Speech language and hearing program for preschool children: Part A: Program development and implementation.

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A SPEECH, LANGUAGE, AND HEARING PROGRAM
FOR PRESCHOOL CHILDREN

PART A: PROGRAM DEVELOPMENT AND IMPLEMENTATION

By

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B.A. University of Montana, 1974

Presented in partial fulfillment of the requirements for the degree of
Master of Communication Sciences and Disorders

UNIVERSITY OF MONTANA

1976

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Date, June 7, 1976

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ACKNOWLEDGEMENTS

The author wishes to convey special thanks and appreciation to Debbie Manovich, friend and fellow coordinator of this preschool program. Her many important contributions along with her cooperative and positive approach aided greatly in the development and implementation of this program. Much appreciation is also extended to Barbara Bain for her constant support, concern, and editorial contributions to this paper and to the entire Externship experience.

Special thanks go to Dr. Jack Radio, Director of Special Services, Missoula School District #1, and Dr. Fred Appleman and Jane Solberg, Regional Services For The Handicapped, Region V for making this preschool program possible. To the 4 C's, appreciation is due for providing additional information and assistance in scheduling speech and language screening in the licensed Day Care facilities.

The supportive services provided by Missoula School District #1 Speech and Language Clinicians and School Psychologists were appreciated. Marion Lund and Sharon Whitehouse deserve special recognition for their continued involvement and encouragement.

In addition, the author wishes to thank the members of her Externship Committee for their professional interest and support.

Finally, to Michael Wheat goes a special thank you for his constant support and patience throughout my endeavors of the last four years.
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Many writers in the area of early childhood development acknowledge the need for early assessment and preventive programs for preschool children. Information related to speech, language, and hearing make up only a part of the literature on preschool development. This paper, Part A: Program Development and Implementation, provides a detailed review of the recent literature dealing with speech, language, and hearing screening programs for preschool children. In addition, it gives a detailed description of the development and procedures of a preschool speech, language, and hearing program conducted in Missoula, Montana during the 1975-76 school year. During that time, a total of 734 preschool children were screened. A detailed description of the screening tool itself and data derived from the program can be found in Part B: Program Procedures and Data (Manovich, 1976). Chapter V of this paper, the "Program Evaluation", covers both Part A and Part B. It was written by the two University of Montana Externs in charge of development and implementation of the program to provide a comprehensive evaluation of that program.
Rationale for Preschool Intervention

In recent years, there has been a revival of interest in the preschool age population (Weikart, 1967; Murphy, 1968). According to Bloom (1964) the period before 4 years of age "is the time of greatest intellectual growth and is therefore the optimal time for (educational) training" (Weikart, 1967). Weikart (1967) reviewed various preschool programs and teaching methods. He stated that "while the timing of intervention can be flexible, much work needs to be done in exploring use of the period between age 1 and age 3 for a preventive program" designed to counter handicapping conditions.

Preschool programs for handicapped children are now mandated by legislation in several states and being considered in many others. Caldwell (1970) presented a rationale for early intervention by drawing inferential support from three main sources: 1) animal studies on the effects of early experiences; 2) conceptual analyses of the importance of early stimulation; and 3) studies comparing development of children in different social environments. She drew empirical support from work showing the results associated with early environmental enrichment. In addition to this, Caldwell listed four obligations to be met if significant progress is to be made in the area of early intervention. These are: 1) mandatory follow-up on research studies; 2) continuity between preschool programs and future educational placement; 3) careful program description; and 4) re-assignment of priorities regarding funding.
It is important to diagnose even mild problems during the earliest years "so that adequate compensation can be provided sufficiently early and the child can be given the specific kinds of help needed for active mastery of the demands of the environment" (Murphy, 1968). Murphy proposed that large scale day-care programs might be the most feasible way to provide a preventive approach to the problems of culturally determined retardation, as well as creating a solution to the child care problems of working parents. At present, day-care facilities in Missoula appear to adequately solve the child care problems of many working parents. However, in this authors opinion, to provide a preventive approach which allows for general assessment of a child's needs and referral to appropriate sources as well as support to professionals involved in remediation, day-care facilities would have to employ specialized trained personnel. Clinical observation of many preschool facilities in Missoula indicates that this type of "preventive approach" is not being used to the fullest at this time. In general, it is not the design of these programs to offer such an approach.

