THE EFFECTS OF TASK DIFFICULTY AND MAGNITUDE OF REINFORCEMENT UPON THE LEVEL OF ASPIRATION OF NORMAL AND MENTALLY RETARDED MALE STUDENTS

By

Basil G. Johnson, Jr.

Bachelor of Arts
University of Oklahoma
Norman, Oklahoma
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Master of Arts
Tulsa University
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Thesis Approved:

W P Ewens
Thesis Adviser

Idella Lahmann

J Johnson Gilbert

Dean of the Graduate School

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CHAPTER I

THE PROBLEM

Introduction

The Level of Aspiration (LA) technique is perhaps the most widely used of all the "work-sample" tests. Although differing among themselves, experiments concerned with LA have in common the following procedures:

1. The subject (S) is given experience with some task.
2. He is asked to make an expectancy statement regarding how he will subsequently perform on the task.
3. He is given additional trials with the task.
4. He is requested to make another expectancy statement concerning future performance on the task.

This procedure may be repeated several times, allowing the examiner to objectively investigate the effects of success and/or failure on the explicitly verbalized goals of an S in a situation where success and failure are defined in terms of attaining or not attaining previously stated goals. Lewin (1944) who obtained the LA method from Hoppe (1930), published the first theoretical article in this area. He suggested that the verbal estimates obtained from S may be

subsumed under three general factors:

1. S's attempting to be as realistic as possible
2. S's attempting to do as well as he can
3. S's attempting to avoid failure experiences

Frank (1937, 1935 a & b) was the first to quantify LA data in a meaningful manner. He introduced the D-score, a discrepancy score between S's aspiration and his actual performance (D = Aspiration - Performance). Thus D-scores may range from high positive (e.g., aspiration is greater than performance) to high negative numbers (e.g., aspiration is less than performance).

It should be noted that, in the LA situation, S is requested to make a verbal statement regarding his anticipated behavior; this statement should not be interpreted as necessarily reflecting S's "real" level of aspiration. As Gardner (1940) suggests, the so-called "inner level of aspiration" may be a myth, and what is really being dealt with is an artificial but objective and quantifiable indication which S makes regarding his future performance on a given task. Also, Preston and Bayton (1941) have indicated that there are several types of level of aspirations, e.g., hope, expectancies, minimum goals, etc., and they have provided evidence that these types of LA are more or less independent.

Purpose

The purpose of this study was to investigate the effects of task difficulty and magnitude of reward upon the level of

aspiration in a perceptual-motor and digit span task of normal and mentally retarded elementary school male students. Twenty mentally retarded residential school students were matched on the basis of mental age and socio-economic status with twenty normal elementary school students.

The perceptual-motor task consisted of a hoop throw task. The digits in the digit span task were visually presented by a teaching machine and required a written response.

There were two levels of difficulty and two levels of reward for each task. Level of difficulty in the case of the perceptual-motor task was defined as distance of the subject from the peg on which the hoops were to be thrown. Level of difficulty in the digit span task was defined as length of time the subject was allowed to view the digits to be reproduced. Reward condition level number one was a condition of no reward. Reward condition level number two in the perceptual-motor task consisted of giving the subject one cent for each hoop placed on the peg. In the case of the digit span task, the subjects were given one cent for each digit correctly reproduced.

The data were subjected to an analysis of covariance in which the effect of chronological age was partialled out.

A review of the literature is presented in Chapter II. A detailed presentation of the method and procedure followed in this research may be found in Chapter III. The analysis of the data is presented in Chapter IV, and the results of the study are discussed in Chapter V.

CHAPTER II

REVIEW OF LITERATURE

Discussion of these experiments requires definitions of the terms level of aspiration, success, and failure. The original study defined the level of aspiration as the totality of goal settings, and success and failure as subjective experiences (Hoppe, 1930). Later investigators have confined themselves to strictly behavioral definitions of these concepts. For them, the level of aspiration represents the level of future performance in a familiar task which an individual explicitly undertakes to reach (Frank, 1935; Gardner, 1939; Gould, 1939). Success and failure, similarly, have referred to performances defined in terms of (a) their relation to the level of aspiration - a success being a performance above it, a failure one below it; (b) the adequacy of the performance to the task, often supplemented by reference to the performance of the group - a success being a good performance, a failure a poor one by these criteria (Adams, 1939; Escalona, 1940; Rosenzweig, 1933; Sears, 1939).

The results obtained in the earlier and later studies have been compatible, suggesting that these differences in definitions seem more satisfactory for experimental purposes and will be used in this review of the literature (Gardner, 1940).

The original investigation, using a variety of tasks, studied the condition of success and failure experiences as inferred from spontaneous utterances and general behavior (Hoppe, 1930). Later investigators have used only simple tasks with a one-dimensional quantitative scale of difficulty, namely: a series of similar tasks (mazes or pegboards) graded as to complexity or simple repetitive tasks with an achievement scale of speed or accuracy (Escalona, 1940; Jucknat, 1937; Frank, 1935; Gardner, 1939; Gould, 1939). The subject indicates his level of aspiration with the first type of task by choosing a task of a given degree of complexity, with the second by stating verbally or in writing the point on the achievement scale he intends to reach. Performance in the first type of task is defined only as accomplishment or nonaccomplishment at a given level of complexity. In the second type, performance is expressed in terms of the same scale as the level of aspiration, and the subject may also be told the relation of his performance to the average of his own or other groups (Anderson, 1939; Gardner, 1940; Gould, 1940). With most material the apparent level of performance may be modified without the subject's knowledge through using apparently soluble, but actually insoluble, mazes through falsifying the time scale or through expressing the level of performance to the subject solely in terms of a nonverifiable relationship to the group average (Escalona, 1940; Frank, 1935; Gardner, 1939; Jucknat, 1937).

In all studies the subject is given some familiarity with the material before being asked to indicate his level of aspiration, usually through practice trials, occasionally simply through statements about the task (Chapman, 1939).

Several quantitative measures of the level of aspiration yielded by these techniques have been used: (a) Attainment is expressed directly in terms of the achievement scale or, more commonly, as the average difference between a series of levels of aspiration and immediately preceding levels of performance, the average difference score (Chapman, 1939; Escalona, 1940; Frank, 1935; Frank, 1935). (b) Rigidity or, conversely, mobility is determined either by the relation of the number of shifts to the total number of levels of aspiration or by the sum of the sizes of the shifts (Escalona, 1940; Frank, 1935; Sears, 1939). (c) A related measure, responsiveness, is given by the number of times the level of aspiration moves in the same direction as the preceding performance (Adams, 1939; Escalona, 1940; Sears, 1939).

Other interesting measurable aspects of behavior in the level of aspiration setup are the time required to choose a given level of aspiration, and the number of voluntary choices, when the subject is permitted to break off at will (Escalona, 1940).

The criteria of reliability and generality have been applied only to the average difference score, which several investigators find to be highly consistent in a single task. In several tasks two independent observers have obtained

split-half correlations of not less than .95 (Gardner, 1939; Gould, 1939). Reliability remains high despite an interval of a week between sessions (Frank, 1935).

Correlations between average difference scores in different tasks range from .25 to .70, all but two of the 24 reported being statistically significant (Gardner, 1939; Gould, 1939). Such correlations are influenced not only by underlying personality characteristics, but probably also by such situational factors as phenomenal similarity between the tasks, levels of performance, and whether the tasks are in the same or different experimental sessions (Frank, 1935; Gould, 1939).

The chief value of studies of this type lies in demonstrating that this behavior is sufficiently stable and consistent to justify its being singled out for study. The level of aspiration represents to some extent an objective judgment of probable future performance. That this need not be the sole factor operating has been shown by two studies comparing the individual's prediction of his own future performance (his level of aspiration) with his prediction of someone else's (an objective judgment) (Frank, 1936; McGehee, 1940). Despite differences in technique, both studies showed that the level of aspiration as compared with a judgment tended towards a somewhat higher and more variable difference score and towards markedly greater rigidity.

