that character to behave, and this affects the efficiency with which one reads about that character. Of course, the role of prediction (or expectation, it might better be termed) is usually more important in the immediate sentence one is in the act of reading than in its affect upon how one reads beyond that sentence. Good readers, however, stopped at a given point in a story or an

article, can give a much better idea of what is coming than readers who score lower on standard tests of reading comprehension. This is because they have formed the habit of, and have developed skill at, inferring ideas about what is to come.

Certainly reading is one of the most complex activities of which a human being is capable, and we can only guess at some of the details of the process. All the evidence indicates that every fluent reader acquires his own individual patterns of use of different reading strategies as he becomes more proficient. These patterns, which we may term "higher-level" strategies and assign to Block 11, are the patterns in which the simpler processes specified in the model operate in concert in different reading contexts, for maximum efficiency and speed.

The ideal outcome of reading development, represented in Block 12, is extended language and personal development through extensive reading. It has been stated that a good high-school graduate (certainly not an average one) has a spoken vocabulary of about 25,000 words, but has a reading vocabulary twice that large! If this is true, he has acquired more vocabulary through reading than by any other means. Whatever the benefits of reading may be for a hearing person, they are potentially much more important for a deaf person, unless it is accepted that deaf persons simply cannot become as good readers as hearing persons. On average they do not, but there is no theoretical reason why they should not.

Application of the Reading Development Model

The task of the Gallaudet subcommittee on Reading, Language Development, Cognition and Comprehension with respect to reading was to develop a model of the process of reading development (not a model of the reading process itself) that could be used to identify the points at which deaf children likely have most difficulty in developing reading ability, to relate these to communication and educational backgrounds, and to identify questions that should be answered through research in order to suggest ways of enabling deaf children to become better readers. The description of the model in the preceding pages relates specifically to the way in which hearing children learn to read, and what they bring with them to the process of reading. Now we will analyze the (expanded) model and relate its implications for deaf children with different backgrounds.

The Model Applied to the ASL Child

No deaf child, even a child of deaf parents who use ASL most of the time, will grow up learning only ASL. Such a child will learn some Pidgin Sign English, some fingerspelling, and probably, if given therapy, even a little spoken

language. For the purpose of this analysis it will be assumed that these are not of sufficient extent to affect significantly the development of reading through the strategies listed in the model. It is quite likely that the deaf child will have learned a good bit of language through fingerspelling, and may through instruction at home may have acquired a substantial sight vocabulary. Thus, in learning to read, the ASL child will be assumed to be able to make use of his knowledge of ASL, his cognitive skills, his sight vocabulary, and what he is taught at school and elsewhere.

The ASL child can be taught a large sight vocabulary in several ways, including matching written words to ASL signs or to pictures, or by pairing fingerspelled words to pictures or explanations given in ASL. If he is to succeed in reading, however, he must amass a sight vocabulary large enough to include most of the words he will encounter in his early reading experiences. When confronted by a word not in his sight vocabulary, he must either have help or be able to deduce the meaning of the word from context, linguistic and/or situational. Because, presumably, the ASL child will not know the grammar of English, including its idioms, the burden imposed on semantic closure, inference and prediction in the process of reading will be proportionally greater.

Those who believe that a deaf child can be taught to read effectively through instruction in the written language, without prior knowledge of the spoken language, will postulate that as the child is being taught a large sight vocabulary he will be taught English grammar concurrently, so that the entire process is coordinated. In estimating the probable effectiveness of this approach it may be relevant to look at how well hearing persons have fared when taught to read a foreign language without prior knowledge of its spoken form. Probably they have had the advantage of learning the spoken form to some extent in the process, and of using that knowledge to support their reading efforts.

The PSE (Pidgin Sign English) Child

It is an oversimplification to identify a "PSE" child or an "ASL" child. A child growing up in a primarily ASL environment will pick up a lot of PSE, and a so-called PSE child will likely pick up a good bit of ASL. Because the categories will overlap, the explanations must be interpreted appropriately.

The PSE child will have one advantage over the ASL child in learning to read, by virtue of his greater knowledge of English grammar and its specific idioms. For example, unless he knew some PSE, an ASL child would probably not know the idiomatic connotations of the words on, off, and out as applied to lights. The PSE child will

likely be familiar with these and will thus pick up the written expression readily, or even anticipate it, as in the statement: "Mary turned the light ____." The PSE child will likely be ready for the last word as having one of the three meanings cited. The PSE child will also be familiar with many grammatical patterns, not found in ASL, which would expedite his closure of meanings of new words, or make them easy to retain, once taught to him.

The implication here is that the PSE child will have a theoretical advantage over the ASL child in proportion to his knowledge of English grammar and idioms. Because neither is depicted accurately or fully by PSE, the advantage may be slight, and it may be outweighed by other factors, such as possibly a more fluent, stimulating communication environment in a home in which ASL is used. The PSE child may have another slight advantage in that he/she may have been taught more spoken language, perhaps enough to provide a small amount of support to reading.

The SEE (Manually Coded English) Child

Though the different forms of manually-coded English have slightly different advantages and disadvantages, this analysis will not be detailed enough for attention to those differences. Thus, the designation SEE will be used as referring to a child brought up on any of the major manually-coded English systems, such as SEE-1, SEE-2, LOVE, etc.