Zehrbach (1974) defined screening as "the process of determining whether a child is developing according to normal patterns or whether he or she manifests developmental lags that suggest the need for a thorough evaluation and consideration for a special program before entering school". Most recently developed speech and language screening tools are based on the premise that, through early detection and remediation, many small problems can be prevented from developing into major ones.

In most communities, a minimum of 3 to 5% of the children could
benefit from a special preschool program (Zehrbach et al., 1975). Historically, preschool children have been referred for speech, language, and/or hearing evaluations through agencies, physicians, other professionals, or parents. These children usually have severe and obvious problems. Often, children with mild to moderate handicaps in speech, language, or hearing go unnoticed until they enter school. Those children who could benefit from special preschool programs can be identified if a comprehensive effort is made to locate and screen all children.

Speech and Language Screening

Scattered throughout the volumes of literature on child development and development of preschool education programs are materials and procedures related specifically to speech, language, and hearing problems in preschool children. The following review will be concerned with those publications specifically related to early identification of these problems, and purposes and procedures of screening tools which have been developed.

One of the speech and language screening tools reviewed was conducted in a summer Headstart program and operated under the following basic premises: 1) assessment of a child's ability to use any language as an effective tool of communication; and 2) concern with aspects of a child's language that could be educationally handicapping (Monsees & Berman, 1968). Monsees and Berman used receptive and expressive items from developmental scales and tests at a 4 and 5 year level. From a basic language sample, they checked sentence use, intelligibility, voice quality, and fluency. Hearing screening was not included. The screening tests were not scored, but over-all communicative ability, judged by the quality of responses.
on the test, provided the basis for rating. One of 4 possible recommend-
ations was given for each of the 286 children tested: 1) average need
for language enrichment within the Headstart program; 2) special need
for stimulation in the Headstart program; 3) need for evaluation by a
public school speech clinician; and 4) a complete diagnostic evaluation
at a Speech and Hearing Clinic. This test was developed primarily for
use with economically and socially disadvantaged blacks. No statistical
data regarding reliability of the screening tool was presented.

Fluharty (1973) designed a preschool speech and language test that
followed the transformation-generative grammar model and was based on
developmental studies of speech and language acquisition. The test
was standardized on 203 children in Cincinnati, Ohio aged 3 to 5 years.
Intra-test reliability was .97 and inter-test reliability was .96. The
correlation co-efficient of validity for this instrument was .87. In the
first subtest, covering articulation and vocabulary, the child is asked
to name several pictures. The second subtest requires non-verbal responses
to sentences incorporating 10 basic syntactic structures. In the third
section, the child is asked to imitate 10 one-sentence picture descriptions.
This screening tool does not include provision for sampling of spontaneous
expressive language, and inclusion of hearing screening is not considered.

The Comprehensive Identification Process (CIP) is another approach
to preschool screening for children aged 2½ to 5½ (Zehrbach, 1975). It
was developed in 1973-74 by R. Reid Zehrbach, Ph.D. and others at the
University of Illinois at Urbana-Champaign. The program is designed to
identify children 2½ to 5½ who may be in need of "special medical, psych-
ological, or educational assistance before entering a public school
program" (Zehrbach et al., 1975).
This process provides an attempt at assessing a child in relation to eight developmental areas: 1) cognitive-verbal; 2) fine motor; 3) gross motor; 4) speech and expressive language; 5) hearing; 6) vision; 7) social/affective; and 8) medical history. The test is administered by a screening team consisting in large part of trained paraprofessionals. After the screening data has been reviewed, an individual child is given one of three possible ratings: 1) pass; 2) recommendation for re-screen or referral for more detailed examination in one of the eight areas tested; or 3) recommendation of a complete evaluation.

Zehrbach (1975) writes that validation of the CIP comes from several sources: 1) it gains some validity through the item selection by professionals in the area of early childhood education and development; 2) the items selected for the test closely associate with items that have been validated against developmental behaviors; and 3) because CIP is designed to locate children for further evaluation and special programs, it is validated against the criterion of eligibility for participation in such programs. During the initial study, 762 children were screened. Of these, 71.5% passed the initial screening process. Of the remaining 28.5%, 10.4% needed further evaluation, 7.6% were rescreened, and 5.3% were placed in special programs.