The behavior of the level of aspiration is partially determined by such structural properties of the task as the

number of steps in the achievement scale, the degree to which individual trials are emphasized, and whether or not the subject is forced to change the height of his level of aspiration after each trial. The apparent difficulty of the material is particularly important. If the task appears much too easy or much to hard, the dynamics of the situation are entirely different than if the task lies within an intermediate range of difficulty (Hoppe, 1937). Moreover, subjects in a competitive situation tend to overestimate their probable progress when the task is made progressively harder without their knowledge and to underestimate it if the task is made progressively easier (Sait, 1938; Hilgard, 1940).

Any single level of performance may lead to a rising, falling, or unchanged level of aspiration depending on the momentary constellation of situational and personal factors (Escalona, 1940; Gould, 1939). In general, the level of aspiration tends to follow the level of performance, but responds more readily to success than to failures. This is demonstrated by the greater number of upward shifts after success than downward shifts after failure, and by the fact that the average difference score is usually positive (Escalona, 1940; Frank, 1935; Frank, 1936; Gardner, 1939; Gould, 1939; McGehee, 1940). Furthermore, the average difference score tends to be more positive in a series of failures than in a series of successes. Thus, the average difference score is greater in a falling than in a rising part of the performance curve (Gardner, 1939). Anderson and Brandt (1939), in a study of American school children, showed that children

whose performance in the experimental task was in the lower quartile of the class had a highly positive average difference score. Those in the upper quartile had a negative average difference score. Sears (1939) found that children who had done poorly in the experimental task, or in a school task similar to it, had a higher average difference score than those who had done well.

In the above three studies, the ranking of the subject's performance with respect to the group was stressed to him. That this relationship was probably an important determinant of the results is suggested by the findings that knowledge of the supposed average performance of a group tends to raise the levels of aspiration of those whose performances are below it, but does not affect the levels of aspiration of those whose performances are above it. Furthermore, the upward pull is more marked when the group is "inferior" (unselected W.P.A. workers) than when it is one's own (Gould, 1940). Chapman and Volkmann (1939) found, on the other hand, that knowledge of the performance of others has no effect on the height of the level of aspiration if the subject knows his own past level of performance in the task. The discrepancy probably arises from differences in subjects and technique, causing the level of aspiration to be more influenced by dynamic factors in the former study, more by perceptual "anchoring points" in the latter.

The degree to which successes or failures in one task effect the first level of aspiration in another appears to depend primarily on the perceptual similarity of the two

tasks (Frank, 1935). Later levels of aspiration in the second task seems to be influenced by broader situational factors, such as the degree to which the subject regards his level of performance in both tasks as a measure of his worth (Frank, 1935).

Studies of children's reactions to success and failure and to cooperative or competitive situations indicate that behavior suggesting the presence of a level of aspiration - for example, choosing to repeat an unfinished, in perference to a finished, task or attempting to excel - does not appear until the child has developed awareness of a "self" whose individual and social value is affected by his performance (Greenberg, 1932; May 1937; Rosenzweig, 1933).

That sex differences in the behavior of the level of aspiration may warrant attention is suggested by incidental findings in two independent investigations that females show lower average difference scores than males (Anderson, 1939; Frank, 1936).

Many investigators have felt that the behavior of the level of aspiration might express more inclusive personality patterns. Thus, it has been suggested that self-confidence, ambition, subjectivity, wishfulness might find expression in a high level of aspiration; realism, cautiousness, self-protectiveness, fear of failure, "sensitivity to load" in a low one (Adams, 1939; Frank, 1935; Hausmann, 1933; Hoppe, 1930; Sears, 1939). Attempts to verify such impressions through conventional statistical methods have been only partially successful. One investigator using statistically

reliable ratings of certain personality attributes found suggestive, though statistically unreliable, relationships between high average difference scores and dissatisfaction with status and between low average difference scores and fear of failure (Gardner, 1940; Gould, 1940). Another found that children with the highest average difference scores were rated by others as more self-motivated than socially motivated, those with the lowest difference scores as highly socially reactive and less self-motivated (Sears, 1939). A group of college students showed suggestive positive correlations between the height of the average difference score and tests of subjectivity and between rigidity and tests of tenacity of purpose (Murray, 1938). Another study obtained only insignificant correlations between average difference scores and tests of dominance feeling and introversion-extraversion (Gould, 1940). The aspiration levels of high I.Q., male high school students were found by Bell (1963) to be positively associated with motivational directives of parents and the students interaction in higher status reference groups. Muthayya (1962) measured the level of aspiration of two groups of high achievers and low achievers of thirty boys. They were also given the Raven's Progressive Matricies. Results showed lack of relationship between scholastic achievement and level of aspiration, between intelligence and aspiration and between achievement and intelligence. Crandall (1963) found that eighth grade boys raised their expectancy-of-success estimates during a period of adult nonreaction when the adult had previously been negative and lowered their estimates when

the adult had previously been positive. Muthayya (1963), using three performance and three nonperformance tasks was able to show that level of aspiration is a general trait of personality. Maag (1958) investigated the relationship between ability and aspiration. Maag's findings were interpreted as suggesting that the discrepancy between ability and aspiration is a function of the task and is not a generalized trait. Hills (1955) devised and administered to a sample of college students an inventory involving four areas of goal-striving: economic, social, academic, and professional along with a typical goal-discrepancy measure of level of aspiration. He found that his goal-discrepancy measure did not measure the same variable or variables that were measured by the inventory.

In a study using psychotics for subjects, it was noted, among other observations, that rigidity of the level of aspiration tended to parallel rigidity of the personality in paranoid reactions. Total lack of relation between level of aspiration and level of performance might accompany impairment of judgment in schizophrenic reactions (Hausmann, 1933). A particularly illuminating investigation showed that the level of aspiration of manics tended to show great mobility, with especial sensitivity to failure. The behavior of the level of aspiration of depressed patients tended to be goverened more by increased sensitivity to social standards than by success and failure (Escalona, 1940).

Wenar (1953) suggests significant differences in the aspiration levels of handicapped and non-handicapped children. Non-handicapped children given a motor task progressively

lowered their level of aspiration while severely and moderately handicapped children showed initial lowering followed by a reversal toward setting higher goals as the task was continued. This is interpreted as an unrealistic approach toward his capabilities on the part of the handicapped child, demonstrating a wish rather than an ability.

The Lewinian theory of mental deficiency holds that the mentally deficient person is less highly differentiated than the normal person of the same chronological age, and that the functional boundaries between differentiated psychological regions are more rigid in the mentally deficient person than in the normal person of the same degree of differentiation. The comcept of differentiation has been generally accepted, despite the fact that the experimental evidence supporting it is quite limited.

Shaw and Bensberg (1955) designed an experiment to test the hypothesis that the degree of differentiation is a negative monotonic function of the degree of mental deficiency, using the level of aspiration phenomena as the experimental device. Four groups of subjects were chosen on the basis of Standford-Binet mental age. Half of the subjects in each group were given failure experiences on these tasks.

The eight groups were matched as closely as possible for chronological age, years in the institution, sex, and socioeconomic level. Levels of aspiration were elicited before each trial for all three tasks. The effect of prearranged performance scores on the task was determined, the analysis revealing that the effect increased with degree of mental deficiency.