If a preschool child receives consistent exposure to SEE in the home, at school, and among peers, that child should acquire a good grasp of English grammar and idioms. There is no doubt that this would be of advantage in learning to read. The extent of the advantage, in practice, will depend upon the accuracy with which the English patterns are represented in practice, the consistency of use, and the amount of time spent in communication with the child. Beyond that, the effectiveness with which the child can make use of his/her knowledge of English grammar in the form in which he/she knows it is worth examining.

In programs using SEE there is a systematic effort to teach the children the written word corresponding to each sign used, and in many programs a serious effort is made to teach also the spoken form. If a child did learn English well in accurate SEE, and if he/she were taught all the written words for which the signs were encountered, the child should be able to read anything in which he/she encountered no unfamiliar written words. Further, he/she should be able to make use of the various aids to closure on the meanings of unfamiliar words that are used by the hearing child except phonic word attack, including grammatical closure, recognition of familiar idioms, semantic contribution to closure, inference and prediction. To the ex-

tent the child learned the spoken language, he/she could also utilize phonic word attack.

Judging from the trend (or lack of trend) in language and reading levels throughout the United States in the last decade, the desirable combination of developments described above simply fails to materialize for most profoundly deaf children in SEE programs. There are several apparent reasons. First, as teachers become more proficient in signing, they tend to deviate more and more from SEE, omitting markers and gravitating more toward PSE. Second, most hearing parents, in addition to gradually dropping more and more markers, tend to plateau at a level of signing competence adequate for the needs of home life with a preschool child, but not for continuing language development. Thus, the contribution of the home to learning English typically tapers off, as does also its contribution to development through communication. Third, the task of teaching all the written words to the child appears to be too much for the school and the home combined. Fourth, the learning of the spoken language typically occurs at a very limited level, certainly not adequate for the desired support of reading through phonic decoding.

There should be increased study of Total Communication programs using SEE most effectively, and particularly of SEE programs using Cued Speech to teach the spoken language. Attention should also be given to possible improvements in the home environment, though low estimates (no larger than three percent) of hearing parents keeping up with their deaf child in signing indicate little basis for optimism regarding the probability of raising them to reasonable levels.

The Fingerspelling (Rochester Method) Child

If a hundred profoundly deaf babies were isolated on a benign Pacific island, and if those attending them communicated with them only in fingerspelling at an appropriate rate (say, one-third to one-half the rate of spoken language), if they trained the children to use fingerspelling expressively and fought the children's probable tendency to substitute invented gestures and use abbreviations to avoid so much fingerspelling, theoretically those children could acquire a fingerspelling vocabulary of several thousand words by the age of six and should know most of the grammar and idioms by normal children at that age. Theoretically, they could be taught to read anything they knew in fingerspelling in a matter of a few days, during which they would be taught to pair the twenty-six letters of the alphabet with the corresponding fingerspelling configurations. Moreover, they would theoretically have at their disposal reading strategies equivalent to those of the hearing child: grammatical and idiomatic closure, semantics, inference and prediction. Finally, the code by which they rela-

ted unfamiliar written text to their language stock would be even more accurate than the one used by the hearing child, for whom the disparity between spoken English and the spelling of written English is at least a slight problem in phonic reference.

The hypothetical and fanciful illustration above is not really so fanciful as it may appear. It is a fairly accurate description of what has actually happened in a few isolated cases of families which have provided the kind of environment described above by dint of prodigious family effort and extensive use of tutors who maintained the same environment. In the one case with which the writer is specifically familiar, by the time the child reached school age he read well enough that his academic success was assured, although continued tutoring and interpreting services were needed to cope with the problems of school life. He has achieved spectacularly as a profoundly deaf adult.

The major problem with this approach appears to be that the logistic and economic requirements are simply too great for the vast majority of families. A second is the level of ability that appears to be required in the child. Schools following the Rochester method have achieved some success, particularly in the children's early years, but have found the problems too difficult to solve over time. They have tended to abandon fingerspelling except as a teaching tool and as an adjunct to sign communication.

Auditory/Verbal and Auditory/Oral Children

Hearing-impaired children who really succeed through appropriate amplification and auditory/verbal or traditional aural/oral methods should acquire a knowledge of spoken language near enough to that of a hearing child to make it possible for reading abilities to develop similarly. Of course, the fact that the input is not as clear will make necessary correspondingly more effort, more skillful teaching and more support in the home and elsewhere. Unfortunately, the numbers of children who are capable of achieving this, and who receive the necessary quantity and quality of instruction and support, seem to represent a small fraction of the profoundly deaf with whom these methods are used. For those who do succeed, however, the pattern of reading development should be essentially that described in the explanation of the reading development model, though requiring more instruction and support at school and at home than is necessary for the hearing child.

The oral deaf child is likely to have serious weaknesses in all the areas represented in the model. Specifically, spoken vocabulary will tend to be much smaller than for a hearing child, and the phonemic patterns of the spoken words will not be known as accurately as by the hearing child. Thus, phonic decoding will not be as helpful. Simi-

larly, the grammatical patterns will not likely be known as accurately, and the stock of familiar idioms will be much smaller. The child may have as good innate abilities at semantic closure, inference and prediction as a hearing child, but the effectiveness with which these strategies can be used will be limited by the deficiencies in the other strategies which must accompany them. The fact is that, as in Total Communication programs, the percentage of successful profoundly deaf children in oral programs is very small, and the average language and reading levels in both leave the deaf child poorly equipped for life.

Cued Speech Children

Children brought up on Cued Speech, like those with whom other systems are used, are characterized by a wide range of levels of success. There are some significant differences, however, which appear to skew the distribution upward. One is that the percentage of parents who succeed in doing their part is much higher than with manual methods, so that children whose exposure starts early approach school age with a much stronger foundation for reading.

