LANGUAGE PERFORMANCE OF INSTITUTIONALIZED AND NON-INSTITUTIONALIZED TRAINABLE MENTAL RETARDATES

Thesis for the Degree of M. A.
MICHIGAN STATE UNIVERSITY

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1965

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ABSTRACT

LANGUAGE PERFORMANCE OF INSTITUTIONALIZED AND NON-INSTITUTIONALIZED TRAINABLE MENTAL RETARDATES

by Dale W. Kitchen

The purpose of the present study was to compare the performance of an institutionalized and non-institutionalized trainable mentally retarded population on the Parsons Language Sample.

Forty-eight subjects and one examiner were used in the investigation. The subjects consisted of mentally retarded children, ages seven years 11 months through 10 years 11 months, randomly selected according to chronological age and scores obtained on the WISC, Revised Stanford-Binet, Forms L and M, the Kuhlmann-Binet Intelligence Test, and the Cattell Infant Intelligence Scale. The examiner was a male graduate student enrolled in Speech and Hearing Science at Michigan State University.

Each subject was tested individually and his or her responses were recorded verbatim by the examiner. The test environment consisted of a small room, limited in distractions, and equipped with a table and two small chairs.

The Parsons Language Sample was utilized for purposes of assessing language performance. This test consists

of the following seven subtests:

(1) Tact Subtest

(2) Echoic Subtest

(3) Echoic Gesture Subtest

(4) Comprehension Subtest

(5) Intraverbal Subtest

(6) Intraverbal Gesture Subtest

(7) Mand Subtest

The test was administered strictly according to the procedures recommended with the Sample. Raw scores for each subject were recorded for all of the subtests.

The scores were analyzed using a three dimensional analysis of variance. The Michigan State University CDC 3600 computer was utilized for purposes of analysis. The results indicated significance for Tact language performance as a function of intelligence, Tact language performance as a function of intelligence and chronological age, Comprehension language performance as a function of age, Intraverbal language performance as a function of age, and Mand language performance as a function of environment. Due to a violation of equal sample variances, no positive statement could be made concerning Tact language performance as a function of intelligence and chronological age.

On the basis of the analysis of the data, the following conclusions were made: Tact language performance increases with intelligence. Comprehension language performance increases with chronological age. Intraverbal

language performance increases with chronological age. Mand language performance varies as a function of environment, with institutionalized mentally retarded children scoring significantly higher than non-institutionalized mentally retarded children.

Implications for future research were suggested and discussed.

LANGUAGE PERFORMANCE OF INSTITUTIONALIZED AND NON-INSTITUTIONALIZED TRAINABLE MENTAL RETARDATES

By

Dale W. Kitchen

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Speech

1965

ACKNOWLEDGMENTS

I would like to express my thanks to the Chairman of my Committee, Dr. Elsie M. Edwards, Associate Professor of Speech, for her excellent cooperation; and to Dr. James W. Hillis, Assistant Professor of Speech, and Dr. Leo V. Deal, Assistant Professor of Speech, for serving as members of my Committee.

I would also like to extend my thanks to the following for their cooperation and assistance in the conducting of this study: Dr. Al Baumeister, Research Director, Mount Pleasant State Home and Training School; Mr. Howard Holland, Mount Pleasant State Home and Training School; Dr. Maureen Bailey, Clinical Psychologist, Plymouth State Home and Training School; Mr. Peter Zeibell, Clinical Psychologist, Lapeer State Home and Training School; Mr. Marvin Beekman, Director of Special Education, Lansing Public Schools; Mr. William Seiter, County Superintendent, Montcalm County; and Miss Margaret Knowles, Director, Lincoln School Foundation, Grand Rapids.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

The concept that institutionalization affects language performance has been discussed by various individuals with interest in this problem. Gesell and Amatruda are concerned with defects and deviations of development when they write,

> First and foremost the child in institution X,Y,Z lacks the normal tensions of language,--the tensions of intercommunication by facial expression, by gesture, by pantomimic action, by social laughter, by interjections, by words and sentences, and by other forms of expressional behavior, both on the give and take sides, which occur in the intimacy of home life.[1]

According to the authors, certain of the institutional mechanisms are operating to create "syndromes of retardation" one of which is retarded language development and limited verbal expression. They further state, "There can be no doubt that institutional children are retarded in language development." In summary, they conclude that, "The behavior [verbal] improves with improvement of

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[1]Arnold Gesell and Catherine Amatruda, Developmental Diagnosis (2nd ed. rev. and enlarged; New York: Medical Book Department of Harper and Brothers, 1947), pp. 325-26.

environment."[1]

It seems feasible that separation of the child from the influences of the home environment acts to place certain limitations on language development and verbal output. The mother-child interaction within the confines of the home environment is stressed by McCarthy.[2] She indicates that the rate of language development shows a direct relationship to the amount of contact a child has with the mother. Those children spending the most time with their mothers tend to develop language at a more rapid rate.

More specifically related to the topic of this paper, Lyle has conducted several studies which deal with the relationship between language performance of retarded children and institutionalization.

> For a number of reasons which require closer examination, large institutions are often unsatisfactory environments for the verbal development of children. It seems likely that long residence in the institution retards verbal intelligence much more than nonverbal intelligence.[3]

In addition, Lyle concludes that the verbal development of imbeciles could be less affected by institutionalization if greater emphasis were placed on social organization and

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[1] Ibid.

[2] Dorothea McCarthy, "Home Influences: Factors that Influence Language Growth," National Council of Teachers of English (Chicago: 1953), pp. 8-16.

[3] J. G. Lyle, "The Effect of an Institutional Environment Upon the Verbal Development of Imbecile Children: II. Speech and Language," Journal of Mental Deficiency Research, 4 (1960), pp. 122-28.

human relations at the institutional level.

Schlanger appears to agree with the above findings when he writes, concerning mental retardation,

> The institutionalized child is deprived of certain motivational factors affecting speech verbal output through the severance of significant familial relationships, the lack of challenge offered in routinized living and the constant companionship of peers which minimizes his speech experiences and practice.[1]

Various studies dealing with speech and language deficiency indicate that institutionalized retarded populations show higher incidence figures than non-institutionalized populations. Hudson[2] points to a twelve percent incidence of speech defects with a general language retardation among a group of non-institutionalized educable mental retardates. Donovan[3] evaluated the speech performance of 2000 educable mentally retarded school children (I.Q. 50-74). The results of the study indicated eight percent of the group had severely defective speech.

A study by Gens,[4] utilizing 1252 institutionalized

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[1]B. B. Schlanger, "Environmental Influences on the Verbal Output of Mentally Retarded Children," Journal of Speech and Hearing Disorders, 19 (1954), pp. 339-43.

[2]Margaret Hudson, "Methods of Teaching Mentally Retarded Children" (Unpublished manuscript, George Peabody College, 1958), pp. 1-131.

[3]Helen Donovan, "Organization and Development of a Speech Program for the Mentally Retarded Children in New York City Public Schools," American Journal of Mental Deficiency, 62 (1957), pp. 455-59.

[4]G. W. Gens, "Speech Retardation in the Normal and Subnormal Child," Training School Bulletin, 47 (1950), pp. 32-36.

subjects, showed significantly higher incidence figures. Seventy to seventy-five percent of the population studied indicated severe speech defects. Schlanger[1] found 79 percent of an institutionalized mentally retarded population to have articulatory defects (sound omissions, substitutions, and distortions).

This variance of incidence figures between the institutionalized and non-institutionalized groups may be attributed, in part, to differences in research methodology, differences in a definition of mental retardation, differences in the intellectual ranges which were sampled, and the size of the populations selected for each study. The findings of Schlanger and Lyle, however, point to the strong possibility that institutionalization tends to retard language performance by virtue of the fact that the institutionalized retardate has been removed from the mainstream of social-verbal interchange.

Bender lends support to this concept of deprivation when she writes,

> Our experiences at Bellevue have shown us that a child can stand many disturbing and distressing experiences provided they are not actually destructive to the organism, and provided the child has the emotional and interpretive support from an adult as a parent or parent substitute. That is sufficient mothering care is necessary to permit the normal maturation of the individual or to

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[1]B. B. Schlanger, "The Speech and Hearing Program at the Training School," Training School Bulletin, 53 (1957), pp. 267-72.

compensate for deficiencies in either sensory and motor functioning.[1]

The mentally retarded child can be seen to express varying degrees of either sensory or motor dysfunction, or both. It seems doubtful that sufficient mothering care is given the institutionalized mentally retarded child. According to Bender, this care should be provided to assist compensation of the organism to deficiencies of sensory or motor functioning.

According to Kirk,[2] language involves processes of encoding and decoding and can be thought to be both a sensory and speech-motor task. If the retarded child expresses limited usage of sensory-motor equipment, if the retarded child is placed within the confines of an institution and removed from significant adult relationships, then it seems safe to assume, in most instances, that the institutionalized retarded child has neither proficient language usage nor the opportunity, based on Bender's concept, to compensate for this deficiency. Kirk indicates this to be true, when he writes, "Trainable mentally retarded children, for example, are delayed and retarded in all aspects of

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[1]Lauretta Bender, Psychopathology of Children with Organic Brain Disorders (Springfield, Illinois: Charles C. Thomas Publisher, 1956), p. 121.

[2]Samuel A. Kirk, "A Behavioral Approach to Learning Disabilities," Conference on Children with Minimal Brain Impairment, Sponsored by the Easter Seal Research Foundation, National Society for Crippled Children and Adults, Inc. (Urbana, Illinois: January, 1963), p. 40.

communication."[1]

Statement of Problem and Purpose of Study

Increased emphasis in speech and language pathology, as these relate to mental retardation, points the way to a need for original research devoted to both disciplines. "As long as speech correctionists deal with problems of language and speech retardation they will almost of necessity be confronted with problems of mental retardation."[2] Increasing pressures are being placed on the profession of speech pathology to devote increasing amounts of time and effort to work with the mentally retarded.

> In our own clinical experience, mental retardation has been one of the most frequently encountered factors associated with language and speech retardation. We feel there is a very important role for speech therapy in the field of mental retardation. This will require that speech pathologists not only increase their knowledge of the speech of the mentally retarded but of the field of mental retardation itself.[3]

A belief in the preceding statements, a background in speech pathology, and an interest in mental retardation leads to the following statement of purpose:

It is the purpose of this study to compare the language performance, on the Parsons Language Sample, of two

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[1] Ibid.

[2] Jack Matthews, "Speech of the Mentally Retarded," in Lee Edward Travis (ed.), Handbook of Speech Pathology (New York: Appleton-Century-Crofts, 1957), pp. 532-33.

[3] Ibid.

trainable mentally retarded populations, institutionalized and non-institutionalized. It is thought that answers to the following questions might be obtained, in part: (1) Do institutionalized trainable mental retardates perform differently from non-institutionalized mental retardates on the Parsons Language Sample? (2) If so, in what subtest areas is there a significant difference?

Hypothesis

The preceding questions serve as a basis for the following null hypothesis:

1. There is no significant difference between the scores obtained by the institutionalized mental retardates and the non-institutionalized mental retardates on any of the subtests of the Parsons Language Sample.

Importance of Study

The Research Committee of the American Speech and Hearing Association was structured to explore research needs and possibilities of twelve problem areas related to speech pathology and audiology. One of the subcommittees was designed to survey speech and language problems associated with mental retardation and delayed speech and language development. Certain questions were set forth by this subcommittee, one of which is pertinent to the comprehensive and meaningful development of this paper.

> What are the interactions of cultural, social and other environmental factors with the speech and

language behavior of the mentally retarded?[1]

The purpose of this paper as it is stated herein seems directly related to the subcommittee question. If a significant difference can be found to exist between the language performance of the institutionalized and non-institutionalized retarded groups, then possibly this project can contribute to a degree of insight into the interactions of environmental factors and the mental retardate's language performance or behavior. Subtest analysis will point out the strengths and weaknesses of both groups in language performance.

According to Schlanger,[2] institutionalization contributes to language retardation due to complete association with peers and absence of a conventional home environment. This study uses a new language assessment device and applies it to a population in which there is much current interest. Subtest analysis may provide insight into the mechanisms of both environments, mechanisms which tend to retard or enhance language performance.

