# DEVELOPMENT OF LEVEL OF ASPIRATION IN THE LATE ELEMENTARY SCHOOL YEARS

by

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# ABSTRACT

The present study deals with two kinds of developmental change in late elementary school children: changes in the height and realism of level of aspiration and changes in the determinants of level of aspiration. Atkinson's theory of risk-taking behavior was extended to include a developmental dimension by postulating changes with age in (a) the accuracy of expectancies of success and (b) the relationship between values for success and failure and task difficulty. In addition, hypotheses concerning the relationship of effort attributions to unrealism of level of aspiration were derived from attribution theory.

The subjects were 50 third grade and 50 sixth grade boys. Each took a questionnaire measure of test anxiety and defensiveness and worked at an individually-administered level of aspiration task. After performing items at varying levels of difficulty, the subject was asked which level he wanted to try to complete in the time allowed (i.e., his level of aspiration). Then he was asked his expectancies of success for future performance at each level, the value of success and failure at each level, and to which of four factors he would attribute success and failure at the task: ability, effort, task difficulty, or luck.

The results reveal a significant tendency for level of aspiration to become more realistic from the 3rd to the 6th grade, and a nonsignificant tendency for level of aspiration

to become higher with age. Regarding determinants of level of aspiration, the findings show that: (1) the more accurate the expectancy of future success with reference to past performance, the more realistic the level of aspiration, (2) expectancies become more accurate as children become older, (3) the more values for success and failure are a function of task difficulty, the higher the level of aspiration, and (4) values for success and failure become more a function of task difficulty as children become older. Thus accuracy of expectancy, and values for success and failure appear to partially account for developmental changes in height and realism of level of aspiration. Effort attributions were not related to realism of level of aspiration, but age trends in attributions to luck and task difficulty were obtained. Dispositional variables were not directly related to realism of level of aspiration, but may have affected realism of choice indirectly by affecting the intervening accuracy of expectancy.

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# INTRODUCTION

The present study deals with developmental changes in level of aspiration. Two kinds of developmental changes are considered. The first concerns changes in the level of aspiration itself: that is, age-related changes in the height of level of aspiration and in the realism of level of aspiration. The second concerns developmental changes in the determinants of level of aspiration.

## Definitions

In defining the concepts employed in level of aspiration research, it may be helpful to consider the hypothetical situation depicted in Table 1. Suppose a person has been given puzzles that vary in difficulty. There are 11 levels of difficulty, and there are many puzzles within each level. The person has worked 10 puzzles at each level. The number of successes out of ten he obtained for each level of difficulty is presented in the first row of Table 1. In the second row the number of successes is represented as the objective probability of success. Suppose further that he believes his chances of succeeding (expectancy of success) on the next trial, for each level, are as presented in the third row of Table 1. Finally suppose that he can choose to attempt a puzzle from any level he likes and that he chooses the puzzle at the 8th level of difficulty. Level of aspiration (LA) refers to the level of difficulty the person chooses to undertake. In this case, the LA is the 8th level.

TABLE 1

Hypothetical Level of Aspiration Situation

| | Level of Difficulty | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Number of Successes out of ten tries | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Objective probability of success | 1.0 | .9 | .8 | .7 | .6 | .5 | .4 | .3 | .2 | .1 | .0 |
| Expectancy of Success | 1.0 | 1.0 | .9 | .9 | .8 | .8 | .7 | .7 | .6 | .6 | .5 |

LA is considered "realistic" if the chosen level is not too easy or too difficult. In this study, a LA with a .5 objective probability of success is considered the most realistic; it is gradually more unrealistic as the choice goes further from the .5 level. Unrealism of LA can be defined as the difference between the level with .5 objective probability of success and the LA. In the hypothetical case presented in Table 1, the 6th level is considered to have a .5 objective probability of success.[1] The subject's unrealism score, therefore, would be level 8 - level 6 = 2.

The extent to which the person's expectancy of success for a particular level agrees with his objective probability of success for that level is one of the central concerns of the present study since it may be an important determinant of

[1]The first row in Table 1 presents past successes. While these are not necessarily the same as future probabilities, they will be taken as the best estimate of objective probability of success for the next trial.

LA. This kind of agreement will be referred to as "accuracy of expectancy" and specific measures of this variable will be described in the method chapter.

Finally it is assumed that a person expects a certain amount of pleasure for success and pain for failure at each level of difficulty. Those variables will be referred to as "value for success" and "value for failure".

The present study adopts essentially continuous scales in terms of probability for describing task difficulty. In past studies, tasks have often been described as "easy or difficult", "easy, intermediate or difficult", etc. However, the present study requires a more detailed language since quantification of a relatively subtle difference between subjective probability of success and objective probability of success for a particular level of task difficulty is one of its principal concerns.

Age Differences in Level of Aspiration

Preference for more difficult tasks increases with age: Children in the preschool and early elementary school years appear to prefer easy tasks to difficult tasks. One way in which preference for task difficulty has been studied in children involves giving them a choice between repeating a previously failed task (assumed to have a relatively low objective probability of success) or a task on which they have previously succeeded (assumed to have a relatively high objective probability of success). Rosenzweig (1945) found that there was a significant age difference as to whether a

previously succeeded task or a previously failed task was preferred. The mean age of those who preferred to repeat the previously succeeded task was 7 years and 9 months, while the mean age of those who preferred to repeat the previously failed task was 12 years and 9 months. The age-range of the subjects was 4 years and 3 months to 14 years and 4 months. The Transition in preference from easy to difficult tasks occurs gradually within the age range from preschool to the early elementary school years (Crandall and Rabson, 1960). Another finding that indicates that young children prefer easy tasks is that in the preschool years LA is low with reference to the child's own past performance. (Sears and Lewin, 1957).

One further study supporting this trend establishes task difficulty by telling the subject the proportion of other children his age who can succeed at each level. Veroff (1969) finds a clear decrease in the number of "easy" tasks chosen from kindergarten to the sixth grade and a clear increase in choices for tasks that are intermediate in difficulty or "hard".

Unrealism decreases with age: Two studies report a second kind of age-related trend for the late elementary school years. Studies by Smith (1969) and by Reidel and Milgram (1970) found that within the range of the late elementary school years older children aspired to intermediate levels more than did younger children. In the Smith Study, goal discrepancy scores (LA minus immediate past performance) were found to have a higher mean and a higher variance in

fourth graders than in fifth graders. That is, fourth graders more often aspired to levels greatly above or below their past performance, while fifth graders tended to set their levels of aspiration closer to their past performance.

Riedel and Milgram (1970) compared third and sixth graders with respect to unrealism of LA. With the standard Level of Aspiration Board developed by Rotter (1942), absolute discrepancy scores were found to be higher for third graders than for sixth graders. However, since LA was assessed by means of "an estimate" and the instructions to the subjects were not reported in detail, it is not clear whether the measure represents LA or expectancy.

Two age trends have been noted: increasing preference for more difficult tasks, and increasing realism of preference. What is the relationship between these two trends? Consider first the trend toward choice of more difficult tasks. It appears that most very young children choose very easy tasks (and, therefore, tend to be unrealistic in the direction of underaspiration). As children grow older the extremely easy tasks are avoided and the choices, for boys at least, are more often for intermediate, and difficult tasks (See Veroff, 1969, p. 72). This trend raises the mean LA and produces a decrease in unrealism because of the increase in the number of subjects selecting tasks of intermediate difficulty. It also has another effect, namely, that the unrealism that does occur in older boys is more often overaspiration than underaspiration.

Determinants of Level of Aspiration

There may be relevant age trends in other factors which occur in addition to, or instead of, LA differences. Specifically, the determinants of LA may change with age, although the actual choices might be the same for two age groups. To consider this possibility it is necessary to present four theories of the determinants of LA.

The Atkinson theory as a framework: The Atkinson model of achievement motivation (Atkinson, 1966) predicts preference for task difficulty by obtaining the strength of the approach tendency (Ta) for each level of task difficulty. The level with the highest Ta becomes the chosen level. According to Atkinson's model Ta is determined by the relative strength of the tendency to achieve success (Ts) and the tendency to avoid failure (T-f): Ta = Ts + T-f. Each tendency is a multiplicative function of three variables. Atkinson has defined those variables and described the function for each tendency as follows:

> "It is assumed that the strength of the tendency to achieve success (Ts) ... is a multiplicative function of three variables: motive to achieve success (Ms), conceived as a relatively general and relatively stable disposition of personality; and two other variables which represent the effect of the immediate environment - strength of expectancy (or subjective probability) that performance of a task will be followed by success (Ps), and the relative attractiveness of success (Is). In other words, Ts = Ms x Ps x Is." (Atkinson, 1974, pp. 13-14)
>
> "Tendency to avoid failure is also considered a multiplicative function of a motive, an expectancy, and an incentive. We speak of the motive to avoid failure (Maf) and refer to a disposition which is separate and distinct from the achievement motive.

> It might be thought of as a capacity for reacting with humiliation and shame when one fails. This is considered the source of individual differences in the anticipatory emotional reaction called anxiety or fear of failure. The tendency to avoid failure (T-f) is aroused and expressed when there is an expectancy that some act might lead to failure (Pf), and it is also influenced by the incentive value of failure at that particular activity. That is T-f = Maf x Pf x If." (Atkinson, 1974, pp. 16-17)

Because Is = 1 - Ps in Atkinson's model, and because Pf = 1 - Ps, there are only 3 independent variables: Ms, Maf, and Ps. Thus $Ta - (Ms - Maf)\{ Ps \times (1 - Ps)\}$ .

Hence, this model explains preference for task difficulty defined by Ps solely by dispositional factors. That is, when a person's Ms is stronger than his Maf, Ta is always positive, and the person should approach the task no matter what the level of difficulty the task is. He would be most attracted to the task of intermediate difficulty where the Ps is .5 and thus the Ps x (1-Ps) is at a maximum. If Maf is stronger than Ms, Ta is always negative. That is the person with Maf > Ms tends to avoid the task, no matter what the level of difficulty of the task. The maximum strength of avoidance tendency occurs when the task is of intermediate difficulty. Thus, when the person is forced to do the task, he would avoid the intermediate level of difficulty, and would choose either an easy or a difficult task.

Accordingly, studies of LA with the Atkinson model have been designed to compare risk preference between Ms > Maf and Maf > Ms groups. Proponents of this approach believe that predictions based on the model have been confirmed in studies

with college and high school students (e.g. Atkinson and Litwin, 1960; Moulton, 1965; Raynor and Smith, 1966; Weiner, 1965) and with elementary school children (Smith, 1969). In these studies, however, there is an additional assumption involved. The Atkinson model deals with preference for task difficulty defined by the subjective probability of success. However, most of these studies do not directly assess subjective probability of success. Rather, it has either been inferred, or it has been presumably established by means of experimental manipulations. Those experimental operations include "structuring the actual task difficulty so that different levels of difficulty are quite apparent to the subject" (Atkinson, 1966, p. 353), presenting subjects "with objective probability or reported norms which involve reference to the performance of related groups" (pp. 353-354), and "relying upon number of trials taken at the task, the actual performance of subjects over trials, or the E's stated conclusions based on the S's past performance on similar tests" (p. 354). To be precise, therefore, the Atkinson model deals with preference for task difficulty defined by subjective probability of success, while past studies deal with preference for task difficulty defined either by the obtained distribution of LA choices or by experimental operations and typically have not measured subjective probability of success directly.

The Atkinson model, per se, does not yield developmental predictions, and therefore does not help to explain the

developmental trends in height and unrealism of LA. If one attempted to extend the Atkinson model to explain these developmental trends, one would, first, look for changes in the component variables of the model, Ms, Maf, expectancy and incentive. Past research has reported that there is some tendency for both Ms and Maf to increase gradually throughout the elementary school years (Smith, 1969, p. 221-223), but there is no indication that one increases more than the other. If changes in motive dispositions are the causes of increasing preference for intermediate difficulty, an increasing dominance of Ms over Maf would have to occur. Accordingly, it would seem to be the case that changes in dispositional variables are not probable candidates for developmental changes in LA. However, there is evidence derived from a study by Kaneda (1972) and studies by Bandura and Kupers (1964) and Liebert and Ora (1968), suggesting that examination of changes in expectancy and incentives may account for developmental changes in LA.

Expectancy theory: A previous unpublished study by the author (Kaneda, 1972) found that children's expectancies of success are affected by their age level, test anxiety, and feedback information. This study suggests a supplement to the Atkinson theory. Fourth and sixth grade Japanese boys were divided into high and low test anxiety groups using scores from the Test Anxiety Scale for children. Three booklets of addition problems, each including seven levels of difficulty, were given individually to obtain performance

levels for each level of difficulty. Expectancy was assessed in terms of the child's estimate of his future level of performance. Accuracy of expectancy was obtained by a measure of the discrepancy between actual and estimated performance. It was found that expectancies were more accurate in 6th graders than in fourth graders, and tended to be more accurate in subjects with low test anxiety than in subjects with high test anxiety. Accuracy of expectancy was also affected by whether the child had feedback about his performance or not.

Being inaccurate in expectancy of success may be a source of unrealism of LA in addition to the individual differences in motives. The Atkinson theory defines unrealism as deviation from a .5 subjective probability of success; the present theory defines unrealism as deviation from a .5 objective probability of success. In other words, level of aspiration choice may consist of two processes. To choose an intermediate level task, one must (a) know which the intermediate task is and (b) desire to choose or to avoid a task with intermediate difficulty. The Atkinson model deals with the determinants of the latter process in terms of the individual's disposition, but does not account for developmental trends in LA. Developmental differences in LA may instead be due to the former process: the better ability of older children to be accurate in locating where the intermediate difficulty levels are. This greater accuracy is consistent with indications from research that older children have more

developed means and strategies for organizing incoming information and detecting patterns and structures than younger children (cf. Farnham-Diggory, 1972).

Value theory: Past research indicates that children in the late elementary school years have not fully developed graded values for success and failure with increasing task difficulty. Studies regarding the effects of modeling on self-reward have reported that, without comparison models, children of the late elementary school years did not show a discriminative pattern of self-reinforcement as a function of increasing levels of performance. But, when models were provided, self-reward varied with the difficulty of the task. (Bandura and Kupers, 1964; Liebert and Ora, 1968).

The fact that younger children do not have clearly differentiated value scales for success and failure at various levels of difficulty may explain their preference for easy tasks. It is possible that young children's aspirations are mainly determined by probability of success and failure and not by value for success and failure. By choosing tasks of lower difficulty, younger children attempt tasks which give them a high probability of success. These children do not consider, for example, that one success on a difficult task may be better than five successes on an easy task.

Atkinson (1969) has suggested this possibility. In commenting on a study by Veroff (1969), he notes that 77 per cent of kindergarten boys pick the easy task. "By 4th grade,

50 per cent of them are picking the moderately difficult task. It is an obvious change from choice of easy task to choice of moderately difficult task. Now why didn't he say that what the children had learned is that the incentive value of success is related to difficulty as defined by the social group? Originally the children behaved as if the incentive value of success was constant for all of the activities because the definition of difficulty based on social comparisons meant nothing to them; they had to learn that people react more approvingly and whatnot when you have done something that is difficult." (p. 204) Although Atkinson is talking about socially-defined incentive values, his comments also seem appropriate for incentives defined by the subject's own internal standards of performance.

Attribution theory: An attribution model of achievement behavior assumes that a person implicitly makes an attribution regarding the causality of the outcome of his performance. His success or failure is attributed to one or more of four factors: ability, effort, task difficulty and luck. These factors comprise two dimensions: locus of control (internal vs. external) and stability (fixed vs. variable) (Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum, 1971). Research with the Weiner model has produced a number of interesting findings about achievement behavior. For example, the dimension of locus of control was found to be important in determining the relationship between task difficulty and affect arousal (Weiner, Heckhausen, Meyer and Cook, 1972).

The stability dimension was found to be important in mediating the relationship between performance outcome and the expectancy for a subsequent attempt (Weiner, Heckhausen, Meyer and Cook, 1972, McMahan, 1973). As to individual differences, those who are high in achievement motivation attribute their success to internal factors more than do those with low achievement motivation (Weiner and Kukla, 1970). In teacher evaluation of students, the inferred amount of student effort expenditure was an important determinant of the amount of reward and punishment that teachers would administer (Rest, Nierenberg, Weiner and Heckhausen, 1973).

Regarding the level of aspiration, the attribution model explains the relationship between effort expenditure and performance outcome (Weiner, Heckhausen, Meyer and Cook, 1972). That is, one would not need very much effort to succeed in a very easy task, and would not expend effort if the task is very difficult and failure is obvious. Making an effort becomes important for succeeding in a task of intermediate difficulty. Thus, the attribution model predicts that tasks of intermediate difficulty will be selected by the individual who knows that effort is the salient determinant of performance outcome and at the same time likes to expend effort to obtain success.