Krugman (1959) compared by the Rotter Level of Aspiration Test two groups of male volunteer subjects (thirty-nine aged seventy to eighty-six years and thirty-six aged twenty-two to thirty-five years). It was found that greater need for self-protection and more vulnerbility to stress were manifested by the older group, and that more maladaptive and extreme patterns of response were exhibited by the older population. Harway (1955), having observed rigidity of behavior, attempted to measure it on three level of aspiration tasks using rigid and nonrigid groups. He proceeded on the assumption of Goldstein's concept of secondary rigidity of behavior which holds that an individual manifests behavioral rigidity when he is unable to cope with a task, e.g., the individual, who has a need for adequacy or success or who fears failure greatly, will tend to not "see" or seek alternative methods of problem solving. Results indicated that goal-setting behavior differs significantly between rigid and nonrigid groups in several aspects, and that the rigid group set lower aspiration levels.

Certain transient attitudes evoked by the interplay of person and situation influence the level of aspiration. For example, both a self-competitive attitude and the regarding of the task as "play" seem to be accompanied by high average difference scores (Frank, 1935; Gould, 1939; Sears, 1939). Low average difference scores may accompany exaggerated sensitivity to the social aspects of the situation (Frank, 1935; Sears, 1939).

Full understanding of the behavior of the level of aspiration requires consideration of the influence of the social and cultural background. It has been found, for example, that the average discrepancy score tends to be higher in individuals with an inferior socioeconomic background than in those with a better one (Gould, 1940). Reissman (1953) using adults for subjects sought to determine how much of a sacrifice various age and occupational groups were willing to make for the sake of a hypothetical advancement in occupational level. He found successful achievement in the past does not necessarily mean higher aspirational levels in the future. Age emerged as an important factor. Among the older men, those with relatively high past achievements as indexed by occupational prestige, income, rent, and education, expressed relatively high levels of aspiration compared to those with lower past achievement. A reverse situation was found among the younger men; it was the low occupational achievers who expressed the high levels of aspiration. Second, it was found that the reference groups used by individuals affected the relationship between class and aspirations. Also, it was found that a group of young men from a Junior Chamber of Commerce who were well educated, and ranked comparatively high in class indicies did not show especially high levels of aspiration. They were disinclined to leave their friends, to move around the country for the sake of job advancement.

In identical experimental situations, Germans seem to show a much greater tendency than Americans to lower the level of aspiration after failure (Escalona, 1940). Cantril (1963)

developed a self-anchoring scale designed to measure human concerns and aspirations throughout the world. Some common aspirations and concerns were found as well as some individual differences as a function of country. Gist (1963) using questionnaire responses of 412 Negro and 461 White urban high school students found no racial differences in regard to occupational or educational aspirations. Melikian and Prothro (1957) found that Arab students as compared to American students seemed more eager for academic, vocational, and political achievement but less concerned with world peace and family welfare. Results of a study conducted by Walter and Marzolf (1951) indicated that goal-discrepancy scores for boys were greater than for girls and that the goal discrepancy score was independent of actual level of achievement or level of aspiration. It was concluded that boys feel greater need for achievement and therefore produce greater discrepancy scores. An individual tends to shift his own average difference score in the direction of the supposed average difference score of his group (Hertzman, 1940). Zander and Medow (1963) compared teams and solo persons on equivalent tasks and found that teams and solo persons raised aspiration after exceeding a previous level, but teams more often lowered the level after an unexpectedly poor performance.

The behavior of the level of aspiration is necessarily simple, due to restrictions imposed by the experimental conditions. Actually, it represents the final integration of complex and constantly shifting personal and situational factors. A few such factors may be singled out. The level of

aspiration situation is usually a threat to the subject's self-esteem in that he must not only exhibit his ability before someone else, but must openly commit himself as to his expectation of future achievement. The subject attempts to meet this threat both by performing well and by manipulating his level of aspiration. Involvement of the subject's self-esteem may often be inferred from tension, obvious effort to do well, acute awareness of the experimenter, and other signs that he regards his own "worth" as involved.

Social and cultural factors are important in such a situation, especially subject-experimenter and subject-group relationships and the "demands" of the cultural milieu as to both achievement and statements about achievement (Gould, 1939).

The level of aspiration usually represents a compromise between the subject's evaluation of his ability with respect to the difficulty of the task and his desire to achieve a high level of performance - that is, between a judgment and a goal.

As a judgment, the level of aspiration ordinarily tends to remain close to the actual level of performance. This tendency probably arises from the almost universally present need to keep in touch with reality. Its relative strength may be increased by such factors as the degree of the subject's "detachment" or a belief that the experimenter wishes him to estimate his future performance as closely as possible (Frank, 1935).

Insofar as the level of aspiration is a judgment, it is largely determined by perceptual "anchoring points", of which the most influential is the subject's own past performance (Chapman, 1939).

As a goal, the level of aspiration tends to remain well above the level of performance in that it expresses the wishes to do well and to improve. High achievement and constant improvement, being socially approved, increase self-esteem.

Level of aspiration may be used to improve performance by being placed far enough above actual performance to act as an incentive. Conversely, if a high level of aspiration injures performance by making the subject tense, he may try to improve his achievement by lowering it. Secondly, the level of aspiration may be used to help protect the ego from the effects of failure by being kept resolutely high despite poor performance. This public refusal to admit that the failures are significant aids the subject to disregard them and also, being socially valued, strengthens him with respect to the experimenter. On the other hand, if the subject experiences a performance below his estimate as a severe threat to his self-esteem, he may keep his level of aspiration low to prevent such a situation arising. Steisel and Cohen (1951) suggest that in the experimental situation when the subject is requested to make a verbal statement regarding his anticipated behavior, this statement does not reflect some significant aspect of the motivation system or the true level of aspiration. Bayton's and Whyte's (1950) study indicated three levels of aspiration available to the individual: Maximum Level of Aspiration, which represents ultimate ability and can be expressed as Hope; Actual Level of Aspiration, which is the score the subject expects to make on the next trial and which can be expressed as Expectation; and Minimum Level

of aspiration which is the score below which the individual is certain he will not fall and can be expressed as Minimum Goal.

It is apparent that the level of aspiration may have many different meanings. For example, a high level of aspiration may represent a direct expression of a goal, an incentive to better performance, or a means of protecting the ego. A low one may express an objective judgment, a method of avoiding tension, or a way of avoiding the appearance of failure. Furthermore, successes and failures may not only influence the behavior of the level of aspiration in any one of its meanings, but may cause it to change from one meaning to another (Gould, 1939). Lachman (1963) found that in an ordinary classroom situation level of aspiration tends to: 1. remain close to actual performance, 2. remain above the level of actual performance rather than below it, 3. rise with success, and 4. fall with failure. In order to investigate the motives involved in expressing a level of aspiration, Kausler (1958) used three groups of subjects performing simple arithmetic tests under varying conditions. The results indicated that expressing an aspiration level served to increase performance level on the subsequent tasks and that there was no correlation between magnitude of aspiration level and magnitude of performance score when differences in task aptitude were eliminated. He suggested the operation of a "set", introduced only by the expressing of an aspiration level, which is then modified by the frame of reference surrounding the expressing of the aspiration level.

More important than the complexity of the factors underlying the level of aspiration is their amenability to experimental study. The significance of studies of the level of aspiration lies in their demonstration of a promising experimental study. The significance of studies of the level of aspiration lies in their demonstration of a promising experimental approach to problems of success and failure, of the formation of goals, and of the genesis of the "self" and its relations to personality structure, achievement, and the social environment.

Summary

Only three of the studies discussed in this review of the literature utilized mentally retarded subjects. None of the studies used magnitude of reinforcement as a variable. It is assumed, however, that those studies bearing on the reliability of the LA technique are applicable to this study. The very absence of studies in the literature in which the mentally retarded served as subjects or in which magnitude of reinforcement was investigated points to the need for this kind of research.

