



1987

## The Relationship between Achievement and Achievement Beliefs: A Path Analysis of a Cognitive Model Or Achievement

Carla M. Leone  
*Loyola University Chicago*

Follow this and additional works at: [https://ecommons.luc.edu/luc\\_theses](https://ecommons.luc.edu/luc_theses)



Part of the [Psychology Commons](#)

---

### Recommended Citation

Leone, Carla M., "The Relationship between Achievement and Achievement Beliefs: A Path Analysis of a Cognitive Model Or Achievement" (1987). *Master's Theses*. 3446.

[https://ecommons.luc.edu/luc\\_theses/3446](https://ecommons.luc.edu/luc_theses/3446)

This Thesis is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Master's Theses by an authorized administrator of Loyola eCommons. For more information, please contact [ecommons@luc.edu](mailto:ecommons@luc.edu).



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License](#).  
Copyright © 1987 Carla M. Leone

THE RELATIONSHIP BETWEEN ACHIEVEMENT  
AND  
ACHIEVEMENT BELIEFS:  
A PATH ANALYSIS OF A COGNITIVE MODEL OF ACHIEVEMENT

by  
Carla M. Leone

A Thesis Submitted to the Faculty of the Graduate School  
of Loyola University of Chicago in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Arts

April

1987

c 1987, Carla M. Leone

Dedicated to  
the author's great-aunt

MARY M. FLATLEY

1891-1986

## ACKNOWLEDGEMENTS

I am grateful to a number of people for their assistance, direct and indirect, with the lengthy process of conceptualizing, conducting and reporting on this research project. I especially thank Dr. Joseph Durlak, the chairperson of my thesis committee, who provided generous amounts of expertise, time, and energy, along with equal amounts of humor and encouragement. I also thank thesis committee member Dr. Maryse Richards, who frequently took time out of a very busy schedule to offer both enthusiasm and thoughtful scholarly comments. In addition, thanks are extended to Dr. Bernard Dugoni, who provided statistical consultation; Gabby Norcus, who assisted with data collection; the students, faculty and administration of St. Gregory's High School, who were cooperative and helpful participants in the study; and especially fellow graduate student Todd Miller, who contributed considerable statistical expertise and assistance. Lastly, I greatly appreciate the support and encouragement of my family and friends, and especially thank Denise Lensky for the constant friendship and laughter that got us through the Thesis process together.

## VITA

The author, Carla M. Leone, is the daughter of Ms. Carla Connell and Mr. Richard R. Leone. She was born in Weymouth, Massachusetts, on July 9, 1960.

Ms. Leone graduated from Weymouth North High School in June, 1978, and attended Shenandoah College and Conservatory of Music for two years following high school, majoring in music therapy. She transferred to Lesley College, Cambridge, Massachusetts, in September, 1980, and earned a Bachelor of Science degree in May, 1982, with a double major in elementary and special education.

Ms. Leone was employed for two years following college graduation as a Teacher/Counselor in two alternative high school programs for emotionally and behaviorally disordered adolescents: the Open Road School in Waltham, Massachusetts and the Advance Program of Randolph High School, in Randolph, Massachusetts. In September, 1984, Ms. Leone entered graduate school in the Clinical Division of the Department of Psychology at Loyola University of Chicago.

# TABLE OF CONTENTS

	page
ACKNOWLEDGEMENTS .....	ii
VITA .....	iii
TABLE OF CONTENTS .....	iv
LIST OF TABLES .....	vi
LIST OF FIGURES .....	vii
INTRODUCTION .....	1
Chapter	
I. LITERATURE REVIEW .....	3
Why Study Motivation? .....	5
Theoretical Background .....	6
Task Value .....	9
Expectancy of Success .....	10
Self-concept of Ability .....	11
Causal Attributions .....	12
Sex Differences .....	14
Weiner's Attributional Model .....	16
Eccles' Expectancy-Value Model .....	22
Critique of Eccles' Model .....	27
The Present Study .....	33
II. METHOD .....	38
Subjects .....	38
Measures .....	39
Procedure .....	44
Data Analysis .....	45
III. RESULTS .....	47
Preliminary Analyses .....	47
Model Testing Analyses:	
Eccles' Model .....	59
Present Study's Model .....	63

TABLE OF CONTENTS (Continued)

IV. DISCUSSION .....	71
Preliminary Analyses .....	71
Eccles' Model .....	72
Present Study's Model .....	73
SUMMARY AND CONCLUSIONS .....	85
REFERENCES .....	87
APPENDIX .....	93



## LIST OF TABLES

Table	Page
1. List of Constructs and Measures .....	40
2. Means and Standard Deviations of All Variables .....	48
3. Intercorrelations of All Variables .....	49
4. Results of Significant Univariate F Tests Following Significant Main Effects for Grade and Level Following the First MANOVA .....	55
5. Results of Significant Univariate F Tests Following Significant Main Effects for Grade and Level on the Four Individual ANOVA's .....	57
6. Unstandardized Parameters and Standard Errors for Final Model .....	68
7. Goodness of Fit Indices and Squared Multiple Correlations of Dependent Variables for All Four Models .....	70

## LIST OF FIGURES

Figure	Page
1. Attributional Model of Achievement Proposed by Weiner .....	18
2. Expectancy-Value Model of Achievement Proposed by Eccles, et al. ....	23
3. Model-Testing Results Reported By Eccles, et al., for Relevant Portion of Their Model ...	26
4. Model Proposed by the Present Study .....	36
5. Present Study's Initial LISREL Results of Model Proposed by Eccles, et al. ....	60
6. Final Version of Eccles' Model After Indicated Modifications .....	62
7. Initial LISREL Results of the Model Proposed by the Present Study .....	65
8. Final Version of the Model Proposed by the Present Study .....	67

## INTRODUCTION

The problem of academic underachievement has long frustrated researchers, educational professionals and the general public. Despite decades of research on the etiology and treatment of academic underachievement, large numbers of students nationwide continue to perform below their capacity in school.

In recent years, cognitive theories of achievement (Covington, 1984; Rotter, 1966; Weiner, 1974) have been widely heralded as a potential solution to the puzzle of under-achievement (e.g. Bar-Tal, 1979; Pearl, 1985) because they appear to suggest more specific, realistic methods of classroom level interventions than have previously prominent drive-oriented, behavioral and humanistic theories of achievement. However, although cognitive theory appears very promising, it has not yet led to consistent empirical findings or to consistently effective interventions for underachievers.

The slow progress in these areas may well be due to the fact that a number of different cognitive theories or constructs have been proposed and investigated separately, in "piecemeal" fashion. These include expectancy of success, self-concept of ability, perceived value of school, and attributions for success

and failure. With few exceptions, research into cognitive theories of achievement has neglected to determine the relative importance of these constructs in predicting achievement and to investigate possible relationships among causal factors.

It is generally accepted that achievement behavior, like other behavior, is multiply determined, so it is hardly surprising that interventions based on only one relevant factor have not been shown to be consistently effective (e.g. Scheirer & Kraut, 1979). Rather, it appears that the development of effective interventions for underachievers awaits the development of a comprehensive, empirically-based model of achievement that effectively integrates all relevant predictors of achievement.

Toward this end, the present study will investigate a cognitive model of achievement recently proposed by Eccles and her colleagues (Eccles, Adler, Futterman, Goff, Kaczala, Meece & Midgley, 1983), which integrates a number of cognitive constructs. Using LISREL structural analysis techniques, the study will first test the ability of the Eccles model to predict high school students' scores on a regular classroom test, and will then attempt to improve upon Eccles' model by incorporating additional variables.

## CHAPTER I

### LITERATURE REVIEW

The study of academic achievement involves investigating the factors that influence children's learning and academic performance in school. Achievement is to be distinguished from other areas related to learning, such as intellectual ability or creativity, and from the study of other kinds of school-related behavior, such as peer relationships. Rather, academic achievement refers specifically to children's performance on school tasks, as measured by some type of testing or grading.

The study of academic achievement has far-reaching implications. At a basic level, academic performance is clearly important simply because it is an example of human behavior - one that can be studied similarly in almost the entire population and across a wide age range. In addition, school performance is a measure of learning and productivity which can be viewed as one general indicator of adjustment or health. Therefore, a clearer understanding of the factors influencing academic achievement can contribute to our understanding of the factors influencing human behavior, in general, and adjustment in particular.

In addition to adding to our general knowledge of human behavior, however, the study of academic achievement is particularly important because it has direct applications to current societal problems. Specifically, recent studies indicate that despite the value Americans place on education, large numbers of students nationwide are not performing in school at a level consistent with their ability or potential. This has led to widespread concern about the long term effects this underachievement will have - both on the later adjustment of the individual students, and on the country's eventual ability to compete with other industrialized nations.

For these reasons, a considerable amount of past research has focused on studying a wide variety of factors that may influence achievement, and numerous theories of achievement have been proposed. Therefore, before discussing the specific cognitive model of achievement that is the focus of the present study, this review will first attempt to provide a general contextual framework through which the present study may be viewed. Constructing this framework will involve establishing the rationale behind focusing specifically on the motivational factors that may affect achievement, describing the theoretical perspective upon which the present study is based, and finally presenting and

critiquing the relevant empirical literature in the area.

### Why study motivation?

Previous investigations have explored the relationship between academic achievement and almost every imaginable potential influence on achievement, including home, classroom, and individual differences variables. Various educational theories have differentially emphasized one or more of these variables (Haertal, Wahlberg & Weinstein, 1983), despite little evidence as to their relative importance.

Recently, a meta-analysis of over 250 studies indicated that the eight most important predictors of achievement are ability, motivation, quantity and quality of instruction, peer group, home environment, classroom environment and media influence (Parkerson, Lomax, Schiller, & Wahlberg, 1984). This study also tested several causal models of interrelationships among these variables, and concluded that ability, motivation, and quality of instruction are the primary predictors of achievement, accounting for 72%, 12%, and 6% of the overall variance, respectively. The home environment, peer group and media influence were found to be secondary factors, affecting achievement mainly through their influence on motivation.

Thus, a greater focus on motivation may be most valuable for the development of intervention programs, as motivation appears to be the most influential predictor of achievement after ability, and a mediator of major environmental influences on achievement. In addition, since ability, home life, peer group and media are not easily influenced by educators or clinicians, motivation is likely to be the influence on achievement that is most amenable to intervention.

### Theoretical Background

Theoretical conceptualizations of achievement motivation have reflected various theories of human motivation in general, with achievement behavior viewed by drive-reductionists as due to an unconscious drive, the need for achievement (e.g. Atkinson, 1964), by behaviorists as due to environmental reinforcement (e.g. Skinner, 1953), and by humanists as due to the desire to develop the self to its fullest potential (e.g. Maslow, 1969). Although interventions based on each of the above perspectives have been attempted, they have generally been found to be either impractical for school-based interventions (Pearl, 1986); ineffective, at least when used as the sole means of intervention (Scheirer & Kraut, 1979); or both.

Consistent with the trend in the field of



psychology toward conceptualizing human behavior from a cognitive or social learning perspective, achievement behavior has increasingly been explained from a cognitive perspective as well. Cognitive theory, in general, proposes that behavior is a response to both environmental stimuli, or reality, and to perceived reality, or the individual's interpretation of the stimuli. These interpretations or perceptions are thought to result in learned subjective beliefs about the self and the environment (Bandura & Walters, 1963; Mischel, 1973; Rotter, 1966), which may be inaccurate or maladaptive and thus lead to maladaptive behavior. Intervention attempts focus specifically on changing or modifying these maladaptive beliefs (e.g. Guidano & Liotti, 1983).

Cognitive theories of achievement, then, propose that achievement behavior results from students' learned beliefs or perceptions about themselves and their achievement experiences, as well as from actual environmental factors, such as actual ability or task difficulty. Achievement-related beliefs include beliefs about the likelihood of a rewarding consequence (expectancy of success), about the value of the reward (perceived task value), about one's ability to earn the reward (self-concept of ability), and about the causes of rewarding and aversive consequences (causal

attributions). Inaccurate or self-deprecating beliefs are thought to lead to maladaptive school performance, suggesting that interventions should focus on identifying and changing such beliefs.

Indeed, preliminary evidence suggests that school-based cognitive interventions can and do increase students' achievement, although so far by only relatively small amounts (e.g. Chapin & Dyck, 1976; Schunk, 1982) and somewhat inconsistently (Scheirer & Kraut, 1979; Pearl, 1985). As noted earlier, this evidence has been widely acclaimed among applied educational researchers, because cognitive interventions appear to involve more focused, specific, practical procedures that could be incorporated into regular classroom situations. However, the development of such interventions depends on first establishing a more detailed understanding of the interrelationships among the various proposed achievement-related cognitions.

Before describing research on these interrelationships, theory and research on each of the four cognitive constructs listed above (perceived task value, expectancy of success, self-concept of ability, and causal attributions) will be presented separately, and evidence of possible sex differences on these variables will be briefly reviewed. More recent attempts to integrate the constructs will then be

discussed, the model proposed by Eccles and her colleagues (Eccles, et al., 1983) will be presented and critiqued, and the present study will be described.

