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# AN EMPIRICAL TEST OF WEINER'S ATTRIBUTION

# THEORY OF ACHIEVEMENT MOTIVATION WITH A

# SCHOOL-AGE POPULATION

by

John  Bradley  Woudzia

B.A.,  University  of  British  Columbia,  1980

M.A.  (Education),  Simon  Fraser  University,  1986

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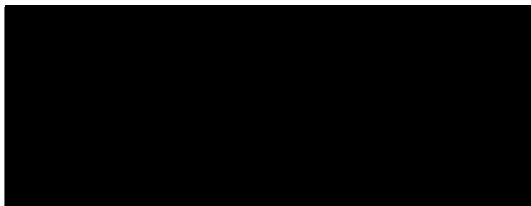
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Examining Committee:

    Chair:                     Roger Gehlbach

---

Ronald W. Marx
Senior Supervisor

---

Philip H. Winne
Professor

---

W. John C. Walsh
Assistant Professor

---

Jack Martin
Professor

---

Paul R. Pintrich
Associate Professor
University of Michigan
External Examiner

Date Approved  *29 July 1991*

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AN EMPIRICAL TEST OF WEINER'S ATTRIBUTION THEORY OF ACHIEVEMENT

MOTIVATION WITH A SCHOOL-AGE POPULATION

Author:

(signature)

John Bradley Woudzia

(name)

91-July-29

(date)

## Abstract

This study investigated the relationships among a set of variables as predicted by Weiner's Attribution Theory of Achievement Motivation. In all, 406 grade 7 students responded to a questionnaire following either success or failure on a math exam which addressed causal attributions, affective reactions, and future expectancies. The purpose of the study was to trace specific pathways from the attributions of ability, effort, luck, and task difficulty following either success or failure to subsequent emotions, future expectancies, and performance on a second math test. Data were also gathered which addressed students' perceptions of their classroom environments, academic self-concept, ability level in math, and effort expenditure.

Results revealed that a number of Weiner's predictions regarding the relationships among attributional variables were supported. In particular, predicted relationships between effort attributions and expected and obtained scores, and ability attributions and affective reactions to failure were upheld. Moreover, predicted relationships between effort attributions and emotions, and ability attributions and expected and obtained scores following success were also supported. Significant gender differences were also present across effort and ability attributions following failure, indicating that girls tend to attribute failure to low ability, whereas boys tend to make attributions to low effort following failure. Boys who experienced failure also possessed significantly higher math self-concepts than did girls who experienced failure. Results are discussed within an attributional and developmental framework.

# Acknowledgements

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CHAPTER 1

INTRODUCTION TO THE STUDY

Overview

The purpose of this study is to examine the validity of Weiner's attribution theory of motivation and emotion with a school age population in classroom settings. The study couples a replication and extension of Covington and Omelich's (1979a, 1984d) test of Weiner's attribution theory, using elementary school students in the place of adults, with an investigation of classroom structure as conceptualized by Rosenholtz and Simpson (1984a, 1984b). This two-pronged approach facilitates a test of Weiner's model of attribution theory and permits an examination of the influence of classroom structure on students' attributional tendencies. To date, the effects of classroom structure on students' causal attributions have not been investigated directly even though their importance in attributional contexts have been acknowledged repeatedly during the last decade (e.g., Ames, 1978). This chapter begins with an introduction to the study, followed by a discussion of Weiner's attributional theory of achievement motivation, and a description of the problems in the attributional literature regarding tests of this theory. Following this, definitions of the attributional variables to be investigated, as well as the specific hypotheses guiding the inquiry in this study are presented.

Background to the Study

In recent years, a number of theories of achievement motivation have emerged and have played a prominent role in advancing knowledge about student motivation to learn. Central to all of these

theories is the role that causal attributions play in determining behaviour in achievement contexts (Weiner, 1986). Some theories, such as Self-Worth Theory (Covington & Omelich, 1979a), make predictions about specific causal linkages between different attributions and affective responses, as well as between attributions and future expectancies for success. Similarly, Task Orientation Theory, as proposed by Nicholls (1984), makes predictions about achievement behaviour based on causal attributions made by learners identified as either task or ego-oriented. Still, other perspectives focus on specific developmental patterns in learners' casual attributions for success and failure outcomes, and seek to understand why attributional patterns change as grade level increases (e.g., Stipek, 1981).

Another theory that has influenced profoundly all other contemporary theories of motivation is Bernard Weiner's Attribution Theory of achievement motivation (cf. Weiner, 1974, 1979, 1980, 1984, 1985, 1986). Indeed, since the appearance of Weiner's first major book on attribution theory nearly 20 years ago (Weiner, 1972), causal attributions and their underlying dimensions have played a dominant role in cognitive interpretations of human behaviour, and have come to represent a major focus of motivational research in achievement settings. During the past decade, Weiner's Attribution Theory has also attempted to articulate more precisely relationships between causal attributions, their corresponding emotions, and expectancy changes among individuals who experience either success or failure.

For the most part, attributional research in interpersonal, social, and achievement contexts has focused on two main areas. The first is the underlying dimensional structure of specific casual attributions following a particular event and the extent to which these ascriptions provide empirical support for the viability of the locus, stability, and controllability dimensions. The second, influenced principally by Weiner, has examined relationships among variables specified by the attributional model, most notably the attribution-affect relationship. What has been missing, however, is a systematic test of the entire model of achievement motivation either as originally conceived by Weiner (1972, 1974, 1977) or in its revised and expanded form (1984, 1985, 1986). In total, tnere have been fewer than a half-dozen published studies of the links specified in Weiner's attributional model. All of these attempts suffer from a number of conceptual and/or methodological problems, and therefore, do not represent an acceptable test of fitness of the model.

A second, and no less serious omission characteristic of attribution research conducted in achievement settings is the lack of attention paid to the influence of the organizational and instructional milieu of the classroom on students' attributional patterns following success or failure. Both of these problems are discussed in further detail in a separate section of this chapter. However, before any further elaboration, an overview of Weiner's attributional model is presented.

Weiner's Attributional Theory of Motivation and Emotion

This section describes causal attributions, emotions, expectancy change, and behavioural outcomes as the four central features of Weiner's attributional model of achievement motivation. Each of these components is first described separately, and then all are presented in relation to one another in a description of the complete theory.

## Causal Attributions

Most contemporary attribution theorists assume that individuals search for understanding about why events occur in their lives, particularly when the outcome of such events is unexpected, negative, or important (Nicholls, 1984; Stipek, 1984; Weiner, 1980). That is, individuals seek information to answer "why?" questions following unexpected outcomes such as, "Why did I fail that test?", "Why doesn't Johnny like me?" or "Why didn't my team win the match?" Weiner describes this desire to make sense of events as the basic "spring of action" which compels individuals to engage in a search for potential explanations. Within the context of this attributional framework, causal attributions provide answers to these questions (Weiner, 1980). In achievement contexts, attributional research has demonstated that students generally make attributions to one of four specific causes following either success or failure: a) effort, b) ability, c) task difficulty, and d) luck. That is, when a student succeeds at a task, s/he will attribute this success to factors associated with either having tried hard, being smart in the subject area, an easy test or examination, or good luck. Conversely, if this student fails at a task, attributions for

failure will be made to factors such as either having not put forth sufficient effort, not being smart enough in the subject, the difficulty of the task, or bad luck.

Recently, Weiner (1986) stated that this list of attributions is too restricted to account for the vast array of reasons individuals could give for having done poorly or well at achievement-related tasks. He called for an expanded set of plausable causes to be included in future research involving the study of attributions. However, in analyzing a wider collection of attributional variables reported by subjects, Weiner found that the majority of these additional causes were idiosyncratic to the specific setting and were often classified in reports as "miscellaneous." Moreover, in the majority of these studies, the four original causal ascriptions were reported as the most frequently selected reasons by subjects for having performed poorly or well. Based on these findings, Weiner (1986) states that he and his colleagues were, "more guilty of the sin of omission than of commission when (we) designated ability, effort, task difficulty, and luck as the most common causal perceptions...In nearly all the reported investigations, how competent we are and how hard we try are the most frequently given explanations of success and failure" (p. 40).

Hence, causal attributions (or causal ascriptions) represent the cornerstone of Weiner's attributional model since they serve as the critical first stage in the complex sequence following an outcome which gives rise to both emotional responses and expectations for future performance. However, causal attributions themselves are less important determinants of achievement-related behaviour than

are the three dimensions which underly attributions. These dimensions are locus of causality, stability, and controllability. Their role is described below.

Locus of causality. Although all three dimensions as conceptualized by Weiner are based on Rotter's (1966) internal-external distinctions about causal beliefs, the locus of causality dimension draws most heavily from Rotter's original conceptions, as well as those of Fritz Heider (1958), who proposed an attributional framework for behaviour based on distinctions between individually and environmentally determined outcomes. In Weiner's attributional model, locus of control refers to the source of the cause as represented by the causal ascription. Individuals who perceive an external locus of control interpret their behaviour as being caused by external events (e.g., other people, conditions, etc.), while those individuals with an internal locus of control believe that they are personally responsible for their successes and failures. Weiner (1984) describes the internal-external locus dimension within the context of achievement-related attributions by stating, "within the achievement domain, such causes as aptitude, effort, and health commonly are considered internal to the person, whereas task difficulty, help from others, and luck are perceived among the environmental determinants of an outome" (p. 21).

Stability. The stability dimension distinguishes causes on the basis of duration or time, and thus is associated closely with students' expectations about future events. Attributions such as ability in mathematics or teacher attitude are perceived as constant and enduring; whereas, good or bad luck attributions are considered

temporary since these change from time to time. As such, attributions to ability following a successful outcome, for example, are considered to be more predictive of future performance than are attributions to effort, since effort may vary over time whereas ability or aptitude attributions do not (Weiner, 1985).

Controllability. The third dimension of controllability was added to the taxonomy by Weiner in 1979 in order to account for the fact that some attributions, whether internal or external, and stable or unstable, were under the individual's control whereas others were not. In the achievemnt domain, effort is an example of an internal controllable cause, whereas ability or aptitude are considered to be beyond individual control. An example of an external, controllable factor is a teacher's attitude toward students, whereas an external, uncontrollable factor is bad luck. Similar to the stability dimension, controllability is closely related to feelings of confidence and future expectations. Thus, if a student attributes failure to a controllable factor such as effort, s/he can be more confident about the prospects for success in the future than if such failure is attributed to ability.

## Affective Reactions to Attributions

Simply put, affects are emotions. Weiner (1986) defines emotions as "a complex syndrome or composite of many interacting factors. Emotions are presumed to have 1) positive or negative qualities of 2) a certain intensity that 3) frequently are preceded by an appraisal of a situation and 4) give rise to a variety of actions" (p. 119). Within the attributional model, emotions are the by-products of causal reasoning and, as such, occupy a second critical

link in Weiner's theory. However, Weiner makes distinctions between "outcome dependent-attribution independent" emotions on the one hand, and "attribution-dependent" emotions on the other, both of which follow a success or failure outcome. Emotions that depend on outcomes but are independent of attributions are considered affective states which follow immediately upon a given outcome and actually precede the formation of causal attributions. Moreover, these emotions are considered to be global or general, as well as quite stable over time. Weiner (1985) identifies two global "outcome dependent-attribution independent" emotions which typically follow positive and negative events; these are happiness in the event of a positive outcome and sadness or frustration in the event of a negative outcome. Weiner claims that these affects occur independently of causal attributions which are only activated when the outcome achieved by the individual is perceived to be either unexpected, negative, or important. If a particular outcome is characterized by any one of these three possibilities, then "attribution-dependent" emotions such as guilt following failure, or pride following success are activated.

## Future Expectancy

Although "attribution-dependent" emotions are direct by-products of causal ascriptions, they do not represent the only consequences. Subjective estimates of future performance are also activated following the selection of a cause for an outcome just experienced. Speculations about goal attainment are an important feature of most contemporary motivational theories and are also characteristic of early theories where the expectation of rewards

served to distinguish cognitive from mechanistic perspectives (e.g., Tolman, 1932). Early motivational theorists such as Heider (1958) viewed expectancy of success as being influenced by perceived ability and expenditure of effort relative to the perceived difficulty of the task, whereas Atkinson (1964) viewed expectancy as influenced by the number of individuals against whom one is competing, previous reinforcement history, and information from others.

## Behavioural Outcomes

The fourth and final step in Weiner's attributional model of motivation is behaviour or action. According to Weiner (1980, 1983), attribution-dependent emotions and expectancies of future success influence subsequent behaviour; causal attributions do not influence subsequent behaviour. Attributions give rise concomittantly to affective responses and expectancies of future success which, in turn, determine behavioural outcomes. Weiner (1983) has indicated that, although exam performance in achievement contexts does represent a tangible measure of behavioural outcome, it can be an overdetermined motivational index influenced by many unknown factors. He considers some of the underlying characteristics of actual performance, such as task persistence, to be equally reliable indices of achievement-motivated behaviour.

## The Complete Theory

Weiner's attributional theory of achievement motivation has undergone some important changes and refinements over the past 20 years. Most notably, previously held views regarding individuals'

manifest need for achievement (nAch), which were derived from Atkinson's (1964) Expectancy x Value Theory, have been disregarded in Weiner's recent attributional model (Weiner 1980, 1984, 1985, 1986). Figure 1 illustrates the key stages in Weiner's (1979) original conception of the attributional model with antecedents, causal attributions, affects, and behavioural consequences depicted for a failure outcome. The paths depicted in this figure were tested originally by Covington and Omelich (1979a). They found, among other things, that individual need for achievement bore no systematic relationship to causal ascriptions following failure.

Although the four dominant causal attributions specified by Weiner are included in this depiction, only one attribution-dependent emotion, shame, and an absolute estimate of future success is included. As indicated in the figure, causal attributions concomittantly produce affective reactions and expectations for future performance which, in turn, give rise to action.

Figure 2 illustrates an updated version of the model. Achievement needs have been eliminated, and expectancy change estimates and outcome measures of persistence have been added to the original expectancy and performance variables. In addition, affective reactions of guilt and humiliation have been added to the lone shame variable tested in the original model. The paths outlined in this conception were tested empirically by Covington and Omelich (1984d) in response to criticisms (Brown & Weiner, 1984) regarding the omission of multiple affects and other key variables. In their investigation, Covington and Omelich (1984d) found that neither expectancy change nor persistence variables were any better
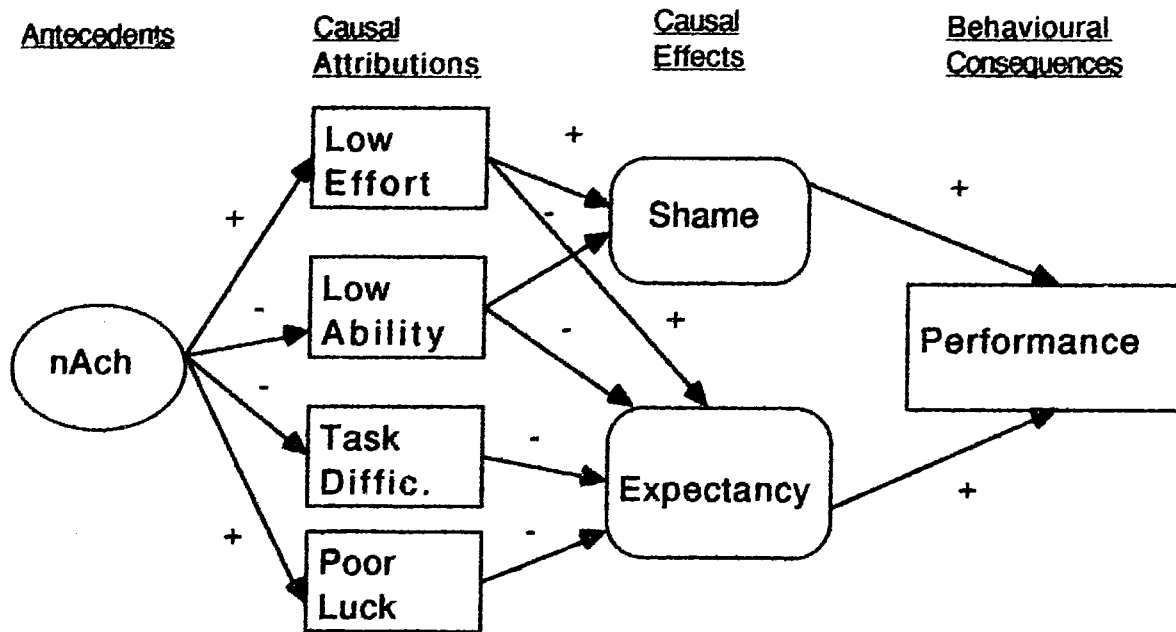
Figure 1. The Initial Conception of Weiner's Attributional

Model for a Failure Experience as Tested by Covington and
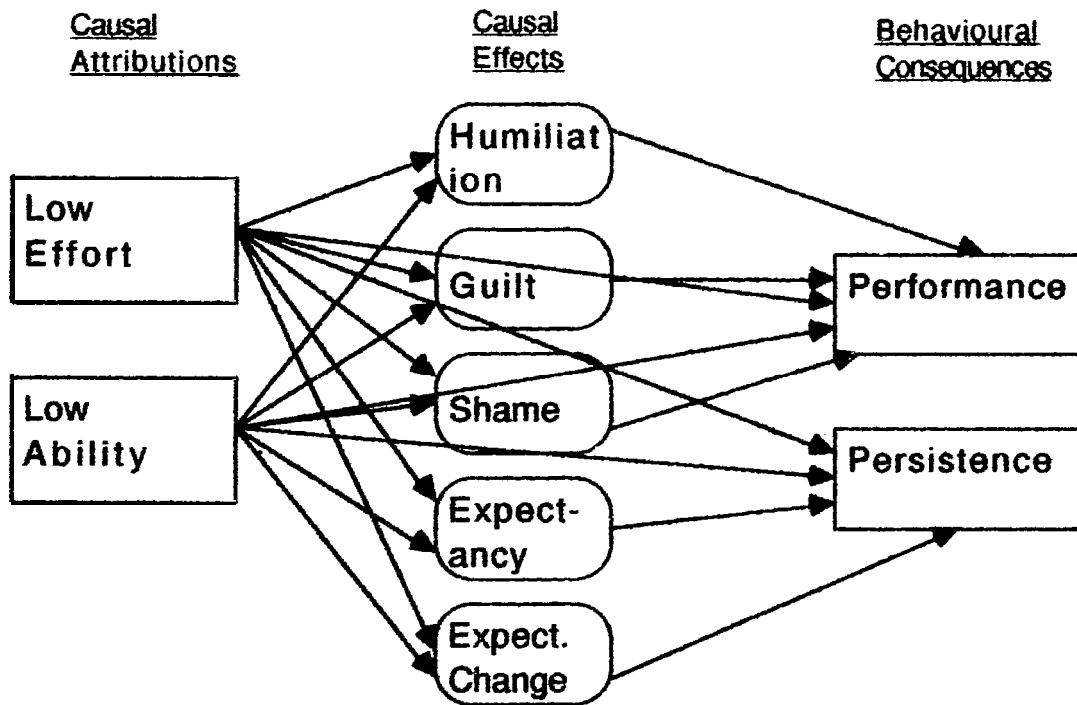
 Omelich (1979a).

**Figure 2.   A Later Conception of Weiner's Attributional Model as Tested by Covington and Omelich (1984d).**

predictors of students' attributional tendencies than were the original variables of future expectancy and performance. These two studies are discussed at length in the second chapter.

Figure 3 presents a further refinement of Weiner's (1984) theory. Unlike the previous two conceptions, this model includes information about the roles and relationships between causal antecedents, causal ascriptions, and causal dimensions. In addition, expectancy of success and attribution-dependent affects are depicted as specific features of a broader category referred to as psychological consequences. Moreover, behavioural consequences are viewed as consisting of a variety of motivational indices in addition to achievement outcomes such as choice of activity, intensity, and persistence.

Finally, Figure 4 provides an illustration of the most recent version of the complete attributional theory as conceptualized by Weiner in 1986. Essentially, this version differs from the one depicted in Figure 3 in that it highlights the existence of outcome-dependent affects which immediately follow a positive or negative event. Moreover, it acknowledges the necessary outcome prerequisites for a causal search to be initiated, namely, the event must be either unexpected, negative, or important. Finally, behavioural outcomes have been classified as consisting of characteristics of actions as well as actions themselves. Although the version of the model illustrated in Figure 4 is built on seven different stages, moving from initial outcome to consequent behaviour, the critical causal relations are the links between causal ascriptions, attribution-dependent affects, expectancy of success,
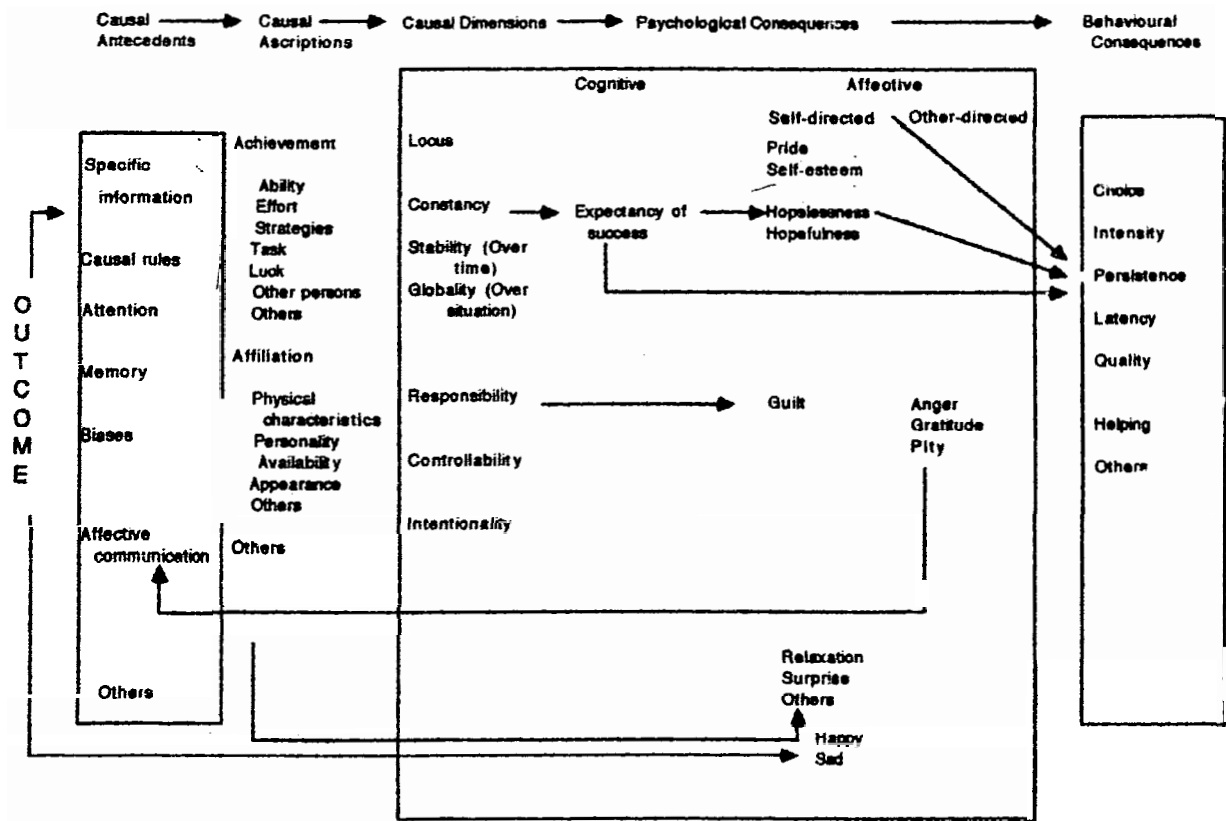
<u>Figure 3.</u>   <u>An Elaborated Version of the Attributional Model</u>
<u>as Proposed by Weiner in 1984</u>.

From <u>Research on Motivation in Education, Vol. 1: Student</u>
<u>Motivation</u> (p. 33) by R. Ames and C. Ames (Eds.), 1984, San
Diego, Academic Press Inc.   Copyright 1984 by Academic
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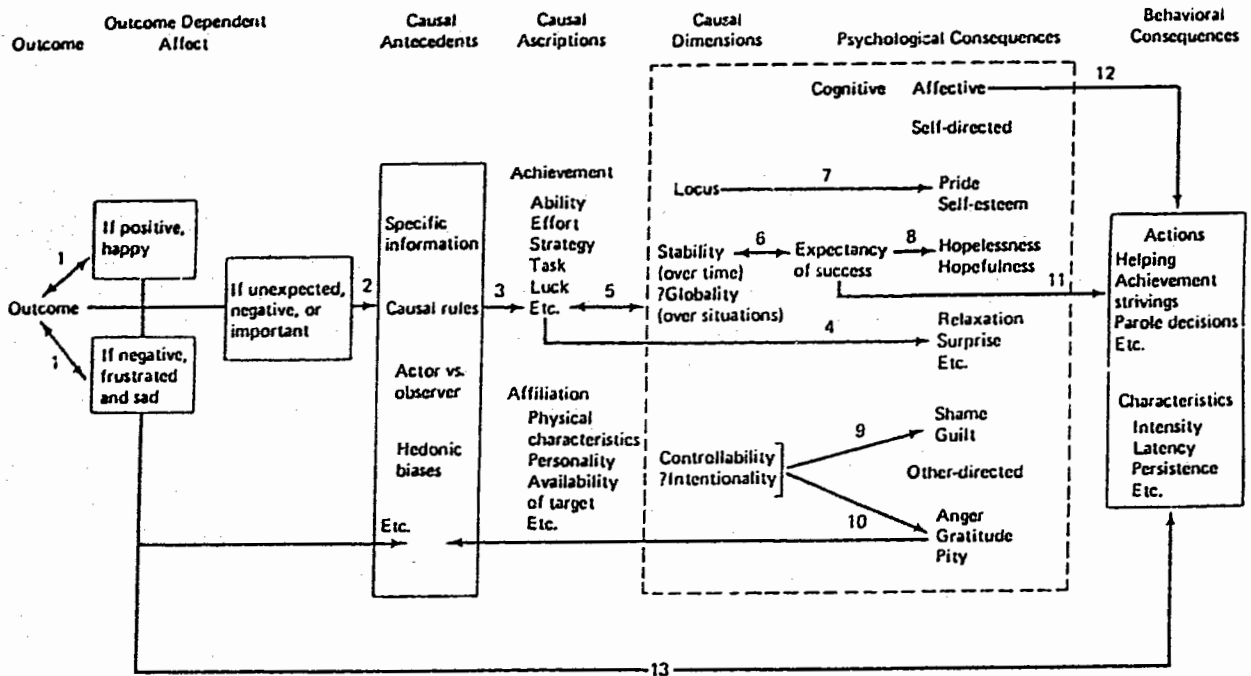
Figure 4.  The Most Recent Version of Weiner's Attribution
Model.

From An Attributional Theory of Motivation and Emotion
(p. 240) by B. Weiner, 1986, New York, Springer-Verlag.
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and behavioural consequences. A discussion of the each of the specific paths for both negative and positive outcomes is now presented.

Causal Pathways Predicted for a Negative Outcome

By far, the most extensively studied set of causal relations within the attributional model has been that for failure outcomes. Relatively few studies have examined the relationship between two or more attributional variables for success outcomes. This situation may be due to the fact that individual self-esteem and expectations about future performance are thought to be jeopardized less under success than under failure conditions. That is, beliefs about the causes of failure, whether internal or external, are more likely to undermine students' motivation to learn than are beliefs about the varying causes of success.

Within the attributional framework for failure outcomes, the most widely investigated and controversial link connects the casual ascriptions of effort and ability to the attribution-dependent affects of guilt and shame. In the initial stages of theory building, Weiner (1972, 1974, 1977) and his colleagues (Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971; Weiner, Heckhausen, Meyer, & Cook, 1972; Weiner & Kukla, 1970; Weiner & Potepan, 1970) predicted that attributions to low effort following failure would give rise to strong feelings of shame, whereas attributions to low ability under the same conditions would lead to strong feelings of guilt. In two separate tests of these assumptions, Covington and Omelich (1979a, 1984d) found that a precisely opposite relationship emerged. That is, causal ascriptions to low effort following failure produced

strong feelings of guilt, whereas attributions to low ability led to strong feelings of shame, as well as humiliation.

In recent years, Weiner has acknowledged the low effort-high guilt and low ability-high shame relationships under failure conditions reported by Covington and Omelich as well as other attributional researchers (e.g., Graham, 1984). This revised perspective has also been influenced by findings in Weiner's own research (Weiner, Graham, & Chandler, 1982). Concerning task difficulty, attributional research dealing with this ascription has demonstrated that failure outcomes which are perceived as being due to external and controllable factors typically result in feelings of anger (Averill, 1982, 1983; Hamilton, 1980; Weiner, Graham, & Chandler, 1982).

The attribution of bad luck appears be the least studied of the four causal ascriptions, and it is not clear whether bad luck has an attribution-dependent affect which is different from some of the other causal ascriptions. In one study, Weiner, Russell, and Lerman (1979) asked college students to rank-order 15 affective reactions to failure across each of the four attributions: anger emerged as the most prevalent emotion for bad luck (i.e., 36 percent).

In light of these findings, the following causal relationships are predicted by Weiner for a failure outcome:

1. Causal ascriptions to low effort (internal/unstable/ controllable) will give rise to strong feelings of guilt, will increase expectancy of success, and bear a positive relationship to behavioural outcome (e.g., test score).

2. Casual ascriptions to low ability (internal/stable/

uncontrollable) will give rise to strong feelings of shame,
will decrease expectancy of success, and bear a negative
relationship to behavioural outcome.

3. Causal ascriptions to task difficulty (external/stable/
uncontrollable) will give rise to strong feelings of anger,
will decrease expectancy of success, and bear a negative
relationship to behavioural outcome.

4. Causal ascriptions to bad luck (external/unstable/
uncontrollable) will also give rise to strong feelings of
anger, will decrease expectancy of success, and bear
a negative relationship to behavioural outcome.

Positive outcome. As indicated, causal relations for success
outcomes are less well documented, most likely due to the fact that
the majority of the causal attributions for such outcomes have
fewer psychologically harmful effects on individuals than do
ascriptions following failure. Moreover, Weiner's treatment of
success outcomes within his attributional framework is problematic
in that it also does not indicate specific emotions for all four
attributions. To illustrate, pride is considered to be an attribution-
dependent emotion which is linked to both high effort and high
ability, even though effort is unstable and controllable whereas
ability is stable and uncontrollable. However, both attributions are
characterized along the internal locus dimension which, according to
Weiner (1986), is sufficient to produce feelings of pride in both
cases following success. Causal ascriptions to task ease and good
luck following success, and their corresponding emotions, are also
poorly documented in the research literature. This owes to the fact

that effort and ability ascriptions tend to be more widely reported in studies investigating success outcomes. In Weiner, Russell, and Lerman's (1979) study, subjects were asked to rank-order 12 affective responses to success across the four attributional outcomes. Results indicated that causal ascriptions to task ease resulted in highest ratings for happiness (46 percent) and gratitude (43 percent), whereas causal ascriptions to good luck yielded the highest rating for surprise (52 percent).

In light of these findings, the following four paths are predicted for success outcomes:

1. Causal ascriptions to high effort (internal/unstable/ controllable) will give rise to strong feelings of pride, will increase expectancy of success, and will bear a positive relationship to behavioural outcome (test score).

2. Causal ascriptions to high ability (internal/stable/ uncontrollable) will give rise to strong feelings of pride, will increase expectancy of success, and will bear a positive relationship to behavioural outcome.

3. Causal ascriptions to task ease (external/stable/ uncontrollable) will give rise to strong feelings of happiness and/or thankfulness, will increase expectancy of success, and will bear a positive relationship to behavioural outcome.

4. Causal ascriptions to good luck (external/unstable/ uncontrollable) will give rise to strong feelings of surprise, will inrease expectancy of success, and will bear a positive relationship to behavioural outcome.

## Unaddressed Issues in Attributional Research

This section highlights two specific areas: problems encountered with previous tests of the attributional model, and the absence of data regarding the instructional milieu and its influence on students' attributional patterns. The role of academic self-concept in an attributional context is also discussed.

One of the major problems besetting research involving Weiner's attributional model is the dearth of empirical evidence in support of the causal relations central to his theory. Weiner (1986) identified only two studies that attempted to test the predicted relations between all four variables, those by Covington and Omelich (1979a, 1984d). Weiner also cited three studies which tested three of the four links in the theory excluding emotions. These were: a study involving black and white children where causal attributions for failure, expectancy of success, perceived competence, and measures of persistence were taken (Graham, 1984); an unpublished German doctoral dissertation dealing with high-school males' causal ascriptions for failure, expectancy of success, and performance speed at a follow-up task (Meyer, 1970); and a study by Bernstein, Stephen, and Davis (1979) involving high-school students' attributions, expectancies, and performance on a series of successive semester exams. In summarizing the empirical evidence to date, Weiner (1986) wrote, "Unfortunately, the achievement literature does not yield unambiguous proof in support of the complete attributional theory, in part because the conception has only recently been fully developed, in part because even recent

investigations have not included all the pertinent variables, and in part because some of the findings have been disconfirmatory" (p. 166). In response to these problems, one of the primary objectives of the present study is to provide an effective test of the model.

A second limitation of attributional research is the lack of attention paid to the importance of the instructional milieu of the classroom and its influence upon students' causal perceptions and attributional patterns. A rich literature attests to the fact that organizational and instructional practices of classrooms can differentially affect students' perceptions of their own and their classmates ability levels (Marshall & Weinstein, 1986; McIver, 1989; Rosenholtz & Wilson, 1980; Rueman, 1989), their academic and social power (Marx, 1985), their academic self-concepts (Simpson, 1981), and their attitudes toward school (Rosenholtz & Simpson, 1984). The bulk of research in this area is based on a classification scheme developed by Rosenholtz and Wilson (1980), who conceptualized classroom composition as existing along a unidimensional-multidimensional continuum. Unidimensional classrooms produce highly salient, stratified perceptions of ability levels among students whereas multidimensional environments produce more diffuse and undifferentiated perceptions.

Although some motivational researchers, such as Ames (1981), have attempted to document the undermining effects of competitive over cooperative classroom organizational structures on students' achievement attributions, the majority of attribution research has neglected to assess the influence of classroom structure upon students' attributional tendencies following either success or

failure. As such, a second aim of this study is to explore some of the relationships between classroom structure and these tendencies. A classification scheme similar to the one developed by Rosenholtz and Wilson (1980) to assess classroom environment will be employed for this purpose.

Finally, although attribution theory has in the last decade moved away from viewing attributions as being influenced by trait-like characteristics such as the need for achievement (nAch), there is some evidence to suggest that academic self-concept does influence individuals' attributional and emotional reactions to success or failure (see Ames, 1978; Ames & Felker, 1979). Moreover, in related areas of research such as intrinsic motivation, perceived competence at tasks is considered to be an important characteristic in determining motivated behaviour among individuals (Harter, 1988; Harter & Connell, 1984). Consequently, a measure of academic self-concept is taken in this study to determine whether it bears any relationship to students' attributional patterns.

<u>Research Questions</u>

The four causal relationships to be investigated for both success and failure outcomes have already been outlined, and are simply stated here in terms of the questions to be examined. Questions regarding the effects of the instructional environment and academic self-concept on students' attributional patterns are also presented.

1. Do the four causal relationships central to Weiner's theory for success and failure outcomes have empirical support?

2. Do classroom organizational and instructional practices influence students' attributional patterns for success and

failure?

3. Does academic self-concept influence students' attributional style?

CHAPTER TWO

REVIEW OF THE LITERATURE

Overview

This chapter reviews of the literature pertinent to certain features of attribution theory, classroom structure, and academic self-concept. With respect to the section on attribution theory, previous attempts to test the entire range of variables in Weiner's model are presented. Concerning classroom structure, a review of research relevant to teachers' organizational and instructional practices is presented. Finally, recent research viewing the role of academic self-concept within the context of an attributional framework is reviewed.

The Attributional Literature

In this section, tests of Weiner's attributional model of achievement motivation are reviewed, as well as studies that have focused solely on the relationship between attributions and emotions. The relationship between attributions and expectancy is discussed briefly. It is not elaborated due to the general acceptance among motivational theorists that the stability dimension accounts for the majority of the variance in attribution-expectancy relationships (Weiner, 1986).

Previous Tests of the Attributional Model

Despite the enormous amount of research that has been conducted on Weiner's particular version of attribution theory over nearly two decades, there are only five existing studies that have attempted to trace the links from attribution to outcome in achievement contexts. In two of these studies, subjects were either elementary or high-

school students; in the other three, subjects were university undergraduates. In contexts outside the achievement domain, there have also been attempts to investigate relationships between attributions, emotions, and expectancies of various behaviours following the outcome of an event. These contexts include helping behaviour in academic and social situations, smoking cessation, and reactions to flight delays. Relevant studies in these non-achievement areas as well as those conducted in achievement areas are reviewed here.

Achievement-related studies. The first documented attempt to examine the links in Weiner's attributional model was undertaken by Meyer (1970). Meyer explored relationships between achievement needs, causal attributions for failure, expectancy of success, and performance speed. However, Meyer did not examine the effects of attributions on emotions. Meyer classified male high-school students according to their achievement needs as either high in achievement motivation or low. Students experienced five failures at a digit-symbol substitution task where the proper digit had to be inserted under its corresponding symbol. Students were directed to work at a series of tasks of increasing complexity until five failures had been experienced. Following each unsuccessful trial, subjects attributed their failure to either low ability, low effort, bad luck, or task difficulty. At the same time, subjects estimated their likelihood of successfully completing the next trial of digit-substitution tasks under the same time constraints. During the next trial, performance intensity was measured as the index of motivation. Regarding the link between achievement needs and

attributions following failure, Meyer found that subjects high in achievement needs ascribed failure to lack of effort more than individuals low in achievement needs, whereas subjects low in achievement needs tended more to ascribe failures to lack of ability. These findings corroborated existing views at the time on the relationship between individual achievement needs and attributional tendencies (e.g., Weiner & Kukla, 1970; Weiner & Potepan, 1970).

Concerning the relationship between attributions and expectancy of success, Meyer found that attributions to stable factors following failure (i.e., ability and task difficulty) lowered expectations of success more than attributions to unstable factors (i.e., effort and luck). Moreover, expectations dropped more dramatically for attributions based on stable factors as failures continued to mount over the six trials. Regarding the link between expectancy of success and performance speed, Meyer reported a correlation of -.43 between attributions to stable factors and performance. This indicates that attributions to ability and task difficulty following failure adversely affect individual performance. Overall, Meyer's study supports Weiner's attributional model and respresents an important first step towards investigating its central variables. However, the pivotal role of emotions were not examined in this investigation and causal modelling procedures were not used to analyze the data due to their lack of sophistication at the time. Moreover, the role of achievement needs, which was viewed as a central determinant of attributional behaviour at the time, has since been disregarded as an important predisposing factor in motivational research.

The first researchers to examine systematically the paths between all attributional variables as prescribed by Weiner (1974, 1977) were Covington and Omelich (1979a). They investigated relationships between five variables: a) individual achievement needs, b) attributions for failure, c) emotional responses, d) expectancy of success, and e) follow-up test performance. In their study, Covington and Omelich had 206 undergraduate university students who felt they had recieved a poor mark on an initial psychology test respond to a set of questions regarding their attributions for the poor mark, amount of shame experienced, and their expected score on the follow-up exam. During pre-enrollment for the course, these researchers also had all students respond to the Mehrabaian Achievement Risk Preference Scale and the debilitating anxiety subscale of the Achievement Anxiety Test in order to obtain measures of achievement motivation. Two days after students had completed their booklets, an equivalent form of the initial test was administered with the number of questions correct serving as the performance measure.

Data were analyzed using path analysis to trace the paths from: a) achievement needs to attributions, b) achievement needs to attributions to affect, c) achievement needs to attributions to expectancy, and d) achievement needs to attributions to affect and expectancy to retest. In each of these analyses, both direct and indirect paths of influence were investigated. Unlike Meyer's study, however, the results challenged some of the propositions of Weiner's attributional model. Specifically, the theoretical claim that individuals high in achievement needs attribute failure to lack of

effort was not upheld. More importantly, the attribution-emotion links between effort and shame and ability and shame were statistically significant, but in a direction opposite to that predicted by Weiner. That is, low effort in the face of failure reduced rather than increased feelings of shame, whereas attributions to low ability following failure elevated expressions of shame. In addition, attributions to low effort following failure reduced rather than increased expectancy for future success significantly. Finally, the only direct path of influence to affect performance significantly was expectancy of future success. Neither shame, need for achievement, nor the four attributional variables exerted any signficant direct effect on follow-up test performance by subjects.

Based on these findings, Covington and Omelich concluded that Weiner's formulation of attribution theory was inaccurate, especially with respect to the central role accorded causal attributions in influencing emotional reactions, future expectancies, and actual performance behaviour. In turn, they proposed an alternative explanation of the findings which centered on students attributing failure to low effort or other excuses in order to avoid shame and protect both public and private images of competency. Covington and Omelich referred to their ego-defensive position as Self-Worth Theory (see also Covington & Beery, 1976; Covington & Omelich 1979b, 1979c).

In another study, Bernstein, Stephan, and Davis (1979) used path analysis to investigate the relationships in a set of attributional variables relating to university undergraduates' successive test

taking experiences over the course of three semester exams. In this study, Bernstein et al. examined the paths between: a) causes for expected score for test one, b) the expected score for test one, c) actual score for test one, and d) attributions for the actual score on test one. The four attributions considered were ability, effort, task difficulty, and luck. The identical four paths were investigated for tests two and three as well. Similar to Meyer's (1970) test, affect was not included in the design of this study.

Results indicated that effort played the most important role in the formation of students' expectancies over a series of trials; whereas, neither ability nor task diffculty was important in the formation of expectancies. Luck, on the other hand, did emerge as a causal factor but primarily for students whose expectancies were disconfirmed rather than confirmed. In addition, attributions made to internally-based causes such as ability and effort were significantly higher under success conditions than externally-based attributions, which were significantly higher in the event of failure. The important role of effort attributions in affecting expectancies and performance in this path anlysis contradicted the path analysis conducted by Covington and Omelich (1979a) who found that effort expenditure significantly lowered rather than raised students' expectancies of future success and related negatively to performance as well. As such, results of tests of Weiner's attributional model up to this point remained inconclusive.

Covington and Omelich's (1979a) path analytic study was criticized by Weiner (1983) on conceptual and methodological grounds. In response to these criticisms, Covington and Omelich

(1984d) conducted a replication of their original study incorporating Weiner's (1983) recommendation to include a wider range of affective variables, a longer test-retest interval, a measure of expectancy change, and a measure of persistence in addition to test scores as a behavioural outcome. Specifically, this follow-up study included the three affective responses of humiliation, shame, and guilt, a test-retest interval of three weeks, an expectancy change measure derived by subtracting an expectancy score for the second exam from that for the first, and a measure of effort centering on degree of preparation for the second test. Unlike the initial 1979 study, a measure of individual achievement needs was not gathered due to its growing deemphasis among cognitive theorists, and the attributions of task difficulty and luck were omitted due to their nonsignificant effect in the original study.

Paths were tested from: a) attributions for failure to emotional reactions, b) attributions for failure to expectancy, c) attributions for failure to outcome measures directly, and d) indirectly via affective and expectancy variables, and e) affect and expectancy to outcome measures directly. Results revealed that both effort and ability attributions were related significantly to all three affective responses. Low effort was related most strongly to guilt, and low ability related most strongly to shame and humiliation respectively. Similar to the first study, low effort exerted a significant negative influence on expectancy variables, a finding once again in contradiction to the relationship specified in Weiner's model. Furthermore, expectancy of success proved to be a more accurate predictor of performance than expectancy change, and test scores

were more highly related to affective measures than measures of persistence. Most importantly, ability and effort attributions were identified as playing only a minor role in affecting performance. The total direct and indirect effects via emotions and expectancy on performance were 8.64 and 6.61 percent respectively. Based on these results, Covington and Omelich (1984) asserted that Weiner's attributional model was flawed with respect to the pivotal role accorded to causal attributions.

The fifth path-analytic attempt to examine the major tenets of Weiner's attributional theory in an achievement setting was undertaken by Graham (1984) who explored the impact of adults' expressions of sympathy and anger on children's achievement-related cognitions and performance following failure. Specifically, Graham had 12 year old black and white children of middle and lower social class attempt to complete four block-design puzzles which were unsolvable. Following each unsuccessful trial, children's causal attributions for failure, judgments of personal competence, and expectancies of success were measured based on either an angry (e.g., "I'm really mad at you") or a sympathetic (e.g., "I feel sorry for you") adult response to the failure. On the final trial, subjects were allowed to work for as long as they wished on the insoluble puzzle which provided a measure of persistence or motivation.

Results across all race and social class groups indicated significant links between communications of adult sympathy and attributions to low ability following failure, as well as between communications of adult anger and attributions to low effort. Results of the path analyses revealed significant negative path

coefficients between ability ascriptions and feelings of personal competence, expectancy of success, and persistence. Coefficients between low effort ascriptions and the three dependent measures were also negative, although none of these were statistically significant. In addition, the path between between perceived competence and persistence was both positive and significant as was the path between expectancy and perceived competence. As such, many of the propositions underlying Weiner's attributional model were upheld, save for the nonsignificant relationships between low effort and expectancy, competence, and peristence. Other confirming but nonsignificant relationships included the positive path from expectancy to persistence, and the path from low ability ascriptions to persistence. Unfortunately, Graham did not include a direct measure of affect in this study, thereby precluding a complete test of Weiner's conception of attribution theory. Nonetheless, these findings offer empirical support which tends to contradict the assertion made by Covington and Omelich (1979a, 1984) that the basic tenets of Weiner's theory are inaccurate.

Nonachievement-related studies. A number of path-analytic studies based on Weiner's conception of attribution theory have been conducted outside the achievement domain which have some bearing on the accuracy of his model. The results of two studies of helping behaviour (Meyer & Mulherin, 1980; Betancourt, 1983), one study of attempts at smoking cessation (Eiser, Van der Pligt, Raw, & Sutton, 1987), and one study concerning reactions to flight delays (Folkes, 1985) are discussed briefly below.

In their study of helping behaviour, Meyer and Mulherin (1980) constructed a series of hypothetical situations where an acquaintance was portrayed as requesting financial assistance for reasons which varied in terms of personal control, stability, and locus of causality. Measures of respondents' affective judgements, expectations of the acquaintance's need for future assistance, and their likelihood of offering such assistance were gathered.

Results of path analyses involving attributional, affective, and expectancy variables revealed a significant positive relationship between controllability of the cause for economic hardship and anger, and a significant negative relationship between controllability and feelings of empathy. Similarly, significant negative relationships emerged for paths between controllability and helping judgements, and anger and helping judgements. On the other hand, a significant positive relationship emerged for the path linking empathy and helping behaviour.

Betancourt (1983) conducted a similar investigation of help-giving, which involved a series of stories each describing why an individual had failed at school and was requesting assistance. Similar to Meyer and Mulherin, reasons for school failure ranged from extremely controllable to extremely uncontrollable. Subjects rated the degree to which they perceived the excuse to be controllable, their emotional reactions, and their likelihood of helping the person in the story.

Path analytic results revealed significant positive relationships between perceived uncontrollability of the cause and expressions of sympathy, and uncontrollability and likelihood of

providing assistance. Results also revealed positive relationships between the empathic perspective of the respondent and perceived uncontrollability of the cause. Moreover, empathy also influenced helping judgements in a positive direction.

Taken together, data from these two studies of helping behaviour provide strong empirical support for a number of the propositions underlying Weiner's attributional model, especially those concerning attribution-affect and affect-outcome relationships.

In a study investigating the attributional tendencies of individuals attempting to quite smoking, Eiser et al. (1987) classified the responses of 20,000 smokers to a questionnaire about difficulties involved in quitting smoking into internal and stable classifications. Subjects were also questioned regarding how confident they felt about their ability to quit smoking, their expectations for quitting, and their intentions to quit sometime during the next year.

Path analytic results revealed that individuals who attributed personal failure as well as failure of others to stable factors had lower expectancies and weaker intentions to quit smoking than indivduals who attributed failure to unstable causes. In addition, expecting to quit bore a positive significant relationship to intention to quit, as well as to actual smoking cessation per se. Internal locus of control also bore a positive but nonsignificant relationship to expectation to quit. Taken together, these data support Weiner's theorizing about the importance of self-

perceptions, the dimensions underlying attributions, and their influence over expectancy.

Another path analytic attempt to test the accuracy of Weiner's attributional model outside of the achievement domain was conducted by Folkes (1985) and involved individuals' reactions to airline delays. Passengers who had been delayed at least 15 minutes from boarding an airplane were asked, among other things, why they thought the plane had been delayed, their feelings of anger, their intention to fly with the airline again, as well as their intentions to register a complaint.

Results of path analyses revealed significant positive relationships between stability of the cause and anger, as well as controllability of the cause and anger. Moreover, paths from anger to intention not to fly with the same airline as well as to intention to complain were positive and significant. Stability and control were also positively related to intention not to fly again with the same airline, although only control bore a significant positive relationship to intention to complain. Similar to the three studies already discussed, these results tend to provide further confirmation of tenets underlying Weiner's attributional theory, particularly those regarding the controllability and stability aspects of attributions for failure and corresponding negative emotions.

Summary. In all, there have been five achievement-related and four nonachievement-related studies that have attempted to test some or all of the basic propositions of Weiner's model of attribution theory. As is evident, there are numerous problems with this body of research which preclude either a wholesale acceptance

or rejection of Weiner's conception of the theory. With the sole exception of Covington and Omelich (1979a, 1984d) all of these studies represent only partial tests of Weiner's theory. In three of the five achievement-related studies, affective reactions to causal attributions were not assessed, a problem that also exists for one of the four nonachievement studies. Moreover, among those studies where affective variables have been included, some assessed affects directed towards others rather than to oneself. In addition to affect, variables such as expectancy were excluded from the design in some studies.

Most importantly, much of the evidence to date regading the accuracy of Weiner's theory is either inconclusive or contradictory. Most illustrative of this problem are the findings of Covington and Omelich (1979a, 1984d), whose data regarding the predicted relationships among attributional variables are at variance with most of the other findings reported by attribution researchers. However, although it might be tempting to regard Covington and Omelich's (1979a, 1984d) findings as representing a minority position, it is important to remember that they were the only researchers who did include the entire range of attributional variables in both studies. In addition, aside from Bernstein et al. (1979), they were the only researchers to employ real-life classroom tasks rather than puzzles or digit-substitution exercises in their research. As such, their findings may be more reflective of subjects' attributional tendencies in achievement settings than the others. The purpose of the present study is to attempt to clarify this issue.

## The Attribution-Affect Relationship

In this section, studies that have investigated the relationship between causal attributions and affective reactions in achievement contexts are reviewed. As is evident from the preceding section, this particular relationship has been documented far less extensively than the attribution-expectancy relationship in motivational research and the findings are more ambiguous. In order to understand more completely the nature of this relationship, approximately a dozen studies examining the attribution-affect linkage are discussed.

The first attempt to explore relationships between causal attributions and emotions elicited by these attributions was undertaken by Weiner and Kukla (1970). In this study, undergraduate psychology students were asked to indicate whether they would experience greater pride for success or shame for failure if the outcome was due to high effort and low ability, or if it was due to high ability and low effort. Subjects were also asked to assume the role of the teacher and to indicate which types of students they would reward and punish as a result of the varying degrees of ability and effort across both success and failure situations. Weiner and Kukla hypothesized that since effort is under volitional control, it would bear a stronger relationship to both success and failure affects than attributions to ability. Moreover, they believed that students would offer greater rewards to high effort-low ability students than to low effort-high ability students under success conditions, and would punish low effort-high ability students more directly than high effort-low ability students following failure.

Results confirmed both of these hypotheses. That is, reports of pride were highest when success at a task was attributed to high effort, whereas feelings of shame were highest when failure was ascribed to low effort. Furthermore, subjects assuming the role of teachers rewarded high effort in the event of success more than low effort, and punished low effort in the face of failure more than high effort. Base on these findings, Weiner and Kukla concluded that effort rather than ability ascriptions were more important determinants of affective responses.

In a test of this position, Nicholls (1975) had children indicate their degree of pleasure following the successful completion of a novel task. Nicholls hypothesized that when tasks are novel rather than routine, attribution-affect linkages should be stronger for ability than for effort since uncertainty will exist about the quality of future performance. Correlational data supported this position, with the strongest correlations emerging for pleasure following success and attributions to ability, followed by attributions to effort and task difficulty respectively. As such, Nicholls findings ran counter to those reported by Weiner and Kukla (1970), indicating that ability rather than effort attributions bear the strongest relationship to emotional responses following success.

In a follow-up study centering once again on the effort versus ability debate, Nicholls (1976) conducted a replication of Weiner and Kukla's (1970) original study and introduced an additional measure of perceived individual preference. In this study, educational psychology undergraduates responded to a series of questions about the conditions under which they would experience greater pride for

success or shame for failure. These conditions were when the outcome was the result of high effort and low ability, or when the outcome was the result of high ability and low effort. These attribution-affect linkages were explored across courses that students considered to be important to their future as well as those considered to be less important. In addition, students were asked to indicate whether they would prefer to be seen as someone who possesses high effort and low ability, or someone with high ability and low effort. Results indicated that feelings of pride following success bore the strongest relationship to high effort-low ability ascriptions, whereas feelings of shame following failure were more strongly associated with low effort-high ability ascriptions. As such, these findings were in complete agreement with the results of Weiner and Kukla's (1970) original study. However, data concerning preferences indicated that students preferred to be seen as possessing high ability and low effort in the event of success despite the strong correlations between pride and high effort-low ability just cited. Furthermore, students still indicated their preferences to be seen as possessing high ability and low effort in the face of failure even though this combination correlated most strongly with feelings of shame.

In a similar study, Sohn (1977) had undergraduate psychology students engage in three separate but related experiments. In the first experiment, students were asked to indicate the degree to which a first-class grade would be attributable to both ability and effort. In the second experiment, students indicated the extent to which feelings of pride and happiness would be elicited under

success conditions following attributions to both effort and ability, and the degree to which shame and unhappiness would be present under failure conditions following attributions to effort and ability. In the third experiment, students rated the extent to which the same affects in experiment two would be experienced under identical conditions if they assumed their ability level to be high for success and low for failure (experiment three).

Results of the first experiment revealed that effort and ability attributions were equally as likely to be primarily responsible for generating positive affects associated with obtaining a first-class grade, thus calling into question Weiner and Kukla's (1970) claim that effort is the stronger determinant of affective responses. Results from the second study also indicated that ability attributions were at least as predictive of feelings of happiness and unhappiness following outcomes as were effort attributions. However, in accordance with Weiner and Kukla's (1970) theorizing about effort-shame and effort-pride linkages, Sohn found that low effort in the face of failure and high effort in the event of success was more predictive of shame and pride affects than was ability. Moreover, results of the third experiment provided the same linkages irrespective of assumed ability level on the part of the subjects. Sohn interpreted his findings as being supportive of Weiner's position on attribution-affect relationships where the "unneutral" affects of pride and shame were concerned, but concluded that both effort and ability were equal in terms of generating "neutral" affects such as happiness and unhappiness.

The findings of Sohn (1977) regarding the equal impact of ability and effort attributions on general or more global affects such as happiness and unhappiness received further suppport from a study conducted by Weiner, Russell, and Lerman (1979). In this study, psychology undergraduates were asked first to recall a critical incident where they had succeeded or failed a test for a particular reason and then to indicate three dominant emotions that were experienced. Six reasons for either passing or failing were provided, namely, ability, stable and unstable effort, personality, others, and luck. Results for the successful test experience revealed that the most widely selected affect across all six attributions was happiness with reported percentages ranging from 38 percent for personality to 48 percent for luck. Results for the unsuccessful testing experience were somewhat less uniform, although affects of anger, depression, and frustration were the most highly ranked across the majority of causal attributions. Based on these data, Weiner et al. labeled these emotions 'outcome dependent-attribution independent' affects since they occurred primarily as a function of outcome regardless of attributions.

Additional results also revealed relationships between causes and feelings which were indeed attribution-dependent. Specifically, attributions to ability following success were associated with feelings of competence and confidence, whereas ability attributions following failure were linked with feelings of incompetence. In addition, attributions to effort under success conditions were associated with feelings of pride, whereas effort attributions following failure were linked with feelings of guilt and fear.

Interestingly, affective reactions of shame which figured so prominently in the findings of Sohn (1977), Nicholls (1976) and Weiner and Kukla (1970) were not even reported by subjects when given a free-choice oppportunity to list their most intense react' *s to failure.

Further evidence of the link between low effort ascriptions and guilt following failure was furnished by Covington and Omelich (1979a) in one of two studies inspired by the results of their path analysis. In the first study, psychology undergraduates were instructed to rate their affective reactions to hypothetical exam failure under conditions of high or low effort and in the presence or absence of ego-protecting excuses. The four possible configurations were: a) failure due to little effort, b) failure despite high effort, c) failure due to low effort brought on by illness, and d) failure due to high effort but expended studying the wrong material. The affective reactions investigated were dissatisfaction and shame, and were manipulated so as to examine the effects of private versus public knowledge of the failure outcome on these two emotions. Students were then asked to assume the role of the teacher and to indicate the degree to which they would punish students under the same failure conditions. Finally, students were asked to rank-order their preferences for failing the exam across the four configurations provided from most prefered to least preferred.

Results indicated that students felt the least personally dissatisfied when failure was attributed to low effort alone and experienced the greatest dissatisfaction under high effort attributions in the absence of an excuse. Similarly, the least

amount of public shame was experienced when failure was attributed to low effort alone, whereas the greatest amount of shame resulted when failure was viewed as the result of high effort and no excuse. In the role of the teacher, subjects indicated that they would administer the greatest amount of punishment to students who failed because of low effort alone, and would be the least punitive towards students who had failed despite high effort and no excuse. Ironically, the very type of students subjects indicated they would be inclined to punish most following failure also turned out to be the most personally preferred type of student under failure conditions. That is, subjects indicated a preference to be seen as failing due to low effort alone above all other options. Moreover, failure accompanied by high effort alone ranked as their least preferred alternative. Results of this study tended to support Covington and Omelich's theorizing about the value of low effort ascriptions and excuses in protecting students' images of competence and hence, self-worth. However, their findings regarding the low effort-high shame/dissatisfaction linkage were at variance with the findings of Sohn (1977), Nicholls (1976), and Weiner and Kukla (1970) but more similar to those of Weiner et al. (1979) who used a free-choice method for generating student affects.

