This is to certify that the

thesis entitled

THE MEDIATING ROLE OF COGNITIVE
DEVELOPMENT IN ACHIEVEMENT
JUDGMENT AND BEHAVIOR

presented by

DeWayne Moore

has been accepted towards fulfillment
of the requirements for

M. A. degree in Psychology

Barbara Keinar
Major professor

Date 11/9/77

O-7639

THE MEDIATING ROLE OF COGNITIVE DEVELOPMENT IN ACHIEVEMENT JUDGMENT AND BEHAVIOR

By

DeWayne Moore

A THESIS

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

MASTER OF ARTS

Department of Psychology

1977

ABSTRACT

THE MEDIATING ROLE OF COGNITIVE DEVELOPMENT IN ACHIEVEMENT JUDGMENT AND BEHAVIOR

By

DeWayne Moore

Eighty children, 40 males and 40 females from the first and third grades, participated in two 15 minute sessions. In the first session, children evaluated the achievement behavior of hypothetical others. In the second session their level of cognitive maturity was assessed and each child individually performed an embedded figures task. Half the children were given information linking their performance to the internal, stable factor of ability. All children were told that they had not found all the hidden figures (failure). Subsequently, their affective and expectancy responses were assessed.

Although the attempt to manipulate attributions to ability was not effective, an internal analysis revealed that both expectancies and affective responses were related to causal attributions. Level of cognitive development, included in a multiple correlation with causal

attributions to predict expectancies and affect, did not improve prediction.

Results of the achievement judgments revealed that effort, ability and outcome were influential evaluative determinants for both age groups and that even children at the preoperational level used the three dimensions to evaluate the performance of others.

To my mother and grandparents

ACKNOWLEDGMENTS

The children, parents, teachers, and principal, Mr. Canaday, of Elliott School, deserve my special thanks for their assistance and cooperation.

I wish to express my appreciation to Dr. Barbara Riemer, my committee chairperson, for her guidance and well-timed support and to Dr. Ellen Strommen and Dr. Elaine Donelson for their thoughtful and insightful advice.

In addition, Maureen Hart, Jane Dritsas, and Marc Duffy served as testers and scorers; their assistance was vital and is greatly appreciated.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER I

INTRODUCTION

Cognitive maturity is known to have important effects on social behavior (Lee, 1971; Tomlinson-Keasey & Seasey, 1974; Selman, 1971; Feffer & Gourevitch, 1960). This research has been guided by the assumption that cognitive change in itself will be one critical determinant of how children respond to their social environment. Only recently, however, have achievement-related behaviors begun to be studied within this framework (Weiner & Peter, 1973; Salili, Maehr, & Gillmore, 1976).

The following literature review is designed to examine the cognitive developmental approach to achievement. The attributional analyses of achievement proposed by Weiner and his associates (Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971) and Piaget's theory of cognitive development are reviewed. Finally, the research attempting to integrate cognitive developmental theory with attribution theory is critically examined, and the necessity of further research is discussed.

An Attributional Theory of Achievement

Adopting Heider's (1958) notions, Weiner and his associates (Frieze & Weiner, 1971; Weiner, Frieze, Kukla, Reed & Rosenbaum, 1971; Weiner & Kukla, 1970) have developed an attributional model of achievement motivation. The model postulates four causal attributions that "mediate between antecedent stimulus-organism transactions and ensuing achievement behavior" (Weiner et al., 1971, p. 96). The four causal elements are ability, effort, task difficulty and luck. The theory postulates that in attempting to explain the prior outcome (success or failure) of an achievement related event, "the individual assesses his own or the performer's ability level, the amount of effort expended, the difficulty of the task, and the magnitude and direction of experienced luck" (Weiner et al., 1971, p. 96). Much of the research generated by Weiner's model has focused on the relationship between causal attributions and two achievement-related behaviors: expectations of success and affective responses to achievement outcomes.

The first research to examine the relationship between causal attribution and expectations of success was conducted by Rotter and his associates (Rotter, 1966; Phares, 1957; Lefcourt, 1966). Rotter (1966) cited a number of studies supporting his hypotheses that changes in expectancy are a function of whether the person perceives internal or external control over the situation. Lefcourt

(1966) defined the control poles: "Internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions . . .; external control refers to . . . events as being unrelated to one's own behavior . . . and therefore beyond personal control" (p. 207). Rotter cited a study by Phares (1957) which is representative. In this experiment, subjects were given a discrimination task that was ambiguous with respect to the objective determinants of success and failure. The outcome in one condition was described as determined by skill (internal control), while in a second condition performance was said to be entirely a matter of luck (external control). Expectancy of success was inferred from the number of chips subjects were willing to bet on their next performance. Phares found that there were typically more expectancy shifts, and the shifts were of greater magnitude in the skill condition than in the chance condition.

Weiner et al. (1971), subsequently reformulated Rotter's hypotheses. They noted the causal determinants of outcome listed by Rotter (1966) differed not only along the dimension of locus of control (internal vs. external), but also along a stability dimension (fixed vs. variable). According to this model, the results of an achievement situation can be attributed either to internal or external factors (locus of control) and to fixed or variable factors (stability). Estimates of ability and task

difficulty are relatively fixed, while estimates of intended effort and anticipated luck are free to vary from trial to trial. In addition, effort and ability are properties internal to the person while task difficulty and luck are external factors.

Several studies have supported Weiner's model that stability and not locus of control is the determining dimension (Weiner, Nierenberg, & Goldstein, 1976). Meyer (1970; reported in Weiner, 1972) was the first to compare expectancy shifts between stable and unstable attributions. Male high school students were given five repeated failures at a digit-symbol substitution task. Following each trial subjects attributed their failure to low ability, bad luck, low effort, or task difficulty. Next, they estimated their probability of successfully completing the next trial. Expectancies decreased most following failure when attributions were to low ability and/or task difficulty than when attributions were to lack of effort or bad luck.

A study by McMahan (1973) essentially replicated the results using a different experimental procedure. He found, using a correlational design, a positive relationship between the stable attributes of ability and task difficulty and subsequent expectancy following success and a negative relationship following failure, while the relationships between effort and luck attributions and subsequent expectancy tended to be negative following success

and positive following failure. As McMahan noted, the obtained correlations between effort and task attributions and subsequent expectancy were in the opposite direction from that predicted by the one-dimensional analysis of Rotter. Together, these results suggest that the stability dimension is the more salient in an achievement context.

Sex Difference in Expectancies

Several studies indicate that females have lower expectancies for success than males. Crandall (1969) demonstrated in a series of studies on various age groups and on a variety of tasks the generally low expectancies of females, compared to males. Her samples included elementary school children who gave expectancy estimates for their performance at novel intellectual tasks; eighth graders who were asked to state how well they expected to do at a digit-symbol matching task; college-aged people from the Fels longitudinal sample who guessed their performance at a geometric task. The results were consistent: females had lower expectations than males in all situations.

Other researchers have replicated Crandall's findings with a variety of age groups and tasks. Using 10 year old subjects, Montanelli and Hill (1969) found that boys expected to do better than girls at marble dropping games. Parsons (1974) found similar differences in expectancies in a group of children 6 1/2-8 years old.

The task consisted of identifying objects hidden in a series of pictures. Furthermore, high school boys anticipated more favorable performances than their female classmates on verbal intelligence tests (Brim, Goslin, Glass, & Goldberg, 1969), and college males had higher expectations for success at anagrams (Feather, 1969). Finally, Nichols (1975) found that fourth grade boys had higher expectancies than girls at an angle matching task.

Based on the Weiner et al. (1971) model, researchers have put forth two related hypotheses to account for sex differences in expectancies. One line of research has attempted to account for differences in expectancy in terms of the different attributional tendencies of males and females. For example, Dweck and her associates (Dweck & Reppucce, 1973; Dweck & Bush, 1976) have found that girls are relatively more likely to attribute failure to the stable factor of lack of ability. Boys, on the other hand, are more likely than girls to attribute failure to unstable factors, such as lack of effort (Dweck & Reppucci; Dweck & Bush) or bad luck (Nichols, 1975). As discussed above, attributions following failure to stable factors such as ability and/or task difficulty are associated with larger drops in expectancy than are attributions to unstable factors such as effort and/or luck. Indeed, Nichols found that females, who had lower expectancies than males, also differed from males in their attributional

patterns. After a practice session in which half the subjects failed and half succeeded, boys reported higher expectancies than girls. Attributions were also measured. Nichols found that girls, but not boys, attributed failure to poor ability more than success to good ability. It was also found that boys more than girls attributed failure to bad luck; and boys, but not girls, had higher luck attributions after failure than after success. Thus, the sex differences in expectancies were paralleled by sex differences in attributions.

A second but related explanation of sex differences in expectancies rests on the assumption that the stability of causal attributions made about a performance is related to whether or not the outcome confirms or disconfirms prior expectations. The lower expectancies of females may result in success being an unexpected outcome and failure being an expected outcome, while for males, success may be an expected outcome and failure an unexpected outcome. Feather (1969) has hypothesized that unexpected outcomes are attributed to variable factors and expected outcomes to stable internal factors. More specifically, Feather found that subjects with high expectations of success tended to attribute success to ability (stable attribute) and failure to bad luck (variable attribute); on the other hand, subjects with low expectations of success tended to attribute success to good luck and failure to lack of

ability. Subsequent studies by Feather and Simon (Feather & Simon, 1971a, 1971b, 1972; Simon & Feather, 1973) have supported this notion.

The stability of attributions made about one's performance is thus partially a function of the difference between the actual outcome and the initial expectancies. Valle and Frieze (1976) have developed a mathematical model relating initial expectation and causal attributions. Unexpected outcomes are attributed to unstable causes and, therefore, have less weight in determining future predictions; expected outcomes are attributed more to stable causes and tend to support and reinforce original expectations. When persons with low expectancies fail on a task, an expected outcome, they tend to attribute it to lack of ability. This cycle maximizes the negative effects of failure and minimizes the positive effects of success. Low expectations, then, are self-perpetuating since they lead to attributions which maintain their accuracy.

To summarize, sex differences in initial expectancies of success lead to sex differences in attributional patterns which result in differential expectancy drops. This study further examined this cycle.