The speech and language section of the CIP is designed to assess articulation, voice, fluency, expressive language, and "associated factors" (general communication ability). Basic air conduction audiometric screening is done at all frequencies to assess hearing abilities. The speech and expressive language subtest is quite an extensive screening test and could be used apart from the over-all CIP test. Addition of a receptive language section would make it a more complete screening tool.
Because the CIP is a comprehensive tool, it takes at least 30 minutes per child to administer. This, coupled with the large number of trained paraprofessionals necessary, make it a more time-consuming tool than many which cover only speech, language, and hearing. In considering a preschool screening program, one must decide whether to concentrate on speech, language, and hearing, or expand to a program that will also provide information regarding a child's general and educational abilities. Availability of time and personnel, as well as general program goals must be known before an adequate program can be selected.

In 1973, a program for speech and hearing screening of preschoolers was developed in Georgia (Wright, 1974). Two of the stated goals of the program were to locate children with speech and language deficits, and to locate children requiring medical attention or other special treatment relating to hearing problems. Trained volunteers were used to do most of the screening. In 1973, 1,450 children were screened. Of these, 134 (10.8%) failed either speech, language, or hearing screening.

Articulation and some basic language skills were assessed in this program. The articulation test is an appropriate and complete screening tool. However, according to Wright (1976) in correspondence with this author, the language index is being revised because it is not statistically significant. This language index, designed primarily for use with children aged 5 and 6, does not appear to adequately sample many language skills. It includes 9 items, all of which require a verbal response. The items cover name, age, body parts and their function, prepositions, counting, sentence repetition, and response to a question. This author would question whether inclusion of some of these items, i.e. name, age, and counting, makes a significant contribution to an assessment of language.
The Georgia program also includes pure tone hearing screening, done at 25 dB at 1000, 2000, and 4000 Hertz. A lack of response to two or more frequencies in the same ear constituted failure. All hearing failures were rescreened within two weeks. Those children who failed any portion of the speech, language, or hearing screening were referred either to their family physician, medical specialist, or Easter Seal Center for additional tests and possible therapy.

Another preschool speech and language screening tool has been designed specifically for use by physicians because they are continually in a critical position for identifying and referring children with communication disorders (Kulig, 1975). The Physician's Developmental Quick Screen for Speech Disorders (PDQ) (Kulig & Baker, 1973) can be used with children aged 6 months to 6 years. The screening test covers language, articulation, voice, rhythm, and oral peripheral examination. Results on 105 children tested indicate that the physician employing the PDQ will not miss more than 3% of the speech and language problems in his pediatric patients under the age of 6. The screening tool is now being used at the University of Texas Medical Branch at Galveston. Frequency of use of the PDQ by physicians in other areas of the country was not documented or discussed.

As can be seen from this review, there is a general lack of information on preschool speech and language screening tools and programs in the literature. The importance of the preschool years to future performance should be considered by all professionals dealing with children. It appears that the speech pathologist concerned with prevention and early intervention should begin to deal more with the preschool population.
Hearing Screening

The adage "an ounce of prevention is worth a pound of cure" is very relevant to early intervention and detection of hearing loss. It's important to the child's cognitive development that his hearing be within normal limits during the early years of life. Many studies have shown that even mild hearing losses can cause learning problems (Northern and Downs, 1974). Middle ear infections, primarily otitis media, are quite common in children and occur most frequently during the preschool and early school years (Grant, 1974; Downs, 1968). Ear infections often go unnoticed by children and parents. For example, 14% of the children waiting for non-medical services in a large pediatric clinic in Baltimore, Maryland were found to have some form of middle ear infection (Grant, 1974). For this reason, efficient hearing screening programs at the preschool and early school years should be of prime importance.