In theory the Cued Speech child should acquire what is necessary for all the strategies represented in the model, and should thus learn to read in precisely the same way as a hearing child. This is independent of the articulation skills of the child. Despite the importance of speech skills to a deaf child, these are not required in order for the child to acquire language through Cued Speech and become a good reader.

The Cued Speech child with adequate support receives language consistently in a code translatable into the target form (written) for reading. This input is clear to him when others are cueing to him. When others are not cueing to him, what he receives is still in the same form, though not clear, requiring him to make extra effort and put up with some confusion. Research is needed to establish or refute the claim that a higher percentage of deaf children in programs using Cued Speech are inclined and able to cope in the company of hearing peers who do not cue. This claimed advantage is in addition to the easily observable fact that Cued Speech children develop good relationships with hearing peers and siblings who cue, and learn a great deal of language from them, as well as profit from them socially.

The assertion that language and reading skills of Cued Speech children are skewed upward strongly in comparison with children with whom other methods are used is at this point an assertion based primarily on observation and anecdotal information. There is research to support it (Nicholls, 1979; Nicholls and Ling, 1981), but much more data must be collected and analyzed in order to impress those who are not already inclined to recognize it as fact.

The Cued Speech child who makes good progress in language development (at or better than the rate of the average hearing child) may still be delayed in language because of a late start. If such a child is within one or two years of the norm at age six, and if he/she is acquiring language at a good rate, serious consideration should be given to delaying systematic efforts to teach the child to read, in order to enable the child to be at a normal language level when he starts to read. To start systematic instruction in reading before the child has adequate language may endanger reading development and overly discourage the child.

Summary

The model of reading development used here to analyze the problems of reading likely to be encountered by hearing-impaired children is based on interactive theories of reading. The analysis proceeds bottom-up, but the reading process itself is depicted as interactive, variable from reader to reader, and variable in a single reader according to the stage of his/her reading development and the material read.

The model identifies the principal strategies and skills used in reading, and is used to stress the importance of prior knowledge of language, especially the language in which one is learning to read. The most important assertions made or implied in the application and explanation of the model are as follows:

In order to learn to read easily and naturally, with a minimum of teaching, a child must know the spoken language reasonably well at the level of the material used, including its vocabulary, grammar, and common idioms. In the process of acquiring this knowledge of language, he/she must have developed some comprehension skills such as semantic closure, inference and prediction. Deaf children capable of doing this are probably limited to those who are brought up successfully in traditional oral programs, or in programs using Cued Speech. The emphasis here must be on the word "successfully," because the implication is that the child must know (not necessarily articulate) the spoken language about as well as the average hearing child, except perhaps for size of vocabulary and extent of general knowledge about the world. Deaf children who otherwise measure up to language norms of hearing children tend to be deficient in these two areas, but do not appear to be handicapped greatly thereby in learning to read. Further, these deficiencies can be made up through extensive reading, once a child becomes a good reader.

Modest deficiencies in any of the requisite areas identified above can usually be compensated by specific remedial instruction, so long as they are detected and remedied early in the process of reading development. The deficien-

cies must be slight, however, or alternative methods of reading instruction must be used.

Deaf children who do not learn spoken language well enough to learn to read in essentially the same way as hearing children must be taught English through the written language, as they learn to read it. Some prior knowledge of English grammar and idioms, such as may have been gained through use of manually coded English, should be helpful, as should also even a limited familiarity with spoken words and patterns. Of crucial importance is the level of cognitive ability, such as may have been developed through prior extensive use of sign communication. The lack of adequate ability to decode written words by relating them to the spoken form already known, however, changes the entire pattern of reading development. Specifically, it makes it necessary to provide materials which minimize encounters with words and phrases outside the child's sight vocabulary, except in contexts in which the child can infer meaning from situational and linguistic clues, and to be ready to provide help whenever the process breaks down. The level of the material must then be raised progressively as the child's sign vocabulary, knowledge of grammar, and reading strategies improve, hopefully reaching the point at which reading ability and motivation enable him to read independently and extensively.

Children who are likely to be able to be taught to read by the methods described above are those who have grown up on manually coded English, used faithfully and well in the home from infancy, and used skillfully in preschool and clinic in language development, prereading training, and through the early grades; who have received speech therapy and auditory training consistently and whose school and home environments support learning and use of spoken language; and who are considerably above average intelligence.

Much is yet to be learned about teaching ASL children to read. Certainly methods similar to those above are necessary, but they would have to be modified to compensate for the lower knowledge of English grammar and idioms. Because these children presumably have at least one deaf parent, they may have superior cognitive skills and self-image resulting from a good background of communication in the home. These are significant assets in cases in which the child has to learn to read without much prior knowledge of the language being read.

One of the most difficult aspects of the problem of reading in the education of hearing-impaired children is that for so many of them intervention does not start early enough to make it possible to develop the necessary language foundation before the child starts receiving reading instruction. Obviously, reading instruction should be delayed until the child has enough language, if a year or two

of delay would solve the problem. But, such a delay is difficult to arrange and maintain, is difficult for parents and schools to accept, and requires special treatment of each child. Also, unless the results are successful, one can argue that it would have been better to start early and depend on teaching language through reading.

In this article no attempt has been made to address the problems of children who are deficient in mental ability, who have difficulty processing visual symbols or temporal sequences of visual information, or who have other learning disabilities.