The attributional pattern regarding the causality of performance outcome appears to undergo developmental changes. Attributing success and failure to task difficulty increases from sixth graders to college students and attributing

failure to luck decreases from sixth graders to college students (McMahan, 1973). In a recent study investigating the relative importance of effort or outcome in evaluation of achievement behavior (Weiner and Peter, 1973), it was found that children before age 10 regard having success as more important than trying hard. This relationship is reversed among the 10-12 year-olds; after age 12, outcome again becomes more important than effort.

In summary, although the Atkinson theory provides a general conceptual analysis of LA behavior, it does not generate any developmental predictions. In order to make such predictions, one can supplement the model by allowing for developmental changes in the component variables of the model. The following kinds of theoretical extensions are proposed to account for developmental trends in LA.

First, accuracy of expectancy is hypothesized to increase during the elementary school years. Thus, as children become older, unrealism should decrease as accuracy of expectancy increases.

Second, incentive value is hypothesized to be originally independent of task difficulty and to gradually become inversely related to task difficulty as children become older. Hence, LA should become higher for older children as a result of the increasing value of more difficult tasks.

However, it is assumed that LA realism is a function of <u>both</u> accuracy of expectancy (the developmental variable) and the relative strength of Ms and Maf (the determinants

specified by the Atkinson model). Dispositional variables are still needed to account for within group variations of LA unrealism. Thus accuracy of expectancy should account for between group differences in unrealism, and both accuracy of expectancy and motives should account for within group differences in LA unrealism.

A different theoretical perspective, that of attribution theory, is also employed in the present attempt to explain developmental trends in LA. Attribution theory suggests that developmental changes in effort attribution should lead to changes in LA realism.

Present study: The first objective of the present study is to demonstrate age-related changes in LA height and realism by comparing data from two age groups. The second objective is to investigate developmental changes in the determinants of LA in terms of the approaches summarized above.

The first approach deals with inaccuracy of expectancy as a determinant of developmental changes in LA unrealism. It is assumed that in setting a level of aspiration a person begins by forming a scale of task difficulty which will apply to the various alternatives he can choose. Having such a scale of task difficulty should then permit the person to locate and select a task at his preferred level of difficulty. This line of reasoning leads to the following hypotheses: (1a) the greater the inaccuracy of expectancy the greater the LA unrealism; (1b) younger children will be more inaccurate

in expectancy for success than older children; (1c) unrealism of LA will be greater in younger children than older children.

The process of establishing a scale of task difficulty means establishing an expectancy or subjective probability of success for each level of the task. Such estimates can be relatively accurate or inaccurate. Inaccuracy can be assessed in two ways. The first is simply the discrepancy between estimated difficulty and objective difficulty. The second is the degree to which the subject's subjective scale of task difficulty does or does not increase monotonically as objective levels of task difficulty increase.

If hypothesis 1a is correct it should follow that an experimental manipulation for increasing accuracy of expectancy would also improve the realism of LA.

The second approach examines the role of the subject's value for success and value for failure as determinants of developmental changes in LA height. It is expected that subjects who will choose a difficult task are those who expect higher pleasure for succeeding at a difficult task than at an easy task and/or who expect lower pain for failing at a difficult task than at an easy task. On the other hand, subjects who will choose an easy task are those who do not see a relationship between task difficulty and values for success and failure. This determinant (value scales for success and failure) might have a different effect in the two age groups. Young children might not, for example, attach a higher value for succeeding at a difficult task than at an

easy task; rather they probably expect that success at any task will be equally rewarding. Older children, by contrast, would attach a higher positive value for succeeding and a lower negative value for failing at a difficult task than at an easy task. In sum, it is hypothesized (2a) that children whose values for success and failure are a function of task difficulty will choose more difficult tasks than those whose values for success and failure are independent of task difficulty; (2b) that older children's value scales for success and failure are more a function of task difficulty than are younger children's; (2c) that more difficult tasks will be chosen by older children than younger children.

In the present study, it is considered that the Atkinson model should account for variations in LA unrealism within each age group. That is, the tasks that subjects with Ms>Maf prefer should have a subjective probability of success of approximately .5 while subjects with Maf>Ms should avoid tasks with a Ps of .5. Of the two relevant motives, Ms and Maf, Maf is assessed in terms of test anxiety, but Ms is not assessed. Since a number of studies have shown that the strengths of Ms and Maf are not correlated, the average strength of Ms can be assumed approximately equal in high or

low Maf groups.[1] This means that if the distribution of test anxiety scores for the present sample conforms to norms for the population, a median split on test anxiety scores should create two groups that differ as to which motive dominates the other. Thus, it should be possible with Maf alone to predict task preferences as defined by Ps, that is, those with high Maf should avoid the intermediate levels as do those with Maf>Ms, while those with low Maf should approach them as do those with Ms>Maf. Therefore, the following hypothesis is derived from the Atkinson model (Hypothesis 3): within each age group, preference for intermediate difficulty (defined by subjective probability of success) will be greater for subjects with low test anxiety than for subjects with high test anxiety.

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[1]Atkinson has expressed this argument as follows: "The same logic can be applied, but in reverse, when Test Anxiety has been measured but n Achievement has not. Most anxiety studies deal with more extreme groups than those defined by splitting the distribution scores at the median as in the experiment described above. If n Achievement and Test Anxiety are uncorrelated, a group of persons who score in the top 20 per cent on Test Anxiety will have the same average n Achievement score as a group which scores in the bottom 20 per cent on Test Anxiety. This means that the disposition to be anxious is virtually absent in the low anxiety group, which is otherwise as highly motivated to achieve as the High anxiety group. Subjects classified Low in anxiety, in most of the anxiety studies, are persons in whom the resultant tendency to approach success should be relatively strong. Subjects classified High in anxiety are persons in whom resultant tendency to approach success is either very weak or, what is more likely since only those with the highest 20 per cent of anxiety scores are normally employed, the resultant tendency is avoidant" (Atkinson, 1964, p. 250).

Finally, attribution theory is employed to explain the developmental trend in LA unrealism. Research reviewed earlier suggested that realistic choices increase as children become older as a result of an increase in effort attributions for performance outcomes. Since for younger children, achieving success (outcome) is more important than extent of trying (making an effort), choice of task difficulty is made at easy levels. In sum, it is hypothesized (4a) that the greater the attribution of success to effort or failure to lack of effort, the greater the realism of LA; (4b) older children will attribute success to effort and failure to lack of effort to a greater extent than younger children.

Summary of Hypotheses

In summary, the theoretical approach presented here has suggested the following hypotheses:

Hypothesis 1a. The greater the inaccuracy of expectancy the greater the LA unrealism.

Hypothesis 1b. Younger children will be more inaccurate in expectancy for success than older children.

Hypothesis 1c. Unrealism of LA will be greater for younger children than older children.

Hypothesis 2a. Children whose values for success and failure are a function of task difficulty will choose more difficult tasks than those whose values for success and failure are independent of task difficulty.

Hypothesis 2b. Older children's value scales for success and failure are more a function of task difficulty than are younger children's.

Hypothesis 2c. More difficult tasks will be chosen by older children than younger children.

Hypothesis 3. Within each age group preference for intermediate difficulty defined by subjective probability of success will be greater for subjects with low test anxiety than for subjects with high test anxiety.

Hypothesis 4a. The greater the attribution of success to effort or failure to lack of effort, the greater the realism of LA.

Hypothesis 4b. Older children will attribute success to effort and failure to lack of effort to a greater extent than younger children.

Plan of Present Study

These hypotheses will be tested by contrasting the responses of third and sixth grade males to a task from which information is obtained about LA, expectancy of success, values for success and failure, and attribution for success and failure. The relationship of test anxiety (regarded as a measure of motivation to avoid failure) to LA and expectancy will also be examined.

Methodological Requirements for the Present Study

The methodology in past research on LA has not always been adequate to answer the kinds of questions raised in the present study. The method for the present study must satisfy the following requirements:

1. The LA task must provide a relatively large number of alternatives ranging from very easy to very difficult. This permits a wide range of choice even for a subject who typically overestimates or underestimates his chances of future success. Such a task also makes it possible to obtain a relatively sensitive measure of accuracy of

expectancy, since it permits a wide range of differences between objective and subjective probabilities of success.

2. Task difficulty will be defined relative to the ability of each subject. This is important in order to define the objective probability of success for each subject. This approach defines objective probabilities more accurately, for example, than informing the subject of group norms.

3. The measure of LA must be clearly differentiated from the measure of expectancy. In past research LA and expectancy have not always been clearly distinguished, but this distinction is important for the present study since the relationship of expectancy to LA is of major concern.

4. The task should permit measurement of both LA height and LA unrealism since the present study concerns developmental changes in both aspects of LA.

# METHOD

## Overview of Method

Data were obtained by means of group-administered questionnaires followed by individual testing sessions. In the testing sessions, eleven sets of puzzles representing eleven levels of difficulty were presented, and the subject was first asked to perform puzzles from the 2nd, 4th, 6th, 8th and 10th levels in order to determine how long it took to do each puzzle at each level. Each subject's median performance time was computed for performance at the 4th level. This median performance time for level 4 was used in the subsequent part of the test instructions as the subject's time limit. Then, according to the experimental condition, the subject was told how well he performed in one of three different levels of feedback information: no information, intermediate information or extensive information. Next he was told to choose a puzzle that he wanted to try to complete in his time limit from any of the eleven piles of puzzles. The level he chose was recorded as his LA. Then questions were asked concerning his expectancy of success, his value for success and failure, his attribution for success and failure, and finally, after the subject performed the puzzle he chose, the reason for the choice he made.

Test anxiety, defensiveness, and tendency to lie were assessed by a group-administered questionnaire a few weeks

before the individual interview began. The questionnaire consisted of the Test Anxiety Scale for Children (TASC) (Sarason, Lighthall, Davidson, Waite and Ruebush, 1960. pp. 307-309), the Defensiveness Scale for Children (DSC) and the Lie Scale for Children (LSC) (Sarason, Hill and Zimbardo, 1964. pp. 50-51).

Subjects

The subjects were third and sixth grade boys[1] drawn from two public elementary schools located in a borough of New York City. The schools, geographically about a mile apart, belonged to the same legal district in the New York City Public School System. The majority of the population of those schools was of middle class socio-economic background.

The subjects consisted of those whose parents approved the child's participation by responding personally to a letter from the experimenter. (See copy of letter to parents in Appendix.) In the first school, approximately 50 letters were sent out for each grade, and approval was obtained for

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[1]The theory of achievement motivation derives from research done almost exclusively with male subjects. The theory and projective measure of achievement motivation, as they stand, do not seem directly applicable to females (Horner, 1974). It was felt, therefore, that the hypotheses of the present study could best be studied using only male subjects before the task of accounting for sex differences is undertaken.

37 third and 40 sixth graders. In the second school, approximately 60 letters were sent out for each grade, and approval was obtained for 23 third and 19 sixth graders. The numbers of subjects who took the questionnaire were 34 (third graders) and 31 (sixth graders) in the first school and 17 and 19 (third graders and sixth graders, respectively) in the second school. The final numbers of subjects, who participated in both questionnaire and testing sessions were 33 and 31 in the first school and 17 and 19 in the second school. The dropouts were caused by either failure to take the questionnaire, absence during the testing period, or failure to follow instructions in the experiment.

The subjects consisted of two age groups: third and sixth graders. Mean ages for the third and sixth graders were 8 years and 4 months (SD = 5.1 months) and 11 years and 5 months (SD = 5.6 months). Extensive pretesting which examined various age groups indicated that the tasks to be used in the experiment were not suitable for children below the 3rd grade. It was considered that sixth graders would be old enough to provide a developmental contrast with the third graders. Those two age groups were also chosen to enable comparisons with other studies in which similar age groups have been used.

Experimental Conditions and Assignment of Subjects

The study used a factorial design with two levels of age (3rd and 6th grade) and three levels of feedback information. The three levels of feedback information were

intended to differentiate the subject's understanding of the structure of the task and his knowledge of his actual performance. These components in turn were expected to affect his level of aspiration, expectancy of success, and values for success and failure.

The subjects were assigned to the experimental conditions so that the design would not produce significant differences in the TASC score among the groups. This was done by selecting approximately half of the subjects for each treatment from those with above-median-TASC scores for the grade and half from those with below-median scores. Table 2 presents the number of subjects in each grade and treatment, and the means and SDs for the TASC score, in addition to the DSC and LSC scores, for each grade and treatment. For the third grade subjects, there are no significant differences among the means of the three treatments for TASC scores ($F=.02$, $df=2/47$, n.s.), DSC scores ($F=.23$, $df=2/47$, n.s.), or LSC scores ($F=.28$, $df=2/47$, n.s.). Also, for the sixth grade subjects, there are no significant differences among the means of the three treatments for TASC scores ($F=.42$, $df=2/47$, n.s.), DSC scores ($F=.14$, $df=2/47$, n.s.), and LSC scores ($F=.13$, $df=2/47$, n.s.).

Since TASC alone will be used as a distributional measure with which to explore the relationship between motives and preference for intermediate risk, it is important to show that the distribution of TASC scores obtained from the sample of the present study is typical rather than unusually

TABLE 2

Scores on Test Anxiety Scale for Children, Defensiveness Scale for Children and Lie Scale for Children by Grade and Treatment

| Grade | Treatment (degree of feedback information) | N | TASC[1] | | DSC[2] | | LSC[3] | |
|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | Mean | SD |
| 3 | None | 16 | 10.38 | 6.71 | 12.19 | 4.50 | 4.25 | 3.11 |
| | Intermediate | 18 | 10.06 | 6.47 | 11.44 | 4.33 | 4.94 | 3.51 |
| | Extensive | 16 | 9.88 | 5.60 | 11.31 | 3.30 | 4.93 | 2.32 |
| 6 | None | 17 | 9.76 | 5.84 | 8.53 | 3.57 | 3.06 | 2.49 |
| | Intermediate | 16 | 10.13 | 6.10 | 9.13 | 3.96 | 3.31 | 2.52 |
| | Extensive | 17 | 11.29 | 5.11 | 8.41 | 4.68 | 3.53 | 2.74 |

[1]TASC stands for Test Anxiety Scale for Children

[2]DSC for Defensiveness Scale for Children

[3]LSC for Lie Scale for Children

high or low. As Table 3 shows, means and SDs of the TASC scores of the present study are similar to those reported in the past, and thus it is assumed that the distribution of TASC scores in the 3rd and 6th grade samples of the present study are typical and normative.

Materials and Measures

In this section, the materials and measures used in this study will be described and the reason for selection will be given.

Number connection puzzles: The number connection puzzles used in this study were constructed originally for this experiment through modification of similar kinds of puzzles used in past studies (e.g. Smith, 1969). Each puzzle was printed on a piece of paper. On each page numbers distributed in different patterns were to be connected in consecutive order. To succeed the subject had to connect all the numbers within a given time period. Failure resulted from not finishing the puzzle in time. The difficulty of the puzzle was controlled by the number of numbers included in the puzzle.

There were eleven piles of puzzles representing eleven levels of difficulty. Each pile had more than ten puzzles at the same level of difficulty. The piles were arranged in order in front of the subject from the easiest (the left end) to the most difficult (the right end). They were called from left to right, pile A, B, ...K as indicated on the cover sheet of the pile. Specimen puzzles are shown

TABLE 3

TASC Scores of the Present Sample and Two Other Samples

| | Present Sample | | Hill and Sarason (1966) | | | Smith (1969) | |
|---|---|---|---|---|---|---|---|
| | 3rd Grade | 6th Grade | 3rd Grade | 4th Grade | 6th Grade | 4th Grade | 5th Grade |
| N | 50 | 50 | 157 | 168 | 168 | 86 | 62 |
| Mean | 10.10 | 10.40 | 8.71 | 10.20 | 9.31 | 9.80 | 10.30 |
| SD | 6.15 | 4.96 | 5.83 | 6.50 | 5.40 | 5.96 | 4.40 |

in Appendix II. The puzzles in Pile A had numbers from 1 to 4 placed in a 3 cm x 3 cm frame of 7 cm x 7 cm paper. Puzzles within a pile were different from each other in that the numbers were placed in different patterns. As the difficulty increased by one level, two more numbers were included, and the size of the frame and the paper increased by 1 cm for both sides. Thus the puzzles in the second pile had numbers from 1 to 6 with a 4 cm x 4 cm frame on 8 cm x 8 cm paper; the puzzles in the eleventh pile had numbers from 1 to 24 with a 13 cm x 13 cm frame on 17 cm x 17 cm paper. That the puzzles increased in difficulty from the left to the right was determined in pretesting through examining the mean performance time for the puzzles in the eleven piles. Besides the whole set, there were two additional practice puzzles, one at the easiest level and the other at the most difficult level, which the subject was asked to work when the task was first explained to him.