The statistical treatment of the results of this study may reinforce the information presented by Schlanger

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[1]J. L. Bangs et al., "VIII. Report of Subcommittee on Speech and Language Problems Associated with Mental Retardation and Delayed Speech and Language Development," Journal of Speech and Hearing Disorders, Monograph Supplement V (September, 1959), pp. 50-52.

[2]B. B. Schlanger, "Speech Therapy with Mentally Retarded Children," Journal of Speech and Hearing Disorders, 23 (1958), pp. 298-301.

(and others) or may offer contradictory conclusions regarding the language performance of institutionalized and non-institutionalized retardates. In either case, it is thought that knowledge can be gained regarding total language performance of retardates.

Definition of Terms

For purposes of this study, the terms used are defined in the following manner:

Language Performance--The preceding terms are defined according to the tasks of the subtests of the Parsons Language Sample:

1. Tact. In this subtest the examiner presents an object or picture and asks, "What is it?" The controlling stimulus is vocal and the correct response is vocal.

2. Echoic. In this subtest the child is asked to repeat digits, words, and sentences. The controlling stimuli are vocal and the response is vocal and bears a point-to-point relation to the stimulus.

3. Intraverbal. The examiner asks the child questions such as, "What do you do when you are hungry?" The stimulus is vocal, the response is vocal, but unlike the response in the previous subtest, it does not bear a point-to-point relation to the vocal stimulus.

4. Comprehension. The examiner asks the child to execute a series of commands. The commands are given by speech, by gestures, and by speech and gestures combined. Thus, the controlling stimulus can be either vocal or non-vocal. The correct response is a motor act.

5. Echoic Gesture. The examiner demonstrates a series of motor acts which the child repeats. The controlling stimuli are non-vocal; the response is non-vocal and bears a point-to-point relation to the stimulus.

6. Intraverbal Gesture. The examiner asks the child a series of questions which can be answered by gestures. The controlling stimulus is vocal; the response scored is non-vocal.

7. Mand. The examiner presents the child with a series of situations in which the appropriate response would be to ask a question or make a request. For example, the examiner might ask the child to draw a picture but fail to make paper and pencil available. A correct response could be either a vocal or a non-vocal request.[1]

Parsons Language Sample--A test developed out of the efforts of members of the Parsons Project in Language and Communication of Mentally Retarded Children. Seven subtests (previously described) consisting of 123 items are used for purposes of identifying specific language abilities or disabilities in retarded children between seven years eleven months and fifteen years eight months.

Trainable Mentally Retarded--For purposes of this study, the trainable mentally retarded individual may be defined in the following manner:

1. Chronological age range seven years eleven months to ten years eleven months;

2. Is developing at the rate of one-third to one-half of the normal child, or indicates an intelligence quotient between 30 and 50 as determined by qualified testers;

3. May be either institutionalized or non-institutionalized;

4. Must be non-mongoloid;

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[1]J. Spradlin, "Assessment of Speech and Language of Retarded Children: The Parsons Language Sample," Journal of Speech and Hearing Disorders, Monograph Supplement X (January, 1963), pp. 29-30.

5. Is ineligible for classes for the educable mentally retarded;

6. Is designated as "trainable mentally retarded" by a qualified examiner.

Institutionalized--This term supposes a background of mental retardation and refers to placement in a state-supported facility for purposes of custodial care. These persons classified as "institutionalized" have been removed from the society in which they posed extreme problems of care.

Non-Institutionalized--Refers to that group of trainable mentally retarded children enrolled in state-supported, special education, public school programs. This group lives at home with parents, guardians, or persons responsible for their care.

CHAPTER II

REVIEW OF THE LITERATURE

Speech pathologists often refer to factors which do not lie within the organism but are external yet influential in the development of speech and language. Environmental variables, as these affect speech and language development, can be thought of as external factors. These factors have been studied by numerous persons using normal and retarded subjects.

The material set forth here serves as a review of the literature concerning the studies which have been completed and are related to the development of this paper.

One of the earliest investigations concerned with speech and language retardation and environment was conducted by Beckey, in 1942. A detailed clinical study was made of fifty children with retarded speech development and of a control group of fifty children with normal speech. Home conditions of both groups were evaluated from parent consultation, home calls, and observation of the child with the mother. Attempts were made to secure a control group which was equivalent to the delayed group. The following results were obtained when an attempt was made to determine the role of the environment as an etiological factor of

delayed language development:

1. Children of the delayed group has too much isolation for the encouragement of speech.

2. Fathers of the children of the retarded speech group frequently belonged to the lower socio-economic groups.

3. Severe fright was found to be a factor among the children with delayed speech.

4. Anticipation of wants of the child occurred quite often among the parents of the delayed speech children.[1]

Beckey concluded that certain psychological factors within the home environment have a direct bearing on development or lack of development, of speech and language.

Mason[2] wrote of a girl who was speechless until six and a half years old. The child had been forced to dwell with a mute and uneducated mother for this period of time. There was no environmental stimulation for speech and language, resulting in complete lack of development of these skills. Mason pointed to the importance of environmental stimulation when she concluded that exposure to a speaking environment, with remedial instruction, resulted in the arduous acquisition of speech and language for the patient.

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[1]Ruth E. Beckey, "A Study of Certain Factors Related to Retardation of Speech," Journal of Speech Disorders, 7 (1942), pp. 223-50.

[2]Marie Mason, "Learning to Talk After Six-and-a-Half Years of Silence," Journal of Speech Disorders, 7 (1942), pp. 295-304.

Goldfarb,[1] utilizing graphic Rorschach data, studied the effects of early institutional care on the personality of the adolescent. The responses of an institutional and non-institutional matched group were compared. It was concluded that institutional children tended to deviate from the normal pattern of response more than did foster home children. Institutional children showed greater trends toward "concreteness," apathy, passive surrender to environmental stimulation (or lack of it), and weak reorganization of experience. Goldfarb concluded that the institutionalized child with normal intelligence indicated a generalized deficiency of personality structure as determined by projective techniques.

In another study, Goldfarb[2] compared 40 institutional children with 40 non-institutionalized children. Children placed in foster homes after institutional babyhood rearing were found to exhibit less security, more isolation from other people, less ability to enter into meaningful relationships, more frequent speech and language retardation, and greater school deficiency than children who experienced infant rearing in foster homes.

In another study, Goldfarb utilized an institutional

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[1]William Goldfarb, "The Effects of Early Institutional Care on Adolescent Personality (Graphic Rorschach Data)," Child Development, 14 (1943), pp. 213-23.

[2]William Goldfarb, "Infant Rearing and Problem Behavior," American Journal of Orthopsychiatry, 13 (April, 1943), pp. 249-65.

group consisting of 8 boys and 7 girls with a mean age of 12 years 4 months. They had entered the institution in early infancy (mean age 4.5 months), had remained in the institution 3 years, and had then been transferred to foster homes. These children were equated with 15 children who had always been with families. The two groups were matched in terms of chronological age and sex. The following methods of investigation were employed to evaluate speech and language performance of the two groups:

A. General estimate rating
B. Fluency rating
C. Recording of diction errors

The results of that portion of the study devoted to speech and language are summarized by Goldfarb in the following manner:

> The institution baby has come to the community with a minimum of language, vocabulary, and information. The infinite number and variety of experiences open to a child living in a typical home and community are absent in the institution. In addition, because of his isolation from adults, the institution child is severely retarded in language, has a much narrower vocabulary than his community brother, and tends to mispronounce the words he is familiar with. The limitation in a specific skill such as language tends to restrict the child's intellectual capacity.[1]

In still another study, Goldfarb compared 15 children who had been admitted to an institution at 4.6 months and transferred to foster homes at 37 months, with a matched group of children who had spent most of their lives in foster

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[1]William Goldfarb, "The Effects of Early Institutional Care on Adolescent Personality," Journal of Experimental Education, 12 (1943-1944), pp. 106-29.

homes. Language was evaluated with the Williams, McFarland, and the Little Language Achievement Scale. Individual scores were obtained for speech sounds employed, speech intelligibility, and level of language organization. The total language achievement score was the sum of these three scores. The results indicated that the foster home children were superior to the institution group in the three phases of language evaluated. The foster home children tended to maintain superiority even after the institution children had been in foster families for seven months.

The vocabulary of both groups was measured by the picture vocabulary test of the revised Stanford-Binet (Form L). The institution children were inferior in vocabulary in both the first and second tests. Goldfarb comments on this when he writes,

> Again, it is apparent that even after six months in the normal community, the average vocabulary of the institutional children was still inferior to the vocabulary performance of the foster home children during the first examination.[1]

Aldrich, Sung, and Knop[2,3,4] investigated infant

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[1]William Goldfarb, "Effects of Psychological Deprivation in Infancy and Subsequent Stimulation," American Journal of Psychiatry, 102 (1945-1946), pp. 24-26.

[2]C. Aldrich, C. Sung, and C. Knop, "The Crying of Newly Born Babies: I. The Community Phase," Journal of Pediatrics, 26 (1945), pp. 313-26.

[3]C. Aldrich, C. Sung, and C. Knop, "The Crying of Newly Born Babies: II. Individual Phase," Journal of Pediatrics, 27 (1945), pp. 89-96.

[4]C. Aldrich, C. Sung, and C. Knop, "The Crying of Newly Born Babies: III. The Early Period at Home," Journal of Pediatrics, 27 (1945), pp. 428-35.

crying in a series of studies. The infants used in the study were observed for 24 hours a day during a 30 day period in a hospital nursery. The studies compared the amount of crying under home-care conditions with the amount of crying after increased individualized nursing care in the hospital nursery. The results of these studies indicated that hospital nursery babies cry 117 minutes per day with 11.9 prolonged crying spells of three minutes or more. In the home situation only four prolonged crying spells were noted. Increased nursing care in the hospital nursery resulted in 51.4 percent decrease in the amount of crying. The authors concluded that the environment has a bearing on the child's emotional development and subsequent acquisition of speech and language.

Carlton and Carlton[1] used eight different picture sequences from two popular children's paint books (Blondie and the Lone Ranger) to evaluate the spontaneous use of clauses and the number of oral errors present in the speech of two groups of retarded children. Seventy-two mentally defective school children with an age range of 14 to 16 and a mental age range of 8-6 to 10-5 were selected randomly from 11 Minneapolis schools for defective children. Another group of mentally defective adolescents, 61 in number, the total population falling within the restrictions of the

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[1] T. Carlton and L. Carlton, "Errors in the Oral Language of Mentally Defective Adolescents and Normal Elementary School Children," Journal of Genetic Psychology, 66 (1945), pp. 183-219.

study, were examined at the Minnesota School and Colony at Fairbault, Minnesota. The results of the study indicate no significant differences in the types of grammatical errors in the speech of the retarded children whether they lived in an institution or home community. The institutional children did, however, consistently make a higher mean number of errors.

Levy[1] has studied the effects of institutional versus boarding home care on infant behavior. She concludes that care provided in an institution results in reduced emotional security and decreased external stimulation which is essential if the child is to capitalize on his innate capacities. Institutional care seems to affect the child's personality in later years, as opposed to boarding home care which, according to Levy, has no marked detrimental effects on the personality.

Brodbeck and Irwin[2] studied the results of reduced speech stimulation with 90 babies under six months of age in an orphanage where a minimal speech environment existed. The curves for phoneme types and frequencies of the orphanage babies were below the curves of the home babies.

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[1]R. J. Levy, "Effects of Institutional vs. Boarding Home Care on a Group of Infants," Journal of Personality, 15 (1946-1947), pp. 233-41.

[2]A. Brodbeck and O. C. Irwin, "Speech Sounds of Infants without Families," Child Development, 17 (1946), pp. 145-56.

Moore,[1] using the Smith-Williams Vocabulary Test, evaluated the oral language of a group of orphanage and non-orphanage children. An analysis of variance statistical treatment of the results showed a significant difference attributable to influences of environment, with the orphanage group indicating markedly inferior vocabulary development.