Cued Speech was developed specifically because of the concern of this writer regarding the inability of most prelingually, profoundly deaf persons to read well. Because reading is the only avenue through which the profoundly deaf person can theoretically have full access to information about the world, it is imperative that those with prelingual, profound hearing impairment become good readers. The basic rationale for Cued Speech rests on the assertion that profoundly deaf children with whom it is used consistently and well, from an early age, learn to read in the same way as does a hearing child, and attain the same level of reading skill and comprehension.

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For a list of 89 references related to the specific blocks of the Reading Development Model, refer to the subcommittee report: Models of reading and language development for deaf students. **Directions**, 1:1, (1979, Gallaudet College: Washington, D.C) pp. 64-68.

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THE SELF MONITORING CUE CARD FORMAT: WHAT IT IS AND HOW TO USE IT

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Although developed specifically for the deaf, Cued Speech has proven a valuable aid to persons having language learning and/or maintenance problems for a variety of reasons not related to deafness. In the clinical practice of speech-language pathology, the author uses the terms "cuereading" to describe the visual decoding of spoken language with the benefit of hand cues, and "cuetalking" to describe the act of using synchronized hand cues while speaking.

Clients who benefit receptively from the added information provided by cuereading, and expressively by their own cuetalking, are in therapy sessions at most only one or two hours weekly. In many cases family members neither cue nor provide external monitoring for cuetalking. The establishment of important new skills requires sufficient practice judiciously spaced for maximum effect. The problem for this clinician was to find a bridge from therapy sessions or language skills classes to support the client through carry-over, the critical period during which newly developed skills are habituated.

Two theoretical assumptions seemed in order: (1) Persons with adequate visual skills but difficulty with auditory processing of oral language, who more efficiently develop the needed processing skills when they receive a clear, completely visual representation of spoken language through cuereading, would benefit from a written form of spoken language consistent with the hand cues to consult at will during carryover, (2) Persons with generally adequate somasthetic (i.e., consciousness of bodily movements) feedback systems but having specific difficulty establishing voluntary oral motor production patterns for speech due to auditory dysfunction and/or verbal dyspraxia, who more efficiently develop functional coarticulated speech production patterns with a phoneme-based, syllable-by-syllable monitor provided by hand cueing, would benefit from a written form of spoken language consistent with the hand cues to consult at will during carryover.

From 1982 to 1985 a written format was developed by the author to record the spoken and cued information usually provided by ongoing Cued Speech. The format utilizes two written codes, Foeneemik Speling and cue notations. The codes are easily learned by the average person with a mental age of eight years through adult. This code can be handwritten or typed on a conventional keyboard and is clearly distinguishable from orthographic spelling. The format has been subjected to peer review, including deaf

adults, deaf educators, speech-language pathologists, a teacher of preprofessionals in Communicative Disorders, cueing instructors and the inventor of Cued Speech, Dr. R. Orin Cornett. The SELF MONITORING CUE CARD format has been modified in accordance with their recommendations and continuous feedback during clinical use with a variety of clients.

The SELF MONITORING CUE CARD (SMCC) Format

Phonemes are the actual speech sounds which make up spoken words, not the letters used to spell written words. In the format, one or more phonemic spellings of the naturally coarticulated language unit is written two spaces below the regular orthographic spelling (OS), with cue notations underneath. Underlined letters in the orthographic spelling point out possible variations in pronunciation other than simple word-linkage options. Two examples below from the graded reading vocabulary cards should help to demonstrate:

(OS) for

(FS) **FAWR** / **fawr** / **fur**

(Cues) **5c3s** **5c3s** **5m**

(OS) believe

(FS) **beeLEEV** / **biLEEV** / **buLEEV**

(Cues) **4m6m2s** **4t6m2s** **4sd6m2s**

Foeneemik Speling (FS) has evolved from Cornett's phonemic spelling system, originally called Foenetik Speling (Hegnar & Cornett, 1971) and now called Funeemik Speling) to serve as a production code for speech. The major features of Foeneemik Speling which differ from Cornett's system are the following: a voicing bar to distinguish voiced **TH**, **th** from voiceless **TH**, **th**; a subscript period to designate those syllabic consonants **l**, **m**, **n** (as in "pencil," sounded **PENsl**); a lengthening marker **[:]** used, for example, for the same sound ending one word and beginning the following word without a pause (as in "one nation," sounded **WUN:AEshun**); use of capital letters to designate relatively stressed syllables in words (as in "civilization," sounded **SIvluzAEshun**) and in phrases (such as "all of a sudden," sounded **AWluvuSUdn**); and the use of red or boldface type, and a bright color such as red lead or ink handwriting to set off Foeneemik Speling clearly from regular orthography.

The cue notations are a written code for the designations used by Cornett on the audio instruction tapes available from the Cued Speech Office, Department of Audiology, Gallaudet College. The numbers stand for the handshapes grouping the consonants, and initial letters stand for the

hand positions for the vowels: s, side; m, mouth; c, chin; and t, throat. The letters d and f stand for the downward and forward movements in the side position which were added to the system for clarification. An apostrophe designates the wrist flick, a relatively recent clarifier for successive consonants in the side position using the same handshape (as in "left," sounded LEFT, cued 6c5s5s'). The flick also may point out a syllabic consonant (as in "official," sounded uFISHl', cued 5sd5t6s6s').