Weiner et al. (1971) have also hypothesized that while the stability of the attributions following success or failure influence the individual's expectancy of future success and failure, the locus of control influences

affective responses to success and failure. For example, attributions to internal factors (ability or effort) are assumed to result in greater positive or negative affect than attributions to external factors (task difficulty or luck).

Weiner (1974) reviewed several studies indicating that locus of control influences affective responses to success and failure in adults. In addition, Weiner and Kukla (1970) found that affective responses to feedback were a function of the degree to which the outcome was seen as internally determined with attribution to effort being particularly important. Nichols (1975), however, found that pleasure with success correlated with attribution of success to high ability, but not with attribution to high effort. This study provided further evidence on the relations between attributions of ability and effort and affective responses.

Cognitive Development

Since researchers examining the development of the attribution process have assumed that concrete operations are central for the emergence of the information-attribution-affect and expectancy link (Weiner, 1974; Weiner & Peter, 1973; Ruble et al., 1976), cognitive-developmental theory is reviewed, with particular emphasis on the concrete operational period.

The cognitive-developmental approach, exemplified in the writings of Piaget (1932, 1926, 1928, 1929), represents a major theoretical framework for conceptualizing change processes. Piaget views development as forming an invariant sequence with each developmental stage representing a qualitative different mode of thought. Because earlier stages are necessary parts of their successors, the individual must pass through all preceding stages before he can move on to the next one (Flavell, 1963).

Piaget proposed several important changes that accompany the acquisition of concrete operations. One particularly important achievement is the ability to conserve. Conservation of mass and conservation of liquid, for example, have dramatically illustrated children's emergence from the preoperational to the concrete operational level where reversible thought operations are exhibited by the ability to conserve. One operating principle here is the ability to decenter, i.e., "to take into account features which could balance or compensate for the distorting and biasing effects of a single centration (Flavell, p. 157). As Flavell points out, the tendency to center, i.e., "focus attention on a single, striking feature of the object of its reasoning to the neglect of other important aspects, and by so doing to distort the reasoning" (p. 157), is one of the most salient characteristics of preoperational thought.

Another important series of changes takes place in children's classification of objects. Piaget (1952) investigated children's grasp of the relations between the whole and the parts of a class. Among this group of operations, Piaget views the "relationship of inclusion" as being the principle stumbling block for the cognitively immature child. Piaget (1952) has stated that the pre-operational child "cannot establish a permanent inclusion between the whole and the parts: as soon as the whole is divided, even in thought, the parts cease to be included in it and are merely juxtaposed without synthesis" (p. 171).

Finally, with the acquisition of concrete operations, children begin to overcome the egocentrism of the pre-operational period. Preoperational children repeatedly demonstrate an inability to take a perspective different from their own. This form of egocentrism results from a tendency to confuse thinking about an event and the event itself. Preoperational children tend to assimilate reality to their own perspective (Flavell, 1963).

Development of the Attributional Process

Weiner and his associates (Weiner, 1974; Weiner & Peter, 1973) have attempted to integrate cognitive-developmental theory with attribution theory. They suggest that certain universal developmental patterns may underlie achievement cognitions and achievement behaviors. As Weiner and Peter (1973) state, "Analysis of the cognitive

components in the achievement system supports the belief that a cognitive-developmental approach is applicable in the achievement domain. Individuals concerned with achievement-related goals have forward-looking time perspectives, realistic yet positive expectations of success, and a unique pattern of causal ascriptions for success and failure. Thus achievement motivation is associated with a particular pattern of cognitive functioning" (p. 291).

Weiner (1974) further notes that the attributional model of motivation is "likely to be affected by the cognitive maturity of the actor" (p. 43). Thus cognitive change in itself may be a critical determinant of the child's achievement-related behaviors. One of the cognitive characteristics of the preoperational child is an inability to separate the physical world from his own motivation. This, along with one of the most pronounced characteristics of preoperational thought, the tendency to "center" (Flavell, 1963) suggests as Parsons, Ruble, Hodges, and Small (1976) pointed out, that the young child may not use past experience in predicting future events. According to Inhelder and Piaget (1958), it is not until the stage of concrete operations that the child becomes capable of relating temporarily separated events to each other and avoids focusing on single events. This inability to decenter would make it difficult for the preoperational child to use past experience in predicting future outcomes.

One implication of a cognitive developmental analysis is that if children do not use serial information to form expectancies until they enter the concrete operational period, then sex differences in expectancies would not be expected until children acquire concrete operations. And indeed, research by Parsons and her associates (Parsons, 1974; Parsons and Ruble, 1975; reported in Parsons, Ruble, Hodges, and Small, 1976) provides indirect support. Unfortunately, age rather than cognitive development was relied on as the independent variable. Their research, in any event, suggests that sex differences in expectancies for success do not develop until sometime after the preschool years.

An additional implication of cognitive immaturity results from the inability to use serial information noted above and the tendency to confuse the psychological and physical realms (Flavell, 1963). Young children desiring to succeed may assume that the wish to succeed and actually succeeding are the same. Consequently, young, preoperational children would be expected to have higher expectancies for success than older children who have mastered concrete operations. Again, indirect support for this prediction comes from the work of Parsons and Ruble (Parsons, 1974; Parsons & Ruble, 1972). They found for subjects ranging in age from 3 1/2 to 10 that expectancies for success decreased as a function of age.

Finally, if as Flavell (1963) notes, "the preoperational child is confined to the surface of the phenomena he tries to think about, assimilating only those superficial features which clamor loudest for his attention" (p. 157), the young child would be expected to focus on concrete and external aspects of achievement situations. Consequently, the outcome of an event is likely to be the salient feature. Indeed, in the area of moral development, this cognitive immaturity is reflected in the child's resolution of moral dilemmas. Typically, he focuses on the physical aspects of a moral dilemma, such as whether it was a big or little lie, or how much physical damage was done (Piaget, 1932). Likewise, an achievement event may be considered simply in terms of success or failure. With increased cognitive maturity, however, there should be an increased capacity to consider the event in a more complex fashion.

Such an analysis has received some support (Ruble, Parsons, & Ross, 1976; Weiner & Peter, 1973; Salili, Maehr, & Gillmore, 1976). Ruble et al. (1976) hypothesized that young children would not use locus of control and outcome information in ways suggested by research with adults. In their study, children ranging in age from 6 to 10 were asked to perform a task and were given patterns of information which were expected to produce internal or external attributions. The children's self-evaluative reactions

about their performance were then measured. The results indicate that the younger children's affective responses were not affected by the information they were given. The affective responses of the six year old children depended directly upon the outcome of their behavior. The affective responses of the older children--8 to 10 years of age--, however, were greater for those children who received information indicating internal attributions. One explanation for these results may be the young, pre-operational child's tendency to center. The younger, cognitively immature children focused on the outcome of the event to the exclusion of causal attributions. Such an explanation, while consistent with the results, seems premature, however, since cognitive development was not measured.

Weiner and Peter (1973), likewise, found age-related differences in the influence of causal attributions on achievement judgments. Weiner and Peter asked children 4-18 years of age to make judgments about achievement-related outcomes using three evaluative dimensions: effort, ability and outcome. Subjects were told that children in a classroom had been assigned a puzzle to complete. The pupils were described as high or low in ability, high or low in effort expenditure, and as succeeding or failing at the task. The subjects were given all eight possible combinations of information. They were

then asked to evaluate the pupils. The evaluation could range from +5 (reward) to -5 (punishment). First, it was found that achievement judgments became more positive as age increased. Second, among the younger children, 4-6 years of age, achievement evaluation was primarily determined by the outcome of an action. Success was rewarded, while failure was punished. Then, with increasing age, the amount of effort expended became an influential determinant of evaluation. In a review of this experiment, Weiner (1974) thus concluded, "the consequences of causal ascriptions to effort change with cognitive development" (p. 45).

But here again, as in the Parsons and Ruble studies (Parsons, 1974; Parsons & Ruble, 1972; Ruble et al., 1976; Parsons & Ruble, 1975; reported in Parsons et al., 1976), the children's level of cognitive development was not assessed. Age, rather than cognitive level, was relied on as an independent variable. Because age was thus equated with cognitive level in these studies, conclusions which cite the centrality of cognitive development seem premature. The demonstration of a central role for cognition requires that the stage of cognitive development and not age be the major variable.

The present research was designed to examine the questions raised by the preceding discussion. First, since attributions mediate expectations and affect, both

can be changed by manipulating the perceived causes of a performance. Indeed, Dweck (1975) has demonstrated the efficacy of manipulating causal attributions, though in a slightly different context. She attempted to teach children, who had previously been diagnosed as "helpless," to take responsibility for failure and attribute it to lack of effort. The hypothesis was that this would lead to increased persistence on the part of these children when compared with another group of helpless children who received only success experiences during the training period. This group did not receive the attribution training. The results of the investigation supported the hypothesis. The children who were taught to attribute failure during training to insufficient effort showed a significant increase in persistence from pretraining to posttraining when compared to subjects who received the success only treatment. This demonstrated the mediating effect of causal attributions on persistence.

In a study by Riemer (1975), all four causal elements were manipulated as independent variables in order to determine the relationship between locus of control and affect, and stability and expectancy. The results indicate that locus of control influenced the subjects' affective responses. The affective responses were higher for the internal attributes of effort and ability than for the external attributes of task difficulty and luck. The

stability dimension, however, did not have the predicted affect on expectancy of success. As a possible explanation for these results, it should be noted that this study dealt only with attributions for success. A number of studies discussed above (Dweck & Bush, 1976; Dweck & Repucci, 1973; Parsons, 1974; Nichols, 1975; Meyer, 1970) suggest that causal attributions following failure may be a more influential mediator of achievement-related responses. More specifically, Nichols found differential attributional patterns for high expectancy males and low expectancy females only after failure. In this study attributional patterns following success could not account for the sex differences in expectancies. Furthermore, Parsons found that among 6 1/2-8 year olds, girls and boys responded to success in a similar manner. In both cases, their expectancies increased. However, they responded to failure differentially. The girls dropped their expectancies more. Failure feedback may, therefore, be more salient in the hypothesized stability and expectancy relationship. The failure in the Riemer study to verify the predicted relationship between the stability of the causal attribution and the expectancy response could be due to manipulating attributions for success only.