The National Conference on Identification Audiometry held in Baltimore in 1961 defined the objectives of a hearing screening program as "... to locate children who have even minimal hearing problems so that they can be referred for medical treatment... and so that remedial educational procedures can be instituted at the earliest possible date..." (Lescouflair, 1975). In November, 1974, the American Speech and Hearing Association recommended an individual pure tone air-conduction screening procedure for accomplishing identification audiometry. It stated that screening should be done at 1000, 2000, and 4000 Hertz, at 20 dB (ANSI standards, 1969) (ASHA, 1975). ASHA has not yet made a policy statement regarding additional use of an impedance bridge in hearing screening.

Traditional procedures for audiometric screening have generally involved only pure tone air-conduction testing. Many writers have
recently begun to assert that this method is inefficient for young children (Brooks, 1971; Northern & Downs, 1974; Revall, 1973; Brooks, 1973; Cooper et al., 1975; Lescouflair, 1975). Lescouflair listed the following reasons for the ineffectiveness of many conventional hearing screening programs: 1) poorly defined goals and objectives; 2) ineffectiveness of referral and follow-up procedure; 3) ineffective coverage of school populations; 4) ineffectiveness of test procedures (generally only air conduction); and 5) failure of programs to reach their objectives. To ameliorate these problems, he suggested among other things, that impedance audiometry be used in screening programs, and that parents and teachers be educated on the subject of hearing.

An investigation by Brooks (1969) revealed that 20% of school children have at least one episode of fluid in the middle ear during their first year in school (Brooks, 1971). In a comprehensive study in Pittsburg, 29% of the children failing the primary screening were shown to have normal hearing (Eagles & Wishik, 1961; Eagles et al., 1963, 1967). Also, air-conduction screening failed to identify more than 50% of the children with active middle ear pathology. The following are among the conclusions reported by Eagles after the earlier study (1957-1964): 1) despite the less sensitive average hearing levels in children with otoscopic evidence of disease, many of them have hearing as sensitive as children without such evidence; 2) audiometric testing cannot identify all children with physical abnormalities who may need medical treatment; 3) another method is needed to identify children needing special otological and audiological attention in addition to audiometric screening; and 4) it is necessary to develop identification and management programs for children in the preschool years (Eagles, 1967).
The majority of people promoting an alternative to screening programs employing only air-conduction testing advocate use of a shortened form of impedance audiometry and conventional audiometric techniques at one or more frequency. According to Northern and Downs (1974), the ideal hearing screening program for preschool children would include impedance testing, air-conduction screening at 1000, 2000, 4000, and 6000 Hertz, and pneumatic otoscopic examination.

Northern and Downs (1974) reported that various pathologies in children will be identified by the acoustic bridge test. Pure tone air-conduction screening may identify 50% of the ear pathologies and otoscopic examination will identify most of the middle ear pathologies. Results from the National Health Examination Survey (Silverman, 1972) revealed that only 40% of the otoscopically abnormal children were detected by air-conduction threshold testing. In an investigation conducted by Cooper et al., (1975) 539 children were screened by an abbreviated form of impedance audiometry and conventional audiometric techniques. Ninety-four percent of the hearing disorders were detected by the impedance technique (tympanograms and reflex measurement) and 24% by the audiometric technique. Cost projections were made; the impedance technique was almost 1/6th the cost of the audiometric technique at a rate of 10,000 children per year.

A comparison study of methods used to detect ear pathologies in children was undertaken by Lowe (1974). Seventy-eight children were tested and pure tone screening, impedance testing, and otoscopic examinations were compared. The following were among the conclusions of the study: 1) tympanometry is a reliable screening method for detection of middle ear pathology in children; and 2) tympanometry combined with air-
conduction screening would be of much greater efficiency in the identification of all ear pathology than is air-conduction screening alone.

It can be concluded that, to be effective, a more comprehensive hearing screening procedure must be employed than the conventional air-conduction approach. In order to meet the objective of locating children "with even minimal hearing problems" (perhaps related to middle ear pathology), use of an impedance bridge and otoscope should be included with traditional air-conduction testing.
CHAPTER II

PROGRAM DEVELOPMENT

According to the 1970 Montana Census Report, there were 1562 preschool children between the ages of 2 to 5 in the city of Missoula, Montana in 1970, and an additional 1608 children of these ages in Missoula County. The current (1975-76) preschool population is assumed to be approximately the same as it was in 1970. Recently, Missoula School District #1, Region V of Regional Services for the Handicapped, and the 4 C's organization (Missoula Community Coordinated Child Care) expressed an interest in the development and implementation of a program of speech, language, and hearing screening for preschool children. It was through the support of these agencies that such a program was carried out in Missoula, Montana during the 1975-1976 school year.