The SELF MONITORING CUE CARD format is versatile to encourage individualization of pronunciation patterns. In the following example a widely acceptable pattern is presented, followed by two alternatives that may have regional or individual appeal:

HE FAVORS THE IDEA OF LAW AND ORDER.

HEE FAEvurz	thi ieDIu	uv	LAW	and	AWRdur
3m 5c5t2m2s'	2t 5s5t2t5sd	5sd2s	6c	5t4sls	5c3slm

HEE FAEvuz	thi ieDEEuruv	LAWranDAW:du
3m 5c5t2sd2s'	2t 5s5t1m5sd3sd2s	6c3t4slclsd

HEE FAEvurz	thee ieDEEu:v	LAWnAWRdur
3m 5c5t2m2s'	2m 5s5t1m5sd2s	6c4s'5c3slm

In keeping with Cornett's philosophy about Cued Speech, the CUE CARDS offer a way of making clear the individual's own cue-production pattern. Just as one cues according to one's own pronunciation preferences, so one customizes the CUE CARDS, as shown in the following example:

ARE YOU THROUGH WITH THE NEWSPAPER?

AHR	YUE	THRUE	WITH:u	NYUEZPAEpu
5sf3s	8c	7s3c	6t2sd	4s8c2slc5t1m

Foeneemik Speling clarifies subtle differences in pronunciation. The following humorously intended sequence shows how some persons, who do not make a phonemic differentiation between ur, u, and who "drop" final r sounds, try to make their message "Earl, your car needs oil!" clear:

URL, yoor KAHR NEEDZ OIL
 U:L, yoo: kah: NEEDZ AW:L
 Uul, YOOu KAHu NEEDZ AWul
 Uil, YOOWu KAWu NEEDZ AWil
 Uiul, YUEwu KAW: NEEDZ AWWul
 UYUL, yuh KAW NEEDZ Ahyul
 OIL, yuh KAW NEEDZ URL

SELF MONITORING CUE CARD Materials

Materials have been developed to introduce the SMCC format and ways of practicing new language skills both through ongoing Cued Speech and through the guidance of written codes that lead one to accurate, fluent oral language. When newly-developed functional production patterns are associated with hand cues, the SMCC materials provide the code to guide pronunciation and a means to self-monitor ongoing production. When ear training for the forty-one phonemes of American English is associated with Foeneemik Speling, students can more easily learn the various orthographic spellings of each phoneme and how orthographic spellings overlap phonemic categories. A humorous ERROR CUE, endorsed by Cornett, is presented for use either as a silent flashing warning that an error has occurred, or to show where the error occurred in silent replay of the word or phrase for correction.

SMCC materials teach the forty-one phonemes of American English functionally throughout the auditory-vocal/visual-graphic language loop. In his foreword (Jones, 1985), Dr. Cornett points out the usefulness of the SELF MONITORING CUE CARDS in expediting the learning of Cued Speech itself for persons who prefer to have visual materials providing more flexibility than prepared lessons. The SMCC series includes six practice sets organized around themes, such as capital cities of the world, vocabulary words, structured sentences and questions, original card games such as "Sentence Match/Experience Match" and adaptations of popular games such as "Cue Card Battle!" In addition, "Cue Card Trivia" can be used as a selfcontained game or as add-on material for Trivial Pursuit.

The card games have been used in a regular second grade classroom to aid carryover of reading and spelling skills for two learning disabled clients. The mother of one client, a volunteer teacher's aide, carried out the activities as scheduled by the teacher. The classroom teacher included several other students, including one who was having difficulty with English as a second language in his home.

Clients as young as seven years of age have easily learned the Foeneemik Speling production code. Clients readily learn to cue those sounds that they otherwise have difficulty discriminating. Clients apparently use just what they need from the CUE CARD format to be successful. Students will read the Foeneemik Speling, for example, only when necessary to decode the language unit, or to be sure they have read a word correctly. Persons in carryover for production patterns either monitor their ongoing cuetalk by reading the cue notations or check the cue notations for comparison with their just-completed production patterns. An adult hearing-impaired client, who was trying out the CUE CARD format, stopped cuetalking abruptly, observed that he had cued more sounds than he actually said, then repeated the phrase with the correct sound pattern. He ex-

pressed delight that he could "read" how talking sounds and use the hand cues to monitor his own articulation.

Introducing Foeneemik Speling and/or Cued Speech into ongoing therapy has proven useful for persons having one or more of the following problems: hearing sensitivity loss, auditory perceptual confusion, reading disability, dialectal distortions, spelling difficulties, dysfluency in conjunction with misarticulations, and dyspraxia. The enhancement provided by Foeneemik Speling or Cued Speech and/or the complete SMCC format shows in the client's greater certainty about language input and output, backed by an increased rate of progress on skills tests and improved function observed by family and colleagues. As more speech-language clinicians and teachers of basic language skills incorporate Foeneemik Speling, Cued Speech and/or the complete SELF MONITORING CUE CARD code for spoken language into their programs as appropriate, data will be generated in quantities sufficient for statistical statements about various clinical populations.

Summary

Often the value of cuereading and cuetalking for a client was confined to those relatively few hours when the clinician was physically present. A written code for spoken language which utilizes aspects of Cued Speech, called the SELF MONITORING CUE CARD format, was developed to serve as a therapy tool and a bridge from therapy/instruction through carryover of newly learned skills into everyday use. A prominent feature of the SMCC format is Foeneemik Speling, a production code developed by the author. Receptive and expressive language benefits from use of the new written code were reported for persons with speech-language learning difficulties and/or maintenance due to a variety of causes. Persons have also used the CUE CARD materials as an efficient route to learning Cued Speech and improving cueing skills.