For several reasons, a number connection puzzle was chosen as the task with which to measure level of aspiration behavior. Since success was defined as the subject's completion of a puzzle within a given time period, it was relatively easy to manipulate objective levels of difficulty of the puzzle by increasing or decreasing the number of numbers to be connected. The increase in actual size of the paper on which the puzzle was printed appeared to assist the subject's perception of the graded levels of difficulty. Moreover, the level of objective difficulty could be pre-

determined by giving the subject a time period that was individually adjusted to the speed of his actual performance. For example, by assigning each subject the time in which he achieved two successes out of four attempts at level 4, level 4 could be considered to be of .5 objective probability of success. The pretesting revealed, also, that the task was not too difficult for the third graders and yet enjoyable for the sixth graders.

Use of only number connection puzzles as the task for this experiement will, of course, limit the generality of its research findings. Individual subjects might react differently to the requirement to perform within a time limit. Some children might be confident in doing puzzles in general, but others might not. Those unknown task-specific factors could obscure the meaning of the results to be obtained. It is certainly advisable to extend the study with different kinds of tasks before drawing final conclusions. However, since this task is representative of tasks used in level of aspiration research, positive results should be sufficient to make tentative conclusions concerning developmental changes in aspiration behavior.

Value scale for success and failure: The scale for evaluating hypothetical success and failure at various levels of difficulty consisted of a picture of nine faces which represented nine gradations from sadness to happiness. The faces were arranged horizontally in order from "very sad" (extreme left) to "very happy" (extreme right) on a 12

inch x 18 inch white drawing paper (see copy of scale in Appendix). Each face was drawn in a circle outline, one and a half inches in diameter with eyes and mouth only; the changing expression of the mouth manifested the level of sadness or happiness. The mouth for the neutral face in the middle position among the nine faces was a straight line, while the ends of the mouth of the sad faces curved downward and those of the happy faces upward in gradual degrees of sadness or happiness. In the instructions the experimenter labeled the middle face "not happy or not sad," faces on the lefthand gradually sadder, and faces on the righthand gradually happier.

The subject was asked to point to a face indicating how happy he would feel if he succeeded on a puzzle from pile H. The question was repeated with reference to piles D, F, J and B. The subject was asked about every other level, but the order of the levels was mixed so as to check on the existence of a monotonic scale of value. Similarly he was asked how sad he would feel if he failed on puzzles from piles H, D, F, J and B.

Then referring back to the number of successes the subject said he expected to make at each level, the experimenter asked for each level, how happy the subject would be if he actually obtained his expected number of successes for that level. This question was included for exploratory purposes and the data obtained will not be reported in the present study.

The picture of nine faces was employed as the scale to measure feelings of success or failure at different levels of difficulty. The incentive variable in the context of an achievement situation is defined as "...the relative attractiveness of a specific goal that is offered in a situation, or the relative unattractiveness of an event that might occur as a consequence of some act (Atkinson, 1966, p. 12)." It was thought that the relative attractiveness or unattractiveness of each level would be represented by the anticipated level of happiness or sadness as a consequence of success or failure in the task. Pictorial face expression seemed a way simple enough for children of the age groups in the present study to understand the scale for representing the level of happiness or sadness. Pretesting assured that children recognized, as the instructions described, the gradual increase and decrease in happiness or sadness in the faces.

Attribution alternatives: Four multiple choice alternatives used in assessing attributions to success or failure were presented on four cards (4 inch x $1\frac{1}{2}$ inch) arranged horizontally in front of the subject. The four success attributions were: 1. I am good at doing puzzles. 2. I tried hard. 3. The puzzle was easy. 4. I was lucky. Four failure attributions were: 1. I am not really good at doing puzzles. 2. I did not try hard. 3. The puzzles were too hard. 4. I was unlucky. The subject was asked to rank them in order of importance as causes of success or

failure in working the puzzles.

The measure of attribution was influenced by Weiner's theory of attribution and achievement. An attempt was made to simplify Weiner's categories of ability, effort, task difficulty and luck so they would be suitable for elementary school children.

Questionnaire: The questionnaire items consisted of the TASC, the DSC and the LSC. The form had identification blanks at the top of the first page and seventy questions with a pair of "yes" and "no" responses to be circled for each of the questions. The first thirty questions were the TASC items and the rest were the DSC and LSC items including two filler items. The instructions for introducing the questionnaire were taken from the standard instructions for the TASC, and to connect the TASC items and the DSC items the experimenter simply mentioned that the questions from 31 to 70 would be a little different from the previous ones but could be answered in the same way. All the TASC items are keyed "yes", DSC "no", and LSC "yes". The ranges of possible scores are 0-30 for TASC, 0-27 for DSC, and 0-11 for LSC.

The TASC and DSC have been used extensively for assessing Test Anxiety and Defensiveness in children. Test anxiety is conceived as anxiety evoked in a situation in which one is being evaluated, and defensiveness as "a tendency to deny the experience of negative feeling such as anxiety, hostility, inadequacy, etc." (Sarason, Hill and Zimbardo,

1964). Test anxiety is regarded as indicative of motivation to avoid failure (Maf) in achievement motivation research. Defensiveness has been found to relate to goal-setting behavior in late elementary school children (Smith, 1969). The LSC, assessing the tendency to lie in children, was included in the present study for exploratory purposes.

Procedure

The questionnaire was administered as a group test for each grade in each school a few weeks before the interview began. The seventy items were answered in one session, taking approximately 45 minutes for the third graders and 35 minutes for the sixth graders. For purposes of identification, children were asked to write their initials and classroom number on the questionnaire.

The individual testing sessions were conducted in a small room separate from the classroom but in the same school building. The subject came with the experimenter to the testing room, where all the necessary materials were prepared on the table. (See photograph in Appendix IV.) The experimenter and the subject were seated face to face with the table in between. The experimenter switched on the tape recorder and started the interview by asking the subject's name, birth date and age. Then the experimenter began to deliver the instructions. (The instructions appear verbatim in Appendix V.) The following is a brief description of the procedure.

The experimenter told the subject that he was to

perform some number connection puzzles to show how well he could do this kind of puzzle. Then two practice puzzles were given to the subject; the experimenter explained how the puzzles were to be solved and the subject worked them. The experimenter described how the eleven subtasks were different from each other in degree of difficulty. Following the description of the materials, the subject was given four puzzles from pile B and told to solve each of them as quickly as possible, and the experimenter measured each performance time. In the same way, the performance times were obtained for each of four puzzles from piles D, F, H, and J. From the four performance times of the pile D puzzles the median time was computed (with fractions rounded off) and used in the subsequent instructions as the subject's individual time limit. See Appendix VII for each subject's individual time limit.

In the instructions for feedback, level of aspiration, and expectancy, "success" was, as mentioned before, defined by the subject's completion of the puzzles within the individualized time limit. In order to provide data to see if subjects differed in their accuracy of judging time and also to give a brief training for the time estimate, the subject was told to show how long he thought his time limit was by tapping the desk at the beginning and ending of the duration, and the estimate was corrected by the experimenter. The accuracy of these estimates will be related to LA and expectancy variables in the results section.

The subjects were divided into three different levels

of feedback information. The subjects in the "no information" group were told only "...I found out that you can finish some of the puzzles successfully in ___ sec, but other puzzles you were not able to finish in ___ sec." All subjects in the "intermediate information" group were given the following standard feedback regardless of their actual performance.

> "Now I can tell you how many successes you got for pile B and pile F. You worked 4 puzzles from pile B, and you finished 3 puzzles successfully in less than ___ sec and you took more than ___ sec to finish 1 puzzle. That means for puzzles with numbers from 1 to 6, you got 3 successes out of 4 tries. Out of 4 puzzles you worked for pile F, only one puzzle was finished in ___ sec and 3 puzzles were not. That means for puzzles with numbers from 1 to 14, you got one success out of 4 tries."

All subjects in the "extensive information" group were told that they obtained 3 successes for level 2, 2 successes for level 4, 1 success for level 6, and 0 success for levels 8 and 10. The number of successes was related to the structure of the task by the experimenter's calling attention to the difficulty level of the puzzles in terms of the number of numbers to be connected.

All the groups were given the level of aspiration task by telling each subject that he had one more chance to work on the puzzle with the same time limit, and that he was to choose a puzzle at any level of difficulty "that you want to try to complete in ___ sec." The level he selected was his level of aspiration. He was also asked which level he would have chosen if he had two more seconds for his time limit.

Before the subject actually worked on the selected puzzle, the experimenter asked three sets of questions concerning expectancy of success, value for success and failure, and attribution for success and failure. Then the subject performed the puzzle that he selected as his aspiration level given his time limit. See Appendix VIII for levels chosen and outcome of performance.

At the end of the session, the experimenter asked the subject why he had selected the puzzle and asked several other questions to get at the subject's preference.

Measurement

LA was regarded as the level among the 11 possible levels that a subject chose on his last chance to try. The chosen level provides a measure of the height of LA. Unrealism of LA is the absolute difference between the level chosen and level 4 i.e., $|LA - 4|$. (Level 4 was the .5 objective probability of success level for all subjects.)

Several indexes of inaccuracy of expectancy were obtained. First, as an indication of inability to form a subjective probability scale for 11 levels of monotonically increasing task difficulty, the number of irregularities in 11 expectancy responses was counted. Expectancy of success values were expected to increase monotonically from level 1 to level 11. Any instance of a decrease was regarded as an irregularity. (An instance of no change from one level to the next was not counted as an irregularity.)

The next two indexes were identified as "Sum of Absolute Discrepancies" and "Absolute Discrepancy from Level 4". For

the Sum of Absolute Discrepancies, three absolute discrepancies between the subject's expected number of successes and his actual performance level at three difficulty levels were summed. Those three difficulty levels were levels 1, 4 and 8 at which the subject's objective probability of success was assumed to be 100%, 50% and 0% respectively by virtue of the task and the experimental procedure. The Absolute Discrepancy from Level 4, was simply the absolute discrepancy between the subject's expectancy for Level 4 and .5. These two measures assessed two aspects of expectancy inaccuracy. The Sum of Absolute Discrepancies represents inaccuracy observed over a wide range of levels of difficulty, while Absolute Discrepancy from Level 4 represents inaccuracy at only the level of .5 objective probability of success. High scores on these variables represent a high degree of inaccuracy. Since absolute differences were used, inaccuracy on these indexes can take the form of overestimation, underestimation, or any combination of the two.

Two indexes of over- or underestimation of expectancy were obtained. They are identified as "Sum of Signed Discrepancies" and "Signed Discrepancy from Level 4". For Sum of Signed Discrepancies, the same three discrepancy scores as for Sum of Absolute Discrepancies, were summed with signs retained. For the Signed Discrepancy from Level 4 the discrepancy score at level 4 with sign was employed. These two measures assessed two aspects of over- or underestimation of expectancy. Sum of Signed Discrepancies

represents over- or underestimation observed in overall expectancy responses for various levels of difficulty, while Signed Discrepancy from Level 4 represents over- or underestimation with regard to only the level of .5 objective probability of success. High scores on these variables show a high degree of overestimation.

Success and failure value scale responses were examined for evidence of the absence of monotonically increasing value scales. It was assumed that a large number of irregularities in value responses for various levels of difficulty indicated that the scale did not exist for the subject. One irregularity was counted when a lower positive value was assigned to a success or a higher negative value was assigned to a failure at a more difficult level.

Responses to the attribution rankings were scored to indicate the importance of each attribution. A first choice received weight of 4, a second 3, a third 2, and a fourth 1.

Scores for the dispositional variables were obtained by counting the number of "Yes" responses among the items on the Test Anxiety Scale for Children, "No" responses on the Defensiveness Scale for Children, and "Yes" responses on the Lie Scale for Children.

An index of error in time estimate is the time estimate (TE) minus the time limit (TL) divided by TL. The specific formula used for the signed percentage time estimate error (%TEE) was as follows:

$$\text{Signed \%TEE} = \frac{TE - TL}{TL} \times 100$$

The absolute percentage time estimate error was calculated using the absolute difference instead of the signed difference:

$$\text{Absolute \%TE} = \frac{|TE - TL|}{TL} \times 100$$

# RESULTS

## Age Differences in Level of Aspiration

As mentioned above, previous research has revealed age trends in height and unrealism of LA. A major purpose of the present study is to account for those age trends, but it will first be determined whether this study found evidence of the same age trends.

Table 4 presents LA height by grade and treatment, and Table 5 presents unrealism by grade and treatment. Analyses of variance carried out on these data reveal no significant main effects or interactions for grade or information conditions. However, as Table 4 shows, there is a nonsignificant tendency for LAs to be higher for 6th graders (Mean = 6.10) than for third graders (M = 5.60). As Table 5 shows, there is also a nonsignificant tendency for LAs to be more realistic for sixth graders (Mean = 2.44) than for third graders (Mean = 2.56). These differences are in the same direction as the age trends reported in previous research although these trends are not as strong as in some previous studies.

Results concerning the trend toward realism are more clear-cut, however, when the data are analyzed in a different way. One index of realism is the degree to which extremely high or low LAs are selected. For the following analysis, levels 1 and 2 and levels 10 and 11 were considered extreme, and all other levels were considered

TABLE 4

Height of Level of Aspiration by Grade and Treatment

| | Treatment (degree of feedback information) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | None | | Intermediate | | Extensive | | Treatments Combined | |
| Grade | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 3 | 5.44 | 2.90 | 5.83 | 3.37 | 5.50 | 3.27 | 5.60 | 3.13 |
| 6 | 6.00 | 2.09 | 6.06 | 2.79 | 6.23 | 2.33 | 6.10 | 2.37 |

TABLE 5

Unrealism of Level of Aspiration by Grade and Treatment

| | Treatment (degree of feedback information) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | None | | Intermediate | | Extensive | | Treatments Combined | |
| Grade | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 3 | 2.31 | 2.21 | 2.61 | 2.77 | 2.75 | 2.24 | 2.56 | 2.39 |
| 6 | 2.11 | 1.96 | 2.69 | 2.15 | 2.35 | 2.21 | 2.44 | 2.07 |

Note: Unrealism of LA = $|LA - 4|$

moderate. Among the sixth graders there are 44 moderate choices and 6 extreme choices; among the third graders there are 34 moderate choices and 16 extreme choices ($X^2 = 5.83$, $df = 1$, $p < .02$). Thus when the data are analyzed in this manner, significant age differences indicating a trend toward increasing realism are obtained.

Data as to whether the subject shifted LA upward or downward with an additional 2 seconds added to his time limit also reveal an interesting age-related trend. The reasonable thing to do would be to shift LA upward. While all 50 of the sixth graders shifted upward or stayed at the same level, only 43 of the 50 third graders shifted upward or stayed at the same level. Thus, there are significantly more unexpected downward shifts among the third graders ($X^2 = 5.36$, $df = 1$, $p < .02$). The greater number of unreasonable shifts by third graders might be due to a ceiling effect. However, a check indicates that four out of nine third graders who set LA at level 11 shifted downward, while none of the five sixth graders who chose level 11 did so. Thus, the difference in downward shifts does not appear to be due solely to a ceiling effect.

Determinants of Level of Aspiration

Three approaches were used to search for determinants of LA in the two grades. The first concerned expectancy; the second, value for success and failure; and the third, attribution for success and failure. The results are reported in this order. In addition, effects due to dispositional

factors and errors in time estimate are also reported, and a table of intercorrelations among all the variables is presented in the Appendix.

Expectancy theory: Hypothesis 1a states that the greater the inaccuracy of expectancy the greater the LA unrealism. Table 6 presents correlations between unrealism of LA and indexes of inaccuracy of expectancy for the two grades. For the third grade the correlations are all positive. The only significant correlation is between Sum of Absolute Discrepancies and unrealism of LA and indicates that accuracy of expectancy over a wide range of difficulty levels is associated with realism of LA ($r = .41$) for the third graders. For the sixth graders, there is a significant relationship between the two indexes of signed discrepancies and LA unrealism. This mixed pattern of results indicating that inaccuracy of expectancy is a correlate of LA unrealism in both grades provides partial support for hypothesis 1a.

Hypothesis 1b states that younger children will be more inaccurate in expectancy for success than older children. Table 7 presents means and standard deviations for the different indexes of inaccuracy of expectancy by grade and treatment. Analyses of variance reported in Table 8 show that irregularity is significantly higher in the third grade than in the sixth grade ($p < .0002$) and that the third graders are significantly more inaccurate than the sixth graders according to each of the two absolute discrepancy indexes (for Sum of Absolute Discrepancies $p < .001$; for

TABLE 6

Correlations between Unrealism of Level of Aspiration and Inaccuracy of Expectancy Indexes

| Index of Inaccuracy of Expectancy | Grade 3 | Grade 6 |
|---|---|---|
| Irregularity | .11 | -.12 |
| Sum of Absolute Discrepancies | .41*** | .07 |
| Absolute Discrepancy from Level 4 | .23 | .17 |
| Sum of Signed Discrepancies | .24 | .36*** |
| Signed Discrepancy from Level 4 | .16 | .34*** |

Note: Unrealism of LA = $|LA - 4|$

*** $p < .01$

TABLE 7

Means and Standard Deviations for Inaccuracy of Expectancy Indexes by Grade and Treatment

| Index of Inaccuracy of Expectancy | Grade | Treatment (degree of feedback information) | | | | | | Treatments Combined | |
|---|---|---|---|---|---|---|---|---|---|
| | | None | | Intermediate | | Extensive | | | |
| | | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Irregularity | 3 | 2.56 | 1.75 | 1.67 | 1.61 | 1.75 | 1.69 | 1.98 | 1.70 |
| | 6 | .82 | 1.51 | 1.00 | 1.21 | .53 | 1.07 | .78 | 1.27 |
| Sum of Absolute Discrepancies | 3 | 9.56 | 3.79 | 8.33 | 3.16 | 8.75 | 3.44 | 8.86 | 3.43 |
| | 6 | 7.41 | 3.04 | 6.00 | 3.20 | 6.29 | 3.42 | 6.58 | 3.22 |
| Absolute Discrepancy from Level 4 | 3 | 2.50 | 1.51 | 2.06 | 1.35 | 2.44 | 1.41 | 2.32 | 1.41 |
| | 6 | 2.00 | 1.62 | 1.13 | 1.26 | 2.06 | 1.30 | 1.74 | 1.44 |
| Sum of Signed Discrepancies | 3 | 2.38 | 7.37 | .89 | 6.62 | 1.81 | 6.26 | 1.66 | 6.65 |
| | 6 | 3.41 | 6.63 | 3.12 | 5.10 | 1.24 | 5.91 | 2.58 | 5.89 |
| Signed Discrepancy from Level 4 | 3 | .75 | 2.89 | -.42 | 2.16 | .81 | 2.76 | .35 | 2.62 |
| | 6 | 1.53 | 2.10 | .63 | 1.59 | .18 | 2.48 | .78 | 2.13 |

TABLE 8

Summary of Analyses of Variance for Inaccuracy of Expectancy Indexes by Grade and Treatment

| Inaccuracy of Expectancy Index | Source of Variance | df | MS | F | P |
|---|---|---|---|---|---|
| Irregularity | Grade (A) | 1 | 36.46 | 16.34 | .0002 |
| | Treatment (B) | 2 | 2.62 | 1.17 | n.s. |
| | AB | 2 | 2.39 | 1.07 | n.s. |
| | Error | 94 | 2.23 | | |
| Sum of Absolute Discrepancies | Grade (A) | 1 | 133.53 | 11.92 | .001 |
| | Treatment (B) | 2 | 15.53 | 1.38 | n.s. |
| | AB | 2 | .20 | <1.0 | n.s. |
| | Error | 94 | 11.20 | | |
| Absolute Discrepancy from Level 4 | Grade (A) | 1 | 9.07 | 4.54 | .03 |
| | Treatment (B) | 2 | 4.81 | 2.41 | .09 |
| | AB | 2 | .70 | <1.0 | n.s. |
| | Error | 94 | 2.00 | | |
| Sum of Signed Discrepancies | Grade (A) | 1 | 20.15 | <1.0 | n.s. |
| | Treatment (B) | 2 | 16.05 | <1.0 | n.s. |
| | AB | 2 | 16.58 | <1.0 | n.s. |
| | Error | 94 | 41.45 | | |
| Signed Discrepancy from Level 4 | Grade (A) | 1 | 3.89 | <1.0 | n.s. |
| | Treatment (B) | 2 | 9.10 | 1.62 | n.s. |
| | AB | 2 | 6.77 | 1.21 | n.s. |
| | Error | 94 | 5.60 | | |

Absolute Discrepancies from Level 4, $p < .03$). For the signed discrepancy indexes, the sixth graders are somewhat, but not significantly, higher than the third graders. This means that the third graders tend to both over- and underestimate, whereas the sixth graders primarily overestimate. This pattern of results provides relatively clear support for hypothesis 1b.

Hypothesis 1c states that unrealism of LA will be greater for younger children than for older children. This hypothesis has already been supported by the analysis reported earlier showing that the third graders make significantly more extreme LA choices than the sixth graders.

The effectiveness of the feedback manipulation was examined by comparing inaccuracy scores in the three treatment groups for each grade (see Table 7). Analyses of variance given in Table 8 for each of the inaccuracy of expectancy indexes for each grade show that there are no significant differences between the three groups in either grade. However, there are some indications that some effect might be present since the two groups that had some feedback considered together have a lower mean than the group with no feedback. Comparison of these means using the error term from the analyses of variance reveals only one significant difference. For Sum of Signed Discrepancies, the mean of the intermediate and extensive feedback groups combined is significantly lower than the mean of the no feedback group for the sixth grade ($t = 2.17$, $df = 47$, $p < .05$).

A comparison of mean LA unrealism between the no feedback group (mean = 2.11) and the intermediate and extensive groups combined (mean = 2.49) in the sixth grade, however, does not show that unrealism decreases with feedback information.

Value theory: The second approach investigates the relationship between LA height and the value scales for success and failure. To determine the extent to which the value scale was a function of task difficulty, the number of irregularities in value scale responses was counted for each subject. A subject whose values for success increased gradually as task difficulty increased would have no irregularities, but a subject whose values did not follow the changes in task difficulty would have a high irregularity score.

Hypothesis 2a states that children whose values for success and failure are a function of task difficulty will choose more difficult tasks than those whose values for success and failure are independent of task difficulty. Table 9 presents the frequency of subjects with different numbers of irregularities and Table 10 presents the means and SDs for LA height by grade and high-low irregularity in success value responses. The high-low median split was made between 0 and 1 irregularity. Inspection of the table shows that the mean LA in low irregularity subjects is higher than in high irregularity subjects in both grades as predicted. However, the two-way analysis of variance reported in Table 10

TABLE 9

Number of Irregularities in Success and Failure Value Responses

| Outcome | Grade | Number of Irregularities | | | | Mean | SD |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | | |
| Success | 3 | 21 | 20 | 7 | 2 | .80 | .83 |
| | 6 | 31 | 12 | 5 | 2 | .50 | .84 |
| Failure | 3 | 7 | 15 | 20 | 8 | 1.58 | .93 |
| | 6 | 21 | 15 | 13 | 1 | .88 | .87 |

TABLE 10

Means and Standard Deviations for Height of Level of Aspiration by Grade and High-Low Irregularity in Success Value Responses

| Grade | Irregularity[1] | N | Mean | SD |
|---|---|---|---|---|
| 3 | Low | 21 | 6.10 | 3.53 |
| | High | 29 | 5.24 | 2.81 |
| 6 | Low | 31 | 6.29 | 2.49 |
| | High | 19 | 5.79 | 2.00 |

[1]The "Low" irregularity group consists of subjects with 0 irregularity occurrence, while subjects in the "High" group have 1 or more irregularities.

Analysis of Variance[1]

| Source of Variance | df | MS | F | P |
|---|---|---|---|---|
| Grade (A) | 1 | 3.18 | <1.0 | n.s. |
| High-Low Irregularity (B) | 1 | 11.09 | 1.43 | n.s. |
| AB | 1 | .75 | <1.0 | n.s. |
| Error | 96 | 7.74 | | |

[1]The Analysis of Variance employed the least squared method.

indicates that the difference due to high-low irregularity is not significant.[1]

Table 11 reports the means and SDs for LA height by grade and high-low irregularity in failure value responses. The median split for irregularity for the third grade was between 1 and 2, and for the sixth grade between 0 and 1. Again mean LA height tended to be higher in subjects with low irregularity, but the difference is not significant.

The success and failure value scales together functioned more strongly in their effects on LA height than either considered separately. Table 12 presents the means and SDs for LA height for each grade for subjects whose irregularity scores were low on both the success and failure scales and for subjects whose irregularity scores were high on both scales. Subjects with low irregularities on both scales are significantly higher in mean LA height than subjects with high irregularities (see analysis of variance in Table 12 ). Hypothesis 2a is supported by these findings.

Hypothesis 2b states that older children's value scales for success and failure are more a function of task difficulty than are younger children's. The range of the obtained number of irregularities was zero to three in each grade for both the success and failure value scales. Treatment groups were combined because there were no significant differences between them in either success value responses ($F < 1.0$, $df = 1/94$,

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[1]An Analysis comparing extreme groups (0 vs. 2 or more) revealed an accentuated difference, but it is also not significant.

TABLE 11

Means and Standard Deviations for Height of Level of Aspiration by Grade and High-Low Irregularity in Failure Value Responses

| Grade | Irregularity[1] | N | Mean | SD |
|---|---|---|---|---|
| 3 | Low | 22 | 6.23 | 3.52 |
| | High | 28 | 5.11 | 2.75 |
| 6 | Low | 21 | 6.43 | 2.32 |
| | High | 29 | 5.86 | 2.42 |

[1]The "Low" irregularity group consists of subjects with 0 or 1 irregularity occurence for the third grade and 0 irregularity occurence for the sixth grade, while subjects in the "high" group have 2 or more for the third grade and 1 or more irregularities for the sixth grade.

Analysis of Variance[1]

| Source of Variance | df | MS | F | P |
|---|---|---|---|---|
| Grade (A) | 1 | 6.68 | .87 | n.s. |
| High-Low Irregularity (B) | 1 | 17.49 | 2.28 | n.s. |
| AB | 1 | 1.87 | .24 | n.s. |
| Error | 96 | 7.68 | | |

[1]The Analysis of Variance employed the least squared method.

TABLE 12

Means and Standard Deviations for Height of Level of Aspiration by Grade and Low-Low and High-High Irregularity in Success and Failure Value Responses

| Grade | Irregularity[1] | N | Mean | SD |
|---|---|---|---|---|
| 3 | Low-Low | 10 | 7.10 | 3.70 |
| | High-High | 17 | 5.06 | 2.46 |
| 6 | Low-Low | 13 | 6.46 | 2.18 |
| | High-High | 11 | 5.36 | 1.75 |

Analysis of Variance[2]

| Source of Variance | df | MS | F | P |
|---|---|---|---|---|
| Grade (A) | 1 | .201 | .03 | n.s. |
| High-Low Irregularity (B) | 1 | 30.69 | 4.69 | .035 |
| AB | 1 | 2.72 | .42 | n.s. |
| Error | 96 | 6.55 | | |

[1]Low-Low refers to the group of subjects low in irregularity for both value scale for success and value scale for failure, while High-High refers to the group high in irregularity for both value scales.

[2]The Analysis of Variance employed the least squared method.

n.s.) or in failure value responses ($F < 1.0$, $df = 1/94$, n.s.).

Table 9 reports the frequency of irregularities in success value responses and in failure value responses, and the means and SDs for each grade. In both grades mean irregularity was higher for the failure value scale than for the success value scale, but the difference was significant only in the third grade ($t = 4.67$, $df = 49$, $p < .001$). In both value scales, third graders were higher in mean irregularity than sixth graders, but only the age difference in failure value irregularity was significant ($X^2 = 13.93$, $df = 3$, $p < .01$). These results provide support for hypothesis 2b.

Hypothesis 2c states that more difficult tasks will be chosen by older children than younger children. This hypothesis was not confirmed, although as reported earlier, there was a nonsignificant tendency for older children to set higher LAs than younger children.

The Atkinson theory and dispositional variables: Descriptive results for dispositional variables are presented in Tables 13 and 14. Table 13 shows that DSC and LSC scores are significantly higher in the third grade (for DSC $p < .001$; for LSC $p < .02$), while TASC scores are slightly but not significantly higher in the sixth grade. There were no hypotheses about age changes in these variables, but it is of interest to note that they are in the same direction as those reported in prior research (Hill and Sarason, 1966, p. 54).

Table 14 reports intercorrelations among these measures.

TABLE 13

Means and Standard Deviations for TASC, DSC and LSC

| | Grade | | | | | |
|---|---|---|---|---|---|---|
| | 3 | | 6 | | | |
| Scales | Mean | SD | Mean | SD | t | P |
| TASC | 10.10 | 6.16 | 10.40 | 4.96 | .27 | n.s. |
| DSC | 11.64 | 3.88 | 8.68 | 4.03 | 3.73 | .001 |
| LSC | 4.92 | 3.00 | 3.30 | 2.54 | 2.55 | .02 |

TABLE 14

Intercorrelations among TASC, DSC and LSC

| | DSC | | LSC | |
|---|---|---|---|---|
| | 3rd | 6th | 3rd | 6th |
| Test Anxiety Scale for Children | -0.71*** | -.15 | -.68*** | -.28* |
| Defensiveness Scale for Children | | | .75*** | .60*** |

* $p < .05$ two-tailed

** $p < .02$ two-tailed

*** $p < .01$ two-tailed

Note: N=50 for each correlation

As expected from prior findings there is a moderately strong positive relationship between the two measures of defensive tendencies (DSC and LSC). The expected negative relationship between reported test anxiety and the two measures of defensive tendencies is also obtained, though it is relatively weak among the sixth grade subjects.

Hypothesis 3 states that within each age group preference for intermediate difficulty defined by subjective probability of success will be greater for subjects with low test anxiety than for subjects with high test anxiety. This means that subjects with relatively high motivation to avoid failure (high in TASC) are expected to select LAs where the corresponding expectancies are either high or low but not intermediate. Table 15 presents information on the relationship between test anxiety and the expectancy the subject has assigned for his LA (expectancy for LA). For the present analysis, expectancies of .4, .5, and .6 are considered "intermediate," expectancies of 0 to .3 are considered "difficult," and expectancies of .7 to 1.0 are considered "easy". The frequency of preference for "easy," "intermediate," and "difficult" ranges for subjects above and below the TASC median is reported in Table 15. Contrary to the Atkinson theory, the low anxiety group does not have a higher frequency of preference for the intermediate difficulty range than the high anxiety group in either the third or sixth grade. Thus, hypothesis 3 is not confirmed.

An additional analysis contrasting only subjects in the

TABLE 15

Frequency of Easy, Intermediate and Difficult Task Selections

Made by Subjects High and Low in Test Anxiety

| Grade | TASC | N | Preference (in Terms of Expectancy for LA) Difficult (Ps = 0 to .3) | Intermediate (Ps = .4 to .6) | Easy (Ps = .7 to 1.0) |
|---|---|---|---|---|---|
| 3 | Above Median (Mean = 15.16 SD = 3.84) | 25 | 12 | 10 | 3 |
| | Below Median (Mean = 4.64 SD = 3.66) | 25 | 9 | 7 | 9 |
| 6 | Above Median (Mean = 14.35 SD = 2.80) | 26 | 8 | 13 | 5 |
| | Below Median (Mean = 6.13 SD = 2.67) | 24 | 8 | 11 | 5 |
| 3 | Upper 25% (Mean = 18.09 SD = 3.94) | 11 | 6 | 5 | 0 |
| | Lower 25% (Mean = 2.25 SD = 1.01) | 12 | 3 | 5 | 4 |
| 6 | Upper 25% (Mean = 16.67 SD = 2.25) | 12 | 0 | 7 | 5 |
| | Lower 25% (Mean = 3.83 SD = 2.14) | 12 | 3 | 4 | 5 |

Note: Expectancy for LA is the expectancy the subject assigned to the task he selected as his LA

upper 25 percent of the TASC distribution with those in the lower 25 percent also fails to confirm hypothesis 3. The frequencies, as given in the lower part of Table 15, reveal a nonsignificant tendency for subjects in the high TASC group to choose a greater proportion of intermediate as compared with extreme difficulties than subjects in the low TASC group --a trend opposite to that specified by the hypothesis.

It is of interest to note the relationship between LA height and the expectancy for LA. The correlation between these variables for the third grade is -.29 ($p < .05$) and for the sixth grade is -.30 ($p < .05$). Thus, in both grades, the greater the objective difficulty of the selected task, the greater the subjectively expected difficulty. The obtained relationship is not very strong. This means, for example, that some subjects may be choosing objectively difficult tasks and <u>expecting</u> them to be either moderately difficult or even easy.

The following analysis deals with the relationship between test anxiety and LA unrealism that is relevant to the Atkinson model. The direct relationship between all the dispositional variables and LA height and LA unrealism is reported in Table 16. None of the correlations is significent. Among these correlations, specifically, the one between TASC and LA unrealism is the most relevant to the Atkinson model. There is no evidence in either grade that subjects with lower test anxiety set more realistic LAs, that is, LAs closer to an objective probability of success

TABLE 16

Correlations between Height and Unrealism of Level of Aspiration and Dispositional Variables

| | Level of Aspiration | | | |
|---|---|---|---|---|
| | Height | | Unrealism | |
| | Grade 3 | Grade 6 | Grade 3 | Grade 6 |
| Test Anxiety Scale for Children | .00 | .24 | .00 | .12 |
| Defensiveness Scale for Children | .08 | -.22 | .20 | -.18 |
| Lie Scale For Children | -.09 | -.24 | .10 | -.13 |

Unrealism = | LA - 4 |

of .5.

The relationship was examined further by contrasting LA unrealism in subjects with high and low anxiety with the expectation that low anxiety subjects should more often set LAs in the intermediate range. Table 17 presents means of LA unrealism in the above-median and below-median test anxiety groups for the third and sixth grades. The expected test anxiety difference in LA unrealism did not occur in either grade. An additional analysis contrasted subjects in the upper 25% of the TASC distribution with those lower 25%. As the lower part of the Table 17 indicates, there is a nonsignificant tendency for subjects with low test anxiety to be more realistic than subjects with high test anxiety in the sixth grade, but there is no such tendency in the third grade. In summary, only differences between anxiety groups for the sixth grade reveal the expected (but nonsignificant) tendency for subjects with low test anxiety to set more realistic LAs.

We can now consider how inaccuracy of expectancy intervenes between all three dispositional variables and the LA variables:

Dispositional variables --- Inaccuracy of expectancy --- LA height and LA unrealism

In Table 18 correlations between dispositional variables and inaccuracy of expectancy variables are reported. There are some significant correlations in both grades, but the direction of the correlations is different in the two grades.

TABLE 17

Mean Unrealism of High and Low TASC Groups

| TASC Groups | Grade 3 | | | Grade 6 | | |
|---|---|---|---|---|---|---|
| | N | Mean | SD | N | Mean | SD |
| Above Median | 25 | 2.36 | 2.32 | 26 | 2.54 | 2.12 |
| | | (t=.59) | | | (t=.56) | |
| Below Median | 25 | 2.76 | 2.49 | 24 | 2.21 | 1.98 |
| . . . . . | | | | | | |
| Upper 25% | 11 | 2.09 | 2.55 | 12 | 2.92 | 2.32 |
| | | (t=.52) | | | (t=1.46) | |
| Lower 25% | 12 | 2.67 | 2.77 | 12 | 1.83 | 1.19 |

For the third grade, correlations are negative with TASC and positive with DSC and LSC. For the sixth grade the reverse is true. Apparently the dispositional variables function significantly but differently in the two grades.

Correlations between inaccuracy of expectancy variables and LA variables are reported in Table 19. For the third grade correlations with absolute discrepancy variables are significant and for the sixth grade those with signed discrepancy variables are significant. This demonstrates that for the third grade both over and underestimating subjects set high and unrealistic LAs while for the sixth grade only highly overestimating subjects set high and unrealistic LAs.

The findings reported in Tables 18 and 19 are summarized in Figure 1 to show the overall relationship between dispositional variables and LA variables in each grade. There are no significant relationships in either grade between the dispositional variables and the LA variables. However, we may interpret the results as showing indirect effects of dispositional variables on LA variables by way of intervening expectancy variables.

In Figure 1 arrows with dashed lines represent significant correlations between variables. A solid line designates correlations between dispositional variables and LA variables by way of expectancy variables. In other words, a solid line indicates that the dispositional effects reached to the LA variables. A dashed line designates a relationship found only between dispositional variables and

TABLE 18

Correlations between Dispositional Variables and Expectancy Variables

| Expectancy Variables | Dispositional Variables | | | | | |
|---|---|---|---|---|---|---|
| | TASC | | DSC | | LSC | |
| | Grade 3 | Grade 6 | Grade 3 | Grade 6 | Grade 3 | Grade 6 |
| Sum of Signed Discrepancies | -.30* | .32* | .22 | -.33** | .28* | -.44*** |
| Signed Discrepancy from Level-4 | -.33** | .26 | .17 | -.36*** | .18 | -.41*** |
| Sum of Absolute Discrepancies | -.22 | .02 | .30* | -.50*** | .15 | -.34** |
| Absolute Discrepancy from Level-4 | -.13 | .07 | .09 | -.33** | -.06 | -.18 |
| Irregularity | -.01 | -.02 | -.03 | .21 | .07 | .04 |

* $p < .05$, two-tailed

** $p < .02$, two-tailed

*** $p < .01$, two-tailed

TABLE 19

Correlations between Height and Unrealism of Level of Aspiration and Expectancy Variables

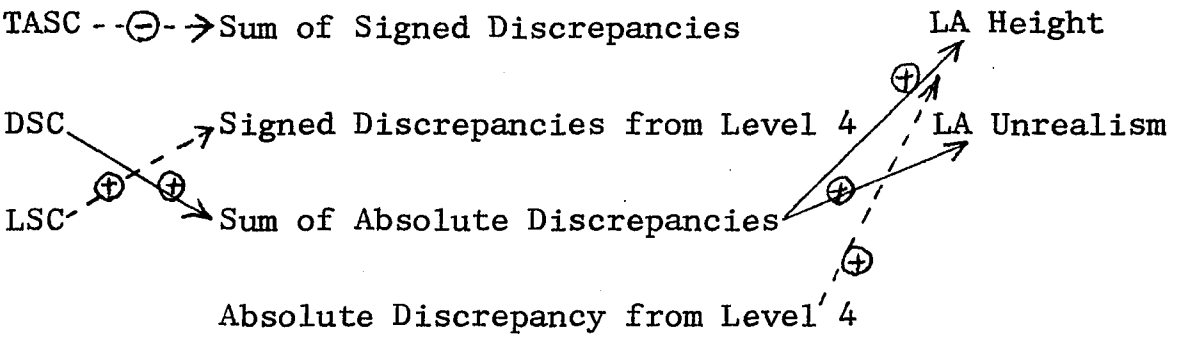
| Expectancy Variables | Level of Aspiration | | | |
|---|---|---|---|---|
| | Height | | Unrealism | |
| | Grade 3 | Grade 6 | Grade 3 | Grade 6 |
| Sum of Signed Discrepancies | .21 | .38*** | .24 | .36*** |
| Signed Discrepancy from Level 4 | .21 | .36*** | .16 | .34*** |
| Sum of Absolute Discrepancies | .35*** | .18 | .41*** | .07 |
| Absolute Discrepancy from Level 4 | .35** | .24 | .23 | .17 |
| Irregularity | -.08 | -.07 | .11 | -.12 |

* $p < .05$, two-tailed

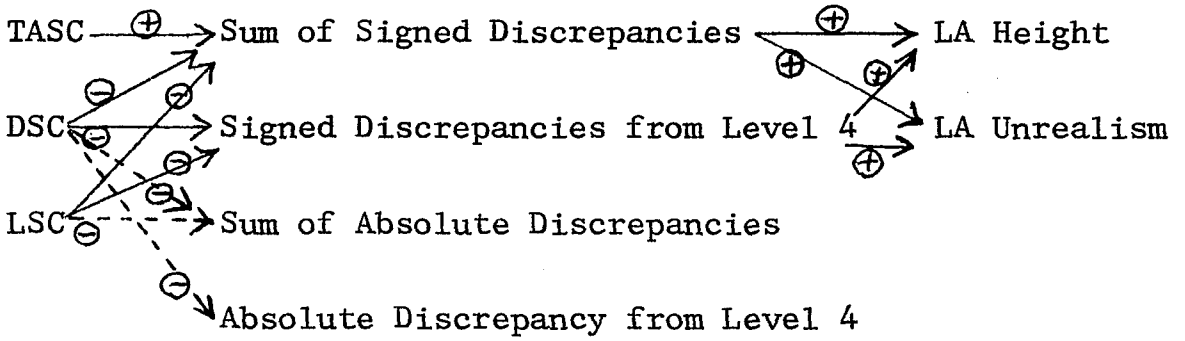
** $p < .02$, two-tailed

*** $p < .01$, two-tailed

Third Grade




Sixth Grade

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Dashed lines indicate a relationship between columns 1 and 2 or between columns 2 and 3. Solid lines indicate relations connecting column 1 to column 2 and column 2 to column 3. Direction of relationship is indicated by + or -.

Figure 1. Relationship among Dispositional Variables, Inaccuracy of Expectancy Variables and LA Variables
(Arrows represent significant correlations.)

expectancy variables or between expectancy variables and LA variables. In other words, the dispositional effects did not go beyond the expectancy variables or the expectancy variables correlated with LA variables but not with dispositional variables.

The figure reveals that the relationships among the three sets of variables are different for the third and sixth graders. Regarding the relationship between dispositional variables and inaccuracy of expectancy variables, there are more significant correlations in the sixth grade than in the third grade: among 12 correlations computed between dispositional variables and expectancy variables eight were significant for the sixth grade and only three for the third grade. The directions of these correlations are reversed for the two grades: in the third grade the correlation of inaccuracy of expectancy is negative with test anxiety and positive with defensiveness and tendency to lie, while in the sixth grade the correlation of inaccuracy of expectancy is positive with test anxiety and negative with defensiveness and tendency to lie.

Regarding the correlations between inaccuracy of expectancy variables and LA variables, in the third grade significant correlations were found with Absolute Discrepancy Scores, while in the sixth grade significant correlations were found with Signed Discrepancy Scores. The direction of these correlations in both grades is positive. This means that in the third grade, the greater the inaccuracy in

expectancy (either as over- or underestimation) the greater the LA height and unrealism, while in the sixth grade the higher the overestimation of expectancy the greater the LA height and unrealism.

In sum, in the third grade, only defensiveness is indirectly related to LA variables by means of intervening inaccuracy of expectancy (Sum of Absolute Discrepancies). In the sixth grade, all three dispositional variables affected LA variables by means of intervening over- or underestimation variables.

Attribution theory: The third approach investigates the extent to which differences in attribution determine unrealism of LA. Responses to the attribution alternatives are scored to indicate the importance of attribution. A first choice received a weight of 4, a second 3, a third 2 and a fourth 1.

Hypothesis 4a states that the greater the attribution of success to effort or failure to lack of effort, the greater the realism of LA. To test this hypothesis mean unrealism scores were compared between subjects who selected effort as the most important attribution and subjects who selected effort as the least important attribution. Table 20 presents these data. The hypothesis is not supported since in no case are subjects with strong effort scores for attributions significantly more realistic. As a further check on this relationship scores for attribution to effort for success and failure were correlated with LA unrealism scores. The

TABLE 20

The Relationship of Unrealism of Level of Aspiration to Effort Attribution

| | Success | | | | Failure | | | |
|---|---|---|---|---|---|---|---|---|
| | Effort as Most Important[1] | | Effort as Least Important[2] | | Effort as Most Important | | Effort as Least Important | |
| Grade | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 3 | 1.75 | .96 | 2.52 | 2.31 | 2.55 | 2.79 | 2.53 | 2.37 |
| | (N=4) | | (N=31) | | (N=9) | | (N=17) | |
| | t=1.212* | | | | t=.023* | | | |
| 6 | 2.33 | 1.45 | 2.25 | 2.05 | 2.86 | 2.03 | 2.00 | 2.40 |
| | (N=3) | | (N=32) | | (N=14) | | (N=9) | |
| | t=.055* | | | | t=.888* | | | |

* n.s.

[1]includes only subjects who said effort was the most important determinant.

[2]includes only subjects who said effort was the least important determinant.

obtained correlations are not significant. Likewise the correlations between unrealism and the other three attributional factors are not significant.

Hypothesis 4b states that older children will attribute success to effort and failure to lack of effort to a greater extent than younger children. Table 21 presents the means and SDs of the attribution scores for each grade. Although the means for effort are slightly higher for the sixth graders than for the third graders for both success and failure, these age differences are not significant. Thus the hypothesis is not supported.

It is of interest to note, however, that significant age differences do occur for two types of attribution. Sixth graders make lower attributions to luck than third graders for both success and failure, and they make higher attributions to task difficulty following success than third graders. These are essentially the same age trends as those reported by McMahan (1973).

Effects of Using Time Limit for Defining Success and Failure

Table 22 presents means and standard deviations of percentage time estimate error for the two grades. Two things are apparent from the table. First, nearly all the errors are in the direction of underestimation: only 6% of the third graders and 8% of the sixth graders overestimated the time. Second, the sixth graders are significantly more accurate in time estimation than the third graders.

In this study a time limit was used to define success

TABLE 21

Age-Differences in Success and Failure Attributions

| Outcome | Attribution Factors | Grade 3 Mean | Grade 3 SD | Grade 6 Mean | Grade 6 SD | t | P |
|---|---|---|---|---|---|---|---|
| Success | Ability | 2.36 | 1.06 | 2.10 | .97 | 1.22 | n.s. |
| | Effort | 3.23 | 1.00 | 3.44 | .88 | .64 | n.s. |
| | Task | 1.96 | .97 | 2.64 | .98 | 3.48 | $< .001$ |
| | Luck | 2.36 | 1.01 | 1.82 | .92 | 2.80 | $< .01$ |
| Failure | Ability | 2.30 | 1.11 | 2.20 | 1.07 | .46 | n.s. |
| | Effort | 2.20 | 1.11 | 2.62 | 1.09 | 1.92 | $< .10$ |
| | Task | 2.92 | 1.14 | 3.02 | 1.06 | .45 | n.s. |
| | Luck | 2.58 | 1.01 | 2.16 | 1.06 | 2.01 | $< .05$ |

TABLE 22

Means and Standard Deviations of Signed Percentage Time Estimate Error and Absolute Percentage Time Estimate Error for Each Grade

| | | Percentage Time Estimate Error | | | |
|---|---|---|---|---|---|
| | | Signed | | Absolute | |
| Grade | N | Mean | SD | Mean | SD |
| 3 | 50 | -45 | 25 | 46 | 21 |
| 6 | 50 | -31 | 24 | 34 | 20 |
| t | | 2.76 | | 3.07 | |
| df | | 98 | | 98 | |
| p | | $< .005$ | | $< .005$ | |

and failure. Thus, it is possible that variation in LA and expectancy could be due to differences in a subject's ability to guess time duration. For example, a subject who overestimated his time limit might choose a higher LA. This possibility was checked by correlating percentage error in time estimate with inaccuracy of expectancy and with LA height and unrealism. The results are reported in Table 23. There are no significant correlations between signed time estimate error and either inaccuracy of expectancy or the LA variables. With absolute time estimate error there are again no significant correlations for the third grade. However, for the sixth graders, there are significant negative correlations between absolute time estimate error and three variables. The negative relationships with Signed Sum Discrepancies and Signed Discrepancy from Level-4 indicate that the higher the absolute time estimate error the greater the underestimation of expectancy. The negative relationship with LA unrealism indicates that the greater the absolute time estimate error the closer the LA choice to Level 4.

TABLE 23

Correlations between Time Estimate Error and Expectancy and Level of Aspiration Variables

| | | Grade 3 Time Estimate Error | | Grade 6 Time Estimate Error | |
|---|---|---|---|---|---|
| | | Signed | Absolute | Signed | Absolute |
| Inaccuracy of Expectancy | Sum of Signed Discrepancies | .08 | -.06 | .18 | -.30* |
| | Signed Discrepancy from Level-4 | .09 | -.11 | .19 | -.38*** |
| | Sum of Absolute Discrepancies | -.08 | -.01 | .18 | -.12 |
| | Absolute Discrepancy from Level-4 | .10 | -.23 | .14 | -.12 |
| | Irregularity | -.23 | .22 | -.11 | .07 |
| Level of Aspiration | Height | .03 | -.05 | .14 | -.24 |
| | Unrealism | .03 | .10 | .17 | -.28* |

* $p < .05$

*** $p < .01$

# DISCUSSION

The present study investigated developmental changes in both the level of aspiration itself and in the determinants of level of aspiration by comparing responses of third and sixth grade boys. Three different theoretical approaches were employed as a basis for investigation of the determinants of developmental changes in level of aspiration. Two of these approaches, those dealing with accuracy of expectancy and the values of success and failure, were proposed as supplements to Atkinson's explanation of LA unrealism since the Atkinson model does not deal with developmental changes in LA unrealism. However, the Atkinson model was employed to explain the variance in LA unrealism within each age group. The third approach, that of attribution theory, was employed as an alternative theoretical perspective.

## Age Differences in Level of Aspiration

Regarding the developmental trend in LA unrealism, the results show that LA tends to be more realistic in the sixth grade than in the third grade. Age differences in unrealism are most clearly manifested in the significantly greater choice of extreme LAs by the third graders as compared with the sixth graders. This finding is consistent with the age trends in realism reported by Smith (1969), and Reidel and Milgram (1970). This trend is explained in part by the fact that children's expectancies of success

become more accurate as they become older. However, the fact that the age differences in LA unrealism were most clear in an analysis comparing preference of extreme scores rather than in an analysis comparing mean LA unrealism may indicate that many third graders are similar to sixth graders in LA unrealism. The difference may be due to the presence in the third grade of a greater number of "still developing children" who have not yet attained the ability to accurately assess the difficulty of the task and the value of success and failure.