Two Speech and Language Externs served as program managers, developing and implementing the preschool program, and making periodic follow-ups on all children referred for further services. These two Externs were employed by School District #1 and Region V through state funds allotted for a nine-month Externship experience. An Externship is a component of the Master of Communication Sciences and Disorders degree offered through the University of Montana Department of Communication Sciences and Disorders. Each Extern was to allot at least 252 working hours to Region V. Throughout the entire 9 months, these hours were devoted to the preschool program.

During the course of the preschool screening in licensed Day Care Centers, the 4 C's served to coordinate between the centers and the Speech and Language Clinicians. According to Judy Wing (1976), 4 C's
Director, the 4 C's is a nonprofit "community agency designed to advocate for the needs of children, coordinate existing services to meet those needs, and develop new programs through a sponsoring agent where a gap exists". The 4 C's personnel notified Day Care staff at meetings and in the Association Newsletter of the availability of speech, language, and hearing screening services. In addition, they made scheduling arrangements for the initial speech and language screenings. Any Day Care operator who wished to refer a child for immediate screening could do so by contacting 4 C's personnel.
CHAPTER III

PROGRAM DESCRIPTION

This preschool screening program was initially concerned with children aged 2 to 6 years who were not in a public school program in Missoula and were not receiving services in speech and language from other agencies. The primary purpose of this program was to screen and thereby identify those preschoolers in the Missoula area who were in need of further speech, language, and/or hearing evaluation, therapy, or medical attention for problems related to hearing. Children requiring further speech and language assessment were referred to School District #1 Clinicians or were evaluated by one of the Externs. If, after a complete diagnostic evaluation, it was determined that the child might benefit from speech and/or language therapy, he/she received such services from the clinician to whom he/she had been referred. In addition, two School District #1 Psychologists provided testing and consultation services when necessary. Children who failed hearing screening were referred to the appropriate sources for follow-up i.e. medical physician and audiologists.

There were 1378 children under 6 years of age with working parents in Missoula County (1970 Census Report). In Missoula, there are licensed Day Care Centers for approximately 474 children and licensed Day Care homes for approximately 231 children (4 C's publication, 1972). Day Care Centers offer group care for children aged 2 to 12 years of age, though they are mainly composed of preschool age children, with the exception of some after-school care. Approximately 25-30% of the working parents in Montana use licensed Day Care facilities. However, 70% of working
parents in Missoula make use of Day Care programs, reflecting a much larger population than in other parts of the state. Due to the large population of preschoolers available in the 11 licensed Day Care Centers in Missoula, the screening program was begun there.

The screening program was later expanded to include seven private and parochial preschool programs. Children specifically referred from licensed Day Care or private homes were also screened. One day of screening was conducted at the University of Montana Married Student Housing Facility, and was open to the public. To date, a total of 734 children have been seen: 407 for speech, language, and hearing screening; 186 for speech and language only; and 145 for hearing screening only. Due to absences, turnover of the day care population, and inavailability of hearing screening equipment, not all children received all three phases of screening.

The necessary hearing screening equipment was not available during the Fall of 1975. Therefore, only speech and language screening was done at the licensed Day Care Centers during that time. In January 1976, hearing screening was begun in the 11 Day Care Centers previously visited, and in conjunction with speech and language screening at other preschool facilities.

Speech and language screening was done with a tool devised by the Externs primarily for use with children aged 3 to 5. The following areas were assessed: articulation, expressive and receptive language, general intelligibility, fluency, and voice. (See Appendix I for a copy of the record form for this test.) Developmental norms provided a basis for scoring criteria. A more detailed description of the items in this screening test can be found in Part B: Procedures and Data (Manovich, 1976).