### Task Value

The concept of task value dates to Lewin's drive-reduction theory of motivation (1938), which proposed that behavior is motivated by the "valence" people attach to objects or goals. This valence was seen as based on both the objective properties of the goal and on the individual's subjective "need" for the goal.

Integrating Lewin's concept of valence and Tolman's work on expectancies, Atkinson (1958, 1964) later conceptualized achievement behavior as motivated by three factors: the "incentive value" of the task, the probability of success at the task, and an unconscious motive to achieve (the need for achievement). Incentive value was viewed as determined by the objective properties of the task, such as the monetary value of the reward given.

Social learning or cognitive theorists have instead viewed task value as determined both by the objective value of the task and by the individual's learned beliefs about its value, which may or may not be consistent with its "true" value (Crandall, Katkovsky &

Preston, 1962; Rotter, 1954, 1966). A number of studies have shown that perceived task value is correlated with task performance (Battle, 1966; Parsons & Goff, 1978; Raynor, 1974; Spenner & Featherman, 1978).

### Expectancy of Success

Tolman (1932) introduced the concept of expectancy of success when referring to the observation that animals eventually came to anticipate response-reward contingencies, or to expect reinforcement for a certain behavior that had been rewarded in the past. As mentioned, Atkinson (1964) incorporated this idea into the probability of success component of his theory of achievement motivation. Similar to his view of the incentive value of a task, Atkinson viewed the probability of success as an objective property of the task, or as the calculable likelihood of success based on odds or norms. Cognitive theorists have broadened this objective view of probability to include the individual's subjective beliefs about the likelihood of success, in addition to the objective characteristics of the situation.

Numerous studies have since demonstrated the relationship between subjective self-predictions of success and a variety of achievement behaviors, including academic performance, task persistence, and

task choice (Covington & Omelich, 1979a; Diggory, 1966; Feather, 1966; Parsons, 1978; Veroff, 1969). It has also frequently been demonstrated that performance at a task influences expectancies for future tasks, with expectancy increasing after success and decreasing following failure (e.g. Diggory, 1966). For example, poor academic achievers have been shown to have lower initial estimates of success and to experience greater decrements in future expectancies following failure (Butkovsky & Willows, 1980).

### Self-concept of ability

The theory that an individual's view of himself influences his behavior has a long history, dating at least to William James (1898, as cited in Scheirer & Kraut, 1979), and has been incorporated into widely diverse areas of psychological, sociological and educational theory. Various terms have been used to describe this construct, including self-efficacy (Bandura, 1977), self-esteem (Coopersmith, 1967) and perceived competence (Harter, 1982), the general construct has been conceptualized very differently within different theoretical perspectives. For example, humanistic or "internal needs" self-concept theorists emphasize the affective nature of the construct, such as the individual's feelings towards himself, while social learning theorists view the self-concept as made up of

beliefs and attitudes about oneself, such as self-categorization and self-evaluation (Scheirer & Kraut, 1979).

The relationship between the self-concept and academic achievement has been the focus of considerable research interest (for reviews of the literature, see Purkey, 1970; Scheirer & Kraut, 1979). Self-concept has consistently been shown to correlate with both achievement test scores and grades (e.g. Bledsoe, 1967; Brookover, Thomas, & Patterson, 1964), with higher correlations found when a more specific measure of self-concept involving only perceptions of academic ability is used instead of a more global measure. For example, in a meta-analysis of 40 published studies of school-aged children, Uguroglu and Wahlberg (1979) found an overall mean correlation of .41 between achievement and academic self-concept, and a mean correlation of .29 between achievement and global self-concept.

### Causal Attributions

Heider (1958) is generally acknowledged to be the founder of attribution theory, which proposes that behavior is motivated by a desire to understand the environment and the self, particularly to understand the causes of events. Heider and other attribution theorists (e.g. Jones & Davis, 1965; Kelley, 1967)

also propose that the type of causal attributions made for past events influences future behavior. Several researchers have particularly emphasized the influence of the internality or externality of attributions on later behaviors (deCharms, 1968; Deci, 1975; Heider, 1958; Rotter, 1966). More recent formulations by Weiner and his colleagues have proposed that the stability of attributions is also an important influence on future behavior (Weiner, 1974, 1979).

Weiner's theory proposes that attributions for success and failure experiences mediate or account for differences in the need for achievement, the unconscious "motive" to achieve proposed by Atkinson and his colleagues (Atkinson, 1964). Ability, effort, task difficulty and luck are proposed to be the most common attributions for success and failure experiences, and are classified along the dimensions internality/externality and stability/instability. Specifically, ability and effort are classified as internal and task difficulty and luck as external; ability and task difficulty are considered stable, and effort and luck as unstable.

Attributions have been shown to be related to a variety of behaviors such as depression, person-perceptions, aggression, and helping, and a considerable amount of research has shown a relationship between

attributions and academic achievement (for reviews see Bar-Tal, 1979; Ruble & Boggiano; 1984; Weiner, 1979). Attributing success to ability and effort, and attributing failure to a lack of effort or to external factors has been shown to be related to task persistence (Andrews & Debus, 1978; Chapin & Dyck, 1976; Dweck & Repucci, 1973), and task choice (Bar-Tal, 1978; Weiner, 1972), and to task performance (Marsh, 1984; Schunk, 1982).

In sum, then, the concepts of task value, expectancies, self-concept and attributions have all been extensively investigated, within cognitive theory and other theoretical views, and all have been shown to be related to academic achievement. In addition, there is further evidence that sex differences in these variables may explain sex differences in achievement. This evidence will now be briefly reviewed.

#### Sex differences on the above variables

Numerous researchers have suggested that sex differences in the above variables may account for sex differences in achievement, but these differences have not been found consistently. When they occur, sex differences usually occur on male sex-typed tasks such as math, and with novel laboratory tasks. They have



been reported much less often when female sex-typed tasks are used.

Specifically, compared to girls, boys have been found to view math as more valuable for future career goals (Eccles, et al., 1983; Fennema & Sherman, 1977, 1978), to have higher initial expectancies for their performance on novel tasks and math tasks (Eccles, et al., 1983; Parsons & Ruble, 1977; Stipek, 1984) and to have higher self-perceptions of ability in math (Eccles, et al., 1983; Fennema & Sherman, 1977). In addition, girls have been found to be more likely to attribute success to luck (Bar-Tal & Frieze, 1977; Sohn, 1982) and less likely to attribute it to ability (Nichols, 1975, 1980). However, at least one study has failed to find these sex differences in attributions, even for a male sex-typed task (Bond & Deming, 1982).

As noted, sex differences in task value, expectancies, self-concept of ability, and attributions have generally not been found for female sex-typed tasks (Battle, 1966; Stipek, 1984). One study (Gitelson, Petersen & Tobin-Richards, 1982) did find that boys had higher expectancies and higher self-evaluations than girls, even on a female sex-typed task, but the same study found differences in attributions were present only for the male sex-typed task. The latter finding is consistent with the results of Deaux's (1976) review of

the literature on sex differences in attributions, which concluded that these differences are present only for male sex-typed tasks.

Thus far, we have seen that task value, expectancies, self-concept and attributions have all been shown to be related to achievement performance and behaviors, and that all have shown sex differences, usually for male but not female-typed tasks. However, as stated earlier, little is known about the relative importance of these variables or about the interrelationships among them. Recently, two models of achievement behavior have been proposed which predict relationships between several variables and academic achievement: an attribution model of achievement proposed by Weiner and his colleagues (Weiner, 1976, 1979) and a more recent expectancy-value model of achievement proposed by Eccles and her colleagues (Eccles, et al., 1983). Each model will now be described, before modifications to the latter model are proposed.

### Weiner's attributional model

Building on the work of Heider (1958) and Rotter (1966), Weiner and his colleagues (e.g. Weiner, 1974) have reframed Atkinson's (1964) need for achievement construct from a cognitive perspective. They propose

that individual differences in the need for achievement are actually differences in attributions made for failure experiences, with those high in need for achievement attributing failure to external, unstable causes, and those low in need for achievement attributing failure to internal, stable factors such as low ability.

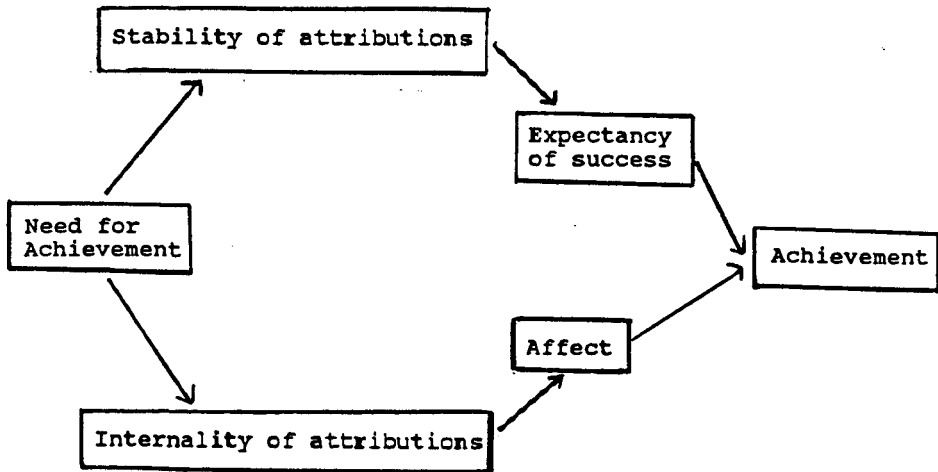
Weiner's model then proposes that attributions influence achievement primarily through their influence on expectancies and affect. The stability of an attribution is thought to influence future expectancies, while its internality is thought to determine one's affective reaction, as diagramed in Figure 1.

For example, attributing success to a stable cause such as ability is thought to lead to continued expectations for success, as ability would be expected to remain constant. Attributions of success to ability are also thought to lead to greater pride and more positive affect because ability attributions are internal and thus allow one to take credit for the success. Similarly, attributing failure to a lack of ability would be expected to lead to lower expectancies and more negative affect.

This analysis has generated a large volume of research (for reviews see Weiner, 1974, 1977) and initially received considerable empirical support,

Figure 1.

Attributional Model of Achievement Proposed by Weiner  
(e.g. Weiner, 1979).



especially when tested in laboratory settings. A number of studies supported the proposition that individuals differing significantly in need for achievement also differ significantly in attributions for failure (Bartol & Frieze, 1977; Weiner & Kukla, 1970; Weiner & Potepan, 1970).

It is also fairly well established that the stability of attributions is related to future expectancies (Fontaine, 1974; McMahan, 1973; Weiner, Hackhausen & Cook, 1972). Some evidence supports the earlier view of Rotter and others that the internality/externality dimension of attributions, rather than the stability dimension, influences expectancies, but when this question was directly tested (Weiner, Nierenberg & Goldstein, 1976), the stability dimension proved to be the stronger predictor of expectancies. Finally, as noted in the previous section, attributions have been shown to be related to achievement performance (e.g. Marsh, 1984), and training students to attribute failure to lack of effort has been shown to improve task performance (Chapin & Dyck, 1976).

Despite the considerable support for these aspects of the model, questions remain about the validity of the proposed internality/externality and stability/instability dimensions, about the model's applicability to actual classroom situations, and about

its relative value in comparison to other achievement models. The existence of the proposed dimensions of internality/externality and stability/instability initially received empirical support from factor-analytic studies (Meyer, 1980), although another dimension, labeled intentionality or controllability, also emerged (Weiner, 1979). However, in reviewing a number of such factor-analytic studies of attributions, Marsh et al. (1984) found that a variety of factor solutions have been reported that are quite different from those predicted by Weiner's model.

In addition, Covington and Omelich (1979a) tested the model's ability to predict college students' expected and actual grades on a final exam, using repeated multiple regressions to construct a path model. Although they found that the model predicted exam scores moderately well, when they directly compared the predictive ability of the measures of need for achievement and attributions, they found that attributions added little predictive power to that of the traditional need for achievement measure.

It is worth noting that while Covington and Omelich (1979a) appear to advocate deleting attributions from the traditional model, both attributions and need for achievement accounted for approximately the same amount of variance in achievement when the other was

deleted, and neither accounted for significantly more variance in combination with the other. Therefore, either of the two constructs could conceivably be deleted with the same results.

Covington and Omelich (1979a) argued for the view of others (Kukla, 1972; Nichols, 1976) that differential self-perceptions of ability, rather than causal attributions, are the primary component of the need for achievement construct. This interpretation has received some empirical support, as need for achievement has been found to be moderately correlated with self-concept of ability (Moulton, 1974). Under this interpretation, Covington and Omelich appear to suggest that attributions do not add to the prediction of achievement beyond that predicted by the self-concept. Opposing evidence, however, can be found in a more recent study by Marsh and his colleagues (Marsh et al., 1984).

Investigating the correlations between attributions and self-concept, this latter study found that attributions of success to ability were substantially positively correlated with the self-concept of ability, but that each accounted for a portion of the variance in achievement beyond that accounted for by the other. Contrary to Weiner's model, Marsh suggested that attributions, self-concept and

achievement may exist in a "dynamic equilibrium" such that a change in any one causes a concomitant change in the other two.

### Eccles' expectancy-value model of achievement

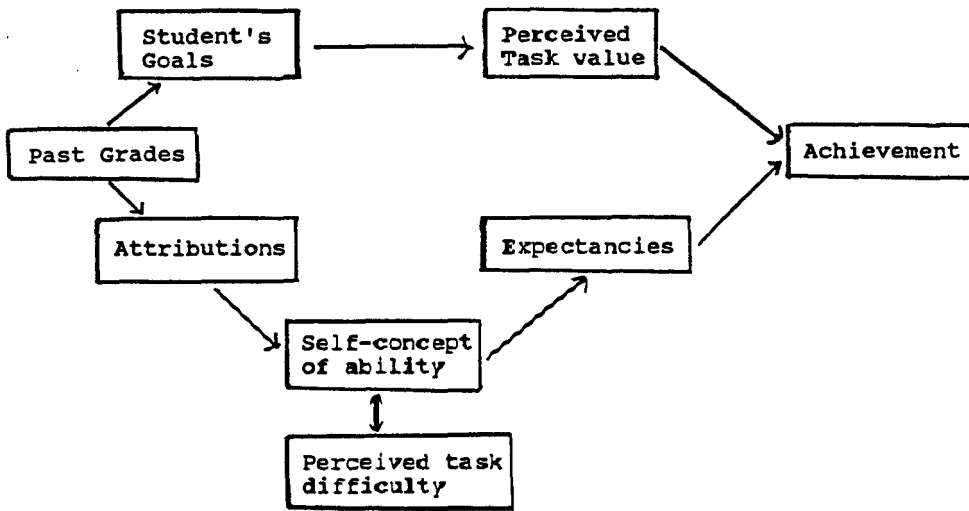
Building on the previous work of Weiner, along with that of expectancy-value theorists such as Atkinson, Crandall and Rotter, Eccles and her colleagues (Eccles, et al., 1983) have proposed a more comprehensive model of achievement in which expectancies and perceived value are seen as the primary predictors of achievement. Both are seen as caused by the self-concept of ability, which in turn is formed from interpretations of past school experiences, or attributions, as shown in Figure 2.

The complete model proposed by Eccles and her colleagues (Eccles, et al., 1983) also includes the role of parental perceptions or beliefs in causing students' beliefs. However, as the present study is concerned only with student beliefs, for the sake of clarity these parent variables are not shown in the diagram. Deleting these variables does not alter the remainder of the proposed model, so the model as shown in Figure 2 remains an accurate depiction of this portion of Eccles' overall model.



Figure 2.

Relevant Portion of the Expectancy-Value Model of Achievement Proposed by Eccles et al. (1983).



Rather than attributions, Eccles and her colleagues emphasize the concept of perceived task value. They have proposed three components of task value: intrinsic value, or the interest in and enjoyment of the task; utility value, or the usefulness of the task for current or future goals, and attainment value, the importance of doing well at the task, and have developed a six-item questionnaire to assess these constructs.

Based on Covington and Omelich's (1979a) findings, Eccles' model does not predict a direct path from attributions to expectancies, as originally proposed by Weiner. However, the model does not advocate disregarding the construct entirely. Rather, it predicts that attributions contribute to the development of self-perceptions of ability and perceptions about the difficulty of the task, both of which are seen as primarily formed during the early years of school. Once these beliefs are developed, however, Eccles suggests that attributions then have no further effect on achievement.

Eccles and her colleagues tested their model using questionnaire and school record data collected in two waves from 668 students in grades five through twelve. Questionnaire data collected the first year was used to predict achievement the following year.

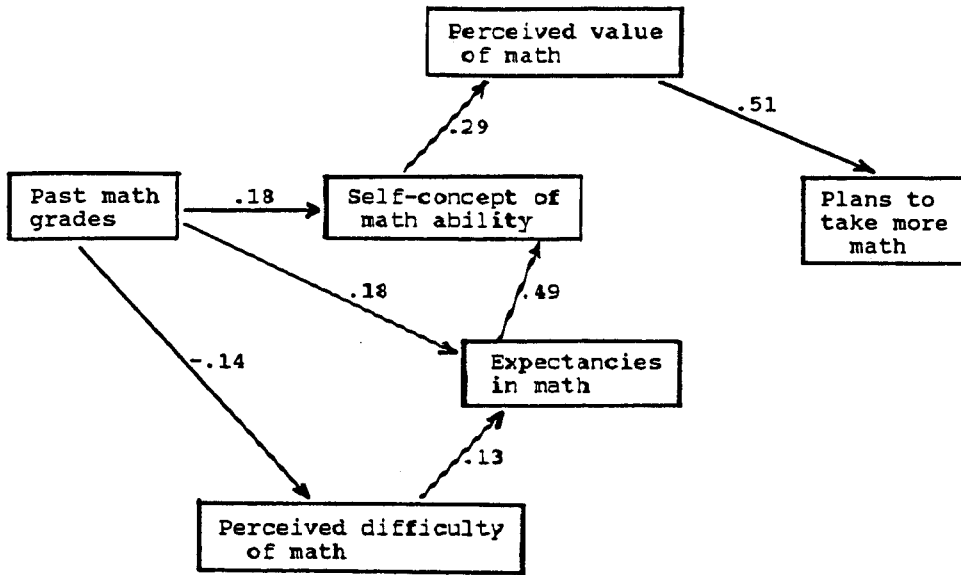
Achievement was measured by both course selections of optional advanced math courses and by report card math grades, as Eccles and her colleagues were especially interested in the reasons for sex differences in math-related fields.

The data were analyzed using multiple regression path analysis, in which repeated step-wise multiple regression equations are calculated, with each variable in turn used as the dependent variable. Unfortunately, data from the measures of attributions and student goals were not included in the path analysis, as these variables were not measured in interval form. In addition, although both math course selection and Year Two math grades were used as measures of achievement, path coefficients were reported only for the path analysis in which course plans was used as the achievement measure. Although specific path weights were thus not reported separately for the analysis using math grades, the authors indicated that the findings were similar for both measures of achievement. Their reported results (for the portion of their model relevant to the present study) are shown in Figure 3.

Overall, support was found for the proposed model, which accounted for approximately 36% of the variance in course selections and 26% of the variance in

Figure 3.

Model Testing Results Reported by Eccles et al. (1983)  
for Relevant Portion of Their Proposed Model.



year Two math grades (not shown). However, the model was found to be a better predictor of grades for boys than girls, as it accounted for only 13% of the variance in grades for girls, but 40% for boys. In addition, a direct path from past grades to expectancies was found that was not expected. Also, contrary to predictions, task difficulty and expectancies were not found to contribute to the prediction of achievement.

#### Critique of Eccles' model

While Eccles' results appear promising, they lead to a number of questions. First, several questions related to the methodology used by Eccles and her colleagues in testing their model can be raised. In addition, their results also lead to questions about the possible benefit of adding additional variables to her model.

Regarding Eccles' methods and results, the first major question that arises concerns the fact that the study focused on math-related beliefs. It is therefore unclear how well the results would generalize to other academic subjects.

In recent years, considerable interest has focused on math-related perceptions in particular, due to interest in the sex differences often found in math achievement. However, clinical experience suggests

that the majority of underachievers perform below their ability in all or almost all school subjects, while those that underachieve only in mathematics, frequently girls, appear to be in the minority of the overall population of underachievers. Therefore, it seems important to focus first on the development of an empirically sound model of achievement that applies to most areas of achievement, before considering specific sub-types of underachievement that may have unique etiological components, such as societal sex-typing of tasks.

A second general question about the accuracy of the results arises from the technique of using repeated multiple regressions to calculate the path weights. While Eccles reports that all paths are statistically significant at the  $p < .05$  level of significance, the use of repeated analyses suggests the level of significance should have been altered accordingly. It is thus unclear if some of the paths she reports may be significant only by chance. The statistical package LISREL may therefore have been a preferable statistical technique due to its ability to analyze an entire model at once.

Eccles' results also raise the question of why the model was somewhat better at predicting course selections than it was at predicting report card grades,

especially for girls. Two possible reasons for the difference can be speculated.

First, as the predicted variables were measured a year after the cognitive belief variables, one possibility is that course plans may be more stable over time than are grades. Report card grades reflect numerous components, including some teacher subjectivity, and thus may reflect more external sources of variations than do course plans, which are mainly internally determined. Conceivably, teacher-related variation could be more of a factor for girls' grades than boys' grades, as well. Thus, perhaps measuring achievement performance with a more objective measure would increase the model's ability to predict achievement. In addition, it is likely that the model's predictive power would be enhanced if it was used to predict grades earned sooner than a year later after the predictor variables were assessed, during which time many grade-related factors may have changed.

The second possibility, related to the potential need to add additional variables to the model, is that grades may be more influenced by actual ability than are course selections. As cited earlier, ability has been often been shown to account for considerably more variance in achievement than motivational factors. In addition, cognitive theory holds that behavior is

determined by both perceptions of reality, or subjective beliefs, and by actual reality, which in this case would be ability. However, neither Weiner nor Eccles postulate a role of actual ability in their models.

As Phillips (1984) points out, it would hardly be surprising if a child of low intellectual ability attributed failure to low ability and had lower expectancies and a lower self-concept than a child of higher ability. Rather, it is the inaccuracy of achievement-related perceptions, not the perceived level of ability per se, that is expected to exert an additional influence on achievement. Therefore, the inclusion of a measure of actual ability may improve Eccles' model.

Another way of improving the model might be through the task value construct. Eccles and her colleagues reported that task value was the major predictor of course selections, while self-concept of ability was the major predictor of subsequent grades. In other words, their conceptualization of the task value construct, consisting of the interest, usefulness and importance of the task, appears to be more of an influence on task choice than on task performance.

This is hardly surprising when considering that although a course in general may seem interesting, useful or important to a student, leading them to select



it, certain parts of the course or certain assignments reflected in the course grade may not be as interesting. Behaviorists have repeatedly shown that achievement performance can be influenced by extrinsic or external rewards, especially for tasks that are not intrinsically motivating, but Eccles' conceptualization of task value does not appear to consider the potential influence of extrinsic factors. It is unclear from Eccles' description of the construct whether extrinsic factors are considered to be subsumed within the usefulness or importance components, but an examination of the questionnaire items used to measure task value reveals no items tapping extrinsic factors directly. Thus, it appears that the addition of an extrinsic value component to Eccles' construct of task value may increase its ability to predict task performance.

In addition, since attributions were not included in the path analysis, it is unclear what role attributions may have in the prediction of achievement. Eccles has proposed that attributions contribute only to the development of the self-concept, but there is as yet no evidence to support this view. In addition, although one study (Covington & Omelich, 1979a) suggested that attributions do not account for additional variance in achievement beyond that accounted for by the need for achievement, and thus perhaps beyond that provided by

self-concept of ability, other evidence suggests just the opposite (Marsh, 1984). Considering the large body of evidence supporting Weiner's model, further consideration of the potential role of attributions in Eccles' model seems warranted.

Lastly, in their critique of Weiner's model, Covington and Omelich (1979a) point out that much of the evidence supporting the model comes from laboratory studies, many of which measure achievement in terms of persistence at a task, rather than in terms of grades or scores in an actual academic setting. A plausible explanation for the fact that the relationship between persistence and attributions appears to be stronger than that between exam scores and attributions is that persistence may mediate the influence of attributions on test performance. Attributions for past successes or failures may influence the amount of effort expended, which in turn influences test performance.

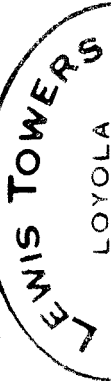
Felson (1984) reported that the influence of the self-concept of ability on grades was partially mediated by self-reported effort, but the possibility that a similar relationship exists between attributions, effort, and achievement has not yet been investigated. Indeed, Felson's findings lead to the idea that all achievement-oriented beliefs may influence achievement through their effect on effort.

Although the mediating nature of effort may seem rather obvious, many theorists and researchers appear to have merely assumed it to be operating and have not studied effort directly. For example, Eccles and her colleagues propose that their model predicts "achievement behaviors" in addition to task performance and task choice, but do not test this hypothesis, while Weiner does not include effort in his model at all. Others have shown a relationship between achievement beliefs and task persistence (e.g. Andrews & Debus, 1979) but have not in turn demonstrated a relationship between persistence and task performance. In addition, Felson (1984) appears to have been the first to demonstrate this relationship using a measure of effort other than task persistence at a laboratory task, namely self-reported descriptions of studying.

Based on the work of Felson (1984), then, and on the apparent hypotheses of Eccles and other theorists, the present study also proposes that the inclusion of effort as a mediating variable between achievement beliefs and task performance may improve the model proposed by Eccles and her colleagues.

### The present study

To address the questions raised above, the present study will first test the validity of the Eccles



model (Eccles, et al., 1983) as proposed, before then testing the hypothesis that the inclusion of additional variables would increase the model's ability to predict grades. Although not the main focus of the study, it is also expected that there will be no significant sex differences in any of the variables measured, because of the use of a female sex-typed task.

The first purpose of the study, then, is to attempt to replicate Eccles' results (Eccles, et al., 1983) using a slightly different procedure which should not detract from the model's predictive ability. This part of the study uses Eccles' proposed model to predict scores on a objectively scored regular classroom English (rather than math) test, which was administered just a few days after the cognitive variables were assessed. In addition, the fit of the model to the data is tested with LISREL structural equations, rather than with the multiple regression path analysis used by Eccles and her colleagues. This replication thus allows the validity of Eccles' results and the applicability their proposed model to be further investigated.

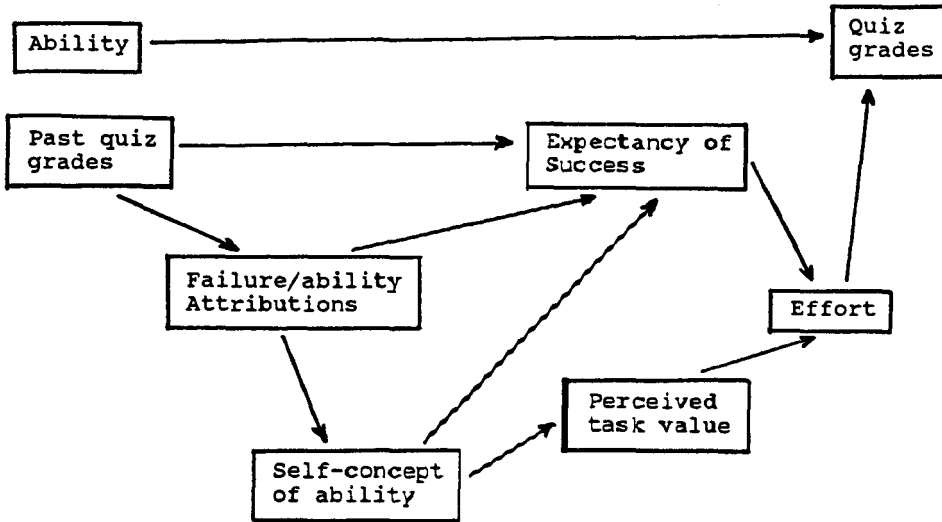
Although not the main intent of this part of the study, the procedural changes alone may increase the predictive power of Eccles' model. As described earlier, the use of an objectively-scored measure of achievement that is collected shortly after the

predictor variables are assessed may control for some of the possible variability in report card grades that may have affected Eccles' results. In addition, as sex differences in the predictor variables are found more consistently for male sex-typed tasks, the present study's use of English-related beliefs and a measure of English achievement may improve the model's predictive ability for girls, and thus for the sample as a whole.

The study will next test the hypothesis that several modifications in Eccles' model will increase its ability to predict test scores. Proposed modifications include the addition of causal attributions, effort, and ability to the model, and the addition of an extrinsic value component to Eccles' task value construct, as noted above. The model proposed by the present study to include these modifications is shown in Figure 4.

As shown in the diagram, it is expected that the self-concept of ability predicts both task value and expectancy of success, as in Eccles' (Eccles, et al., 1983) model. However, the current model predicts that effort will mediate the influence of these two variables on achievement, based on Felson's (1984) findings. It also predicts that ability influences test scores both directly and as mediated by the achievement-related beliefs, and includes an extrinsic component in the perceived task value construct, as discussed above.

Figure 4

Model Proposed by the Present Study.

Lastly, the present model proposes that attributions to ability predict self-concept of ability, based on Marsh's findings (Marsh, 1984). However, based on other previous evidence supporting Weiner's model, it is also expected that attributions to ability contribute to the prediction of expectancy of success, beyond that contributed by the self-concept of ability.

## CHAPTER 2

### METHOD

#### Subjects

The entire freshman and sophomore classes (N=210) of a Chicago parochial high school were asked to volunteer to participate in the study. Ten students were absent from English classes on both days of data collection, and eight students declined to participate in the study. However, of the remaining 192 students, only 177 were present on both days of data collection, and 33 of these did not complete all of the measures. As a result, the final study sample consisted of 144 subjects on whom complete data are available.

There were 92 males and 52 females, equally divided between ninth graders (27 females, 45 males) and 72 tenth graders (25 females, 47 males). Although data on religion and ethnicity were not collected, seventy percent of the school's population is Catholic, and the majority of students are white, with a small number of students from other ethnic backgrounds.

Subjects had been grouped by the school into below average, average, and honors level classes, based on standardized tests and/or past school performance. Sixteen ninth graders and 17 tenth graders, or 23% of the sample were classified as having below average



ability (one class in each grade), 37 ninth graders and 32 tenth graders or 48% of the sample were classified as of average ability (two classes in each grade), and 19 ninth graders and 23 tenth graders or 29% of the sample were in honors level classes (one class in each grade). For the total of eight classrooms involved in the study, there were four different teachers, each of whom taught two classes.

### Measures

A list of the constructs assessed and the measures used is presented in Table 1, and a copy of the measures is included in Appendix A. Each measure will also be briefly described below.

**Academic Achievement:** Scores on a multiple-choice vocabulary test made up by the teachers were used as a measure of academic performance. As each teacher made up their own tests, a total of six different tests were used. All tests consisted of fifteen vocabulary words from the students' vocabulary text books, which the teacher judged to be the appropriate level of difficulty for the class. All the teachers reviewed the words orally once with his or her class, and all students were told which words to study three days before the test. Because different tests were used, standard scores were computed to indicate the students'

Table 1.

List of Constructs and Measures Used in the Present Study.

CONSTRUCT	MEASURE
Academic achievement .....	Standardized scores on teacher-made vocabulary quizzes
General ability.....	Vocabulary subtest of the WISC-R
Past grades .....	Self-report of past vocabulary quiz grades
Self-concept of vocabulary ability .....	Three items used by Eccles et al. (1983) and one additional item
Expectancy of success .....	Expected quiz grade
Perceived task value I .....	Six items used by Eccles et al. (1983)
Perceived task value II .....	Six items used by Eccles et al. (1983) plus seven additional items
Causal attributions .....	Four items asking students to rate how much a past good grade on a vocabulary quiz had been due to each cause (one item each)
Causal attributions .....	Same as above, asking how much a past poor quiz grade had been due to each cause
Effort .....	Two items used by Felson (1984) asking how hard the student studied for the quiz and for how long

relative achievement within their English classes.

**Ability:** The vocabulary subtest of the WISC-R (Wechsler Intelligence Scale for Children - Revised) was used as an estimate of the students' general ability.

**Past grades:** Past grades were assessed via student self-report. The one item measure asked "What grade do you usually earn on vocabulary tests?" Previous evidence indicates that students of this age are usually quite accurate in reporting their grades (Wylie, 1979).

**Self-concept of ability:** This construct was assessed with the three items used by Eccles (Eccles, et al., 1983), for which Eccles reports alpha levels of .80, as well as one additional item. The items used by Eccles were changed slightly by substituting the words "vocabulary test" for "math class". The resulting items ask students to rate how good they are at vocabulary tests, both in general and in relation to the rest of their class, and how well they usually do on vocabulary tests. The additional item asks how well they could do if they tried as hard as they could. All ratings were made on a scale from 1 (poor or worst) to 7 (very good or best). The internal consistency of the measure (alpha coefficient = .89) was found to be consistent with that reported by Eccles et al. (1983) and well within accepted limits.

**Expectancy of success:** Following the method used by several researchers (e.g. Battle, 1965; Covington & Omelich, 1979a), students were asked to indicate the numerical grade (0-100) they expected to earn on the vocabulary test.

**Perceived task value:** The six item questionnaire used by Eccles and her colleagues (Eccles, et al., 1983), with "vocabulary words" again substituted for "math" was used to assess the interest value, importance and usefulness of the vocabulary words. Each component consists of two items rated on a seven point scale. The alpha coefficient of internal consistency was calculated at .85, which is consistent with that reported by Eccles. To distinguish it from the perceived value measure proposed by the present study, this measure will be referred to as "Perceived Value I".

The perceived value measure proposed by the present study added seven items assessing the task's "extrinsic value" to the measure used by Eccles. These items ask students to rate on a seven point scale how important school performance is to their parents and peers, to rate the amount of praise or punishment they receive from parents and peers for doing well or poorly in school, and to describe the type of rewards and punishment their parents employ. The internal consistency estimate for this new measure was

unacceptably low, with an alpha of .52. The term "Perceived Value II" will be used to refer to Eccles' perceived value measure with these ten items added.

**Causal attributions:** Perceived causes of past vocabulary test performance were assessed using the structured rating formats used in previous studies (Covington & Omelich, 1979a; Feather, 1969). Students were first asked to recall a vocabulary test they had done well on, and then to rate how much each of Weiner's four proposed attributions (ability, effort, task difficulty and luck) had caused them to do well. They were then asked to recall a past vocabulary test that they had done poorly on and to rate how much each attribution had caused them to do poorly. There were thus a total of eight attribution items, four attributions for a past success (success/ability, success/effort, success/task, and success/luck) and four attributions for a past failure (failure/ability, failure/effort, failure/task, failure/luck).

**Effort:** The two items employed by Felson (1984) were used to assess effort. Felson's items ask the students to rate how hard they studied for the test and to indicate the approximate number of hours or minutes they spent studying for it. Responses to the latter open-ended question were coded as follows, based on the frequency distribution of responses: 0 minutes = 1, 1-

10 minutes = 2, 11-30 minutes = 3, 31-60 minutes = 4, and more than 60 minutes = 5.

### Procedure

Measures of ability, past grades, self-concept of ability, attributions, expectancies, perceived value, effort and achievement were administered during students' regularly scheduled English classes, with the majority of measures administered during one class period, and the measures of effort and achievement administered three days later. On the first day, measures of ability, past grades, self-concept of ability, task value, and attributions for past grades were administered in counter-balanced order. The students were then told that they would be taking a vocabulary test given by their teacher in a few days, and were asked what grade they expected to earn on that test.

On the second day of data collection, the regular classroom teacher administered both the effort measure and the vocabulary test, reminding the students that only the experimenter would see their responses to the effort measure. Confidentiality was assured by using only code numbers on all measures to identify each subject. The classroom teachers were asked to keep a list of students and code numbers, and the students were

assured that the examiner would not have access to the list and that the teacher would not have access to any of the completed measures except for the classroom test.

### Data Analysis:

Data were analyzed in two stages, with preliminary analyses conducted before model-testing analyses. Preliminary analyses consisted of identifying the interrelationships among the variables and investigating the presence of any systematic group differences based on sex, grade, or class level. Model-testing analyses were then conducted to test both the cognitive model proposed by Eccles and the revised model proposed by the present study.

Model-testing was conducted using LISREL-VI (Joreskog & Sorbom, 1984), the most commonly used structural analysis (or structural equation modeling) program. Briefly, LISREL computes "structural coefficients", or parameters, which are estimates of the causal impact of an independent variable on a dependent variable, as proposed by a given model. It then compares these predicted parameters to the actual observed parameters, and conducts a chi-square test of significance on the difference between the observed and expected relationships among variables. Thus, a non-significant chi-square indicates support for the

proposed model.

The LISREL-VI program also calculates the significance of each path predicted by the model by conducting  $t$  tests (T-values greater than 2.00 indicate significant parameters), and indicates paths that exist in the data that were not predicted by the model (modification indices). Thus, the LISREL procedure for testing a model involves first running the proposed model, and then making changes indicated by  $t$  statistics and modification indices, if the model does not initially fit the data well.



## CHAPTER 3

### RESULTS

#### Preliminary analyses

Means and standard deviations of all the variables in the present study are presented in Table 2, and intercorrelations among variables are given in Table 3. As shown, almost all the measures except for most of the attribution items were significantly correlated with both standardized and raw quiz scores. However, these correlations were generally slightly lower than the correlations with Year 2 math grades reported by Eccles and her colleagues (Eccles, et al., 1983).

Specifically, the present correlations ranged from approximately  $r = .14$  for self-concept of ability and raw quiz scores to  $r = .30$  for past grades and quiz scores, while those reported by Eccles et al. ranged from  $r = .11$  (perceived value and grades) to  $r = .42$  (past grades and later grades). In addition, the correlation between self-concept of ability and quiz grades ( $r = .14$  with raw scores and  $r = .17$  with standardized scores) is somewhat lower than the mean correlation between academic self-concept and achievement ( $r = .40$ ) reported in a meta-analysis by Uguroglu and Wahlberg (1979), cited earlier.

Table 2

Means and Standard Deviations of All Variables.