Regarding the developmental trend in LA height, the results show that LA was slightly but not significantly higher for the sixth grade than for the third grade. This tendency is consistent with past research reporting that LAs become higher as children become older within the elementary school years (Veroff, 1969). Failure to find a significant change in LA height may be due to the fact that the age range employed in the present study did not encompass the years of greatest change. Veroff's data suggest that changes in LA height are considerably greater between kindergarten and the third grade than between the third grade and the sixth grade. Changes in LA height may be nearing their asymptote by the sixth grade because of the relatively high degree of realism attained by that age.

Determinants of Level of Aspiration

Expectancy theory: The first theoretical approach assumes that to choose an intermediate level task (i.e. to

make a realistic choice), one must a) know which task the intermediate task is (i.e. have accurate expectancy of success) and b) desire to choose or avoid a task with an intermediate difficulty.

The first hypothesis (1a), that the greater the inaccuracy of expectancy the greater the LA unrealism, was partially supported. Some, but not all, indexes of inaccuracy of expectancy were associated positively and significantly with LA unrealism for third and sixth graders.[1] These results mean that third graders with unrealistic LAs both overestimated and underestimated their chances of success on the LA tasks, while the sixth graders with unrealistic LAs greatly overestimated their chances of success. Apparently this occurred because for the sixth graders the mean LA was higher than the level with .5 objective probability of success. Thus, relatively low LAs were realistic and also associated with relatively low expectancies. In sum, for the third grade, inaccuracy over a wide range of difficulty levels was associated with LA unrealism, while for the sixth grade only subjects with inaccurately high

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[1]Although the discrepancy indexes are measures of the same underlying inaccuracy variable, signed and absolute scores assess different aspects of inaccuracy. Signed discrepancies represent over- or underestimation with reference to objective probability of success. Absolute discrepancies represent inaccuracy of expectancy regardless of direction of over- or underestimation. Sum discrepancy scores assess inaccuracy observed over a wide range of task difficulty, while level-4 discrepancy scores assess inaccuracy observed only at the level where objective probability of success is .5.

expectancies set unrealistic LAs (high LAs).

According to the first theoretical approach, a second source of LA unrealism was thought to be explained by the Atkinson model. That is, it was expected that test anxiety would be a determinant of unrealism defined with reference to a .5 subjective probability of success. This expectation was not confirmed. Instead, dispositional variables, including test anxiety were related to inaccuracy of expectancy variables. Evidence for the existence of the second process was not obtained in the present study.

Inaccuracy of expectancy was expected to undergo developmental change, which in turn might explain developmental differences in LA unrealism. The hypothesis (1b), that younger children would be more inaccurate in expectancy for success than older children, received relatively clear support. The expectancy responses given for monotonically increasing levels of difficulty included significantly more irregularities by third graders than by sixth graders. This result may indicate that to be accurate in expectancies for success for tasks of gradually increasing difficulty requires the ability to seriate; that is, to order the tasks in order of difficulty in a transitive series as A<B<C<D<E, etc. However, seriation emerges only after a certain stage of cognitive development (e.g. Inhelder and Piaget, 1964), although the specific age cannot be determined as research findings differ depending on the particular experiments (e.g. Siegel, 1972). This suggests that the child's

attainment of expectancy accuracy, a determinant of LA realism, must await a certain stage of cognitive development.

Also absolute discrepancy indexes of inaccuracy reveal differences between the two grades, whereas signed discrepancy indexes did not. This means that the third graders were more inaccurate than the sixth graders in the direction of both over- and underestimation. This age difference is consistent with the prior finding that accuracy of expectancy improves significantly from the fourth grade to the sixth grade in Japanese boys (Kaneda, 1972).

Hypothesis 1c, that unrealism of LA would be greater for younger children than older children, was supported by the greater preferences for extreme LAs by third graders than sixth graders as reported above. This age trend which has appeared in prior research is now understandable in terms of the processes described in hypotheses 1a and 1b, that is: inaccuracy of expectancy leads to LA unrealism: younger children have more inaccurate expectancies and, therefore, should have more unrealistic LAs than older children.

Accuracy of expectancy was expected to improve with increased feedback information but the results did not confirm this expectation. There was a slight increase in accuracy of expectancy from "no feedback" to "some feedback" (intermediate and extensive feedback groups combined), but the extensive information group was not always more accurate than the intermediate group. There are several possible reasons for this latter result. First, the extensive

information provided may have been too great for the information processing capacity of the age groups studied. For children to benefit from such extensive information, some form of assistance may be necessary. For example, it might be helpful to provide a written record of past performance when the subject makes an estimate for future performance or makes an LA choice so that fewer demands are made on memory. It might also be helpful to give training to focus on the task difficulty dimension so that attention would be directed to it at the time the information is received.

Another possible reason that the extensive information feedback may not have had the expected effect could be that defensiveness was aroused because the extensive information included a lot of failure feedback. In other words, the feedback information for performance at difficult levels introduced in order to make the feedback extensive might not have been accepted as easily as the less threatening intermediate information. A third possibility is that these age groups may not be able to convert information given in terms of some number of successes out of four to expectancy responses in terms of some number of successes out of ten. Thus, both intermediate and extensive feedback information may have given only a global impression to the subject that the task was difficult or easy.

Although in the present study accuracy of expectancy did not improve with increased feedback information, this method was shown to be effective in a previous study (Kaneda, 1972).

Clarification is needed as to the kind of feedback that will be effective in improving the accuracy of expectancy.

In summary, it would appear that the first part of the two process theory of LA unrealism was supported by the findings that (1) inaccuracy of expectancy is related to LA unrealism in both grades; and that (2) accuracy of expectancy and LA realism improved with age. However, no evidence was obtained for the second part of the theory dealing with motivationally determined preference for subjectively-defined intermediate difficulty.

Value theory: The second theoretical approach dealt with determinants of LA height. It was thought that LA height would be influenced by the extent to which the value for success and the value for failure are differentiated for increasing levels of task difficulty. Hypothesis 2a, which states that children whose values for success and failure are a function of task difficulty will choose more difficult tasks than those whose values for success and failure are independent of task difficulty, was supported when data for the two value scales were combined.

It was also expected that differentiation of value scales for success and failure for increasing levels of task difficulty would undergo developmental changes. Hypothesis 2b states that older children's value scales for success and failure are expected to be more a function of task difficulty than younger children's. The pattern of results tends to support the hypothesis. There is a significant age

difference in the expected direction for the value scale for failure. The age difference for the value scale for success is in the same direction but is not significant.

These findings suggest that children of this age range are gradually developing graded values for success and failure for increasing task difficulty. In past research, studies of modeling effects on self-reward have reported similar findings (Bandura and Kupers, 1964; Liebert and Ora, 1968).

These results may again indicate that to have graded values for success and failure associated with gradually increasing task difficulty involves the concept of seriation so that younger children who have not fully developed seriation show more irregularities in value responses. However, the present study also revealed a difference between success and failure values: children showed fewer irregularities for success values than failure values. This success-failure difference suggests that the development of value scales for success and failure has a social origin. It may be that in our daily experiences rewards for success are more differentiated for different performance levels than are punishments for failures.

Hypothesis 2c states that LA will be higher for older children than for younger children. There is a tendency for older children to choose more difficult tasks than younger children, but the difference is not significant because in the selection of a task the values for success and

failure are weighted by the probabilities of success and failure, which should make intermediate choices most attractive for subjects with strong motivation to approach success and least attractive for subjects with strong motivation to avoid failure, if Atkinson's theory is correct.

In summary it would appear that the value theory of LA height received relatively clear support in the results of the present study: (1) the extent to which values for success and failure are functions of task difficulty is a determinant of LA height; (2) the value scales become more a function of task difficulty as children become older.

Atkinson theory and dispositional variables: On the basis of the Atkinson theory, it was expected that choice of intermediate levels of difficulty defined by Ps would be associated with low test anxiety. However, this relationship was not found.

The failure of test anxiety to relate to LA as it has in prior studies of the Atkinson model may be due to the difference between the tasks used in the present study and those used in prior studies. The present study also employs a direct measure of expectancy, whereas most previous studies have only inferred expectancies. The situation is further complicated by the fact that high test anxiety is associated with underestimation of expectancies for third graders, but with overestimation for sixth graders (see Table 18), something that is not anticipated by the Atkinson model.

Text anxiety, as well as other dispositional variables,

also has indirect effects on LA variables by way of intervening expectancy variables. However, these indirect relationships are different in the two age groups. For the third grade, defensiveness was related to one index of expectancy inaccuracy which was, in turn, related to the LA variables, whereas for the sixth grade test anxiety, defensiveness, and tendency to lie were all related to some of the inaccuracy indexes that, in turn, were related to the LA variables.

The finding that inaccuracy of expectancy is affected by a greater number of dispositional variables in the sixth grade than in the third grade may reflect a general direction of personality development toward individual differences in dispositions becoming more stable and influential with age, or it may mean that the scores for the dispositional variables were more reliable in the sixth grade than in the third grade. The interpretation of these relationships is complicated by the interdependency of the expectancy measures and of the dispositional variables.

The reason for the reversed direction of the relationship between the dispositional variables and indexes of inaccuracy of expectancy between the third and sixth grades is not clear. However, the pattern of results is similar to the findings of the Smith study (1969). In the Smith study, test anxiety was associated with unrealism of LA (which is consistent with prior findings in achievement motivation research) in the fourth grade, whereas in the fifth grade defensiveness was

associated with unrealism of LA. In the present study test anxiety was associated with underestimation (which is also consistent with prior findings in achievement motivation research, e.g. Feather, 1965) in the third grade, whereas in the sixth grade defensiveness was associated with underestimation. Apparently in boys test anxiety is replaced by defensiveness toward the end of the elementary school years.

The Atkinson model was not supported by the results concerning the relationship between test anxiety and LA unrealism within each age group. This may be due to the fact that test anxiety alone was not powerful enough to differentiate groups in which one motive, Ms or Maf, dominates the other. However, the present study does show that test anxiety, as well as defensiveness, does affect LA unrealism defined in terms of the objective probability of success by way of intervening inaccuracy of expectancy variables.

This finding suggests that dispositional variables determine LA unrealism by affecting the accuracy of expectancies rather than, or as well as, by affecting the attractiveness of the task, as the Atkinson theory suggests.

A second aspect of Atkinson's theory concerns the assumption that expectancies are inversely related to the incentive values of success and failure. The present study suggests that the assumption of a monotonic inverse relationship may be appropriate for adults but not for young children.

Attribution theory: The third theoretical approach dealt with the role of causal attribution. It was expected

that the extent to which attributions of success and failure are made to effort and lack of effort respectively would be a determinant of LA realism. However, Hypothesis 3a, which states that the greater the attribution of success to effort or failure to lack of effort, the greater the realism of LA, was not supported.

Hypothesis 3b, which states that older children will attribute success to effort and failure to lack of effort to a greater extent than younger children, was also not supported. The results do not necessarily contradict the previous study which found that effort was judged important for children 10 to 12 years old (Weiner and Peter, 1973), since in that study the importance of effort was compared with the importance of a successful outcome, while in the present study effort was compared with three other possible attribution alternatives. The present study rather shows another kind of developmental change in attribution processes. Namely, among the four attribution alternatives sixth graders made lower attributions to luck for both success and failure and higher attributions to task difficulty for success than the third graders. These findings are in essence consistent with the findings of McMahan (1973).

Time estimate error: The results show that accuracy of time estimation improves significantly from the third grade to the sixth grade, although sixth graders are still quite inaccurate. It is of interest to note that nearly all the errors are underestimates of the given time in both age groups.

Contrary to what was expected, however, there is, for the third grade, no significant relationship between time estimate error and either accuracy of expectancy or LA choice. It is likely that in some third graders a scale for time length or the relationship between time and the task is not well developed. When the subjects were given two additional seconds and asked to set another level of aspiration, some third graders, but no sixth graders, selected lower (easier) LAs than their original choices ($p < .02$). This result suggests that for some third graders, due to the lack of a time scale, an additional two seconds does not extend the time limit, or, due to the lack of a perceived relationship between the time limit and task difficulty, the change in time limit does not relate to a change in task difficulty.

On the other hand, for the sixth grade, inaccurate time estimation is negatively correlated with the signed inaccuracy of expectancy indexes and with LA unrealism. This suggests that time estimate errors affect the accuracy of expectancy, which, in turn, may affect LA unrealism.

Implications for Future Research

The present study has provided evidence for the existence of some determinants of developmental change in level of aspiration which help to explain the age trends in LA realism that have been reported in previous research.

It should be possible in training studies to teach children how to be more accurate in assessing task difficulty and that the value for success and failure varies inversely

with task difficulty. For example, expectancies should become more accurate if feedback information about performance is given properly. Value scales for success and failure may be improved by providing a model as suggested by research on self-reward in late elementary school children (Bandura and Kupers, 1964; Bandura and Whalen, 1966). Then one could determine whether such training has the expected effects on LA height and unrealism.

The present study also suggests that in future research on the Atkinson model more attention should be given to the measurement of subjective probability of success and to the relationship between objective and subjective probabilities of success. It also appears that defensiveness as a dispositional variable should be considered in conjunction with test anxiety in exploring the relationship of motivation to avoid failure to unrealistic aspiration.

Conclusion

The choice of level of aspiration is affected by numerous factors. Past research on achievement motivation has primarily dealt with personality characteristics, situational factors that arouse motivation, and the skill vs. chance aspect of tasks. The present study adds a new dimension by considering developmental variables which affect levels of aspiration during the late elementary school years. To expand our knowledge of developmental variables, further research must consider a wider age range beginning with strivings and the roots of goal setting in infancy and con-

tinuing up to mature adulthood and take account of socialization processes and changes in cognitive capacity which may influence the development of level of aspiration behavior.

## APPENDIX I

## LETTER TO PARENTS

October 12, 1974

Dear parents:

P.S. ____, Queens, is cooperating with me in carrying out a research project. I am a doctoral student in Developmental Psychology at the City University of New York. My research seeks information about how 3rd and 6th grade children learn to assess the difficulty of tasks requiring skill and to set estimates of how well they perform. The study is not concerned with the child's intellectual capacity, and children will not be evaluated in terms of doing "well" or "poorly". Rather the research seeks general developmental patterns concerning expectancies of success and preferences among tasks of varying difficulty.

All the research will be conducted at the school. It entails the administration of questionnaires for about 45 minutes to the children in class and about 30 minutes of individual interviewing. All the materials have been extensively pretested and have proved to be of interest to the children. They enjoy participating.

The results of the study will be used for research purposes exclusively, and the names of children who participate will not be disclosed. The results will be reported in my Ph.D. dissertation and possibly also in scientific journals dealing with children. They will be of interest to teachers, child psychologists and others whose work is professionally concerned with children.

Mr. _____, the principal of P.S. ____, Queens, Miss _____, the community superintendent, and the Bureau of Educational Research of the Board of Education of the City of New York have generously granted me the opportunity of working at the school. However, your child's participation is completely voluntary. I would appreciate it if you would check the appropriate box in the form enclosed in this letter signifying your approval or disapproval of this request, sign and return in enclosed envelope.

Thank you for your cooperation.

Sincerely yours,

Tatsuko Kaneda

Board of Education of the City of New York

Name of School
Address of School
Name of Principal
Date October 12, 1973

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REQUEST FOR PERMISSION TO COLLECT STUDENT PERSONAL DATA

Sponsor

Special request for authorization of student to answer questionnaires and be interviewed in research conducted by a doctoral student of the City University of New York.

Purpose

To provide information on how children learn to estimate their chances of doing well at tasks requiring skill and why they make realistic or unrealistic task selections.

Contents of Questionnaire, Test or Interview

The questionnaires aim to assess children's attitudes toward taking tests and examinations and how they cope with fear and dislike of tests. The interview includes the child's performance on a connect-the-dots game and questions as to his preference among tasks of varying difficulty, his expectancy of success, his perceived value for success and failure, and the factors to which he attributes his success and failure.

Confidentiality

The questionnaires and interview will include no identifying device, signature or number so that the confidentiality of your child's reply will be completely secure.

Please check the appropriate box signifying your approval or disapproval of this request, print your child's name, grade and class, sign the form in the space provided below and return in enclosed envelope.