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CUED SPEECH: A MIRACLE FOR MARK

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and

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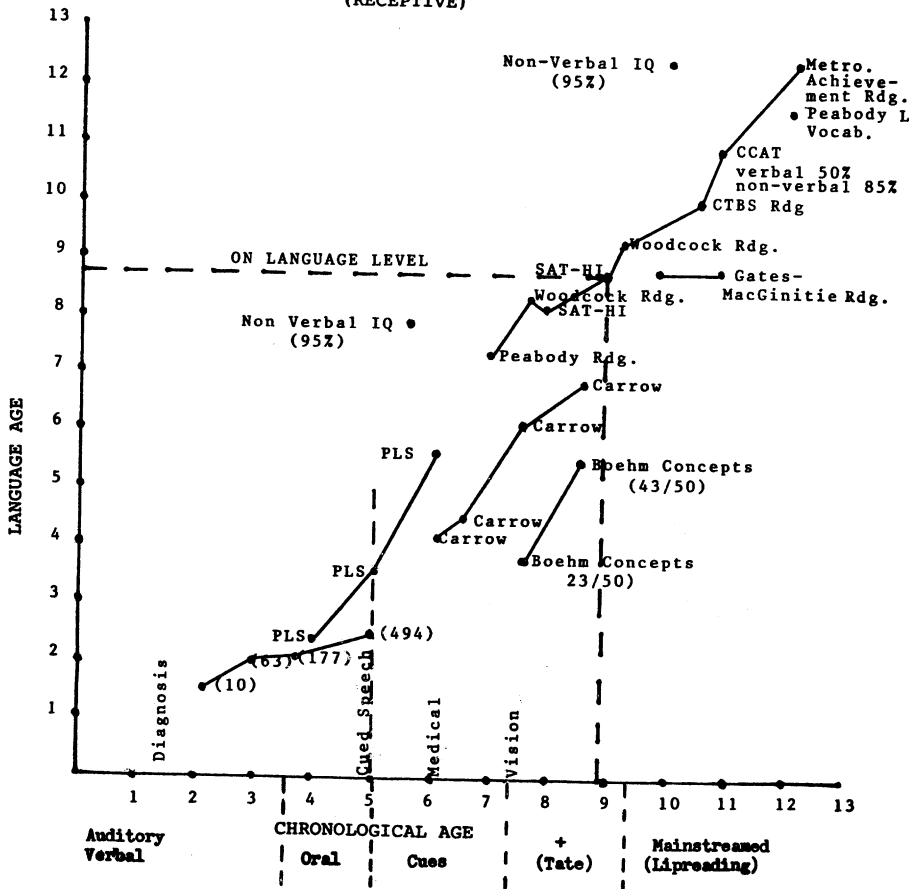
At eighteen months old Mark (son of the first author) was diagnosed at the Children's Hospital of Eastern Ontario in Ottawa, Canada, as having a profound sensori-neural hearing deficit. It was subsequently determined to be a classic "left hand corner" loss, so typical of deaf children: 80-100 dB respectively in the better ear from 250-1000 Hz. The cause is unknown, although, as a result of other developments, we suspect pre-natal rubella.

Mark was fitted with two body-type hearing aids and was introduced to aural habilitation within two weeks. As was to be expected, while he was learning to listen, progress was slow. At age two he had 10 words receptively and 3 expressively (see Figures 1 and 2). At age three it will be noted that he had 63 receptive words and 13 expressive words. Even at this early age Mark's aural habilitationist was concerned about him, commenting that it was difficult to establish eye contact, he was difficult to control, lessons had to be very fast paced, and his progress was too slow. As a result of this concern he was tested by various related disciplines at Children's Hospital: otolaryngology, psychology, ophthalmology, occupational therapy, and neurology. Mark tested within normal limits consistently.