<u>Variable</u>	<u>Means</u>	<u>Standard Deviations</u>
1. Quiz standard score	49.86	10.09
2. Quiz raw score	78.58	16.68
3. Past quiz grades	2.85*	1.09
4. WISC-R vocabulary subtest	23.91	8.58
5. Self-concept of vocabulary ability	25.53	4.78
6. Perceived value I	20.91	6.31
7. Perceived value II	47.85	8.27
8. Expected Quiz Grade	3.16*	.93
9. Effort	5.93	3.27
10. Success/Ability	4.66	1.53
11. Success/Effort	5.07	1.70
12. Success/Task	4.39	1.71
13. Success/Luck	3.18	1.84
14. Failure/Ability	3.00	1.69
15. Failure/Effort	5.06	1.83
16. Failure/Task	3.30	1.77
17. Failure/Luck	2.74	1.94

\* Note: Past grades and expected grades are on a four point scale, where 0 = F and 4 = A.

Table 3

Intercorrelations of All Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Quiz standard score	---	.79***	.30***	.26***	.17*	.20**	.20**	.13
2. Quiz raw score		---	.30***	.26***	.14*	.18**	.13	.17*
3. Past quiz grades			---	.13	.57***	.36***	.35***	.58***
4. WISC-R vocabulary subtest				---	.19***	.19*	.16*	.04
5. Self-concept of vocabulary ability					---	.40***	.36***	.41***
6. Perceived value I						---	.85***	.24**
7. Perceived value II							---	.24**
8. Expected quiz grade								---

(continued)

Table 3 (continued)

Intercorrelations of All Variables

Variable	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Quiz standard score	.21**	.17*	.01	.10	.08	-.09	.13	.26***	.09
2. Quiz raw score	.18*	.01	-.02	-.05	-.05	-.18*	.20*	.19**	-.00
3. Past quiz grades	.17*	.35***	.20**	.15*	-.17*	-.28***	-.00	.01	-.09
4. WISC-R vocabulary subtest	-.07	.18*	-.07	.13	-.11	-.16*	.23**	-.09	-.06
5. Self-concept of vocabulary ability	.14*	.55***	.26***	.28***	-.21**	-.44***	.13	-.12	-.08
6. Perceived value I	.40***	.35***	.30***	-.04	-.30***	-.22**	.05	-.09	-.22**
7. Perceived value II	.51***	.30***	.36***	-.01	-.25**	-.11	.03	-.02	-.21**
8. Expected quiz grade	.27***	.17*	.21**	.13	-.19**	.11	.01	-.07	-.07
9. Effort	---	-.03	.30***	-.13	-.06	-.03	.04	.04	-.10
10. Success/Ability	---	---	.26***	.19**	-.10	-.46	.24**	-.24	-.09

(continued)

Table 3 (continued)

Intercorrelations of All Variables

Variable	9.	10.	11.	12.	13.	14.	15.	16.	17.
11. Success/Effort			---	-.00	-.32***	-.05	.13	-.06	-.15*
12. Success/Task				---	.14*	-.00	.14*	.20**	.09
13. Success/Luck					---	.24**	.02	.24**	.47***
14. Failure/Ability						---	-.16**	.31***	.29***
15. Failure/Effort							---	-.02	-.06
16. Failure/Task								---	.16*
17. Failure/Luck									---

\* $\underline{p} < .05$ \*\* $\underline{p} < .01$ \*\*\* $\underline{p} < .001$

generally significant but lower than expected, it is notable that higher correlations were found between the predictor variables. For example, the correlation between self-concept of vocabulary ability and past vocabulary grades ( $r = .57$ ) was considerably stronger than that between self-concept and quiz grades, and more consistent with previous results. Similarly, perceived value was more highly correlated with effort ( $r = .40$ ) and with self-concept ( $r = .40$ ) than with quiz grades ( $r = .20$ ), and expected quiz grades were more highly correlated with self-concept of ability ( $r = .41$ ) and with past grades ( $r = .58$ ) than with actual quiz scores ( $r = .17$ ).

Examination of the correlations among attribution items revealed that only three of the eight items were significantly correlated with quiz scores (success/ability, failure/ability and failure/task attributions), but that five of the eight were significantly correlated with other predictor variables, generally past grades and self-concept. Of particular interest is the fact that success/ability and failure/ability attribution items were considerably more highly correlated with self-concept ( $r = .55$  and  $-.44$ , respectively) and with past grades ( $r = .35$  and  $-.28$ ) than were the other attribution items.

Next, to assess the effects of grade, sex, and class level on the components of the models to be tested, several 2 x 2 x 3 multivariate and univariate analyses of variance were performed, with sex, grade, and class level (below average, average, above average) as the independent variables. First, since all the variables except attributions to effort, task, and luck were significantly correlated, in line with theoretical expectations, one multivariate analysis of variance (MANOVA) was performed on the following dependent variables: standardized quiz scores, WISC-R, past grades, self-concept of ability, expected grade, success/ability and failure/ability attributions, perceived task value measures I and II, and effort. Second, as success/luck and failure/luck attributions were also significantly correlated ( $r = .46$ ) a separate MANOVA was conducted on these two attributions. Lastly, univariate ANOVAs were performed on the remaining four attribution items: success/effort, failure/effort, success/task, and failure/task, which were not significantly correlated with most other variables.

Results of the first MANOVA (on the first set of dependent variables, listed above) revealed no significant interactions or main effects for sex. However, significant main effects emerged for both class

level [ $F(2,141) = 4.74, p < .000$ ] and grade [ $F(1,142) = 2.26, p < .022$ ].

Univariate F tests following the first overall MANOVA revealed that the significant grade effect emerged only on the two measures of perceived value [ $F(1,142) = 4.78$  and  $4.69, p < .03$ ], with ninth grade students placing a higher value on succeeding on the quiz than tenth graders. Significant univariate effects for class level emerged only for WISC-R scores [ $F(2,142) = 27.90, p < .000$ ] and for expected grades [ $F(2,142) = 3.82, p < .024$ ]. Group means and standard deviations for the variables with significant univariate effects are presented in Table 4.

The second MANOVA (on the two luck attributions) revealed no significant interactions and no main effects for either grade or level. A main effect for sex [ $F(1,142) = 3.34, p < .038$ ] did emerge, however, but inspection of the two univariate F's indicated that neither attained significance.

Lastly, the four individual ANOVA's on the task and effort attributions again revealed no significant interactions and no significant main effects for sex. However, main effects for level emerged for success/task [ $F(2,142) = 13.47, p < .01$ ], failure/task [ $F(2,142) = 14.43, p < .008$ ], and failure/effort [ $F(2,142) = 15.16, p < .008$ ] attributions. A significant main effect for



Table 4.

Results of Significant Univariate F Tests Following Significant Main Effects for Grade and Level on the First MANOVA.

## GRADE DIFFERENCES

<u>Variable</u>	<u>F value</u>	<u>Group Means</u>	<u>Standard Deviations</u>
Perceived Value I	4.78 ***		
Grade 9		22.07	6.54
Grade 10		19.85	5.63
Perceived Value II	4.69 ***		
Grade 9		70.55	11.17
Grade 10		66.97	11.73

## CLASS LEVEL DIFFERENCES

<u>Variable</u>	<u>Univariate F value</u>	<u>Group Means</u>	<u>Standard Deviations</u>
WISC-R vocabulary subtest (raw scores)	27.90 ***		
Below average		17.21	6.68
Average		24.19	6.35
Above average		29.88	9.01
Expected quiz grade	3.82 *		
Below average		3.45	.71
Average		2.96	1.02
Above average		3.28	.86

\* =  $p < .05$ ; \*\*\* =  $p < .001$

Note: Univariate F's for the remaining variables in the first MANOVA (quiz scores, past vocabulary grades, self-concept of vocabulary ability, success/ability and failure/ability attributions, and effort) were nonsignificant for both grade and level.

grade also emerged on success/task attributions [ $F(1,142) = 13.47, p < .008$ ], with tenth graders attributing past successes to the ease of the task significantly more often than did ninth graders. Group means and standard deviations for these significant univariate effects are presented in Table 5.

To determine which of the class level groups differed significantly from each other, Duncan's Multiple Range Test post-hoc group comparisons were conducted on the five variables for which significant univariate effects for level had emerged: WISC-R scores and expected grades from the first MANOVA, and success/task, failure/task, and failure/effort attributions from the individual ANOVAs. Beginning with the former, the comparisons revealed the expected pattern of group differences on WISC-R scores, as mean scores of the below average classes, average classes and above average classes all differed significantly from each other ( $p < .05$ ). However, the pattern of level group differences on the expected grades variable was not consistent with expectations, as average level students reported significantly lower expected quiz grades than did either above average or below average students.

Post-hoc analyses of the differences between level groups on the failure/effort and failure/task variables revealed that students in above average level

Table 5.

Results of Significant Univariate F Tests Following Significant Main Effects for Grade and Level on the Four Individual ANOVA's

## GRADE DIFFERENCES

<u>Variable</u>	<u>Univariate F value</u>	<u>Group Means</u>	<u>Standard Deviations</u>
Success/task attributions	7.15 **		
Grade 9		4.06	1.77
Grade 10		4.75	1.68

## CLASS LEVEL DIFFERENCES

<u>Variable</u>	<u>Univariate F value</u>	<u>Group Means</u>	<u>Standard Deviations</u>
Failure/task attributions	5.03 **		
Below average		3.64	1.85
Average		3.54	1.67
Above average		2.57	1.60
Failure/effort attributions	5.06 **		
Below average		4.57	2.02
Average		5.06	1.71
Above average		5.85	1.44
Success/task attributions	4.79 **		
Below average		4.15	1.66
Average		4.81	1.63
Above average		3.90	1.90

\*\* =  $p < .01$

classes attributed past failures significantly more to lack of effort, and significantly less to the difficulty of the task, than did students in either of the other two class levels, who did not differ significantly from each other ( $p < .05$ ). In addition, the pattern of level group differences on the success/task variable revealed that average level students viewed past successes as due to the task being easy, significantly more often than did the above average students ( $p < .05$ ). There was a trend for below average students to also attribute past successes to the ease of the task more than did above average students, but the difference between the below average and above average groups did not attain significance on this variable.

In sum, then, all of the predictor variables except most of the attributions items were significantly correlated with quiz scores, and higher correlations were noted between predictor variables. In addition, there were no significant effects due to sex or to interactions of the independent variables, but two minor differences between the two grades and several differences between class levels emerged, including the expected differences on the estimate of general ability. The latter difference was not accompanied by concomitant differences on any other variables except for expected grades and three attribution items, however. Thus,

there were no systematic differences on quiz scores or on measures of self-concept, past grades, ability attributions, or effort.

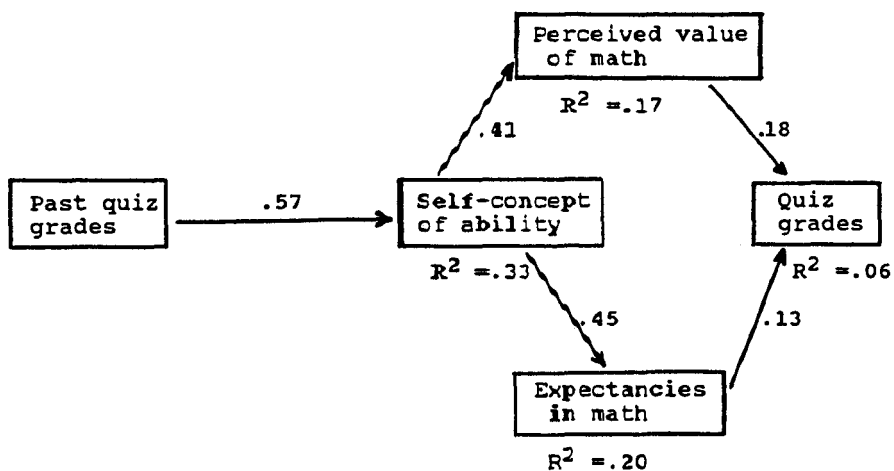
### Model-testing analyses

**Eccles' model:** Results of the present LISREL structural analysis of the model proposed by Eccles and her colleagues (Eccles, et al., 1983) are shown in Figure 5. Standardized parameter coefficients are shown for each parameter or path, and  $R^2$  values for each dependent variable are shown beneath the variable. These results show that the model proposed by Eccles is not well supported by the data of the present study.

As indicated, the chi-square test of the difference between reproduced and observed matrices yielded a significant result,  $\chi^2(5) = 45.78, p < .000$ . The total coefficient of determination, a measure of the overall strength of the relationships in the model, was relatively low (.35). In addition, the squared multiple correlations for the dependent variables of the model were generally low ( $R^2$ 's  $\leq .33$ ). These  $R^2$  values were considerably lower than the comparable values reported by Eccles and her colleagues (Eccles, et al., 1983), especially for achievement. In particular, Eccles' model accounts for only 6% of the variance in quiz grades in the present study, whereas Eccles reported 26%

Figure 5.

Present Study's Initial LISREL Results of Model Proposed by Eccles et al. (1983).



Goodness of Fit Indices:  $\chi^2(5) = 45.78, p < .000$   
 Normed index = .90  
 Nonnormed index = .70  
 Residual = .29  
 Coefficient of Determination = .35

Note: Standardized parameter coefficients are given on each path, and the variance accounted for in each dependent variable ( $R^2$ ) is noted beneath dependent variables.

of the variance in achievement was accounted for.