Schlanger compared verbal output of two groups of mentally retarded children. Twenty-one children from an institutional environment, at St. Coletta School for Exceptional Children in Jefferson, Wisconsin, were compared with 21 children from special classes in the Madison, Wisconsin, School System. Subjects were matched according to chronological age, mental age, intelligence quotient, and consonant articulation proficiency. Mean sentence length and number of words per minute scores were obtained and statistically analyzed. View-Master pictures were used to elicit spontaneous speech from each subject. Schlanger summarized the conclusions when he writes,

> The superiority of the city children in language development is evident as far as these measures evaluate this skill. The city children achieved a mean sentence length of 5.36 words compared to the institutionalized children's mean of 4.18 words. This difference of 1.18 is significant at the one percent level of confidence.[2]

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[1] J. K. Moore, "Speech Content of Selected Groups of Orphanage and Non-Orphanage Preschool Children," Journal of Experimental Education, 16 (1947), pp. 122-23.

[2] B. B. Schlanger, op. cit., pp. 122-23.

In addition, the city children used 64.9 words per minute, or 15 more words per minute than the institutional children. The difference was significant at the three percent level of confidence. Schlanger concluded that severance of familial ties, and the resulting emotional reactions results in a loss of security in interpersonal relationships which appear to be reflected in minimal verbalization. The result is the use of overt actions for verbalization and a reduction in the practice needed to develop and maintain adequate speech patterns.

Badt studied the effects of institutionalization on the ability of retarded children to define words and manipulate concepts. Sixty in-patients of a state school for mental defectives were drawn from those children who attended the institutional academic program. The subjects ranged in age from seven to fifteen, were diagnosed as idiopathic or familial mentally deficient, and ranged in intelligence quotient from 50-75. The vocabulary list of the Stanford Binet Intelligence Scale (Form L) was used to assess the subject's ability to verbalize abstract definitions. Responses to the vocabulary items were scored plus or minus according to pre-determined Stanford Binet standards. All plus responses were weighted as follows:

Word	Level	Example	Score
Orange	Abstract	"a fruit," "a color"	5
Orange	Use	"to eat"	3
Orange	Descriptive	"it's round and yellow"	1

An Abstraction Score was obtained for each subject by totalling the scores for each word. Relations were sought

between abstraction scores (subject's ability to define words abstractly) and chronological age, Stanford-Binet mental age, and duration of institutionalization.

The results of the study indicate Pearson product moment correlations of .34 between chronological age and abstraction scores, .24 between abstraction score and mental age. In her discussion of the relationship between duration of institutionalization and abstract thinking, Badt concludes,

> This evidence seems to show that the length of time spent by the subjects in the institution strongly affects the level at which they define words and manipulate concepts. The longer the time of institutionalization, the lower is abstracting ability.[1]

Haggerty investigated the effects of prolonged hospital care on a group of children. Data were accumulated on 100 children over a five-year period. All subjects had spent a considerable amount of time in child care and hospital settings. All subjects were in the seventh grade of grammar school; the mean age of the group was 12.7 years. The average age at which the children were separated from their homes was 3.7 years, with 3.5 years the average length of placement in a hospital setting.

The hypothesis, as set forth by the author, was that "Early and prolonged hospitalization or institutionalization

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[1]Margit Badt, "Levels of Abstraction in Vocabulary Definitions of Mentally Retarded School Children," American Journal of Mental Deficiency, 63 (July, 1958 - May, 1959), pp. 241-46.

can affect a child's personality development through the disruption of verbal communication ability." A parts-of-speech analysis was used to study the language of the subjects. In an effort to obtain language samples, all oral responses were recorded, with a recorder, from a sentence completion test and from responses (stories) given to the Thematic Apperception Test. The oral vocabulary portion of the WISC was also included. Rorschach data were obtained for a personality inventory.

The results of the study show that the subjects indicated lower than normal language content, with a pattern resembling that of schizophrenics who are considered to express regressed language facility. In addition, the institutional group were very similar to schizophrenics in their selection of functional and example types of definitions, as opposed to the higher conceptual abstractions of normals. Haggerty concludes in the following manner:

> It appears from the results of this study that early and prolonged hospital or other institutional experience can damage personality integration and can lead to an inhibition of proper communicability.[1]

In 1959 Psychologist J. G. Lyle designed a study to determine whether institutional imbecile children were retarded in verbal intelligence as compared with a similar group of imbeciles who attend day schools and live at home

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[1]A. D. Haggerty, "The Effects of Long-Term Hospitalization or Institutionalization Upon the Language Development of Children," Journal of Genetic Psychology, 94 (June, 1959), pp. 205-209.

with parents.

The institutional sample consisted of 77 children selected from Fountain Hospital in London. One hundred seventeen children constituted the day-school sample, drawn from special training schools in the Middlesex area. The Minnesota Preschool Scale of Intelligence (Form A) was utilized to determine verbal intelligence.

The following limitations were used in defining procedure:

(1) I.Q.(s) were restricted to the 20-50 range, the range used to define imbecility. The non-verbal portion of the Minnesota Preschool Scale was used to provide an I.Q. measure.

(2) The chronological age range suggested by the upper and lower limits of the test was restricted to six years six months to thirteen years six months. No child with a mental age below two years six months or above five years eleven months was included in the sample.

(3) There were no deaf, blind, or severely spastic children included in either sample.

In addition, the institutional sample consisted of 34 mongols and 43 non-mongols distributed more or less equally among the various age groups. The day school sample contained 76 mongols and 41 non-mongols, proportionately more mongols than the institutional sample. The Minnesota test is calibrated in C-scores described as equal units of equal

interval from which M.A. equivalents are derived by means for a conversion table.

The results of the study were summarized by Lyle in the following manner:

> (1) There were no significant differences between any of the C-score means on the non-verbal subtest of the Minnesota Preschool Scale, indicating that in terms of non-verbal M.A., the four groups of imbeciles were comparable. Discrepancies in verbal intelligence cannot, therefore, be explained in terms of differential brightness.
>
> (2) There were highly significant differences between the C-score means on the verbal subtest of the Minnesota Preschool Scale between the Day School and Institution groups both for mongols and non-mongols, in favor of the Day School group. The mean discrepancy was 12 months of verbal M.A. in the case of mongols and six months of verbal M.A. in the case of non-mongols.
>
> (3) There was a significant difference between mongols and non-mongols in the Institution of nine months of verbal M.A. The difference between mongols and non-mongols in Day Schools was not significant.
>
> (4) It seems likely that long residence in the institution retards verbal intelligence much more than non-verbal intelligence. The reason for this appears to be simply that in the institution children have learned only a very limited repertoire of speech.[1]

In another study, Lyle utilized the same subjects in an attempt to measure and compare different aspects of speech and language. A number of scales were designed, based on the Analytical Scale of Language Achievement described by Williams, McFarland, and Little, in order to

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[1]J. G. Lyle, "The Effect of an Institution Environment Upon the Verbal Development of Imbecile Children: I. Verbal Intelligence," Journal of Mental Deficiency Research, 3-4 (February, 1959), pp. 122-28.

assess various aspects of speech and language.

The following ad hoc scales were utilized in the study:

(1) Word Naming. This test, according to Lyle, measures the ability to attach verbal symbols to familiar objects and actions.

(2) Comprehension of Words. The child is required to point to objects or execute commands named by the examiner.

(3) Definition of Words. This test involves the skill to make pertinent verbal associations to named objects.

(4) Speech Sounds. This scale was used to determine the ability to discriminate and utter 80 speech sounds contained in simple words repeated by the child.

(5) Complexity of Language. A scale was used to measure the complexity of sentences used by the children in describing pictures.

(6) Clarity of Speech.

(7) Frequency of Speech. Two teachers' ratings were obtained independently for each of these variables.

(8) Verbal Intelligence.

Statistical treatment of the results of the study indicates the following conclusions:

(1) The various scales of speech and language were highly correlated, attributable to one factor, verbal ability.

(2) Non-mongols were superior to mongols in verbal ability whether in day school or in the institution.

(3) Institutionalized imbecile children were lower in verbal ability expressed as a composite verbal score, than those at day school whether they were mongols or non-mongols.

(4) The interaction effect between Institution Day School and Mongol/Non-Mongol variables was not significant.

(5) Sex did not have a significant effect upon the criterion for verbal ability.

(6) Form A of the Minnesota Preschool Scale seems to be a functional intelligence test for imbecile children, containing a non-verbal subtest which correlates .80 with Stanford-Binet, and a subtest of verbal ability which correlates .70 with various ad hoc verbal tests.[1]

In conclusion, Lyle cites restricted learning opportunities for speech, restricted motivation to utilize language as a communicative tool, and emotional disturbance concomitant with mental retardation as factors which operate to retard verbal development within the confines of the institution.

In a follow-up study, Lyle compared two matched groups of subjects to determine whether or not emphasis on personal relationships would enhance verbal performance of retardates. The two groups each consisted of 9 males and 7 females. In eleven cases, mongols were paired with mongols, or non-mongols with non-mongols, since it was thought possible that this broad classification could be relevant to verbal ability. Five of the sixteen pairs could not be matched for "clinical type." The subjects were matched according to verbal and non-verbal intelligence as determined by the Minnesota Preschool Scale of Intelligence.

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[1]J. G. Lyle, "The Effect of an Institution Environment Upon the Verbal Development of Imbecile Children: II. Speech and Language," Journal of Mental Deficiency Research, 3-4 (January, 1960), pp. 1-13.

The following ad hoc verbal tests were administered to all of the 32 subjects: (1) Speech Sounds, (2) Comprehension of Words, (3) Word Naming, (4) Definition of Words, and (5) Complexity of Language.

The experimental group of 16 subjects were placed in the Brooklands Unit, a large, detached house located a number of miles from the institution. The matched control group remained in the institution. Within the Brooklands Unit, emphasis was placed on the fostering of personal relationships and the provision of opportunities for the retarded children to talk with the adult staff, and to other children. The control group subjects continued to live within the institution with the same regimented approach. The subjects remained in these environments for a period of three years.

The results of the first retesting indicated the following:

(1) On verbal tests the non-mongols improved at a more rapid rate than the mongols; this tendency was not cancelled by placing mongols in a more favourable environment.

(2) Significant differences were found in favour of the experimental Brooklands group on three of the verbal tests; on the remaining verbal tests and the non-verbal subtest of the Minnesota, no significant differences were found. The verbal tests for which significant differences were found were Comprehension, Complexity of Language, and Definition of Words.

(3) The Brooklands group improved about 4 months

of verbal M.A. more than the control group.[1]

In an 18-month retest, the results obtained were similar to those obtained at the first retesting. Over the 18-month period, the following behavior changes were noted in the experimental group:

(1) Formation of personal relationships with staff adults,

(2) More interaction with peer groups, and

(3) Increased social-emotional security.

Sievers and Essa utilized the Differential Language Facility Test to compare the language development of institutionalized and community mentally retarded children. In addition, all subjects were given a speech and language examination according to procedures developed by Essa. The procedures included all of the following:

(1) a modified speech reception hearing test,

(2) an abridged articulation test,

(3) an oral response test,

(4) a rating of speech intelligibility, and

(5) taped recorded responses to pictures.

Seventy-four subjects with M.A.'s between 3-0 and 5-11 were randomly selected from an Ohio Training school. The community group consisted of the same number of subjects, randomly selected and falling within the same mental age

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[1]J. G. Lyle, "The Effect of an Institution Environment Upon the Verbal Development of Imbecile Children: III. The Brooklands Residential Family Unit," Journal of Mental Deficiency Research, 3-4 (January, 1960), pp. 14-23.

range as the institutional group. The Stanford-Binet Scale was administered to each subject as an estimate of M.A. The chronological age range of the institutional group was from 6-11 to 16-11 with an 11-9 mean; the chronological age range of the community group was from 7-7 to 16-4 with a mean of 11-3.

The results of the study indicate that the institutional group had a significantly lower mean on the total score of the DLFT. The community group performed at a significantly higher level on the following five subtests of the DLFT:

(1) Labeling Objects,

(2) Labeling Pictures,

(3) Word Association,

(4) Mutilated Pictures, and

(5) Picture Series Description.[1]

The DLFT subtest performance changed with M.A. within both groups. This would seem to indicate that the retardate's language behavior tends to follow the same developmental pattern as normal children.

Contrary to previous findings (Schlanger, 1954), the institution group had a higher mean verbal output than the community group. This was the only significant difference between the institutional and community groups in any

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[1]D. J. Sievers and S. H. Essa, "Language Development in Institutionalized and Community Mentally Retarded Children," American Journal of Mental Deficiency, 66 (May, 1962), pp. 413-20.

of the tests of the speech evaluation. The different results of the Schlanger and Sievers-Essa studies were attributed to differences in research methodology.