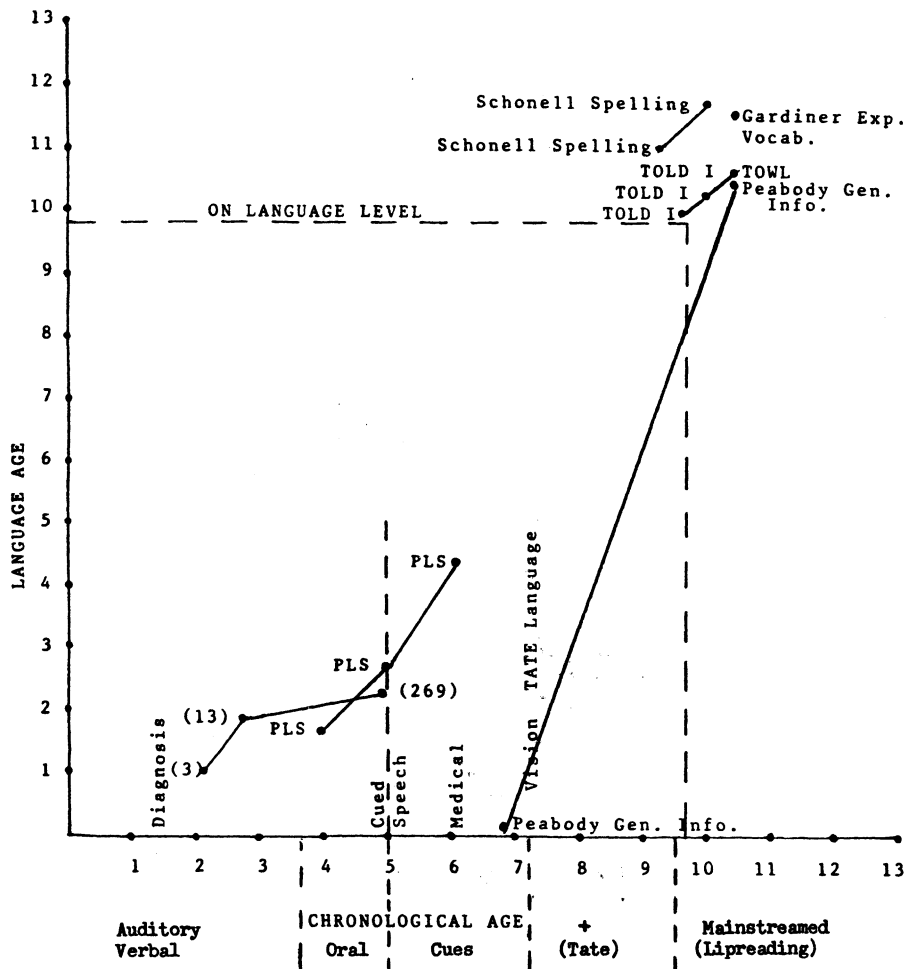
When Mark was three and a half years old, the Rejhon family moved to the Washington, D.C. area. He was fitted with a Phonic Ear #421, and then a #431, as his personal aid. He was enrolled in the excellent half-day, self-contained auditory/oral program of Prince George's County. Auditory and speech training continued as before and lipreading (i.e., speechreading) was added. Intensive home instruction and experience-based learning continued.

By the age of five Mark had acquired only 494 words receptively and 269 words expressively, which gave him a language age of about two-and-a-half and two respectively (see Figures 1 and 2). And achieving those language age numbers was an exercise in clutching at straws! There was continued concern about Mark's abrupt, rough behavior, his poor interaction with other children, short attention span, need to be alone a lot, perseveration (inappropriate repetitions of behaviors), and shaking his hands. This can be summed up as having all the "red flags" of a learning disability -- though Mark had no apparent learning disability. Obviously, something else was needed.

(RECEPTIVE)



SUMMARY OF LANGUAGE ACQUISITION (EXPRESSIVE)



Over the summer, individually and at the Family Cued Speech Workshop at Gallaudet College, the Rejhon family learned Cued Speech and began to use it with Mark. Mark was not impressed (it was one more thing mom was shoving down his throat).

In September at age five years, five months Mark was enrolled in the Gallaudet Cued Speech Program at the National Child Research Center (NCRC) in Washington, D.C. This was a private nursery/kindergarten with four CS children and two teachers of the hearing impaired. Mark was mainstreamed part of the time, with the teachers of the hearing impaired acting as interpreters. Though a very curious child, Mark had asked few questions. In just three months the questions began to come. It was clear that he was now asking questions because he knew -- with Cued Speech -- he would understand the answers. Obviously, he had begun to realize that CS was giving him a lot of information.

From Figures 1 and 2 it will be noted that Mark was tested at ages four, five, and six using the Pre-School Language Scale. Between four and five, while in the oral program, he had gained one year. Between the ages of five and six, while at NCRC, he gained 23 months receptively and 21 months expressively. The effective, intensive cueing time was 7 months.

At the age of five-and-a-half Mark was given the Raven Progressive Matrices (a non-verbal test of intelligence). He scored at the 95th percentile for eight-year-olds. These results were confirmed by the Leiter International Performance Scale and the Beery-Baktenica Development Test of Visual Motor Integration. He was retested at age ten with similar results (see Figures 1 and 2).

Since testing had indicated no other problems, it was the feeling of parents and professionals alike that Mark's behavior problems were caused by frustration with his inability to communicate. If this was the case, given the progress he had made in 7 months, the "behavior" should have been subsiding. It was getting worse. His behavior was unpredictable from day to day, hour to hour, even if he was isolated from other children. He was very moody, destructive, irritable, couldn't rest, couldn't walk a straight line, was kicking and biting.

The medical diagnoses began to come in when Mark was age six: Hypochlorhydria (insufficient hydrochloric acid in the stomach), Dumping Syndrome (the stomach dumped its contents in six minutes), Malabsorption (the intestine could not absorb nutrients), Mineral Imbalance (because of the above), High Heavy Metal Content (particularly aluminum and arsenic), and Sensitivities (allergic reactions) to all inhalents tested (32!) and a number of common foods. Mega vi-

tamin/mineral therapy was begun in conjunction with injections for the allergies and a very closely supervised dietary regime which included feeding him protein every two hours.

The family moved to Montgomery County and enrolled Mark in the Cued Speech Program. He was in a self-contained classroom, but mainstreamed for non-academic subjects. By age eight-and-a-half he was mainstreamed 1/2 days for reading, math, social studies, science, art, physical education and music.

At the age of seven-and-a-half, two very significant things happened. Mark's teacher of the hearing impaired began using the Tate Language Curriculum. It is a highly structured remedial program developed for teaching English as a second language. While Mark had been using three, four, and five word phrases consistently, within six weeks he was speaking in complete sentences with the right tense markers and all the articles. Here are some spontaneous language samples: "I'll pick up the Lego; you go get the bag." "It smells like distasteful." "Excuse me, but may I go to the bathroom?" "Your voice disturb me." "I appreciate it." "I just don't want to!." "I saw it from the corner of my eyes."