In their second study, Covington and Omelich (1979c) used the identical format as the first study except that reactions to a successful hypothetical test outcome were explored. In this study, students indicated how personally satisfied they would feel if they passed an exam if they: a) studied little (low effort), b) studied a lot

(high effort), c) studied little due to illness (low effort, excuse), and d) studied a lot but the test stressed other things (high effort, excuse). Students also indicated how proud they would feel if their classmates were aware of their success under each of the four conditions. Results indicated that feelings of satisfaction were stronger than feelings of pride, and that effort-pride/satisfaction linkages were also stronger than correlations between ability and these affects. Similar to the failure study, however, students preferred to be seen as primarily competent rather than effortful when asked to declare their preferences for explaining success. The attribution-affect results of this success study were also in accord with those reported by Weiner et al. (1979) who found that, after happiness, pride ranked as the second most popular affect across effort and ability attributions.

Although not directly concerned with the effort-ability debate, Weiner, Graham, and Chandler (1982) conducted a study dealing with attributional antecedents of anger, pity, and guilt which have some bearing on the present review. In this study, university undergraduates were instructed to recall times when they had personally experienced feelings of anger, pity, and guilt and then write two separate stories about each emotion. Following this, students rated the perceived cause of each emotional situation according to the dimensions of locus, controllability, and stability. Results indicated that feelings of pity were associated with uncontrollable, stable causes which were either internal or external to the subject of the stories. On the other hand, guilt was associated with internal, controllable causes, and anger was linked

with external, controllable causes. The results of the investigation concerning feelings of guilt and their dimensional underpinnings tended to support the low effort-high guilt linkage reported by Covington and Omelich in their 1984 path analytic study and hinted at in their 1979 hypothetical failure study. That is, effort as both an internal and controllable attribution, gives rise to feelings of guilt, not shame.

Given the growing uncertainty concerning the relationship between ability and effort attributions on the one hand, and guilt and shame reactions on the other, Brown and Weiner (1984) conducted a series of brief experiments aimed at specifying more precisely these attribution-affect relationships. In all, six experiments were conducted, however only the second experiment is discussed at this point, while the fifth is discussed at the end of this section. These two experiments dealt most directly with the attributional antecedents of shame. In the first of these two experiments, undergraduate psychology students rated the affects of shame and unhappiness in response to eight hypothetical exam failures which varied according to attribution (i.e., either high ability-low effort or low ability-high effort) and importance of the exam (high or low). Results revealed that students' mean affective ratings for shame following failure were higher under conditions of high effort-low ability than they were under high ability-low effort conditions whether the course was considered important or unimportant. These findings supported the low effort-high shame linkages reported originally by Weiner and Kukla (1970) and others, although no significance tests were undertaken to determine whether

differences between the two attributional styles were statistically reliable.

In a study based on the methodology of Weiner et al. (1982), Graham, Doubleday, and Guarino (1984) investigated the relationship between perceptions of control of negative outcomes and feelings of pity, anger, and guilt among children ranging in age from 6 to 11 years. Similar to the first study, children were asked to recall a time when they had personally experienced each of these three feelings and to indicate whether the cause of these feelings was controllable or uncontrollable. Following this, children rated the degree of controllability of the outcome from 1 ("couldn't stop it") to 9 ("made it happen"). Results revealed that children perceived the cause of anger as controllable and pity as uncontrollable with respect to the targets of the emotions. In addition, affective reactions of guilt were perceived as highly controllable, although this perception was only significant for 9 to 11 year-olds. For children in the 6 to 7 year old grouping, there were no sigificant distinctions between guilt as a controllable or uncontrollable emotion thus indicating a developmental trend in the perceived controllability-guilt linkage. These results served to reinforce Covington and Omelich's (1979b) findings that guilt affects were dependent on controllable causes such as effort expenditure rather than uncontrollable ones such as ability.

Another study which added support to the low effort-high guilt relationship following failure was undertaken by Jagacinski and Nicholls (1984) who had psychology undergraduates engage in a series of five experiments where the affects of competence and

pride following success, and embarrassment and guilt following failure were examined across ego versus task-involving scenarios. Jagacinski and Nicholls describe ego-involvement as a preoccupation with one's own performance and competence at a given task, whereas task-involvement is characterized by a preoccupation with features of the task per se. Reasons for high or low effort expenditure across scenarios were also provided and included excuses such as lack of interest, doodling during period, and external circumstances (e.g., hospitalization, surprise phone-call from old friend, etc.). Results concerning the effort-guilt relationships following failure across both task and ego-involving scenarios revealed stronger feelings of guilt associated with low effort under task-involving than under ego-involving situations, although in both cases low effort produced stronger feelings of guilt than did high effort. Moreover, high effort-pride relationships under task involving conditions for success were significantly stronger than low effort-pride relationships, whereas low effort-pride and low effort-competence relationships under ego-involving conditions were significantly stronger than high effort-pride and high effort-competence relationships under the same conditions. These results served to corroborate Covington and Omelich's (1979b) position concerning the correctness of low effort-high guilt relationship as well as providing support for their claim regarding the utility of excuses in protecting an image of competence in achievement contexts.

An investigation concerning the relationships between causes for social rejection and a broken social engagement and the affective

reactions of anger and pity was undertaken by Weiner and Handel (1985) with a group of children ranging in age from 5 to 12 years. In the first experiement, children were first read scenarios where one child rejects the request of another same-sex child and then were asked to pretend they were the person rejecting the offer. Children were given eight reasons for rejecting the offer, four of which were internal to the requestor (e.g., "your classmate is not good at games") and four were external (e.g., "you are sick with a bad cold"). Following this, children were instructed to indicate the likelihood of revealing the true reason for rejecting the request and the degree to which the other person's feelings would be hurt. Results indicated that children's perceptions of others' hurt feelings would be higher as a result of internal as opposed to external causes. However, children indicated that they would be more inclined to honestly reveal external rather than internal reasons for rejecting the offer.

In the second experiment, the same children were read eight scenarios describing a broken social appointment which included four controllable causes (e.g., "you decided to play with another friend after school") and four uncontrollable causes (e.g., "you became sick that day and had to rest in bed"). Following each scenario, children were instructed to indicate the likelihood of revealing the true reason for not keeping the appointment and the degree to which the other person would experience anger. Results revealed that children perceived more anger to be forthcoming following controllable rather than uncontrollable causes. Moreover, they indicated that they would be more inclined to reveal uncontrollable reasons if true than controllable ones. Results of

these two experiments further point out the importance of the controllability dimension in determining the types of affects that follow a negative outcome, be it academic failure or social rejection. Although not examined in this study, guilt bears a strong resemblance to the anger variable in that both responses have been demonstrated to follow from causes that are considered to be within an individual's control.

In the second of the two experiments conducted by Brown and Weiner (1984), an attempt was made to determine whether Covington and Omelich's (1979b) conceptualization of the shame variable within the context of public versus private knowledge of performance outcomes was responsible for the conflicting attribution-affect findings. Brown and Weiner hypothesized that public shame would be perceived by students as more synonymous with feelings of embarrassment and humiliation than would shame per se, which would be more reflective of conscience-related feelings such as guilt and remorse. To investigate this question, undergraduate psychology students were assigned to either a public shame, private shame, or undifferentiated shame condition and were instructed to indicate how similar 10 specific emotions were to the emotion of the condition to which they were assigned. The 10 emotions were grouped within the four categories in the following manner: a) guilt (guilt, regret, remorse), b) humiliation (disgrace, embarrassment, humiliation), c) competence (inadequacy, incompetence), and d) outcome (displeasure, unhappiness). Following these ratings, subjects were also asked to indicate the extent to

which they would experience the 10 emotions if they failed because of lack of ability or lack of effort.

Results concerning the similarity ratings indicated that mean correlations between the public, private, and undifferentiated shame on the one hand, and guilt-linked and humilation-linked emotions on the other were significant. Moreover, the mean correlation between the guilt and humiliation cluster was zero. As such, guilt and humiliation were considered distinct emotional reactions in achievement contexts. Regarding the similarity between the four emotional clusters for each of the three shame conditions, humiliation was found to be most similar to public shame whereas guilt was most closely associated with private shame. Post hoc tests between public shame and shame conditions yielded significant differences across feelings of humiliation but not across feelings of guilt. Finally, mean ratings across the humilation cluster were greatest when lack of ability was identified as the cause of failure, whereas ratings across the guilt cluster were strongest when failure was attributed to lack of effort. Results of this study were important, since they suggested that the affect of shame was a general one which consisted of both publically-linked (i.e., humiliation) and privately-linked (i.e., guilt) affects. Moreover, public shame appeared to be a more ability-based emotion whereas private shame was more effort-based.

The final study to be reviewed in this section was conducted by Covington and Omelich (1985) and represents an attempt to confirm the public-shame and private shame distinction following failure uncovered by Brown and Weiner (1984). In this study, psychology

undergraduates read a series of either three success or failure scenarios which varied according to ability (i.e., high, low) and degree of certainty regarding ability status (i.e., certain, uncertain). The certainty of ability variable was introduced to determine whether a failure-adopting or failure-avoiding mode for coping had any affect on the attribution-affect relationships. All students also read a fourth scenario in which only a failure outcome was described. After reading this scenario, students indicated the degree to which they saw themselves as lacking the ability to have passed the fourth test, as well as the extent to which they would experience feelings of humilation, shame, and guilt as a result of this failure.

Results revealed strongest relationships between low effort and guilt and low ability and humiliation, regardless of degree of certainty. Percentages of the proportions of explained variance for these two linkages were 91.6 and 86.2 respectively, although the proportion of variance explained for the low ability-shame linkage was also high at 79.5. The low effort-shame relationship accounted for only 10.1 percent of the explained variance across effort-affect linkages. When degree of certainty is considered, only the low ability-humiliation linkage emerged as significantly stronger for students who were uncertain about their low ability status than for students who were certain. As such, these findings were in accord with those of Brown and Weiner (1984) who found that shame was indeed a more global and undifferentiated emotion which could be partitioned into public, ability-linked (i.e., humiliation) and private, effort-linked (i.e.. guilt) affects. This explanation was accepted by

Covington and Omelich and embraced as a means for making sense of their present findings, as well as for resolving the contradictory attribution-affect findings that had characterized over a decade of attributional research.

Summary. The majority of the reseach concerning the attribution-affect relationship in achievement settings has, to date, focused on identifying more accurately the causal antecedents of shame and guilt. Of the 14 studies reviewed in this section, six were supportive of the low effort-shame linkage following failure whereas eight were supportive of the low effort-guilt association. Studies by Brown and Weiner (1984) and Covington and Omelich (1985) provided some resolution to this debate by demonstrating that guilt and humiliation were component reactions of a larger shame variable. A second issue which occupied much of the early research had to do with whether effort or ability attributions were most responsible for maximizing affective responses to success and failure. The research of Weiner and Kukla (1970) suggested that effort was a more potent agent than ability in influencing emotional responses, whereas researchers such as Nicholls (1975, 1976) and Sohn (1977) suggested just the opposite. The study conducted by Weiner et al. (1979) provided some resolution to this debate by illustrating that ability and effort were equally as effective in influencing neutral affects such as happiness, whereas unneutral affects such as guilt and shame had more specific causal antecedents.

## Research on Classroom Structure

In this section, studies focusing on the effective measurement of classroom structure are reviewed. A series of studies conducted by Rosenholtz and her colleagues (e.g., Rosenholtz & Simpson, 1984) dealing with Ability Formation Theory are reviewed, as well as a number of studies incorporating a more refined measure of classroom structure as conceptualized originally by Rosenholtz.

### Classroom Structure and Ability Formation Theory

Rosenholtz and Rosenholtz's (1981) Ability Formation Theory states that teachers' organizational and instructional practices influence students' perceptions of their own and their classmates' ability. Influenced by Bossert's (1979) research on tasks and social relationships in instructional settings, Rosenholtz and Rosenholtz conceptualized classroom structure as existing along a undimensional-multidimensional continuum of instructional practices where unidimensionality was characterized by: a) undifferentiated task structures, b) large group instructional formats, c) minimal student autonomy, and c) norm-referenced, comparative student evaluations. Multidimensional classrooms, on the other hand, were characterized by: a) highly differentiated task structures, b) indivdualized or small-group instruction, c) high levels of student decision-making, and d) individualized, personal evaluations. In a series of studies aimed at testing the assumptions of Ability Formation Theory, Rosenholtz and her colleagues investigated the impact of dimensionality characteristics of classrooms upon students' perceptions of various aspects of classroom life, such as ability level, social power, and

academic self-concept. Although the results of these investigations have tended to provide support for the theory, methodological problems with instrumentation and a sole reliance on teacher reports of classroom structure have prevented this line of research from demonstrating an unequivocal relationship between dimensionality characteristics and students' perceptions of features of classroom life. A sample of these studies is reviewed below.

In the first study to examine the effects of classroom structure on students' shared perceptions of ability, Rosenholtz and Wilson (1980) investigated the effects of teachers' instructional practices on students' perceptions of their own and their classmates' ability in 15 fifth and sixth-grade classrooms. At this time, Rosenholtz and Wilson used the term 'high resolution' to describe instructional practices across the four areas of task differentiation, grouping procedures, student autonomy, and evaluation that provided visible evidence of individual ability, whereas they used the label 'low resolution' to describe classroom practices that obscured these comparisons across the same four areas. Using an interview-questionnaire procedure with the teachers only, Rosenholtz and Wilson divided the 15 classrooms into eight high and seven low resolution environments. Students then ranked their own as well as their classmates' reading ability while teachers also provided ratings of their students' ability levels in reading.

Results revealed higher degrees of agreement regarding individual reading ability among classmates in high versus low resolution classrooms. Moreover, students' self-ratings were more consistent with classmates' and teachers' ratings in high as opposed to low

resolution classrooms. Finally, associations between teachers' and classmates' ratings of reading ability were stronger in high as compared to low resolution environments. As such, these results demonstrated that different organizational and instructional practices did influence students' perceptions of their own and their classmates' ability levels.

In a series of subsequent papers based on the same data set produced by Rosenholtz and Wilson, Rosenholtz and her colleagues provided further support for the differential effects of organizational and instructional practices on students' perceptions of various features of classroom life. In all of these studies, the terms 'high resloution' and 'low resolution' were replaced with the labels 'unidimensional' and multidimensional' respectively to describe these different types of instructional environments. In the first of these subsequent reports, Rosenholtz and Rosenholtz (1981) hypothesized that students' perceptions of their own reading ability would be more stratified across 'below average', 'average', and 'above average' categories in unidimensional versus multidimensional classrooms. Results confirmed this hypothesis and further indicated that, in addition to individual students' perceptions, teachers' and classmates' perceptions of individual ability level were more highly stratified in unidimensional than in multidimensional classrooms.

In two additional studies based on the same data set, Rosenholtz (1982) and Rosenholtz and Simpson (1984) examined the effects of teachers' instructional practices on students' perceptions of social power and academic self-concept respectively. Concerning social

power, Rosenholtz found that correlations between perceived ability in reading and attributed social power were stronger in unidimensional than in multidimensional instructional environments. Moreover, she found that perceptions of social power were more stratified in unidimensional than in multidimensional environments, although these differences were not significant for boys. An investigation of academic self-concept as reported by Rosenholtz and Simpson indicated that greater stratification of students' self-concepts also occurred in unidimensional than in multidimensional environments. Taken as a whole, this series of studies tended to provide empirical support of the undermining effects of unidimensional organizational and instructional practices on students' perceptions of their academic, personal, and social functioning in the classroom milieu.

In a separate study based on a sample of 16 third grade classrooms, Simpson (1981) investigated Rosenholtz and Rosenholtz's (1981) ability formation argument that unidimensional classroom environments produce greater dispersion and stronger concensus of perceived ability levels on the part of students than do multidimensional environments. Using the same interview-questionnaire developed by Rosenholtz and Wilson (1980), Simpson questioned teachers about their organizational and instructional practices within the three areas of reading, arithmetic, and social studies. Students and teachers were also instructed to rank the students in their class according to ability level. Results were in agreement with those of Rosenholtz and Rosenholtz (1981). That is, students' perceptions of their own and their classmates' ability

levels were more stratified in unidimensional than in multidimensional environments. Moreover, there was greater consensus regarding students' ability level among classmates and teachers in classrooms considered to be unidimensional than in those identified as multidimensional.

In a study involving the relationship between academic ability and social power, Marx (1985) investigated the link between social and academic status and listeners' reports of peer speech in 8 five to seventh grade Canadian classrooms. It was hypothesized that characteristics of academic status in unidimensional classrooms would influence more strongly reports of peer speech than in multidimensional classrooms. The interview-questionnaire developed by Rosenholtz and Wilson (1980) was used to gather classroom structural data, while perceptions of social status were gathered through a six-item measure dealing with friendship, physical attraction, and social power. Perceptions of academic status were gathered using a similar measure focusing on oral reading fluency, reading comprehension, and spelling ability. Results revealed that only one social status variable was directly related to reports of speech in seven of the eight classrooms. Moreover, there were no significant differences between uni- and multidimensional classrooms concerning the relationship between academic status and reports of peer speech.

In a study involving Canadian high school students enrolled in an alternate program for behaviour problems, Woudzia (1989) examined the relationship between teachers' organizational and instructional practices and students' perceptions of their classroom climates.

Teachers from seven alternate school programs were instructed to complete a modified version of the interview-questionnaire developed by Rosenholtz and Wilson (1980) while students completed the Learning Environment Inventory (Fraser, Anderson, & Walberg, 1982) which measured students' perceptions across 16 climate domains such as cohesiveness, formality, and goal direction. Results were somewhat different than previous studies focusing primarily on ability perceptions in that multidimensional environments were associated with negative climate perceptions such as disorganization, uncohesiveness, and lacking goal direction. However, these environments were also perceived as democratic, informal, comfortably paced, and noncompetitive.

Summary. The majority of the studies reviewed here provide support for the ability formation position regarding the undermining effects of unidimensional classrooms relative to multidimensional classrooms. Moreover, these studies demonstrate the ability of the instrument designed by Rosenholtz and Wilson (1980) to discriminate among various dimensionality characteristics of classrooms. Despite these findings, two assessment problems are common to all these studies. First, only teacher reports of classroom structure across the four instructional areas are gathered. No student reports of teachers' organizational and instructional practices were collected. As such, measures of dimensionality within classrooms are based on information provided by a single individual who may be biased toward socially desireable responses. Second, little information regarding validity and reliability are available for this instrument. The only statistical

information reported by Rosenholtz and Wilson (1980) concerns internal consistency where individual item-to-index correlations ranging from .68 to .77 are reported. While Rosenholtz and her colleagues do not address the issue of poor validity and reliability of the instrument, other researchers have acknowledged this weakness as problematic with respect to the results reported in their studies (e.g., Marx, 1985; Woudzia, 1989). In particular, these authors have cited the absence of factor analytic data to support the existence of the four dimesionality constructs central to Ability Formation Theory as particularly troubling.

Classroom Structure: Measurement Improvements

Due to the interest generated by Ability Formation Theory, a number of researchers sought to design a more psychometrically sophisticated instrument than the interview-questionnaire which measured classroom dimensionality across the same four instructional areas. For example, Marshall and Weinstein (1986) designed an instrument to assess classroom structure which incorporated the four areas of differentiation of task structures, grouping, student autonomy, and evaluation plus the two additional areas of motivational strategies and student-teacher relationships. However, this instrument consisted of observers' reports and teachers' narratives rather than any direct measure of students' perceptions of classroom structure. In addition, the psychometric properties of this instrument were weak according to its authors.

A more notable effort to improve the methods for measuring classroom structure from an ability formation perspective was

undertaken by Eccles and her colleagues as part of their Transitions at Early Adolescence Project (e.g., Eccles & Midgley, 1989; Feldlaufer, Midgley, & Eccles, 1988; McIver, 1988; Midgley, Feldlaufer, & Eccles, 1988; Midgley, Feldlaufer, & Eccles, 1989; Reuman, 1989). These researchers developed student, teacher, and observer measures to investigate classroom structural changes during their two-year study of students moving from middle to high school. Studies reporting uses of the student and teacher forms of the instrument are reviewed here.

In a portion of the longitudinal project reported by Feldlaufer, Midgely, and Eccles (1988), a detailed description of the development of the three forms of the classroom structure instrument is presented. In this study, teachers and students completed their respective classroom structure instruments before and after students' transition from a sixth-grade elementary school to a seventh-grade junior high school. Fifteen observers also completed the observational form prior to the transition while eight observers completed the same form following the transition to junior high school. In addition to data concerning perceptual differences on the part of students, teachers, and observers as a result of the transition, internal consistency reliabilities for each of the instruments' subscales were reported. These data are discussed in Chapter 3 along with a description of each of the subscales and are not, therefore, discussed further here.

Results concerning pre-to-post transitional perceptions across the three measures indicated that students were given fewer opportunities for decision-making, peer interaction, and cooperation

following the transition to high school. Moreover, highly undifferentiated task structures and the use of social comparison among students increased, whereas the quality of student-teacher relationships decreased following the move from elementary to high school. However, perceptions of student competition indicated higher levels in elementary than in secondary classroom environments, contrary to the researchers' expectations. While the results of this study were important in highlighting the relationship between students' perceptions and classroom structural differences among elementary and secondary classroooms, they also demonstrated the usefulness of a new, psychometrically sound instrument for assessing classroom structure.

In a similar study based on data from the longitudinal study, MacIver (1988) investigated the relationship between differentiation of task structure, grading practices, and grouping patterns and the stratification of students' self-perceptions of math ability. In this study, differentiation of task structure and grading practices were gathered through use of the teacher instrument exclusively. Ability grouping of students was also measured through teacher reports. Students responded to a three-item academic self-concept measure plus and additional item dealing with their math ability. Results provided support for the ability formation position regarding higher stratification of students' ability perceptions in undimensional versus multidimensional classrooms. However, McIver's findings also served to extend the propositions of the theory by illustrating that dispersion of students' grades rather than the frequency and salience of grading practices is more predictive of

stratification of upper elementary students' ability self-evaluations. Moreover, stratification of students' self-evaluations were more strongly related to teachers' reports of dispersion of talent, irrespective of classroom dimensionality. That is, students' perceptions of ability were more stratified in multidimensional than in unidimensional classrooms when teachers' reports of student talent were more widely than narrowly dispersed.

In a study conducted by Midgley, Feldlaufer, and Eccles (1989), student-teacher relationships and attitudes toward mathematics were assessed before and after the transition from elementary to junior high school. Once again, data for this study, based primarily on students' responses to items within the Teacher Support subscale of the student instrument, were taken from a subset of responses from the two-year longitudinal study. Eccles and her colleagues included this subscale along with the classroom organizational subscales in an effort to assess a dimension of the classroom environment more frequently measured by social climate instruments such as the <u>Classroom Environment Scale</u> (Moos, 1974) and the <u>Learning Environment Inventory</u> (Fraser, Anderson, & Walberg, 1981). Students also completed two separate measures which assessed their perceptions of the intrinsic value of mathematics and the importance and usefulness of mathematics. Results revealed that when students moved from elementary teachers perceived as being low in support to junior high school teachers perceived as being high in support, the intrinsic value of mathematics increased, whereas students who moved from teachers perceived as being high in support to teachers perceived as being

low in support reported descreases in the intrinsic value, perceived usefulness, and importance of mathematics.

In a study based on data from one of the 12 districts that participated in the transitions project, Reuman (1989) examined how students' social comparisons influenced the relationship between teachers' ability-grouping practices and students' achievement expectancies in mathematics. This study focused on the perceptions of sixth-grade students only and did not examine the effects of the transition upon students' perceptions. In this study, the same math self-concept measure as used by MacIver (1988) was used as one component of the assessment of students' achievement expectancies. The frequency and importance of students' comparisons with their classmates in mathematics was also assessed through a five-item measure. Reports of ability grouping practices both within and between classes were provided through teachers' reports. Results revealed that within-classroom ability grouping increased the tendency of students in high-ability groups to select a counterpart who was worse at math, whereas it increased the tendency of students in low-ability groups to select a counterpart who was better at math. No significant effects emerged for between-classroom social comparisons among students. With respect to achievement expectancies, within-classroom ability grouping lowered the expectancies of low achevers and raised the expetancies of high achievers. Again, there were no significant effects with respect to achievement expectancies for between-classroom grouping practices.

Summary. A more psychometrically sophisticated instrument designed to measure features of classroom structure as conceptualized originally by Rosenholtz and Wilson (1980) was developed as part of the assessment component of the large scale Transitions at Early Adolescence Project (e.g., Feldlaufer, Midgley, & Eccles, 1988). Studies reported in this section of the chapter demonstrate the ability of the three forms of the instrument to measure students' perceptions of classroom structural changes before and after the transition from elementary to junior high school (Feldlaufer, Midgley, & Eccles, 1988). In addition, studies were reviewed that indicated the ability of various aspects of the student and teacher form to measure relationships between classroom structure and self-perceptions of math ability (MacIver, 1988), student-teacher relationships and attitudes toward mathematics (Midgley, Feldlaufer, & Eccles, 1989), and social comparison practices among students (Reuman, 1989).

## Academic Self-Concept and Attribution Theory

Since the influence of academic self-concept upon students' attributional tendencies is investigated in the present study, a brief review of the literature in this area is presented. Although numerous studies concerning academic self-concept exist, only a subset of studies focusing on self-concept within an attributional context are reviewed.

In a study examining the influence of self-concept on children's achievement attributions and reinforcing behaviours, Ames (1978) had 112 fifth-grade children identified as either high or low in self-concept work in pairs at a picture-tracing task with one member

succeeding and the other failing to complete the task correctly. Pairs were also assigned to either a competitive or noncompetitive reward structure where either both participants were allowed to select a reward (i.e., noncompetitive) or only the student with the higher number of correct completions received a reward (i.e., competitive). Self-concept was measured using a 15-item short form version of the Piers-Harris Self-Concept Scale.

Results indicated that high self-concept children made stronger attributions to ability following success than did low self-concept children. Moreover, feelings of positive affect following success were stronger for high than for low self-concept children. With respect to reward structure, high self-concept students in the competitive reward condition made significantly higher attributions to ability than did either high or low self-concept students in the noncompetitive condition, although level of positive affect were not significantly different among high self-concept children in either of the two reward conditions. Concerning failure, high self-concept students in both conditions experienced lower perceptions of their own ability than did low self-concept students, although low self-concept students also experienced low perceptions of their own ability following failure. However, low self-concept students experienced lower ability perceptions in noncompetitive than in competitive conditions following failure. Overall, the results of this study provided empirical support for the differential effects of high and low self-concept on students' attributional patterns following success and failure.

In a similar study, Ames and Felker (1979) investigated the effects of self-concept on children's attributional and affective self-reinforcing responses to success and failure at the same picture-tracing task employed by Ames (1978). Self-concept in this study was also measured by a 15 item version of the Piers-Harris Self-Concept Scale. Students' attributions were measured using a two coloured pie-graph device which indicated the ratio of skill to luck attributions following either a success or failure outcome. Affective responses were measured by presenting a series of self-congratulatory and self-punitive statements and asking students to indicate their agreement or disagreement with each.

Results indicated that high self-concept students attributed successful outcomes to personal skill level whereas low self-concept students made greater attributions to luck than to skill following success. Furthermore, high self-concept children felt they deserved more reward for their success than did low self-concept children, although there were no differences among the two groups with respect to frequency of self-congratulatory statements. Contrary to expectations concerning failure, there were no differences among high and low self-concept children in their causal attributions as both groups tended to use lack of skill to explain this outcome. Moreover, there were no significant differences among the two groups with respect to deserved reward, although low self-concept children did select a significantly greater number of self-punitive statements than did high self-concept children. Once again, the results of this study suggested that self-concept did have an

influence over students' attributional tendencies, although these tendencies were stronger for success than for failure outcomes.

In their study involving the attribution-affect relationships with shame and humiliation variables, Covington and Omelich (1985) had psychology undergraduates respond to a brief form of the Michigan State Self-Concept of Ability Scale to determine whether students' actual self-perceptions were at variance with the conditions described in a series of success and failure vignettes. Students were assigned to one of four vignette conditions which varied across level of perceived ability (high versus low) and degree of certainty of perceived ability (certain versus uncertain). Dependent measures involved perceptions of ability level following an additional hypothetical exam failure and degree of guilt, shame, and humiliation experienced as a result of this outcome. A preliminary analysis involving the two levels of ability, certainty, and self-concept (high versus low) across all dependent measures was undertaken to determine whether self-concept affected students' attributional patterns following failure.