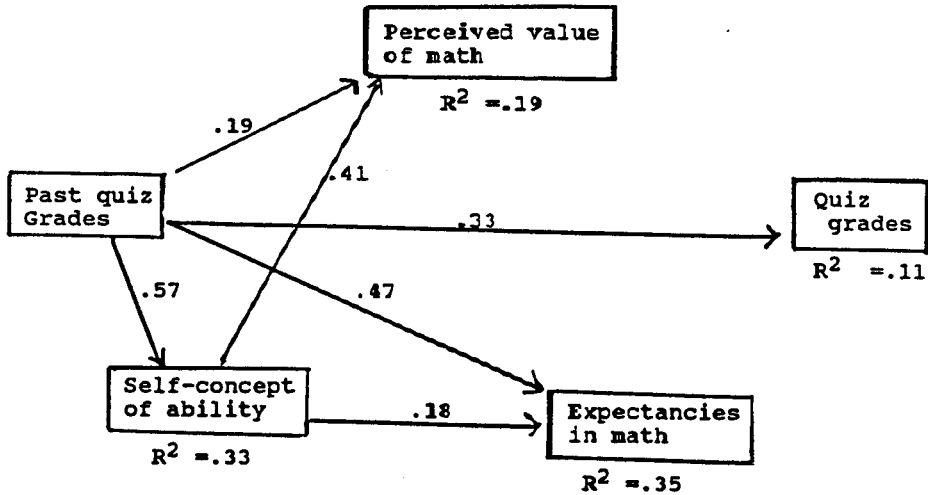
Modification indices, which indicate how the model should be altered to result in an improved fit to the data, indicated that three additional paths (not predicted by the model) were found: from past grades to expectancies, from past grades to perceived value, and from past grades to current quiz grades. In addition, the predicted path from expectancies to quiz grades was found to be nonsignificant, with a  $t$  value of 1.60. Therefore, the latter path was deleted and three paths listed above were added.

Results of the revised model, with the indicated changes made, are diagramed in Figure 6. As shown, the changes resulted in a model with an excellent fit to the data. The chi-square value is now nonsignificant ( $\chi^2 = 2.00$ ,  $p < .735$ ), and the coefficient of determination has risen to .50, which is adequate. All modification indices and normalized residuals are less than 2.0, indicating that no other significant paths exist in the data, and all  $t$ -values are greater than 2.0, indicating all paths are statistically significant.

While this model is clearly an excellent fit to the data, it accounts for only 11% of the variance in quiz grades. More important, all of this explained variance in achievement comes directly from past grades, rather than being mediated by cognitive beliefs as Eccles and other cognitive theorists have suggested. Moreover, even when

Figure 6.

Final Version of Eccles' Model After Indicated Modifications.



Goodness of Fit Indices:  $\chi^2(2) = 2.00, p < .735.$   
 Normed index = .995  
 Nonnormed index = .981  
 Residual = .16  
 Coefficient of Determination = .50

Note: Standardized parameter coefficients are given on each path, and the variance accounted for in each dependent variable ( $R^2$ ) is noted beneath dependent variables.



Eccles' model was run again with the past grades variable deleted (using self-concept as the independent variable and leaving the rest of the model the same), similar results emerged. The chi-square value remained nonsignificant ( $\chi^2 = 3.37$ ,  $p < .186$ ), but the total coefficient of determination (.31) and the squared multiple correlations remained low ( $R^2$  for quiz grades = .06). Thus, these results suggest that self-concept, expectancies and perceived value did not significantly contribute to the prediction of quiz grades.

Last, as Eccles (Eccles, et al., 1983) reported that her model accounted for more of the variance in achievement for boys than for girls, the resulting model was then tested separately for each sex. However, as the present study had significantly fewer female (N=52) subjects than male (N=92) subjects, such comparisons must be interpreted cautiously. No significant sex differences were found, as the chi-square value for the model was 1.89 ( $p < .756$ ) for girls and 3.24 ( $p < .519$ ) for boys, and the variance accounted for in achievement was approximately equal for both groups ( $R = .13$  for boys and .09 for girls).

Present study's model: Next, the model proposed by the present study was tested, adding the variables ability, effort, attributions, and extrinsic value to Eccles' model. As noted earlier, only attributions of

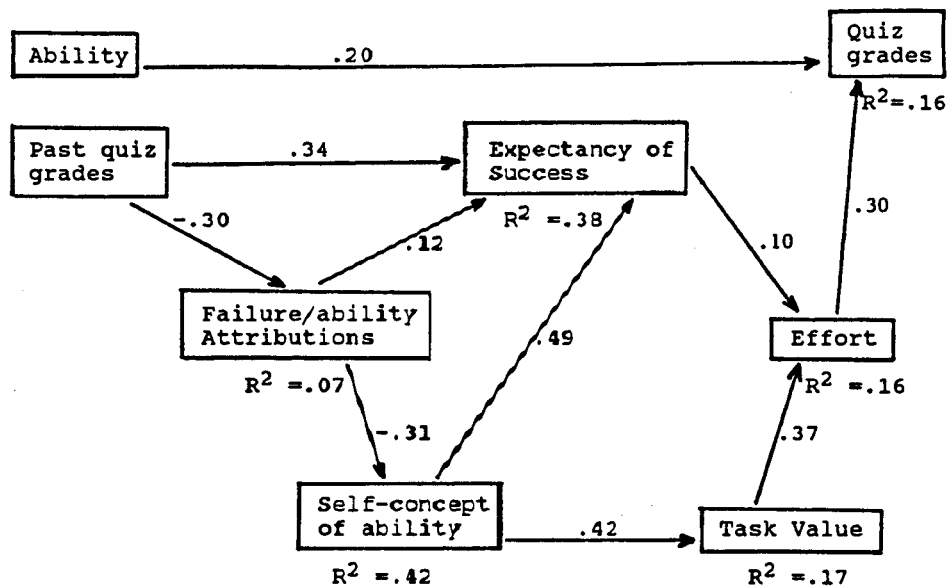
success and failure to ability were included in the model-testing analyses, based on the findings of Marsh (1984).

Initial results indicated that the inclusion of the success/ability attribution measure caused the stability index of the model to exceed 1.00, probably because of multicollinearity with the self-concept of ability measure. The stability index is a measure of the model's ability to arrive at a stable solution. Values over 1.00 indicate that LISREL is unable to find a stable solution and instead continues to iterate, invalidating the results. As this problem did not occur when the failure/ability attribution measure was used, only failure/ability attributions were used in testing the present study's proposed model.

Results of this LISREL analysis are shown in Figure 7, and indicate that the model was not well supported by the data, as a significant chi-square value of 82.20 ( $p < .000$ ) was found, with a low overall coefficient of determination of .36. Specifically,  $t$ -values indicated that the predicted paths from attributions to expected grade and from expected grade to effort were nonsignificant, indicating that expected grade did not contribute to the prediction of quiz grades at all. In addition, additional paths from ability to perceived value, from past grades to

Figure 7

Initial LISREL Results of the Model Proposed  
by the Present Study.



Goodness of Fit Indices:  $\chi^2(17) = 82.20, p < .000.$

Normed index = .878

Nonnormed index = .742

Residual = 2.35

Coefficient of Determination = .35

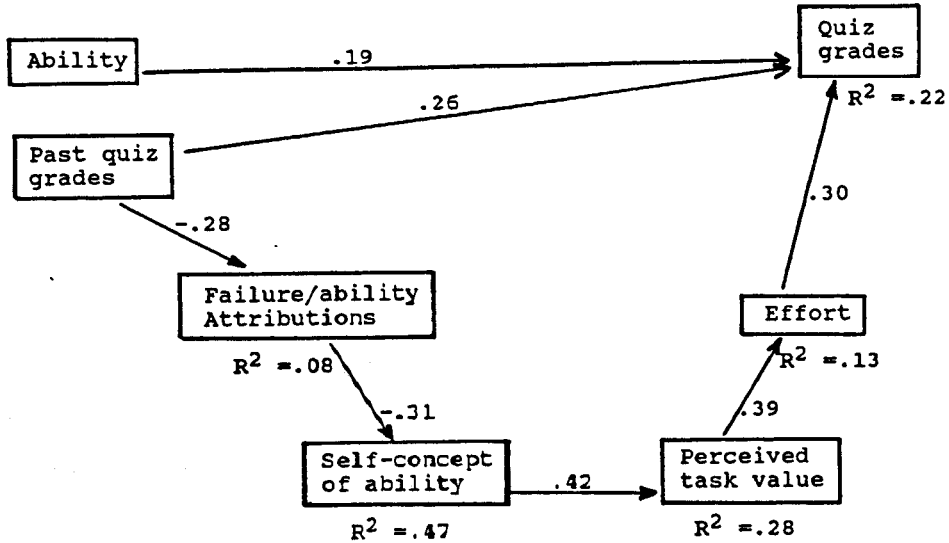
perceived value, and from past grades to current grades were found, as indicated by modification indices. The expected grade variable was therefore deleted from the model, and the indicated paths were added.

The resulting model is diagrammed in Figure 8, with standardized parameters again shown on each path. Unstandardized parameters and their standard errors, from which the standardized parameters are calculated, are listed in Table 6. As indicated, the final version of the model proposed by the present study had a chi-square value of 8.79 ( $p < .552$ ), indicating a good fit to the data, and the coefficient of determination was adequate at .51. The model also accounted for 22% of the variance in achievement. All  $t$ -values were greater than 2.0, and all but two modification indices had values less than 2.0.

The two paths with modification indices greater than 2.0 were those from ability to attributions (modification index = 3.22) and from attributions to effort (modification index = 2.24), but adding these paths to the model (separately) resulted in non-significant  $t$ -values of -1.50 and 1.80. This contradiction by the program's indices indicates that the two paths are only marginally nonsignificant, but they nevertheless were not included in the final model.

Figure 8.

Final Version of the Model Proposed by the Present Study  
After Indicated Modifications.



Goodness of Fit Indices:  $\chi^2(10) = 8.79, p < .552$   
 Normed index = .983  
 Nonnormed index = .953  
 Residual = .05  
 Coefficient of Determination = .51

Table 6.

Unstandardized Parameters and Standard Errors for Final Model

	Unstandardized Parameters	Standard Errors
1. Past grades to Self-concept	.54	.06
2. Past grades to Attributions	-.28	.08
3. Past grades to quiz grades	.26	.08
4. Past grades to Perceived value	.20	.09
5. Ability to Perceived value	.28	.07
6. Ability to quiz grades	.19	.08
7. Self-concept to perceived value	.20	.09
8. Attributions to self-concept	-.29	.06
9. Perceived value to effort	.36	.08
10. Effort to quiz grades	.30	.08

Lastly, Table 7 summarizes the various goodness-of-fit indices of the model proposed by Eccles and her colleagues and the model proposed by the present study, before and after indicated modifications were made. As shown, neither model provided an adequate fit when initially tested, and both fit the data approximately equally well after indicated revisions were made. Although the latter finding indicates that the revised models are equally plausible explanations of the data, the cognitive variables contribute to the prediction of achievement only in the present study's model, which also accounts for more variance in achievement.

Table 7.

Goodness of Fit Indices and Squared Multiple  
Correlations of Dependent Variables for all Four Models.

<u>Variance</u> <u>accounted for</u> <u>in dependent</u> <u>variables:</u>	<u>Eccles</u> <u>model</u>	<u>Eccles</u> <u>model-R*</u>	<u>Present</u> <u>model</u>	<u>Present</u> <u>model-R*</u>
Achievement	.06	.11	.16	.22
Self-concept	.33	.33	.42	.47
Expectancies	.20	.35	.20	
Perceived Value	.17	.19	.17	.28
Failure/ability attributions			.07	.08
Effort			.16	.13
Total	.35	.50	.36	.51
<u>Indices of Fit:</u>				
X (df)	41.48 (4)	2.00 (2)	82.20 (17)	8.79 (10)
Probability	.000	.735	.000	.552
Nonnormed Index	.91	.995	.878	.983
Normed Index	.67	.981	.742	.953
Root Mean Square Residual	.20	.03	2.35	.05

\* Indicates models after indicated revisions were made.



## CHAPTER 4

### DISCUSSION

Results of the present study provide support for cognitive theories of achievement in general, and for the model proposed by the present study, in particular. Results also indicated that the expectancy-value model of achievement proposed by Eccles and her colleagues (Eccles, et al., 1983) was not supported, and appears to be in need of modification. Consistent with predictions, however, the addition of the variables of effort, ability, and failure/ability attributions, proposed by the present study, appeared to improve Eccles' model considerably. If confirmed by future research, these results could have important implications for classroom-level interventions.

#### Preliminary analyses

The most important finding of the preliminary analyses was that there were no significant sex differences on any of the variables in the study, which was consistent with predictions. This finding is especially significant in light of the fact that sex differences on the variables studied have frequently been reported for math-related tasks. Although comparatively fewer investigations have examined

English-related beliefs, the present results are consistent with the vast majority of those that have been conducted. These results thus provide additional support for the view that sex differences in achievement-related beliefs are generally dependent on the sex-typing of the achievement task.