Each child was screened individually in 7 to 10 minutes. Children
were then rated as Pass, Rescreen, or Evaluate. Ratings were assigned in response to the child's performance on each main section of the test. Those children to be rescreened were seen again in approximately six months. If further evaluation was recommended, the results and recommendations were discussed with the child's parents and a release form was obtained allowing the child to receive further services. The child was then assigned to available School District #1 Clinicians.

Hearing screening consisted of an otoscopic observation, tympanometry, and air-conduction screening at 20 dB (ANSI 1969) at 500, 1000, 2000, and 4000 Hertz. Five-hundred Hertz was screened to support the impedance results. Children with tympanograms revealing negative pressure greater than -150 m.m. H₂O were rescreened. Those who had negative pressure greater than -300 m.m. H₂O or Type B tympanograms were referred to a medical doctor. Criteria for pass or failure of air-conduction screening depended to a certain extent on the noise level at each particular center. In general, if a child failed the screening and demonstrated thresholds of 30 dB or greater at any one frequency, he or she was rescreened. If upon rescreening the child once again failed, he or she was referred to an audiologist for further testing.

Periodic follow-up on children referred for diagnostic evaluation or therapy, psychological observation, and medical attention was done by the two Externs. Several meetings were held with School District #1 Special Services Director and Speech & Language Clinicians, Region V Speech & Language Clinician, and C's personnel to keep them informed of progress and future scheduling. All were invited to participate in the screening process. (For a schematic representation of the sequence of procedures, refer to Tables I and II in the test of this paper.)
TABLE I

Sequence of Procedures for Speech and Language Screening

Preschools notified regarding scheduling

Speech and Language Screening - may be Accompanied by Hearing Screening

Children Classified

PASS

RESCREEN

EVALUATE

Re-classify (within 6 mos.)

Parents Contacted (within 2 wks)

Child Assigned to Specific Clinician

Diagnosis & Appraisal

Speech and/or Language Therapy

Referral to other professionals or agencies

Follow-up by Program Coordinators

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TABLE II

Sequence of Procedures in Hearing Screening

Preschools notified re. Scheduling

> Hearing Screening - may be accompanied by Speech and Language Screening

Children classified

PASS

RESCREEN

EVALUATE

Re-classify (within 2 to 4 weeks)

Parents contacted; phone and letter

Referral to medical physician

Parent signed release of information

Results reported to physician

Follow-up by program coordinators

Referral to Audiologist

Parent signed release of information

Results reported to Audiologist

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CHAPTER IV

CONCLUSION

The preceding chapters have offered a review of recent preschool speech, language, and hearing programs, and have described one particular program conducted in Missoula, Montana during the 1975-1976 school year. The people involved in development and implementation of that program support the contention that speech, language, and hearing screening, to be preventive, must be conducted during the preschool years.

The basic groundwork for learning and educational success is laid in the language learning which takes place during the preschool years. Speech and language screening of preschool children can quickly identify those in possible need of speech or language therapy. If remediation is begun during the preschool years, it is hoped that much of the child's problem can be eliminated by the time he or she enters public school.

Hearing screening, using an impedance bridge and air-conduction technique, is equally important during the preschool years. Much irreparable damage can be done by middle ear infections during the first 5 years of life. Preschool children with significant hearing problems may suffer delay in language and speech development as a result. If this were to continue until the child entered school, extensive rehabilitation would be necessary to correct the language and speech problem.

The area of preschool speech, language, and hearing programs is in its infancy. At this time, there is a need for development of screening tools and studies on their efficiency. But even more important is the need for implementation of screening and therapy programs for preschool age children.
CHAPTER V

PROGRAM EVALUATION

The following is a comprehensive evaluation of the preschool speech, language, and hearing program conducted in Missoula, Montana during the 1975-1976 school year. This evaluation was written jointly by the two University of Montana Externs in Communication Sciences and Disorders who served as coordinators of the program. The evaluation covers information provided in both Part A: Program Development and Implementation (Wheat, 1976) and Part B: Program Procedures and Data (Manovich, 1976).

A shortage of time allocated to personnel for preschool involvement resulted in many of the problems that affected the program. The two Externs each devoted an average of one day per week to screening and an additional one-half day per week for direct services. This was the only consistent attention that the preschool program received. Others were involved in working with preschoolers on a low priority basis. (See Table below for data on hours of direct service.)