CHAPTER III

METHOD AND PROCEDURE

Subjects

The subjects for the perceptual motor and digit span task consisted of twenty mentally retarded male students enrolled at Denton State School and twenty normal male students enrolled in the public school systems of Denton County, Texas. None had gross motor defects, emotional or behavioral problems. Both groups were matched on the basis of Stanford-Binet mental age. The mentally retarded group had mental ages which ranged from seven years to ten years, eleven months. The mean mental age of the mentally retarded group was eight years. Their chronological ages ranged from eleven years, five months to seventeen years, eleven months. The mean chronological age of the mentally retarded group was fourteen years (see Table I).

The normal group had mental ages which ranged from six years, eight months to ten years, eight months. The mean mental age of the normal group was eight years. Their chronological ages ranged from seven years to ten years, ten months, and their mean chronological age was eight years.

A *t*-test was computed to determine if there was a significant difference between the mental age and chronological

TABLE I

MEAN AND STANDARD DEVIATION OF THE CHRONOLOGICAL AND MENTAL AGES OF THE SUBJECTS

		C.A. MONTHS	M.A. MONTHS
Normals	Mean	99.95	100.00
	S.D.	14.96	15.51
Retarded	Mean	169.90	99.75
	S.D.	29.90	16.03

age of the normal group. The resulting *t* value of 0.534 was not significant. Therefore, it was assumed that the normal group was of average intelligence.

Also, a *t*-test was computed to determine if the mental age of the normal group was significantly different from the mental age of the mentally retarded group. A test for variability resulted in an *F* of 1.069 ($F_{05} = 2.46$). The resulting *t* value of 0.268 was not significant ($P_{05} = 2.093$). Therefore, it was assumed that the two groups were equated on the basis of mental age.

The two groups were also matched on the basis of socio-economic status. This was considered an important variable because Gould (1941) divided eighty-one students into extreme groups showing high and low discrepancy scores respectively on six different tasks. She was able to show that members of the low discrepancy group had better economic and social backgrounds than the high discrepancy group. The author suggests that the latter group is subject to more social and economic stress than the former. A similar difference in social circumstances has been found between high and low discrepancy groups by Klugman (1948).

Several authors (Heber, 1962; Burt, 1958; Stoke, 1927) have indicated that the mild mental retardates stem largely from the lower socio-economic group. Other studies, however, have provided more specific data concerning the relationship between socio-economic group and the prevalence of mild mental retardation. A survey directed by the Mental Health Research Unit and conducted in Onondaga County, New

York, (1955) revealed that the socio-economic status of parents is reflected in the incidence of mild mental retardation. Over seventy percent of the parents of the mild mentally retarded subjects were found to be members of the lower socio-economic group.

Penrose (1938) studied the incidence of mild mental retardation in professional as opposed to other occupations. He found that the parents of ninty percent of the mild mental retardates in his study engaged in clerical and manual occupations, whereas, only ten percent of the parents engaged in professional and managerial occupations.

Table II lists the occupations of the parents of the normal and mentally retarded groups. Eighty percent of the parents of the mentally retarded and normal groups engaged in clerical and manual occupations, whereas, only twenty percent engaged in professional and managerial occupations. Therefore, it would seem that the mentally retarded group was a representative sample of the mild mentally retarded population from the standpoint of occupations of parents, and that both groups were matched on the basis of socio-economic group.

Although the data were collected over a period of two years, it is not felt that the time differential in obtaining data from the subjects has a significant or systemic effect on the results of the study.

Sequence of Tasks

Half of the S's in each group performed the perceptual motor task first; the other half of the subjects performed

TABLE II

OCCUPATIONS OF PARENTS OF THE MENTALLY RETARDED AND NORMAL GROUPS ACCORDING TO THE 1949 EDITION OF THE DICTIONARY OF OCCUPATIONAL TITLES

Normal Group		Mentally Retarded Group	
Number of Subjects	Occupation of Parent	Number of Subjects	Occupation of Parent
4	Professional & Managerial	4	Professional & Managerial
0	Clerical & Sales	1	Clerical & Sales
0	Service Occupations	2	Service Occupations
6	Agricultural	3	Agricultural
4	Skilled Occupations	3	Skilled Occupations
3	Semiskilled Occupations	4	Semiskilled Occupations
3	Unskilled Occupations	3	Unskilled Occupations

the digit span task first.

Apparatus for Perceptual-Motor Task

The apparatus consisted of a two inches by six inches pine board, three feet in length in which a wooden peg eight inches long and three-fourths inch in diameter could be inserted six inches from either end. The board was placed on a table which was three feet high.

The hoops thrown on the peg consisted of circular plastic rings seven inches in diameter. The distance between the S and the peg for level of difficulty number one was four feet and for level of difficulty number two, six feet and six inches.

Apparatus for Digit Span Task

The apparatus was the Cyclo-Teacher, a teaching machine manufactured by the World Book Company. There are five windows in the Cyclo-Teacher. The first window is used for presenting the problem. The second window is used for responding to the problem. After the S has written his answer to the problem he pulls a lever in the upper left-hand corner of the machine which moves his answer to the third window which is covered with a transparent plastic shield. As the S's answer moves into the second position the correct answer appears in the fourth window. The S marks his answer "C" for correct or "X" for incorrect in the fifth window. Only the presenting-problem window and the response window were used

in this study. The other three windows were covered with opaque tape.

The problems presented in the window were eight digits randomly selected from a table of random numbers. There was a total of fifteen digit problems, and they were presented in the same order to all S's.

Procedure for Perceptual-Motor Task

A trial consisted of five throws at the peg. Each subject was given five practice trials. The instructions to the S's were as follows: "I want to see how many of these rings you can throw on the post." The S was then given five practice trials. "Now, I want you to tell me how many of the five rings you hope to get on the peg this time." The S's response was recorded. "How many do you think you can get on the post this time?" The S's response was recorded.

Each S was given ten trials and his performance score was recorded. After each trial, the experimenter (E) reported how many rings the S got on the peg.

There were two levels of difficulty defined as distance of the S from the peg. Under level of difficulty number one the S was four feet from the peg; under level of difficulty number two the S was six feet and six inches from the peg.

There were two conditions of reinforcement. Under condition number one the S did not receive a reward. Under condition number two the S received one cent at the end of each trial for each ring he threw on the peg.

Procedure for Digit Span Task

Each S was given a total of fifteen trials five of which were practice trials. The instructions to the S's were as follows: "Look at these eight numbers. Say the numbers. How many of these numbers do you think you can remember after I hide them?" The S's response was recorded. E turns the crank on the Cyclo-Teacher so that the series of numbers were no longer visable. "Now write as many of the numbers as you can remember." The number of digits correctly reproduced was reported to the S. "You got _____ correct that time. How many do you think you will remember next time? How many do you hope you can remember next time?" E turned the crank presenting the next series of digits. After ten seconds E again turned the crank. "Write them here."

There were two levels of difficulty defined as number of seconds the S was allowed to view the digits. Under level of difficulty number one the S's were allowed to view the digits for ten seconds. Under level of difficulty number two the S's were allowed to view the digits for five seconds.

There were two conditions of reinforcement. Under condition number one the S did not receive a reward. Under condition number two the S did receive at the end of each trial one cent for each digit correctly reproduced.

Experimental Design

The experimental design for the perceptual motor and digit span task is depicted below:

Where: D_1 refers to level of difficulty number one

D_2 refers to level of difficulty number two

R_1 refers to reinforcement condition number one

R_2 refers to reinforcement condition number two

N refers to the normal group

R refers to the retarded group

5 refers to the number in each cell

D_1				D_2			
R_1		R_2		R_1		R_2	
N	R	N	R	N	R	N	R
5	5	5	5	5	5	5	5

Hypotheses

The hypotheses were as follows:

1. The discrepancy scores between performance and the two measures of aspiration, hope and expectancy, will be greater on both tasks for the mentally retarded group than for the normal group.
2. The performance scores of the normal subjects will exceed the scores of the retarded on the digit span task.
3. Reward (reinforcement condition number two) will have a positive influence on performance and will result in a decrease in expectancy discrepancy scores

in the normal group.