In order to examine the information-attribution-expectancy and affect link, the present experiment attempted to manipulate attributions to ability, a stable, internal

attribute. Furthermore, since attributions following failure may be more influential in the information-attribution-expectancy and affect link, all children received failure feedback on a hidden figures task.

In addition, the Weiner and Peter (1973) study, which asked children to evaluate the performance of others, was replicated in order to determine the relationship between the mediating affect causal attributions on both achievement judgments and achievement behaviors. Finally, the present study examined the influence of cognitive development on the mediating influence of causal attributions on expectancies and affect and achievement judgments. Age was thus not relied on as a variable.

Summary of Hypotheses

In line with the preceding discussion the following predictions were made.

Achievement judgments. The first three hypotheses are based on results from Weiner and Peter (1973).

1. When judging the performance of others, evaluation will be primarily determined by the outcome of the action. This will be true of both age groups.
2. However, among the older children the amount of effort expended will be an influential evaluative determinant.

3. Finally, achievement judgments will become more positive with increasing age.

Self evaluations expectancy. Hypotheses 4 and 5 are based on the results from Parsons (1974).

4. Expectancies for success will be age-related. The younger children will have higher expectancies than the older children.
5. Sex differences in expectancies will be age-related. Specifically, the predicted higher expectancies for success of males will be found only for the older children.

Hypotheses 6a through 7b reflect the assumed role of cognitive development.

6a. It is predicted that expectancies will drop following failure. However, the expectancy drops of the younger children will not be mediated by causal attributions. Specifically, the younger children's expectancies should not be affected by the instructions suggesting attributions to ability.

6b. Secondly, the expectancy drops of the younger children will not be related to the attributions given following failure.

6c. Finally, the expectancies of the younger children will drop more than the expectancies of the older children.

7a. Among the older children causal attributions will be an influential determinant of expectancies. Specifically, children who are led to believe that failure is primarily determined by ability (stable factor) should decrease expectancies of success to a greater extent than children who do not receive the attribution orienting instructions.

7b. In addition, the expectancy drops of the older children will be related to the attributions given following failure. The expectancy drops will be positively related to the stable attributions and negatively related to the unstable attributes.

Hypotheses 7c and 7d follow from the hypothesized higher initial expectancies of third-grade males (Hypothesis 5).

7c. The expectancy drops of third grade males and females will differ. Third grade females will drop their expectancies more than will third grade males.

7d. Third grade males and females will differ in their attributions. Third grade females will give more attribution to ability than will third grade males.

Hypotheses 8a through 9b reflect the assumed role of cognitive development.

8a. The affective responses of the younger children will not be affected by the attribution orienting instructions.

8b. The affective responses of the younger children will not be related to the attributions following failure.

9a. The affective responses of the older children will be influenced by the attribution orienting instructions. Greater negative affect will be expressed by the older children in the ability condition.

9b. The affective responses of the older children will be related to the attributions made following failure. The expectancies of negative affect will be positively related to the internal attributions and negatively related to the external attributions made following failure.

10. Finally, Parson (1972) and Ruble et al. (1976) found an age-related increase in the impact of failure information on affect ratings. Based on these findings, it is predicted that the older children will be more negative about their affect ratings after failure than the younger children.

Cognitive development. Finally, it was hypothesized that the impact of concrete operational thinking will be reflected by qualitative changes in the mediating affect

of causal attributions on achievement judgment and achievement behavior (affect and expectancy). However, once the impact of a major cognitive reorganization has been reflected by changes in the mediating role of causal attributions, it is not immediately obvious how cognitive development would continue to exert its influence. Consequently, there should be an orderly fluctuation in the magnitude of the relationship between cognitive development and information-attribution-achievement behavior link. The magnitude of the relationship should be higher following major cognitive reorganizations and lower during the intervals between such cognitive reorganizations. Therefore, it was predicted that the correlation between cognitive development and the mediating affect of causal attributions on both achievement judgments and behaviors would be greater among children evidencing an initial mastery of concrete operational thought than among those firmly established in concrete operations. The following four hypotheses, therefore, applied only to the younger children.

11. The mediating influence of effort on achievement judgments will be related to the children's level of cognitive development.
12. The influence of ability attributions on expectancies will be related to the children's cognitive level.

13. Cognitive development will also be related to the influence of ability attributions on affect.
14. Finally, high expectancies of success will be negatively related to the level of cognitive development.

CHAPTER II

METHOD

Subjects

Eighty children, 40 males and 40 females, were selected from the first and third grade classes of a lower-middle to middle-class suburb of Lansing, Michigan. Permission was obtained from the school administrators to test three classrooms at each grade level. Prior to the study, parents were notified of their child's possible participation and permission slips were returned by the children. The average age of the children was 6.72 years for the first graders and 8.76 years for the third graders.

The teachers at each grade level served to briefly introduce the experiment to the children, indicating that the experimenters were from Michigan State University and desired help with a project involving elementary students. All children were asked whether they wanted to participate and were given ample opportunity to refuse. All children agreed to participate.

Instruments

Achievement judgments. The achievement-related judgments were adapted from Weiner and Peter (1973). The situations involved a child working at a puzzle. The child was characterized according to ability (present or absent), "trying" (yes or no), and the consequences of the action (completion and success or incompletion and failure). More specifically, the subjects were told the following:

> I am going to play a game with you, and in this game I am going to tell you about some children. After I tell you about each boy or girl, I want you to put a check mark above either gold or red stars, whichever you think the boy or girl should get. Gold stars mean that you are pleased with the boy or girl and that you want to reward him or her. Red stars mean that you are not pleased with the boy or girl and you want to punish him or her. You can check either 1, 2, 3, 4, or 5 gold or red stars, depending on how many you think the child deserves. Five gold stars would be a big reward and 1 gold star would be a little reward, while 5 red stars would be a big punishment and 1 red star a small punishment. Do you understand all that?
>
> Now let's practice a little. Bernie is a little boy who helped his mother with the dishes. What color star would you give him? How many stars? Susie is a

little girl who would not clean up her room. What color star would you give her? How many stars? Now I am going to tell you about some other children. These children are in school and the teacher has given them a picture puzzle to put together. This is the kind of puzzle in which you fit the pieces together. Each child is supposed to put his or her puzzle together before the bell rings. I'll tell you about each child and you give him or her either gold or red stars.

For all subjects, the instruction and the experimental conditions were read aloud. The eight experimental conditions judged are presented in Appendix A.

Each subject received a booklet containing the eight stories (see Appendix A). Under each story were two rows of numbers 1-5. Directly below each row of numbers, the appropriate number of stars were reproduced. The first row contained gold stars, the second, red stars. Subjects were asked to put a check mark above the color and number of stars they thought the child in the story deserved.

Selection of cognitive measures. The tasks used to measure cognitive development were selected to define the different stages of development and to stay close to Piaget's original concepts and data-gathering procedures as possible. Since the subjects used were children 6-7 and 8-9 years of age, their levels of cognitive functioning

was assumed to range from the preoperational subperio- through the concrete operational subperiod. Since the ability to perform reversible operations on classes and relations are essential processes in the emergence of concrete operational thought (Piaget, 1952, Ch. 2), two tasks were selected as being representative of operations performed upon logical classes and two tasks were selected involving operations performed upon the relations which may exist between two classes.

The tasks selected were conservation of mass and conservation of liquid, and two tasks dealing with the child's ability to additively compose classes--the "wooden bead" problem and the "children" problem.

Procedure

Each child participated in two 15 minute sessions. The first session, during which the achievement judgment stories were completed, consisted of groups of five same sex and same age children randomly drawn from within a classroom. The classroom from which the children were drawn was randomly selected from among the total of six. There were three classrooms for each grade. A few exceptions to this procedure occurred in order to avoid inconveniencing a teacher. This first session was conducted by an experimenter of the same sex as the children.

After all subjects had completed this session, the second session began. This session was conducted by a

male or female experimenter (counterbalanced for the sex of subject). There were two male and two female experimenters. Four measures of cognitive development were completed first. Then the child was asked to do the achievement task. Each subject was tested individually, seated across a table from the experimenter.

Cognitive Measures

All subjects were assigned the four Piagetian tasks in the following order.

Conservation of mass. Two play-doh balls identical in size, shape and weight were placed on the table in front of the child.

"Do the balls have the same amount of play-doh, is there as much in this ball as in this one?" (As an additional check, the following instructions were included.) "If this was candy, and you eat this ball and I eat this one, will we both have just as much to eat?"

The child was encouraged to make them the same if he doubted the equality of the balls. When the child agreed that the two balls were equal, the experimenter proceeded.

"If I made my ball of candy into a hot dog, will I have just as much candy to eat as you have? Will we both have the same amount of candy to eat?"

The experimenter actually rolled one of the balls into a hot dog while the child watched.

"Do we both have the same amount of candy to eat now? Why?"

If the child had any questions or did not understand the instructions, the experimenter repeated the instructions.

Conservation of liquid. Two jars (A & A') of equal size were placed before the child and water was poured into each while the child watched. "If you were to drink this water and I drink this, will we both have just as much to drink?" If the child doubted the equality of the two jars, water was poured into each until the child was satisfied that both jars contained the same quantity of water.

"Now, let's pour this (A') water into this one (cylindrical jar). Do we both have the same amount of water to drink? Do you have just as much to drink as I have? Why?"

Children problem. The child was asked the following questions: (a) How many children are there in your class? (b) How many boys in the class? (c) How many girls in the class? (d) Are there more girls (or boys depending upon the sex of the child being questioned) or more children in your class? Those children who answered incorrectly

were asked (e) What are children? and then question (d) was asked again. The questions were repeated as often as necessary to insure the child's attention and understanding.

Bead problem. The child was given a box containing 20 blue beads and 4 red beads, all of which were made of wood. After ascertaining that the child was aware that all the beads were made of wood, he was asked, "Are there more wooden beads or more blue beads?" Those children who answered incorrectly were asked, "Are all of the beads made of wood?" And then the previous question was asked again. The questions were repeated as often as necessary to insure the child's understanding and attention.