Results indicated that differences in students' self-concepts interacted with experimental manipulations in two cases. First, low self-concept students rated failure under high ability conditions as greater evidence of incompetence than did high self-concept students. Secondly, low self-concept students experenced a greater degree of humiliation under high-effort conditions than did high self-concept students following failure. Thus, low self-concept students were less able to perceive themselves as highly competent and failing despite high effort than were high self-concept students.

However, the researchers reported that the magnitude of these differences were not strong enough to warrant separate analyses and as a result, they combined the two self-concept groups for the major analysis undertaken in this study. Unlike the findings of Ames and her colleagues, results of this preliminary investigation suggested that while self-concept may influence students' attributional tendencies following failure, these effects may not be significant.

## Conclusion

To conclude, this chapter presented a review of the reserach literature in three distinct areas: attribution theory, classroom structure, and academic self-concept. In the first section on attribution theory, 23 studies were reviewed which focused on path analytic attempts to test Weiner's model in achievement and nonachievement settings, as well as patterns of relationships among attributional and affective variables. Major problems cited in this body of literature were: a) partial and incomplete tests of the entire attributional model, and b) contradictory findings among researchers with respect to relationships between effort and ability attributions on the one hand, and affective reactions of guilt and shame on the other.

A body of research was also reviewed in the area of classroom structure, which discussed Ability Formation Theory as well as the development of various procedures for measuring the instructional and organizational features of classrooms. The major issue discussed in this section was the poor psychometric properties of the early attempts to measure classroom structure and the

development of more sophisticated procedures for assessing instructional and organizational features of classrooms. Finally, a subset of three studies focusing exclusively on the importance of self-concept within an attributional framework were presented. In particular, the effects of differences in self-concept on students' attributions and affective responses to success and failure were examined.

## CHAPTER THREE

## METHODS AND PROCEDURES

### Overview

This chapter begins with a description of the participants involved in the study, followed by a discussion of the measures used to gather the data. Following this, a description of the procedures used during the organizational, data-gathering, and follow-up stages of the study is presented.

### Description of the Sample

In this section, the rationale for selecting elementary school-age children to serve as subjects is first presented, followed by a description of the students who took part in the study.

### Rationale for Selecting Elementary School Children

In the majority of attributional research published over the last two decades, elementary school-age children have been vastly underrepresented as subjects in studies focusing on achievement strivings. Although there are some exceptions (e.g., Graham, 1984), the majority of this research has focused on undergraduate university students as subjects (e.g., Weiner, 1979; Weiner & Potepan, 1970; Weiner, Russell, & Lerman, 1978, 1979) and, to a much lesser extent, high school students (e.g., Bernstein, Stephan, & Davis, 1979). However, there is sufficient empirical evidence in current developmental research on attributions and emotions to suggest that the omission of at least upper elementary school-age children from achievement motivation research need not continue. From the attributional perspective, developmental psychologists working in achievement contexts such as Stipek (1981, 1984, 1988)

and Nicholls (1976, 1983, 1984) have demonstrated that children are able to view effort as the primary source of performance outcomes by age seven or eight, and are able to make fine-grained distinctions between effort and ability by age eleven or twelve (see also Nicholls & Miller, 1984).

From the perspective of emotions, research has demonstrated that as early as preschool, children are able to discriminate between the emotions of 'happy', 'sad', and 'mad', followed later by the recognition of more highly differentiated affects such as surprise and anger (Deutsch, 1974; Harter, 1982; Izard, 1971). Other research has also demonstrated the 'happy-sad' distinction among young children with older children making more situation-specific responses to outcomes such as proud, thankful, and surprised (Weiner, Kun, & Benesh-Weiner, 1980). Given these findings, it appears that upper-level elementary school-age children are capable of making the kinds of attributional and emotional distinctions necessary to test the various linkages central to Weiner's attribution theory. Furthermore given that this age group has never been represented to date in any empirical test of Weiner's model involving all four linkages, it is imperative that they be represented to examine both the accuracy and essential utility of the model.

The Subjects

In this study, students from 16 grade seven elementary school classrooms located in the same school district agreed to participate. Across these 16 classrooms, nine of the teachers were male and seven were female. In total, 454 students across the 16 classrooms agreed to participate in the study whereas 24 did not.

Twenty four additional students who had consented to participate were absent on the day of the visitation leaving 406 students in total who completed the motivational booklet. Of the 406 who completed the booklet, 212 were boys and 194 were girls. Two hundred forty five of these students were 12 years old, 132 were 13, five were 14, and two were 11 years of age. Eleven boys and 11 girls did not indicate their age. Specific information about participants can be found in Appendix A, which contains information regarding class size, number of consenting and participating students and their gender, curricular data such as type of textbook used, test topics covered and their point value, and ethnic background of students.

## Instrumentation

In this section, the three instruments that made up the motivational boooklet used in this study are described in detail.

### The Attribution Measure

Students were asked questions about their attributions and emotional reactions following either a success or failure outcome, as well as their expectations for future performance. The three specific portions of the measure, namely, the attributions, emotions, and expectancy of success in the future are discussed separately below. The entire motivational booklet, which contains these three categories of items, as well as a cover sheet, can be found in Appendix B.

The four attributions. The four attributions examined for both success and failure outcomes in this study are the ones most widely investigated in the field of attributional research, namely, ability,

effort, luck, and task difficulty (Weiner, 1986). Researchers using free-choice and rank-ordering procedures for studying perceived causes of success and failure have consistently identified these four attributions as among the most prominent reasons cited for such outcomes (e.g., Anderson, 1983; Bar-Tal, Goldberg, & Knaani, 1984; Burger, Cooper, & Good, 1982; Cooper & Burger, 1980; Elig & Frieze, 1979; Frieze, 1976; Frieze & Snyder, 1980). Moreover, investigations of the causal structure of various attributions using factor analytic and multidimensional scaling procedures have verified the distinct nature of these four causes across the locus, stability, and controllability dimensions (cf. Meyer, 1980; Meyer & Koelbl, 1982; Michela, Peplau, & Weeks, 1982; Passer, 1977; Passer, Kelley, & Michela, 1978; Stern, 1983; Wimer & Kelley, 1982).

In the questionnaire, students were asked to respond to four attributional items for either a successful or unsuccessful testing outcome. In order to determine to which set of attributional questions students would respond, they were first asked to answer the following question on the front cover; "Do you consider this mark to be a good mark for you or a poor mark for you?" The decision to use the students' subjective perception of their performance on the test as opposed to a normative standard was based on both Weiner's (1985) and Lewin's (1935) phenomenological viewpoint that individuals act on a perceived, rather than an objective, world. Depending on their decision regarding the outcome, students then turned to either the successful outcome or the unsuccessful outcome section of the instrument and proceded to answer the questions.

At the top of each page, a single attributional question in the form of a sentence was presented with the specific attribution written in capital letters. The four attributional items for a successful outcome were as follows: a) "How much do you think that your good mark on this test was due to you TRYING REALLY HARD?", b) "How much do you think that your good mark on this test was due to the fact that you're SMART IN THIS SUBJECT?", c) "How much do you think that your good mark on this test was due to GOOD LUCK ON YOUR PART?", and d) "How much do you think that your good mark on this test was due to the fact that the TEST WAS EASY?". For a failure outcome, the four attributional items were: a) "How much do you think that your poor mark on this test was due to you NOT TRYING HARD ENOUGH?", b) "How much do you think that your poor mark was due to you NOT BEING SMART ENOUGH in this subject?", c) "How much do you think that your poor mark was due to the fact that you HAD BAD LUCK on this test?", and d) "How much do you think that your poor mark was due to the fact that the TEST WAS TOO DIFFICULT?" Students answered these questions by checking one space beside the following five responses: 'very much', 'quite a bit', 'somewhat', 'very little', or 'not at all'. If students selected either 'very much', 'quite a bit', or 'somewhat', they were then instructed to complete six items dealing with affective responses. It was felt that students selecting one of these three possibilities were responding at, or above the midpoint for acknowledging the attribution as a causative factor. However, if they selected 'very little' or 'not at all', students were instructed to bypass the affective items and proceed to the next page. The remaining three

pages within each section corresponding to success and to failure were arranged in the same manner, with the attributional question and response section appearing at the top of the page and the six specific affective items appearing directly beneath.

The six affects. For this portion of the instrument, six affects were selected for each of the two possible outcomes. For a successful outcome, the affects of pride, satisfaction, relief, , thankfulness, surprise, and happiness were selected, whereas for an unsuccessful outcome, the affects selected were guilt, shame, embarrassment, anger, surprise, and humiliation. The selection of these affects was influenced by previous findings of Weiner, Russell, and Lerman (1979), as well as those of Covington and Omelich (1979b, 1979c). As indicated in the preceding chapter, Weiner et al. (1979), found that pride and happiness in achievement contexts were most strongly linked to attributions of ability and effort, and that feelings of gratitude or thankfulness and surprise were most strongly linked to task ease and luck respectively. From a failure perspective, they found that anger was most strongly linked to attributions of task difficulty and bad luck, whereas guilt was second only to anger as a emotional response to attributions of stable effort. Concerning a successful outcome, Covington and Omelich (1979b, 1979c) demonstrated that in addition to pride, satisfaction was significantly linked to both effort and ability. Concerning failure, Covington and Omelich (1984d) later discovered that shame as well as humiliation correlated significantly with low ability ascriptions.

The six specific affects as they appear in the motivational booklet for both success and failure outcomes were displayed directly below the attributional item and maintained the same response format as that used for the attributional statement. That is, students first read a sentence linking the attribution to the emotion and then selected either 'not at all', ' a little', 'somewhat', 'quite a bit', or 'very much' as their answer. Each sentence was designed so that the attribution was mentioned first, followed by the specific affect in capital letters. The same format was followed for each of the six emotions across all four attributions for both success and failure.

The following are examples of the first affect items for effort ascriptions under success and failure conditions: "Because you tried really hard, how PROUD do you feel about getting a good mark on this test?", and "Because you didn't try very hard, how GUILTY do you feel about getting a poor mark on this test?"

The expectancy variable. Students' expectations for future success were gauged by a single item which appeared at the bottom of the final page of both success and failure outcome sections. This item read, "What mark do you expect to get on your next math exam?" Before students answered this question, they were told that the following test would be worth the same amount as the one just completed and were also informed of the topic or unit to be covered. Students' responses to this item were in the form of a number which represented their estimates of their score out of the possible maximum score for the test.

The outcome measures. The outcome measures taken in this study were the scores students obtained on their second test. These data were gathered after the teacher had marked and returned the results for the second math test to the students.

The "predictive accuracy" variable. An additional variable not used in previous attributional research was constructed in order to explore Weiner's claim that causal searches for meaning typically occur when an outcome differs from that which is expected. This variable was labeled "predictive accuracy". The variable is a measure of students' capacity to predict, or estimate their obtained score on their first math test. This variable was constructed by dividing students' expected score by their obtained score and multiplying the quotient by one hundred. One hundred was then subtracted from the total and the result rounded off to the nearest whole number to provide a percentage for each student. Thus, percentages greater than zero indicate students who underestimated their obtained score and who, therefore, should feel positive about the outcome, whereas percentages less than zero identify those students who overestimated their obtained score and who should feel negative about the outcome. Scores of zero identify those students whose expected score was identical to their obtained score.

## The Classroom Environment Measure

Classroom environment data were gathered through an instrument developed principally by the research team of Eccles, Midgley, and Feldlaufer as part of the assessment component for their Transitions at Early Adolescence Project (e.g., Midgley, Feldlaufer, &

Eccles,1990). Guided by the work on classroom structure and organization developed by Rosenholtz and her colleagues (Rosenholtz & Simpson, 1984a, 1984b), Eccles and her colleagues designed a set of classroom climate scales that assess the dimensionality characteristics of instructional practices in classrooms as well as features of social climate which affect classroom atmosphere.

The version of the scale used in this study was developed to measure students' perceptions of competition and social comparison among classmates, cooperative learning opportunities, student involvement in decision-making, task organization in mathematics, and teacher fairness and friendliness. This form consisted of 24 items and was divided into the following six subscales: a) Cooperation/Interaction, b) Competition, c) Social Comparison, d) Teacher/Student Relations, e) Student Input, and f) Task Organization. All subscales of the instrument were designed by Feldlaufer et al. (1988), although an updated version of the social comparison subscale was used in place of the original. Items from the cooperation/interaction, competition, and teacher/student relations subscales were taken directly from the student form, whereas items for the student input and task organization subscales were taken from the observer form and modified slightly. The modification consisted of replacing the word 'students' with the word, 'we' in order to create items such as, "We suggest projects or topics to study in math". The updated social comparison subscale was created by Reuman (1986, 1989) who expanded the original measure from two to five items for his doctoral research and improved its internal consistency. In responding to the

questionnaire, students were instructed to read each item, consider how representative the item was of their classroom, and respond by circling one of the following five answers: 'never', 'seldom', 'occasionally', 'frequently', or 'always'. The complete classroom environment measure can also be found in Appendix B.

For the five subscales developed by Feldlaufer et al. (1988), a principal components analysis conducted by the authors was first performed which confirmed the five dimensions underlying the items. Following this, a common factor analysis was performed and the five factors were extracted. An orthogonal rotation was also used to interpret the pattern of loadings of the five factors. Since subjects in their study were making a transition from elementary to high school, Feldlaufer et al. performed separate analyses for the cooperation/interaction, competition, and teacher/student relations subscales before and after the transition. Patterns of factor loadings were similar for both years with all items loading at >.30. For the student input and task organization subscales, items loaded on the factors at >.40. Internal consistency reliabilities (Cronbach's alpha) for the five subscales were as follows: a) Cooperation/Interaction (.65), b) Competition (.68), c) Teacher/Student Relations (.75). d) Task Organization (.79), e) Student Input (.85). Factor analysis also confirmed that the items that made up the social comparison subscale as developed by Reuman (1986) were unidimensional and factorially distinct from the other subscale items. The internal consistency reliability of Reuman's five-point social comparison measure was .76 (Cronbach's alpha) as compared to .59 for the original two-point subscale.

## The Academic Self-Concept Measure

The third and final section of the motivational booklet consisted of the academic self-concept measure which was developed originally by Parsons (1980) and used subsequently in the Transitions at Early Adolescence Project. In addition, both McIver (1986, 1988) and Reuman (1986, 1989) used the measure in their doctoral research on student perceptions in mathematics classes. This measure consisted of three items followed by a seven-point response format for each item: "How good at math are you?" (coded 'Not good at all' [1] to 'Very good' [7]); "Compared to most of your other school subjects, how good are you at math?" (coded 'Much worse' [1] to 'Much better' [7]); and "If you were to rank all the students in your math class from the worst to the best in math, where would you put yourself?" (coded 'The worst' [1] to 'The best' [7]). Reuman (1989) reports internal consistency reliabilities for the academic self-concept measure of .81 and .79 for sixth-grade girls and boys respectively, whereas McIver (1988) reports an overall reliability index of .80. Procedurally, students were instructed to read the item, consider their personal strengths in mathematics, and respond by checking the space beside one of the seven possible answers. The layout of these items can be viewed in Appendix B.

## Additional Measures

In addition to the measures described above, teachers were asked to complete two separate tasks. First, teachers were asked to rank-order their students according to their math ability. Specifically, teachers were asked to enter students' names into one of five

possible categories, namely, 'top of class', 'above-average', 'average', 'below-average', or 'bottom of class'. Teachers were told that each category, except for 'average', should contain a maximum number of students. Top and bottom of the class categories were allowed three students each, whereas above and below average categories were permitted six students each. Teachers were instructed to fill in the two extreme categories first (i.e., 'top of class' and 'bottom of class') and work their way toward the 'average' category in the middle where the remainder of the students would be entered. A copy of this exercise is presented in Appendix C.

The second additional task required teachers to provide information regarding their students' ethnic background. Specifically, teachers were asked to indicate the number of participating students in their class who belonged to one of the following categories: a) Caucasian, b) Asian, c) Southeast Asian, d) East Indian, e) Native Indian, f) Hispanic or Central American, or g) Other. If teachers entered a number under the 'Other" category, they were asked to specify the ethnic background of the students. This questionnaire can be found in Appendix D.

## Data Gathering Procedure

The data gathering procedure used in this study was based on Covington and Omelich (1984d). The procedure used in this study differed in that data from both success and failure outcomes were gathered, classroom structure and academic self-concept data were collected, and elementary school children served as subjects instead of university students. The entire data gathering procedure from the initial stages of enlisting classroom teachers' support to final stage

of collecting follow-up student performance data took approximately six months. A description of the complete procedure is provided below and is discussed across three stages; the organizational stage, the data-gathering stage, and the follow-up stage.

## The Organizational Stage

During this stage, the first task involved enlisting the support of classroom teachers who would be willing to participate in the study. To this end, seventh grade teachers from a large urban school district in southwestern British Columbia were invited to participate in a study dealing with student motivation to learn. The Depertment of Assessment and Research within the school district assisted with the enlistment of teachers by sending out information packages to 30 elementary school principals in the district. This package contained a brief description of the study, an outline of teacher and student tasks and timelines, and copies of each of the instruments to be used. If principals agreed with the appropriateness of the study, they were then instructed to invite their grade seven teachers to consider participating as well.

From the initial distibution of 30 information packages, only four grade seven teachers agreed to participate in the study. In addition, all four teachers were located in the same eastern region of the district. Due to the poor response rate, a second mailing to an additional 30 elementary schools in the district was undertaken, which yielded another four grade seven teachers with somewhat greater representation across the district. In an effort to attract a larger number of teachers. I asked four area counsellors in the

school district to speak directly to the grade seven teachers in their schools and explain more fully the nature of the study, the time committments involved, and so on. Based on these efforts, an additional 10 teachers agreed to participate in the study resulting in 18 seventh grade teachers in all. Furthermore, this final group of teachers were representative of schools across eastern, central, and western regions of the school district.

Following this task, a specific planning meeting was held to discuss activities and timelines for the study. At this meeting, teachers were instructed to select two unit tests in mathematics and to design two exams of equal value, each based on one of the two selected units. Initially, the intent was to have all teachers cover the same two units and administer identical exams in mathematics. However, this arrangemant was impossible since many of the teachers had already covered units earlier in the year that others had not yet taught. Moreover, a number of the teachers objected to the requirement of using prescribed, uniform tests for the two units of study in place of their own personally designed tests. As a result, teachers were allowed to select their own two units of study and use the unit tests of their choice. However, three stipulations were introduced: a) both tests had to be of the same point value, b) both had to be unit or topic tests which would count substantially toward their students' next report card grade, and c) both tests had to be administered no more than four weeks apart.

The first stipulation was introduced in order to allow for comparisons between first and second test performance, as well as to permit students to make accurate predictions regarding

expectancy of success at the second test. The second stipulation was introduced in an effort to meet Weiner's outcome criteria for the formation of attributions. That is, the outcome must be perceived by the individual as either important, unexpected, or negative. By requiring that the tests represent a major component of students' term mark in mathematics, it was felt that the criteria of importance would be met. The third stipulation was introduced to ensure that all teachers would use a uniform test-retest interval. All teachers agreed that four weeks would be sufficient time to teach the second unit and administer the second test following the initial unit exam.

The decision to focus on mathematics as opposed to another area of the curriculum was made on the basis of the commonality of content and teaching practices for this subject area across teachers. It was expected that both the material and the instructional strategies used to teach mathematics would be far less variable than those used in other subject areas, such as language arts or social studies. Virtually all of the teachers involved in the study agreed with this decision. However, since a common math test was not used, it was necessary to design a standard math quiz to which all students would respond in order to obtain a measure of comparative ability across subjects. Two of the participating teachers located in the same elementary school, one of whom had a background in measurement theory, volunteered to design the quiz. The quiz consisted of eight items addressing the major topics covered in the British Columbia grade six mathematics currculum, namely, number theory, fractions, addition and multiplication of

decimals, geometry, and word problems. Material at the grade six level of difficulty was selected over seventh grade material since the majority of students had been exposed to this content the previous year, whereas not all students had covered the same material at the grade seven level up to this time. A copy of this quiz can be found in Appendix E.

Following the planning meeting, parent consent forms were mailed to each participating teacher with the school letterhead at the top of each form. In all, 507 parent consent forms across the 18 classroom teachers were sent home with students. Of this number, 485 (96%) forms were ultimately returned indicating agreement to participate. The remaining 22 consent forms indicated either disapproval, or were not returned and students were therefore considered ineligible for participation. A copy of the Parent Consent Form is presented in Appendix F.

The Data-Gathering Stage

During this stage, each of the 18 teachers began by administering the eight-point math quiz to their students and then marking the results. Following this, the first of the two mathematics units selected during the planning meeting was taught, and the corresponding unit test given to the students approximately four weeks after the commencement of the unit. Approximately a week before the test was to be administered, each classroom teacher contacted me and indicated the precise time that the test was to be handed back to the students. At this time, I arranged with each teacher to visit the classroom and have the students respond to the motivational questionnaires.

During each classroom visitation, I began by introducing myself to the students and thanking them for agreeing to participate in the study. I then handed out the motivational booklets, read a prepared statement which described the instructions for completing the three sections of the booklet, and indicated that an alternative activity had been arranged for students who had chosen not to participate or who, during the course of completing the booklet, decided that they wished not to continue (see Appendix G).

Once the statement had been read, classroom teachers handed back students' marked test papers which students were instructed to keep face down until given permission to turn over. Once all the papers had been returned, I instructed students to turn their test papers over and look at the mark they received on their exam. Students were then instructed to indicate by checking the appropriate space on the front cover of their booklet whether they considered their mark to be a good or a poor mark for them. Following this, students were asked to turn to the corresponding page of the first section of the booklet and complete the questions. More specifically, students were instructed to turn to page 1 if they considered their mark to be good or to page 5 if they considered their mark to be bad. Pages 1 to 4 dealt with attribution and emotion questions for a successful outcome whereas pages 5 to 8 focussed on attributions and emotions following an unsuccessful outcome.

After completing this section, students went on to complete the second section which contained 24 items dealing with classroom organization and instruction. Students responded to each item by

circling a number corresponding to one of the following five responses; 'never', 'seldom', 'occasionally', 'frequently', and 'always'. Finally, after the first two sections were completed, students responded to the three academic self-concept items that made up the third section. In all classes, the data gathering procedure for the attributional data was completed in one visit and typically took 45 minutes from initial introductory remarks to completion of the third section of the booklet. No attempt was made to have those students who were absent on the day of the visit complete the booklet at a later date.

Of the original 18 classrooms enlisted for participation in the study, only data sets from 16 classrooms were usable. In one class, the teacher had forgotten to ask her students to indicate the mark they expected to get on the first unit math test, and had handed back the test results in advance of my arranged visitation. Since these two acts were inconsistent with the prescribed requirements for the study, data from this class were eliminated from the sample. In a second class, a research assistant who had been observing me during the first six classroom visits attempted to administer the motivational booklets to a class without any additional assistance. However, the assistant was unable to manage all the tasks involved with the visitation, and the students became unruly and did not complete the majority of the required tasks. As a result, data from this class were also eliminated from the data set.

## The Follow-Up Stage

During this stage, teachers taught the second unit as indicated during the planning meeting and then administered the unit test to

their students. Once marked, teachers were contacted and arrangement made for the test results to be picked up.

# CHAPTER FOUR

## RESULTS AND FINDINGS

### Overview

In this chapter, a brief review of the study is presented, followed by a discussion of the rationale for conducting the statistical analyses in the manner in which they were undertaken. Following this, descriptive statistics as well as reliability and factor analytic findings for specific attributional constructs are presented. Finally, results of the path analyses are discussed.

### Review of the Study

The major purpose of this study was to test the causal relationships predicted by Weiner's attributional model with an elementary school-aged population. The central question guiding this inquiry was, "Is Weiner's attribution theory of achievement motivation consistent with the types of causal attributions, emotions, and performance expectations elementary school-aged children experience following exam performances in achievement settings?" In all, 406 seventh-grade students across 16 classrooms responded to a questionnaire which asked them to make attributions to either ability, effort, luck, or task difficulty following perceived success or failure at a math exam. Students also indicated their degree of emotional reaction across six affects based on the outcome, as well as their expectancy of success on the next math exam. The six emotions for success were pride, satisfaction, surprise, thankfulness, happiness, and relief, whereas the six emotions for failure were guilt, shame, surprise, anger, embarrassment, and humiliation.

Data were gathered during a single visit to each classroom where a questionnaire addressing attributions, emotions, and expectancies was administered moments after the classroom teacher returned test results to students from a math exam given the previous week. Additional student data obtained through the questionnaire included self-perceptions of ability in mathematics, academic self-concept, and perceptions of their classroom environment. Prior to the test, students completed an identical 8-item math quiz to provide a consistent measure of math achievement across the entire sample for the puposes of comparing groups. After studying a second unit in mathematics, students were given another test approximately four weeks after the first math test. Students' scores from this second math test given were obtained after the tests had been marked and returned to the students.

### Rationale for Statistical Analyses

A number of preliminary analyses were undertaken in this study prior to the path analyses themselves being conducted. These preliminary analyses involved a series of factor analyses which were undertaken to determine whether the attributional constructs under investigation were supported empirically by the data. As was evident in the review of the literature, very few tests of Weiner's attributional model have involved children. As a result, it was considered important to determine whether the subjects in this study were able to make as fine-grained distinctions between attributional causes and their corresponding emotions as were adult subjects, who typically serve as the major participants in attributional research.

Following the factor analyses, a series of tests of reliability were undertaken to determine the internal consistency of existing and/or new constructs which emerged as a result of the factor analyses. Where previous information regarding reliability of measures exists, these are compared with the reliability estimates obtained for the current sample of school-aged children.

Taken together, these two series of analyses prermitted the identification and selection of appropriate variables to be included in all subsequent analyses, most noteably the path analyses. Prior to the path analyses, however, a third series of univariate and multivariate tests were computed on some variables to determine the appropriateness of combining data across gender and classrooms for the purposes of testing the causal model. Following modifications based on the results of these analyses, the path analyses were conducted.

<center>Exploratory Findings</center>

In this section, descriptive statistics for the attributional data are presented first, followed by the results of the factor analyses and tests of reliability. Next, descriptive statistics, results of the factor analyses, and reliability tests are presented for the classroom environmental data. The multivariate tests involving gender and classroom differences, as well as the path analyses are discussed in a separate section of this chapter.

Attributional Data

Descriptive statistics. In order to test the underlying assumptions of Weiner's Attribution Theory, the entire set of student data was divided into two specific categories: a) success

and b) failure outcomes. Data were classified into one of these two categories based on whether students indicated that they had received either a good or a bad mark on their initial math test. In total, 200 subjects indicated on their attributional booklets that they had received a good mark on the test, whereas 206 subjects indicated that they had received a poor mark. All descriptive statistics and subsequent analyses are based on data classified into either of these two categories. Tables 1 and 2 present the means and standard deviations for the four attributions of effort, ability, luck, and task difficulty, and their corresponding six emotions for success and failure outcomes. Descriptive data for expected and obtained scores, academic self-concept, and math ability for success and failure outcomes are presented in Tables 3 and 4.

Factor analyses: affects. Following the calculation of descriptive statistics, a series of factor analyses was performed on each of the six emotions within each attribution to examine whether these emotions were distinct responses across the eight attributions. For these analyses, a principal axis factoring extraction technique was specified, along with a varimax rotation technique. Results of these analyses are presented in Table 5. As can be seen, in every case, the six affective responses load exclusively on a single factor.

In the case of success, the percentage of variance accounted for by the single factors across the four attributions was 50.9 percent for high effort, 52.4 percent for high ability, 59.6 percent for good luck and 61.1 percent for task ease. The eigenvalues for each of these four factors were 3.05, 3.14, 3.58, and 3.66 respectively. In

Table 1.

Means and Standard Deviations for the Four Attributions and
their Corresponding Six Affects across Success Situations. (N = 200)

|  |  | Effort | Ability | Luck | Task |
|---|---|---|---|---|---|
|  | M | 3.47 | 3.42 | 2.32 | 3.38 |
|  | S.D. | 0.98 | 1.17 | 1.13 | 1.06 |
| Proud | M | 3.94 | 3.72 | 3.49 | 3.26 |
|  | S.D. | 0.85 | 0.93 | 0.92 | 1.09 |
| Satisfied | M | 4.12 | 3.77 | 3.65 | 3.48 |
|  | S.D. | 0.88 | 0.92 | 0.96 | 1.01 |
| Surprised | M | 3.30 | 2.95 | 3.71 | 2.81 |
|  | S.D. | 1.20 | 1.14 | 1.15 | 1.13 |
| Thankful | M | 3.93 | 3.57 | 3.67 | 3.42 |
|  | S.D. | 1.03 | 1.10 | 1.03 | 1.12 |
| Happy | M | 4.13 | 3.94 | 3.90 | 3.58 |
|  | S.D. | 0.88 | 0.90 | 0.90 | 0.99 |
| Relieved | M | 3.85 | 3.54 | 3.78 | 3.36 |
|  | S.D. | 1.04 | 1.06 | 0.96 | 1.11 |

Affects — Attribution

Note.   Scores range from 1 (lowest) to 5 (highest).

Table 2.

Means and Standard Deviations for the Four Attributions and

their Corresponding Six Affects across Failure Situations.   (N = 206)

| Affects | | Attribution | | | |
|---|---|---|---|---|---|
| | | Effort | Ability | Luck | Task |
| | M | 2.82 | 2.53 | 2.29 | 2.33 |
| | S.D. | 1.52 | 1.33 | 1.33 | 1.57 |
| Guilty | M | 3.54 | 3.25 | 3.29 | 2.90 |
| | S.D. | 1.04 | 1.31 | 1.34 | 1.04 |
| Ashamed | M | 3.16 | 3.32 | 3.12 | 2.82 |
| | S.D. | 1.17 | 1.21 | 1.36 | 1.18 |
| Surprised | M | 3.31 | 3.06 | 3.61 | 2.93 |
| | S.D. | 1.18 | 1.21 | 1.08 | 1.20 |
| Angry | M | 3.16 | 3.24 | 3.42 | 3.07 |
| | S.D. | 1.33 | 1.35 | 1.44 | 1.17 |
| Embar-rassed | M | 2.94 | 3.18 | 2.84 | 2.61 |
| | S.D. | 1.24 | 1.19 | 1.47 | 1.08 |
| Humil-iated | M | 2.71 | 3.00 | 2.65 | 2.41 |
| | S.D. | 1.20 | 1.27 | 1.44 | 1.21 |

Note.    Scores range from 1 (lowest) to 5 (highest).

Table 3.                                                                    9 5

Means and Standard Deviations for Expected and Obtained Scores

on the First and Second Math Tests, Academic Self-Concept and

Math Ability for Success Outcomes.   (N = 200)

| Variable | Descriptive Statistics | |
|---|---|---|
| | M | S.D. |
| Estimated Score 1 | 82.69 | 12.38 |
| Obtained Score 1 | 87.12 | 11.44 |
| Estimated Score 2 | 84.36 | 12.34 |
| Obtained Score 2 | 82.78 | 14.15 |
| Academic Self-Concept | 15.40 | 3.33 |
| Math Ability | 3.47 | 0.99 |

Note.   Expected and Obtained scores are percentages.The range for Academic Self-Concept is 3 (lowest) to 21 (highest).The range for math Ability is 1 (lowest) to 5 (highest).

Table 4.

Means and Standard Deviations for Expected and Obtained Scores

on the First and Second Math Tests, Academic Self-Concept and

Math Ability for Failure Outcomes.   (N = 206)

| Variable | Descriptive Statistics | |
|---|---|---|
| | M | S.D. |
| Estimated Score 1 | 74.48 | 17.29 |
| Obtained Score 1 | 61.85 | 20.49 |
| Estimated Score 2 | 75.51 | 18.57 |
| Obtained Score 2 | 70.03 | 23.51 |
| Academic Self-Concept | 13.12 | 3.85 |
| Math Ability | 2.84 | 1.09 |

Note: Expected and Obtained scores are percentages. The range for Academic Self-Concept is 3 (lowest) to 21 (highest). The range for math Ability is 1 (lowest) to 5 (highest).

Table 5.

Factor Loadings for each of the Six Affects across

each of the four Attributions for Success and Failure

Outcomes.

| Success | Effort | Ability | Luck | Task |
|---|---|---|---|---|
| Proud | .67 | .69 | .68 | .79 |
| Satisfied | .65 | .68 | .75 | .72 |
| Surprised | .52 | .46 | .53 | .56 |
| Thankful | .68 | .70 | .78 | .72 |
| Happy | .77 | .69 | .78 | .80 |
| Relieved | .54 | .70 | .77 | .78 |

| Failure | Effort | Ability | Luck | Task |
|---|---|---|---|---|
| Guilty | .67 | .68 | .77 | .69 |
| Ashamed | .76 | .83 | .86 | .82 |
| Surprised | .28 | .37 | .28 | .41 |
| Angry | .66 | .53 | .77 | .60 |
| Embarrassed | .77 | .81 | .85 | .75 |
| Humiliated | .83 | .87 | .85 | .80 |

the case of failure, the percentage of variance explained was 54.3 percent for low effort, 55.8 percent for task difficulty, 56.4 percent for low ability, and 63.1 percent for bad luck. The eigenvalues for these four factors were 3.26, 3.38, 3.79, and 3.35 respectively.

Tests of reliability: affects. Reliability estimates were also calculated with the attributional data and affective data. Table 6 presents Guttman reliability coefficients which were calculated for an affect scale consisting of each of the six emotions within each of the four attributions for both success and failure outcomes. Guttman's reliability model was selected over other models because it computes six reliability coefficients, one of which is always the lower bound of true reliability as specified by Guttman (1945). As can be seen, in every case, the six emotions taken together account for at least 80% of the total variance. Guttman reliabilities range from .80 (effort) to .87 (task difficulty) for the success sample, and from .83 (effort) to .89 (luck) for the failure sample.

These results, taken together with the results from the factor analyses suggest that these early adolescent-aged children do not make fine-grained distinctions between feelings of embarrassment, shame, humiliation, anger, surprise, and guilt in the event of failure, nor do they make distinctions between feelings of pride, satisfaction, relief, surprise, thankfulness, or happiness in the event of success. Rather, their responses appear to be characterized by more generalized, or global expressions of positive or negative emotions. Based on these data, the six separate emotions were aggregated within each attribution to create a single affective response variable across each of the four specific attributions.

Table 6.                                                                99

Reliabilities for each of the Six Affects within each of the

Four Attributions for Success and Failure Exam Outcomes.

----------------------------------------------------------------

Success
Outcome

| Attribution | N | Coefficient | M | S.D. |
|---|---|---|---|---|
| High Effort | 171 | .80 | 23.28 | 4.16 |
| High Ability | 155 | .81 | 21.50 | 4.35 |
| Good Luck | 80 | .86 | 22.11 | 4.55 |
| Task Ease | 163 | .87 | 19.90 | 5.01 |

----------------------------------------------------------------

Failure
Outcome

| | | | | |
|---|---|---|---|---|
| Low Effort | 128 | .83 | 18.86 | 5.19 |
| Low Ability | 96 | .86 | 19.06 | 5.57 |
| Poor Luck | 75 | .89 | 18.95 | 6.43 |
| Task Difficulty | 86 | .84 | 16.80 | 5.09 |

----------------------------------------------------------------

Note. The range for each of the combined affects is 6 to 30.
    The affects for success are: a) proud, b) satisfied, c)
    surprised, d) thankful, e) happy, f) relieved.
    The affects for failure are: a) guilty, b) ashamed,
    c) surprised, d) angry, e) embarrassed, f) humiliated.

Thus, eight new affective variables were created acro~~ ~uccess and failure outcomes. These new variables were: a) effort-linked emotions, b) ability-linked emotions, c) emotions linked to luck, and d) emotions linked to task ease or difficulty. Descriptive data for these new variables are presented along with other variables in the section dealing with the path analyses.

Factor analyses: attributions. In order to investigate whether seventh-grade children were able to distinguish among the four specific attributions as causes for success or failure, a series of factor analyses were also conducted for each of the eight causal attributions. In the inital factor analysis for failure, only one factor was extracted which accounted for 42.0 percent of the variance and had an eigenvalue of 1.67. However, a second factor was present in the analysis which accounted for 25.0 percent and possessed an eigenvalue of .99. Since the minimum default set by SPSSx to extract and rotate a factor is an eigenvalue of 1.00, this second factor was not identified. A decision was made to reset the minimum eigenvalue from 1.00 to 0.99 in order to incorporate the second factor. Results of these analyses are presented in Table 7.

As can be seen, attributions under failure conditions loaded on two, rather than four separate factors. Low ability (.84) and task difficulty (.88) served as the main contributors to the first factor, whereas low effort (.72) and bad luck (.77) served as the principal contributors to the second. Similarly, attributions under success conditions also loaded exclusively on two factors, with high ability (.82) and task ease (.73) loading substantially on the first factor, and high effort (.81) and good luck (.79) loading most heavily on the

Table 7. 101

Factor Loadings for the four Attributional Items

for Success and Failure Outcomes.

---

Success
| Attributions | Factor One | Factor Two |
|---|---|---|
| High Effort | .20 | .81 |
| High Ability | .82 | -.14 |
| Good Luck | -.20 | .79 |
| Task Ease | .73 | .08 |

---

Failure
| Attributions | Factor One | Factor Two |
|---|---|---|
| Low Effort | .11 | .72 |
| Low Ability | .84 | .18 |
| Poor Luck | .06 | .77 |
| Task Difficulty | .88 | .02 |

---

second. The eigenvalue for the first success factor was 1.43 and accounted for 36.0 percent of the variance, whereas the eigenvalue for the second success factor was 1.21 and accounted for 30.2 percent of the variance.

These findings suggest that, regardless of the outcome, students tend to discriminate among attributions chiefly along the stability dimension, rather than along the controllability or locus of causality dimensions. More specifically, the degree to which a cause is perceived as either temporary or enduring appears to be the most important consideration for seventh-grade children when seeking explanations for success or failure at an academic task.

Based on these findings, a decision was made to create two new variables for path analyses in addition to the four original attributions across both success and failure outcomes. This task was accomplished by combining effort and luck attributions to form an "unstable causes" variable, and ability and task difficulty to form a "stable causes" variable. The creation of these two new attributional variables required that two new affective variables be constructed that conformed to the stability features underlying the new attributions. This was accomplished by combining effort-linked emotions and emotions linked to luck to create a new variable named "unstable emotions". In the same fashion, ability-linked emotions and emotions linked to task ease or difficulty were combined to create an "stable emotions" variable. These variables were created for success and failure situations. Descriptive statistics for these attributional and emotional variables for both success and failure

situations are presented in the section of this chapter dealing with the path analyses.

Separate series of path analyses had to be undertaken for the newly created stability variables and the four individual attributional variables, since sample sizes for analyses based on the stability variables were substantially reduced when two variables were combined to form one. This reduction occurred due to the fact that both attributional items within each stability variable had to carry a score of three ("somewhat") or higher (i.e., "quite a bit", "very much") on the attributional portion of the questionnaire in order for the affective response items to be answered. This restriction resulted in a substantial reduction in the number of subjects for this series of analyses. As a result, two series of path analyses were conducted; one employing the newly created stability variables and the other using the original individual attributional responses.

Classroom environment data

Descriptive statistics. With respect to the classroom environment data, descriptive statistics are presented in Table 8 for each of the six subscales across the 16 individual classrooms. These data are presented in this manner since they reflect students' perceptions of their individual classroom climate rather than attributional dispositions toward specific success or failure outcomes.

Factor analyses. A series of factor analyses were undertaken for the 24-item scale to investigate whether items loaded on each of the six factors as specified originally by its authors. For this

Table 8.

Means and Standard Deviations for each of the Six Factors of the

Classroom Environment Scale across the 16 Classrooms. (N = 390)

---

Classrooms                                    Subscales

---

| Classrooms | | Coop-eration | Social Comp. | Student Relations | Student Input | Task Organiz. | Comp-etition |
|---|---|---|---|---|---|---|---|
| 1. | M | 18.26 | 13.87 | 17.30 | 5.65 | 12.00 | 5.91 |
|    | S.D. | 3.57 | 4.96 | 2.40 | 1.67 | 2.07 | 1.68 |
| 2. | M | 12.61 | 16.39 | 16.29 | 4.94 | 14.17 | 6.61 |
|    | S.D. | 2.79 | 3.53 | 2.03 | 1.47 | 1.38 | 1.82 |
| 3. | M | 14.67 | 14.59 | 18.86 | 6.37 | 10.85 | 6.67 |
|    | S.D. | 2.69 | 4.69 | 2.15 | 1.86 | 2.82 | 1.73 |
| 4. | M | 14.82 | 13.53 | 17.24 | 6.41 | 13.47 | 5.82 |
|    | S.D. | 2.72 | 3.06 | 1.89 | 2.09 | 1.63 | 1.33 |
| 5. | M | 11.96 | 14.93 | 17.56 | 5.70 | 12.96 | 5.63 |
|    | S.D. | 2.44 | 5.17 | 2.83 | 2.00 | 2.74 | 1.39 |
| 6. | M | 13.63 | 14.04 | 18.58 | 5.83 | 14.17 | 7.29 |
|    | S.D. | 2.68 | 3.77 | 2.92 | 1.88 | 0.96 | 1.68 |
| 7. | M | 13.59 | 17.36 | 19.77 | 6.64 | 13.96 | 7.73 |
|    | S.D. | 2.50 | 3.35 | 2.81 | 2.34 | 1.36 | 1.38 |
| 8. | M | 10.78 | 18.44 | 17.50 | 5.56 | 13.94 | 6.61 |
|    | S.D. | 3.47 | 4.16 | 3.19 | 2.55 | 1 .11 | 1.65 |
| 9. | M | 13.05 | 16.59 | 18.91 | 6.14 | 13.27 | 6.96 |
|    | S.D. | 3.09 | 4.23 | 2.35 | 1.70 | 2.00 | 1.33 |

| 10. | M | 16.68 | 12.79 | 18.74 | 7.32 | 11.37 | 6.79 |
|-----|------|-------|-------|-------|------|-------|------|
|     | S.D. | 2.79 | 3.21 | 1.88 | 1.86 | 1.61 | 1.69 |
| 11. | M | 17.33 | 16.11 | 20.17 | 7.67 | 10.11 | 6.94 |
|     | S.D. | 3.05 | 4.47 | 2.15 | 1.53 | 2.45 | 2.36 |
| 12. | M | 15.61 | 15.74 | 20.17 | 6.52 | 13.96 | 6.74 |
|     | S.D. | 3.46 | 5.50 | 2.37 | 2.86 | 1.40 | 2.46 |
| 13. | M | 14.73 | 13.97 | 20.87 | 5.13 | 13.77 | 7.63 |
|     | S.D. | 3.14 | 5.03 | 2.77 | 2.10 | 1.89 | 2.53 |
| 14. | M | 11.69 | 13.86 | 17.73 | 5.69 | 11.85 | 6.54 |
|     | S.D. | 2.85 | 4.86 | 2.75 | 1.89 | 2.49 | 1.75 |
| 15. | M | 9.62 | 15.10 | 18.52 | 4.95 | 13.57 | 6.57 |
|     | S.D. | 3.06 | 4.07 | 3.20 | 1.60 | 1.36 | 1.60 |
| 16. | M | 14.57 | 15.07 | 17.71 | 6.46 | 13.93 | 6.50 |
|     | S.D. | 2.80 | 4.64 | 2.76 | 2.37 | 1.25 | 1.04 |

analysis, a principal axis factoring extraction procedure was specified, along with a varimax rotation technique. The results are provided in Table 9 with factor loadings for each of the 24 items presented. Only those loadings which reached a level of .50 or higher were acknowledged as significant contributors to that factor. Items 14 and 15 were included since they loaded on their particular factors at .49. Although this selection criterion was somewhat stringent, this level was selected as the entry point since the majority of the items loaded on their respective factors at or above .70 following a single rotation. Below this threshold, two items loaded at either the .30 or the .40 level on their respective factors, while the remainder loaded at or below the .25 level of significance.

As can be seen in Table 9, seven factors were extracted instead of six. The additional factor consists of two items, one of which also contributed significantly to the Student Input scale, with the other item loading subtantially on the Cooperation subscale. Table 10 presents comparative data regarding items specified by the authors as intended to characterize one of the six given factors as well as those extracted by the present analysis for each of these subscales. As is evident, identical items were extracted during the present factor analysis as were specified originally by the authors of the instrument for all subscales. The only exceptions are found with the Cooperation and Student-Teacher Relations subscales. The Cooperation subscale contains items number 7 and 18. These items were not extracted for this subscale in the present factor analysis. Also, the Student-Teacher Relations subscale does not contais item 21, although this item was extracted for this subscale in the

Table 9.

Factor Loadings on each of the Seven Factors by the

24 Items of the Classroom Environment Scale.

| Questions | | | | Factors | | | |
|---|---|---|---|---|---|---|---|
| Items | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | - | - | - | - | .74 | - | - |
| 2 | - | - | - | - | - | - | .77 |
| 3 | - | .75 | - | - | - | - | - |
| 4 | - | - | - | - | - | .69 | - |
| 5 | - | - | - | .71 | - | - | - |
| 6 | .67 | - | - | - | - | - | - |
| 7 | - | - | .77 | - | - | - | - |
| 8 | - | - | - | - | - | - | .77 |
| 9 | - | .77 | - | - | - | - | - |
| 10 | - | - | - | - | - | .74 | - |
| 11 | - | - | - | .82 | - | - | - |
| 12 | .73 | - | - | - | - | - | - |
| 13 | - | - | - | - | .49 | - | - |
| 14 | - | .73 | - | - | - | - | - |
| 15 | - | - | .49 | - | - | .49 | - |
| 16 | - | - | - | .68 | - | - | - |
| 17 | .71 | - | - | - | - | - | - |
| 18 | - | - | .70 | - | - | - | - |
| 19 | - | .72 | - | - | - | - | - |
| 20 | - | - | - | - | .69 | - | - |
| 21 | .68 | - | - | - | - | - | - |
| 22 | .63 | - | - | - | - | - | - |
| 23 | .78 | - | - | - | - | - | - |
| 24 | - | .68 | - | - | - | - | - |

Table 10.                                                              108

Comparison of the Items per Factor of the Classroom Environment

Scale as Reported by the Authors and as Extracted in this Study.

---

| Factor Name | Items Specified by Authors | Items Extracted in Present Study |
| --- | --- | --- |
| Social Comparison | 3, 9, 14, 19, 24 | 3, 9, 14, 19, 24 |
| Student-Teacher Relations | 6, 12, 17, 22, 23 | 6, 12, 17, 21, 22, 23 |
| Student Input | 4, 10, 15 | 4, 10, 15 |
| Task Organization | 5, 11, 16 | 5, 11, 16 |
| Competition | 2, 8 | 2, 8 |
| Cooperation | 1, 7, 13, 18, 20 | 1, 13, 20 |
| *Autonomy | - - - - - | 7, 15 |

---

Note. * This factor was not identified by the authors.

Eigenvalues and pecentage of variance explained for each factor is as follows:
a) Student-Teacher Relations (eigenvalue = 3.46, % = 14.4),
b) Social Comparison (eigenvalue = 3.07, % = 12.8),
c) Task Organization (eigenvalue = 1.83, % = 7.6),
d) Cooperation-Interaction (eigenvalue = 1.36, % = 5.7),
e) Student Input (eigenvalue = 1.19, % = 4.9),
f) Competition (eigenvalue = 1.05, % = 4.4)
g) Autonomy (eigenvalue = 2.30, % = 9.6)

present analysis. In addition, items seven and 15 loaded on a seventh, unspecified factor. Because both of these items were characterized by the aspect of student freedom, (e.g.. "During work time, we can move around the classroom when we want to"; "We can decide which order to do our math work in"). this seventh factor was named Autonomy.

Tests of Reliability. Similar to the attributional data, Guttman reliability coefficients were calculated for each of the seven subscales. These data are presented in Table 11, along with Guttman reliability coefficients for the academic self-concept variable, and the 8-item math quiz. As can be seen, reliabilities range from .43 for the Student Input subscale to .81 for the Student-Teacher Relations subscale. The Guttman reliability coefficient for the new Autonomy subscale was .63.

## Path Analyses and Related Tests

### Preliminary Tests.

Gender differences. For the series of path analyses undertaken, attributional data from the 16 classrooms had to be combined in order to meet the sample size requirements. Prior to this, however, a number of tests were performed to determine whether gender differences existed within the sample. Wtih respect to the attributional data, a multivariate analysis of variance was undertaken which examined the variables of first and second expected and obtained scores across gender. For the success sample, the overall result was nonsignificant (Wilks Lambda = .53, p = .72). The overall result for the failure sample was also nonsignificant (Wilks Lambda = 1.86, p = .12).

Table 11.

Guttman Reliabilities for the Six Subscales of the

Classroom Environment Measure, the Math Self-Concept

Scale, and the Eight-Item Quiz. (N = 363)

| Subscale | Number of Items | Guttman | M | S.D. |
| --- | --- | --- | --- | --- |
| Social Comparison | 5 | .79 | 14.93 | 4.57 |
| Student-Teach. Relations | 6 | .81 | 23.39 | 5.06 |
| Student Input | 3 | .43 | 6.03 | 2.12 |
| Task Organization | 3 | .66 | 5.03 | 2.24 |
| Cooperation | 3 | .68 | 13.96 | 3.64 |
| Competition | 2 | .55 | 5.03 | 1.82 |
| Autonomy | 2 | .63 | 5.41 | 1.74 |
| Academic Self-Concept | 3 | .86 | 14.11 | 3.93 |
| Math Quiz | 8 | .59 | 5.58 | 1.71 |

Next, a series of MANOVA's was performed for a number of variables with gender serving as the independent variable. To begin, a series of MANOVA's was undertaken for each of the four emotion variables across success and failure by gender. Results for all four variables across both success and failure samples were nonsignificant (Success: Wilks Lambda = .82, p. = .52; Failure: Wilks Lambda = .1.34, p. = .12). A series of MANOVA's was also performed for the "stable emotions" and "unstable emotions" variables across both success and failure with gender serving as the independent variable. Results of these two analyses were nonsignificant (Success: Wilks Lambda = .46, p. = .63; Failure: Wilks Lambda = .96, p. = .38). Results were also nonsignificant for a series of MANOVA's for the "stable causes" and "unstable causes" variables for gender (Success: Wilks Lambda = .99, p. = .76; Failure: Wilks Lambda = .97, p. = .06).

A series of MANOVA's was also performed for each of the four attributional variables across success and failure outcomes with gender serving as the independent variable. For the success sample, results for were nonsignificant (Wilks Lambda = .71, p. = .59). However, results for the failure analysis were significant (Wilks Lambda = .92, p. = .002). Subsequent univariate tests revealed that attributions to low effort = 5.73, p. = .02) and low ability (F = 6.35, p. = .01) were significantly different. This finding indicates that boys make low effort attributions following failure to a significantly higher degree than do girls. Conversely, girls attribute failure to low ability to a significantly higher degree than do boys.

To summarize, gender differences across the vast majority of attributional variables for both success and failure outcomes were

found to be nonsignificant. The variables investigated included individual attributions, the newly created attributional variables of "stable" and "unstable causes", the four individual emotions as well as the "unstable emotions" and "stable emotions" variables, and expected and obtained exam scores. Significant gender differences did emerge for the attributional variables of low effort and low ability following failure only. These were the only two significant differences among all attributional variables concerning gender. These two findings are discussed in detail in chapter 5.

Gender differences: Nonattributional variables. Two MANOVA's were also performed for the nonattributional variables of academic self-concept, ability level, and eight-item math quiz with gender serving as the independent variable. Results of the MANOVA for the success sample were nonsignificant (Wilks Lambda = .04, p. = .99). However, MANOVA results for the failure sample were significant (Wilks Lambda = 5.81, p. = .001). An investigation of subsequent univariate F tests for the failure sample indicated that only the math self-concept variable was significant with boys possessing higher academic self-concept than girls (F = 5.54, p. = .02). The math quiz variable was not significant (F = 2.57, p. = .11), nor was the ability ranking variable (F = 1.1, p. = .30). Thus, with the exception of the math self-concept variable among the failure sample, gender differences across nonattributional variables were uniformly nonsignificant. Thus, based on the bulk of evidence indicating nonsignificant gender differences among both attributional and nonattributional variables, male and female

subjects were combined for the purposes of conducting path analyses.

Classroom differences. Next, it was necessary to determine the appropriateness of combining data from all 16 classrooms for the purposes of conducting path analysis. To do this, a multivariate analysis of variance test was first conducted using student ability level and academic self-concept variables across the 16 classrooms. Results of this test were nonsignificant (Wilks Lambda = 1.40, p = .07). In addition, an ANOVA was undertaken for scores on the eight-item math quiz across the 16 classrooms. Results of this test were significant (F = 2.49, p = .002). However, post-hoc Scheffe tests did not identify any two classrooms that were significantly different with respect to scores on the 8-item math quiz at the 0.05 level of significance. Based on these findings, as well as those produced by the multivariate tests, data were combined for all 16 classrooms for the purposes of conducting the path analyses.

Use of classroom environment data. A multivariate analysis of variance was also conducted for the seven classroom environment subscales across classrooms. For the purposes of this test, the sample was not divided into success and failure subsets since the attributional data were not under consideration. The results of this analysis were highly significant (Wilks Lambda = 4.48. p = 0.001). Post hoc Scheffe tests indicated numerous differences across the seven subscales at the .05 level of significance. However, closer inspection of the specific differences among subscales within and between classrooms revealed classroom composite scores which could not be unambiguously distinguished from one another.

An additional exercise was conducted where Pearson product-moment correlations were calculated between each of the seven subscales and the nonattributional variable of math self-concept within each of the 16 classrooms. This exploratory exercise was performed to determine whether patterns of relationships might exist among features of classroom environment and other perception variables despite differences across classrooms based on the classroom environment data alone. Counter to expectations, results of the analyses revealed correlations which were close to zero in almost every case. These results were attributed to the influence of between-class effects, which served to attenuate the within-class effects when the data were aggregated for the analyses.

Thus, despite preliminary analyses which demonstrated the strength of the factor structure underlying this classroom environment measure, as well as the relatively high reliability estimates of the seven subscales, the presence of such strong classroom differences as evidenced in the MANOVA made it difficult to justify including this instrument for the purposes of path analysis. In addition, the absence of any pattern of relationships among classroom environment and other student perception variables provided no alternative justification for retaining the classroom environment data. As a result, the decision was made to exclude the classroom environment data from the series of path analyses, even though this meant eliminating a critical variable from the original model to be tested.

## The Path Analyses

In this section, a description of the series of separate path analyses conducted for both the success and failure samples is presented, followed by a discussion of the results of the analyses themselves. As indicated earlier, the entire series of path analyses was performed twice; once using the four individual attributional variables, and again using the "stable" and "unstable" causes variables with the reduced data set. Results are reported for both series of analyses. However, the findings based on the "stable" and "unstable causes" variables are considered less reliable than findings based on the individual attributions due to reduced data sets in most cases.

### Description of the Analyses

In this section, the results from two different series of path analyses are described. For both success and failure outcomes, the first series traces paths from the initial variable of predictive accuracy to each of the four individual attributions, to affective responses and future expectancy, through to final score on the second exam. In the second series, individual attributions are replaced by the "stable" and "unstable" causes and emotions variables for both success and failure samples and path analyses are performed despite the reduced sample sizes.

All of the analyses were performed using the regression procedure specified in SPSSx, Third Edition (1988). To illustrate the procedure in the case of a successful outcome, the five regression variables were first specified, namely, predictive accuracy, ability attributions, ability-linked emotions, future expectancy, and final

score. Next, ability attributions were specified as the dependent variable. The predictive accuracy variable was then entered using a forced entry procedure. All subsequent analyses were conducted using the forced entry procedure in order to examine the effects of all specified independent variables on dependent variables regardless of their level of tolerance. A forward entry procedure was also specified in order to ensure that variables in each block were added to the equation one at a time.

Series one: Results for failure. Findings related to the first series of analyses for failure are presented in Figures 5 to 8 and contain all relationships among variables. However, only those relationships which were significant at the .05 level are discussed. Means and standard deviations for variables present in all four analyses in this first series are presented in Table 12 and differ slightly from other tables due to variations in sample size. All path coefficients for this series of analyses are presented in Tables 1 through 4 in Appendix H. Table 5 in the Appendix provides a summary display of all of the relationships among variables for failure in this series. R square statistics representing the percentage of variance explained across each of the path models for this series are presented in Table 1 in Appendix I.

Figure 5 reports findings for low effort attributions and is based on data taken from 102 subjects who selected this attribution at or above the minimum score of three on the attribution measure. As can be seen, the variable of predictive accuracy correlates positively with future expectancy ($\beta = .30$, p. $= .002$) and obtained score ($\beta = .25$, p. $= .01$). Similarly, effort attributions also correlate

Table 12.