4. Reward will not have an influence on performance, but will result in an increase in discrepancy scores relating to expectancy in the mentally retarded group.

Rationale for the Hypotheses

Blatt reviewed a great many studies concerning the physical status of children who are mentally retarded. Although there was disagreement among researchers, the consensus seems to indicate that there is a positive relationship between intelligence and various indices of physique. However, this relationship is not invariable and appears to be too minor to be useful for predictive or educational purposes. This relationship does not appear to be linear in character, and it may be more significant in the more severely retarded group (Rothstein, 1961).

Although, as a group, mentally retarded children both in special education and regular classes surpass their academic expectancy as measured against their mental age (Rothstein, 1961), it was felt that the mentally retarded group would compare less unfavorably with the normal group on a performance task such as the hoop throw task than on a cognitive task like the digit span task.

Ellis (1963) postulates a "stimulus trace theory" for the retarded in which he contends that, on learning trails, this trace decays faster for the retarded than for the normal of the same mental age since they have central nervous system

dysfunctions possibly of a biochemical nature. Thus, they have poorer short term memory than the average. However, once they have thoroughly learned, they may retain as well as the average even on a long term basis. It was on the basis of this "stimulus trace theory" that it was hypothesized that: (1) the discrepancy scores between performance and the two measures of aspiration would be greater for the mentally retarded group than for the normal group; and (2) the mentally retarded group would perform significantly more poorly than the normal group on the digit span task. Also, it was felt that the normal group's hope and expectancy scores would be determined more by a consideration of past performance than the mentally retarded group's scores. The normal group was viewed as posessing more ability to evaluate and predict future performance on the basis of past performance than the mentally retarded group.

It was hypothesized that reward would have a positive invluence on performance in the normal group and would not have a positive influence on performance in the mentally retarded group because the mentally retarded group was viewed as being more likely to perform at capacity in the absence of reward than the normal group. This prediction stems from the fact that participation in the experiment would constitute a more welcomed break in routine for the mentally retarded group than for the normal group. No doubt the normal group has more of an opportunity to participate in games and interact with adults than does the institutionalized mentally retarded group.

It was also hypothesized that reward would result in a decrease in expectancy discrepancy scores in the normal group and result in an increase in discrepancy scores in the mentally retarded group because it was felt that reward would serve to reduce the frivolity with which the normal group might approach the task and make the task more of a problem solving situation.

It was felt that reward would serve only to disrupt the performance and judgment of the mentally retarded group because they were viewed as being optimally motivated to perform in the absence of the reward condition. Reward, then, would serve only to foster a stressful situation in which performance might suffer.

CHAPTER IV

ANALYSIS OF RESULTS

The analysis of results is reported in two sections. The first section is composed of an analysis of the data obtained from the perceptual-motor task. The second section contains the analysis of the data obtained from the digit span task.

Appendix A is a sample of the data sheet. Five practice trials were allowed for each task. In the case of the perceptual-motor task, the subject was asked how many hoops he hoped to get on the post. His hope score was recorded under the word "Hope" on the data sheet. He was then asked how many hoops he expected to get on the post, and his expectancy score was recorded under the word "Expectancy". After the trial, his score (number of hoops placed on the post) was recorded under the heading "Performance". This was his performance score. The hope-attainment discrepancy score on a given trial was obtained by subtracting the performance score on the preceding trial from the hope score. For example, the hope-attainment discrepancy score on trial number two was obtained by subtracting the performance score on trial number one from the hope score on trial number two. The hope goal-discrepancy score was obtained by subtracting the performance score on a given trial from the hope score on the same trial.

The expectancy attainment discrepancy score on a given trial was obtained by subtracting the performance socre on the preceding trial from the expectancy score. The expectancy goal discrepancy score was obtained by subtracting the performance score on a given trial from the expectancy score on the same trial.

The data obtained from both tasks were subjected to an analysis of covariance partialling out the effect of chronological age. The .05 level was chosen as indicating a statistically significant difference between the two groups.

Hope Aspiration Scores of Task I

Both the normal group and the mentally retarded group had a higher mean hope score at reinforcement level one than at reinforcement level two (see Table III). In other words, both groups reported higher hope scores when they were not rewarded for placing hoops on the post than when they were given one cent for each hoop placed on the post.

Expectancy Aspiration Scores of Task I

The mentally retarded group and the normal group reported lower mean expectancy scores at level of difficulty number two than at level of difficulty number one (see Table IV). That is, both groups expected to place fewer hoops on the peg when throwing at the far peg than when throwing at the near peg.

Performance Scores of Task I

TABLE III

TASK I

ANALYSIS OF COVARIANCE OF MEAN HOPE SCORES

	Means
Normals	4.166
Defectives	2.969
Reward Level 1	3.749
Reward Level 2	3.386
Difficulty Level 1	3.622
Difficulty Level 2	3.513

	DF	SS	MS	F
Normals vs. Defectives	1	2.830	2.830	2.965
Reward Level 1 vs. Level 2	1	4.114	4.114	4.310*
Difficulty Level 1 vs. Level 2	1	0.073	0.073	1.000
Difficulty vs. Reward	1	0.012	0.012	1.000
Difficulty vs. Group	1	0.326	0.236	1.000
Reward vs. Group	1	0.377	0.377	1.000
Difficulty vs. Reward vs. Group	1	0.093	0.093	1.000
		Within, Total		
	32	30.540	0.954	
	39	38.353		

* Significant at .05 Level

TABLE IV

TASK I

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY SCORES

	Means
Normals	2.340
Defectives	2.573
Reward Level 1	2.454
Reward Level 2	2.459
Difficulty Level 1	3.013
Difficulty Level 2	1.900

	DF	SS	MS	F
Normals Vs. Defectives	1	0.000	0.000	0.000
Reward Level 1 vs. Level 2	1	0.111	0.111	1.000
Difficulty Level 1 vs. Level 2	1	12.594	12.594	20.530**
Difficulty vs. Reward	1	0.012	0.012	1.000
Difficulty vs. Group	1	0.326	0.326	1.000
Reward vs. Group	1	0.377	0.377	1.000
Difficulty vs. Reward vs. Group	1	0.093	0.093	1.000
		Within, Total		
	32	30.540	0.954	
	39	38.353		

** Significant at .01 Level

Both groups received higher mean performance scores at difficulty level one than at difficulty level two (see Table V). Also, both groups obtained higher mean performance scores at reinforcement level one difficulty level one than at reinforcement level one difficulty level two. This means that both the mentally retarded group and the normal group placed more hoops on the peg when throwing at the near peg than when throwing at the far peg, and that both groups received higher performance scores when throwing hoops on the near post for no reward than when throwing hoops on the far peg for no reward.

Hope Attainment Discrepancy Scores of Task I

Both the normal group and the mentally retarded group had lower mean hope attainment discrepancy scores at reinforcement level two than at reinforcement level one (see Table VI). In other words, the number of hoops both groups hoped to get on the peg more closely approximated the number they actually had previously placed on the peg when they were given one cent for each hoop placed on the peg than when they were not rewarded for placing hoops on the peg.