### Eccles' model

The results of the present study supported parts of the achievement model proposed by Eccles and her colleagues (Eccles, et al., 1983), but the overall model was not supported. As noted earlier, the model as a whole was found to be a poor fit to the data and to account for little variance in achievement.

Results that were consistent with those of Eccles and her colleagues included the following: (1) past grades were found to be significantly related to expectancies and to the self-concept of ability; (2) self-concept significantly predicted expectancies and perceived value; and (3) the expectancy of success variable was not found to be significantly related to achievement. Thus, both studies support the contention of cognitive theory that past experiences lead to the development of subjective beliefs about the self and the environment.

However, although the above aspects of the Eccles et al. model were supported, present results failed to confirm other major aspects of the model. Specifically, Eccles et al. reported that the cognitive variables of their model (other than expectancy of success) significantly contributed to the prediction of achievement, and that past grades predicted achievement only indirectly, through these mediating cognitive variables. However, the present study's attempt to replicate these findings yielded exactly opposite results: past grades predicted achievement directly and were not mediated by the cognitive variables. Moreover, the cognitive variables did not significantly predict achievement at all. This finding is particularly problematic because it is inconsistent with cognitive theory, upon which Eccles' model is based.

In addition, Eccles et al. found that their model accounted for 26% of the variance in achievement, while the present test of Eccles' model found it to account for only 6% of the variance in achievement before indicated modifications were made, and 11% after these modifications. The present study thus appears to raise serious questions about the usefulness of Eccles' expectancy-value model of achievement as originally proposed.

The possibility that the present results are due to the slight differences in the methodology used by Eccles et al. and that of the present study can not be completely ruled out, but it seems unlikely. For example, the present results could be related to the use of a different measure of achievement (standardized English quiz scores instead of report card math grades), or to the differences in the samples used (ninth and tenth grade parochial school students vs. Eccles' sample of fifth through twelfth grade public school students), but if true this would indicate that Eccles' model is not widely applicable. Rather, it seems more likely that the conflicting findings are related to the fact that the present study used a more stringent type of analysis (LISREL instead of multiple regression path analysis).

As mentioned earlier, the use of repeated separate analyses without adjusting the significance levels from  $p < .05$  could have caused some of Eccles' significant paths to be influenced by chance. In addition, because LISREL provides several indices for evaluating the adequacy of a model which multiple regression does not, Eccles' test of her model could even have resulted in disadvantages or problems with the model similar to those found in the present study, which

were simply not identified due to the limitations of the analysis used.

### Present study's model

Although the model proposed by the present study was initially not completely supported, a similar modified version of the model was found to be an excellent fit to the data. In addition, this model was found to be consistent with cognitive theory, for when effort was added to Eccles' model as a mediator between the achievement beliefs and quiz scores, the cognitive variables then did contribute significantly to the prediction of achievement.

The apparent importance of the effort variable is probably the most important finding of the present study. Rather than merely establishing a relationship between various beliefs and achievement, the present results provide evidence as to how this relationship may operate, which others appear to have merely assumed. As suggested by Felson (1984), it appears that achievement-related beliefs or perceptions influence achievement by affecting students' effort, such that students who have higher perceptions of their ability and who value school more appear to study more (or harder) than do their peers who score lower on measures of such beliefs. While previous investigations have established a

relationship between some achievement beliefs and persistence in the face of failure at a laboratory task (e.g. Andrews & Debus, 1979), the present study and the work of Felson (1984) indicate that these beliefs are also related to the amount of time students spend studying and to the quality of their studying as well.

Collectively, these results suggest that research on academic achievement should include a greater direct focus on the role of effort as a potential mediating variable. Such investigations may have important implications for intervention programs that attempt to increase school performance. Whereas many interventions attempt to "increase the self-concept" in general, which has frequently been shown to be ineffective in increasing achievement (Scheirer & Kraut, 1979), the present results suggest that such interventions should focus specifically on the influence of the self-concept (and other beliefs) on students' effort or work habits.

Although the evidence for the role of effort in achievement is the most significant finding of the present study, the additional finding that failure/ability attributions significantly contribute to the prediction of achievement is also noteworthy, in light of the current controversy over the comparative usefulness of the attributions construct (e.g. Covington

& Omelich, 1979a). Although attributions were significantly correlated with expectancies, as Weiner's model (e.g. Weiner, 1979) would predict, the correlation was low ( $r = -.15$ ), and the expectancies variable did not in turn affect achievement, contrary to Weiner's predictions. Rather, consistent with some of the results reported by Marsh (1984), ability attributions appear to be related to the self-concept, and to affect achievement mainly through this relationship. However, it should be noted that possible reciprocal relationships among these variables (suggested by Marsh) were not tested in the present study. The present results should therefore be interpreted accordingly.

If confirmed in future studies, however, the above interpretation could explain the fact that interventions that attempt to increase achievement by modifying children's attributions (e.g. Chapin & Dyck, 1977) generally appear to be successful, despite the recent questions about Weiner's attribution model. That is, attribution training may increase achievement indirectly by increasing the self-concept. It may even be a more effective and/or practical method of impacting the self-concept than has previously been available.

Lastly, as noted, the results of the present study also suggest that actual ability accounts for a portion of the variance in academic achievement beyond

that accounted for by either achievement-related beliefs or by effort. Although ability is often neglected in studies of achievement-related perceptions, the present results support the view of traditional cognitive theories that both actual and perceived reality influence behavior. It therefore appears to be important to consider both of these factors separately in studies of cognitive theories of achievement.

Thus, the major predictions of the present study regarding the value of incorporating the variables of effort, failure/ability attributions and ability into Eccles' model were clearly supported. The final model of the present study suggests that school performance is primarily influenced by the students' intellectual ability and by the effort they expend at a task. The amount of effort expended appears to be primarily based on the degree to which students' perceive the task to be interesting, important, and useful (task value), a perception which may be based both on how much ability students' believe they possess at the task and on how much ability they objectively have. Lastly, the results suggest that perceptions of ability may be formed based on past experiences and the individual's subjective interpretations as to the causes of those experiences (attributions).



Although the major predictions of the study were thus supported, four less significant aspects of the results were inconsistent with predictions. Each of these unexpected findings will now be briefly discussed. First, predictions regarding success/ability attributions could not be tested because the model became "unstable" when the variable was added, probably due to a problem with multicollinearity. As success/ability attributions were more highly correlated with self-concept of ability ( $r = .47$ ), than with any other variable, the hypothesized multicollinearity most likely existed between these two variables. Since the model's predictions could not be tested, the results neither confirm nor disconfirm the hypothesis that success/ability attributions may influence self-concept of ability, or that the two may exist in a reciprocal relationship, as suggested by Marsh (1984). Further understanding of the relationship between the two constructs must await further investigation.

Second, contrary to predictions, the "extrinsic value" component added to Eccles' measure of perceived value did not improve the measure's ability to predict achievement. This finding may be related to the fact that the distribution of responses to the extrinsic value measure were skewed to the right, while the responses to Eccles' measure alone were normally

distributed. Thus, to questions such as "How much do your parents reward you for high grades?", most students responded quite positively. The questions may thus have been worded in a way that caused responses to be overly influenced by social desirability factors. In addition, while the other measures used were worded to ask about vocabulary quizzes in particular, the extrinsic value measure was somewhat more vague. Thus, it is conceivable that changes in the measure could improve its ability to predict achievement.

Third, the specific model proposed by the present study required four modifications before it provided an adequate fit to the data. Contrary to the original model's predictions, (1) expected grades did not significantly contribute to the prediction of achievement (or effort), (2) both past grades and ability predicted perceived value, and, perhaps most importantly, (3) there was an unexpected direct relationship between past grades and achievement.

The lack of support for a path from expectancies to effort or achievement is not completely surprising in light of the fact that Eccles and her colleagues also found the path to be nonsignificant, but it is inconsistent with a number of studies, described earlier, that have found a relationship between expectancies and achievement. One reason for the

conflicting findings regarding this relationship may be that most of the latter studies have examined the relationship between expectancies and achievement separately from the self-concept variable. Although expectancies and achievement may be correlated when considered on their own, as they were in the present study ( $r=.18$ ), it may be that this relationship is overshadowed when self-concept of ability is also included in an analysis, such as in both Eccles' study and the present study. In other words, the expectancy construct may not share any variance with achievement beyond that it shares with the self-concept, which appears to be more strongly related to achievement.

The emergence of the paths from ability to perceived value, and from past grades to perceived are of relatively little concern, as they are not surprising theoretically or inconsistent with the rest of the proposed model. These paths merely appear to indicate that the value a student places on school is influenced by objective indicators of the student's ability (ability and past grades) as well as by the student's subjective perceptions of his or her ability (self-concept of ability). Thus, these paths are not inconsistent with cognitive theory, which holds that objective reality and the subjective interpretation of that reality both influence behavior.

The last necessary modification, the addition of a path from past grades to current grades, is of greater concern. As noted above, cognitive theories of achievement seek to explain the well-established relationship between past and later grades in terms of mediating cognitive variables. Therefore, the finding that in the present study the cognitive variables were unable to completely account for the relationship between past and later grades suggests a partial lack of support for cognitive theory and for the present study's model.

One possible explanation for the unexpected finding is that the past grades measure may be assessing a component of actual ability, which was perhaps not captured by the WISC-R measure. Previous grades were presumably influenced by both actual ability and subjective beliefs, and have often been used as an estimate of ability. If so, then the present findings would not be inconsistent with cognitive theory, as the path from past grades to current grades could be considered the contribution of actual reality factors in addition to the subjective perceptions. However, although this is possible, it appears that the present study's model may be in need of additional modification to more completely account for the remaining relationship between past grades and current grades.

Related to this possible need for further modification is the fourth and last unexpected finding, the fact that the final model of the present study still only accounted for 22% of the variance in achievement, which is disappointingly low (although higher than that accounted for by Eccles' model). This finding also indicates the possibility that further modification of the model may prove beneficial.

Potential modifications could involve improving the measures of some variables or including additional potentially relevant variables. Regarding the former, although inadequate measures of any of the variables could obviously have influenced these results, the measurement of the constructs of effort and ability are those most likely in need of improvement. For example, it seems possible that effort might account for even more of the relationship between past and current grades if additional components of the construct are identified and measured effectively. Furthermore, the use of the self-administration procedure for administering the vocabulary subtest of the WISC-R might have detracted from the measure's assessment strength, so that ability might actually account for even more variance in achievement than the current results suggest.

Additional variables that might improve the model further include objective factors, (e.g.

instruction, study skills, study time), other subjective beliefs or perceptions (e.g. perceptions about the value of the achievement task in relation to other valued activities), and social/emotional factors (e.g. mood, relationships). Although these variables are not consistent with traditional cognitive theory, the development of a comprehensive model of achievement may require the inclusion of affective and behavioral variables in addition to cognitive variables.

Although the four findings just described were thus inconsistent with predictions, the major predictions of the present study were supported, as noted earlier. Future studies are needed to test the present model on additional samples, to explore further the role of the variable of effort in achievement, and to identify additional variables that may improve the model further. In addition, if the model is supported by future studies, investigations of the effectiveness of interventions based on the model will be needed.

## SUMMARY AND CONCLUSIONS

Cognitive theories of achievement have been widely acclaimed as having important implications for the development of practical and effective interventions for underachievement. However, the development of such interventions has hindered by the previously "piecemeal" nature of research on individual cognitive variables. The present study therefore investigated a more comprehensive model of achievement proposed by Eccles and her colleagues which attempts to integrate a number of achievement predictors.

The present study's attempt to replicate the findings of Eccles and her colleagues found that their model was not supported by the data and suggested that the model is in need of modification. Instead, the revised version of the Eccles et al. model, proposed by the present study, was found to provide a better fit to the data and to have several advantages over the original model, including accounting for more variance in achievement. Most important, the addition of the variable of effort to Eccles' model was found to mediate the relationship between the cognitive variables and achievement, providing support for cognitive theory and significantly improving the model's fit to the data. The variables of ability and failure/ability attributions were also found to contribute significantly

to the prediction of achievement. If confirmed by future research, the present results will represent a further important step towards the goal of developing an empirically sound model of achievement, which could lead to the development of improved interventions for underachievers.