Means and Standard Deviations for the Variables of Predictive

Accuracy, Low Effort, Low Ability, Poor Luck, Task Difficulty,

Emotions, Future Expectations, and Obtained Score for a Failure

Outcome.

| Variable | Sample Size | M | S.D. |
|----------|-------------|-----|------|
| Low Effort | 102 | 3.57 | .65 |
| Predictive Accuracy | | -15.88 | 22.50 |
| Emotions-Effort | | 18.41 | 4.85 |
| Future Expectancy | | 75.20 | 17.68 |
| Obtained Score | | 68.12 | 23.77 |
| | | | |
| Low Ability | 77 | 3.63 | .78 |
| Predictive Accuracy | | -23.09 | 24.66 |
| Emotions-Ability | | 18.73 | 5.35 |
| Future Expectancy | | 66.39 | 18.01 |
| Obtained Score | | 59.43 | 23.57 |
| | | | |
| Poor Luck | 59 | 3.78 | .79 |
| Predictive Accuracy | | -19.83 | 9.87 |
| Emotions-Luck | | 19.36 | 5.95 |
| Future Expectancy | | 72.42 | 19.34 |
| Obtained Score | | 68.31 | 24.72 |
| | | | |
| Task Difficulty | 72 | 3.43 | .65 |
| Predictive Accuracy | | -23.43 | 23.87 |
| Emotions-Task | | 16.60 | 4.47 |
| Future Expectancy | | 67.40 | 17.80 |
| Obtained Score | | 61.19 | 24.94 |
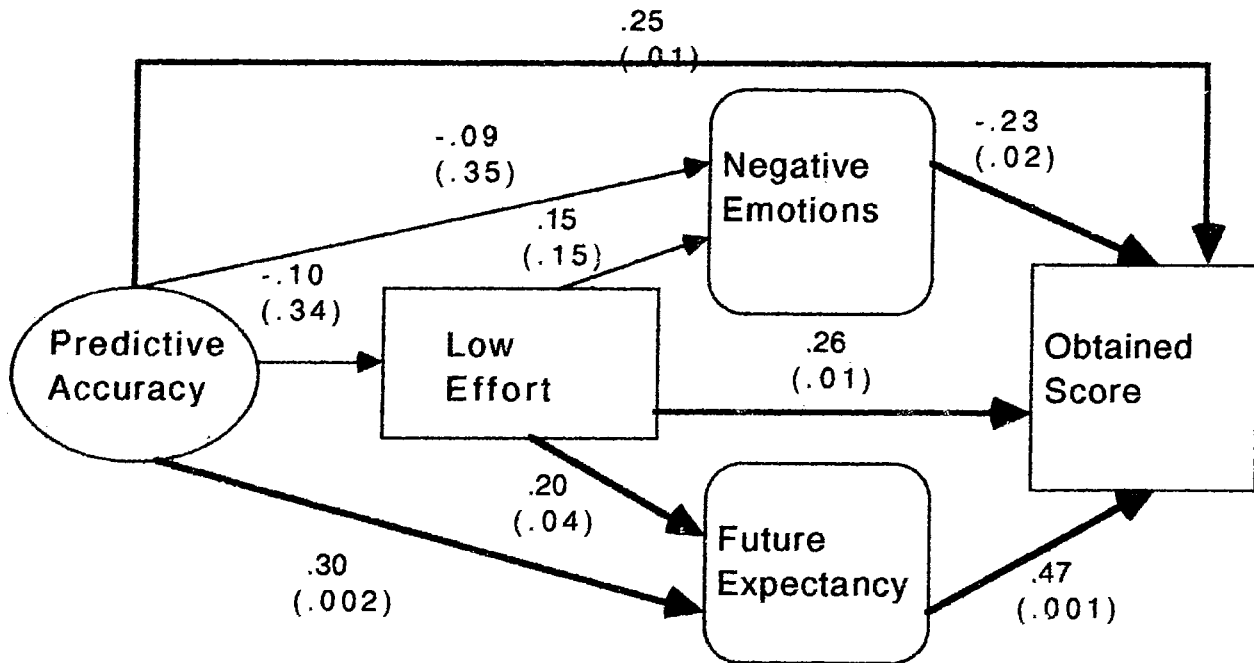
Figure 5. Path Analysis for Low Effort Attributions

Following a Failure Outcome. (N = 102)

Note: Probability levels are indicated in parentheses for

all path diagrams.

positively with future expectancy (ß = .20, p. = .04) and obtained score (ß = .26, p. = .01), whereas effort-linked emotions correlate negatively with obtained score (ß = -.23, p. = .02). The strongest relationship in this analysis exists between expected and obtained scores, with expected score being highly predictive of obtained score (ß = .47, p. = 02).

The second analysis examined relationships among variables for individuals who selected low ability attributions as a reason for failure. The sample size for this analysis is 77 and the relationships among variables are depicted in Figure 6. As can be seen, predictive accuracy correlates positively with obtained score (ß = .26, p. = .02), and ability attributions are predictive of negative affect following failure (ß = .23, p. = .04). Future expectancy is also highly predictive of obtained score (ß = .36, p. = .001).

Figure 7 presents path coefficients among variables for attributions to bad luck following failure. The number of subjects who selected this attribution at or above the midpoint was 59. Again, the variable of predictive accuracy bears a positive relationship to obtained score (ß = .28, p. = .03), while attributions to bad luck following failure are also predictive of negative affective reactions (ß = .30, p. = .02). Expected score is also highly correlated with obtained score (ß = .65, p. = .001).

The final analysis in this first series examines the relationships among variables for subjects who made attributions to test difficulty following failure. These relationships are presented in Figure 8 and are based on data provided by 72 subjects. As is evident, predictive accuracy bears a strong positive relationship to
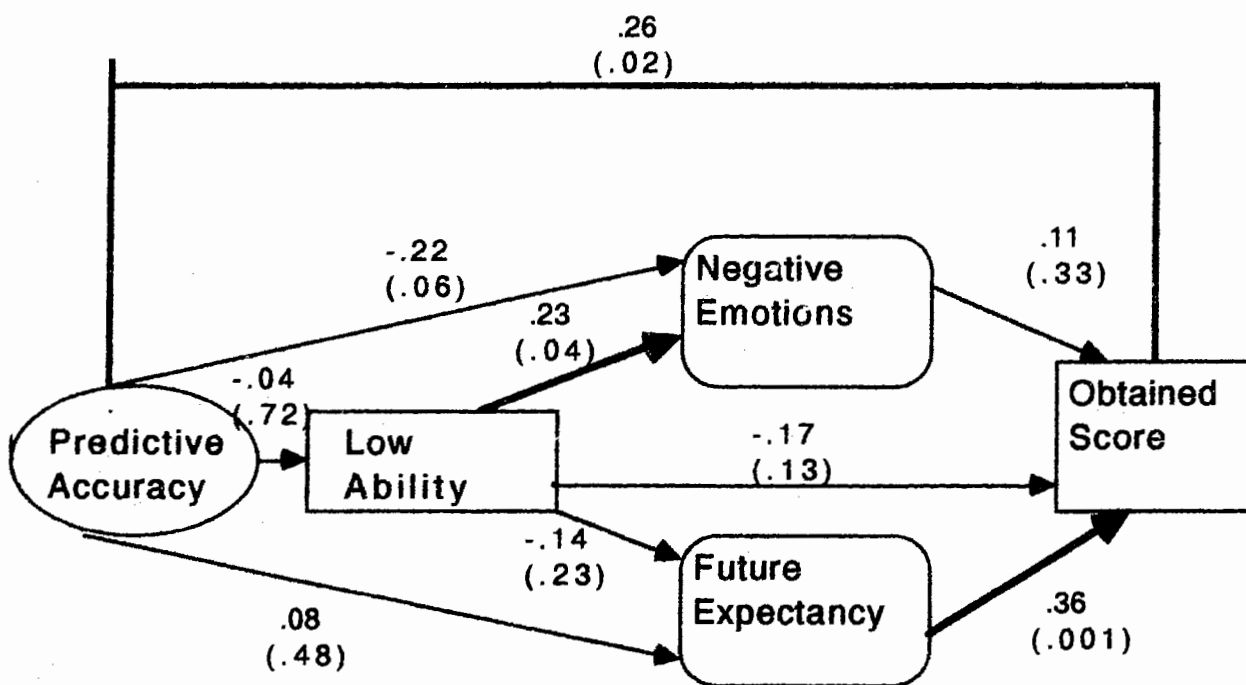
Figure 6. Path Analysis for Low Ability Attributions

Following a Failure Outcome. (N = 77)
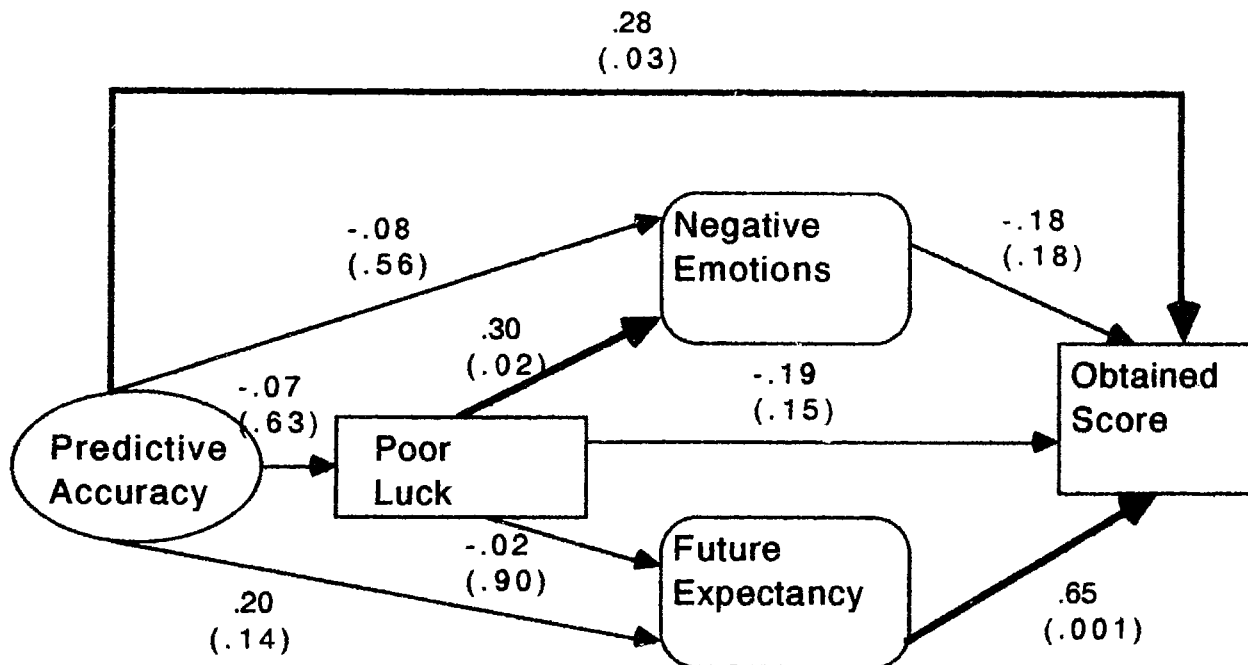
Figure 7. Path Analysis for Poor Luck Attributions

Following Failure. (N = 59)
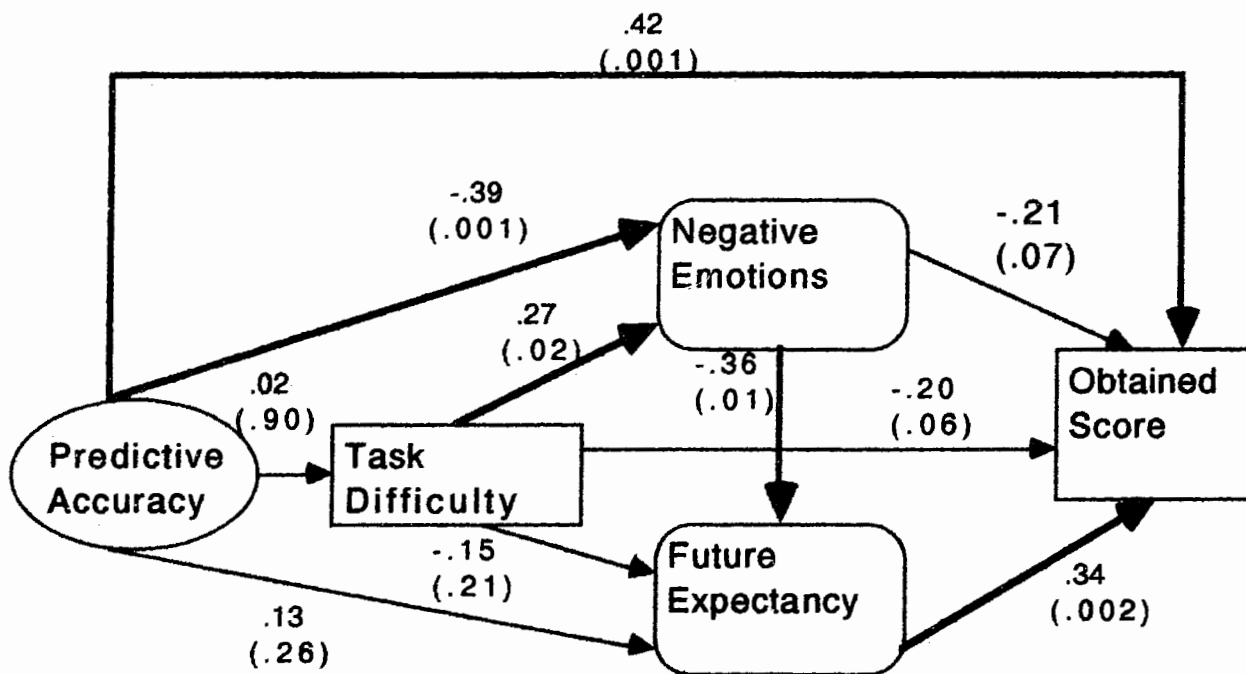
Figure 8.   Path Analysis for Task Difficulty Attributions

Following Failure.   (N = 72)

obtained score (ß = .42, p. = .001), but a strong negative relationship to negative emotions (ß = -.39, p. = .02). Attributions to test difficulty also bear a significant relationship to negative emotions, although positively (ß = .27, p. =.02). Negative emotions, on the other hand, bear a negative relationship to future expectancy (ß = -.36, p. = .01), whereas future expectancy bears a positive relationship to the obtained score variable (ß = .34, p. = .002).

Series One: Results for Success. The following four analyses describe relationships among variables for subjects who felt they experienced a successful test outcome. Figures 9 through 12 depict relationships among all variables including significance levels. Table 13 presents means and standard deviations for variables involved in the four analyses. All path coefficients are presented for variables involved in this series in Tables 6 through 9 in Appendix H. Table 10 in Appendix H presents a summary display of all the relationships among variables for success in this series. In addition, Table 1 in Appendix I presents R square statistics for each of the path models for success.

Figure 9 presents significant relationships for 156 subjects who made attributions to high effort following success at or above the midpoint of three on the attributional questionnaire. As can be seen, predictive accuracy correlates positively with positive emotions following success attributed to effort (ß = .24, p. = .003). In addition, effort attributions also correlate positively with positive emotions (ß = .29, p. = .001), and expected score correlates strongly with obtained score (ß = .43, p. = .001).

Table 13.

Means and Standard Deviations for the Variables of Predictive

Accuracy, High Effort, High Ability, Good Luck, Task Ease,

Emotions, Future Expectations, and Obtained Score for a

Success Outcome.

| Variable | Sample Size | M | S.D. |
|---|---|---|---|
| High Effort | 156 | 3.76 | .65 |
| Predictive Accuracy | | 7.06 | 15.61 |
| Emotions-Effort | | 23.16 | 4.15 |
| Future Expectancy | | 83.16 | 12.61 |
| Obtained Score | | 81.59 | 14.26 |
| High Ability | 143 | 3.92 | .78 |
| Predictive Accuracy | | 6.43 | 13.98 |
| Emotions-Ability | | 21.38 | 4.33 |
| Future Expectancy | | 86.94 | 10.42 |
| Obtained Score | | 84.27 | 13.92 |
| Good Luck | 73 | 3.51 | .73 |
| Predictive Accuracy | | 6.16 | 17.65 |
| Emotions-Luck | | 22.03 | 4.63 |
| Future Expectancy | | 79.62 | 13.84 |
| Obtained Score | | 79.22 | 14.57 |
| Task Ease | 151 | 3.79 | .75 |
| Predictive Accuracy | | 7.31 | 15.20 |
| Emotions-Task | | 19.77 | 5.06 |
| Future Expectancy | | 85.40 | 11.35 |
| Obtained Score | | 82.99 | 13.72 |
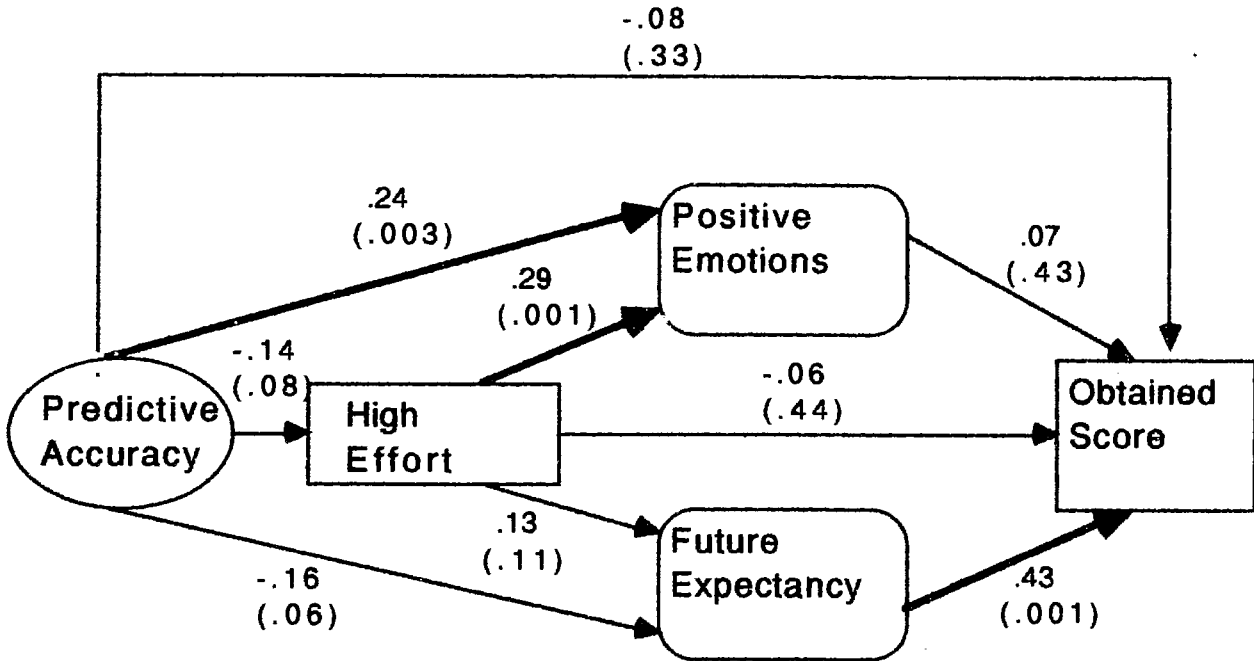
**Figure 9.** **Path Analysis for High Effort Attributions**

**Following Success.** (N = 156)

Figure 10 presents relationships among variables for 143 subjects who made attributions to ability following success at of above a score of three. In this analysis, predictive accuracy correlates positively with ability-linked emotions ($\beta$ = .18, p. = .04), but negatively with expected score ($\beta$ = -.19, p. = .03). Ability attributions bear strong positive relationships to both expected ($\beta$ = .47, p. = .001) and obtained ($\beta$ = .37, p. = .001) scores. Finally, expected score bears a positive relationship to obtained score ($\beta$ = .28, p. = .001).

Figure 11 presents relationships among variables for 73 subjects who attributed success to good luck following an exam outcome. As can be seen, predictive accuracy bears a positive association to subjects' tendency to make attributions to luck ($\beta$ = .28, p. = 02), while luck attributions are predictive of students' positive emotions in this situation ($\beta$ = .28, p. = .02). Moreover, students' expected scores are highly predictive of their obtained scores ($\beta$ = .38, p. = .001).

Relationships among variables for 151 subjects who attributed exam success to ease of the task are presented in Figure 12. In this analysis, positive emotions correlate negatively with obtained score ($\beta$ = -.22, p. = .01), task-ease correlates positively with expected score ($\beta$ = .29, p. = .001), while expected score correlates positively with obtained score ($\beta$ = .41, p. = .001).

Series Two: Results for Failure. In this series, the four attributional variables have been replaced by the "unstable causes" and "stable causes" variables. In addition, the "unstable emotions" and "stable emotions" variables have replaced the four original
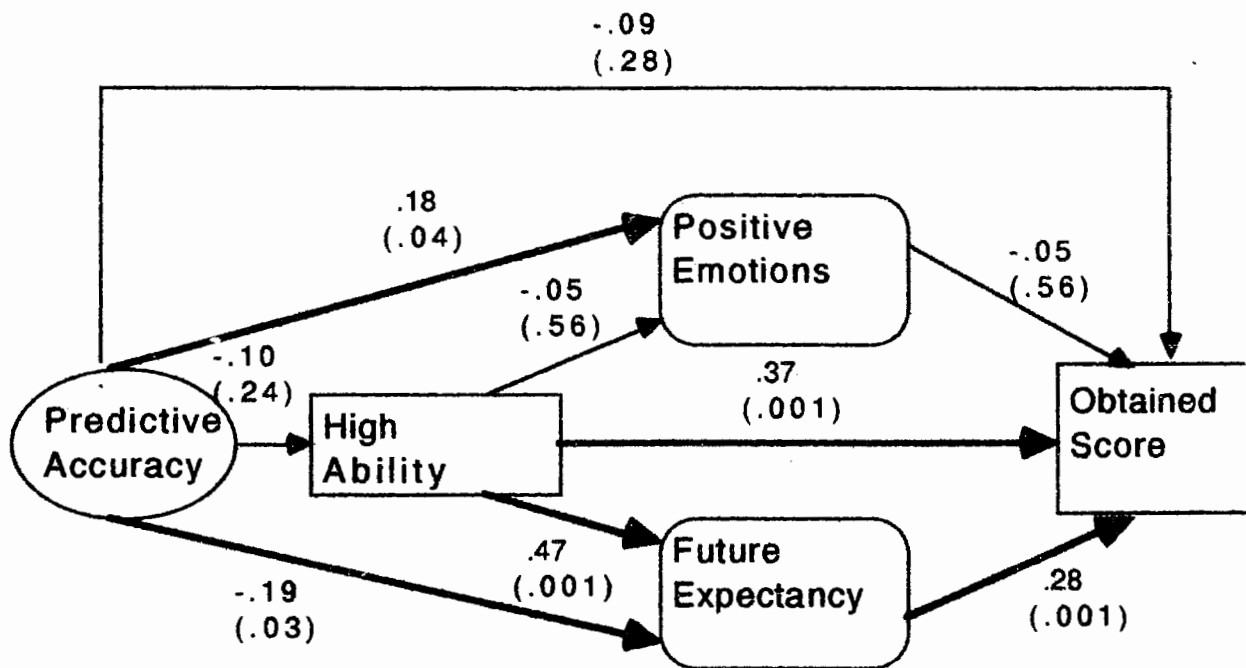
Figure 10.   Path Analysis for High Ability Attributions

Following a Successful Outcome.   (N = 143)
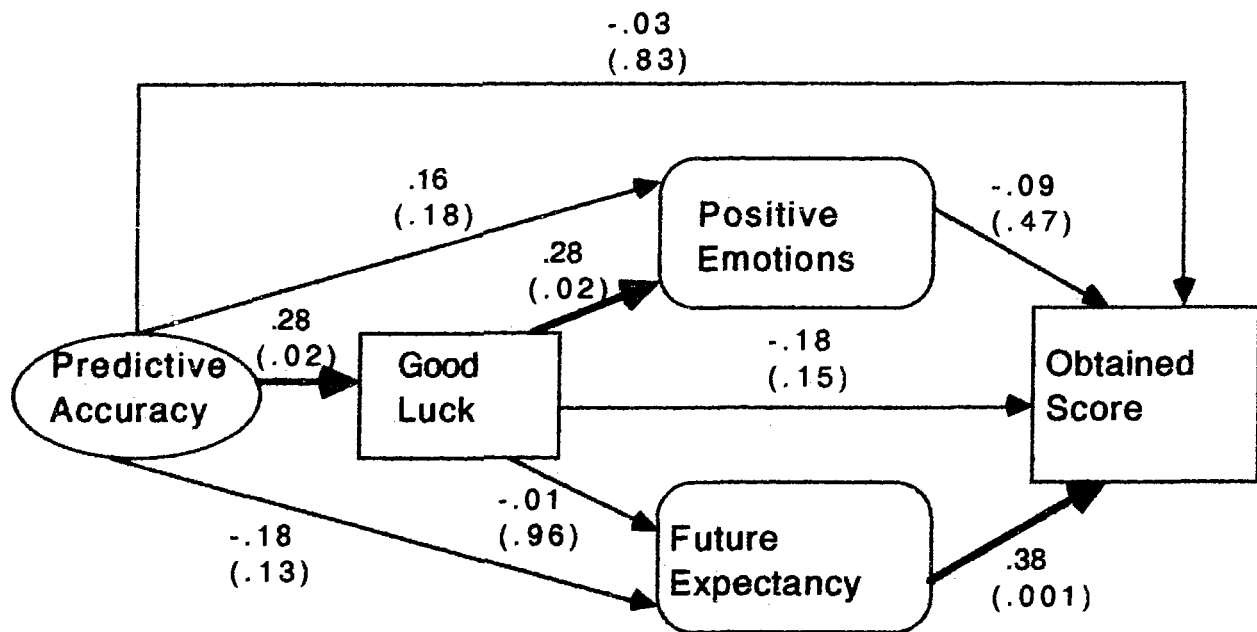
Figure 11. Path Analysis for Good Luck Attributions

Following a Successful Outcome. (N = 73)
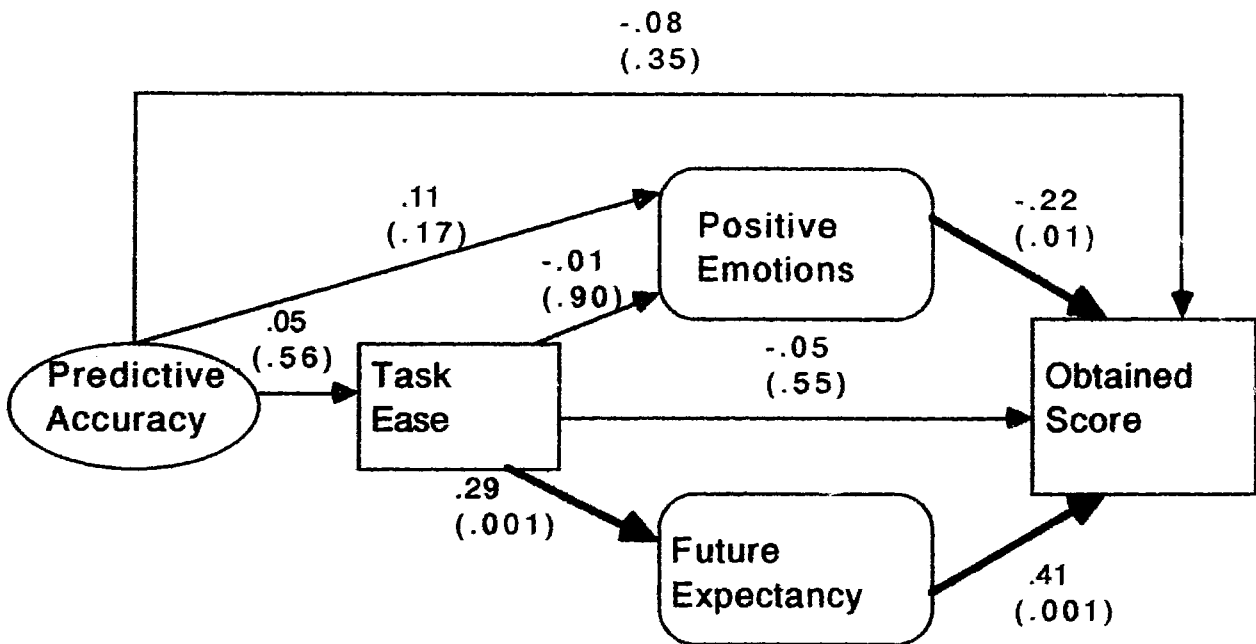
Figure 12. Path Analysis for Task Ease Attributions

Following a Successful Outcome. (N = 151)

emotion variables tied directly to ability, effort, luck, or task difficulty. In all other respects, this series is identical to the first series of analyses. Descriptive statistics for all variables involved in these two analyses are presented in Table 14. Figures 13 and 14 depict relationships among variables and their significance levels. Appendix H presents complete path coefficients for all variables involved in this series of analyses which can be found in Tables 11 and 12. Table 13 in Appendix H presents a summary display of all path coefficients among variables for both success and failure outcomes. The R square value for the stable causes path model following failure was .35, whereas the value for the unstable causes path model was .51.

Figure 13 displays significant relationships among variables for 39 subjects who attributed failure to unstable causes. As can be seen, there was only one relationship which attained an acceptable level of significance. In this case, exptected score is highly predictive of obtained score ($\beta = .67$, p. $= .001$).

Figure 14 displays the relationships among variables for 48 subjects who made attributions to stable causes following failure. In this analysis, predictive accuracy bears a negative relationship to stable emotions ($\beta = -.38$, p. $= .004$) but a positive relationship to obtained score ($\beta = .39$, p. $= ..01$). In additon, expected score bears a positive relationship to obtained score ($\beta = .27$, p. $= .04$). These were the only relationships among variables which reached a level of significance.

Table 14.