Hope Goal Discrepancy Scores of Task I

Both groups had a higher hope goal discrepancy score at reinforcement level one than at reinforcement level two (see Table VII). Also, both groups obtained higher hope goal discrepancy scores at difficulty level two than at difficulty level one. That is, both groups' hope scores

TABLE V

TASK I

ANALYSIS OF COVARIANCE OF MEAN PERFORMANCE SCORES

	Means
Normals	1.519
Defectives	1.651
Reward Level 1	1.663
Reward Level 2	1.507
Difficulty Level 1	2.079
Difficulty Level 2	1.089

	DF	SS	MS	F
Normals vs. Defectives	1	0.023	0.023	1.000
Reward Level 1 vs. Level 2	1	0.066	0.066	1.000
Difficulty Level 1 vs. Level 2	1	9.901	9.901	21.124**
Difficulty vs. Reward	1	3.271	3.271	6.979*
Difficulty vs. Group	1	0.195	0.195	1.000
Reward vs. Group	1	0.410	0.410	1.000
Difficulty vs. Reward vs. Group	1	0.015	0.015	1.000
		Within, Total		
	32	14.999	0.649	
	39	28.882		

* Significant at .05 Level
** Significant at .01 Level

TABLE VI

TASK I

ANALYSIS OF COVARIANCE OF MEAN HOPE ATTAINMENT DISCREPANCY SCORES

	Means
Normals	2.673
Defectives	1.657
Reward Level 1	2.307
Reward Level 2	2.024
Difficulty Level 1	1.784
Difficulty Level 2	2.546

	DF	SS	MS	F
Normals vs. Defectives	1	2.856	2.856	4.008
Reward Level 1 vs. Level 2	1	6.145	6.145	8.626**
Difficulty Level 1 vs. Level 2	1	1.721	1.721	2.416
Difficulty vs. Reward	1	0.112	0.112	1.000
Difficulty vs. Group	1	0.111	0.111	1.000
Reward vs. Group	1	1.448	1.448	2.033
Difficulty vs. Reward vs. Group	1	0.277	0.277	1.000
		Within, Total		
	32	22.797	.712	
	39	35.468		

** Significant at .01 Level

TABLE VII

TASK I

ANALYSIS OF COVARIANCE OF MEAN HOPE GOAL DISCREPANCY SCORES

	Means
Normals	2.674
Defectives	1.680
Reward Level 1	2.353
Reward Level 2	2.003
Difficulty Level 1	1.874
Difficulty Level 2	2.483

	DF	SS	MS	F
Normals vs. Defectives	1	1.769	1.769	2.543
Reward Level vs. Level 2	1	3.488	3.488	5.014*
Difficulty Level 1 vs. Level 2	1	3.969	3.969	5.704*
Difficulty vs. Reward	1	1.962	1.962	2.820
Difficulty vs. Group	1	0.217	0.217	1.000
Reward vs. Group	1	0.215	0.215	1.000
Difficulty vs. Reward vs. Group	1	0.195	0.195	1.000
		Within, Total		
	32	22.262	0.696	
	39	34.077	0.696	

* Significant at the .05 Level

more closely approximated their performance scores when given one cent for each hoop placed on the peg than when not given a reward for placing hoops on the peg. Also, both groups' hope scores more closely approximated their performance scores when throwing at the near peg than when throwing at the far peg.

Expectancy Attainment Discrepancy Scores of Task I

No significant difference was found to exist between the two groups (see Table VIII). That is, the difference between the number of hoops each group expected to place on the peg and the number they had previously placed on the peg was comparable for both groups under both levels of difficulty and both levels of reinforcement. There was very little variation in the size of the expectancy attainment discrepancy scores under the various conditions of the hoop throw task. The mean expectancy attainment discrepancy scores ranged from 1.137 in the case of level of difficulty number two to 1.144 for the mean normal group's score.

Expectancy Goal Discrepancy Scores of Task I

No significant difference was found to exist between the two groups mean expectancy goal discrepancy scores (see Table IX). In other words, the difference between the number of hoops each group expected to place on the peg and the number of hoops actually placed on the post was comparable for both groups. the mean expectancy goal discrepancy scores

TABLE VIII

TASK I

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY ATTAINMENT DISCREPANCY SCORES

	Means
Normals	1.144
Defectives	1.341
Reward Level 1	1.167
Reward Level 2	1.318
Difficulty Level 1	1.347
Difficulty Level 2	1.137

	DF	SS	MS	F
Normals vs. Defectives	1	0.022	0.022	1.256
Reward Level1 vs.Level 2	1	0.456	0.456	1.235
Difficulty Level 1 vs. Level 2	1	0.464	0.464	1.000
Difficulty vs. Reward	1	0.185	0.185	1.000
Difficulty vs. Group	1	0.023	0.023	1.000
Reward vs. Group	1	0.157	0.157	1.000
Difficulty vs. Reward vs. Group	1	0.025	0.025	1.000
		Within, Total		
	32	11.829	0.370	
	39	13.162		

TABLE IX

TASK I

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY GOAL DISCREPANCY SCORES

	Means
Normals	1.253
Defectives	1.397
Reward Level 1	1.309
Reward Level 2	1.340
Difficulty Level 1	1.461
Difficulty Level 2	1.189

	DF	SS	MS	F
Normals vs. Defectives	1	0.012	0.012	1.000
Reward Level 1 vs. Level 2	1	0.060	0.060	1.000
Difficulty Level 1 vs. Level 2	1	0.762	0.762	1.264
Difficulty vs. Reward	1	0.233	0.233	1.000
Difficulty vs. Group	1	0.079	0.079	1.000
Reward vs. Group	1	0.127	0.127	1.000
Difficulty vs. Reward vs. Group	1	0.012	0.012	1.000
		Within, Total		
	32	9.225	0.288	
	39	10.508		

ranged from 1.189 to 1.461. That is, under all conditions of the hoop throw task the expectancy score was, on the average, within one and one-half points of the performance score.

Hope Aspiration Scores of Task II

No significant difference was found to exist between the two groups' mean hope scores (see Table X). This means that the number of digits the mentally retarded group hoped to remember was essentially the same number that the normal group hoped to remember. The normal group hoped to remember 6.070 digits, whereas, the mentally retarded group hoped to remember 5.075 digits.

Expectancy Aspiration Scores of Task II

No significant difference was found to exist between the two groups' mean expectancy scores (see Table XI). That is, no difference was found to exist between the two groups in terms of the number of digits they expected to remember. The average number of digits the normal group expected to remember was 4.275, and the average number of digits hoped to be remembered by the mentally retarded group was 4.375.

Performance Scores of Task II

The mean performance score for both groups was significantly greater at reinforcement level one than at reinforcement level two (see Table XII). In other words, both groups remembered more digits when not given a reward than when given one cent for each digit remembered. On the average, the

TABLE X

TASK II

ANALYSIS OF COVARIANCE OF MEAN HOPE SCORES

	Means
Normals	6.070
Defectives	5.075
Reward Level 1	5.815
Reward Level 2	5.330
Difficulty Level 1	5.670
Difficulty Level 2	5.475

	DF	SS	MS	F
Normals vs. Defectives	1	4.183	4.183	1.709
Reward Level 1 vs. Level 2	1	3.977	3.977	1.625
Difficulty Level 1 vs. Level 2	1	0.332	0.332	1.000
Difficulty vs. Reward	1	0.372	0.372	1.000
Difficulty vs. Group	1	2.599	2.599	1.062
Reward vs. Group	1	5.708	5.708	2.332
Difficulty vs. Reward vs. Group	1	4.635	4.635	1.894
		Within, Total		
	32	78.331	2.448	
	39	100.137		

TABLE XI

TASK II

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY SCORES

	Means
Normals	4.275
Defectives	4.375
Reward Level 1	4.580
Reward Level 2	4.070
Difficulty Level 1	4.365
Difficulty Level 2	4.285