In 1964, Mueller and Weaver compared the psycholinguistic abilities of two groups of mental retardates. One of the hypotheses of the Mueller-Weaver study was stated as follows:

> (1) Trainable mental retardates in day school classes will score significantly higher on overall language ability on the Illinois Test of Psycholinguistic Abilities (ITPA) than will institutionalized trainable mental retardates of comparable intelligence quotient and chronological age.[1]

A matched pairs design was used in which subjects from the institution and day school were matched for sex and race, matched within six months of age, and within seven points in I.Q. Sixty-eight subjects were obtained for each group. Chronological age was limited from 8 to 19 and I.Q. was restricted to a 20-56 range.

The results of the study indicate that the institutionalized trainable mental retardates were significantly higher in overall language ability than the day school group of trainable mental retardates. This finding is contrary to most of the studies presented in this review of the literature. The authors conclude that,

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[1]Max Mueller and S. Joseph Weaver, "Psycholinguistic Abilities of Institutionalized and Non-Institutionalized Trainable Mental Retardates," American Journal of Mental Deficiency, 68 (May, 1964), pp. 775-83.

The superiority of the institutional group's total language ability scores in the present study raises the possibility that the ITPA tests some aspect of language that tests used in previous studies did not.[1]

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[1] Ibid.

CHAPTER III

SUBJECTS, EQUIPMENT, AND PROCEDURES

Subjects

For purposes of this study, the institutionalized population consisted of resident patients from the Mount Pleasant State Home and Training School, the Lapeer State Home and Training School, and the Plymouth State Home and Training School. These facilities are tax maintained by the State of Michigan for the custodial care of mentally retarded patients. Upon the medical certification of two physicians, persons are committed to such facilities by court order. A diagnosis of mental retardation must precede admission.

The non-institutionalized population consisted of mentally retarded children living in Lansing, Montcalm County, and the Grand Rapids area. All non-institutionalized subjects were living at home with parents, other relatives, or guardians responsible for their care. Subjects were in attendance at Forrest Road and Woodhaven Schools in Lansing, the Friendbrooke and Forest Grove Schools in Montcalm County, and the Lincoln School Foundation in Grand Rapids. All of the aforementioned facilities are public training schools.

Subjects selected for the study had normal hearing and vision. Normal hearing was assumed if no diagnosis of hearing loss was indicated by the records of the public school or the institution. Vision was assumed to be normal if a subject could correctly identify the number of fingers held up by the examiner at the testing distance.

This study was concerned with assessing the language performance, as measured by the Parsons Language Sample, of an institutionalized and non-institutionalized mentally retarded population. The institutionalized and non-institutionalized groups ranged in chronological age from 7 years 11 months to 10 years 11 months, and were divided into two intelligence quotient categories, 30-39 and 40-49. This classification resulted in two populations defined by chronological age and full scale scores on the Wechsler Intelligence Scale for Children,[1] the Revised Stanford-Binet, Forms L or M,[2] the Kuhlmann-Binet Intelligence Test,[3] and the Cattell Infant Intelligence Scale.[4]

The sampling procedure for each of the two populations involved random selection of subjects from institutional

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[1]David Wechsler, Wechsler Intelligence Scale for Children (New York: Psychological Corporation, 1949).

[2]L. M. Terman and M. A. Merrill, Measuring Intelligence (Boston: Houghton-Mifflin Company, 1937).

[3]F. Kuhlmann, A Handbook of Mental Tests (Baltimore: Warwick and York, 1922).

[4]P. Cattell, The Measurement of Intelligence of Infants and Young Children (New York: The Psychological Corporation, 1947).

TABLE 1

CHRONOLOGICAL AGE, SAMPLE SIZE, INTELLIGENCE SCORE AND MEASURING INSTRUMENT FOR EACH OF SIX INSTITUTIONAL GROUPS

Population	Chronological Age	Sample Size	I.Q. Score	Intelligence Test
1	7-11 to 8-10	4	30-39	Stanford-Binet L or M
2	8-11 to 9-10	4	30-39	WISC, Cattell
3	9-11 to 10-11	4	30-39	Cattell, Kuhlmann-Binet
4	7-11 to 8-10	4	40-49	Stanford-Binet L or M, Cattell
5	8-11 to 9-10	4	40-49	Stanford-Binet L or M, WISC
6	9-11 to 10-11	4	40-49	Stanford-Binet L or M, Cattell

TABLE 2

CHRONOLOGICAL AGE, SAMPLE SIZE, INTELLIGENCE SCORE AND MEASURING INSTRUMENT FOR EACH OF SIX NON-INSTITUTIONAL GROUPS

Population	Chronological Age	Sample Size	I.Q. Score	Intelligence Test
1	7-11 to 8-10	4	30-39	Stanford-Binet L or M
2	8-11 to 9-10	4	30-39	Stanford-Binet L or M
3	9-11 to 10-11	4	30-39	Stanford-Binet L or M
4	7-11 to 8-10	4	40-49	Stanford-Binet L or M
5	8-11 to 9-10	4	40-49	Stanford-Binet L or M
6	9-11 to 10-11	4	40-49	Stanford-Binet L or M

and public school records, resulting in a sample size of 24 subjects from each of two environments.

Discussion

This discussion is concerned with a major point in the selection of subjects, and that is the acceptance of intelligence quotient results from four intelligence tests (WISC, Stanford-Binet, Cattell, Kuhlmann-Binet).

The exclusive use of any of the preceding tests for the accepted I.Q. score is ruled out by the nature of the design of the study. The process of psychometric testing in an institution is dependent on the age at which a person is legally committed to such a facility. Many of the institutionalized subjects, included in this study, entered the institution during infancy. In an effort to obtain intelligence quotients for such persons, it is necessary to utilize a measuring instrument which is standardized for lower age groups. According to Anastasi, "Another type of measuring instrument suitable for the infant level is provided by several special revisions and downward extensions of the Binet scales. Kuhlmann's 1922 revision of the Binet extended the scales down to a 3-month level."[1] The tests of the Stanford-Binet do not sample age brackets below the two year level, thus the need for a device to measure intelligence of infants committed to the institution.

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[1]A. Anastasi, Psychological Testing (New York: The Macmillan Company, 1961), p. 282.

Still another infant scale was developed by Cattell.[1] Anastasi states,

> A scale that many psychologists consider one of the most satisfactory instruments for infant testing is the Cattell Infant Intelligence Scale. This scale was developed as a downward extension of the 1937 Stanford Binet Form L. The items are grouped into age levels, and the MA and ratio I.Q. are computed by the same procedures followed in the 1937 Stanford Binet. In order to insure close comparability of scores on the two scales, certain groups within the standardization samples were retested at the age of 3 years with Form L of the Stanford Binet. The placement of items in the Cattell scale was then adjusted so as to yield approximately the same median I.Q. as that obtained by each group on the Stanford Binet.[2]

In regard to the use of the WISC scores, Wechsler states in his manual, "This scale with a mean of 100 and a standard deviation of 15 will give I.Q.'s which on the whole are fairly close numerically to I.Q.'s of other well standardized tests such as the Stanford-Binet."[3] In addition, the author considers the comparison of the WISC I.Q.'s with I.Q.'s of other scales a reasonable procedure.

A study by Nale attempted to show the degree of relationship existing between the total quotients of 104 defective Polk State School patients on the Childrens-Wechsler Scale and the I.Q.'s of these same patients as derived from the Revised Stanford-Binet. The Binet and Wechsler scales were administered during the same calendar year.

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[1]Cattell, loc. cit.

[2]Anastasi, loc. cit.

[3]Wechsler, loc. cit.

Fifty-four boys and 50 girls constituted the sample. The patients ranged in age from 8 years through 15 years 11 months of age. Binet I.Q.'s ranged from 35 to 80, while WISC I.Q.'s ranged from 39 to 80. The mean WISC I.Q. was 57.97 and the mean Binet I.Q. was 55.38, a difference of 2.59 I.Q. points. The standard deviation of the scores in the WISC group was 10.15; the Binet scores were slightly lower with a standard deviation of 9.85. The 104 pairs of scores were plotted on a scatter diagram, the linearity of which suggested the use of the Pearson Product-Moment correlation method. According to Nale,

> The coefficient of correlation between the WISC and the Binet as determined by this method is .909 the standard error of that being .017; then a plus or minus .05 would establish the correlation limits for additional samples. The statistical conclusion is that a marked degree of relationship does exist between the Binet and WISC test results. On the average the WISC I.Q.'s for these Polk defectives are 2.5 I.Q. points higher than the I.Q.'s taken from their Binet records. There is a significant difference but quantitatively speaking it is so small that it would not likely have any bearing on the choice of the instrument used except possibly in cases where legal determinants have been set.[1]

Harlow made cross comparisons between the Revised Stanford-Binet Form L intelligence quotient and the intelligence quotients derived from the Wechsler Intelligence Scale for Children.

The sample consisted of 90 subjects, thirty at each

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[1]S. Nale, "The Childrens Wechsler and the Binet on 104 Mental Defectives at the Polk State School," American Journal of Mental Deficiency, 56 (July, 1951 - April, 1952), pp. 419-23.

age level selected as follows: for a six-and-one-half-year level from age six years six months to six years seven months; for a ten-year level ten years 0 months to ten years one month; and for the fourteen-year level from fourteen years 0 months to fourteen years three months. The results of the study indicate that "the correlations between the I.Q.'s were high and significant at better than the .01 level of confidence. The least discrepancy was found in dull normal groups."[1]

Littell reviewed a number of studies of varied methodology concerned with WISC-Stanford-Binet correlations. He concludes in the following manner:

> Studies involving a variety of ages and I.Q. ranges are very consistent in showing that at least within a white, American, school population the WISC and the Stanford Binet scores are related to a significant degree. Correlations between the WISC Full Scale and the Stanford Binet are predominantly reported in the 80's. The WISC scores tend to be lower than S-B scores for the same children within the middle and upper ranges and somewhat higher for defectives. Using the S-B as a criterion, the highest correlations are found with the Full Scale I.Q. scores, the next highest with Verbal, and lowest with Performance scores.[2]

Krugman[3] calculated product-moment correlations

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[1]J. Harlow et al., "Preliminary Study of Comparison Between Wechsler Intelligence Scale for Children and Form L of Revised Stanford Binet Scale at Three Age Levels," Journal of Clinical Psychology, 13 (January, 1957), pp. 72-73.

[2]W. Littell, "The Wechsler Intelligence Scale for Children: Review of a Decade of Research," Psychological Bulletin, 57 (March, 1960), p. 154.

[3]A. Krugman et al., "Pupil Functioning on the Stanford Binet and the Wechsler Intelligence Scale for Children," Journal of Consulting Psychology, 15 (December, 1951), pp. 475-84.

between WISC and Stanford-Binet scores for 332 students in New York City public schools. The subjects ranged in age from $5\frac{1}{2}$ to $15\frac{1}{2}$ years. Average I.Q.'s for the group ranged from 88 to 118.

Since the WISC scores used in the current study were all Full Scale scores, only the correlations between Stanford-Binet and WISC Full Scale scores are reported from the Krugman study. The results indicate that WISC Full Scale scores correlated .817 with Stanford-Binet scores. Correlations between Stanford-Binet and WISC Full Scale I.Q.'s vary between approximately .75 and .90 at varied age levels. The WISC gave results similar to the Revised Stanford-Binet, Form L, in the large majority of cases at the lower I.Q. levels.

Weider, Noller, and Schramm administered the Wechsler Intelligence Scale for Children and Form L of the Revised Stanford-Binet Scale to a group of 106 white children in Louisville, Kentucky, public schools. The subjects ranged in age from 5 years 0 months to 11 years 11 months. The I.Q. scores obtained were correlated for a younger group (5-0 to 7-11 years) and for an older group (8-0 to 11-11), as well as for all subjects. Correlations were obtained between the verbal scale, performance scale, and full scale of the WISC and the Stanford-Binet.