Means and Standard Deviations for Predictive Accuracy,

Stable and Unstable Causes, Negative Emotions, Future

Expectancy, and Obtained Score following a Failure Outcome.

| Variable | Size | M | S.D. |
|----------|------|-----|------|
| Unstable Causes | 39 | 3.74 | .62 |
| Predictive Accuracy | | -23.15 | 23.13 |
| Negative Emotions | | 19.21 | 5.32 |
| Future Expectancy | | 68.97 | 9.16 |
| Obtained Score | | 62.39 | 25.50 |
| | | | |
| Stable Causes | 48 | 3.58 | .46 |
| Predictive Accuracy | | -24.29 | 26.69 |
| Negative Emotions | | 17.96 | 3.99 |
| Future Expectancy | | 63.56 | 18.10 |
| Obtained Score | | 56.13 | 24.20 |
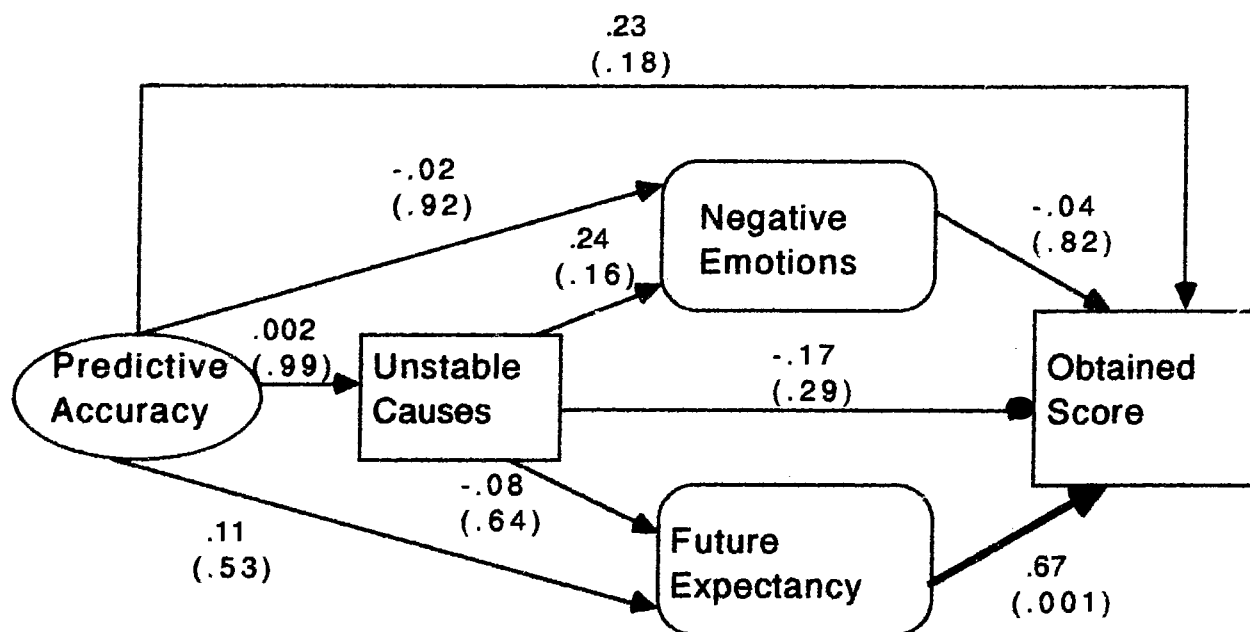
Figure 13. Path Analysis for Unstable Causes Attributions

Following a Failure Outcome. (N = 39)
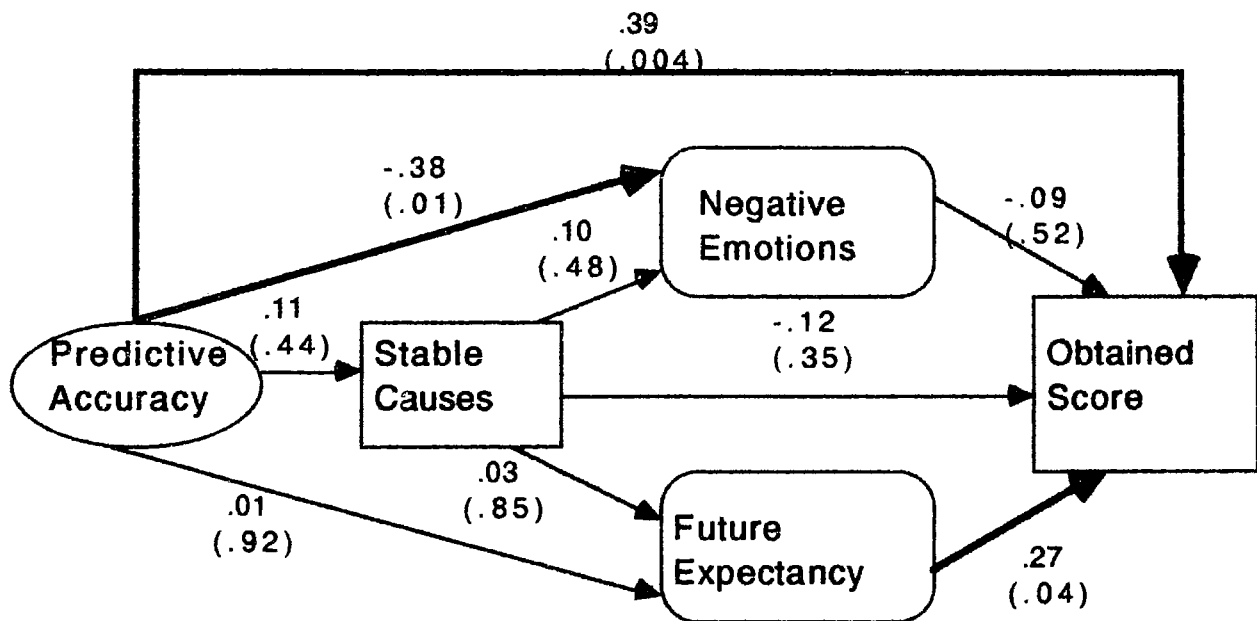
Figure 14. Path Analysis for Stable Causes Attributions

Following a Failure Outcome. (N = 48)

Series Two: Results for Success. In this final series, the variables of "stable" and "unstable" causes and emotions are introduced for subjects who experienced a successful exam outcome. Descriptive statistics for all variables involved in the two analyses are presented in Table 15. Figures 15 and 16 display relationships among variables and their level of significance. Path coefficients among all variables involved in the two analyses are presented in tables 14 and 15 in Appendix H. Table 13 in Appendix H presents a summary display of all path coefficients among variables for success along with failure. The R square value for the stable causes path model for success was .20, which was also the R square value for the unstable causes path model.

Figures 15 displays the relationships among variables for 68 subjects who attributed success to unstable causes. In this analysis, predictive accuracy is positively related to attributions to unstable causes ($\beta$ = .33, p. = .01), whereas unstable causes are predictive of unstable positive emotions ($\beta$ = .27, p. = .04). Students' expected scores are also predictive of their obtained scores ($\beta$ = .38, p. = .002).

Relationships among variables for 124 subjects who attributed success on their math exam to stable causes are presented in Figure 16. In this analysis, attributions to stable causes are predictive of expected future scores ($\beta$ = .24, p. = .01), and students' expected scores are predictive of their obtained scores ($\beta$ = .38, p. = .001). However, stable positive emotions are negatively related to students' obtained scores ($\beta$ = .25, p. = .01).

Table 15.

Means and Standard Deviations for Predictive Accuracy,

Stable and Unstable Causes, Positive Emotions, Future

Expectancy, And Obtained Score following a Successful

Outcome.

| Variable | Size | M | S.D. |
|---|---|---|---|
| Unstable Causes | 68 | 3.52 | .74 |
| Predictive Accuracy | | 6.27 | 17.59 |
| Positive Emotions | | 21.96 | 4.66 |
| Future Expectancy | | 79.52 | 14.06 |
| Obtained Score | | 78.37 | 14.41 |
| | | | |
| Stable Causes | 124 | 3.84 | .74 |
| Predictive Accuracy | | 6.71 | 14.18 |
| Positive Emotions | | 19.94 | 5.10 |
| Future Expectancy | | 86.83 | 10.57 |
| Obtained Score | | 83.32 | 14.10 |
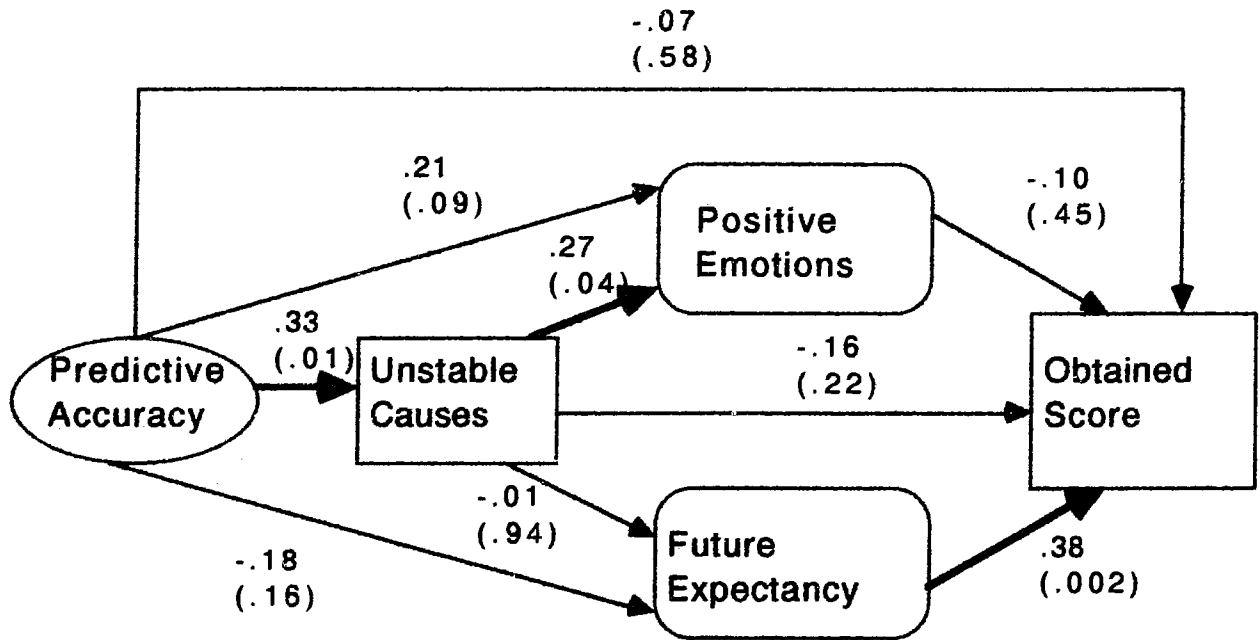
Figure 15. Path Analysis for Unstable Causes Attributions

Following a Successful Outcome. (N = 68)
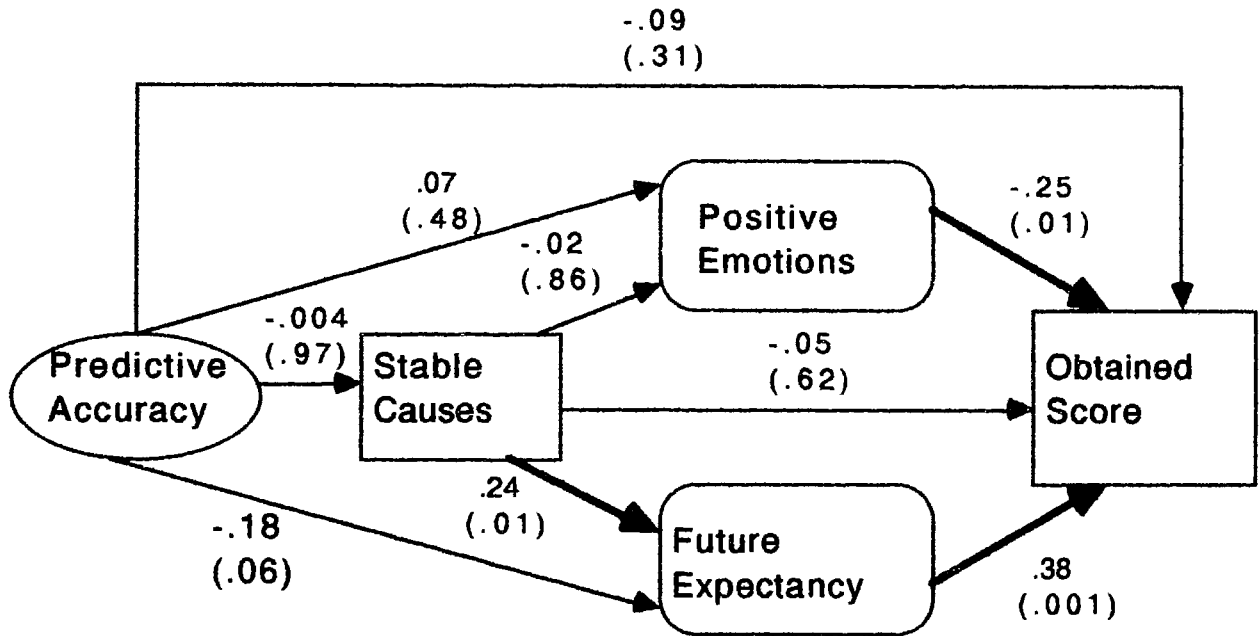
Figure 16. Path Analysis for Stable Causes Attributions

Following a Successful Outcome. (N = 124)

## Summary

To summarize, this chapter presented the results of two separate series of path analyses, as well as the results of a number of preliminary tests leading up to the path analyses. These preliminary tests included factor analyses of the four attributions across both success and failure situations, as well as of the six emotions within each of the four attributions for both success and failure. Findings from these tests indicated that attributions loaded on two factors along the stability dimension for success as well as for failure. Specifically, unstable attributions of effort and luck attributions loaded substantially on one factor, while stable attributions of ability and task difficulty lodaded significantly on a second factor. Each of the six affects loaded on a single factor for each the eight attributional possibilities across success and failure situations. Tests of reliability were also conducted for affective and classroom environmental variables, as well as other variables such as student rank, math self-concept, and an 8-item quiz. Finally, a series of univariate and multivariate analyses of variance tests were performed to determine whether gender and classroom differences existed within the sample. Based on these tests, gender differences with respect to stable attributions following failure were the only ones to attain a level significance across the entire sample. However, significant differences were found to exist across classrooms concerning the subscales of the classroom environment scale. Consequently, data derived from this scale were not included in the series of path analyses. The following chapter discusses the results of the two series of path analyses as well as the findings regarding gender differences.

# CHAPTER FIVE

## DISCUSSION AND IMPLICATIONS

### Overview

The results of this study are discussed within the context of the specific research questions posed in the first chapter. The chapter begins by reformulating the original hypotheses presented in chapter 1 and provides a rationale for doing so. Following this, findings are discussed as they relate to each of the new hypotheses. Implications of the present findings for future research in the field of attribution theory are also discussed.

### Reformulation of the Hypotheses

In the first chapter, four hypotheses were presented for both success and failure outcomes relating specifically to the links between effort and ability attributions on the one hand, and specific emotions such as guilt, shame, and humiliation on the other (see p. 17-18 for failure hypotheses, and p. 19 for success hypotheses). In addition, two exploratory questions were posed on page 22. The first centered on the nature of the relationship between students' academic self-concept and their attributional tendencies following success or failure. The second focussed on the nature of the relationship between classroom environment and students' attributional patterns.

As was indicated in the preceding chapter, the variable of classroom environment was eliminated from the series of path analyses due to highly significant differences for all 16 classrooms across all classroom environment subscales. Consequently, the exploratory hypothesis involving this variable was not investigated.

With respect to academic self-concept, the original research question was, "Does academic self-concept influence students' attributional style"? The uni- and multivariate analyses conducted in the previous chapter prior to the path analyses suggest strongly that this variable does indeed influence students' attributional tendencies. Details related specifically to this question are discussed in a later section of this chapter.

The four directional hypotheses stated for success and failure outcomes in Chapter 1 have been reformulated based on the results of the factor analyses and reliability tests for attributions and affects. These results indicated that individual affects within each attributional response were not clearly distinguishable from one another. This finding led to the formation of a single "emotions" variable for each attributional response across both success and failure outcomes which was then used throughout the series of path analyses. As a result of this modification, the original hypotheses have been reformulated in the following manner. The hypotheses for failure are presented first:

1. Causal ascriptions to low effort will give rise to strong expressions of negative affect, will increase expectancy of future success, and bear a positive relationship to behavioral outcome (i.e., obtained score).

2. Causal ascriptions to low ability will give rise to strong expressions of negative affect, will decrease expectancy of future success, and bear a negative relationship to behavioral outcome.

3. Causal ascriptions to poor luck will give rise to strong expressions of negative affect, will decrease expectancy of future success, and will bear a negative relationship to behavioral outcome.

4. Causal ascriptions to task difficulty will give rise to strong expressions of negative affect, will decrease expectancy of future success, and will bear a negative relationship to behavioral outcome.

The four revised hypotheses for path analyses relating to success outcomes are restated here in a single statement since, in all four attributional cases, the predicted relationships are the same:

Causal ascriptions to high effort, high ability, good luck, and task ease will give rise to strong expressions of positive affect, will increase expectancy of success, and will bear a positive relationship to behavioral outcome (i.e., obtained score).

Before concluding this section, some mention of the role of the predictive accuracy variable within the path analyses is warranted. Given that this is a new variable not previously investigated in attributional research, the following exploratory question is posed; "What relationship does predictive accuracy bear to the other attributional variables following success and failure outcomes"? This effect of this variable within each of the path analyses undertaken is addressed in the following section of the chapter.

## Results of the Study

Results of the study are discussed in the following order: Implications of the findings of the factor analyses and reliability tests for attributions and emotions are discussed first, followed by a discussion of the relationship between academic self-concept and students' attributional style. Results of the path analyses as they relate to the newly formulated hypotheses are then discussed.

### Factor Analyses

Attributions. The factor analyses performed on the four attributions of ability, effort, luck, and task difficulty revealed that these attributions are characterized chiefly along the stability-instability dimension. In the case of both success and failure, the unstable attributions of effort and luck loaded substantially on one factor, whereas the stable attributions of ability and task difficulty loading substantially on the second. Moreover, these factors were extracted after a single rotation.

These findings suggest that school-aged children perceive the four original causal attributions as primarily permanent and enduring, or as temporary and subject to change. These results tend to be consistent with previous factor analytic studies such as those conducted by Meyer (1980) and Meyer and Koelbl (1982). These authors found that student ability loaded on a factor identified as stability to a significantly higher degree than a host of other causes, including effort and luck. However, the overall factor loadings were lower than those produced in the present study. Moreover, task difficulty was one of the weakest contributors to the

stability factor in both studies, ranking only above mood, luck, and exam preparation.

The factor analytic findings of the present study represent an advance in current knowledge of students' perceptions of causal attributions, especially with respect to the potential link between the stability dimension in influencing students' thoughts, feelings, and actions in achievement contexts. These findings suggest strongly that the degree to which children perceive causes as being either internal or external, or controllable or uncontrollable may not be as important in influencing students' beliefs regarding the central determinants of causation as are perceptions regarding permanence or stability. That is, students' perceptions regarding the dimensions of locus of causality and degree of controllability may be less important than stability perceptions in determining subsequent tendencies with respect to emotions, and future expectancies.

The strength of this finding for this particular age group, coupled with the lack of similar empirical support in achievement contexts suggests that upper elementary-aged children may harbour views about personal causation that differ from older subjects, such as undergraduate university students. These views may, in turn, influence how these children feel about success and failure, as well as their level of optimism regarding performance expectations for the future. This finding suggests that perceptions of personal causality may exist along a developmental continuum, with younger children viewing causation as being more one-dimensional, and older students perceiving causes as more multidimensional in nature.

Emotions. A series of factor analyses for each of the six emotions across all eight attributional causes revealed that all six emotions within each attribution loaded exlusively upon a single factor. This finding suggests that school-aged children do not make fine grained distinctions between emotions such as embarrassment, shame, and humiliation in the event of failure, or between feelings of pride, satisfaction, and happiness following success. Additional tests of reliability revealed that the six emotions, when aggregated within each of the four attributions, accounted for at least 80% of the predicted variance. The lowest reliability estimate among these new affect variables was .80 for low effort following success, whereas the highest was .89 for affects related to poor luck following failure.

These findings indicate that the emotional responses of elementary school-aged children to success and failure outcomes are more global in nature than attribution-specific as suggested by Weiner's attribution theory. Simply put, children experience expressions of positive emotions following success and negative emotions following failure regardless of the attribution made for such outcomes. This pattern of responding provides support for Weiner's (1986) contention that emotions such as happiness and sadness always follow upon either a successful or unsuccessful event regardless of the attribution made subsequently to explain the outcome. As such, these emotions are "attribution independent".

However, the findings of the present study suggest that subjects respond in an "attribution-independent" manner even after specific causes are identified. This tendency among elementary

school-aged children runs contrary to Weiner's theorizing about attribution-affect relationships, which states that specific emotional reactions such as guilt or shame, or pride and satisfaction are elicited upon the selection of specific attributions to explain the outcome. These findings also contrast sharply with those reported by Covington and Omelich (1979a; 1984d), and Weiner, Russell, and Lerman (1978; 1979) who indicate that individuals do experience different emotional reactions and that these reactions tend to be attribution-dependent.

The findings of the present study suggest that distinctions among emotions which follow upon the selection of specific casual attributions may be a developmental phenomenon similar in kind to that described previously for attributions. That is, elementary school-aged children may perceive emotional reactions to achievment outcomes in a more global, nonspecific manner, whereas older students tend to make fine-grained distinctions between success and failure-linked outcomes. If this perspective is accurate, then specific attribution-affect relationships so firmly established in the research literature may not, in fact, represent a universal principle of attribution theory. Further research into children's emotional reactions to achievement outcomes and their link to specific attributions will determine more fully whether fundamental features of attribution theory are in need of revision.

## Academic Self-Concept and Attributional Tendencies

In this section, the relationship between academic self-concept and attributional tendencies among boys and girls are discussed. However, this relationship is positioned within a larger discussion

regarding significant gender differences which emerged as a result of the series of MANOVA's conducted in the previous chapter. The three significant differences were detected for a) attributions to low effort, b) attributions to low ability, and c) students' academic self-concept. All three differences occurred exclusively within the failure sample.

Results of the MANOVA's involving attributions across gender indicate that boys make low effort attributions following failure to a significantly higher degree than do girls. Moreover, results concerning low ability indicate that girls select this attribution to explain failure to a significantly higher degree than do boys. Finally, MANOVA results involving nonattributional variables indicate that boys who experience failure possess much stronger academic self-concepts than do girls who also fail.

Taken together, these findings suggest that boys tend to cope with failure more constructively than girls by attributing lack of success to causes that do not undermine their sense of personal competence. Moreover, not only are girls less inclined than boys to employ strategies which deflect self-images of incompetence, but they actively select low ability ascriptions to make sense of their failure. This pattern is reinforced by the additional finding that boys who experience failure nonetheless possess significantly stronger academic self-concepts than do girls who experience failure.

These gender differences tend to corroborate current findings in the attributional and learned helplessness research which demonstrate that girls as a group are more inclined than boys to

interpret failure as evidence of low ability, regardless of the reasons for such an outcome (cf., Covington & Omelich,1979b; Deaux, 1984; Dweck & Gilliard, 1975; Nicholls, 1975). Researchers such as Deaux (1984) have found consistently that females tend to attribute success to unstable causes and failure to stable causes, whereas typical male patterns are in the opposite direction. Moreover, other researchers have discovered that girls tend to consider high ability a less important attribute in achievment-related matters than do boys (Zander, Fuller, & Armstrong, 1972).

One interpretation of these results is that boys appear to be more confident in their abilities despite failure and possess a better academic sense of themselves than do girls. However, whether such perceptions are real or imagined is another matter. An alternative explanation for this pattern of findings may be that boys are less perceptive than girls in identifying the correct reasons for their failures. That is, boys may unwittingly select low effort to make sense of their failures even though low ability attributions may be more appropriate. While this explanation seems plausible, some educational researchers investigating social cognition in the classroom have found boys to be as equally competent as girls at distinguishing between effort and ability in achievement contexts (Blumenfeld, Pintrich, & Hamilton, 1986; Pintrich & Blumenfeld, 1985).

Another plausible explanation which has to do with the accuracy of causal perceptions is that boys may be affected more profoundly by the self-worth motive as described by Covington and Omelich,(1979b) than girls. The self-worth motive involves making

a conscious decision to ascribe failure to causes which do not threaten an individual's public or private image of personal competence. Such strategic causal reasoning permits the individual to retain a sense of self-esteem in the eyes of others as well as oneself.

This speculation is supported in part by previous research which indicates a tendency among boys to ascribe failure to low effort, as well as an inclination for defensiveness in matters concerning achievement (Snyder, Stephan, & Rosenfield, 1976). Moreover, boys indicate a stronger tendency to engage in self-agrandizement than girls (Stephan, Rosenfield, & Stephan, 1976). Previous research has also demonstrated that males experience significantly greater feelings of dissatisfaction following failure based on low ability than do females and view high effort expenditure in the event of failure as compelling evidence of incompetence (e.g., Covington & Omelich, 1979b). As such, the findings of this study provide partial support for the existence of a self-worth motive which may be influencing the attributional tendencies of boys. Further research aimed at investigating more directly the causal reasoning that influences children's decisions to select certain attributions over others will provide a better undertanding of the self-worth motive as an explanation for children's attributional behaviours.

## Results of the Path Analyses

In this section, significant results from the two series of path analyses are discussed. The first series deals with the four individual attributions of effort, ability, luck, and task difficulty for success and failure outcomes. The second series deals with the

newly formed attributional variables which emerged from the factor analysis, namely, stable and unstable causes. Results from both series are discussed in connection with the reformulated hypotheses presented earlier in this chapter.

Series One: Results for Failure

Low effort. In this path analysis, a number of Weiner's predictions regarding links between low effort attributions and other attributional variables were supported. To illustrate, low effort was highly predictive of both future expectancy and obtained score, indicating that students who make attributions to such internal, unstable, and controllable causes following failure harbour positive expectations about future performance. Moreover, students' low effort attributions following failure are positively associated with improved performance on the second exam. The strength of this positive relationship can be attributed, in part, to the fact that the mean for the obtained score on the second exam is nearly ten points higher than the mean for the score on the first exam. Students' expectations about enhanced future performance are also predictive of their actual performance, indicating further that perceptions of volitional control over outcome is positively related to students' performance at similar tasks in the future.

Negative emotions bore a negative relationship to obtained score, indicating that, the worse students feel about having failed due to low effort expenditure, the poorer they actually perform in the future. This finding is balanced by the fact that low effort ascriptions, which were highly predictive of both future expectancies and obtained scores, bore no significant relationship to

negative emotions. Somewhat contrary to Weiner's theorizing, this latter finding suggests that low effort ascriptions do not give rise to negative affective reactions in the event of failure, at least not to a level approaching significance (i.e., $\beta$ = .15, p. = .15). That is, students do not feel particularly badly about failing when the reasons for doing so are internal, amenable to change, and temporary rather than permanent. From this perspective, the dimensional features underlying the attribution become the most important determinants of whether significant levels of negative affect will be experienced in the event of failure. In this case, the controllable and unstable nature of the cause is enough to override any adverse feelings which might have been experienced due to the cause also being internal rather than imposed from without.

Another possible explanation is that this attribution-affect relationship is a function of the specific cognitive-developmental level of the subjects involved in the study. Unlike older students in achievement settings, early adolescents may simply not experience negative emotions when the reasons for failure have to do with low effort expenditure. This finding suggests that children at this age may not view effort expenditure as great a moral imperative as do most older students, or may not perceive its instrumental value to success as strongly as young adults. Consequently, they may experience less remorse or dissapointment when failure is the result of low effort rather than other factors. Partial support for this argument is found in the next analysis dealing with low ability following failure, where low ability ascriptions do give rise to negative emotional reactions.

Finally, students' degree of predictive accuracy was positively associated with future expectancy and obtained score. This finding suggests that students who overestimate their score on the initial exam, and who fail because of perceived low effort expenditure, nonetheless expect to perform significantly better on future exams and, in fact, do so.

In summary, the significant relationships which emerged from this initial path analysis are consistent with the bulk of previous attributional research which indicates that low effort attributions under failure conditions give rise to self-perceptions of improved expectations and future performance. At the same time, elementary school-age children do not appear to experience debilitating affective reactions to initial failure stemming from low effort expenditure. These findings further illustrate why attribution retraining programs tend to focus on encouraging individuals to attribute unsuccessful outcomes to internal, unstable, and controllable causes such as low effort.

Low ability. In this analysis, propositions regarding attribution-affect, and attribution-expectancy relationships under failure conditions were supported. Low ability was predictive of negative emotions indicating that, students who attribute failure to internal, stable, and uncontrollable causes such as low ability experience negative affective reactions in turn. Moreover, low ability attributions following failure do not give rise to increased future expectations or actual performance. Future expectations, however, were predictive of future performance following failure suggesting that increases in expected performance are associated with actual

performance increases despite low ability attributions. Predictive accuracy also bore a strong association to actual performance, indicating that, despite an overestimation of the actual score on the first exam, students' estimates are nonetheless predictive of higher scores on the second exam.

The latter two findings seem somewhat puzzling, especially since low ability estimates based on initial test performance should not, theoretically, permit other attributional variables to be associated with improved performance on a subsequent test. One potential reason for these associations may be that second math exams for subjects in this study were not based on the same topic as the first. That is, subjects responded to questions dealing with attributions, emotions, and future expectancies based on test results derived from an initial unit or topic of study (e.g., fractions), whereas the second exam was based on the next topic of study in the curriculum (e.g., integers). Because this study was conducted in classroom settings, it had to be developed around existing instructional and organizational practices. Participating teachers were unwilling to administer two highly similar tests on the same topic since this was not their typical practice.