Scoring of Cognitive Measures

The concrete operations task were tape recorded and scored independently by two people according to the theoretical criteria established by Piaget (1952) and used by Elkind (1961a, b). For the children and bead problem, the responses were categorized as follows: All responses indicating the partial class was greater than the total class were categorized as Stage I responses and assigned a score of zero. Responses indicating that the partial class was identical with the total class were categorized as Stage II responses and assigned a score of 1. Those answers which were "correct" were categorized as Stage III responses and given a score of 2.

For the conservation tasks, each conservation response, including both judgments and explanations, were scored 2 and all nonconservation responses were scored zero. A correct judgment without a reasonable explanation was scored 1. The total scores for each child were summed, yielding a composite index of scores ranging from zero to eight. The inter-rater reliability was .98.

Achievement Task

A task fulfilling several criteria was needed for the study. The task had to be sufficiently ambiguous regarding the determinants of performance to yield an effective manipulation of causal attributions. Further, the outcome had to be under experimental control. Finally, a task having some interest for the participants was desired. With this in mind, subjects were asked to find the hidden objects in each of two hidden object pictures. The subjects were divided into one of two experimental conditions: a control group and an ability instruction group. Prior to attempting the task, subjects were read one of two sets of instructions. The ability instruction group were told that success or failure at finding the hidden objects was due to ability. The intent of these instructions was to induce attributions to ability. The instructions read to the control group were identical except that no information about the causes of success or failure was included (see Appendix B).

After the instructions were read, subjects were asked how good they thought they would be at finding the hidden animals. Subjects then began the task and were told at the end of a designated time that they did not (failure) find all the hidden animals in the picture. The degree of difficulty of the pictures was such that all children found three or four animals, at which point the experimenter called "time." Time was called on the average after about 30 seconds for the first graders and after about 20 seconds for the third grade children.

Following this trial, a questionnaire containing the dependent measures was administered. The questionnaire contained one expectancy measure, two affect measures, and one question included to assess attribution. Data collection was complete at this point. An additional trial was given on which all children "succeeded" and were told that they had done very well.

Apparatus and Materials

Dependent measure. The expectancy and affect measures were adapted from the procedure used by Hill and Dusek (1969). The child was presented with a bar graph with a stick figure under each of the seven bars. The bars decreased linearly across the page from left to right. The subject was told that the child represented by the stick and bar to the far left "does best at this task," and

the one to the far right "does poorest at this task." The subject was then asked to point to the child he thought he would turn out to be. The same principle was used for the affective measures (see Appendix C).

The attribution measure was adopted from McMahan (1974). Subjects attributed causality for their failure by means of a set of six paired comparison questions, all possible pairings of the four attributional factors. The use of paired comparisons was undertaken on the assumption that the operations required to state which of two factors was more influential were simpler than the operations required to rate independently the influence of each factor. Attribution scores were derived by assigning one point to a factor for each time it was preferred; the score for each factor could thus range from 0 to 3.

All the dependent measures were read to each subject and each subject responded verbally. The responses were scored by the experimenter.

Experimental task. The achievement task consisted of two pictures, each containing eight hidden objects. In an attempt to control objective performance, three objects in each picture were made more salient so that all children were able to find at least three objects. Subjects were asked to color in each hidden object they found. Prior to beginning the task, subjects were told that they would be timed. After finding three of the hidden objects,

the experimenter called "time." The subject was then told that he did not find all the hidden objects.

CHAPTER III

RESULTS

Achievement Judgment Stories

The first two hypotheses were concerned with how the children would evaluate the hypothetical performances of other children working a puzzle. These hypotheses were tested by means of a 2 X 2 X 2 X 2 analysis of variance with subjects crossed with ability, effort, and outcome and nested within grade level. The rewards and punishments given to the achievement judgment stories were transformed to a scale from one to ten with one being the most punishment given (five red stars) and ten being the most reward given (five gold stars). The analysis of variance was performed on these transformed scores. Table 1 presents the means and standard deviations for the three variables by grade level.

The analysis of variance revealed four significant main effects and no significant interactions. Table 2 presents a partial summary of this ANOVA, as well as the variance accounted for of each variable.

Table 1

Means and Standard Deviations of Achievement Judgment Scores

	Ability		Effort		Outcome		
	High	Low	High	Low	High	Low	
Grade 1	M =65.05	M =64.38	M =66.51	M =62.93	M =71.63	M =57.81	64.71
	SD=18.68	SD=18.22	SD=18.71	SD=18.01	SD=17.43	SD=16.76	
Grade 3	M =72.84	M =70.19	M =74.65	M =68.38	M =80.36	M =62.66	71.51
	SD=15.94	SD=16.44	SD=16.24	SD=15.63	SD=13.90	SD=13.30	
	68.94	67.29	70.58	65.65	75.99	60.23	

Table 2

Summary of the 2 (Sex of Subject) x 2 (Grade Level) x 2 (Effort) x 2 (Ability) x 2 (Outcome) Repeated Measures ANOVA

Source	SS	df	MS	F	Signifi.	% of Variance
Grade (G)	7384.81	1	7384.81	4.86	.031	.037
Outcome (O)	39753.03	1	39753.03	239.11	.0005	.199
Effort (E)	3890.76	1	3890.76	36.88	.0005	.0195
Ability (A)	438.91	1	438.91	5.41	.023	.002
G x O	600.63	1	600.63	3.61	.061	.003
G x E	288.91	1	288.91	2.74	.102	.001
G x A	158.01	1	158.01	1.95	.167	.001
Error	661.89	76	8.71			
Total	199579.44	639				

As Hypothesis 1 predicted, and as Table 2 indicates, there was a main effect for outcome. Success was more positively evaluated ($\bar{X}$ = 75.997) than failure ($\bar{X}$ = 60.234).

Hypothesis 2 stated, "among the older children the amount of effort expended will be an influential evaluative determinant." The grade X effort interaction did not reach statistical significance as Table 2 indicates; however, the trend, depicted by Figure 1, is in the predicted direction. While both first and third graders dispensed rewards on the basis of expended effort, as indicated in Table 2 by the main effect for effort, the mediating effect of effort on rewards given was stronger for third graders than for first graders.

Table 2 also indicates a main effect for ability, which was not predicted. The variance accounted for by this main effect, however, was only .0022.

Hypothesis 3 stated, "achievement judgments will become more positive with increasing age." This hypothesis received support from the main effect for age in the analysis of variance depicted in Table 2. An inspection of the means for the two grade levels reveals that the main effect is in the predicted direction. Third graders gave more total rewards ($\bar{X}$ = 71.513) than did first graders ($\bar{X}$ = 64.719).

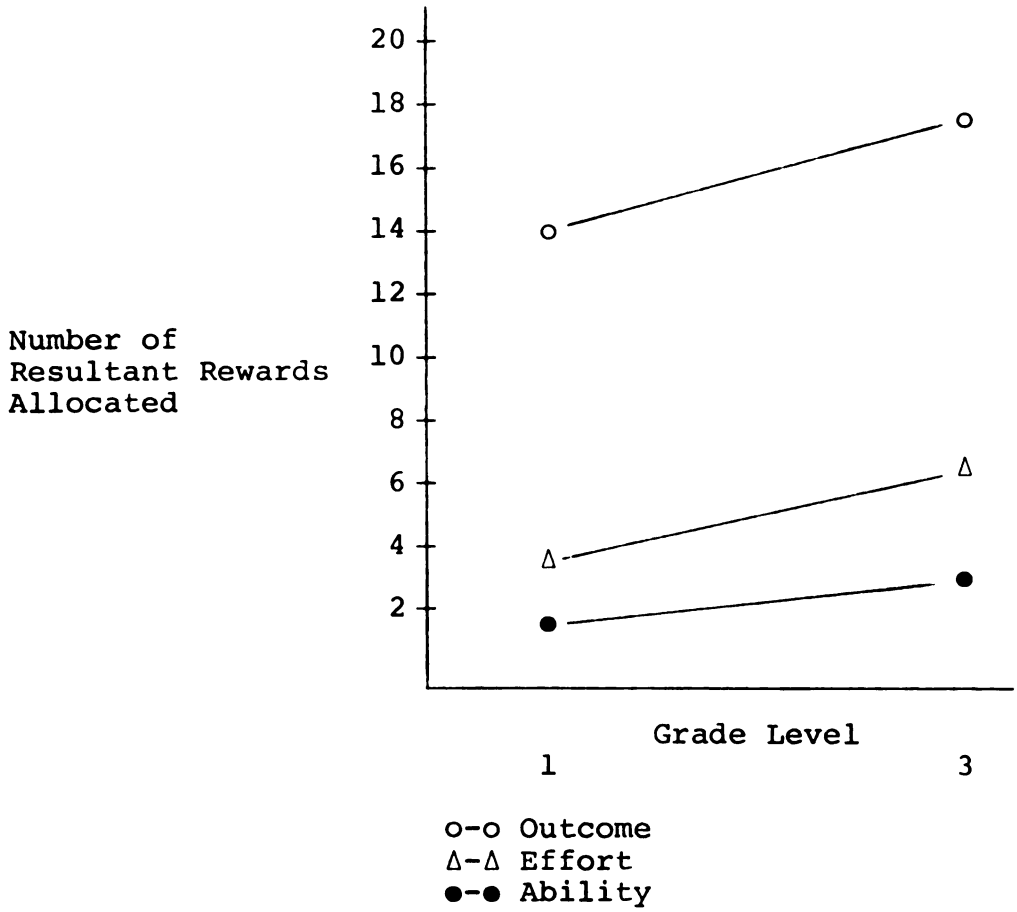

Figure 1. Resultant Rewards Allocated for Effort, Ability, and Outcome as a Function of Grade Level.

Self Evaluations

The means and standard deviations of the self evaluation responses are presented in Table 3.

Expectancy. Hypotheses 4 and 5 concerned the children's expectancies for success assessed prior to doing the task. These initial expectancies were subject to a 2 (Sex of Subject) X 2 (Grade Level) X 2 (Sex of Experimenter) unweighted means analysis of variance. This ANOVA is summarized in Table 4.