The authors conclude in the following manner:

> The coefficient of correlation for all subjects between the full scale WISC I.Q. and the Binet I.Q. is .89 plus or minus .02; for the verbal scale and

> Binet I.Q. .89 plus or minus .02; and for the performance scale and the Binet I.Q. .77 plus or minus .04. The regression equation y = 0.85 x plus 11 can be utilized for predicting the WISC I.Q. from the Binet I.Q.[1]

Test Environment

Testing was done in a small, quiet room equipped with a table and two small chairs. The subject was seated across the table from the investigator. The test materials were kept out of sight of the subject in an effort to limit distractions. In addition, all materials which were not necessary to the administration of the test were removed from the test environment. Each time that a piece of test equipment was utilized it was placed out of sight of the subject unless it was needed for a following item.

Materials

Scoring Sheets--Scoring sheets contained information regarding the individual subject under test. This information consisted of the name of the subject, the name of the institution, sex, age, I.Q. score and the name of the psychological instrument from which the I.Q. score was obtained. In addition, the sheets contained the name of each of the subtests of the Parsons Language Sample and spaces for recording the responses of the subject. Included with the title of each subtest were directions for

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[1]A. Weider, P. Noller, and T. A. Schramm, "The Wechsler Intelligence Scale for Children and the Revised Stanford Binet," Journal of Consulting Psychology, 15 (August, 1951), pp. 330-33.

administering the test.

Visual Stimulus Material--The visual stimulus materials utilized, in this study, correspond to those materials necessary for the administration of the items of the Parsons Language Sample (Appendix A).

Procedure

This study utilized, as an examiner, a male graduate student in Speech and Hearing Science at Michigan State University. Prior to the testing of the subjects, a number of trial administrations of the test were enacted so that the examiner might become familiar with the materials and procedures.

Subjects were brought to the test room one at a time by a cottage parent (institutionalized subjects) or the classroom teacher (non-institutionalized subjects). Each subject was asked his or her name, and instructed to identify the number of fingers held up by the examiner. All responses to the test items were recorded by the examiner. The subtests and items of the subtests were administered strictly according to the directions included on the scoring sheets of the Parsons Language Sample (Appendix A). Responses were recorded verbatim by the examiner. Testing time varied with the ability of the subject. None of the subtests of the Parsons Language Sample were timed. The same procedure was repeated for every subject.

CHAPTER IV

ANALYSIS AND DISCUSSION

Analysis

The data for this study are in the form of raw scores for each subject obtained on the seven subtests of the Parsons Language Sample. These scores were derived by recording, verbatim, each subject's responses to the items of the measuring instrument.

Seven analyses of variance, designated by Lindquist[1] as three dimensional, were utilized in this study. Since such analyses require the assumption of equal sample variances,[2] a statistical test for homoscedasticity was utilized for those sources of variance in which differences among means were found. A test for homogeneity of variances was made by taking the ratio of the largest sample variance to the smallest sample variance and referring to the sampling distribution of F.[3] The results of the tests are reported subsequently.

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[1]E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education (Boston: Houghton Mifflin Company, 1956), p. 220.

[2]Hubert M. Blalock, Social Statistics (New York: McGraw-Hill Book Company, Inc., 1960), p. 249.

[3]H. M. Walker and J. Lev, Statistical Inference (New York: Holt Book Company, 1953), p. 192.

Seven analyses of variance were computed for the data, one analysis for each subtest of the Parsons Language Sample. The data were subjected to a factorial design analysis of variance. An analysis of variance routine (FACREP, Option 3) for the CDC 3600 computer was employed.[1] The analyses yielded a total of seven F statistics for each subtest, or an overall total of 49 F statistics. Each subtest F statistic corresponds to the following summary table:

TABLE 3

F STATISTIC SUMMARY TABLE

SOURCE OF VARIANCE	DEGREES OF FREEDOM
Intelligence Level (A)	1
Age Level (B)	2
A X B	2
Environment Level (C)	1
A X C	1
B X C	2
A X B X C	2
Error	36
Total	47

Five significant F ratios were obtained for the data, corresponding to the following:

(1) Tact Subtest	A (Intelligence Level)
(2) Tact Subtest	AXB (Interaction--Age Level by Intelligence Level)
(3) Comprehension Subtest	B (Age Level)
(4) Intraverbal Subtest	B (Age Level)
(5) Mand Subtest	C (Environment Level)

[1] D. F. Kiel, A. L. Kenworthy, and W. L. Ruble, "Analysis of Variance Routines" (East Lansing: Michigan State University, September 30, 1963), p. 24.

Since only five significant F ratios were obtained, the results of only five tests of homogeneity of variance are reported. The value obtained for "A" of the Tact subtest was F = 1.68. An F of 2.70 was required for significance at the .01 level of confidence, for 24 degrees of freedom. The value obtained for "A X B" of the Tact subtest was F = 7.32. An F of 7.00 was required for significance at the .01 level of confidence for seven degrees of freedom. The value obtained for "B" of the Comprehension subtest was F = 1.48. An F of 3.48 was required for significance at the .01 level of confidence, for 16 degrees of freedom. The value obtained for "B" of the Intraverbal subtest was F = 5.69. An F of 3.48 was required for significance at the .01 level of confidence for 16 degrees of freedom. The value obtained for "C" of the Mand subtest was F = 1.28. An F of 2.70 was required for significance at the .01 level of confidence for 24 degrees of freedom.

The results of the preceding tests of homoscedasticity indicate that the assumption of homogeneity of variance has been violated in two instances, Tact A X B significance, and Intraverbal B significance. However, the writer did not feel the necessity for resorting to non-parametric analyses. Blalock states, "Generally speaking, moderate departures from normality and equality of variances can be tolerated without necessitating the use of non-parametric alternatives."[1]

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[1]Blalock, loc. cit.

Hays comments on homogeneity of variance in his statement, "Ordinarily, other things being equal, this assumption of homogeneous variances can be violated without serious risk, provided that the number of cases in each sample is the same."[1]

In regard to the significant F ratios which were computed, the value obtained for "A" of the Tact subtest was F = 8.48. An F of 4.11 was required for significance at the .05 level of confidence for one and 36 degrees of freedom. It should be included that an F of 7.39 was required for significance at the .01 level of confidence for one and 36 degrees of freedom. The value obtained for "A X B" of the Tact subtest was F = 3.29. An F of 3.26 was required for significance at the .05 level of confidence for two and 36 degrees of freedom.

The value obtained for "B" of the Comprehension subtest was F = 4.12. An F of 3.26 was required for significance at the .05 level of confidence for two and 36 degrees of freedom.

The value obtained for "B" of the Intraverbal subtest was F = 3.77. An F of 3.26 was required for significance at the .05 level of confidence for two and 36 degrees of freedom.

The value obtained for "C" of the Mand subtest was F = 4.28. An F of 4.11 was required for significance at

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[1]William Hays, Statistics for Psychologists (New York: Holt, Rinehart and Winston, Inc., 1963), p. 379.

the .05 level of confidence for one and 36 degrees of freedom.

Discussion

The analyses of the data indicate that a significant difference exists among I.Q. groups on the Tact subtest. Figure 1 reveals that those children with I.Q.'s 40-49 had a mean Tact score of 14.86. The 30-39 I.Q. group subjects had a mean Tact score of 9.67, for a difference between means of 5.19. According to Spradlin, "In this subtest the examiner presents an object or picture and asks, 'What is it?' The controlling stimulus is the picture or object and the correct response is vocal."[1] A review of the Tact subtest (Appendix A) indicates that this test progresses from real objects, to miniature objects, to colored pictures, to black and white pictures. It may be said for the populations of this study that those subjects with an I.Q. of 40-49 completed more items of the Tact subtest than subjects with an I.Q. of 30-39, indicating that the ability to name objects and pictures, which vary in the aforementioned order, is a function of intelligence.

A study of Figure 2 would seem to indicate that mean Tact scores vary as a function of intelligence and age for subjects in I.Q. group 40-49. The curve for I.Q. group 30-39 may be indicative of a type II error, possibly

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[1]Joseph Spradlin, "Assessment of Speech and Language of Retarded Children: The Parsons Language Sample," Monograph Supplement 10 (January, 1963), p. 29.

attributable to lack of homoscedasticity. Therefore, it is not possible to set forth a significant conclusion regarding Tact subtest performance as a function of chronological age and intelligence.

A review of Figure 3 indicates that mean Comprehension scores vary as a function of age for both institutional and non-institutional subjects. Spradlin states, concerning the Comprehension subtest, "The examiner asks the child to execute a series of commands. The commands are given by speech, by gestures, and by speech and gestures combined. Thus the controlling stimulus can be either vocal or non-vocal. The correct response is a motor act."[1] The results of the analysis of the Comprehension subtest show that the ability to execute commands of the preceding type varies as a function of age. As age increases, the ability to execute a motor act, in response to a vocal, gestural, or vocal and gestural command, increases. Spradlin indicates, "Depending on the language measure, the correlation between CA and language after age 10 would probably decrease rapidly to almost zero."[2] This statement by Spradlin and the subtest analysis would seem to indicate the need for the application of language therapy techniques among retarded populations, at the earliest possible age.

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[1] Ibid.

[2] Joseph Spradlin, "Language and Communication of Mental Defectives," Handbook of Mental Deficiency, ed. Norman R. Ellis (New York: McGraw-Hill, Inc., 1963), p. 525.

A study of Figure 4 indicates very similar results to those of Figure 3. The mean Intraverbal subtest score varies as a function of chronological age for both institutional and non-institutional subjects. Spradlin comments on this subtest, "The examiner asks the child questions such as 'What do you do when you are hungry?' The stimulus is vocal, the response is vocal, but unlike the previous subtest Echoic it does not bear a point-to-point relation to the vocal stimulus."[1] The child must spontaneously respond to the items of the Intraverbal subtest; therefore, it is concluded that such ability increases with chronological age. Since the mean score of this test varies as a function of age, the concept of applying language therapy at an early age would apply in this instance also.

The results of the analysis of the Mand subtest are presented in Figure 5. The institutional subjects obtained a mean Mand score of 3.04, while the non-institutional subjects attained a mean score of 2.16, or a difference between means of .88. According to Spradlin, "Mand behavior includes such behavior as demanding, commanding, requesting, and asking. Usually the reinforcement for mand behavior is rather specific and is often related to specific drive operations."[2] He further concludes that the responses to the Mand items of the Parsons Language Sample are the

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[1]Spradlin, loc. cit.

[2]Spradlin, loc. cit.

result of the need to obtain an object for the completion of some task, or to obtain feedback from the examiner as to the "rightness or wrongness" of some task already completed. It would appear that environment has effects on such language behavior. Retarded institutional children performed significantly better on the Mand subtest than retarded non-institutional children. The results of this analysis correspond to the findings of Sievers and Essa[1] who compared and analyzed an institutional and day school sample of retarded children on various speech tasks and found the institutional sample to have a higher mean verbal output than the community group.

In addition, Mueller and Weaver utilized the ITPA to evaluate the psycholinguistic abilities of an institutionalized and non-institutionalized population. The results of the study indicated that the institutionalized trainable mental retardates were significantly higher in overall language ability than the day school group of mental retardates.

The authors conclude in the following manner:

> The superiority of the institutional group's total language ability scores in the present study raises the possibility that the ITPA tests some aspect of language that tests used in previous studies did not.[2]

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[1]D. J. Sievers and S. H. Essa, "Language Development in Institutionalized and Community Mentally Retarded Children," American Journal of Mental Deficiency, 66 (May, 1962), pp. 413-20.

[2]Max Mueller and Joseph Weaver, "Psycholinguistic Abilities of Institutionalized and Non-Institutionalized Trainable Mental Retardates," American Journal of Mental Deficiency, 68 (May, 1964), pp. 775-83.

The procedures and results of the Sievers-Essa and Mueller-Weaver studies are reported in greater detail in Chapter II.

The higher mean Mand score for the institutional group is contrary to the findings of the greater majority of the studies in the review of the literature. It is quite possible that the Mand subtest samples an aspect of language behavior that previous instruments have not sampled.

The data analysis, supplemented by a study of Figure 5, indicates a relationship between Mand language behavior and environment in two groups of mental retardates. The results of this analysis seem to offer evidence that there is a significant difference between the scores obtained by institutionalized mental retardates and non-institutionalized mental retardates on the Mand subtest of the Parsons Language Sample. The null hypothesis tested was as follows: There is no significant difference between the scores obtained by the institutionalized mental retardates and the non-institutionalized mental retardates on any of the subtests of the Parsons Language Sample. Therefore, the null hypothesis of no difference between environment groups is rejected at the .05 level of confidence.