	DF	SS	MS	F
Normals vs. Defectives	1	0.832	0.832	1.000
Reward Level 1 vs. Level 2	1	1.208	1.208	1.000
Difficulty Level 1 vs. Level 2	1	0.089	0.089	1.000
Difficulty vs. Reward	1	3.413	3.413	2.334
Difficulty vs. Group	1	0.761	0.761	1.000
Reward vs. Group	1	3.890	3.890	2.660
Difficulty vs. Reward vs. Group	1	1.715	1.715	1.173
		Within, Total		
	32	46.780	1.462	
	39	58.687		

TABLE XII

TASK II

ANALYSIS OF COVARIANCE OF MEAN PERFORMANCE SCORES

	Means
Normals	3.470
Defectives	2.875
Reward Level 1	3.635
Reward Level 2	2.710
Difficulty Level 1	3.290
Difficulty Level 2	3.055

	DF	SS	MS	F
Normals vs. Defectives	1	1.776	1.776	4.616*
Reward Level 1 vs. Level 2	1	9.952	9.952	25.871**
Difficulty Level 1 vs. Level 2	1	0.523	0.523	1.359
Difficulty vs. Reward	1	0.026	0.026	1.000
Difficulty vs. Group	1	1.540	1.540	4.003
Reward vs. Group	1	4.226	4.226	10.990**
Difficulty vs. Reward vs. Group	1	0.853	0.853	1.000
		Within, Total		
	32	12.309	.384	
	39	31.206		

* Significant at .05 Level
** Significant at .01 Level

two groups remembered 3.635 digits when they did not receive a reward for remembering digits, whereas, they remembered only 2.710 digits when they received one cent for each digit remembered.

A second finding in the analysis of the performance scores of the digit span task was that the normal group remembered significantly more digits than the mentally retarded group. The normal group remembered, on the average, 3.470 digits as opposed to 2.875 digits for the mentally retarded group.

Hope Attainment Discrepancy Scores of Task II

No significant difference was found to exist between the two groups' mean hope discrepancy scores (see Table XIII). The number of digits each group hoped to remember in relation to the number they had previously remembered was similar. The mean hope attainment discrepancy scores for the two groups under the various difficulty and reinforcement conditions ranged from 2.685 to 2.935. On the average, there was a difference of two and one-half to three points between their hope score and their previous performance score.

Hope Goal Discrepancy Scores of Task II

No significant difference was obtained between the two groups' mean hope goal discrepancy scores (see Table XIV). That is, the number of digits each group hoped to remember in relation to the number of digits they actually remembered was similar. The mean hope goal discrepancy scores of the

TABLE XIII

TASK II

ANALYSIS OF COVARIANCE OF MEAN HOPE ATTAINMENT DISCREPANCY SCORES

	Means
Normals	2.935
Defectives	2.685
Reward Level 1	2.690
Reward Level 2	2.930
Difficulty Level 1	2.720
Difficulty Level 2	2.900

	DF	SS	MS	F
Normals vs. Defectives	1	0.036	0.036	1.000
Reward Level 1 vs. Level 2	1	0.258	0.258	1.000
Difficulty Level 1 vs. Level 2	1	0.349	0.349	1.000
Difficulty vs. Reward	1	1.173	1.173	1.000
Difficulty vs. Group	1	0.453	0.453	1.000
Reward vs. Group	1	0.886	0.886	1.000
Difficulty vs. Reward vs. Group	1	6.761	6.761	4.140
		Within, Total		
	32	49.061	1.533	
	39	58.977		

TABLE XIV

TASK II

ANALYSIS OF COVARIANCE OF MEAN HOPE GOAL DISCREPANCY SCORES

	Means
Normals	2.935
Defectives	2.640
Reward Level 1	2.720
Reward Level 2	2.840
Difficulty Level 1	2.670
Difficulty Level 2	2.890

	DF	SS	MS	F
Normals vs. Defectives	1	0.109	0.109	1.000
Reward Level 1 vs. Level 2	1	0.022	0.022	1.000
Difficulty Level 1 vs. Level 2	1	0.513	0.513	1.000
Difficulty vs. Reward	1	1.473	1.473	1.000
Difficulty vs. Group	1	0.105	0.105	1.000
Reward vs. Group	1	0.705	0.705	1.000
Difficulty vs. Reward vs. Group	1	6.286	0.286	3.962
		Within, Total		
	32	50.769	1.587	
	39	59.982		

two groups ranged from 2.640 to 2.935.

Expectancy Attainment Discrepancy Scores of Task II

No significant difference was obtained between the two groups' mean expectancy attainment discrepancy scores (see Table XV). In other words, the number of digits each group expected to remember in relation to the number of digits they had previously remembered was similar. The mean expectancy attainment discrepancy scores under the various difficulty and reinforcement levels ranged from 1.725 to 2.055.

Expectancy Goal Discrepancy Scores of Task II

No significant difference was obtained between the two groups' mean expectancy goal discrepancy scores (see Table XVI). This means that the number of digits each group expected to remember in relation to the number they actually remembered was similar. The mean expectancy goal discrepancy scores of the two groups under the two levels of difficulty and two levels of reinforcement ranged from 1.895 to 2.140.

Summary

Differences between the two groups or among the treatment conditions at or beyond the .05 level was obtained on the following treatments of the data from the perceptual motor task (hoop throw task).

1. Both the normal group and the mentally retarded group had greater mean hope scores at reinforcement level one than at reinforcement level two.

TABLE XV

TASK II

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY ATTAINMENT DISCREPANCY SCORES

	Means
Normals	1.840
Defectives	1.940
Reward Level 1	1.725
Reward Level 2	2.055
Difficulty Level 1	1.825
Difficulty Level 2	1.955

	DF	SS	MS	F
Normals vs. Defectives	1	0.118	0.118	1.000
Reward Level 1 vs. Level 2	1	1.070	1.070	1.598
Difficulty Level 1 vs. Level 2	1	0.171	0.171	1.000
Difficulty vs. Reward	1	0.004	0.004	1.000
Difficulty vs. Group	1	2.407	2.407	3.593
Reward vs. Group	1	0.171	0.171	1.000
Difficulty vs. Reward vs. Group	1	0.064	0.064	1.000
		Within, Total		
	32	21.428	.670	
	39	25.432		

TABLE XVI

TASK II

ANALYSIS OF COVARIANCE OF MEAN EXPECTANCY GOAL DISCREPANCY SCORES

	Means
Normals	1.955
Defectives	2.080
Reward Level 1	1.975
Reward Level 2	2.060
Difficulty Level 1	1.895
Difficulty Level 2	2.140

	DF	SS	MS	F
Normals vs. Defectives	1	0.081	0.081	1.000
Reward Level 1 vs. Level 2	1	0.106	0.106	1.000
Difficulty Level 1 vs. Level 2	1	0.599	0.599	1.000
Difficulty vs. Reward	1	0.002	0.002	1.000
Difficulty vs. Group	1	1.525	1.525	2.230
Reward vs. Group	1	0.147	0.147	1.000
Difficulty vs. Reward vs. Group	1	0.333	0.333	1.000
		Within, Total		
	32	21.885	0.684	
	39	24.679		

2. Both groups had greater mean expectancy scores at difficulty level one than at difficulty level two.
3. Both groups had higher mean performance scores at difficulty level one than at difficulty level two.
4. Both groups obtained higher mean performance scores at reinforcement level one, difficulty level one than at reinforcement level one, difficulty level two.
5. Both groups had lower mean hope attainment discrepancy scores at reinforcement level two than at reinforcement level one.
6. Both groups had higher hope goal discrepancy scores at reinforcement level one than at reinforcement level two.
7. Both groups obtained higher hope goal discrepancy scores at difficulty level two than at difficulty level one.

Differences between the two groups or among the treatment conditions at or beyond the .05 level was obtained on the following treatments of the data from the cognitive task (digit span task).

1. The mean performance score for both groups was greater at reinforcement level one than at reinforcement level two.
2. The normal group's mean performance score was greater than the mentally retarded group's score.

CHAPTER V

DISCUSSION OF RESULTS

Hope Aspiration Scores of Task I

Both the normal group and the retarded group had greater mean hope scores at reinforcement level one than at reinforcement level two. This finding is interpreted as suggesting that the reinforcement condition (giving one cent for each hoop placed on the peg) served to make the two groups attempt to approximate future performance in reporting hope scores more so than when reward for performance was not involved.

Expectancy Aspiration Scores of Task I

Both groups had greater mean expectancy scores at difficulty level one than at difficulty level two. This indicates that both groups perceived level of difficulty number two as a more difficult condition than level of difficulty number one and hence, expected to have less success at level of difficulty number two than level of difficulty number one.

Performance Scores of Task I

Both groups obtained higher performance scores at level of difficulty number one than at level of difficulty number two. This finding along with the finding just discussed is

interpreted as lending further support to the assumption that level of difficulty number two was a more difficult condition than level of difficulty number one.

Hope Attainment Discrepancy Scores of Task I

The finding that the mean hope attainment discrepancy score for both groups was smaller at reinforcement level two than at reinforcement level one is interpreted as indicating that both groups were more influenced by past performance in reporting hope scores when they were given one cent for each hoop placed on the peg than when not rewarded for placing hoops on the peg. Thus, the hope scores in this instance served more as a judgment of future performance and less as an aspiration level than when reward was given for performance.

Hope Goal Discrepancy Scores of Task I

Hope goal discrepancy scores reflect the extent to which hope scores influence subsequent performance scores while hope attainment discrepancy scores reflect the extent to which previous performance scores influence subsequent hope scores. Both groups obtained higher hope goal discrepancy scores at reinforcement level one than at reinforcement level two. Apparently, the hope scores under reinforcement level two were more influenced by and consequently, more closely approximated performance scores than when reward was not given for placing hoops on the peg. Perhaps there was more of a need to protect

the ego from failure when reward was given for successful performance.

The hope scores of the two groups more closely approximated their performance scores under level of difficulty number one than level of difficulty number two. Perhaps the two groups perceived difficulty level two as a task in which few successes would be expected. Hence, they felt less of a need to protect against failure by reporting low hope scores and were at greater liberty to use the hope score as a means of expressing their desire to do well.

Expectancy Discrepancy Scores of Task II

No significant differences were found to exist between any of the combinations of expectancy attainment discrepancy scores. The absence of significant differences between the two groups in these comparisons is interpreted as indicating that both groups' scores were determined by similar factors.

Aspiration Scores of Task II

Since no significant differences were found to exist between the two groups in their aspiration scores on Task II, the scores were perhaps determined by similar factors in both groups.

Performance Scores of Task II

An unexpected finding was that both groups had higher mean performance scores under reinforcement level one than under reinforcement level two. In a previous, but similar,

study by the present writer in which the subjects were not matched on the basis of socio-economic group, the major finding was that both groups performed more poorly under reinforcement level two on Task II. Also, the mentally retarded group performed more poorly under reinforcement level two on Task I of the previous study. Apparently, the incentive value of the reward condition in the digit span task had a deliterious effect on remembering digits for both groups. This suggests that when the magnitude of reward is contingent upon performance, a stressful situation may result which is disruptive of performance. The subjects were apparently optimally motivated to perform on the digit span task in the absence of the reward condition.

A second finding in the case of the performance scores on Task II was that the performance scores of the normal group exceeded the scores of the mentally retarded group. This finding is consistent with one of the hypotheses of the experiment.

Comparison of Perceptual-Motor Task With Digit Span Task

Since both groups had greater mean performance scores at level of difficulty number one on Task I (Perceptual-Motor Task) and since both groups' mean expectancy score was greater at level of difficulty number one than at level of difficulty number two on Task I, it is assumed that difficulty level one on Task I was a less difficult condition than difficulty level two. However, the same results did not maintain in Task II. This suggests that level of difficulty number two in Task II (digit span task) was not,

in fact, a more difficult condition than level of difficulty one. Level of difficulty one on Task II consisted of allowing the subjects to view the digits for five seconds, and level of difficulty number two extended the time to ten seconds. Perhaps if the time allowed the subjects to view the digits had been reduced to two or three seconds for difficulty level one, a significant difference may have resulted between the mean performance scores for the two levels of difficulty.

The hypothesis stating that the performance scores of the normal group will exceed the scores of the retarded group on the digit span task was supported. This finding tends to lend support to the theory that the mentally retarded have poorer short term memories than the average.

The hypothesis stating that reward will have a positive influence on performance and will result in a decrease in expectancy discrepancy scores for both tasks in the normal group was not supported. In fact, reward apparently had a depressing effect on the performance scores of both groups in Task II (digit span task).

The hypothesis stating that reward will not have an influence on performance, but will result in an increase in discrepancy scores relating to expectancy in the mentally retarded group was not supported. Again, reward apparently had a depressing effect upon performance in both groups on Task II, and the two groups' expectancy discrepancy scores were similar on both tasks.

Implications of the Study for Teaching

The major implication of this study for the field of teaching relates to the possible deleterious effects of reward on the performance of a task similar to the digit span task used in this study. One can only speculate on the reasons for the two groups being unable to remember as many digits when given one cent for each digit remembered than when not given a reward for remembering digits. The subjects were paid for their performance at the end of each trial and their counting of the pennies may have interfered with their remembering digits. Also, there is the possibility of the reward condition fostering a stressful situation which can be better contended with in a perceptual-motor task than in a cognitive task. Since this was an unexpected finding in the study, one would be tempted to question its reliability were it not for the fact that the same phenomenon occurred in a previous but similar study by the present writer.

A second implication is suggested by the finding that the mentally retarded subjects remembered fewer digits. Hence, the mentally retarded subjects in this study possessed poorer short-term memories than the normal subjects. This would suggest that mentally retarded subjects should have more of an opportunity for review of material to be learned than would be necessary for normal subjects.

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DATA SHEET

Name:_____ Sex_____ Age_____

Birth date:_____ Dorm_____

PRACTICE TRIALS

Trial	Performance
1.	_____
2.	_____
3.	_____
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EXPERIMENTAL TRIALS

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Trial	Hope	Expect.	Perf.	A.D.	G.D.	A.D.	G.D.
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VITA

Basil G. Johnson, Jr.

Candidate for the Degree of

Doctor of Education

Thesis: THE EFFECTS OF TASK DIFFICULTY AND MAGNITUDE OF REINFORCEMENT UPON THE LEVEL OF ASPIRATION OF NORMAL AND MENTALLY RETARDED MALE STUDENTS

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Snyder, Texas, March 5, 1933, the son of Basil G. and Bessie Pauline Johnson.

Education: Attended grade school in Snyder, Texas and Walters, Oklahoma; graduated from Walters High School in 1951; received the Bachelor of Arts degree from the University of Oklahoma, with a major in Psychology, in May, 1958; received the Master of Arts degree from the University of Tulsa with a major in Clinical Psychology, in May, 1959; completed requirements for the Doctor of Education degree in May, 1966.

Professional Experience: Clinical Psychologist employed by the Oklahoma State Health Department and consulting psychologist for the Lawton and Duncan, Oklahoma Public School Systems 1958-1959. Dean of Students and Director of Guidance and Counseling, Murray State College, Tishomingo, Oklahoma, 1960-63. Chief Psychologist and Director of Admissions, Denton State School, Denton, Texas, 1963 to present.