Hypothesis 4 stated, "younger children will have higher expectancies than the older children." As Table 4 indicates, there is a significant main effect for grade level. An inspection of the means for the two grade levels reveals that the first-grade children had higher initial expectancies ($\bar{X}$ = 6.675) than did the third-grade children ($\bar{X}$ = 5.225). Additional support for Hypothesis 4 comes from comparing the number of children at each grade who indicated the highest possible choice (7) in response to the initial expectancy question. Of 40 first grade children, 33 chose 7 while only seven of the 40 third grade children chose 7 on the expectancy scale.

Hypothesis 5 predicted that the third grade males would have higher initial expectancies than would the third grade females. An examination of Table 4 reveals a sex X grade level interaction that approaches significance. This trend is depicted in Figure 2. In the first grade, females

Table 3

Means and Standard Deviations on Self-Evaluation Measures

	Dependent Measures				Attributions			
	Initial Expectancy	Final Expectancy	Expectancy Drops	Affect Index	Ability	Effort	Luck	Task Difficulty
Grade 1	M =6.68	M =4.65	M =2.03	M =11.38	M =1.65	M =.83	M =1.35	M =2.18
	SD= .82	SD=1.80	SD=1.66	SD= 2.75	SD= .90	SD=.93	SD= .95	SD= .75
Grade 3	M =5.23	M =4.10	M =1.13	M = 9.80	M =1.28	M =.60	M =1.75	M =2.35
	SD=1.21	SD=1.24	SD=1.61	SD= 2.70	SD= .82	SD=.84	SD= .90	SD= .83

Table 4

Summary of 2 (Grade) x 2 (Sex) x 2 (Sex of E) ANOVA Performed on the Initial Expectancies

Source	SS	df	MS	F	Signif.
Grade (G)	42.731	1	42.731	40.622	.001
Sex (S)	.077	1	.077	.073	.787
Sex of E (SE)	4.713	1	4.713	4.481	.038
G x S	3.025	1	3.025	2.876	.094
G x SE	.109	1	.109	.104	.748
S x SE	.014	1	.014	.013	.910
G x S x SE	.116	1	.116	.110	.741
Error	75.737	72	1.052		
Total	125.800	79	1.592		

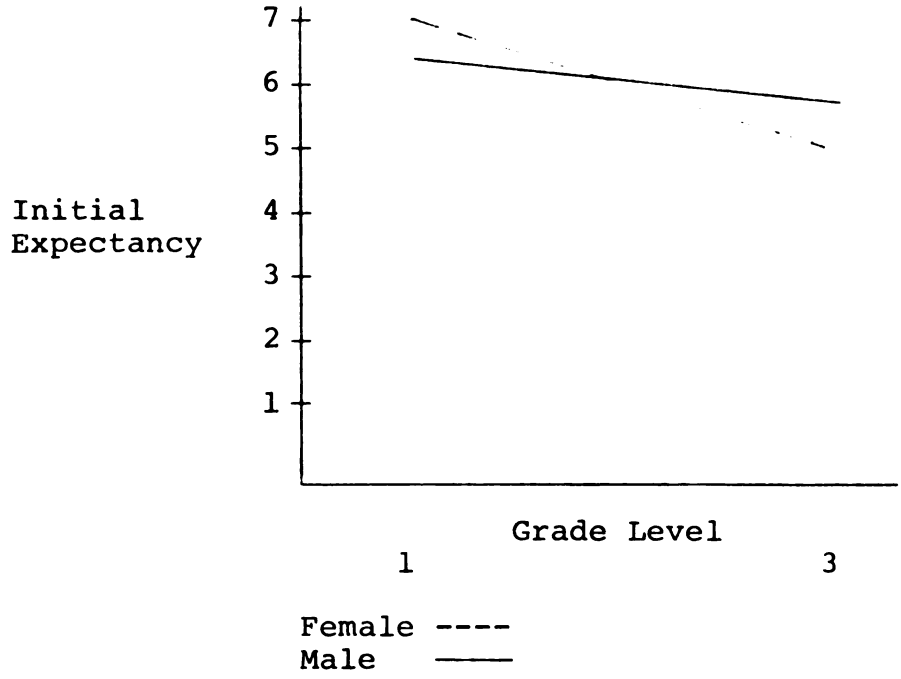

Figure 2. Initial Expectancies of Males and Females as a Function of Grade Level.

have slightly higher initial expectancies than do males. However, by third grade, this difference has been reversed. Third grade males have slightly higher initial expectancies than do third grade females.

Table 4 also indicates a main effect for sex of experimenter. An inspection of the means reveals that expectancies were lower for male experimenters (5.875) than for female experimenters (6.025).

Several of hypotheses 6 through 10 concerned the attempt to manipulate attributions to ability. A manipulation check reveals that the mean number of attributions to ability did not differ for the ability instruction group and the group not receiving any attribution orienting instructions.

A 2 (Sex) X 2 (Grade Level) X 2 (Instruction Condition) analysis of variance performed on the mean number of attributions to ability shows that the attribution instructions were not effective, independent of the age and sex of the children. This ANOVA is summarized in Table 5. Table 6 shows the mean number of attributions to ability by grade and sex. Consequently, Hypotheses 6a, 7a, 8a, and 9a cannot be tested since each depended on the efficacy of the manipulation of attributions to ability. These four hypotheses will not be examined in the following discussion.

Table 5

Summary of 2 (Sex) x 2 (Grade Level) x 2 (Attribution Instructions) ANOVA Performed on Attributions to Ability

Source	SS	df	MS	F	Signif.
Sex (S)	1.012	1	1.012	1.378	.244
Grade (G)	2.812	1	2.812	3.828	.054
Instructions (I)	.012	1	.012	.017	.897
S x G	1.012	1	1.012	1.378	.244
S x I	.012	1	.012	.017	.897
G x I	.612	1	.612	.834	.364
S x G x I	1.512	1	1.512	2.059	.156
Error	52.900	72	.735		
Total	59.888	79	.758		

Table 6

Means and Standard Deviations of Ability Attributions by Grade and Sex

	First Grade		Third Grade		
Male	M	1.650	M	1.050	1.300
	SD	.875	SD	.759	
Female	M	1.650	M	1.500	1.575
	SD	.933	SD	.827	
		1.650		1.275	

Hypothesis 6b stated that the expectancy drops of the first grade children would not be related to the attributions given following failure. Expectancy drops were defined as the initial expectancy minus the final expectancy. This hypothesis was examined by means of a product-moment correlation for each of the four attributes of ability, effort, task difficulty, and luck with the expectancy drops. These correlations are presented in Table 7. As predicted, neither of the two stable attributes of ability and task difficulty were related to the expectancy drops. Effort and luck were not related to the expectancy drops either. Thus Hypothesis 6b was confirmed.

Table 7

Correlations of Attributions with Expectancy Drops

	Ability	Effort	Task Difficulty	Luck
First Grade	.145	-.0304	.017	-.120
Third Grade	.189	-.304*	.101	.022

*p < .05, two tailed test. N = 40

Hypothesis 6c predicted that the expectancy drops of the first graders would be larger than the expectancy drops of the third graders. To examine this hypothesis, the expectancy drops were subjected to a 2 (Sex) X 2 (Grade Level) unweighted means analysis of variance. As can be seen from Table 8, there was a significant difference in

Table 8

Summary of the 2 (Sex) x 2 (Grade Level) ANOVA Performed on Expectancy Drops

Source	SS	df	MS	F	Signif.
Sex (S)	.200	1	.200	.074	.787
Grade (G)	16.200	1	16.200	5.956	.017
S x G	.450	1	.450	.165	.685
Error	206.700	76	2.720		
Total	223.550	79	2.830		

the expectancy drops of the two age groups. An inspection of the means reveals that the difference was in the predicted direction. First graders dropped their expectancies ($\bar{X}$ = 2.025) more than did third graders ($\bar{X}$ = 1.125). Hypothesis 6c was confirmed.

Hypothesis 7b stated that the expectancy drops of the third grade children would be related to the attributions given following failure. This hypothesis was examined by means of a product-movement correlation computed for the four attributes of ability, effort, task difficulty, and luck with the expectancy drops. As can be seen from Table 7, only attributions to effort were related to the drops in expectancies. Effort was, as predicted, negatively related to expectancy drops. None of the other three attributes, however, were related to drops

in expectancy. Therefore, Hypothesis 7b received only partial support.

Hypothesis 7c predicted that the third grade females would drop their expectancies more than would the third grade males. A 2 (Grade Level) X 2 (Sex) unweighted means analysis of variance performed on the expectancy drops is summarized in Table 8. The predicted sex by grade level interaction was not significant.

Hypothesis 7d stated, "Third grade females will give more attributions to ability than will third grade males." As the analysis of variance summarized earlier in Table 5 shows, the predicted grade X sex interaction was not significant.

Hypothesis 8 through 10 concerned the affective responses of the children. To examine these hypotheses, an affect index was computed by summing the response to the two affective measures. This resulted in a scale from 2 to 14 with 2 being the most negative affect and 14 being the most positive affect. Hypothesis 8b stated, "The affective responses of the first grade children will not be related to attributions following failure." This hypothesis was examined by means of a correlation coefficient computed for each of the four attributes of ability, effort, task difficulty, and luck with the affect index. These correlations are presented in Table 9. Contrary to Hypothesis 8b, ability and luck were significantly

Table 9

Correlations for Attributions With Affect

	Ability	Effort	Task Difficulty	Luck
First Grade	-.467**	-.074	.180	.371*
Third Grade	-.091	.043	.066	-.053

*p < .01, two tailed test.

**p < .001, two tailed test.

N = 40

correlated with the affective responses of the younger children. The negative correlation for ability indicates that as attributions to ability increased, negative affect increased. The positive correlation between attribution to luck and affect indicates that as luck attributions increased, negative affect decreased. Both of these relationships are consistent with Weiner's model.