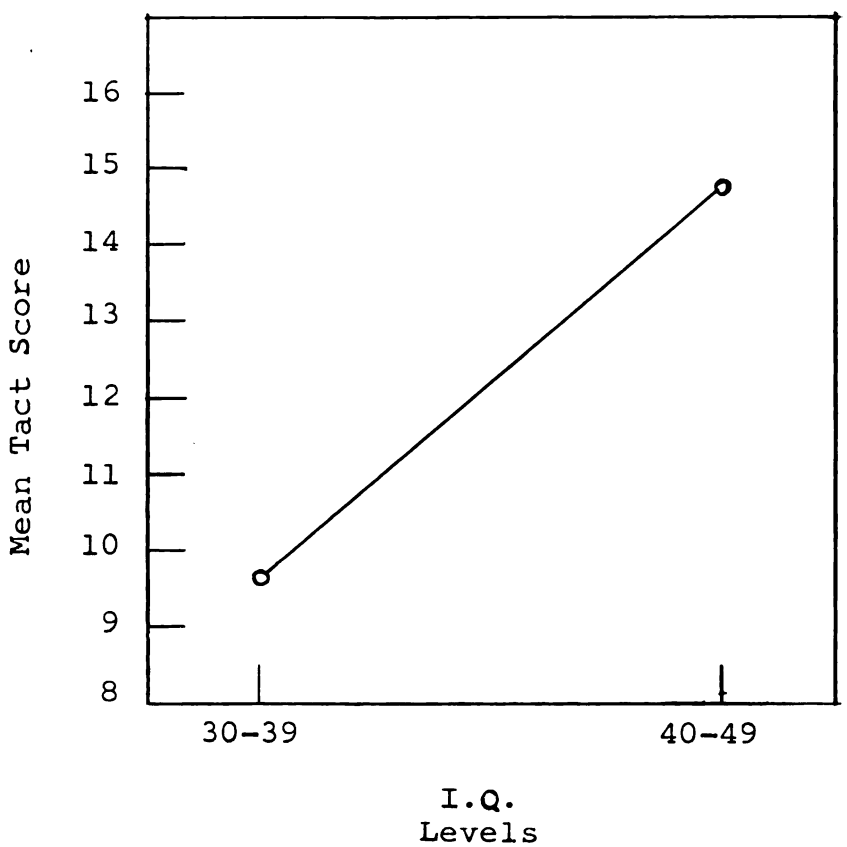

Figure 1. Mean Tact score plotted against I.Q. level.

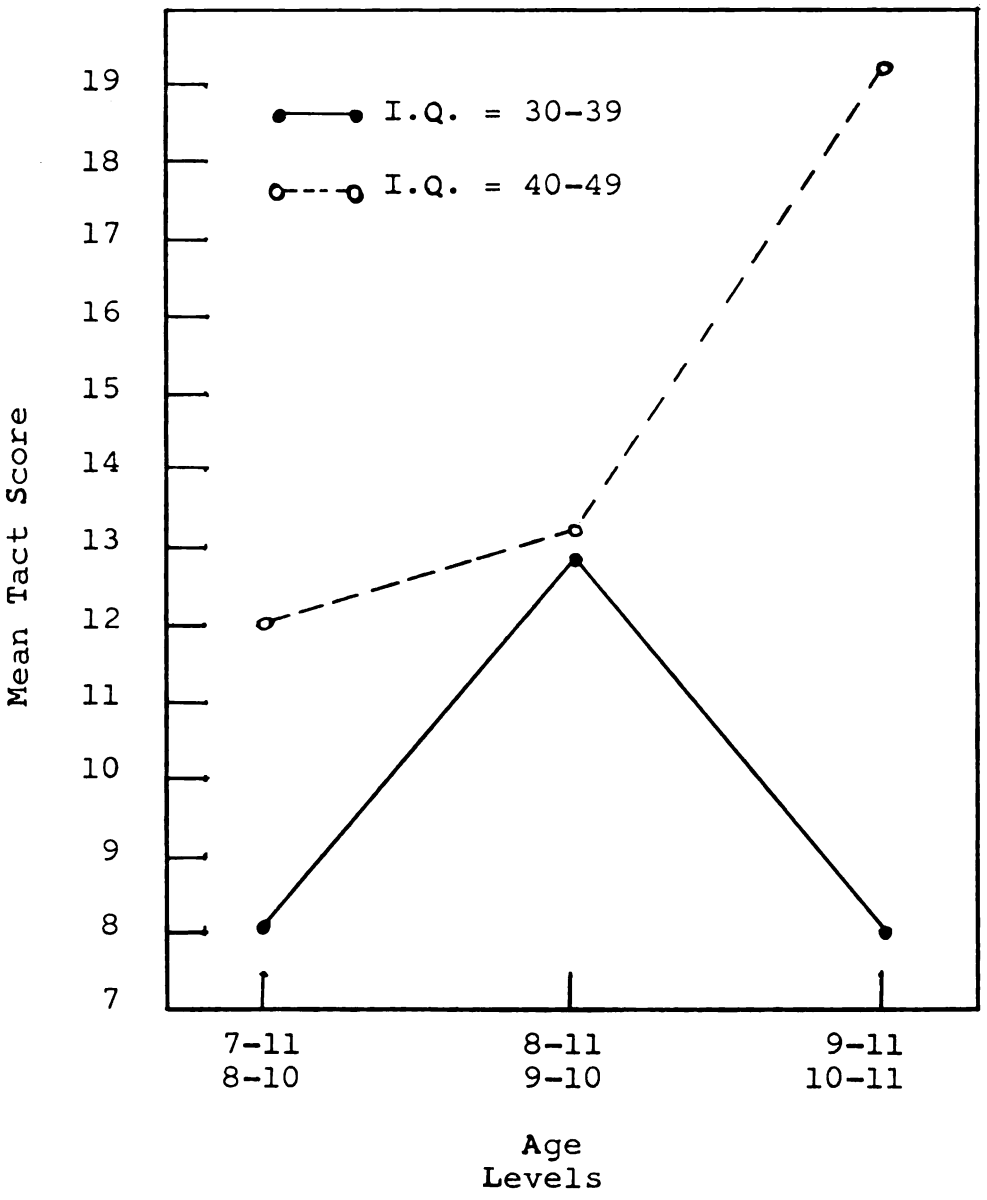

Figure 2. Mean Tact score plotted against chronological age level. I.Q. level is the parameter.

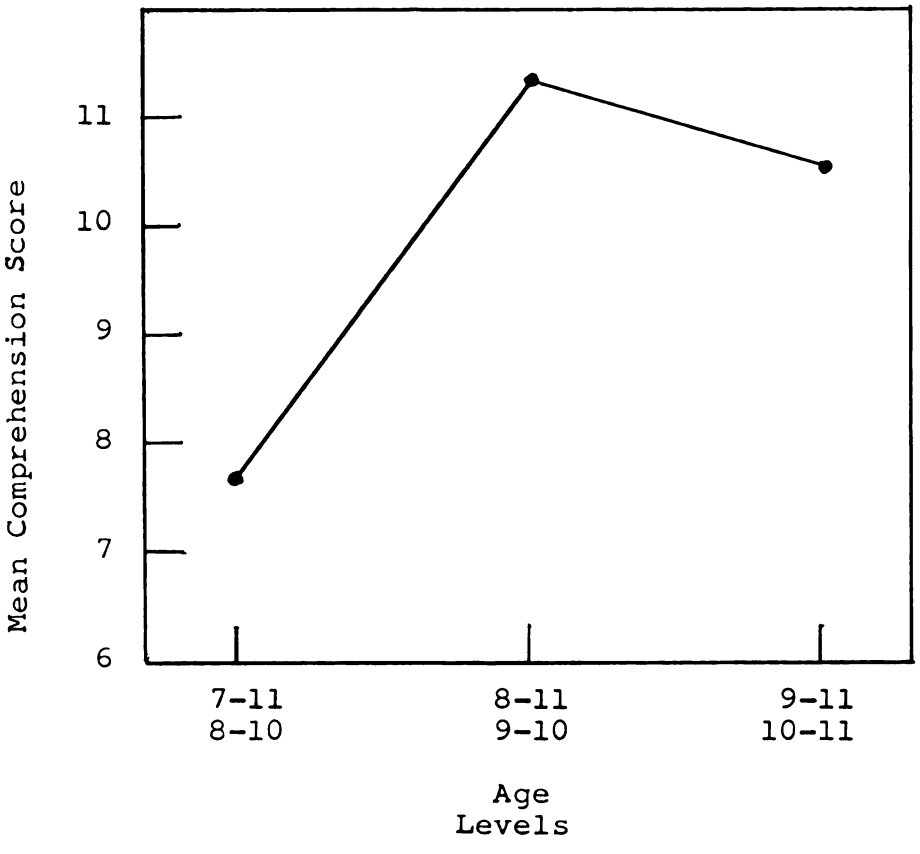

Figure 3. Mean Comprehension score plotted against chronological age level.

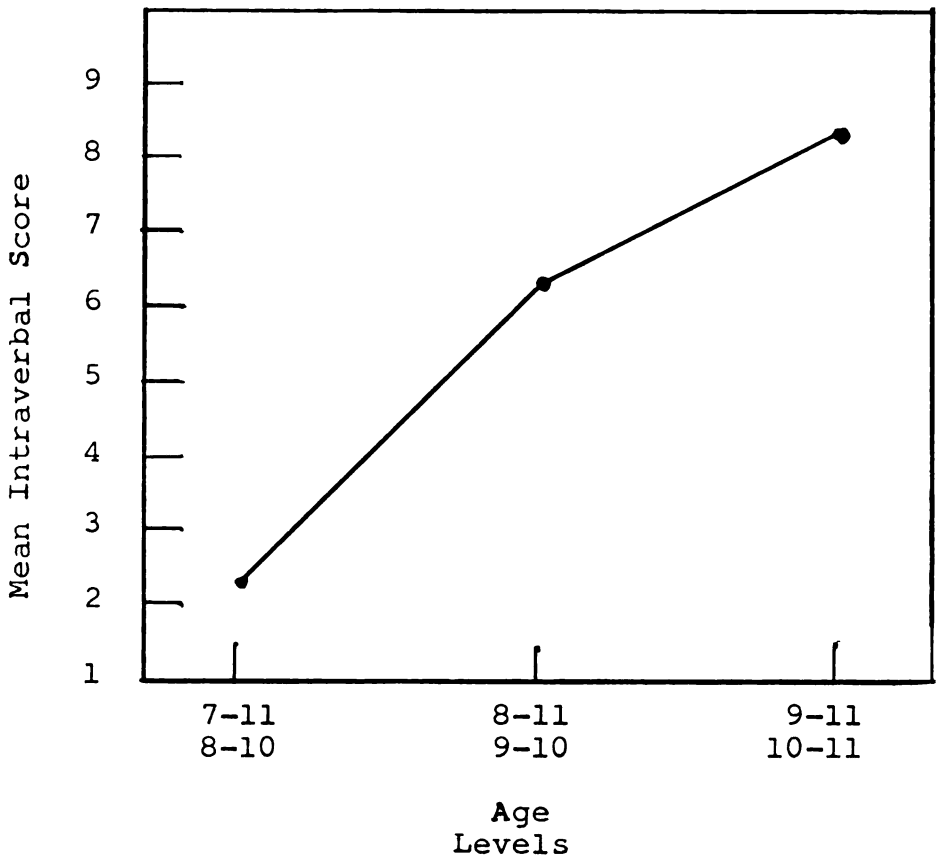

Figure 4. Mean Intraverbal score plotted against chronological age level.