Approve

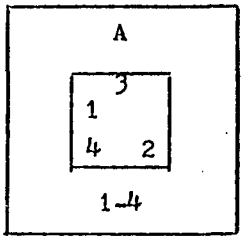
Disapprove

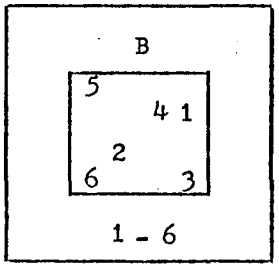
_____ _____ _____
Child's name (please print) Grade Class

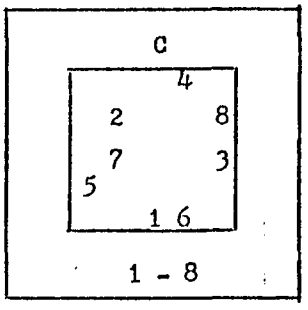
_____ _____
Parent's signature Date

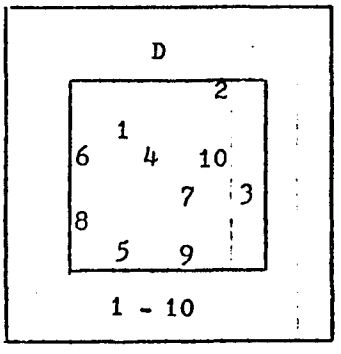
## APPENDIX II

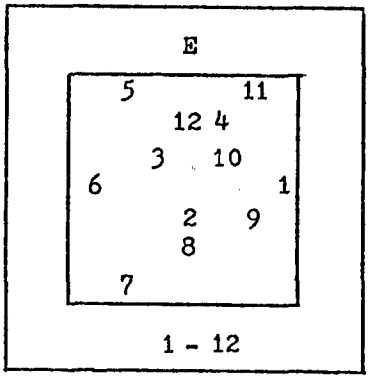
## SPECIMEN PUZZLES

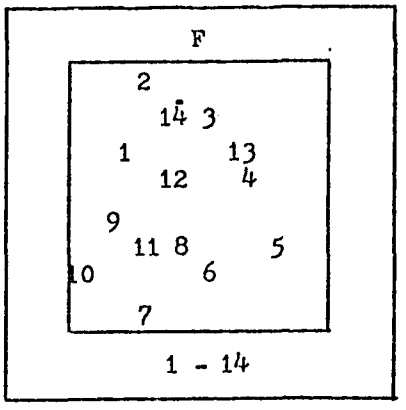


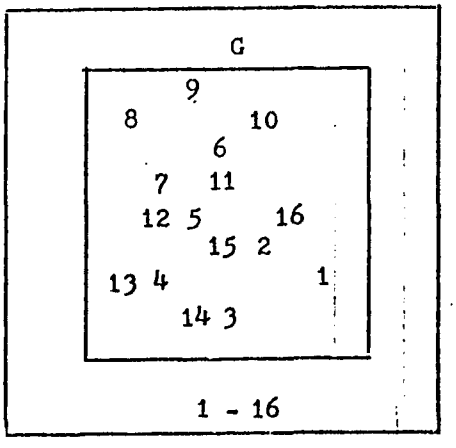



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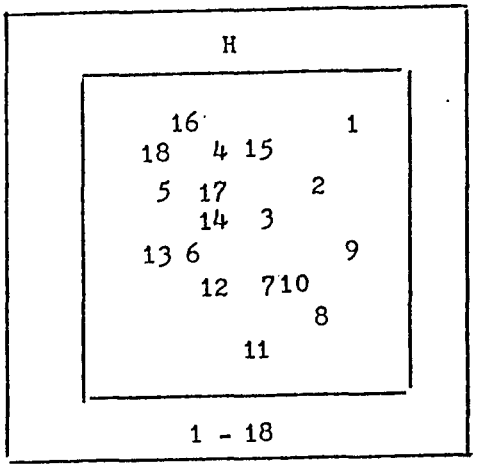


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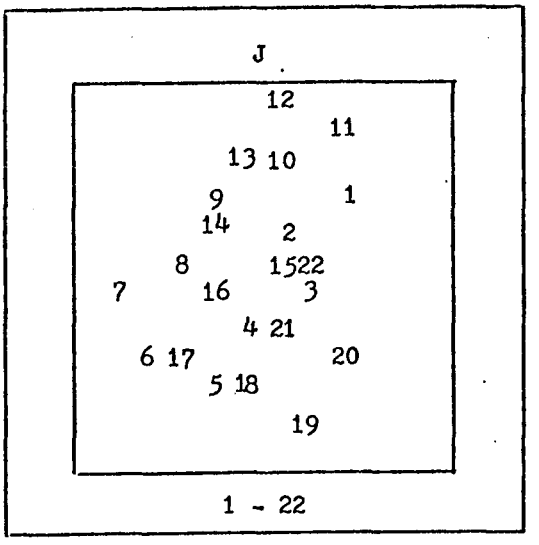
J

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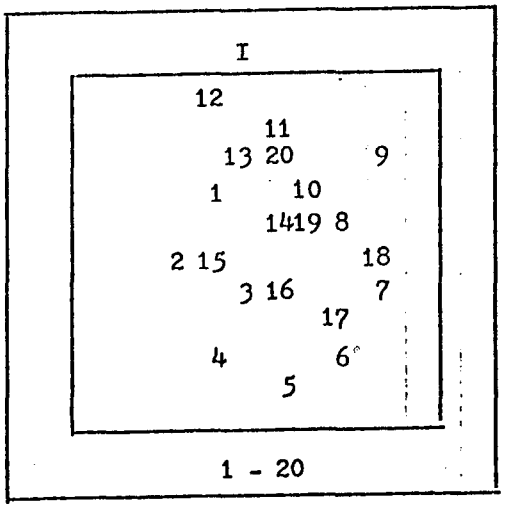


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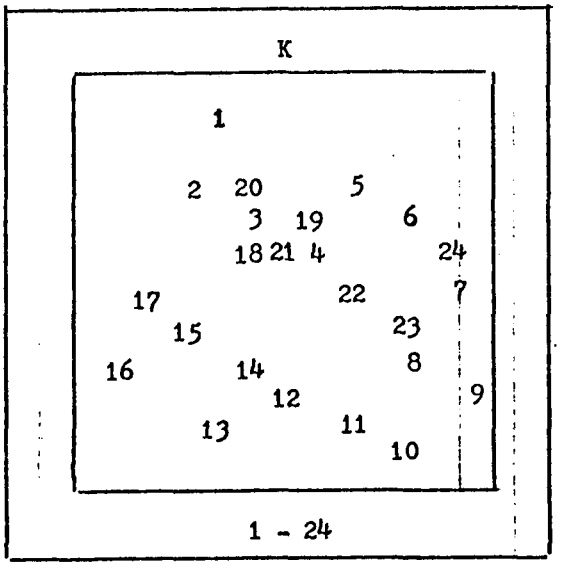
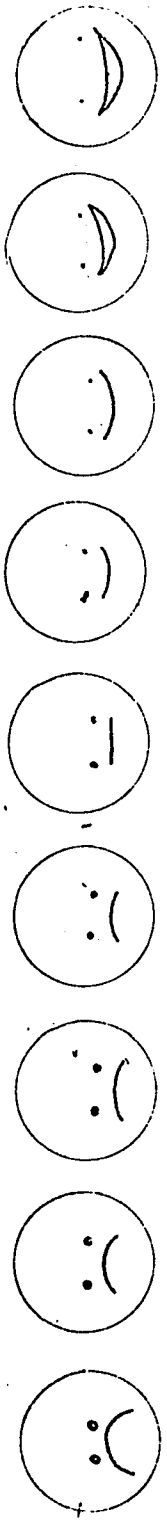



1 - 24

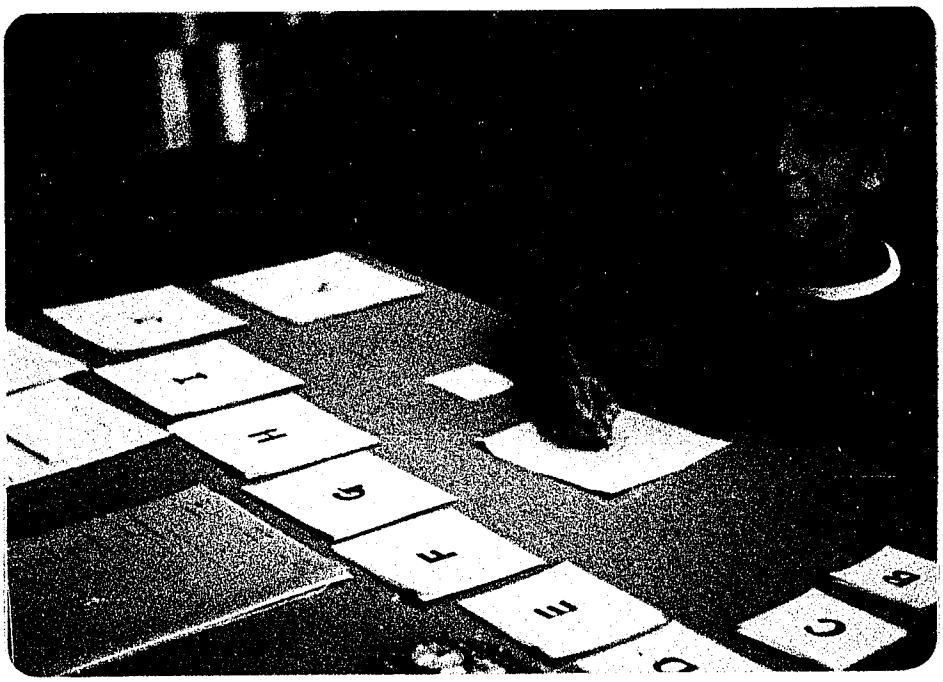
# APPENDIX III

## THE VALUE SCALE FOR SUCCESS AND FAILURE

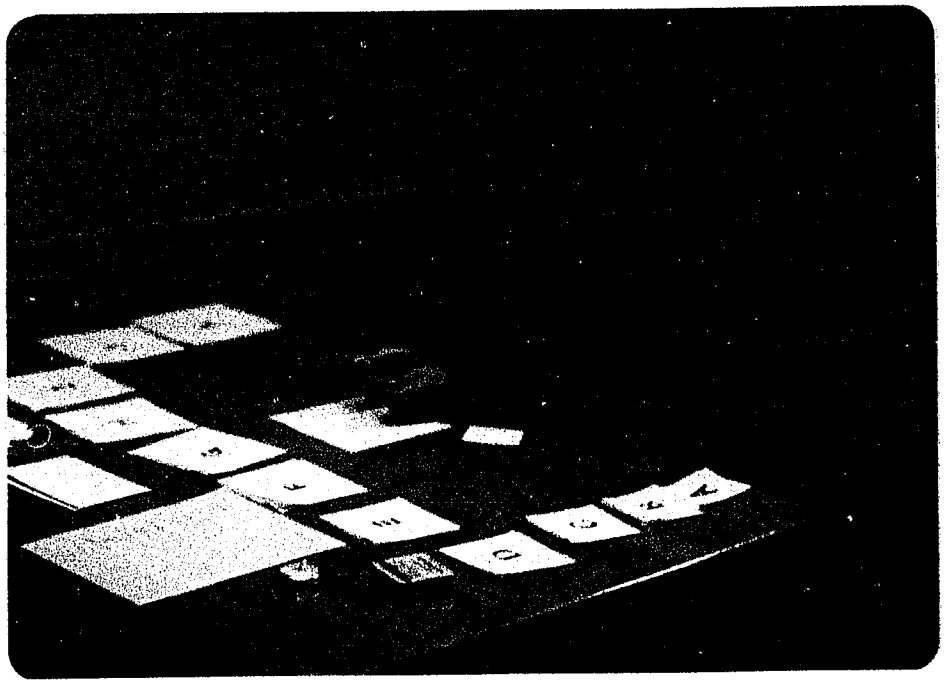


APPENDIX IV

ARRANGEMENT IN TESTING ROOMS



School 1



School 2

APPENDIX V

INSTRUCTIONS

1. Introduction

I have some puzzles for you to do. I want to see how well you can do them, so try to do your best.

2. Practice

First we are going to do some practice puzzles. On these puzzles, you connect 1 to 2, to 3, to 4 and so on up to the highest number on the puzzles. Now try this first puzzle. That is the idea. Try the other one.

3. Performance

Here are 11 piles of puzzles of the same kind as you have practiced. There are about 10 puzzles in each pile. As you can see, the puzzles vary in difficulty. The puzzles in this pile A are the easiest, and each pile is more difficult than the one before. This pile A has puzzles with numbers from 1 to 4. This pile B has numbers from 1 to 6. This pile C from 1 to 8 and so on up to the pile K which has numbers from 1 to 24. Do you understand how the piles are different from each other? Now I am going to give you some puzzles to work on so that you will know how easy or how difficult they are. I want to see how fast you can do each of them, so you will work one at a time, and I will keep time for each of them. When I say "ready" get ready, and when I say "go"

start working on the puzzle. You do not have to draw lines neatly. Speed is more important than neatness. Do you understand? Let's start from pile B. (The S was then asked to work 4 puzzles from each of piles B, D, F, H, and J. The experimenter recorded the time taken to complete each puzzle. The experimenter, then, calculated the median time taken to complete puzzles at level D. The median time was used as the subject's individual time limit.)

4. Time estimate

Let's go to the next thing.

Do you know how long____sec (individualized time limit) is? I want you to show me how long you think____sec is. When I say "begin" I want you to tap the desk, wait for____sec and tap the desk again. I will keep track of the time between the first tap and the second tap. Do you understand? All right. Begin.

That was less than (or more than)____sec.

This time I will show you how long___sec is. Start...

Stop. This is how long___sec is.

5. Feedback

No information: When you were working on the puzzle, I was watching how long it took you to do each of them, and I found out that you can finish some of the puzzles successfully in____sec, but other puzzles you were not able to finish in____sec.

Intermediate information: Now I am going to tell you how well you did. I was watching on every puzzle whether you could finish it in____sec or not, and I marked success when you could finish it in____sec. Now I can tell you how many successes you got for pile B and pile F. You worked 4 puzzles from pile B, and you finished 3 puzzles successfully in less than ____sec and you took more than____sec to finish 1 puzzle. That means for puzzles with numbers from 1 to 6, you got 3 successes out of 4 tries. Out of 4 puzzles you worked for pile F, only one puzzle was finished in____sec and 3 puzzles were not. That means for puzzles with numbers from 1 to 14, you got one success out of 4 tries.

Extensive information: Now I will tell you how well you did. I was watching on every puzzle whether you could finish it in____sec or not, and I marked success when you could finish it in____sec. First you worked 4 puzzles from pile B. You finished 3 puzzles in less than ____sec, and you took more than____sec in one puzzle. That means for puzzles with numbers from 1 to 6, you got 3 successes out of 4 tries. Out of the 4 puzzles from this pile D, 2 puzzles were finished in time and 2 puzzles were not. That means for puzzles with numbers from 1 to 10, you got 2 successes out of 4 tries. For pile F,1 puzzle was finished and 3 puzzles were not. That means for puzzles with numbers from 1 to 14, you got one

success out of 4 tries. For pile J, none of the 4 puzzles was finished within ___ sec. That means for puzzles with numbers from 1 to 18 no success out of 4 tries. For pile J, none of the 4 puzzles were finished in time. That means for puzzles with numbers from 1 to 22 no success out of 4 tries.

6. The level of aspiration

I think you have gotten some idea of how easy or how difficult these puzzles are. Now what I want you to do is to choose one puzzle that you want to try to complete in ___ sec. You can choose a puzzle from any pile you like. There are 11 piles to choose from. Take your time and think about which puzzle you want to try to complete in ___ sec. Now point to the pile that you want to try a puzzle from. If I gave you two more sec, in other words if I gave you ___ sec (individualized time limit plus 2 sec) instead of ___ sec, which one would you like to have chosen?

7. Expectancy of success

O.K. Before you actually work on the puzzle, let me ask you some questions. The first question is a little hard, so listen carefully. Suppose I asked you to work each of the ten puzzles in this pile A, one at a time and for each puzzle you would have ___ sec to work. There are ten puzzles in this pile A. You would have ___ sec for each one. I want you to tell me how many puzzles out of ten you can complete within ___ sec.

Do you understand what I mean? (If the answer is "No", repeat the instruction from the third line.) Tell me how many puzzles you can successfully solve in ___ sec for this pile A.[1] How about puzzles in pile B? Suppose I asked you to work each of the ten puzzles in this pile B, one at a time and for each puzzle you would have ___ sec to work. How many puzzles out of the ten can you complete within ___ sec? How about puzzles in pile C? There are ten puzzles in pile C, and you would have ___ sec for each one.

---

[1]If the subject seemed still not sure that he understood the question, or if the answer was lower than 7, a further detailed instruction was given. Since most of the misunderstandings appeared to come from the subject's taking the time limit for working all the ten puzzles in the pile, the instruction emphasized that the time given was for each of the ten puzzles.

"I want to make sure that you understand what I mean. What I mean to ask you is this: Suppose, first, I asked you to work the first puzzle in this pile A for ___ sec to see if you could finish it in ___ sec. If you could, that is one success. Then you work the second puzzle in the pile for ___ sec. If you could solve it in time again, you would have two successes. Then you work the third puzzle for ___ sec. If you could solve it in time again, you would have three successes. Suppose you would repeat this ten times. If you could solve every one of ten puzzles in pile A, you would get 10 successes. If there are some puzzles that you could not solve in time, for example two or three, you would get 8 or 7 successes. What I am asking you is how many successes you could get if you would work every one of the puzzles in pile A in this way."