The teacher obviously did not teach him this in six weeks. He knew the vocabulary but had not been able to put it together. The Tate Language Curriculum was the key. He has never looked back!

The second dramatic development was the discovery of a vision problem. In spite of having been seen by three pediatric ophthalmologists over the years, all of whom said he was "just fine," Mark was, in fact, unable to focus his eyes close up. Within the range of 4 feet (it was now discovered) he saw double. Here was the explanation for why he had not learned to lipread, had attention span problems, and was very poorly coordinated. Vision training and glasses went a long way toward correcting these problems.

It was now time to get back to academics (see Figures 1 and 2). In one year he mastered the Boehm Basic Concepts. In repeated testing on the Carrow Comprehension of Language test he continued to progress. Reading scores (Peabody, Stanford Achievement Test: Hearing Impaired, Woodcock) all showed continued progress until receptively he was at his age level at nine years. At age seven he was given the Peabody General Information Test. He scored 0.1. Mark had no way of expressing what he knew. Administered again at age ten-and-a-half, he was on level. At age 12.2 he was tested with the Metropolitan Achievement Reading and the Peabody Vocabulary tests. He scored at age 12.5 in reading and at age 11.7 in vocabulary.

Acquisition of expressive language took a little bit longer, but by the age of ten Mark was on level. He has always had superior spelling skills and mathematics (Metropolitan Math 98%), and computers are his forte.

When Mark was nine-and-a-half the family moved back to Ottawa. He was mainstreamed in his neighborhood school with the additional services of a full-time aide who cued and a teacher of the hearing impaired (the second author) three hours a week. Auditory and speech training continued. As well, a structured lipreading program was introduced, and work designed to refine skills and develop Mark's ability to manipulate language and to use it creatively was begun.

The objective tests at various stages were useful diagnostic tools and provided ways to monitor progress. But the real tale is told in these samples of Mark's spontaneous spoken language:

Age 4.6 - 5.6 (Pre Cued Speech)

"after maybe...no more...one more sleep...where find it?... on off turn left...I want pick up...I want two pennies gum¹...tie my shoe...I want some coffee...three pieces... Nina school...yummy!"

Age 5.6 - 6.6 (Cued Speech)

"I said yes....which one Jesse?...one more time...Don't touch me!...Mommy go out, Daddy stay home...no no don't open, no ask me...pick up Nina and then we go home...Daddy come home in little while...when the sun comes up...May I go to the bathroom?...See you later...while Mommy cook supper Mark and Daddy walk under tree long walk...I like that flavor better...Where's my pencil?...Nina sleeping."

Age 6.6 - 7.6

"Mark can have three pieces of candy....Me too, I'm tired...I can't say....I want to talk....I want to stay here and talk about candy....Okay, I will not play. I will eat now."

Age 7.6 - 8.6 (Tate Language Curriculum)

"I'll pick up the Lego; you go get the bag....It smells like distasteful....Excuse me, but may I go to the bathroom?... Your voice disturb me....I appreciate it.... I just don't want to....I saw it from the corner of my eyes."

¹ Nina is Mark's nine-and-a-half-year-old sister, who is hearing, pretty, has tons of personality, all the social graces, and is a straight "A" student.

Age 8.6 - 9.6

"I better look for it....I'll try hard to agree with you... Bless you!...Mind your own business....I forgot...Now it came back to me....My eye is itchy....It feels like a little speck....Daddy will be sorry....I'll have them on alternate days."

Age 9.6 - 10.6 (Garfield Comics)

"I forgot. It slipped my mind....I don't know what to write. Think of a good idea....Is that a gap?...Do some unusual high school have playgrounds?...My house is completed....That was a tricky one....I learned some new ones. In fact I learned all of them....[and some language obviously not in any formal curriculum]....f _ _ _ off!"

Age 10.6 - 11.6 (Archie Comics)

"I could have sworn I had six....If I were you I wouldn't do that....Do you like that style?...confounded pen....I'm not interested - not one little bit....You blew my cover."

Age 11.6 - 12 (Fantasy and Novels, Newspaper)

"That's a disgrace....This is cramping your style. I'll take it off....But sometimes he takes it too literally.... Does this make sense? Do you want to be on stage together with Cory Hart?...Does it surprise you that I know what a slumber party is?...Does he make money appear out of thin air?...Wow that'll be some trick!...If I had a choice I'd use my own money for more jelly beans....Is there such a thing as micrometers? It would be less than a millimeter. And maybe there are such things as micrograms - a millionth....I'm sort of worried about pollution that will ruin the earth by the end of the century....I'm not wasting time, I'm being mad."

This has been the story of one profoundly deaf boy, Mark. Because of Cued Speech (accompanied by excellent teaching) he acquired in five years the receptive and expressive language capabilities of a ten-year-old. His language and academic future seem secure.

Obviously Cued Speech does not solve everything, nor did it solve everything for Mark. He still has problems with social interactions and communication with his hearing peers -- which is, of course, a two-way street. And he still has some lapses in behavior. He lost a lot of time in the early years due to deafness, due to medical problems and the variety of educational settings, time when those skills should have been developed and refined. He is now on the threshold of adolescence with all its identity issues to be resolved. With appropriate help Mark will be able to

deal with these aspects of his development just as successfully as he has been able to deal with others.

It has not been easy; it has not been fast; it has not been cheap. But it has been worth it!