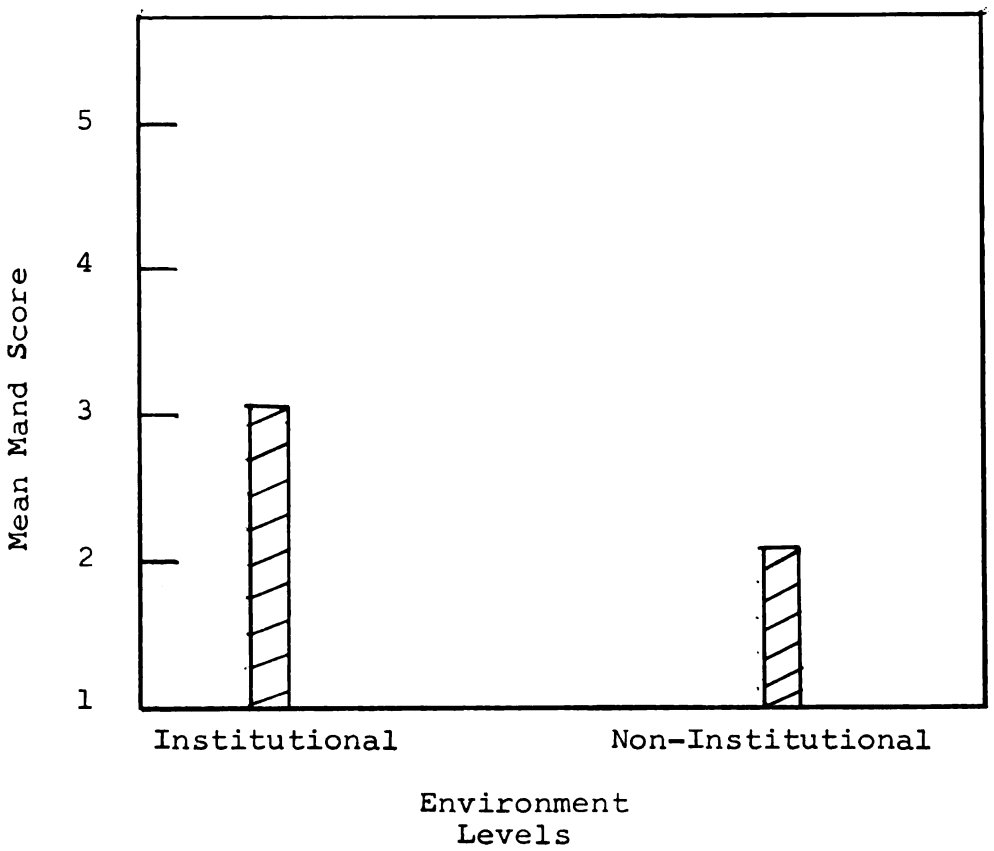

Figure 5. Mean Mand score for each of two environment levels.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

Speech and language development, as it relates to environment, has been explored by numerous investigators in the past. More specifically, the relationship between language ability and environment has been extensively measured in a number of research studies. Such studies have involved a variety of measuring instruments and an even greater variety of subjects varying in intelligence, sex, chronological age, type of retardation, mental age, socio-economic status, and environment.

Current emphasis in the discipline of speech pathology, as it relates to mental retardation, has prompted interest in this study.

The purpose of the present study was to determine the relationship between environment and language ability, as measured by the Parsons Language Sample.

Forty-eight subjects and one examiner were utilized in this investigation. All of the subjects were mental retardates, ages seven years eleven months through ten years eleven months, randomly selected according to chronological age and intelligence scores on the WISC, Cattell, Kuhlmann-

Binet, and Stanford-Binet Form L or M. Twenty-four of the subjects were institutionalized in state homes for the mentally retarded. The second population of twenty-four subjects was in attendance in public training schools for the mentally retarded. The examiner was a male graduate student enrolled in Speech and Hearing Science at Michigan State University.

Each subject was tested individually and the responses were recorded verbatim by the examiner. A room, free from distractions and equipped with a table and two small chairs, was utilized for the test situation.

Each subject was presented the items of the seven subtests of the Parsons Language Sample in accordance with the directions for administering these items. The subjects responded orally, or with a motor act, to the various stimuli presented by the examiner.

The data were submitted to a three dimensional analysis of variance. The Michigan State University CDC 3600 computer was utilized for purposes of analysis. The results indicated a significant difference in Tact subtest performance as a function of intelligence, Tact subtest performance as a function of age and intelligence, Comprehension subtest performance as a function of age, Intraverbal subtest performance as a function of age, and Mand subtest performance as a function of environment. Due to violation of homoscedasticity, no positive statement could be set forth in regard to Tact subtest performance as a function of age and intelligence.

Conclusions

From the results obtained by statistical analysis of the data, it was possible to reject the following null hypothesis at the .05 level of confidence: There is no significant difference between the scores obtained by the institutionalized mental retardates and the non-institutionalized mental retardates on any of the subtests of the Parsons Language Sample. Therefore, the following conclusion seems warranted: Mand subtest performance, as measured by the Parsons Language Sample, varies as a function of environment level in the mentally retarded populations of this study. Certain institutional mechanisms operate to significantly improve Mand language behavior.

Implications for Future Research

The significant F ratios obtained in this study suggest the need for increased research efforts in the area of language development among retardates. Therapy programs should be formulated out of the results of such devices as the ITPA and the Parsons Language Sample. Such programs should be periodically evaluated, on a longitudinal basis, in an effort to determine which language assessment instrument accurately determines language abilities and disabilities.

Since Mand language behavior does manifest itself as a function of environment level, the following question seems warranted: What are the environmental mechanisms which operate to influence success or failure on such subtests as the Mand subtest of the Parsons Language Sample?

APPENDICES

APPENDIX A

The Parsons Language Sample

Name_____Birthdate_____Date_____

Key

appropriate
inappropriate
unintelligible
no response

Subtest I

Tact: The examiner shows the child each object or picture one at a time. Upon presenting each item the examiner will say:

"WHAT IS IT?" or "WHAT DO YOU CALL IT?"

If the child does not respond the examiner repeats the question. The examiner accepts and rates any response given by the child. Responses are rated according to the above key.

Ceiling: 5 consecutive errors

Real Objects	Correct Responses	Vocal Rating
1. Ball	Ball	
2. Cup	Cup	
3. Telephone	Telephone	
4. Spoon	Spoon	
5. Pencil	Pencil	
6. Wrench	Wrench	
7. C Clamp	Clamp or C Clamp	
Miniature Objects		
8. Duck	Duck	
9. Car	Car	
10. Chair	Chair	
11. Table	Table	
12. Screwdriver	Screwdriver	
13. Pliers	Pliers	
14. Bottle Brush	Bottle Brush or Brush	

Colored Pictures	Correct Responses	Vocal Rating
15. Motherly Woman	Mother, Lady, Woman	
16. Kitten	Kitten, Kitty, Cat, Kitty Cat	
17. Apple	Apple	
18. Drum	Drum	
19. Nail	Nail	
20. Leaf	Leaf	
21. Anchor	Anchor	
Non-Colored Pictures		
22. Fatherly Man	Man, Daddy, Father, Workman	
23. Puppy	Dog, Doggy, Puppy	
24. Baseball Bat	Bat, Baseball Bat	
25. Watch	Watch	
26. Arrow	Arrow	
27. Feather	Feather	
28. Propeller	Propeller	

Subtest II

Echoic: Prior to administering each item the examiner makes certain he has the child's attention. This is necessary since the examiner says the word(s) and number(s) only ONCE.

Ceiling: Section A--Three consecutive failures
Section B--Three consecutive failures

Section A	Correct Response
1. Say "ball."	Repetition of the stimulus
2. Say "skate."	Repetition of the stimulus
3. Say "playhouse."	Repetition of the stimulus
4. Say "Give me one."	Repetition of the stimulus
5. Say "The cat is black."	Repetition of the stimulus
6. Say "Bob made a box for his cat."	Repetition of the stimulus
7. Say "My sister wants Daddy to buy her a big doll."	Repetition of the stimulus
8. Say "At night we went to see a movie at the theater."	Repetition of the stimulus
9. Say "In the summer time the little children like to eat black walnut ice cream."	Repetition of the stimulus
Section B	
1. Say "1."	Repetition of the stimulus
2. Say "2."	Repetition of the stimulus

	Correct Response
3. Say "3--9."	Repetition of the stimulus
4. Say "1--4."	Repetition of the stimulus
5. Say "4-9-3."	Repetition of the stimulus
6. Say "4-6-3."	Repetition of the stimulus
7. Say "9-7-6-8."	Repetition of the stimulus
8. Say "2-8-1-3."	Repetition of the stimulus
9. Say "5-4-8-7-1."	Repetition of the stimulus
10. Say "3-9-6-7-1."	Repetition of the stimulus
11. Say "1-7-9-3-2-5."	Repetition of the stimulus
12. Say "1-5-8-9-3-7."	Repetition of the stimulus

Subtest III

Echoic Gesture: The gesture may be demonstrated by the examiner three times for each item. If the child is successful on echoing the gesture on any of the three trials, he is given credit.

Ceiling: Section A--5 errors
Section B--2 consecutive errors

Section A	Correct Response
1. The examiner points toward the light and says, "DO THIS."	Imitation of E
2. The examiner pounds on the desk twice and says, "DO THIS."	Imitation of E
3. The examiner claps hands and says, "DO THIS."	Imitation of E
4. The examiner shakes his head and says, "DO THIS."	Imitation of E
5. The examiner rubs top of head with palm of hand and says, "DO THIS."	Imitation of E
6. The examiner slaps left knee with left hand and says, "DO THIS."	Imitation of E
7. The examiner slaps left knee with right hand and says, "DO THIS."	Imitation of E
8. The examiner places one Kohs block on the table, taps it with his finger, and says, "DO THIS."	Imitation of E

Section B

For Items 9-13 the examiner places 2 Kohs blocks on the table and taps them with his finger according to the right (R) left (L) sequences listed.

		Correct Response
9.	The examiner taps on blocks R-L-L	Imitation of E
10.	The examiner taps on blocks R-L-R-R	Imitation of E
11.	The examiner taps on blocks R-R-L-R-R	Imitation of E
12.	The examiner taps on blocks L-R-R-R-L-R	Imitation of E
13.	The examiner taps on blocks L-L-R-R-L-L-L	

Subtest IV

Comprehension: The purpose of this subtest is to sample the child's comprehension of three types of directions--Vocal directions only; gestural directions only; and vocal and gestural directions given together. With the exception of the first item, it is necessary to obtain the child's attention before administering the item. All items may be given once and once only. If the child does not respond to the item, the first time it is given, move to the next item.

Ceiling: 5 consecutive errors

Directions	Correct Response
1. (Vocal only). The examiner waits until the child is looking away from him and then says the child's name. If the child changes position so that he is looking toward the examiner, credit is given.	Execution of command
2. (Vocal and gestural). The examiner gets up from his chair and moves away from the child. When he is 6-10 feet away, he makes a beckoning motion with his arm and says, "COME HERE."	Execution of command. Credit is given if child moves toward the examiner.
3. (Vocal only). The examiner says, "OPEN THE DOOR." Once the door is open the examiner says, "NOW CLOSE THE DOOR." If the child does not respond to Part 1, Part 2 is not given.	Execution of command
4. (Gesture). The examiner points to the child and then to his chair, saying nothing. If after two administrations of the command the child does not return to his seat, the examiner vocally tells him to do so but credit is not given.	Execution of command

Directions	Correct Response
5. (Gesture only). The examiner places a ball, doll, and a mechanical toy (examiner's left to right) on the desk close to the child. If the child picks up any of the toys the examiner holds out his palm, just in front of the toy, palm up.	Execution of command. Credit is given if the child places the toy in the examiner's hand.
6. (Vocal only). The examiner says, "PUT YOUR FINGER ON YOUR NOSE."	Execution of command. Credit is given if child places finger on nose.
7. (Vocal only). The examiner places a cup and spoon on the desk and says, "PUT YOUR FINGER ON THE CUP."	Execution of command. Credit is given if child puts finger on cup.
8. (Vocal only). The examiner says, "PUT THE SPOON IN THE CUP."	Execution of command. Credit is given if child puts spoon in cup.
For items 9-18 the examiner will place the following objects in front of the child (examiner's left to right): Cup-spoon-toy car-toy purse-toy chair. After each item the objects are returned to the above position.	
9. (Vocal and gesture). The examiner says, "PUT THE CUP TO YOUR MOUTH," and makes a gesture as if he were picking up a cup to put to his (the examiner's) mouth.	Execution of command
10. (Gesture only). The examiner points to the chair and then to the top of the purse.	Execution of command. Credit is given if child places chair on or in the purse.
11. (Vocal only). The examiner says, "PUT THE CAR ON THE FLOOR."	Execution of command
12. (Vocal and gesture). The examiner says, "PUT THE CUP BESIDE THE CHAIR," while pointing first to the cup, then to a spot to the right of the chair.	Execution of command. Credit is given if child places the cup beside the chair.