Table III

DATA ON HOURS OF DIRECT SERVICE
(from 6 clinicians)

| Estimated number of hours in screening | ....... 500 |
| Number of therapy & diagnostic sessions | ....... 312 |
| Number hours direct therapy & diagnostics | ....... 177 |

This program provided a basis for a preschool speech, language, and hearing program in Missoula. Many aspects of the program could be improved to make for a more complete and efficient program.

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In general, a more stable foundation should have been laid at the initiation of this program. Program objectives and procedures should have been outlined in more detail to provide clinicians and others involved with an organizational framework. The extent and type of involvement of School District #1 clinicians and psychologists was not spelled out in precise terms and was considered to be low priority by supportive personnel. There was little coordination between Speech and Language Clinicians and no specific diagnostic procedures or set criteria were established for case selection. With set criteria, children would have been selected for therapy on a more consistent scale of priorities.

Throughout this program, very little time was devoted to public relations. Day-care and nursery school personnel and parents were often unaware of what services were offered. For this reason, it would have been beneficial for day-care and nursery personnel, parents, pediatricians, Ear-Nose-Throat specialists, and others to receive more information regarding the program at its outset. One training session was held for licensed Day Care personnel, however, attendance was small. A number of workshops and training sessions to provide necessary information regarding appropriate referrals would be an asset to any preschool program.

Though day-care facilities and nursery schools provide optimal centers for mass screening of preschool children, they also provide unique problems. It was often difficult to obtain full names, birthdates, addresses, and current phone numbers on each child. Parent contact was limited due to the fact that most were working during the day. For these reasons, a more defined channel of communication must exist between day-care personnel and those involved in preschool screening.

During the first part of this program, speech and language screening
and hearing screening were done on different days. However, after January 1976, hearing screening was conducted on the same day as speech and language screening. This proved to be much more efficient and insured that all children involved would receive all stages of screening.

With allocation of more personnel hours to the preschool program, the time span could be reduced between steps of the screening sequence, i.e. parent calls, follow-up visits, referrals, etc. (Refer to Tables I and II in the text of this paper) This was a problem in the program as it existed this year. Additional time and personnel devoted to a preschool program would also allow for more extensive follow-up of children to be rescreened and referred, more diagnostic evaluations, and a greater number of hours in direct therapy. Increased parent involvement would help to achieve optimum carry-over of therapy goals.

Overall, the speech and language screening tool developed by the two Externs generally discriminated between those children with appropriate speech and language skills, and those who could not communicate effectively. Of the 593 children screened for speech and language, 66 failed. Of these failures only 4 were identified as false-positive, approximately .7% of the total population screened. Thusfar none of the children passing speech and language screening have been referred back for further speech, language, or hearing evaluation. Numerous variables could account for this, such as: a lack of information regarding communication skills among day-care and nursery school personnel; a lack of familiarity with each child as an individual, sometimes due to fluctuating attendance; or the effectiveness of this tool in discriminating between children with or without communication problems. The 7 to 10 minutes necessary to screen each child was adequate for the screening of articulation,
receptive and expressive language, voice, fluency, and intelligibility. Children had no difficulty attending for this time period and it was thought to be an efficient use of clinical time.

Some of the test items were found to be ineffective in screening out those children with communication problems. It is recommended that these items be deleted from the tool. Several of the pictures were confusing and prevented an accurate assessment of the child's understanding of that item. For a complete discussion and evaluation of each item in this screening tool, refer to Part B: Program Procedures and Data (Manovich, 1976). The screening tool was appropriate for children aged 3 to 6 years, but most of the items could not be applied to a 2 year old child. Because speech and language of a 2 year old is very difficult to evaluate using a screening device, special play activities and direct observation of communication skills should be built into the screening process for 2 year old children.

"Who lives at your house?" was a question used to obtain a sample of expressive language. However, the desired samples of grammar and syntax often were not obtained because a child could respond appropriately with a single word. Pictures and creative play toys might be considered as a means of obtaining spontaneous speech, as they often provide a better stimulus and produce a more complete sample of spontaneous speech.

