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The development of language has received considerable attention in recent years from speech pathologists, psychologists and educators. Much has been written on the nature and development of the elements and structure of language in normal children, but less attention has been given to the development of vocabulary and syntax in mentally retarded individuals. This study was designed to determine the relationships of language development (vocabulary and syntax) and age (chronological and mental).

Twenty-nine mentally retarded children between the ages of three and eight were selected for study. Selection was based on scores from intelligence tests. The Peabody Picture Vocabulary Test (Dunn, 1959) and the Northwestern Syntax Screening Test (Lee, 1969) were administered to these children in order to derive receptive vocabulary, receptive syntax and expressive syntax scores. Observed and derived scores from normative data were recorded. Comparisons within each test were made by statistical analyses in order to determine significant differences between the rate of vocabulary and syntax development in normal and mentally retarded children.

The results of the study revealed no significant differences in the rate at which mentally retarded and normal individuals between the ages of five and eight learn

vocabulary, receptive syntax and expressive syntax. The rate of change in the development of receptive syntax is somewhat slower than the rate of development of receptive vocabulary, although the difference is not significant.

THE PSYCHAL DEVELOPMENT IN MENTALLY

RETARDED CHILDREN

By

Charlotte Fetter Jones

A Thesis Submitted to  
the Faculty of the Graduate School of  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

Greensboro  
1973

Approved by

*Richard H. ...*  
THESIS ADVISOR

A STUDY OF RECEPTIVE VOCABULARY DEVELOPMENT  
AND SYNTAX DEVELOPMENT IN MENTALLY  
RETARDED CHILDREN

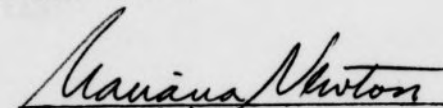
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APPROVAL PAGE

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Language development in children is a matter of current interest and concern. Recent investigations (Thaplin, 1957; Gata, 1958; Kopyak, 1958; Lee, 1966) have centered around the nature and development of the elements and structure of language.

The development of language skills in the mentally retarded interests speech pathologists, psychologists and educators alike. Language is used to determine the nature and degree of intellectual deficits in these children. Hence, language deficiencies are thought by some to be indicative of intellectual deficits. Language is also a primary tool used for instructional purposes. Especially with reference to the mentally retarded, language is an important avenue of definition and remediation.

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CHAPTER I  
INTRODUCTION

Language development in children is a matter of current interest and concern. Recent investigations (Templin, 1957; Goda, 1964; Menyuk, 1964; Lee, 1966) have centered around the nature and development of the elements and structure of language.

The development of language skills in the mentally retarded interests speech pathologists, psychologists and educators alike. Language is used to determine the nature and degree of intellectual deficit in these children. Indeed, language deficiencies are thought by some to be predictive of intellectual deficits. Language is also a primary tool used for instructional purposes. Especially with reference to the mentally retarded, language is an important avenue of definition and remediation.

Measures of vocabulary development (Peabody Picture Vocabulary Test) have been commonly used indices of language development in normals and mentally retarded. However, syntax, an equally important aspect of language, has not been commonly evaluated, primarily because a functional test of syntax was not available. The development of the Northwestern Syntax Screening Test (Lee, 1969) makes available a

screening instrument suitable for use in detecting errors in both receptive and expressive manipulations. In addition, comparisons of receptive vocabulary and receptive syntax are now possible. Such comparisons may have particular importance with reference to the abilities of the mentally retarded to use variously complex language units as instructional tools.

The purpose of this study was to determine the relationships of language development (vocabulary and syntax) and age (chronological and mental). It was hoped that this information would be helpful in clarifying patterns of vocabulary and syntax development in the mentally retarded.

CHAPTER II  
REVIEW OF THE LITERATURE

The volume of literature on mental retardation is staggering. While some of it deals with vocabulary, very little has been written on syntax. Contrary to the usual circumstance, much of the literature concerning speech and language development of mental retardation deals with methods for developing speech and language as well as the natural course of development. Curiously enough, in speech pathology, most of the literature regarding speech and language disorders deals with the development of the disorder and little with the method of treatment.

Of particular importance to the present investigation is a summary of research of language and speech development in retarded children. Studies concerned with babbling, vocabulary development, motor activities and articulation and syntax will be reviewed.

Intelligence and Language Learning

There is general agreement among most speech and language authorities regarding the onset of speech in children with normal intelligence. Around the ninth or tenth month imitative verbal behavior begins. This imitative behavior is especially prominent around the end of the first

year and the beginning of the second year when meaningful speech begins to emerge (Lillywhite and Bradley, 1969; McCarthy D., 1954).

Before speech and language can develop there must be sufficient development in four areas. These areas include (1) sensory development involving the auditory and visual capacities; (2) motor development involving kinesthetic development of the muscular sense; (3) psychomotor maturation in which there is a progression of vocal utterances to voluntary and intentional sound utterances; and, (4) intellectual development (Luchsinger and Arnold, 1965).

Of the four areas, the relationship of intellectual development and language learning is of particular interest here. Reduced intellectual function makes learning to speak a slow and difficult process.

Learning to speak is an intellectual function which is based on adequate employment of the cortex, or higher neural centers. This is a complex process requiring a certain minimum level of intellectual ability as well as the rapid and unconscious manipulation of the various articulators. Thus, it is not astonishing to find that retarded children are slower in speech development, speak at a slower pace and finally attain a lower level of success in speech than the intellectually normal.  
(Smith, 1968, p. 96.)

Since the mentally retarded are slower in developing language and speech, one would assume that there is a definite relationship between the onset and development of speech and the intellectual level. Abt, Adler and Bartelme (1929) reported

data concerning the age of onset of speech in a group of 1000 cases with an average IQ of 81. Correlations for the age of speech onset and intelligence were .41 for boys and .39 for girls. Goodwin (1955) reviewed 454 cases of speech and language retardation seen in a hospital. They ranged in age from 21 months to 13 years. Each child was given a speech and hearing evaluation, a complete medical examination and an intelligence test. According to this study the most frequent factor held to be responsible for speech retardation was mental retardation.

Morley (1965) studied 280 children who were referred with delayed speech development. General mental retardation was considered to be the cause of speech delay in 71 of the 280 cases. Morley stated further that retarded mental development is the most common cause of delayed development of speech when hearing is normal. Noted authorities (Irwin, 1959; West, Kennedy and Carr, 1947) agree that the degree of speech and language retardation actually parallels the degree of mental deficiency.

Contrary to the above findings, Bangs (1942) found that only a slight positive correlation exists between the intelligence quotient and the onset and development of speech. According to Bangs, language is correlated with developmental age and developmental age is much more characteristic of speaking ability than chronological age.



Research has shown that a positive relationship does exist between the onset and development of speech and language and intelligence level.

It would be difficult to identify the minimum level of intellectual ability below which speech will not develop. Likewise, it would be hazardous to suggest that speech will develop adequately in children who are above a certain intellectual level. In a general sense, the retarded have more difficulty with the peripheral mechanisms associated with communication.

(Smith, 1968, p. 96.)

#### Environment and Language Learning

The type of environment affects the mentally retarded in learning speech and language just as it affects the child of normal intelligence. "The limited social and cultural environment of most retardates interacts with the limited intellectual capacity to produce less than the optimal climate for language learning" (McCarthy, J., 1965, p. 11).

Wood (1957) emphasized the importance of a good environment to speech and language development. McCarthy (1954) found that the quality of the home atmosphere as determined by the parents' personalities was the most important single factor influencing the child's acquisition of speech. Just as the quality of the home atmosphere is important, McCarthy also found rather uniformly in her review of the literature that social class related to language ability positively; the lower the social class the lower the linguistic ability.

Since the bulk of the retarded reside in the lower social class communities, the question of the depressing effect of their social class on their language acquisition is particularly critical for them.

(McCarthy, J., 1965, p.14).

The effect of an institutional environment on the mentally retarded child's speech has been investigated. Sievers and Essa (1961) compared 74 mentally retarded institutionalized children with 74 mentally retarded children living in the community. These children were given the Differential Language Facility Test and a speech and language evaluation. They found that on the speech and language evaluation the institutional group had a higher mean verbal output, but were found to be more repetitious.

Schlanger (1954) favored the home environment over the institution because the "almost complete association with subnormal peers lessens the desire and need for oral communication by minimizing their speech experiences" (p. 341).

Likewise, Karlin and Strazzulla (1952) found that mentally retarded children who remain at home are "more alert, receive superior training and tend on the average to develop more adequate speech."

### Language Development in the Mentally Retarded Child

#### Babbling

One of the early stages in the acquisition of speech is called babbling. According to Wood (1957), this is the



period when "the child carries on vocal play with its random production of different speech sounds." Babbling is present in the mentally retarded child; however, "instinctive babbling may not proceed beyond an incipient stage, or it may disappear completely without leading to the next stage of spontaneous speech" (Luchsinger and Arnold, 1965, p. 374). In an earlier study, Karlin and Strazzulla (1952) found the average age of the onset of babbling to be 20.8 months in retardates whose intelligence quotients were in the 50-70 range.

#### Vocabulary

Speech emerges when symbolic value is attached to the vocal utterances of an infant. When mentally retarded children are compared with normal children there is ". . . a greater delay in the onset of the higher level of symbolic activities such as speech, than in the onset of predominately motor activities such as sitting and walking" (Karlin and Strazzulla, 1952, p. 288). Their data concerning these activities are summarized in Table 1.

Table 1. Age of motor activities and speech acquisition

Activity	15-25 IQ	26-50 IQ	51-70 IQ
Sitting	14.7 mos.	11.2 mos.	10.6 mos.
Walking	31.0	23.5	14.4
Babbling	25.0	20.4	20.8
Words	54.3	43.2	34.5

Children of normal intelligence begin using simple words sometime between the tenth and eighteenth months (Strazulla, 1954).

Morley (1965) made an extensive study of 82 mentally retarded patients, aged 3-65 years, and found that the age range for the first use of words was from one to six years as compared with eleven months in the random sample of childhood. Those who used words under two years were limited to one or two words. Matthews (1957) reported that Mead (1913) found the average age of talking for a group of mentally retarded youngsters was 38.5 months as compared with 15.3 months in children with normal mental ability. These studies do, indeed, point out that on the average mentally retarded children acquire speech considerably later than the child of average intelligence.

Others have studied the vocabulary developmental levels of mentally retarded youngsters using the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959). This is a well-known test that has been used to estimate intellectual functioning in the non-retarded child by measuring receptive capacity for single words. The validity and utility of the PPVT, when used to measure the intelligence of subnormal children has been investigated. Dunn and Brooks (1960) gave forms A and B of the PPVT to 371 white, educable, mentally retarded pupils. An analysis of the test scores showed a close correspondence between alternate

forms of the PPVT. These PPVT test scores were also found to compare closely with Stanford-Binet (Revised Form) (S-B<sub>r</sub>) scores, the PPVT mental ages being on the average 4.5 months lower than the S-B<sub>r</sub> mental ages and the PPVT intelligence quotients (IQ) average 2.1 points above the S-B<sub>r</sub> IQ. A similar study was conducted by Budoff and Purseglove (1963). The PPVT and S-B<sub>r</sub> were administered to forty-six adolescents, aged 16 to 18 years, whose IQ's ranged from 20 to 80. There was a closer relationship between the PPVT and the S-B<sub>r</sub> scores for those in the lower (below 50) IQ group than for the higher grade (above 50) IQ retarded patients. On the average, mental age scores on the PPVT were 8.1 months below those on the Binets. Burnett (1965) gave the PPVT to 238 students and found that the PPVT mean IQ's were significantly higher than those of the Wechsler-Belvue (W-B) and Stanford-Binet. The fact that the PPVT norms were 20 years old was given as a possible explanation for the differences in PPVT and Wechsler-Belvue-Stanford-Binet IQ's. Despite this finding, the author concluded that the PPVT is a useful device for measuring the IQ of educable mental retardates.

#### Motor Development and Articulation

Since speech is an extremely complex skill and requires many precise muscular and articulatory movements, the retardates' slowness in motor tasks carries over to

the motor activities involved in speech. Immaturity appears to be the most typical articulation pattern presented by the mentally retarded (Bradley and Lillywhite, 1969). According to Bangs' (1942) findings, the congenital mental defective studied had an articulatory ability comparable to that of normal children of equal developmental age. If the misarticulated sounds of a mentally retarded child are compared with the developmental norms of Templin (1967) one usually finds that the child is using sounds consistent with or below his mental age rather than his chronological age. Carmichael (1946) reported that speech sounds made by ten low-grade feeble-minded children (average age 4 years, none of whom were using real language) approximated those of normal children of one year of age in such characteristics as vowel ratio, vowel-consonant ratio and distribution of consonants. Irwin (1942) studied the developmental status of the speech sounds of a group of four-year-old feeble-minded children. Their developmental status of speech sounds was similar to that of normal children less than one year of age. He also studied the phonology development of a group of ten mentally retarded children. He found a greater concentration in the front vowels used in contrast to the middle and back vowels. All ten subjects used the (I) (ε) and (Λ) sounds.

Consonant articulation in mental retardates shows heavy concentration among the labials, post-dentals and glottals. Schlanger (1953) studied 74 retarded children who had a mean age of 12. He found the following sounds to be the most frequently defective: /θ/, /ð/, /s/, /r/, /z/, /tʃ/, /d/, /ʃ/, /v/, /f/. Bangs (1942) studied a group of 53 feeble-minded cases and found that the sounds avoided by the feeble-minded were no different than those avoided by normals. Sound omission was found to be the most common error in the speech of the mentally retarded (Bangs, 1942; Johnson, Capobianco, and Miller, 1960).

#### Syntax Development

Syntax, the basic construction rules of language, has recently been studied and investigated (Chomsky, 1965; Brown and Bellugi, 1965; and Lee, 1970). Chomsky described and discussed syntax in three parts: (1) phrase structure rules, (2) transformational rules, and (3) morphological rules. The phrase structure rules involve subdivided units like those in traditional grammar (noun phrase + verb phrase). The transformational rules involve more complex relationships such as order inversions, and the morphological rules enable one to form such structural changes within words.

Syntax development is a much more complicated part of language learning than vocabulary development. The



process of syntax learning in children is not fully understood. McNeill (1970, p. 38) discussed a theory by which a child derives the rules of language called Language Acquisition Device (LAD). According to this theory "LAD receives primary linguistic data--especially a corpus of speech from fluent speakers within hearing range--as input and has grammatical competence as output."

In terms of this theory of language learning, LAD is universally applicable. Syntactically, every language utilizes the same grammatical relations among these categories--subject and predicate, verb and object, etc. All of these are characteristics of the abstract underlying structure of sentences.

Not all psycholinguists are in agreement with LAD. Slobin (1970, pp. 87-88) argues that a "child is not born with a set of linguistic categories but with some sort of process mechanism--a set of procedures and inference rules. These mechanisms are such that, applying them to the input data, the child ends up with something which is a member of the class of human languages." Slobin feels that experience with the linguistic input alone is insufficient to support the task of grammar construction.

The syntactic element of speech emerges when a child begins putting words together and constructing sentences or using single words to mean the same thing as structurally complete sentences. The normal child is likely to begin

two-word constructions at about eighteen months. Imitating mother seems to play the biggest role in developing a child's syntax in that the general word order is preserved, and thus the adult is able to "understand" these sentences (Brown and Bellugi, 1965).

So long as a child speaks correctly or at any rate so long as he speaks correctly as the adults he hears, there is no way to tell whether he is simply repeating what he has heard or whether he is actually constructing. However, when he says something like "I digged a hole" we can often be sure he is constructing.

(Brown and Bellugi, 1965, p. 144)

By the time a child is four years old he is usually advancing rapidly in the use of self-made rules of grammar. Sentence construction is becoming more complex and by five years he is beginning to experiment seriously with several aspects of linguistic morphology (Berry, 1969).

The mentally retarded often have difficulty with syntax learning.

Dyslogic dysgrammatism is prominent in the verbal expression of individuals with deficient intelligence. This inability to formulate correct sentences represents a lasting and characteristic component of the dyslogic disorder of diction among many retardates.

(Luchsinger and Arnold, 1957, p. 703)

Several investigators have analyzed the language development of mentally retarded children. According to Luchsinger and Arnold (1957, p. 703) the following limitations are particularly characteristic of mental retardates: "monoverbal sentences, telegram style with infinitive verbs, omission of meaningful sentence particles, primitive

circumlocutions of difficult concepts or words and absence or faulty use of abstract concepts."

Some attention has been given toward analyzing the syntax of the mentally retarded. Several studies of expressive syntax of the mentally retarded have been concerned with the sentence structure and relationships of word classes to each other. O'Connor and Hermelin (1963) conducted a series of experiments on the grammatical structure (noun and verb usage) of conversational speech and the frequency of usage of descriptive adjectives. They concluded that the structure of the language used by defectives resembles that of normal children at a corresponding stage of mental development and that the words used by mental retardates have the same semantic characteristics for normals of a like mental age.

Carlton and Carlton (1945) studied the errors made in oral English by mentally defective adolescents and normal children of the same mental ages. Approximately sixty clauses were secured. The test results showed that the mental defectives made a significantly greater mean number of errors than their matched normals. Most errors of the mental defectives were in "verb and verb parts"--failure of verb to agree with subject in person and number, use of double subject and wrong verb. Thirty-seven to 40% of all errors made fell under the category of syntactical redundancy.



Goda (1964) examined the spoken syntax in a group of normal, deaf and retarded adolescents. He compared the spoken syntax of each group with that of the other and found that responses of the retardates had less variety than those of the normal subjects' in syntax. He analyzed the word samples by word classes--nouns, verbs, adjectives, adverbs and function words.

Sievers and Essa (1961) evaluated the language structure of seventy-four institutionalized children and seventy-four matched subjects living in the community. They found that the use of pronouns, verbs and prepositions increased as the mental age increased while the proportion of nouns decreased.

Using Chomsky's (1965) theory of syntactical rules, Menyuk (1964) compared normal children with language delayed children. She reported that the language delayed group manifested more omissions in their transformational structures than did normals. It was hypothesized that the syntactic differences in these two groups might be due to the use of the coding processes for perception and production.

Lee (1966) explored Menyuk's observation that the language delayed child is not just slower in syntactic development but is proceeding in a bizarre manner. She tested two children--one who was developing normally and one who was delayed in language. Analysis was made according to developmental sentence types. Lee's hypothesis was

upheld. She found that the language delayed boy was not merely slower in following a normal pattern of development, but was failing to produce certain types of syntactic structures.

According to Brown and Bellugi (1964) the best single index to the level of speech development is the average length of utterances. Bradley and Lillywhite (1969, p. 104) point out, however, that

It is not uncommon to find a retarded child who perseverates so extensively that his mean length of response will be impressive, yet the responses are largely irrelevant. Mental retardates also learn to use a surprising number of fairly complex responses, such as "How do you do, Mr. X., I hope you are well today." Eventually it is discovered that this repertoire is limited and must serve for many inappropriate occasions. Mean length of response again is a good measure, but it may be misleading.

Several have studied the mean length of response. Schlanger (1954) matched a group of mentally retarded children living at home with another group of mental retardates living in an institution. He found that the mean sentence length of institutionalized children (4.18 words/sentence) was significantly less than that of the matched group of retarded children living in the community (5.36 words/sentence). Siegel (1962) investigated the mean length of sentences produced on the Thematic Apperception Test (TAT) pictures. For a group of retardates with a mean age of 14.6 years he found a mean sentence length of 6.4 words. Siegel compared his results with Templin's

(1957) results on normal children whose mean age was eight and mean sentence length was 7.6 words. He concluded that the defectives were more retarded in their language development.

Most studies of syntax deal with expressive syntax. One recent study investigated the written language abilities of educable mentally retarded children. Cartwright (1968) tested mentally retarded subjects and normal control subjects on composition length, sentence length, type-token ratio, the percentage of usage of parts of speech, grammatical correctness ratio and spelling correctness ratio. The normal children were significantly superior to retarded children of the same chronological age in all areas of written language. When compared to normal children at a comparable mental age, the normal children were superior to the mentally retarded on type-token ratio, grammatical correctness ratio and spelling correctness ratio.

### CHAPTER III PROCEDURES

Measures of vocabulary development have been commonly used indices of language development in normals and mentally retarded. Only recently has attention been focused on the developing syntax of normal children. Such interest has yielded a rapidly increasing body of knowledge about the normal development of syntax, including both quantitative and qualitative variables. The application of this information clinically makes available measurement instruments suitable for use in detecting errors in both receptive and expressive manipulations. In addition comparisons of vocabulary development and syntax development are now possible.

#### Statement of the Research Questions

The objectives of this study are stated in the following questions:

1. How do mentally retarded children compare with normals in their receptive vocabulary development by chronological age and by mental age?
2. How do mentally retarded children compare with normals in their syntax development by chronological age and mental age?

3. How does receptive vocabulary development compare with receptive syntax development in mentally retarded children?

#### Subjects

Twenty-nine white, educable mentally retarded children were selected from classes for the educable mentally retarded in the Greensboro City Schools, Winston-Salem-Forsyth County Public Schools, and the High Point Kindergarten for Handicapped Children.

The children ranged in age from five years, six months to eight years. Children of these ages were thought to be old enough to have developed some speech, yet still within the age range in which normative data are available.

The intellectual ability of the subjects was verified by school records. Stanford-Binet scores were available on all but one subject; a WISC score was obtained on this child. The subjects' intelligence quotients ranged from fifty to seventy-five. Children described in school records as being emotionally disturbed or physically handicapped were not chosen for this study.

#### Test Administration

##### Instrumentation

The Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959) is designed to provide an estimate of a subject's

verbal intelligence through measuring his hearing vocabulary. The PPVT is a test battery of 150 plates. Each plate consists of four pictures, one of which depicts the stimulus word; the other pictures are decoys. The plates are arranged according to difficulty with a fairly even number of plates at each age level. The PPVT was standardized on 4,012 cases aged 2 1/2 to 18 years. Norms were established in terms of mental age, intelligence quotient and percentile equivalents. Reliability coefficients ranged from a low of 0.67 at the six-year level to a high of 0.84 at the 17- and 18-year levels.

The Northwestern Syntax Screening Test (NSST) (Lee, 1969) is designed to give an estimate of the syntactic development of children between the ages of three and eight. It does not attempt to measure a child's general language skill, nor does it provide a detailed study of syntax. It is to be used as a screening test only.

The NSST is divided into two parts: receptive and expressive. Each part consists of twenty pairs of syntactically similar sentences arranged in order of difficulty. Black and white pictures are used to depict each pair of sentences. Decoy pictures are included in the series that tests receptive vocabulary. A pointing response is elicited on the receptive part, and a verbal response is required for the expressive part. Norms, expressed in



terms of percentile scores, are based on the performance of 344 children (Sept., 1970).

#### Testing Procedure

The Peabody Picture Vocabulary Test (Dunn, 1959) and the Northwestern Syntax Screening Test (NSST) (Lee, 1969) were administered according to standard procedures to the subjects selected as described above. Permission to test each subject in the Greensboro City Schools was given by the parents. Administrators in the Winston-Salem-Forsythe County Schools and High Point Kindergarten for Handicapped gave permission for testing children enrolled there.

Testing was done in a well-lighted, simply-furnished room. Each child was seated across the table from the examiner. Only the examiner and the subject being tested were present during administration of the two tests. Prior to the actual testing, the examiner involved each child in a brief period of informal conversation in order to establish rapport with each subject. Test instructions were given in a simple manner and followed by several practice items. Practice was continued until the examiner was satisfied that the subject understood the procedure. The PPVT was administered first because it involves no verbal response. This helped to make each subject more relaxed in the testing situation. After the PPVT was completed the child

was given several minutes to relax before beginning the next test. Another short intermission was given between the receptive and expressive parts of the NSST. Total testing time for each subject was approximately forty to sixty minutes.

After each subject was tested, all tests were scored according to the procedure described in the respective administration manuals (Dunn, 1965; Lee, 1969). A raw score was obtained on the PPVT. From the raw score, a mental age, intelligence quotient and percentile rating were derived using the normative data in the test manual.

The NSST was scored in two parts. A separate score was obtained for each part, receptive and expressive. Using the normative data at the fiftieth percentile level, each subject's score was tabulated according to his chronological age, the PPVT mental age and the Stanford-Binet mental age.



CHAPTER IV  
RESULTS AND CONCLUSIONS

Results

Data on 29 educable mentally retarded children were obtained in order to investigate vocabulary and syntax development. Results of full-scale intelligence tests on each subject were obtained from school records. The Peabody Picture Vocabulary Test (PPVT) and the Northwestern Syntax Screening Test (NSST) were administered to each subject and scored according to standard procedure. These scores were tabled along with the normal standard scores on both tests for the mental age and chronological age of each subject. (See Appendix, Table 5, p. 42.) Thus, nine scores, observed or derived, were obtained for each subject.

Receptive Vocabulary of the Subjects

Three of the nine scores obtained for each subject had to do with receptive vocabulary: the observed PPVT score (V-1), the normal standard score of PPVT for the subject's chronological age (V-2), and the normal standard score of PPVT for the subject's mental age (V-3). The means, variances, standard deviations and regression coefficients for each group of scores are presented in Table 1.

Table 2. Mean, variance, standard deviation and regression coefficients of variables 1, 2, 3

Variable	Mean	Variance	Standard Deviation	Regression Coefficient
V-1	48.0690	49.2808	7.0200	5.5392
V-2	61.3621	13.3553	3.6545	5.0948
V-3	44.6071	30.5251	5.5250	4.9460

The regression coefficient for each variable represents the slope of a "best fitting" straight line drawn to represent the observed or derived score by age. For example, an increase in receptive vocabulary is expected as a function of age, assuming that all other variables affecting vocabulary are constant. But the rate at which the vocabulary increases is of interest here. The regression coefficient reflects the rate of change by age.

To determine the significance of the difference between the mentally retarded subjects and normals, three comparisons in the rate of change of vocabulary growth were made: (1) the receptive vocabulary of mentally retarded subjects with normal children of a comparable chronological age; (2) the receptive vocabulary of mentally retarded subjects with normal children of a comparable mental age; and (3) the mentally retarded child's receptive vocabulary at chronological age with his receptive vocabulary at mental age.

The statistic  $\underline{t}$  for each comparison was computed according to the following formula, where  $b_1$  and  $b_2$  represent the regression coefficients,  $S_{x \cdot y \cdot p}$  represents the variability about the lines of regression, and where  $S_{x_1}$  and  $S_{x_2}$  represent the variance of ages for normals and the variance of ages for the mentally retarded respectively:

$$\underline{t} = \frac{b_1 - b_2}{S_{x \cdot y \cdot p} \sqrt{(n_1 - 1)S_{x_1}^2 + (n_2 - 1)S_{x_2}^2}}$$

The differences between the regression coefficients of V-1 and V-2 ( $\underline{t} = .042138$ ), V-1 and V-3 ( $\underline{t} = .067256$ ), and V-2 and V-3 ( $\underline{t} = .05737$ ) were not significant.<sup>1</sup>

The observed PPVT scores of the retarded subjects as well as the PPVT scores at the mentally retarded subjects' mental age were consistently below the normal scores for their expected chronological ages. However, one might expect the PPVT scores for the subjects to be essentially the same as a non-retarded child of comparable mental age. Observation of the data reveals that though the scores more closely approximate each other, only four subjects have the identical scores when compared with a normal counterpart of the same mental age.

<sup>1</sup>p.05 = 1.65

Receptive Syntax of the Subjects

The possibility that mentally retarded children could differ considerably on syntax development was considered. Learning syntax is complicated and requires many grammatical rules. Understanding syntax (receptive syntax) requires that one understand what is being said without necessarily being able to repeat what is said. This differs from receptive vocabulary in that the child must understand certain morphological and syntactical changes that determine sentence meaning.

Part of the NSST tests receptive syntax. Three scores on this part of the test were recorded: the observed score (V-4), the normal standard score of the NSST for the subject's chronological age (V-5), and the normal standard score for the subject's mental age (V-6). Table 2 shows the means variances, standard deviations and regression coefficients for each group of scores.

Table 3. Mean, variance, standard deviation and regression coefficients of variables 4, 5, 6.

Variable	Mean	Variance	Standard Deviation	Regression Coefficient
V-4	25.3448	13.3768	3.6574	0.7710
V-5	36.1690	4.5779	2.1396	2.7905
V-6	26.6034	5.2625	2.2940	1.9118

The following three comparisons revealed no significant difference<sup>2</sup> between normals and mental retardates in the rate of development of receptive syntax development.

- (1) The scores of the mentally retarded subjects (V-4) compared with the scores (derived) of normals of a comparable chronological age (V-5) yielded a  $\underline{t} = .759039$ .
- (2) The scores of the mentally retarded subjects (V-4) compared with the scores (derived) of normals of a comparable mental age (V-6) yielded a  $\underline{t} = .355649$ .
- (3) The scores of the mentally retarded subjects at their mental ages (V-5) compared with the scores at their chronological ages (V-6) yielded a  $\underline{t} = 1.116649$ .

The observed scores on the receptive portion of the NSST and the receptive NSST scores at the mentally retarded subject's mental age were below the normal standard scores for their expected chronological ages. This was to be expected of the mentally retarded subjects. When comparing the observed NSST score with the derived score for the retarded subject's mental age, the scores more closely approximated each other as would be expected. This suggests that though the scores are different the rate of receptive syntax development with the mentally retarded is the same

<sup>2</sup>p.05 = 1.65

as normals. The mentally retarded children seem to develop an understanding of normal syntactical development at the same rate, but they begin at a later age.

#### Expressive Syntax of the Subjects

Understanding syntax and being able to use syntactical expression are two different, though related, tasks. Absence of syntactical expression does not necessarily indicate lack of understanding, and correct syntactical expression is not necessarily indicative of understanding. It is generally thought, however, that expressive syntax is more complicated and in the normal course of development, expressive syntax follows receptive syntax.

Three comparisons, similar to the ones described earlier, were made in order to determine the significance of the difference in expressive syntax development between normals and mental retardates. Comparisons were made between the mentally retarded child's rate of change in expressive syntax development (V-7) and the rate of change in normal's expressive syntax development by chronological age (V-8); the rate of change in the expressive syntax development of the mentally retarded (V-7) and the rate of change in normal's expressive syntax development by mental age (V-9); and the rate of change of the mentally retarded child's expressive syntax development at chronological age (V-8) and his expressive syntax development at mental age



(V-9). The means, variances, standard deviations and regression coefficients for each group of scores are presented in Table 4.

Table 4. Mean, variance, standard deviation and regression coefficients of variables 7, 8, 9.

Variable	Mean	Variance	Standard Deviation	Regression Coefficient
V-7	19.8214	77.3373	8.7942	5.1985
V-8	35.4724	4.0479	2.0119	2.6339
V-9	23.3536	15.1744	3.8954	2.4705

Computation of the  $t$  statistic indicated no significant differences between the regression coefficients for V-7 and V-8 ( $t = .207050$ ), V-7 and V-9 ( $t = .185476$ ), or V-8 and V-9 ( $t = .092571$ ).

As indicated by the above analysis, mentally retarded children do indeed learn expressive syntax at the same developmental rate as do normal children of like mental ages and chronological ages. The mentally retarded children's NSST (expressive) scores were substantially below the expressive scores at their chronological age, but the rate at which these children learn expressive syntax remained unchanged. Most of these scores were also lower in expressive syntax than they should have been as indicated by comparing these scores with the normal standard scores of comparable mental ages. Observation of the tabled scores

shows that there is a slightly greater difference in the retardate's observed expressive NSST scores when compared with the normal standard scores by mental ages than the difference in the observed receptive NSST scores by mental age. The difference in expressive and receptive scores by mental age tended to increase as the chronological ages decreased. This seems to indicate particularly in the case of the younger retarded children, that expressive syntax is more difficult to learn.

One additional comparison was made between receptive vocabulary (V-1) and receptive syntax (V-4). A comparison of this nature was thought to be useful in order to determine the significance of differences in the rate at which receptive vocabulary and receptive syntax are learned. Analysis indicated no significant difference in the rate at which mentally retarded individuals learn receptive vocabulary and receptive syntax ( $t = .52345$ ). The regression lines are shown in Figure 1.

#### Conclusion

Of interest is the finding that the rate of development of receptive syntax is somewhat slower than the rate of change in the development of receptive vocabulary, although the difference is not significant. The often observed progression in learning from simple to complex, single to multiple, and concrete to abstract appears to be once again demonstrated.



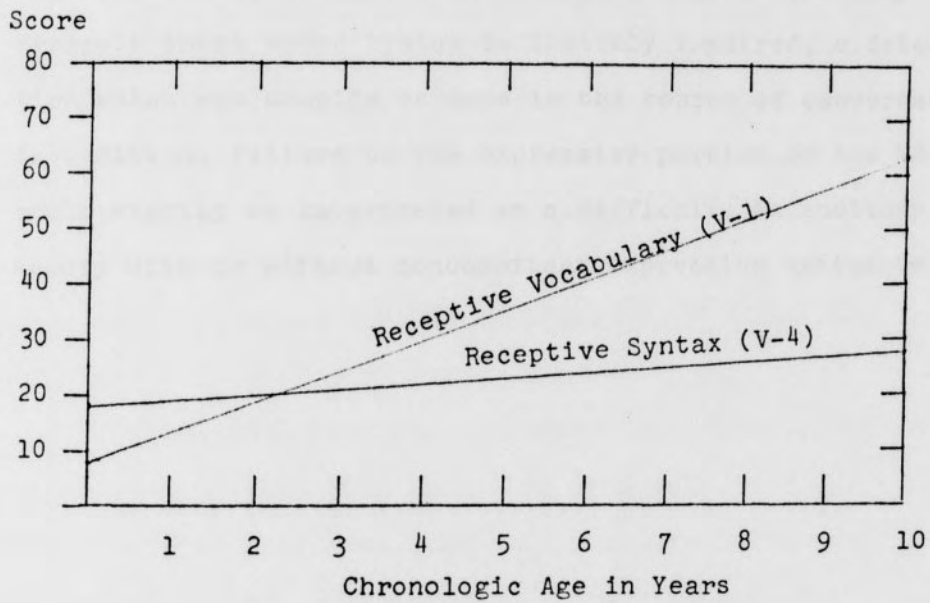


Figure 1. Regression lines of variables 1 and 4

Several observations regarding the tests used in this study may be clinically useful. The Northwestern Syntax Screening Test is proposed as a screening test, but even as that, it is quite long. Moreover, in spite of its length, its sensitivity is less than desirable. It serves only to separate those whose syntax is severely impaired, a determination which can usually be made in the course of conversation. In addition, failure on the expressive portion of the NSST could rightly be interpreted as a difficulty in auditory memory with or without concomitant expressive syntax delay.

## CHAPTER V

## SUMMARY

The development of language in children has been of interest to persons in fields where language learning plays an important part. Many studies have centered around the nature and development of the elements and structure of language in normal and mentally retarded children. Language is frequently used in mentally retarded to determine the nature and degree of intellectual deficit. It is also an important tool used for instructional purposes.

The Peabody Picture Vocabulary Test (Dunn, 1959) has been used frequently to assess language development in normals and mentally retarded individuals. The recent development of the Northwestern Syntax Screening Test (Lee, 1969) provides a screening test to detect errors in both receptive and expressive syntax. The development of these language aspects relative to mental age and chronological age may have particular importance with reference to the abilities of the mentally retarded to use variously complex units as instructional tools.

The purpose of this study was to determine the relationships of receptive vocabulary and syntax to age. Twenty-nine educable mentally retarded children between the

ages of five and eight years were selected for study. Each child was given the Peabody Picture Vocabulary Test and the Northwestern Syntax Screening Test. These tests were scored according to standard procedures. Additional scores were derived for each subject at his chronological age and mental age based on normative data, yielding nine variables for statistical analyses. The resulting data were tabulated and analyzed statistically. The analyses yielded the following results:

1. There was no significant difference in the rate at which mental retardates learn receptive vocabulary and receptive syntax.
2. There was no significant difference in the rate at which mentally retarded children and normal children learn receptive vocabulary, receptive syntax and expressive syntax when compared by mental age and chronological age.

Certain considerations regarding the clinical use of the tests and the interpretation of results were discussed.



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Table 2. Observed and derived scores for 17 subjects initially entered children on the Reading Test, Vocabulary Test, and the Northwestern Syntax Repeating Test.

Subject No.	V-1	V-2	V-3	V-4	V-5	V-6	V-7	V-8	V-9
1	53	53.5	4.0	25	38.2	25.7	14	36.7	23.4
2	55	55.5	52.5	29	28.2	27.7	26	36.7	23.4
3	48	55.5	53.5	25	38.2	27.7	22	36.7	23.4
4	52	55.5	52	24	38.2	27.7	31	36.7	23.4
5	51	55.5	45.5	21	38.2	27.7	14	36.7	23.4
6	58	55.5	47	24	38.2	26.1	17	36.7	26.3
7	45	61.5	47	22	38.2	26.3	25	36.7	24.1
8	50	53.5	58	26	38.2	27.2	28	36.7	25.4
9	52	61.5	48	27	38.2	27.7	25	36.7	21.8
10	42	61.5	45.5	24	38.2	27.2	34	36.7	25.4
11	55	62	43	30	38.2	26.3	30	36.7	24.3
12	51	63	46	27	38.2	26.3	30	36.7	21.3
13	54	68	47	29	38.2	26.3	18	36.7	26.3
14	53	67	43.5	26	38.2	26.3	25	36.7	32.9
15	55	62	52	31	38.2	27.7	17	36.7	25.8
16	42	62	49.5	28	38.2	27.7	14	36.7	23.4

## APPENDIX

Table 5. Observed and derived scores for 29 educable mentally retarded children on the Peabody Picture Vocabulary Test and the Northwestern Syntax Screening Test

Subject	MA	V-1	V-2	V-3	V-4	V-5	V-6	V-7	V-8	V-9
1	4.0	50	65.5	4.2	28	38.2	27.7	14	36.7	23.4
2	5.6	56	65.5	52.5	29	38.2	27.7	26	36.7	23.4
3	5.3	48	65.5	51.5	23	38.2	27.7	22	36.7	23.4
4	5.5	53	65.5	52	24	38.2	27.7	33	36.7	23.4
5	4.1	51	65.5	43	21	38.2	27.7	14	36.7	23.4
6	4.1	59	64.5	43	24	38.2	26.3	17	36.7	24.3
7	4.8	45	64.5	47	22	38.2	26.3	25	36.7	24.3
8	5.1	50	63.5	50	28	38.2	27.7	29	36.7	23.4
9	4.0	52	63.5	42	29	38.2	27.7	25	36.7	23.4
10	4.6	42	63.5	45.5	24	38.2	27.7	36	36.7	23.4
11	3.11	56	63	41	30	38.2	26.3	30	36.7	24.3
12	4.7	51	63	46	27	38.2	26.3	28	36.7	24.3
13	4.1	54	63	43	29	38.2	26.3	18	36.7	24.3
14	5.8	53	63	53.5	26	35.6	32.4	25	36.9	30.9
15	4.8	53	62	47	32	35.6	27.7	17	36.9	23.4
16	5.0	47	62	49.5	28	35.6	27.7	14	36.9	23.4

Table 5 (continued)

Subject	MA	V-1	V-2	V-3	V-4	V-5	V-6	V-7	V-8	V-9
17	5.2	51	62	51	24	35.6	29.4	15	36.9	29.8
18	4.0	53	61.5	42	26	35.6	26.3	24	36.9	24.3
19	4.6	30	61	45.5	18	35.6	27.7	5	36.9	23.4
20	4.1	61	60	43	27	35.0	26.3	7	34.2	24.3
21	4.3	48	60	44	32	35.0	26.3	32	34.2	24.3
22	5.1	42	59	50	24	35.0	29.4	16	34.2	29.8
23	4.0	40	58.5	42	21	35.0	26.3	10	34.2	24.3
*24	3.10	42	58	40	25	35.0	22.1		34.2	
25	3.8	40	58	38	18	35.0	22.1	11	34.2	20.0
26	3.4	44	58	34	26	31.8	22.8	29	31.6	12.4
27	3.8	38	55.5	38	27	21.8	22.1	14	31.6	20.0
28	3.2	38	52.5	31	23	32.4	22.8	4	30.9	12.4
29	4.0	44	52.5	42	26	32.4	26.3	15	30.9	24.3

\*Subject would not perform expressive tasks.



## Key for Table 5

- V-1 = PPVT Raw Score
- V-2 = PPVT at subject's chronological age
- V-3 = PPVT at subject's mental age
- V-4 = NSST (receptive) Raw Score
- V-5 = NSST (receptive) at subject's chronological age
- V-6 = NSST (receptive) at subject's mental age
- V-7 = NSST (expressive) Raw Score
- V-8 = NSST (expressive) at subject's chronological age
- V-9 = NSST (expressive) at subject's mental age