## REFERENCES

- Andrews, G. T., & Debus, R. L. (1978). Persistence and causal perception of failure. Journal of Psychology, 70, 154-166.
- Atkinson, J. W. (Ed.) (1958). Motives in fantasy, action, and society. Princeton, N.J.: Van Nostrand.
- Atkinson, J. W. (1964). An introduction to motivation. Princeton, N.J.: Van Nostrand.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. Psychological Review, 84, 191-215.
- Bandura, A., & Walters, R. H. (1963). Social learning and personality development. New York: Holt, Rinehart & Winston.
- Bar-Tal, D. (1978). Attributional analysis of achievement-related behavior. Review of Educational Research, 48, 259-271.
- Bar-Tal, D., & Frieze, I. (1977). Achievement motivation for males and females as a determinant of attributions for success and failure. Sex Roles, 3, 301-313.
- Battle, E. (1966). Motivational determinants of academic task persistence. Journal of Personality and Social Psychology, 4, 634-642.
- Bledsoe, J. (1967). Self-concept of children and their intelligence, achievement, interests, and anxiety. Childhood Education, 43, 36-38.
- Bond, L. A. & Deming, S. (1982). Children's causal attributions for performance on sex-stereotypic tasks. Sex Roles, 8, 1197-1208.
- Brookover, W. B., Thomas, S., & Paterson, A. (1964). Self-concept of ability and school achievement. Sociology of Education, 37, 271-278.

- Butkovsky, I. S., & Willows, D. M. (1980). Cognitive-motivational characteristics of children varying in reading ability: Evidence for learned helplessness in poor readers. Journal of Personality and Social Psychology, 72, 408-422.
- Chapin, M., & Dyck, D. G. (1976). Persistence in children's reading behavior as a function of N length and attribution retraining. Journal of Abnormal Psychology, 85, 511-515.
- Coopersmith, S. (1967). The antecedents of self-esteem. San Francisco: W.H. Freeman & Co.
- Covington, M. V., & Omelich, C. L. (1979). Are causal attributions causal? A path analysis of the cognitive model of achievement motivation. Journal of Personality and Social Psychology, 37, 1487-1504.
- Covington, M. V., & Omelich, C. L. (1984). Controversies or consistencies? A reply to Brown and Weiner. Journal of Educational Psychology, 76, 156-168.
- Crandall, V. C. (1969). Sex differences in expectancy of intellectual and academic reinforcement. In C. P. Smith (Ed.), Achievement-related behaviors in children. New York: Russell Sage.
- Crandall, V. C., Katkovsky, W., & Preston, A. (1962). Motivational and ability determinants of young children's intellectual achievement behavior. Child Development, 33, 643-661.
- Deaux, K. (1976). Sex: A perspective on the attributional process. In W. Ickes & R. Kidd (Eds.), New directions in attributional research. Hillsdale, NJ: Erlbaum.
- deCharms, R. (1968). Personal causation. New York: Academic Press.
- Diggory, J. (1966). Self-evaluation: Concepts and studies. New York: Wiley.
- Dweck, C. S. (1975). The role of expectancies and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 31, 674-685.

- Dweck, C. S., & Repucci, N. D. (1973). Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 25, 109-116.
- Eccles, J. E., Adler, T. F., Futterman, R., Goff, S.B., Kaczala, C. M., Meece, J. I., & Midgley, C. (1983). Expectations, values, and academic behaviors. In J. T. Spence (Ed.), Achievement and achievement motives. San Francisco: W.H. Freeman.
- Feather, N.T. (1966). Effects of prior success and failure on expectations of success and subsequent performance. Journal of Personality and Social Psychology, 3, 287-298.
- Feather, N. T. (1969). Attribution of responsibility and valence of success and failure in relation to initial confidence and task performance. Journal of Personality and Social Psychology, 13, 129-144.
- Feather, N. T., & Simon, J. G. (1973). Fear of success and causal attributions for outcome. Journal of Personality, 41, 525-542.
- Felson, R. B. (1984). The effect of self-appraisals of ability on academic performance. Journal of Personality and Social Psychology, 47, 944-952.
- Fennema, E., & Sherman, J. (1977). Sex-related differences in mathematics achievement, spatial visualization, and affective factors. American Educational Research Journal, 14, 51-71.
- Fennema, E., & Sherman, J. (1978). Sex-related differences in mathematics achievement and related factors: A further study. Journal for research in mathematics education, 9, 189-203.
- Fontaine, G. (1974). Social comparison and some determinants of expected personal control and expected performance in a novel task situation. Journal of Personality and Social Psychology, 29, 487-496.
- Gitelsen, I., Petersen, A., & Tobin-Richards, M. Adolescents' expectancies of success, self-evaluations, and attributions about performance on spatial and verbal tasks. Sex Roles, 8, 411-419.
- Guidano & Liotti (1983). Cognitive processes and emotional disorders. New York: Guilford Press.

- Harter, S. (1982). The perceived competence scale for children. Child Development, 53, 87-97.
- Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley.
- Jones, E. E., & Davis, K. E. (1965). From acts to dispositions: The attribution process in person perception. In L. Berkowitz (Ed.), Advances in experimental social psychology. (Vol. 2). New York: Academic Press.
- Joresborg, K. G., & Sorbom, D. (1984). LISREL VI: Analysis of linear structural relationships by the method of maximum likelihood. Chicago: National Educational Resources.
- Kelley, H. H. (1967). Attribution theory in social psychology. In D. Levine (Ed.), Nebraska Symposium on Motivation. Lincoln: University of Nebraska Press.
- Kukla, A. (1972). Foundations of an attributional theory of performance. Psychological Review, 79, 454-470.
- Lewin, K. (1938). The conceptual representation and the measurement of psychological forces. Durham, N.C.: Duke University Press.
- Marsh, H. W. (1984). Relations among dimensions of self-attributions, dimensions of self-concept, and academic achievement. Journal of Educational Psychology, 76, 1291-1306.
- Marsh, H. W., Cairns, L., Relich, J., Barnes, J., & Debus, R. (1984). The relationship between dimensions of self-attribution and dimensions of self-concept. Journal of Educational Psychology, 76, 3-32.
- McMahan, I. D. (1973). Relationships between causal attributions and expectancy of success. Journal of Personality and Social Psychology, 28, 108-114.
- Moulton, R. (1974). Motivational implications of individual differences in perceived competence. In J. W. Atkinson & J. O. Raynor (Eds.), Motivation and achievement. Washington, D. C.: Winston.

- Nichols, J. G. (1975). Causal attributions and other achievement-related cognitions: Effects of task outcome, attainment value, and sex. Journal of Personality and Social Psychology, 31, 379-389.
- Nichols, J. G. (1976). Effort is virtuous, but it's better to have ability: Evaluative responses to perceptions of effort and ability. Journal of Research in Personality, 10, 306-315.
- Nichols, (1980). A reexamination of boys' and girls' causal attributions for success and failure based on New Zealand data. In L. Fyans (Ed.), Achievement motivation: New trends in theory and research. New York: Plenum Press.
- Parkerson, J. A., Lomax, R. G., Schiller, D. P., & Wahlberg, H. W. (1984). Exploring causal model of educational achievement. Journal of Educational Psychology, 76, 638-646.
- Parsons, J. (1981). Attributions, learned helplessness, and sex differences in achievement. In S. R. Yussen (Ed.), The Development of Achievement. New York: Academic Press.
- Parsons, J., & Goff, S. B. (1978). Achievement and motivation: Dual modalities. Journal of Educational Psychology, 13, 93-96.
- Pearl, R. (1985). Cognitive-behavioral interventions for increasing motivation. Journal of Abnormal Child Psychology, 13, 443-454.
- Phillips, D. (1984). The illusion of incompetence among academically competent children. Child Development, 55, 2000-2016.
- Purkey, W. W. (1970). Self-concept and School Achievement. Englewood Cliffs, N.J.: Prentice Hall.
- Raynor, J. O. (1974). Future orientation in the study of achievement motivation. In J. A. Atkinson and J. O. Raynor (Eds.), Motivation and Achievement. Washington, D.C.: Winston.
- Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. Journal of Educational Psychology, 74, 548-556.

- Sohn, D. (1982). Sex differences in achievement self-attributions: An effect-size analysis. Sex Roles, 8, 345-357.
- Spencer, K. & Featherman, D. L. (1978). Achievement ambitions. Annual Review of Sociology, 4, 373-420.
- Stipek, D. J. (1984). Sex difference in children's attributions for success and failure on math and spelling tests. Sex Roles, 11, 969-981.
- Uguroglu, M. E. & Wahlberg, H. J. (1979). Motivation and achievement: A quantitative synthesis. American Educational Research Journal, 16, 375-389.
- Weiner, B. (1974). Achievement motivation and attribution theory. Morristown, N.J.: General Learning Press.
- Weiner, B. (1976). An attributional approach for educational psychology. In L. Schulman (Ed.), Review of research in education. (Vol 4). Itasca, IL: Peacock.
- Weiner, B. (1979). A theory of motivation for some classroom experiences. Journal of Educational Psychology, 71, 3-25.
- Weiner, B., Heckhausen, H., Meyer, W. N. & Cook, R. E. (1972). Causal ascriptions and achievement motivation: A conceptual analysis of effort and reanalysis of locus of control. Journal of Personality and Social Psychology, 21, 239-248.
- Weiner, B., Nierenberg, R., & Goldstein, M. (1976). Social learning (locus of control) versus attributional (causal stability) interpretations of expectancy of success. Journal of Personality, 44, 52-68.
- Weiner, B., & Potepan, P. A. (1970). Personality characteristics and affective reactions toward exams of superior and failing college students. Journal of Educational Psychology, 61, 144-151.
- Wylie, R. (1979). The self-concept. (Vol. 2) Lincoln: University of Nebraska Press.

## **APPENDIX**

### Perceived Value of Vocabulary\*

1. How useful are this weeks vocabulary words for what you do in your daily life outside of school?

not at all useful							very useful
1	2	3	4	5	6	7	

2. How useful will this week's vocabulary words be for what you want to do when you finish high school?

not at all useful							very useful
1	2	3	4	5	6	7	

3. How much do you like learning vocabulary words?

not at all							very much
1	2	3	4	5	6	7	

4. In general, I find working on vocabulary assignments:

very boring							very interesting
1	2	3	4	5	6	7	

5. In general, how important is it to you to do well on this week's vocabulary test?

not very important							very important
1	2	3	4	5	6	7	

6. In general, how important is it to you to increase your vocabulary or to learn new words?

not very important							very important
1	2	3	4	5	6	7	

\*Adapted from measure developed by Eccles, et al. (1983)



## Extrinsic Value Items

1. How important is it to your parents that you do well in school?

not very important								very important
	1	2	3	4	5	6	7	

2. How important is it to your friends that you do well in school?

not very important								very important
	1	2	3	4	5	6	7	

3. How happy or pleased are your parents when you do well in school?

not very happy								very happy
	1	2	3	4	5	6	7	

4. How angry or upset are your parents when you do poorly in school?

not very upset								very upset
	1	2	3	4	5	6	7	

5. How do most of your friends feel when you do well in school?

like and respect you less								like and respect you more
	1	2	3	4	5	6	7	

6. How much do your parents reward you when you do poorly in school? (For example, praise, gifts, privileges, etc.)

not very much								very much
	1	2	3	4	5	6	7	

7. how much do your parents punish you when you do poorly in school?

not very much								very much
	1	2	3	4	5	6	7	

### Self-concept of Vocabulary Ability\*

1. How easy is it for you to do well at vocabulary tests?

not very easy								very easy
	1	2	3	4	5	6	7	

2. How easy is it for you to learn definitions of words?

not very easy								very easy
	1	2	3	4	5	6	7	

3. If you were to order all the students in your grade from the worst to the best on vocabulary tests, where would you put yourself?

the worst								the best
	1	2	3	4	5	6	7	

4. How well do you usually do on vocabulary tests?

very poorly								very well
	1	2	3	4	5	6	7	

5. How well could you do on vocabulary tests if you studied and tried as hard as you could?

very poorly								very well
	1	2	3	4	5	6	7	

\*Items 1-4 adapted from measure developed by Eccles, et al. (1983). Item 5 added by present study.

## Causal Attributions

1. Think of the last time you got a good grade on a vocabulary test in English. How much did each of the following reasons cause you to do well?

-- The test was easy.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I studied hard.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I am good at learning vocabulary words.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I was lucky.

not a cause								very much a cause
	1	2	3	4	5	6	7	

2. Think of the last time you got a poor grade on a vocabulary test in English. How much did each of the following reasons cause you to do poorly?

-- The test was hard.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I did not study enough.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I am not good at learning vocabulary words.

not a cause								very much a cause
	1	2	3	4	5	6	7	

-- I had bad luck.

not a cause								very much a cause
	1	2	3	4	5	6	7	

## Other Measures

### Expectancy of Success

1. What grade do you expect to earn on this week's vocabulary test?

### Past grades

1. What grade do you usually get on vocabulary tests?

### Effort

1. How hard did you study for this test?

not at all										very hard
	1	2	3	4	5	6	7			

2. How long (in hours or minutes) did you spend studying for this test?

### Ability

Please give the best definition you can for the following words. If you do not know a word, please put your best guess.

(Items 1 - 25 from the WISC-R vocabulary subtest were then listed, with space provided for the definition to be written in.)

APPROVAL SHEET

The thesis submitted by Carla M. Leone has been read and approved by the following committee:

Dr. Joseph Durlak, Director  
Professor, Psychology, Loyola

Dr. Maryse Richards  
Assistant Professor, Psychology, Loyola

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

April 9, 1987  
Date

Joseph A. Durlak  
Director's Signature