Statistical information was not obtained on this screening tool because this was a pilot program and was not set up on a research model. It is recommended that a statistical analysis be run on this tool to provide precise information on reliability and validity of the over-all test and each item.

Otoscopic observations, impedance measurements, and air-conduction
screening combined to make an efficient screening device. This procedure was effective in identifying those children with hearing loss, whether it was due to ear infections, impacted cerumen, or sensorineural components. Impedance measurements provided the most valuable information on the preschool age children because of the high incidence of middle ear pathology in the preschool population. This test yielded objective results and required no conditioned response from the child. Otoscopic observation supported impedance results by revealing cerumen, ventilating tubes, reddened canals and tympanic membranes, etc. Pure tone air-conduction screening was frequently difficult in the day-care settings, not only because of extreme background noise, but also because conditioning was often time-consuming or impossible with some preschool age children. In most cases, results of air-conduction screening in the low frequencies served only to confirm impedance measurements. A small number of children with possible high frequency loss were also identified by air-conduction screening at 2000 and 4000 Hertz.

The hearing screening program was conducted from January 1976 to May 1976. During the winter months, the incidence of flu and colds presenting symptoms of respiratory congestion was high. It is strongly recommended that hearing screening be conducted in early fall or late spring to avoid the high incidence of illness which often occurs during the winter months.

The preschool program, as conducted this year, provided a solid foundation for future work in the preschool area. This program identified and served many children with speech, language, and hearing problems who may have gone unnoticed and untreated until entering school, and thus re-confirmed the importance of intervention at the preschool level.
It is hoped that this pilot program will evolve into a more comprehensive and permanent speech, language, and hearing program to serve preschool children.


APPENDIX I

PRESCHOOL SPEECH & LANGUAGE SCREENING TEST

Name: 
Age: 
Center: 
Clinician: 
Date: 

ARTICULATION: 
(m,n,h,w,b,p,k,g,t,d - 2 to 3 years) 
(f,y,r,l,s - 3 to 4 years) 

Identify these pictures or objects:

1. Hat /h/ /t/ 
2. Dog /d/ /g/ 
3. Ball /b/ /l/ 
4. Sock /s/ /k/ 
5. Knife /n/ /f/ 
6. Teeth /t/ /o/ 
7. Pencil /p/ /n/ 
8. Window /w/ /d/ 
9. Comb /k/ /m/ 
10. Ring /r/ /j/ 
11. Shoes /f/ /z/ 
12. Leaves /l/ /v/ 
13. Chair /t/ /r/ 
14. Feather /f/ /j/ 
15. Jelly /dz/ /l/ 
16. Yes /j/ /s/ 

RECEPTIVE LANGUAGE: 

1. The girl is jumping. 3 3 
2. Who is by the table? 3 3 
3. Running 3 3-6 
4. Find the cat with no eyes. 3 4 
5. Big 3-6 4-6 
6. They 3-6 6-6 
7. Two 4 4 
8. More 4 5 
9. Eating 4 4-6 
10. Smaller 4 5 
11. When do you sleep? 4-6 5-6 
12. A small car 4 6 
13. Fast 4 6 
14. On the table 5-6 6 
   (Zimmerman) 3 4 
15. Under the table 5-6 6 
   (Zimmerman) 3 4 
16. The man painted the house. 5-6 7 
17. Mother gave the ball to her. 6 7 

Colors: red, blue, green, yellow (4 years)

Body parts: hair, mouth, eyes, feet, nose, ear, hands (2 to 4 years)

Physical Needs: What do you do when you're tired? cold? hungry?

(3 to 6 years)

Voice: 
Fluency: 
Motor: 

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Behavior:

Intelligibility:

Mean Length of Response: (3 to 4 years: 3 words; 4 to 5 years: 5 words)

EXPRESSION LANGUAGE:

Sentence Imitation:
1. The girls have the presents.
2. The baby is little.
3. The man is a football player.
4. They are walking.
5. The bus is here.
6. That is her cat.
7. The man can't reach.
8. The man said, "Who is it?"
9. The boy said, "Blow hard!"
10. The ice cream fell.

COMMENTS: