A STUDY OF THE EFFECT OF HETEROGENEOUS GROUPING AS OPPOSED TO HOMOGENEOUS GROUPING FOR LANGUAGE DEVELOPMENT OF SEVERELY RETARDED STUDENTS

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THESIS

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

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Denton, Texas
August, 1968

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CHAPTER I

Language development is a vital part of an individual's intellectual functioning. Studies (8, 12, 17, 19, 22) indicate that a person's verbal ability is an excellent indicator of his intelligence. While this evidence exists, relatively little research has been done in the field of language development. Newland concluded:

> Not having previously concerned myself intensively with this area of behavior, I had anticipated being able to summarize, and perhaps suggest a helpful integration of a sizeable body of directly relevant research. This, however, is not possible because I was unable to locate a sufficient amount of what I regarded as relevant to my intent (25, p. 73).

After reviewing the existing research in the field, it was concluded that the majority of the studies were concerned with the normal population. Newland also reported that "studies of language development in children have characteristically, been normative in nature" (25, p. 75). Other studies (14, 24, 30, 9) have been concerned with gifted students. While research has been done with normals, gifted, and mild retardates, no research could be found dealing with language development in severely retarded students.

Statement of the Problem

The purpose of the present study was to investigate the effect of heterogeneous grouping and homogeneous grouping in the language development of severely retarded students. A further purpose was to determine how beneficial either of the grouping procedures would be for this level student.

Related Literature

Since the days of Pavlov and Thorndike, psychologists have been interested in learning and have expended a great deal of effort doing basic research in this area. Until recent years there has been a definite lack of interest in the basic learning of the mentally retarded individual. Cantor stated that "this paucity is surprising, since basic learning research involving other classes of subjects has been the preoccupation of large numbers of psychologists" (4, p. 175). Others with an interest in basic learning skills of the retarded have been unsuccessful in coming up with substantial research. McPherson (20) surveyed the literature on learning in retardates and could locate only fourteen experimental papers of relevance to the topic. Even though a decade later McPherson was able to identify only fourteen additional studies, she concluded that "there is an upsurge in the research" (21, p. 876).

McCarthy stated the need for understanding in language development because of its importance in communication:

> The amazingly rapid acquisition of an extremely complex system of symbolic habits by young children is a phenomenon which has increasingly attracted the attention of child psychologists as well as linguists in recent years. This area of child development is one of the most important for the child psychologist, not only because the possession of the ability to speak is one of the distinguishing characteristics which sets man apart from the lower animals, but also because of the intimate relationship which exists between language and thought (19, p. 492).

The increased interest in language development, since the 1930's, appears to be due to the realization of the valuable insights which can be gained into the content of the child's mental life through the study of his linguistic expression. Harrison reported a number of significant investigations of speech and language. However, there has been little research with mentally retarded children on:

1. The effect of perceptual dysfunction on speech and language development.
2. Development of abstract and conceptual thinking.
3. Scales for diagnosis and for evaluation of growth in speech and language.
4. Analysis of speech and language performances as part of the differential diagnostic process.
5. Methods and techniques of value in the developmental language and therapeutic speech programs.
6. Language and speech development during the pre-school period (12, pp. 238-239).

Developing language ability requires emphasis on several factors. It is essential to have an ever-increasing speaking vocabulary, plus growth in concepts and meanings

of words. A third essential is that the child have the ability to express himself in adequate sentences. Kirk and Johnson listed several activities used for language development.

1. Encourage free expression related to their immediate experiences, such as their home, weather, health, individual activities, and so forth.
2. Another procedure for language development is the following. Have the child carry out instructions in any activity, and then encourage the child to tell about it.
3. Books and pictures serve a useful purpose in developing language and language concepts. With the use of pictures, the teacher can aid the children in increasing their sentence length and vocabulary (17, pp. 163-165).

While language development depends upon several factors, such as those listed above, there are still additional factors. Willey and Waite (35) added the factors of maturation of the organism and the familiarity with one's environment. Language itself begins with vocalization, cooing, vocalization of discomfort, pleasure, eagerness, satisfaction, and recognition. Further development in childhood is detected in response to another person's voice, in vocal response to another person, in imitation of sounds, and imitation of syllables. More advanced forms of simple language were detected in "the child's ability to name objects, recognize pictures, use simple sentences, and use pronouns past and plural" (35, p. 41).

This shift of interest in the study of language development is further supported by Mueller and Weaver (22), who stated that the study of language development of mental retardates has definitely changed in recent years. The former concern was with an approach based upon speech defined as "the uttering of articulate sounds in order to communicate" (22, p. 799). For years the bulk of language research dealt with that area of language development described above. However, the former approach seems to be giving way to an interest in focusing upon language defined as "the understanding and use of symbols, that is, the recognition of pictures, comprehension, and use of words, conceptual thinking, and communication" (22, p. 781). The development of the intellect appears to be related so closely to the development of speech and language that these constitute the main channels by which attempts are made to assess the state of mental functioning.

The beginning of the grouping movement began in the late nineteenth century (15). At that time it was recognized that there were large numbers of children in school who could benefit little from the program of the regular classroom and required something distinct and apart from the traditional educational experiences provided for normal children. Studies dealing with gifted children (14, 24, 30, 9) concluded that they performed academically much better when grouped homogeneously.

A study involving normals in a comparison of sociometric patterns showed that grouping had no apparent effect on the structure of the groups. In other words, "the dull tend to select the dull, and the bright tend to select the bright as friends" (7, p. 510). Another educator advocated that special classes should be homogeneous as far as possible. Johnson observed that "children are ordinarily placed in primary, elementary, or secondary classes on the basis of their intellectual, social, emotional, educational, and physical levels of maturity... (15, p. 204). The group experiences in this type of situation would be more alike and geared to that particular level of development.

Until recently, only a few psychologists challenged the traditional approach to grouping students for learning tasks. Among these earlier critics, Bennett (1) in 1932 reported that retarded children in homogeneous classes did poorly in physical, personality, and academic areas when compared with the retarded children in heterogeneous classes. Pertsch's study (26) presented the same results in 1936. And more recently, Quay (27) reported that not a single study had demonstrated that special-class (homogeneous) placement is more effective than regular-class (heterogeneous) placement when the criterion of effectiveness is achieved. A great deal has been said and written concerning the segregation of children in

special classes. Many educators have expressed the conviction "that children with widely deviating abilities can be taught more effectively, in terms of their total growth and development, in a regular classroom than in a special class" (15, p. 208). Cassidy and Stanton (5) compared a group of special-class retardates from sixteen different systems with a group of regular-class retardates from twenty school systems which had no special classes. They administered a number of tests, with the crucial difference, significant at the .01 level of confidence, occurring on the Stanford Achievement Test, and favored the regular-class group.

Other studies (33, 2, 23) offer supporting evidence that heterogeneous grouping for learning tasks of retarded children is to be preferred over homogeneous grouping. The most representative study was by Mullen and Itkin (23), dealing with achievement and adjustment of educable mentally handicapped children in homogeneous and heterogeneous classes. They showed that academic progress was greater in the heterogeneous group, and that behavior problems decreased significantly. Studies involving grouping in language development (16, 31) bear evidence that mildly retarded children show greater progress and achievement in a heterogeneous grouping rather than a homogeneous grouping.

In addition to investigations concerning the efficacy of various grouping arrangements for retarded children, various techniques for bringing about desired modification of behavior have been proposed. Among these, operant conditioning techniques as introduced by B. F. Skinner (13) have gained wide attention and use as a tool for language development. Representative studies such as those conducted by Greenspoon (10), Krasner (18), and Salzinger (29) have indicated that operant techniques effectively facilitate learning tasks such as language development.

Hypotheses

Based on the assumption that heterogeneous grouping is more beneficial to retarded children for learning tasks, such as language development, the following hypotheses were investigated.

Hypothesis 1. Students on three levels of severe retardation (high, medium, and low) will show more achievement in language development in heterogeneous groupings than students in homogeneous groupings.

Hypothesis 2. Due to their association with the high level students, the low level students will show the greatest achievement in the heterogeneous grouping, while the high level students will rise slightly, and the middle level students will remain the same, as if grouped homogeneously.

Description of Measuring Instrument

The first serious attempt to devise a vocabulary test for young children was made by M. E. Smith in 1926 (19). In this test 203 words were selected by a systematic sampling of the Thorndike (1921) 10,000-word list, which has been checked against the vocabularies of a large number of children in order to eliminate words which these young children were almost certain not to know. Most of the words were elicited from the child by means of pictures, although no standard pictures were provided.

The fact that picture identification is a measure of one's language development can be seen in the works of Williams and McFarland (19), who revised Smith's vocabulary test and called it the Smith-Williams Vocabulary Test. In 1929, Van Alstyne (19) devised a picture vocabulary test, taking a total of fifteen minutes to administer. Ammons (19), basing his work on Van Alstyne's technique, developed in 1950 a series of studies presenting the standardization of a full-range picture vocabulary.

A big problem in measuring progress or intelligence in severely retarded students has been the lack of an adequate tool. One promising approach to the problem has been the "picture vocabulary test" technique. Research has shown that vocabulary is one of the best single indicators of general intellectual ability (32, 34). For children with severe handicapping conditions, including those with

marked mental handicaps, the picture vocabulary test seems to be an exceptionally useful tool since it "reduces the likelihood that test results will be restricted by neuromuscular interference with verbal output" (8, p. 448).

The Peabody Picture Vocabulary Test (PPVT) was constructed to maximize the probability of measuring adequately children's comprehension of the spoken word as well as their ability to associate a verbal symbol with its pictorial representation. The PPVT consists of 150 plates, each composed of 4 pictures arranged in ascending order of difficulty with mental ages from 1-9 through 18-0 years. To administer the test, the examiner provides orally a stimulus word, i.e., "Show me a bat." The subject then points to, or otherwise indicates, the picture that best illustrates "bat". Thus no child is penalized for inability to produce intelligible speech. The subject is tested from a basal of 8 consecutive correct responses up to a ceiling of 6 errors in 8 consecutive responses. Age, standard score, and percentile norms are provided, based on a standardizing population of 4,012 children ranging across the full range of intellect.

Studies (8, 11, 3, 28) suggest the feasibility of using the PPVT with mentally retarded children with emphasis placed on the advantages for using it with low level retardates.

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CHAPTER II

METHOD

Description of Subjects

The subjects for this study consisted of thirty-six severely retarded boys in Dormitory 25A at Denton State School, Denton, Texas. They were involved in a training program utilizing operant conditioning methods as introduced by B. F. Skinner (2). The training program served a two-fold purpose; behavior control, and simple academic training.

The subjects ranged in age from eight years to seventeen years. Each student was officially classified as "severely retarded" on the basis of psychometric scores and adaptive behavior. Since the training program had been in progress for eighteen months, the students were accustomed to this procedure. While it might be argued that this procedure could be considered a variable, it will be noted that in this case the variable was constant throughout the experiment. The reward system was standardized and each subject received equal opportunity during each language session. No changes were necessary in the

dormitory program since the students were accustomed to classes each day at the time of the experiment, with the trainer using operant conditioning techniques.

Procedure For Collecting Data

At the beginning of the experiment each student was administered the Peabody Picture Vocabulary Test, Form A, (PPVT). The results of this administration were used as a constant throughout the experiment. On the basis of the first administration the students were divided into three homogeneous groups. One group, consisting of twelve students, were those scoring high on the PPVT. The second group consisted of twelve students scoring in the middle range of the PPVT, while the third group consisted of twelve students who scored lowest on the PPVT.

The language development sessions were held for one hour daily. The students, grouped homogeneously, were given popular magazines during this time. They were reinforced for each picture they identified correctly, or for asking what a picture was and then repeating the name of it correctly. The reinforcement consisted of an M&M candy, vanilla wafer, or cereal. Volunteers were used, as well as regular dormitory trainers, for the duration of the experiment. No one volunteer or trainer was with the same group of students two days in succession. They were rotated to avoid any one group having the "best" volunteer or trainer working with them all the time. This step was

taken to insure fairness for all students throughout the experiment. This procedure was followed for thirty days, at which time all of the students were retested, using the PPVT, Form A.

Again, on the basis of the original administration of the PPVT, the students were regrouped. One-third of group I consisted of high level scorers; one-third middle level scorers; and one-third low level scorers. The same procedure was followed for groups II and III, producing a heterogeneous grouping. The same procedure of language development, as described for the homogeneous grouping, was employed for another period of thirty days. At the end of thirty days the students were retested, using the PPVT, Form A.

Procedure for Analyzing Data

After all students were tested, *t*-tests of correlated means were employed three different ways. First, a *t*-test was used for comparing the means of the original groups with the means of the homogeneous groups. Second, a *t*-test was used for comparing the means of the original groups with the means of the heterogeneous group. Finally, a *t*-test was used to compare the means of the homogeneous groups to the means of the heterogeneous groups. The levels of significance were determined, and .05 was accepted as being the critical level of significance.

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CHAPTER III

Statistical Analysis of the Results

The procedures in the experiment were standardized as much as possible to avoid unnecessary variables. The tests were administered and scored by the same examiner according to the directions by Dunn (1). The first administration of the test was scored, but the retests were not scored until all subjects were tested. The volunteers and dormitory trainers were not told about the grouping or results until after the experiment was completed, to avoid a possible bias.

The variables, as stated in the hypotheses were tested with a t-test of correlated means, and levels of significance were determined (2).

Differences Between Groups on PPVT Data

Each subject was administered Form A, Peabody Picture Vocabulary Test, three different times. The raw scores for the three tests appear in the Appendix.

The data for the original test as compared to the homogeneous test group appears in Table I, with levels of significance.

The subjects were assigned to a group (I, II, or III) depending on the raw score of the first administration of the PPVT. Twelve subjects were assigned to each group, with group I consisting of high scorers; group II the middle scorers; and group III the low scorers. For purposes of comparison they remained members of this group throughout the experiment.

TABLE I

LEVELS OF SIGNIFICANCE OF THE DIFFERENCE BETWEEN MEANS OF ORIGINAL TEST GROUPS AS COMPARED TO HOMOGENEOUS GROUPS

Group	Test I (Original Test)			Test II (Homogeneous)		Mean Diff. (I-II)	t test
	N.	M.	S.D.	M.	S.D.		
I	12	42.66	10.38	50.66	6.84	-8.00	-3.45**
II	12	19.66	2.77	24.91	10.15	-5.25	-1.86
III	12	11.91	2.92	14.83	1.90	-2.91	-2.57*

*p = .05.
**p = .01.

The means of the homogeneous tests were significantly higher for groups I and III. The t-test for group I was significant at the .01 level of confidence. The t-test for group III was significant at the .05 level of confidence.

The negative relationship in the analysis is due to the nature of the comparison. The hypothesis called for a

comparison of test I with test II. Therefore, since the scores on test II were greater, a negative mean difference was derived, showing that improvement was achieved on the second test.

The results of the original groups and the heterogeneous groups and their statistical treatment are shown in Table II.

TABLE II

LEVELS OF SIGNIFICANCE OF THE DIFFERENCE BETWEEN MEANS OF ORIGINAL TEST GROUPS AS COMPARED TO HETEROGENEOUS GROUPS

Group	Test I (Original Test)			Test III (Heterogeneous)		Mean Diff. (I-III)	t test
	N.	M.	S.D.	M.	S.D.		
I	12	42.66	10.38	50.91	7.58	-8.25	-3.92**
II	12	19.66	2.77	27.83	8.93	-8.16	-3.09**
III	12	11.91	2.92	19.91	6.15	-8.00	-4.35***

**p = .01
***p = .001

The greatest increase in the raw scores of the subjects can be seen in the heterogeneous grouping. The mean difference for all three groups was eight points or over. The t-test for groups I and II were significant at the .01 level of confidence, while the t-test for group III was significant at the .001 level of confidence.

The data for test II and test III is shown in Table III, with the levels of significance of the difference between the means.

TABLE III

LEVELS OF SIGNIFICANCE OF THE DIFFERENCE BETWEEN MEANS OF THE HOMOGENEOUS GROUPS AS COMPARED TO THE HETEROGENEOUS GROUPS

Group	Test II (Homogeneous)			Test III (Heterogeneous)		Mean Diff. (II-III)	t test
	N.	M.	S.D.	M.	S.D.		
I	12	50.66	6.84	50.91	7.58	- .25	- .16
II	12	24.91	10.15	27.83	8.93	-2.91	-1.58
III	12	14.83	1.90	19.91	6.15	-5.08	-2.22*

*p = .05

The significant rise in performance for test III as compared to test II was in group III. These were the students who scored lowest on the original test, and infers that they showed the greatest improvement. The inference is supported by a t-test of -2.22, significant at the .05 level of confidence.

While groups I and II showed definite signs of increased improvement, it was not significant at the .05 level of confidence.

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CHAPTER IV

Discussion of the Results

This study has demonstrated that severely retarded students benefit significantly from a program of language development. As noted in Table I, groups I and III (high and low level groups) improved significantly while in the homogeneous groupings. However, group II (middle level group) did not increase significantly.

In reviewing Table II, it was observed that all three groups showed highly significant gain while grouped heterogeneously, with groups I and II significant at the .01 level of confidence, and group III significant at the .001 level of confidence. This substantiates the hypothesis that the low level students would show more achievement in the heterogeneous grouping.

These findings are in keeping with studies by Thurstone (2) and Cassidy and Stanton (1), who found that low level educable students showed more achievement when grouped heterogeneously. Cassidy and Stanton (1) found that retardates of different intellectual levels showed more achievement in heterogeneous classes than students in homogeneous classes

in the highest and lowest IQ groups, but they found no difference between homogeneously grouped and heterogeneously grouped subjects in the middle (IQ sixty to sixty-nine) group.

A further study was conducted, as presented in Table III, which compared the increase of raw scores of the heterogeneous groups to the raw scores of the homogeneous groups. While all three groups showed an increase in the raw scores, only group III showed a significant increase, determined at the .05 level of confidence. These findings further substantiate the hypothesis that the low level students would show the greatest achievement in the heterogeneous grouping.

The part of the hypothesis concerning group I rising slightly has been substantiated. Group I rose slightly because they were probably already performing at their peak level of performance. However, group II rose slightly, which was not expected. This suggests that all students benefited from the heterogeneous grouping.

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CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this investigation was to determine the effect of heterogeneous grouping of severely retarded students for language development as opposed to homogeneous grouping for the same task.

The first assumption formulated for investigation included the assumption that severely retarded students, divided into three levels (high, middle, and low) on the basis of raw scores obtained on the first administration of the PPVT, would show greater achievement in a heterogeneous grouping than in a homogeneous grouping. The second hypothesis suggested that low level students would achieve significantly more in the heterogeneous grouping, while the high level students would rise slightly, and the middle level students would remain the same, as if grouped homogeneously.

Thirty-six severely retarded boys in Dormitory 25A at Denton State School, Denton, Texas, were selected for this study. They were all involved in a training program utilizing operant conditioning techniques. A program of language

development was set up on the dormitory, with the students divided into groups. The students were rewarded (M&M candy, or cereal) when correctly identifying a picture, or seeking to know what the picture was, and then repeating the name of the picture.

Each student was examined three times, each time with the Peabody Picture Vocabulary Test, Form A. The tests were administered and scored by the same examiner each time. The first examination was used as a control throughout the experiment. On the basis of the raw scores obtained on the first administration, the students were divided into homogeneous groups and heterogeneous groups, and classified as either high, middle, or low.

Conclusions

The hypotheses of this study were supported. As was expected, the heterogeneous grouping showed a greater rise in the scores than the homogeneous grouping. Based on other research, it was not expected that the middle group would show significant improvement in the heterogeneous grouping. In the actual experiment the middle group did show slight improvement, but the change was not significant at the .05 level of confidence.

As was expected, group I (high level) and group III (low level) increased significantly in the heterogeneous grouping, as compared to their original performance. However, neither group I or group II, when grouped heterogeneously,

showed a significant rise in raw score over the homogeneous grouping. This was expected, and probably accounted for, because the high level students were already performing at their peak.

Group III showed the greatest increase, significant at the .05 level of confidence, while grouped heterogeneously. This significant rise was for the heterogeneous grouping as opposed to the homogeneous grouping. It is assumed that their association with the high level students and the frequency with which they heard correct responses aided them in making correct responses, which in turn permitted more rewards and more lasting impressions.

It may be concluded that all levels of severely retarded students benefit from a program of language development. While it might not be practical to group students heterogeneously for dormitory living, it appears to be beneficial for learning tasks such as language development.

Recommendations

Further studies are needed to support the findings of this investigation. Since significant improvement was shown in a period of thirty days, it would be interesting to find out if that trend would continue over a period of months or even a year, or if the students reach a peak and then taper off in performance.

On the basis of the present study alone, it would not be possible to recommend that retarded students be grouped

heterogeneously for all phases of their living program in dormitories. However, while it appears beneficial to group them heterogeneously by dormitories for learning tasks, further studies are needed to evaluate changes in behavior and group attitudes.

APPENDIX A

THE RAW SCORES OF THREE ADMINISTRATIONS OF THE PEABODY PICTURE VOCABULARY TEST, FORM A

Subjects	Group	Original Test	Homogeneous Grouping	Heterogeneous Grouping
		Test I	Test II	Test III
1	I	41	55	60
2	I	46	49	50
3	I	31	37	39
4	I	38	51	51
5	I	47	49	51
6	I	28	47	52
7	I	25	44	34
8	I	50	63	54
9	I	55	50	56
10	I	55	62	61
11	I	39	48	47
12	I	57	53	56
13	II	22	24	34
14	II	16	16	25
15	II	18	29	24
16	II	22	21	21
17	II	16	15	21
18	II	25	47	43
19	II	21	24	21
20	II	17	43	46
21	II	21	29	27
22	II	22	18	20
23	II	19	18	34
24	II	16	18	12
25	III	11	16	28
26	III	12	17	16
27	III	14	12	29

APPENDIX A--Continued

Subjects	Group	Original Test Test I	Homogeneous Grouping Test II	Heterogeneous Grouping Test III
28	III	13	16	15
29	III	11	15	18
30	III	14	12	22
31	III	13	13	28
32	III	15	14	20
33	III	12	14	26
34	III	7	17	13
35	III	12	15	14
36	III	5	14	16

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