8. Value for one success and one failure

Let me ask you another kind of question. Look at those pictures. Let's pretend this middle one (point) shows how you would look if you did not feel happy or sad. Let's pretend that this picture over here shows how you would look if you were very happy. This one is just a little happy, happier than this one. This is happier, this is yet happier and this is very happy. This one is just a little sad, sadder than this one. This is sadder, this is yet sadder and this is very sad. Suppose I took a puzzle from pile H, and I let you work on that puzzle for____sec, and suppose you got a success from the puzzle, in other words you could finish the puzzle in ____sec. How happy would you feel? Point to the picture that shows how happy you would feel. How about if I took a puzzle from pile D, and you got a success. How happy do you think you would be? How about pile F (J, B)? Suppose I took out another puzzle from pile H, and I let you work on the puzzle, and suppose you got a failure, in other words you could not finish the puzzle in____sec. How sad would you feel? Point to the picture that shows how sad you would feel. How about if I took out a puzzle from pile D, and you got a failure, how sad do you think you would be? How about pile F (J, B)?

9. Success value for one subtask

You told me before that you thought you could get ____ successes (the response for expectancy of success) on this pile H (D, F, J and B), if I gave you ten chances. Suppose you really got ____ successes out of the ten chances on pile H; how happy would you be?

10. Attribution for success and failure

One other question before you work on the puzzle. You have worked many puzzles, and some puzzles you successfully solved in time and some puzzles you did not. When you could solve puzzles successfully, why could you? In other words, what do you think was the reason you could solve some puzzles successfully in the time given? Is there any other reason? When you could not solve successfully, why couldn't you? Is there any other reason?

I am going to show you a list of four possible reasons that I could think of for why you could solve puzzles in time. (The list consists of 1. I am good at doing puzzles; 2. I tried hard; 3. The puzzle was easy; 4. I was lucky.) Which do you think would be the most important reason why you could solve puzzles in time? Which do you think would be the second important reason? Which would be the third?

Let me ask you the reason why you could not solve some puzzles in time in the same way. (Showing the list of

reasons which consists of 1. I am not really good at doing puzzles; 2. I did not try hard; 3. The puzzles were too hard; 4. I was unlucky.) Which do you think would be the most important reason why you could not solve some puzzles in time? Which do you think would be the second? Which would be the third?

11. Performance of the selected puzzle and anecdotal questions

Now you can work on the puzzle you chose. I will give you____sec.

Ready? Go.

You got a success (failure).

Why did you choose this puzzle when I asked you to choose one puzzle among the eleven piles? (If there is not response, ask in another way).

Why did you like this (pointing to the puzzle)?

APEENDIX VI - 1

Intercorrelations Among the Variables
Third Grade

| | | | LA | |
|---|---|---|---|---|
| | | | H | U |
| LA: | Height | (H) | | .78*** |
| | Unrealism | (U) | | |
| Inaccuracy of Expectancy: | Sum of Absolute Discrepancies | (SAD) | | |
| | Absolute Discrepancy from Level 4 | (ADL) | | |
| | Sum of Signed Discrepancies | (SSD) | | |
| | Signed Discrepancy from Level 4 | (SDL) | | |
| | Irregularity | (I) | | |
| Value Scales for Success and Failure : | Irregularity in Success Value Scale | (ISVS) | | |
| | Irregularity in Failure Value Scale | (IFVS) | | |
| Attribution: | Success to Ability | (SA) | | |
| | Effort | (SE) | | |
| | Task Difficulty | (STD) | | |
| | Luck | (SL) | | |
| | Failure to Ability | (FA) | | |
| | Effort | (FE) | | |
| | Task Difficulty | (FTD) | | |
| | Luck | (FL) | | |
| Dispositional Variables : | Test Anxiety | (TA) | | |
| | Defensiveness | (D) | | |
| | Tendency to Lie | (TL) | | |
| Time Estimate Error : | Signed | (S) | | |
| | Absolute | (A) | | |

NOTE: * $P < .05$
** $P < .02$
*** $P < .01$

| Inaccuracy of Expectancy | | | | | Value Scales for Success and Failure | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SAD | ADL | SSD | SDL | I | ISVS | IFVS | SA | SE | STD |
| .35** | .35** | .21 | .21 | -.08 | -.16 | .00 | .04 | -.04 | .12 |
| .41*** | .23 | .24 | .16 | .11 | -.13 | -.12 | .08 | .04 | .04 |
| | .53*** | .32* | .31* | .22 | -.18 | -.10 | .01 | .04 | .24 |
| | | .36*** | .33** | -.31* | -.10 | -.16 | .03 | -.07 | .25 |
| | | | .84*** | -.02 | -.17 | -.17 | .29* | .01 | .04 |
| | | | | .02 | -.13 | -.08 | .32* | -.14 | -.08 |
| | | | | | .08 | .01 | -.06 | -.02 | .02 |
| | | | | | | .02 | -.10 | .00 | .12 |
| | | | | | | | .14 | -.07 | -.09 |
| | | | | | | | | -.50 | -.24 |
| | | | | | | | | | -.26 |

| Attribution | | | | | Dispositional Variables | | | Time Estimate Error | |
|---|---|---|---|---|---|---|---|---|---|
| SL | FA | FE | FTD | FL | TA | D | TL | S | A |
| -.13 | -.14 | -.02 | .09 | .07 | .00 | .08 | -.09 | .03 | -.05 |
| -.16 | -.04 | .07 | -.05 | .02 | .00 | .20 | .10 | -.13 | .10 |
| -.29* | -.07 | .07 | .00 | .00 | -.22 | .30* | .15 | -.08 | -.01 |
| -.20 | -.11 | -.11 | .11 | .13 | -.13 | .09 | -.06 | .10 | -.22 |
| -.36*** | -.17 | .29* | -.28* | .18 | -.30* | .22 | .28* | .08 | -.06 |
| -.12 | -.09 | .20 | -.24 | .15 | -.33** | .17 | .18 | .09 | -.11 |
| .06 | .06 | .15 | .00 | -.23 | .01 | -.03 | .07 | -.23 | .22 |
| -.01 | .17 | -.07 | .33** | -.49*** | .06 | .03 | -.05 | -.08 | .11 |
| .01 | -.07 | .10 | .10 | -.15 | -.12 | .07 | .12 | .04 | -.01 |
| -.33** | -.01 | .01 | -.09 | .10 | -.18 | .20 | .12 | -.01 | .10 |
| -.22 | -.13 | .20 | .00 | -.09 | -.05 | .08 | .13 | -.18 | .03 |
| -.45*** | .07 | -.13 | .24 | -.21 | -.07 | .04 | .04 | .27 | -.22 |
| | .07 | -.08 | -.13 | .17 | .30* | -.33** | -.29* | .08 | .07 |
| | | -.30* | -.16 | -.59*** | .29* | -.15 | -.16 | .27 | -.25 |
| | | | -.63*** | -.05 | -.02 | -.09 | .00 | -.13 | .07 |
| | | | | .26 | .13 | .18 | .15 | -.03 | .09 |
| | | | | | -.15 | .06 | .01 | -.12 | .10 |
| | | | | | | -.71*** | -.68*** | .00 | .02 |
| | | | | | | | .75*** | -.13 | .11 |
| | | | | | | | | | -.92*** |

APPENDIX VI - 2

Intercorrelations Among the Variables
Sixth Grade

| | | | LA | |
|---|---|---|---|---|
| | | | H | U |
| LA: | Height | (H) | | .90*** |
| | Unrealism | (U) | | |
| Inaccuracy of Expectancy: | Sum of Absolute Discrepancies | (SAD) | | |
| | Absolute Discrepancy from Level 4 | (ADL) | | |
| | Sum of Signed Discrepancies | (SSD) | | |
| | Signed Discrepancy from Level 4 | (SDL) | | |
| | Irregularity | (I) | | |
| Value Scales for Success and Failure : | Irregularity in Success Value Scale | (ISVS) | | |
| | Irregularity in Failure Value Scale | (IFVS) | | |
| Attribution: | Success to Ability | (SA) | | |
| | Effort | (SE) | | |
| | Task Difficulty | (STD) | | |
| | Luck | (SL) | | |
| | Failure to Ability | (FA) | | |
| | Effort | (FE) | | |
| | Task Difficulty | (FTD) | | |
| | Luck | (FL) | | |
| Dispositional Variables : | Test Anxiety | (TA) | | |
| | Defensiveness | (D) | | |
| | Tendency to Lie | (TL) | | |
| Time Estimate Error : | Signed | (S) | | |
| | Absolute | (A) | | |

NOTE: * $P < .05$
** $P < .02$
*** $P < .01$

| Inaccuracy of Expectancy | | | | | Value Scales for Success and Failure | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SAD | ADL | SSD | SPL | I | ISVS | IFVS | SA | SE | STD |
| .18 | .24 | .38*** | .36*** | -.07 | -.13 | -.16 | .00 | .00 | .11 |
| .07 | .17 | .36*** | .34** | -.12 | -.14 | -.13 | -.07 | -.02 | .17 |
| | .74*** | .38*** | .43*** | -.19 | -.22 | -.20 | .33** | .09 | -.11 |
| | | .40*** | .57*** | -.27 | -.16 | -.19 | .30* | .03 | -.13 |
| | | | .84*** | -.05 | -.16 | -.18 | .24 | -.05 | -.09 |
| | | | | -.21 | -.22 | -.21 | .34** | -.12 | -.07 |
| | | | | | .20 | .27 | -.16 | -.09 | -.15 |
| | | | | | | .12 | -.15 | -.15 | .05 |
| | | | | | | | -.11 | -.14 | -.19 |
| | | | | | | | | -.36** | -.26 |
| | | | | | | | | | -.42*** |

| Attribution | | | | | Dispositional Variables | | | Time Estimate Error | |
|---|---|---|---|---|---|---|---|---|---|
| SL | FA | FE | FTD | FL | TA | D | TL | S | A |
| -.12 | .06 | .17 | .00 | -.24 | .24 | -.22 | -.24 | .14 | -.24 |
| -.09 | .14 | .14 | -.09 | -.21 | .12 | -.18 | -.13 | .17 | -.28 |
| -.32* | .02 | .04 | .14 | -.20 | .02 | -.50*** | -.34** | .18 | -.12 |
| -.19 | .14 | .00 | .12 | -.26 | .07 | -.33** | -.18 | .14 | -.12 |
| -.11 | .03 | .22 | .04 | -.29* | .32* | -.33** | -.44*** | .18 | -.30* |
| -.18 | .13 | .19 | .06 | -.38*** | .26 | -.36*** | -.41*** | .19 | -.38*** |
| .42*** | -.12 | .10 | -.26 | .27 | -.02 | .21 | .04 | -.11 | .07 |
| .24 | -.01 | -.17 | .03 | .15 | .14 | .41*** | .05 | .14 | .19 |
| .45*** | -.02 | .12 | .28* | .17 | .12 | .19 | .25 | -.02 | .04 |
| -.44*** | .06 | -.14 | .10 | -.02 | .02 | -.21 | -.20 | -.07 | .16 |
| -.13 | .03 | .14 | .00 | -.16 | -.18 | -.16 | .03 | -.04 | .07 |
| -.39*** | -.12 | -.04 | .12 | .04 | -.04 | .14 | .17 | .04 | -.10 |
| | .04 | .05 | -.23 | .13 | .19 | .23 | .00 | -.17 | .11 |
| | | -.50*** | -.20 | -.29* | .08 | -.18 | -.14 | .03 | -.08 |
| | | | -.29* | -.23 | -.13 | -.02 | -.02 | -.04 | -.01 |
| | | | | -.49*** | .16 | -.08 | -.02 | .06 | .03 |
| | | | | | -.11 | .29* | .18 | -.06 | .07 |
| | | | | | | -.15 | -.28* | -.11 | .11 |
| | | | | | | | .60*** | -.27 | .29* |
| | | | | | | | | -.15 | .22 |
| | | | | | | | | | -.83*** |

# APPENDIX VII

Median (in Seconds) of Times Taken to Complete Four Puzzles at the Fourth Level of Difficulty (The Individual's Time Limit)

| Third Grade | | | | Sixth Grade | | | |
|---|---|---|---|---|---|---|---|
| Subj. No. | Median Time | Subj. No. | Median Time | Subj. No. | Median Time | Subj. No. | Median Time |
| 1 | 12 | 26 | 13 | 1 | 6 | 26 | 11 |
| 2 | 7 | 27 | 8 | 2 | 8 | 27 | 9 |
| 3 | 11 | 28 | 16 | 3 | 9 | 28 | 11 |
| 4 | 12 | 29 | 13 | 4 | 7 | 29 | 5 |
| 5 | 14 | 30 | 11 | 5 | 10 | 30 | 9 |
| 6 | 12 | 31 | 13 | 6 | 6 | 31 | 8 |
| 7 | 14 | 32 | 18 | 7 | 10 | 32 | 6 |
| 8 | 12 | 33 | 11 | 8 | 10 | 33 | 9 |
| 9 | 13 | 34 | 11 | 9 | 5 | 34 | 7 |
| 10 | 13 | 35 | 13 | 10 | 10 | 35 | 6 |
| 11 | 17 | 36 | 12 | 11 | 9 | 36 | 8 |
| 12 | 20 | 37 | 12 | 12 | 7 | 37 | 9 |
| 13 | 21 | 38 | 16 | 13 | 8 | 38 | 7 |
| 14 | 16 | 39 | 20 | 14 | 6 | 39 | 13 |
| 15 | 17 | 40 | 24 | 15 | 6 | 40 | 9 |
| 16 | 12 | 41 | 19 | 16 | 5 | 41 | 7 |
| 17 | 15 | 42 | 15 | 17 | 9 | 42 | 9 |
| 18 | 8 | 43 | 12 | 18 | 6 | 43 | 8 |
| 19 | 10 | 44 | 14 | 19 | 8 | 44 | 9 |
| 20 | 11 | 45 | 14 | 20 | 9 | 45 | 9 |
| 21 | 15 | 46 | 13 | 21 | 9 | 46 | 9 |
| 22 | 11 | 47 | 14 | 22 | 9 | 47 | 7 |
| 23 | 25 | 48 | 8 | 23 | 8 | 48 | 8 |
| 24 | 18 | 49 | 18 | 24 | 9 | 49 | 10 |
| 25 | 25 | 50 | 16 | 25 | 6 | 50 | 8 |
| Mean = 14.30 | | | | Mean = 8.12 | | | |
| SD = 4.13 | | | | SD = 1.71 | | | |

## APPENDIX VIII

Level of Aspiration Chosen by Each Subject, and Success (S) or Failure (F) in Performing the Selected Task

| Level of Difficulty | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | | | | Third Grade | | | | | | |
| 10(S)[1] | 11(S) | 2(S) | 8(S) | 12(S) | 1(S) | 3(F) | 31(F) | 4(F) | | 5(F) |
| 17(S) | 24(S) | 15(S) | 21(S) | 16(S) | 14(S) | 6(F) | | | | 7(F) |
| 32(S) | | 29(S) | 27(S) | 18(S) | 19(S) | 39(F) | | | | 8(F) |
| 46(S) | | 30(S) | 37(S) | 23(S) | 22(S) | 47(F) | | | | 13(F) |
| 49(S) | | 36(S) | 40(S) | 28(S) | 33(S) | | | | | 20(F) |
| | | | 41(S) | 35(S) | 34(S) | | | | | 25(F) |
| | | | 42(S) | 44(S) | | | | | | 26(F) |
| | | | 45(S) | 48(S) | | | | | | 38(F) |
| | | | 50(S) | | | | | | | 43(F) |
| | | | | Sixth Grade | | | | | | |
| 12(S) | | 11(S) | 7(S) | 1(S) | 6(S) | 21(F) | 3(F) | 2(F) | | 4(F) |
| | | 19(S) | 13(S) | 5(S) | 10(S) | 23(F) | 31(F) | 22(F) | | 9(F) |
| | | 27(S) | 15(S) | 8(S) | 25(S) | 29(F) | 33(F) | 28(S) | | 38(F) |
| | | 44(S) | 24(S) | 14(F) | 32(S) | 30(F) | | | | 39(F) |
| | | | 40(S) | 16(S) | 37(S) | 35(F) | | | | 42(F) |
| | | | 41(F) | 17(S) | 49(S) | 43(F) | | | | |
| | | | 45(F) | 18(S) | 26(S) | 47(F) | | | | |
| | | | 46(S) | 20(S) | | 48(S) | | | | |
| | | | | 34(S) | | | | | | |
| | | | | 36(S) | | | | | | |
| | | | | 50(S) | | | | | | |

1. The subject number and the outcome, success (S) or failure (F), of his performance.

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