Hypothesis 9b predicted that the affective response of the older children would be related to attributions made following failure. Specifically, it was predicted that greater negative affect would be expressed by those children giving internal attributions, with attributions to ability being particularly important. In addition, less negative affect would be expressed by those children making external attributions. As Table 9 indicates, none of the four causal attributes were related to the affective responses

of the older children. Hypothesis 9b, therefore, was not confirmed.

Hypothesis 10 stated that the third grade children would express more negative affect than would the first grade children. This hypothesis was examined by means of a one-way analysis of variance performed on the affect index. An examination of the mean affective responses of the two grade levels reveals that the significant effect shown in Table 10 was in the predicted direction. The affect index for the first grade children was $\bar{X}$ = 11.375 and for the third grade children the affect index was $\bar{X}$ = 9.800. The means of the two age groups thus indicate that neither group felt bad after failure since both groups achieved a mean score above the neutral point of eight. Third grade children therefore expressed less positive affect after failure than did first grade children.

Table 10

Summary of One-Way (Grade Level) ANOVA Performed on the Affect Ratings

Source	SS	df	MS	F	Signif.
Between Groups	49.613	1	49.613	6.674	.011
Within Groups	579.775	78	7.433		
Total	629.388	79			

Cognitive Development

The remaining four hypotheses concerned the impact of concrete operations on the mediating affect of causal attributions on the achievement judgment and achievement behavior of the first grade children. Recall that it was assumed that the first grade children would be evidencing an initial mastery of concrete operations while the third grade children would be established in concrete operations. This assumption is supported by examining the mean cognitive task scores of the two grade levels. Out of a possible eight points on the cognitive tasks, first graders achieved a mean score of 4.175, while the third grade children achieved a mean score of 6.900. The difference between these two scores is significant ($t = -5.51$, $df = 78$, $p < .001$).

Hypothesis 11 stated, "the mediating influence of effort on achievement judgment will be related to the children's level of cognitive development." To examine this hypothesis, a score representing the resultant of the evaluation of effort minus the evaluation for lack of effort was computed for the achievement judgment questions. This score was then correlated with the total score on the cognitive tasks. The correlation between this resultant effort score and the cognitive score was .069.

In order to further examine this hypothesis, all subjects were divided according to their stage of cognitive

development. Subjects were classified according to whether they indicated preoperational thinking (scored 3 or less), concrete (scored 7 or 8) or transitional thinking (scored 4, 5, or 6). The number of subjects in each category of the above classification system is shown in Table 11. All mean resultant effort scores were significantly different from zero. A mean of zero would indicate that effort had no influence on evaluations. Consequently, even the evaluations of the preoperational children were influenced by effort. Hypothesis 11 was clearly not confirmed.

Table 11

Mean Resultant Effort Score for Subjects at Different Cognitive Levels

	N	Resultant Effort	t	df	Signif.
Preoperational	13	4.615	3.665	12	.01
Transitional	35	5.457	2.848	34	.01
Concrete	32	5.688	4.490	31	.001

Hypothesis 12 predicted that the influence of ability attributions on expectancy drops would increase with increasing cognitive maturity. This hypothesis was examined by means of a multiple correlation with ability attributions and cognitive development as the independent variables and expectancy drops the dependent variable.

The zero-order correlations are presented in Table 12. This hypothesis was not confirmed (R = .161).

Table 12

Zero-Order Correlations Used in Multiple Correlations for Hypotheses 12 and 13

	CT	AA
Cognitive Task (CT)	X	X
Ability Attributions (AA)	-.050	X
Expectancy Drops (ED)	.064	.145
Affect Index (AI)	.051	-.467

N = 40

Hypothesis 13 predicted that cognitive development would be related to the influence of ability attributions on affect. A multiple correlation was computed to examine this hypothesis. Cognitive development and ability attributions served as the independent variable with the score on the affect index the dependent variable. The zero-order correlations are presented in Table 12. The multiple correlation turns out to be .468. Since the multiple correlation is no higher than the zero-order correlation for ability attributions and affect, Hypothesis 13 was not confirmed.

Finally, Hypothesis 14 stated, "high expectancies of success will be negatively related to cognitive

development." The correlation between the score on the cognitive tasks and the initial expectancy estimates of the first grade children was .003. This final hypothesis was not confirmed.

CHAPTER IV

DISCUSSION

The findings which emerged from this study can be considered under three general headings. First, three hypotheses concerned the evaluative responses of children to the achievement-related behaviors of hypothetical others. Second, several hypotheses focused on the children's responses to failure. Finally, predictions were made about the mediational processes--cognitive maturity and attributions--underlying these achievement-related evaluations and responses.

With regard to the first point, the first three hypotheses concerned the evaluative consequences of effort, ability, and outcome in an achievement context. As predicted, outcome was the principal evaluative determinant. Success was evaluated more positively than failure. In addition, it was predicted that effort would be an important determinant of evaluation only for the older children. While there was a tendency for the evaluations of the older children to be more influenced by effort, effort was an influential evaluative determinant for both age groups.

This apparent discrepancy between the present study and the Weiner and Peter (1973) investigation can best be resolved by an examination of the age groups used in the two studies. Weiner and Peter (1973), using age groups of 4-6 and 7-9, found that the evaluations of the 7-9 age group, and not the 4-6 age group, were influenced by effort. The present study, using age groups of 6-7 and 8-9, suggests that by age seven effort has an important influence on achievement-related evaluations. Consequently, were Weiner and Peter (1973) to reanalyze their data using the age groupings of 4-5, 6-7, and 8-9, the result would probably support the results from the present investigation.

The unexpected finding of the influence of ability on evaluations is not readily explained. Weiner and Peter (1973) found that ability was an influential evaluative determinant only for adults. Salili, Maehr, and Gillmore (1976), however, found that ability had a significant effect on the achievement evaluations of Iranian children. These authors suggested that the divergence of their results from the results of the Weiner and Peter study (1973) was due to the critical role that culture is likely to play in the development of achievement-related behaviors. Specifically, Salili et al. (1976) suggested that the existence of ability is more positively valued in Iran than in the U.S. While it may be true that there are cultural differences in the value placed on ability, it also seems

likely that the existence of ability will be differentially valued within a culture. Consequently, the difference between the results with regard to evaluation of ability of the Weiner and Peter study (1973) and the present investigation may be a result of different subject populations. The Weiner and Peter sample was drawn from a large metropolitan area on the west coast, while the sample for the present study was drawn from a small midwestern community. Yet in order to fully examine subject population differences data concerning the socioeconomic class of individual subjects and achievement and IQ test scores would be needed. Unfortunately, that data is not available from either the Weiner and Peter study or the present study. Finally, it should be noted that while the influence of ability on achievement evaluations in the present study was statistically reliable, the variance accounted for was quite small. In fact, as Table 1 indicated, outcome clearly accounted for the most variance.

The findings with regard to the children's responses to failure were generally consistent, with the notable exception of certain predicted sex differences. The finding that expectancies of success decrease as a function of age is consistent with previous research (Parsons, 1974; Parsons and Ruble, 1972). It is not clear from the present research at what age expectancies no longer decrease as age increases. Parsons (1974) found that children 9 1/2-11

years of age had lower expectancies than children 6 1/2-8 years of age. Unfortunately, most researchers have not reported age differences when investigating expectancies (McMahan, 1974; Crandall, 1969). Consequently, the age range associated with lowered expectancies remains to be determined.

Age differences were also found in reactions to failure. First-graders dropped their expectancies more following failure than did the third grade children. Parsons (1974) also found, using age groups of 6 1/2-8 and 9 1/2-11, that the younger children's expectancies were more influenced by failure than were the older children's expectancies. This may simply reflect the initial higher expectancies of the younger children. In other words, the larger expectancy drops of the younger children may partially reflect a regression effect. But if this were true, the expectancies of the older children should be more influenced by success. The expectancy increases of the younger children should be attenuated by a regression effect, whereas, the expectancy increases of the older children would not reflect attenuation due to regression. Such an analysis could not be examined in the present study since success was not included as a variable. In the Parsons study (1974), which did include success as a variable, the expectancies of the younger children were also more influenced by success. The expectancies of the

younger children increased more than did the expectancies of the older children following success. This would suggest that the expectancies of younger children are more influenced by the outcome of an event, and not just failure.

It was expected that for the older children, females would have lower expectancies than males, which would result in more ability attributions by females. More ability attributions by females would in turn lead to larger drops of expectancy by females. This is essentially the cycle postulated by Valle and Frieze (1976). None of the sex differences suggested by the above analysis, however, emerged in the present investigation. The critical factor which initiates the above cycle is sex differences in initial expectancies of success. It is not surprising, therefore, that sex differences in ability attributions and expectancy drops were not observed in the present study, since no significant sex differences in initial expectancies were found. McMahan (1973) provides support for the argument that sex differences in attribution patterns will appear only when initial expectancies differ. In his study (with sixth graders, tenth graders, and college students as subjects), no differences in initial expectancies for performance on an anagram test were found. As would be expected, no differences between males and females on attribution measures were found either.

The results of the present investigation and the McMahan study (1973) bring into question the empirical validity of the assertion that females consistently have lower expectancies for success than males. Lenney (1977), in an excellent review, suggests that there are at least three situation variables that may affect women's performance expectancies relative to men's. They include the nature of the task, clarity of performance feedback, and the nature of certain social comparison cues. She concluded that future research should be directed toward empirically identifying the exact conditions in which expectancies of both sexes increase or decrease.

Finally, as Parsons et al. (1976) pointed out, age is an important variable when considering sex differences in expectancies. Sex differences have not been found prior to the school age years.

The paper by Lenney (1977) suggests one possible explanation of why sex differences in initial expectancies were found in the study by Parsons (1974) but not in the present investigation. Differences in the task must be ruled out since a hidden figures task was used in both studies. In addition, neither study emphasized social comparison cues. The two studies did differ in that subjects in the Parsons study (1974) did not receive any feedback on the first trial. Expectancies were measured before the second trial. In the present study, however,

expectancies were measured prior to the first trial. As Lenney's review of the literature indicates, females often have lower expectancies than men when they are given minimal or ambiguous feedback on their performances. Therefore, the practice trial with no feedback may have contributed to the lower expectancies of the females in the Parsons study (1974). Finally, subjects in the Parsons study were all tested by a female experimenter while half the subjects in the present study were tested by male and half by a female experimenter. While there was a main effect for sex of experimenter indicating that lower expectancies resulted from male experimenters, there was no interaction with sex of subject. Sex of the experimenter, therefore, cannot account for the differences in the two studies.