Directions	Correct Response
13. (Gesture only). The examiner points first to the cup, then to the car, and holds his upward palm.	Execution of command. Credit is given if the child places both objects in examiner's hand.
14. (Vocal only). The examiner says, "PUT THE SPOON IN THE SPOON IN THE PURSE, PUT THE CAR ON THE FLOOR."	Execution of command. Credit is given if child executes command in sequence.
15. (Vocal and gesture). The examiner says, "PUT THE CHAIR IN THE CUP," while pointing first to the chair and then to the cup, then "PUT THE SPOON BESIDE THE PURSE," pointing first to the spoon and then to the purse.	Execution of command in sequence.
16. (Vocal only). The examiner says, "GIVE ME THE CAR, PLACE THE SPOON UNDER THE CHAIR, THEN PUT THE PURSE ON THE FLOOR."	Execution of command in sequence.
17. (Vocal only). The examiner says, "PUT THE CAR IN THE PURSE, PUT THE SPOON ON THE FLOOR, AND PUT THE CUP TO YOUR MOUTH."	Execution of command in sequence.
18. (Vocal only). The examiner says, "LOOK AT THE LIGHT, OPEN THE DOOR, AND PUT THE CUP BY THE PURSE."	Execution of command in sequence.

Subtest V

Intraverbal: Prior to asking the child the question, the examiner makes sure he has the child's attention. Each item may be read twice. Read each item exactly as it is written.

Ceiling: 5 consecutive errors

	Correct Response
1. What do we do when we are hungry?	Supper, get meal, eat, tell aide, go to dining room, dinner.
2. Why do we have houses?	Live in, shelter, keep warm, keep dry.

	Correct Response
3. Why do we have stoves?	Keep warm or cook on.
4. Why do we have books?	Read, learn, look at.
5. Why do we have clothes?	Wear or keep warm.
6. Why do we have beds?	Sleep, lay down, nap.
7. Before we go outside we put on our coats and_____.	Any article of clothing except coat or jacket.
8. The flag is red, white, and_____.	Blue.
9. The color of an apple is_____.	Red, yellow, green.
10. We go to church on_____.	Sunday.
11. Santa Claus comes on_____.	Christmas, sled, or Christmas Eve.
12. We wear shoes and socks on our _____.	Feet.
13. We smoke_____.	Cigars, cigarettes, pipe, tobacco.
14. Sister is a girl, brother is a _____.	Boy.
15. A lemon is sour, sugar is_____.	Sweet.
16. A car goes on the ground, an airplane goes in the_____.	Air, sky.
17. A mile is long, an inch is_____.	Short, small.
18. A chair is made of wood, a window is made of_____.	Glass.
19. Snow is_____.	White, cold, water, wet, or made of rain.
20. You kick with your foot, you throw with your_____.	Arm, hand.
21. We smile when we are happy, we cry when we are_____.	Sad, unhappy, bad.
22. My Daddy's sister is my_____.	Aunt.
23. My Daddy's brother is my_____.	Uncle.

	Correct Response
24. In what way are a dog and cat alike?	"Both have...." (some common characteristic).
25. In what way are a boat and car alike?	"Both have...." (some common characteristic).
26. In what way are paper and wood alike?	"Both have...." (some common characteristic).
27. In what way are a tree and a lion alike?	"Both have...." (some common characteristic).
28. In what way are cigarettes and cigars alike?	"Both have...." (some common characteristic).
29. In what way is an egg and a seed alike?	"Both have...." (some common characteristic).

Subtest VI

Intraverbal Gestural: The aim of this test is to measure the child's gestural behavior. Credit is given for gesture when the child either answers the question with a gesture or accompanies his vocal answer with a gesture. Prior to asking the question, the examiner makes sure he has the child's attention. Ask each question only once.

Basal: First 5 items
Ceiling: None

	Correct Response
1. Where is the light?	An appropriate gesture
2. Where is your ear?	An appropriate gesture
3. Can a bird fly?	An appropriate gesture
4. Can a dog fly?	An appropriate gesture
5. Can a rabbit eat?	An appropriate gesture
6. How do you fasten a button?	An appropriate gesture
7. What do you do with a cup?	An appropriate gesture
8. Can a boy outrun a horse?	An appropriate gesture
9. What do you do with a key?	An appropriate gesture
10. What do you do with a spoon?	An appropriate gesture
11. What do you do with scissors?	An appropriate gesture
12. What do you do with a crayon?	An appropriate gesture
13. What do you do when you are hungry?	An appropriate gesture
14. What does an airplane do?	An appropriate gesture
15. What does a wheel do?	An appropriate gesture

	Correct Response
16. What does a swing do?	An appropriate gesture
17. What do you do with a saw?	An appropriate gesture
18. What do you do with a cigarette?	An appropriate gesture
19. What is a ceiling?	An appropriate gesture
20. What do you do with a drum?	An appropriate gesture
21. What do you do with a balloon?	An appropriate gesture
22. What do you do with a comb?	An appropriate gesture
23. What is a floor?	An appropriate gesture
24. What do you do with a handkerchief?	An appropriate gesture

Subtest VII

Mand:

1. a. Examiner holds a wind-up duck in the child's view.
   b. Examiner winds up the duck and allows it to run for five seconds on the table.
   c. Examiner picks up the duck and again holds it in the child's view. If the child has not responded in this time the duck is put out of sight. If the child asks or gestures for the duck, a mand is recorded.

2. The examiner pounds a peg in the peg-board, then hands the board to the child and says, "YOU DO IT." The examiner retains the mallet. Mand is recorded if the child requests the mallet in any way.

3. The examiner will operate an automatic Bell Telephone Truck (or any other mechanical toy that has controls), and then hand it to the child and say, "YOU MAKE IT GO." The subject should request the controls in some way for a mand to be scored.

4. The examiner reaches in the drawer (obtains three buttons), then puts his closed hand in front of the child and says, "GUESS HOW MANY BUTTONS I HAVE IN MY HAND." If the subject guesses the examiner will put the buttons back in the drawer and wait for thirty seconds. A response is recorded if the child indicates in some way that he wants feedback on the "rightness" or "wrongness" of his guess.

5. The examiner hands the child a sheet of paper and says, "PLEASE WRITE YOUR NAME HERE." The examiner makes sure the child has no writing implement before making the request. A mand is recorded if the child gestures or vocally indicates that he wants the pencil which the examiner is holding.

APPENDIX B

RAW SCORES

Tact Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	10	25.	10
	2.	15	26.	0
	3.	15	27.	0
	4.	7	28.	8
8-11 to 9-10	5.	20	29.	20
	6.	0	30.	24
	7.	3	31.	3
	8.	17	32.	16
9-11 to 10-11	9.	0	33.	17
	10.	12	34.	11
	11.	11	35.	11
	12.	0	36.	2
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	12	37.	15
	14.	16	38.	16
	15.	5	39.	6
	16.	20	40.	6
8-11 to 9-10	17.	6	41.	6
	18.	14	42.	17
	19.	11	43.	20
	20.	17	44.	15
9-11 to 10-11	21.	20	45.	19
	22.	22	46.	22
	23.	22	47.	24
	24.	13	48.	18

Echoic Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	8	25.	7
	2.	10	26.	0
	3.	12	27.	0
	4.	10	28.	12
8-11 to 9-10	5.	13	29.	11
	6.	0	30.	15
	7.	5	31.	2
	8.	16	32.	8
9-11 to 10-11	9.	0	33.	9
	10.	7	34.	10
	11.	20	35.	17
	12.	0	36.	0
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	9	37.	13
	14.	8	38.	7
	15.	11	39.	10
	16.	11	40.	1
8-11 to 9-10	17.	6	41.	5
	18.	8	42.	11
	19.	11	43.	17
	20.	17	44.	10
9-11 to 10-11	21.	12	45.	14
	22.	11	46.	13
	23.	5	47.	14
	24.	9	48.	15

Echoic Gesture Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	7	25.	8
	2.	6	26.	0
	3.	8	27.	0
	4.	5	28.	7
8-11 to 9-10	5.	7	29.	7
	6.	0	30.	6
	7.	7	31.	6
	8.	6	32.	6
9-11 to 10-11	9.	0	33.	8
	10.	8	34.	5
	11.	8	35.	11
	12.	8	36.	10
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	1	37.	6
	14.	7	38.	8
	15.	6	39.	7
	16.	7	40.	0
8-11 to 9-10	17.	6	41.	7
	18.	6	42.	7
	19.	5	43.	9
	20.	6	44.	7
9-11 to 10-11	21.	10	45.	8
	22.	6	46.	7
	23.	8	47.	9
	24.	6	48.	8

Comprehension Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	9	25.	9
	2.	10	26.	0
	3.	6	27.	4
	4.	7	28.	9
8-11 to 9-10	5.	17	29.	10
	6.	5	30.	14
	7.	7	31.	8
	8.	14	32.	15
9-11 to 10-11	9.	0	33.	11
	10.	12	34.	5
	11.	13	35.	12
	12.	10	36.	8
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	10	37.	13
	14.	12	38.	12
	15.	7	39.	6
	16.	9	40.	0
8-11 to 9-10	17.	10	41.	9
	18.	10	42.	13
	19.	12	43.	13
	20.	13	44.	11
9-11 to 10-11	21.	15	45.	12
	22.	8	46.	13
	23.	11	47.	11
	24.	12	48.	15

Intraverbal Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	0	25.	8
	2.	1	26.	0
	3.	4	27.	0
	4.	0	28.	0
8-11 to 9-10	5.	6	29.	8
	6.	0	30.	16
	7.	0	31.	1
	8.	15	32.	0
9-11 to 10-11	9.	0	33.	1
	10.	0	34.	1
	11.	22	35.	19
	12.	0	36.	2
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	0	37.	4
	14.	0	38.	2
	15.	9	39.	9
	16.	1	40.	0
8-11 to 9-10	17.	0	41.	1
	18.	0	42.	15
	19.	5	43.	15
	20.	11	44.	8
9-11 to 10-11	21.	16	45.	13
	22.	5	46.	19
	23.	3	47.	14
	24.	4	48.	15

Intraverbal Gesture Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	6	25.	4
	2.	7	26.	0
	3.	9	27.	3
	4.	0	28.	8
8-11 to 9-10	5.	22	29.	10
	6.	1	30.	6
	7.	5	31.	3
	8.	4	32.	3
9-11 to 10-11	9.	0	33.	5
	10.	8	34.	6
	11.	4	35.	5
	12.	13	36.	11
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	4	37.	10
	14.	8	38.	6
	15.	3	39.	2
	16.	12	40.	0
8-11 to 9-10	17.	1	41.	3
	18.	3	42.	14
	19.	14	43.	14
	20.	4	44.	2
9-11 to 10-11	21.	5	45.	19
	22.	17	46.	8
	23.	13	47.	17
	24.	12	48.	12

Mand Subtest

Intelligence Level	Environment Level			
30-39	Institutional		Non-Institutional	
Age Level	Subject	Score	Subject	Score
7-11 to 8-10	1.	4	25.	3
	2.	2	26.	0
	3.	2	27.	0
	4.	4	28.	0
8-11 to 9-10	5.	4	29.	2
	6.	2	30.	1
	7.	2	31.	4
	8.	4	32.	3
9-11 to 10-11	9.	3	33.	1
	10.	2	34.	4
	11.	3	35.	2
	12.	0	36.	1
Intelligence Level				
40-49				
Age Level				
7-11 to 8-10	13.	2	37.	5
	14.	2	38.	2
	15.	4	39.	4
	16.	5	40.	0
8-11 to 9-10	17.	3	41.	1
	18.	4	42.	5
	19.	3	43.	2
	20.	0	44.	2
9-11 to 10-11	21.	5	45.	2
	22.	5	46.	1
	23.	4	47.	3
	24.	4	48.	4

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