With regard to the affective response of the children, age again was an important factor. The affective responses of the older children were more influenced by failure than were the affective responses of the younger children. This finding is consistent with the results of the Ruble et al. (1976) study.

Since success or failure represents an evaluation by the experimenter, it may be as Veroff (1969) suggests, that younger children are not sensitive to the evaluations of others. "He [the preschool child] behaves in order to bring about a condition of greater competence on his own. Thus he evaluates on his own" (Veroff, 1969, p. 49). It is

only in the early school years that social evaluation becomes important. Such an interpretation is consistent with the present results. Furthermore, the age differences in the affective responses are not readily explained within an attributional framework. Since there were no age differences in the attributional patterns, there would be no reason to expect age differences in affective responses.

The final group of hypotheses concerned the mediational processes underlying both the evaluation of others and responses to failure. First, it was predicted that cognitive maturity would be related to the influence of effort on achievement evaluations. The results of this study, however, suggest that cognitive maturity, as measured by Piagetian tasks, is not related to the children's ability to use both effort and outcome cues in forming evaluations. Thus while there may be stages and sequences in the development of achievement judgments, as Weiner and Peter (1974) suggest, such stages do not seem to be related to cognitive development. The findings of Kun, Parsons, and Ruble (1974) that even kindergarten children were able to use both ability and effort cues to predict outcome is consistent with this conclusion. The finding from the present investigation that even preoperational children were able to use both effort and outcome in forming evaluations strongly suggests that the assumed central role of

cognitive maturity in the attribution process be reconsidered.

Further evidence against a central role for cognitive maturity in the attribution process is suggested by the failure to find a relationship between cognitive development and the influence of ability attributions on both expectancy and affect. Thus while the findings with respect to the impact of concrete operations on the mediating influence of causal attributions were contrary to predictions, they were at least consistent. Unfortunately, the ineffectual attempt to manipulate attributions to ability ruled out a more rigorous examination of the relationship between cognitive maturity and the attribution process as it applies to achievement behavior. The failure to find a global relationship does, however, suggest that cognitive maturity beyond the preoperational stage is not necessary for the emergence of the information-attribution-affect and expectancy link found in adults. Thus, decentration does not appear to be a unitary construct (Shantz, 1975).

Largely as a result of the assumptions concerning the role of cognitive maturity in the attribution process, it was predicted that attributions would mediate the expectancy drops and affective responses of the older children, and not the first grade children. But since cognitive maturity was not related to the attribution

process, attributions should have influenced the expectancy drops and affective responses of both the first and third grade children. Unfortunately, the results concerning the influence of attributions were not consistent. For the first grade children, internal attributions to ability increased negative affect. This is consistent with previous research by Nicholls (1975, 1976) who has found that ability and not effort is related to affective responses. In addition, external attributions to luck decreased negative affect. This is consistent with the Weiner et al. model (1971). Yet attributions were not related to the expectancy drops of the younger children. In addition, attributions were not related to the affective responses of the older children. Weak support was provided, however, for the hypothesis that attributions would influence the expectancy drops of the older children. Only attributions to effort were associated (negatively) with expectancy drops. This finding was also reported by Nichols (1975).

The inconsistency concerning the relationship between causal attributions and expectancy and affect in the present investigation may have been due to the untested assumption that the four causal attributes of ability, effort, luck, and task difficulty presented to the children were the only important causes for their failure. In other words, these four attributes may not be the ones children readily use when confronted with a situation such as the

one in this experiment. Indeed, Frieze (1976) provides evidence that adults may not use these four attributes, or use others, when allowed to freely attribute causality. She asked subjects to state why a particular event occurred. Because the responses were entirely open ended, subjects were free to respond as they chose. The results revealed that luck was seldom used and that mood, other people and stable effort (lazy, energetic, etc.) were cited relatively frequently, in addition to ability, effort and task difficulty. Furthermore, 20% of the causal explanations given by the subjects were unclassifiable. Taken together these results suggest that a source of error may be introduced by providing subjects with only the four attributes of ability, effort, task difficulty, and luck to explain the consequences of their behavior.

Furthermore, while adults may be able to reliably categorize their causal explanations for events into the four attributes listed above, it is less likely that children, particularly young children, would be able to generalize their own causal explanations to the four attributes presented by the experimenter. Indeed, support for this conclusion comes from the work of Brown and Berko (1960) on semantic development. These researchers found that the emergence of semantic generalization may not occur until the end of the grade school years. In other words,

young children may not readily generalize to words of related meaning.

The above analysis strongly suggests that children may not be able to reliably utilize the four attributes of ability, effort, task difficulty and luck used in the present experiment, and most attribution studies, to explain the results of their behavior. Consequently, an important first step in studying the attributional processes of children would be to determine the causal attributions children actually use. A procedure similar to that used by Frieze (1976) with adults would be one approach. Moreover, it may be unreasonable to assume that the same causal categories are utilized by subjects in all situations. Children particularly may use different causal attributes in different situations. An examination of these questions would seem imperative if consistent results are to be expected from the study of children's attributional processes.

Conclusion

The major purpose of this research was to examine the role of cognitive maturity in the attribution process. The results indicate, surprisingly, that children in the preoperational stage of cognitive development are able to use effort, ability, and outcome in forming evaluations of the achievement behavior of hypothetical others. In addition, the results indicate that cognitive maturity, at

least beyond the preoperational stage, does not mediate the influence of causal attributions on either affect or expectancies. Thus while achievement judgments and behaviors do vary with age, these results suggest that cognitive maturity does not determine or mediate such variation. Further research is required to isolate the particular variables which actually determine or mediate the variation in achievement judgment and behavior with age.

Furthermore, as Wohlwill (1970) noted, correlational procedures take on added significance when measuring change. Most researchers examining the development of the attribution process have employed analysis of variance procedures (Weiner & Peter, 1973; Ruble et al., 1976); however, this may not be the most adequate procedure to follow. As Wohlwill states, "The study of age changes entails a more intensive concern with the measurement of change, and methods for determining correlates of change and interrelationships among measures of change for different variables" (p. 57).

This study also indicates that while causal attributions may have a significant effect on achievement judgments and achievement behaviors, the variance accounted for is quite small. Outcome accounted for ten times as much variance as effort and ability combined in the achievement judgments (.20 compared to .02). Moreover, the four causal attributes of ability, effort, task difficulty, and luck

combined accounted for only .04 of the first graders and .14 of the third graders variance in expectancy drops and .40 of the first graders and .003 of the third graders variance in affect. Thus further research is needed to identify additional influences on achievement judgments and achievement behaviors. The influence of social evaluation (Veroff, 1969) may be one fruitful area of investigation.

Finally, this study offered evidence on the relationship between achievement judgments and achievement behaviors. Third graders were more positive than first graders in their evaluations of hypothetical others. Third graders were less positive than first graders, however, in their self evaluations. Unfortunately, a more rigorous comparison of self and other evaluations was not possible in this study. A study by McMahan (1975) does suggest, however, that adults evaluate the achievement behavior of others more positively than their own achievement behavior. Additional research is needed to further examine the relationship between self versus other evaluations.

APPENDICES

APPENDIX A

ACHIEVEMENT JUDGMENT STORIES

APPENDIX A

ACHIEVEMENT JUDGMENT STORIES

a. Paul is good at working puzzles. He is not trying to do this puzzle. He does not get it put together. What color star will you give Paul? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

b. Carolyn is good at working puzzles. She is not trying to do this puzzle. She gets it put together. What color star will you give Carolyn? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

c. John is good at working puzzles. He is trying to do this puzzle. He does not get it put together. What color star will you give John? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

d. Kathy is good at working puzzles. She is trying to do this puzzle. She gets it put together. What color star will you give Kathy? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

e. Tom is not good at working puzzles. He is not trying to do this puzzle. He gets it put together. What color star will you give Tom? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

f. Pam is not good at working puzzles. She is not trying to do this puzzle. She does not get it put together. What color star will you give Pam? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

g. Bob is not good at working puzzles. He is trying to do this puzzle. He gets it put together. What color star will you give Bob? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

h. Paula is not good at working puzzles. She is trying to do this puzzle. She does not get it put together. What color star will you give Paula? How many?

Gold Stars

1	2	3	4	5

Red Stars

1	2	3	4	5

APPENDIX B

INSTRUCTIONS FOR HIDDEN FIGURES TASK

APPENDIX B

INSTRUCTIONS FOR HIDDEN FIGURES TASK

Hidden Figures Instructions--Ability

I've got some pictures here that have animals hiding in them. I want to see if you can find all the animals that are hiding in this picture. When you see one of the animals, I want you to color its face with this crayon.

Now, we've found that some children are better at finding the animals than other children. Some children are just good at finding the hidden animals. It doesn't make much difference how hard you look. Why do some children find all the hidden animals? (Be sure child understands that some children are just better at the task.) Some children just seem to be better at finding the hidden animals than other children. It doesn't make much difference whether a child looks very hard or takes it easy. So if you find all the animals that are hiding in the picture, it is because you are just good at finding hidden animals. So, at the end of the time limit we'll see if you found all of the hidden animals.

Hidden Figures Instructions--Control

I've got some pictures here that have animals hiding in them. I want to see if you can find all the animals that are hiding in this picture. When you see one of the animals, I want you to color its face with this crayon. So, at the end of the time limit we'll see if you found all of the hidden animals.

APPENDIX C

DEPENDENT MEASURES FOR HIDDEN FIGURES TASK

APPENDIX C

DEPENDENT MEASURES FOR HIDDEN FIGURES TASK

Child's Questionnaire

1a. This picture shows how good seven children your age were at finding the hidden animals. This child was the best at finding the animals (point to figure under the tallest bar) and this child was the worst at finding the animals (point to the figure under the shortest bar). So the taller the bar the better the child did. Point 3 & 4 and say: Look at these two children and tell me which one is better at finding the hidden animals (explain again if child doesn't understand). Now then I want you to show me which child you think you will turn out to be.

1	2	3	4	5	6	7
best						worst

2. This shows how much seven children liked playing this game. This child (point to figure under tallest bar) liked looking for the hidden animals the most. And this child (point to figure under shortest bar) didn't like looking for the animals at all. So, the taller the bar the more the child liked looking for the hidden animals. Look at these two children (point to 5 & 6) and tell me which one liked looking for the animals more. (Make sure the child understands the progressive ordering.) Now, I want you to show me which you turned out to be.

1	2	3	4	5	6	7
didn't like						did like

3. I want to know why you think you didn't find all the animals that were hiding in the picture. Was it because:

you didn't try hard OR you weren't lucky

the animals were not easy to find
OR
you are not good at finding animals

you were not lucky
OR
the animals were not easy to find

you are not good at finding animals hiding in pictures
OR
you did not try hard

you were not lucky
OR
you are not good at finding animals hiding in pictures

you did not try hard
OR
the animals were not easy to find

4. Let's look at this picture again. This time it shows how happy seven children your age were about the number of animals they found in the picture. This child was very happy about the number of animals he found (tallest bar) and this child was very sad about the number of animals he found (shortest bar). So, the taller the bar the happier the child is. Look at these two children (2 & 4) and tell me which one is happier about the number of animals he found. Now, I want you to show me which child you turned out to be.

1 2 3 4 5 6 7
sad happy

5. This picture shows how good seven children your age were at finding the hidden animals. This child was best at finding the animals (point to figure under tallest bar) and this child was the worst at finding the animals (point to figure under the shortest bar). So the taller the bar the better the child. Point to 3 & 4 and say: Look at these two children and tell me which one is better at finding the hidden animals (explain again if the child doesn't understand). Now then I want you to show me which child you think you turned out to be.

1	2	3	4	5	6	7
best						worst

LIST OF REFERENCES

LIST OF REFERENCES

Battle, E. Motivational determinants of academic task persistence. Journal of Personality and Social Psychology, 1965, 2, 209-218.

Brim, O. G. Jr., Goslin, D. A., Glass, D. C., & Goldberg, I. American Beliefs and Attitudes about Intelligence. New York: Russell Sage, 1969.

Brown, R., & Berko, J. Word association and the acquisition of grammar. Child Development, 1960, 31, 1-14.

Crandall, V. C. Sex differences in expectancy of intellectual and academic reinforcement. In C. P. Smith (ed.). Achievement-related Motives in Children. New York: Russell Sage, 1969.

Dweck, C. S. The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 1975, 32, 1077-1088.

Dweck, C. S., & Bush, E. S. Sex differences in learned helplessness: I. Differential debilitation with peer and adult evaluators. Developmental Psychology, 1976, 12, 147-156.

Dweck, C. S., & Gilliard, D. Expectancy statements as determinants of reactions to failure: Sex differences in persistence and expectancy change. Journal of Personality and Social Psychology, 1975, 32, 1077-1084.

Dweck, C. S., & Reppucci, N. D. Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 1973, 25, 109-116.

Elkind, D. Children's discovery of the conservation of mass, weight, and volume: Piaget replication study II. Journal of Genetic Psychology, 1961a, 98, 219-227.

Elkind, D. The development of the additive composition of classes in the child: Piaget replication study III. Journal of Genetic Psychology, 1961b, 99, 51-57.

Feather, N. T. Effects of prior success and failure or expectations of success and subsequent performance. Journal of Personality and Social Psychology, 1966, 3, 287-298.

Feather, N. T. Attribution of responsibility and valence of success and failure in relation to initial confidence and task performance. Journal of Personality and Social Psychology, 1969, 13, 129-144.

Feather, N. T., & Simon, J. G. Attribution of responsibility and valence of outcome in relation to outcome in relation to initial confidence and success and failure of self and other. Journal of Personality and Social Psychology, 1971a, 18, 173-188.

Feather, N. T., & Simon, J. G. Causal attributions for success and failure in relation to expectations of success based upon selective or manipulative control. Journal of Personality, 1971b, 39, 527-541.

Feather, N. T., & Simon, J. G. Luck and the unexpected outcome: A field replication of laboratory findings. Australian Journal of Psychology, 1972, 24, 113-117.

Feffer, M., & Gourevitch, V. Cognitive aspects of role-taking in children. Journal of Personality, 1960, 28, 383-396.

Flavell, J. H. The Developmental Psychology of Jean Piaget. D. Van Nostrand Company, 1963.

Frieze, I. H. Causal attributions and information seeking to explain success and failure. Journal of Research in Personality, 1976, 10, 293-305.

Frieze, I., & Weiner, B. Cue utilization and attributional judgments for success and failure. Journal of Personality, 1971, 39, 591-606.

Hill, K. T., & Dusek, J. B. Children's achievement expectations as a function of social reinforcement, sex of subject, and text anxiety. Child Development, 1969, 40, 547-557.

Inhelder, B., & Piaget, J. The Growth of Logical Thinking from Childhood to Adolescence. New York: Basic Books, 1958.

Kun, A., Parsons, J. E., & Ruble, D. N. Development of integration processes using ability and effort information to predict outcome. Developmental Psychology, 1974, 10, 721-732.

Lee, L. C. The concomitant development of cognitive and moral modes of thought: A test of select deductions from Piaget's theory. Genetic Psychology Monographs, 1971, 83, 93-146.

Lenney, E. Women's self-confidence in achievement settings. Psychological Bulletin, 1977, 84, 1-13.

McMahan, I. D. Relationships between causal attributions and expectancy of success. Journal of Personality and Social Psychology, 1973, 28, 108-114.

McMahan, I. D. Sex and person in achievement and moral evaluation. Developmental Psychology, 1975, 11, 659-660.

Montanelli, D. S., & Hill, K. T. Children's achievement expectations and performance as a function of two consecutive reinforcement experiences, sex of subject, and sex of experimenter. Journal of Personality and Social Psychology, 1969, 13, 115-128.

Nichols, J. Causal attributions and other achievement related cognitions: Effects of task, outcome, attainment value and sex. Journal of Personality and Social Psychology, 1975, 31, 379-389.

Nicholls, J. G. Effort is virtuous, but it's better to have ability: Evaluative responses to perceptions of effort and ability. Journal of Research in Personality, 1976, 10, 306-315.

Parson, J. E., & Ruble, D. N. Attributional processes related to the development of achievement-related affect and expectancy. Paper presented at the meeting of the American Psychological Association, Honolulu, August 1972.

Parsons, J. E., Ruble, D. N., Hodges, K. L., & Small, A. W. Cognitive-developmental factors in emerging sex differences in achievement-related expectancies. Journal of Social Issues, 1976, 32, 47-61.

Phares, E. J. Expectancy changes in skill and chance situations. Journal of Abnormal and Social Psychology, 1957, 54, 339-342.

Piaget, J. The Language and Thought of the Child. New York: Harcourt, Brace, 1926.

Piaget, J. Judgement and Reasoning in the Child. New York: Harcourt, Brace, 1928.

Piaget, J. The Child's Conception of the World. New York: Harcourt, Brace, 1929.

Piaget, J. The Child's Conception of Number. London: Routledge, 1952.

Piaget, J. The Moral Judgement of the Child. Translated by M. Gabain. New York: Free Press, 1965.

Riemer, B. S. The influence of causal beliefs on affect and expectancy. Journal of Personality and Social Psychology, 1975, 31, 1163-1167.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80, 1 (Whole #609).

Rotter, J. B., Liverant, S., & Crowne, D. P. The growth and extinction of expectancies in chance controlled and skilled tasks. Journal of Psychology, 1961, 52, 161-177.

Ruble, D. N., Parsons, J. E., & Ross, J. Self-evaluative responses of children in an achievement setting. Child Development, 1976, 47, 990-997.

Salili, F., Maehr, M. L., & Gillmore, G. L. Achievement and morality: A cross-cultural analysis of causal attribution and evaluation. Journal of Personality and Social Psychology, 1976, 33, 327-337.

Selman, R. The relation of role taking to the development of moral judgement in children. Child Development, 1971, 42, 79-91.

Shantz, C. U. The development of social cognition. In E. M. Heatherington (ed.). Review of Child Development Research (Vol. 5). University of Chicago Press, 1975.

Simon, J. G., & Feather, N. T. Causal attributions for success and failure at University examinations. Journal of Educational Psychology, 1973, 64, 46-56.

Tomlinson-Keasey, C., & Keasey, C. B. The mediating role of cognitive development in moral judgement. Child Development, 1974, 45, 291-298.

Valle, V. A., & Frieze, I. H. Stability of causal attributions as a mediator in changing expectations for success. Journal of Personality and Social Psychology, 1976, 33, 579-587.

Veroff, J. Social comparison and the development of achievement motivation. In C. P. Smith (ed.), Achievement-related Motives in Children. New York: Russell Sage, 1969.

Weiner, B. Theories of Motivation: From Mechanism to Cognition. Markham, 1972.

Weiner, B. Achievement motivation as conceptualized by an attribution theorist. In B. Weiner (ed.). Achievement Motivation and Attribution Theory. General Learning Press, 1974.

Weiner, B., Frieze, I., Kukla, A., Reed, L., Rest, S., & Rosenbaum, R. M. Perceiving the Causes of Success and Failure. General Learning Press, 1971.

Weiner, B., & Kukla, A. An attributional analysis of achievement motivation. Journal of Personality and Social Psychology, 1970, 15, 1-20.

Weiner, B., Nierenberg, R., & Goldstein, M. Social learning (locus of control) versus attributional (causal stability) interpretations of expectancy of success. Journal of Experimental Social Psychology, 1976, 12, 52-68.

Weiner, B., & Peter, N. A cognitive-developmental analysis of achievement and moral judgements. Developmental Psychology, 1973, 9, 290-309.

Wohlwill, J. F. The age variable in psychological research. Psychological Review, 1970, 77, 49-64.

DIFFERENT METHODOLOGICAL APPROACHES TO PHILOSOPHY OF SCIENCE