A second, more likely explanation for this occurrence is the existence of a regression toward the mean effect with respect to first and second obtained scores across both success and failure situations. As can be seen in Table 4, the mean obtained score for the first math test is nearly 10 points lower than that obtained for the second. In the case of success, the opposite pattern is evident. That is, the mean obtained score for the first exam is higher than

that obtained for the second. Moreover, the means for the scores obtained on the second exam for both success and failure conditions are approximately 12 points apart, whereas the discrepancy between means for the obtained scores on the first exam for both groups is approximately 26 points. As such, this convergence toward a midpoint helps to explain why an overestimation of first exam score by low ability students following failure bears a positive relationship to obtained score on the second exam. This regression effect also helps to explain the positive relationship between expected and obtained scores.

Bad luck. In this analysis, propositions regarding external, unstable, and uncontrollable causes for failure such as bad luck were partially supported. Weiner predicts that bad luck attributions typically give rise to emotional reactions such as anger, depression, frustration, and feelings of stupidity (e.g., Weiner, Russell, & Lerman, 1979). In this study, attributions to bad luck following failure did indeed give rise to negative emotions, thus supporting general findings concerning this causal ascription in the attributional literature.

Other results are also consistent with theoretical predictions. To illustrate, attribution theory predicts that bad luck ascriptions, being external and unstable, should not give rise to increased expectations about future performance despite failure. This prediction was borne out by the data, which revealed a nonsignificant relationship between these two variables ($\beta$ = -.02, p. = .90). A strong correlation was obtained, however, for expected and obtained score variables, indicating that students who attribute

failure to an uncontrollable, unstable cause such as bad luck nevertheless expect to perform better in the future, and actually do so.

In addition, students' degree of predictive accuracy following failure was associated with improved performance on the second math test, despite the dimensional features underlying an attribution to bad luck. Once again, this finding may be a function of the regression toward the mean effect evident across first and second obtained scores for the entire sample. In the case of failure, the discrepancy betweeen means is large enough that a positive association between these two variables would not be unusual despite an overestimation of score, especially since the means for students' estimated scores for first and second exams are almost identical. Moreover, both scores differ only from the obtained score on the second exam by approximately five points.

Task difficulty. In this analysis, some of Weiner's theoretical propositions were supported whereas others were not. Theoretically, attributions to external, stable, and uncontrollable causes such as task difficulty following failure should give rise to expressions of negative affect and lower expectations about future performance. Both of these expectations were supported by the data, which indicate that students who attribute failure to task difficulty also experience strong negative emotions. Moreover, the relationship between task difficulty and future exptectancy was nonsignificant ($\beta = -.15$, p. $= .20$), suggesting no increase in expectations about future performance.

A number of relationships among variables were at odds with the theoretical expectations underlying Weiner's model. To illustrate, students' degree of predictive accuracy following failure was negatively associated with students' expressions of negative emotions ($\beta$ = -.39, p. = .001), whereas this relationship should, theoretically, be positive. That is, students' overestimation of their actual exam scores following failure should cause affective reactions to escalate rather than weaken. On the other hand, predictive accuracy bore no significant relationship to future expectancy, but was highly predictive of students' obtained scores. This latter finding suggests that an overestimation of the score obtained on the first exam is associated with improved performance on the second exam, despite the attribution to task difficulty. Once again, this relationship may be the result of a regression toward the mean effect which appears to have influenced all relationships between these two variables across all four analyses.

Another finding inconsistent with theoretical predictions underlying Weiner's attributional model is the significant negative relationship betweeen negative emotions and future expectancy. According to attribution theory, causal attributions give rise to affective reactions and future expectancies, rather than affective reactions influencing future expectancies. As can be seen in this analysis, however, negative emotions do influence expectancies in a negative fashion and to a significant degree ($\beta$ = -.36, p. = .01). This relationship suggests that negative emotions which emerge as a result of attributions made to task difficulty give rise to significantly lower expectations about future performance. This

finding sounds reasonable given that task difficulty is an external, stable, and uncontrollable attribution. However, as noted earlier, the relationship between task difficulty attributions and future expectancy was not significant. That is, attributions to task difficulty did not give rise concomittantly to emotional reactions and future expectancies even though such a pattern is expected according to the theoretical underpinnings of attribution theory. Instead, the attribution-expectancy relationship in this analysis is mediated to a significant degree by expressions of negative emotions. This is the only instance of this occurrence across all twelve path analyses.

A possible explanation for this unexpected finding is that significant associations among variables are attribution-specific and cannot be generalized within the context of a broader attributional framework. That is, the dimensional features of the particular attribution determines whether relationships among specific variables in the model may or may not exist. Particularly in the case of task difficulty, where the underlying dimensions represent the least amount of personal control, affective reactions may be strong enough to causally affect expectancies for future success. If this argument is plausible, then the general attributional axiom concerning the relationship (or supposed lack thereof) between emotions and expectancies may be in need of revision.

Summary. To summarize, some of the relationships among variables predicted by Weiner's Attribution Theory were supported whereas others were at odds with theoretical predictions.

Specifically, the positive relationship between low effort attributions and future expectancy, as well as between low effort and obtained score were in accordance with theoretical propositions that internal, unstable, and controllable attributions enhance expectations about future and actual performance. As such, these findings are in direct opposition to those produced by Covington and Omelich (1979a, 1984d) who, on two separate occasions reported significant negative correlations between low effort and expectancies, as well as nonsignificant relationships between low effort attributions and performance. Interestingly, low effort was the only attribution among the four which was not predictive of negative affect. This finding is important, since it suggests that certain basic tenets of attribution theory may be contstrained by the developmental level of the subjects, and may not be as universal as the majority of contemporary attribution theorists argue.

The second finding in support of Weiner's theory is the strong relationship between low ability attributions following failure and significant expressions of negative affect. The theory predicts that attributions to internal, stable, and uncontrollable causes will give rise to negative affective reactions and the data support this prediction. Furthermore, the lack of a significant relationship between low ability attributions and future expectancy is also in accordance with theoretical predictions which state that internal, stable, and uncontrollable causes for failure lead to reduced expectations about future performance.

Some findings were also contrary to theoretical predictions underlying Weiner's attributional model. Specifically, the absence

of a significant relationship between low effort attributions and expressions of negative affect was unexpected. Moreover, the absence of a significant negative relationship between low ability attributions and future expectancy was also unexpected. Finally, the presence of a significant relationship between negative emotions and future expectancy was contrary to the theoretical tenet which stipulates that emotional responses cannot give rise to expectations about future performance. These findings were discussed from a developmental perspective and suggestions were made that variations in attributional responses may exist across different age groups and therefore may not be generalizable to all subjects performing in achievement settings.

Another somewhat unexpected finding deserves mention. The strongest relationship across all four failure analyses was that between expected and obtained score. In every case, the correlation between these two variables was positive and significant at the .01 level or greater. This finding indicates that school-aged children's expectations for future performance are consistent with their actual performance regardless of the perceived cause of the failure outcome. Even when attributions do not correlate strongly with expected and obtained scores, the relationship between expected and obtained scores is highly significant. This finding suggests that the strongest predictor of children's actual scores in acheivement contexts is actually future expectancies, not causal attributions. This finding is in accord with previous findings cited by Weiner (1986) regarding the importance of future expectancies as a key mediator between causal attributions and performance outcomes.

Other researchers, such as Covington and Omelich (1979a) have also found that future expectancies are the strongest predictors of students' attributional tendencies in achievement settings.

## Series One: Results for Success

High effort In this analysis, all of the significant relationships were in accordance with attributional principles. To illustrate, attributions to high effort following success gave rise to expressions of positive affect. This finding indicates that success which is perceived to be the result of hard work leads to feelings of pride, satisfaction, and the like. Moreover, students' level of predictive accuracy, which in this case was an underestimation of actual performance, is also associated with strong expressions of positive affect. That is, receiving a test result which is better than expected leads to pleasant, or positive emotional responses. Finally, students expectations for future performance were highly predictive of the actual performance on the second test. This finding indicates that students who believe that they succeed because of high effort harbour positive predictions about future performances which are indeed borne out.

An unexpected finding was the presence of a nonsignificant relationship between high effort attributions and future expectancy. That is, students who attribute success to high effort do not increase their expectations for future success to a significant degree ($\beta = .18$, p. $= .11$). This finding was surprising, since effort is under volitional control and should influence significantly perceptions about future performance based on initial success. One possible explanation is that students may not feel certain that they

will be able to put forth the same amount of effort on the next test even though this attribution is internal and controllable. Consequently, their expectations about future performance are lower than might otherwise be expected. Interestingly, the only two analyses for which significant attribution-expectancy relationships emerged were high ability and test ease. Thus, only causes which are perceived as stable appear to give rise to enhanced expectations about future performance.

High ability. In this analysis, predictions central to Weiner's Attribution Theory were supported. High ability is an internal, stable, and uncontrollable attribution, and students who attribute success to this cause expect to perform well on the next exam and actually do so. Moreover, the strength of their expectations for the upcoming exam is highly predictive of their actual scores. Degree of predictive accuracy is also associated with strong expressions of positive affect, indicating that an underestimation of the extent of exam success gives rise to good feelings about the outcome.

Predictive accuracy, however, was negatively associated with expectations for future performance, indicating that students harbour less optimistic expectations about future performance despite an underestimation of their actual mark and attributions made to ability. This finding can be traced in part to the regression toward the mean effect which is evident for first and second obtained exam scores. As mentioned earlier, the mean for obtained score on the second exam was approximately five points lower than that obtained for the first test. Moreover, the obtained score mean on the second exam was only .09 of a point higher than the estimated

score mean for the first exam. making them practically identical (see Table 3). However, the underestimation of exam score in this analysis was based on a 4.4 discrepancy between estimated and obtained mean scores on the first exam with the obtained score being the higher of the two values. Consequently, these findings may have influenced a negative association betweeen predictive accuracy and future expectancies despite an underestimation of initial score.

A finding which deserves mention is the nonsignificant relationship between attributions to high ability and positive affect ($\beta$ = -.05, p. = .56). This finding suggests that students who attribute success to ability do not necessarily experience good feelings about the outcome. This finding is contrary to that reported by Covington and Omelich (1984) and Weiner (1986) where ability and effort attributions following success were both highly predictive of expressions of positive affect. Moreover, since ability is a stable, internal attribution, success perceived to be the result of high ability should give rise to positive feelings about oneself. The fact that such attributions do not give rise to positive feelings suggests that students do not feel emotionally uplifted when success is based on stable characteristics. This finding is further supported by the lack of a significant relationship between attributions to test ease and positive affect. Similar to ability, test ease is a stable attribution. On the other hand, attributions to high effort and good luck both correlate significantly with positive emotions. Moreover, both of these attributions are unstable.

Good luck. In this analysis, only three relationships among variables were significant, although the basic principles of

attribution theory were supported. First, attributions to good luck produced strong feelings of positive affect. Since luck is an external, unstable, and uncontrollable attribution, perceptions of having succeeded due to good fortune should give rise to positive feelings concerning the outcome. The attribution-affect relationship present in this analysis conforms to this pattern.

A second result supportive of attributional principles is the positive relationship between predictive accuracy and attributions to good luck. For this group of students, the extent of the underestimation of scores obtained on the first exam is significantly related to good luck attributions as a means for explaining this successful result. That is, students who are surprised by the extent of their success select luck as the explanation for such an outcome, rather than perceiving the cause as being linked to either high effort, ability, or the ease of the task. Interestingly, good luck was the only casual attribution which bore a significant relationship to the predictive accuracy variable in the entire first series.

The lack of a significant relationship between luck attributions and future expectancy is also in accordance with attributional principles, since individuals who attribute success to external, unstable, and uncontrollable causes such as good luck should not harbour enhanced expectations about future performance on similar tests. Finally, estimates regarding future performance following initial exam success were highly predictive of actual performance despite attributions to good luck. That is, students held optimistic expectations about future performance that correlated positively

with their actual performance even though they perceived their initial success to be the result of such an unpredictable cause as luck.

Task ease. In this analysis, a number of attributional predictions were upheld, although some were not. In support of Weiner's model, attributions to task ease following success were predictive of expectancy of future performance. Although task ease is an external and uncontrollable cause, it is also a stable cause which should enhance students' predictions about future performance following initial success. However, attributions to task ease did not give rise to significant expressions of positive affect. This finding is also in accord with theoretical predictions regarding this attributon. When success at a task is thought to be due to a cause which is both external to the individual and subject to manipulation by another (i.e., teacher), then success due to the ease of the task is assumed and does not give rise to positive emotions. Expectations regarding future performance on the part of students who attributed success to test ease were also predictive of scores obtained on the second test. In other words, students who thought the first test was easy expected to do well on the second test and actually did so.

One finding which is somewhat contrary to theoretical expectations is the negative association between attributions to task ease following success and obtained score on the second test. This finding suggests that the stronger the attribution to task ease following the first test, the poorer the performance on the second test. However, as can be seen in Table 3, students' mean obtained scores on the second test were, in fact, lower than their mean

obtained scores on their first test, a finding which has been attributed to a regression toward the mean effect. As such, this negative association between task ease attributions and obtained score may be a function of this effect.

Summary. To summarize, general principles of attribution theory were suppported across the four success analyses. Attributions to high effort gave rise to expressions of positive affect, whereas attributions to high ability were predictive of expectations about future performance as well as performance per se. Across all four analyses, expected score was the strongest predictor of actual score. Some unexpected findings included the lack of a significant relationship between high ability attributions and positive emotions, and the negative relationship between attributions to task ease and obtained score.

## Series Two: Results for Failure

In this series, the success and failure analyses were performed using the stable and unstable causes variables in place of the four individual attributions. Results for failure are reported in this section, whereas those for success are reported in the next.

Unstable causes. This analysis was based on data obtained from a sample of 39 subjects who qualified to be included. The only significant relationship to emerge among the variables was that between expected and obtained score. In this case, future expectations among students who attributed failure on the first exam to unstable causes were highly predictive of their actual performance on the second exam. That is, students expected to perform better and actually did so. As noted in the previous series,

this finding is consistent with attributional principles regarding students' performance estimates for future tasks when failure has been attributed to unstable sources, especially low effort.

Stable causes. This analysis was based on data obtained from 48 students and produced three significant correlations. Two of these results were inconsistent with attributional speculations, whereas one was consistent with the theory. Predictive accuracy was negatively associated with negative emotions. That is, students' overestimation of their initial test score gave rise to significantly weaker expressions of negative affect following failure ascribed to stable causes. This finding seems curious, since such an overstimation, coupled with attributions to unchangeable causes should produce strong feelings of negative affect. That this is not the case suggests that, the greater the overestimation of score for students experiencing failure due to stable causes, the less upset they are by the outcome.

Some researchers have discovered that this type of relationship is not entirely atypical for students, especially for those students who experience frequent failures. To illustrate, Covington and Omelich (1981, 1985) demonstrated that, as failures mount for students over the course of a semester or year, opportunities to deflect low ability attributions to low effort become reduced to the point where some students adopt a "failure accepting" perspective toward achievement tasks. Failure accepting students are those who, through successive failures, have come to view such outcomes as inevitable and are no longer surprised by such negative results when they occur. Consequently, their emotional responses may be

less negative as a result of this expectation bias. As such, students in this study who attributed failure to stable causes may be have been acting in a failure accepting manner and, consequently, experienced reduced expressions of negative affect.

Equally preplexing is the positive relationship between predictive accuracy and obtained score, which suggests that an overestimation of first score among students who attribute failure to stable causes is associated with better the performance on the second exam. Once again, the regression toward the mean effect evident for obtained scores across both success and failure situations may offer the best explanation for this finding.

Finally, expectations for future performance based on stability-linked failure on the initial test were significantly predictive of actual performance. That is, students' performance estimates were highly similar to their actual scores. An examination of Table 4 indicates that these two scores differ by approximately five points for students who experienced failure. This finding suggests once again that future expectancy is the most powerful predictor of future performance, irrespective of the dimensionality characteristics underlying causal attributions for failure.

Series Two: Results for Success

In this section, results for path analyses involving unstable and stable causes following success are discussed. The sample sizes for these two analyses are 68 subjects for unstable causes and 124 subjects for stable causes.

Unstable causes. In this analysis, theoretical principles of Weiner's attributional model were supported by the three significant

relationships among variables. To illustrate, attributions to unstable causes following success gave rise to strong expressions of positive affect. That is, students who believed that their success was due to conditions which could change in the future felt good about this particular outcome. The absence of a significant relationship between attributions and future expectancy in this analysis indicates that students who believed that they succeeded because of unstable reasons did not possess significantly high expectations about their future performance.

This analysis also indicates that students' expectations about future performance were predictive of their actual performance. In other words, performance estimates of students' who attributed their intial success to unstable causes were very similar to their true performance. Finally, students' level of predictive accuracy was strongly associated with attributions to unstable causes following success. This finding indicates that students who underestimate the extent of their successful test score nevertheless tend to attribute such success to unstable, or potentially changeable causes.

Stable causes. In this analysis, two of the three relationships among variables were in accordance with attributional principles, whereas one was not. To illustrate, attributions to stable factors following success were predictive of future expectancies. That is, students who believed that they performed well because of factors which remain unchanged over time harboured highly optimistic expectations about their future performance. Students' expected scores were also highly predictive of their obtained scores. This

finding suggests that the performance estimates of students who attributed success to stable reasons were very similar to their actual performance.

On the other hand, the negative relationship between positive emotions and score obtained on the second math test is perplexing. This finding suggests that increases in expressions of positive affect following success are associated with significantly poorer levels of performance on the second math test. This finding is somewhat curious since positive emotions should, theoretically, bear a positive relationship to performance on an exam which was similar to the first. However, the relationship between stable causes and positive emotions was not significant in this analysis, nor was the relationship for these two variables under high ability or task ease attributions. As discussed previously, these findings indicate that students do not feel particularly elated about having succeeded because of stable causes such as high ability or task ease. As such, this lack of emotional experession, coupled with a mean obtained score on the second exam which was lower than that for the first (see Table 3) may have played a role in influencing the negative association between these two variables.

Interestingly, there were only three cases across all twelve analyses where the relationship between emotions and obtained score was significant. In addition to the present example, the relationship between negative emotions and obtained score for low effort, and the relationship between positive emotions and task ease were significant. In all three cases, this relationship was negative. These findings indicate that increases in the level of emotional

expression, whether positive or negative, or under success or failure conditions, are always associated with poorer performance on a subsequent exam whenever the relationship is significant.

Summary. Patterns among attributional variables involving stable and unstable causes tended to conform to general attributional principles for success outcomes. Success due to unstable causes produced strong expressions of positive affect, whereas success perceived as being the result of stable causes gave rise to increased expectations about future performance. Since the stable and unstable causes analyses for failure were based on 39 and 48 subjects respectively, few significant relationships emerged. For all four analyses, however, future expectancy was the strongest predictor of actual performance. In every case, the relationship between these two variables attained a level of significance. Moreover, the direction of this relationship was always positive. This overwhelmingly positive finding indicates that students' personal expectations for future performance always predict their actual level of performance, irrespective of outcome, attribution, or intensity of emotion.

## Conclusion

The broad intention of this study was to explore whether Weiner's Attribution Theory of Achievement Motivation had any relevance for elementary school-aged children. More specifically, the aim was to determine whether the causal linkages among variables predicted by the theory would be supported for children studying mathematics in actual classroom settings. Overall, the results suggest strongly that the basic tenets underlying Weiner's

attributional model be accepted as a means for seeking greater understanding of children's achievement strivings in classroom contexts. In the vast majority of cases, Weiner's theoretical propositions were upheld. Moreover, in cases where propositions were not supported, relationships among variables were usually in the hypothesized direction, but did not attain a level of significance. Most notable of these was the nonsignificant relationship between low effort attributions and negative emotions following failure, and the nonsignificant relationship between high ability and positive emotions following success. However, low effort attributions following failure and high ability attributions following success were the only two attributions significantly predictive of students' obtained scores on the second exam. The most powerful association across all twelve path analyses, however, was that between expected and obtained scores. The consistency of this finding suggests strongly that this relationship is affected neither by nature of the outcome nor the attribution for the outcome.

Findings regarding gender differences were also supportive of currently held views in the field of attribution theory. Girls who experience failure typically make attributions to low ability, whereas boys tend to attribute failure to low effort. Moreover, boys who experience failure possess significantly higher academic self-concepts than do girls who fail.

However, a number of findings in this study go beyond merely corroborating existing tenets of attribution theory. Elementary school-aged children perceived and made sense of causal attributions chiefly along the stability dimension, indicating

strongly that the degree to which a cause is perceived as enduring or temporary is more important to this age group than the extent to which it is viewed as either internal or external, or controllable or uncontrollable. These same children also appeared to respond emotionally to success and failure experiences in a more encompassing or global manner, rather than in a discrete fashion. Moreover, this pattern of responding was consistent across all eight individual attributional situations.

## A Final Remark

In the first chapter, Weiner was quoted as saying, "Unfortunately, the achievement literature does not yield unambiguous proof in support of the complete attributional theory, in part because the conception has only recently been fully developed, in part because even recent investigations have not included all the pertinent variables, and in part because some of the findings have been disconfirmatory" (p. 166). At a later point, Weiner (1986) went on to say, somewhat cautiously, that "...although the jury is still out, there is reason for optimism and the expectation of a favorable decision for the attributional litigant (p. 180)". Results from this study suggest that there is indeed reason for optimism, since the majority of the findings offer strong support for the basic principles of attribution theory. However, the results also suggest that some modifications may need to be introduced to make the theory more representative of individuals performing at different cognitive and/or developmental levels in achievement settings. Future research needs to address a developmental hypothesis in attribution theory, focussing

specifically on how perceptions of attributions and emotions may change across the life span. This focus will also require that more attributional research be carried out in naturally occurring classroom settings where students are engaged in real-life, meaningful tasks. Future research in this area should also include more tests of the complete attributional model as opposed to investigations of smaller, more descrete linkages so characteristic of the bulk of the research to date. Research which attempts to investigate the totality of the model will, hopefully, bring us closer to an understanding of the true value of Weiner's attribution theory of achievement motivation for children.

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Appendix A

Information about Participants

Table 1.

Class Number, Size, Teacher Gender, Number of Consenting

Students,and Actual Number of Boys and Girls Present during

the Class Visitation.

| | | | | Students Present During Visitation | |
|---|---|---|---|---|---|
| Class Number | Class Size | Teacher Gender | Consenting Students | Male | Female |
| 1 | 31 | Male | 26 | 8 | 16 |
| 2 | 27 | Female | 24 | 11 | 12 |
| 3 | 31 | Male | 31 | 14 | 16 |
| 4 | 26 | Female | 23 | 14 | 6 |
| 5 | 31 | Male | 27 | 11 | 15 |
| 6 | 28 | Female | 26 | 15 | 11 |
| 7 | 28 | Female | 28 | 14 | 11 |
| 8 | 24 | Male | 21 | 7 | 12 |
| 9 | 26 | Female | 26 | 12 | 12 |
| 10 | 28 | Female | 27 | 15 | 10 |
| 11 | 25 | Female | 24 | 14 | 10 |
| 12 | 27 | Male | 26 | 16 | 9 |
| 13 | 34 | Male | 34 | 18 | 15 |
| 14 | 30 | Male | 30 | 16 | 13 |
| 15 | 27 | Male | 25 | 13 | 10 |
| 16 | 31 | Male | 30 | 14 | 16 |
| TOTAL: | 454 | | 430 | 212 | 194 |

Table 2.

Class Number, Choice of Textbook, Topics for

First and Second Tests, and their Point Value.

| Class | Textbook | Topic #1 | Topic #2 | Test Value |
|-------|----------|----------|----------|------------|
| 1 | Mathematics 7 | fractions | number theory | 27 |
| 2 | Advent. in Math | fractions | ratio, rate, % | 50 |
| 3 | Advent. in Math | fractions | measurement | 25 |
| 4 | Mathematics 7 | fractions | problem-solving | 40 |
| 5 | Advent. in Math | Geometry | ratio, rate, % | 60 |
| 6 | Mathematics 7 | misc. | integers | 50 |
| 7 | Mathematics 7 | fractions | measurement | 50 |
| 8 | Advent. in Math | fractions | problem solving | 22 |
| 9 | Advent. in Math | fractions | geometry | 50 |
| 10 | Mathematics 7 | geometry | problem solving | 28 |
| 11 | Advent. in Math | statistics | ratio, rate, % | 40 |
| 12 | Mathematics 7 | fractions | number theory | 40 |
| 13 | Advent. in Math | fractions | integers | 50 |
| 14 | Advent. in Math | geometry | ratio, rate, % | 21 |
| 15 | Advent. in Math | integers | geometry | 40 |
| 16 | Mathematics 7 | fractions | ratio, rate, % | 50 |

NOTE:   The two textbooks are Mathematics 7 (1988, MacMillan), and Adventures in Mathematics (1988, Houghtin-Mifflin).

Table 3.

Ethnic Background of Students by Class.

| Class | Caucasian | Asian | S.E. Asian | Hispanic | East Indian | Native Indian | Other |
|---|---|---|---|---|---|---|---|
| 1 | 19 | 4 | 3 | 0 | 0 | 0 | 0 |
| 2 | 12 | 12 | 0 | 1 | 0 | 0 | 0 |
| 3 | 7 | 10 | 5 | 3 | 4 | 1 | 0 |
| 4 | 10 | 10 | 2 | 1 | 0 | 0 | 0 |
| 5 | 7 | 12 | 9 | 1 | 0 | 0 | 0 |
| 6 | 20 | 3 | 1 | 1 | 1 | 0 | 0 |
| 7 | 9 | 11 | 4 | 0 | 4 | 0 | 0 |
| 8 | 2 | 7 | 3 | 0 | 0 | 5 | 2 |
| 9 | 19 | 6 | 0 | 0 | 0 | 1 | 0 |
| 10 | 26 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11 | 7 | 7 | 1 | 0 | 9 | 0 | 0 |
| 12 | 3 | 7 | 3 | 3 | 4 | 0 | 6 |
| 13 | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| 14 | 3 | 14 | 4 | 0 | 6 | 3 | 2 |
| 15 | 7 | 8 | 4 | 1 | 5 | 0 | 0 |
| 16 | 2 | 27 | 1 | 0 | 0 | 0 | 0 |
| TOTAL: | 153 | 138 | 40 | 11 | 33 | 10 | 11 |

NOTE: "Other" for Class 8 (2 = African)
Class 10 (1 = Middle Eastern)
Class 12 (3 = Filipino; 3 = Figian)
Class 14 (2 = 'Mixed').

The teacher for class #13 refused to provide ethnicity data.

Appendix B

The Motivational Booklet

STUDENT BOOKLET

Name_____

Class_____

Age: (circle one)  11    12    13    14

Gender: (check one) Male___ Female___

---

## D I R E C T I O N S

Look at the mark you received on your math exam.

Do you consider this mark to be a good mark for you?____
                                        or a poor mark for you?____(check one).

If you consider your mark to be a good mark, please turn to PAGE 1.

If you feel that your mark is a poor mark, please turn to PAGE 5.

---

<u>PLEASE COMPLETE THE FOLLOWING QUESTIONS IF YOU FEEL
THAT YOUR MARK IS A GOOD MARK</u>

1.  "How much do you think that your good mark on this test
    was due to you TRYING REALLY HARD?"

    very much _____
    quite a bit _____
    somewhat _____
    very little _____
    not at all _____

        IF YOU ANSWERED "VERY MUCH", "QUITE A BIT" OR
        "SOMEWHAT" TO QUESTION # 1, COMPLETE QUESTIONS
        1a THROUGH 1f BELOW:

    1a.  "Because you TRIED REALLY HARD, how PROUD
          do you feel about getting a good mark?"

            very much _____      very little_____
            quite a bit _____    not at all _____
            somewhat _____

    1b.  "Because you TRIED REALLY HARD, how SATISFIED
          do you feel about getting a good mark?"

            very much _____      very little _____
            quite a bit _____    not at all _____
            somewhat _____

    1c.  "Because you TRIED REALLY HARD, how SURPRISED
          do you feel about getting a good mark?"

            very much _____      very little _____
            quite a bit _____    not at all _____
            somewhat _____

1d. "Because you TRIED REALLY HARD, how THANKFUL
    do you feel about getting a good mark?"

    very much _____    very little _____
    quite a bit_____    not at all _____
    somewhat _____


1e. "Because you TRIED REALLY HARD, how HAPPY
    do you feel about getting a good mark?"

    very much _____    very little _____
    quite a bit _____    not at all _____
    somewhat _____


1f. "Because you TRIED REALLY HARD, how RELIEVED
    do you feel about getting a good mark?"

    very much _____    very little _____
    quite a bit _____    not at all _____
    somewhat _____

2. "How much do you think that your good mark on this test
   was due to the fact that you're SMART IN THIS SUBJECT?"

    very much _____
    quite a bit _____
    somewhat _____
    very little_____
    not at all _____

IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR
"SOMEWHAT" TO QUESTION #2 COMPLETE QUESTIONS
2a THROUGH 2f BELOW.

2a. "Because YOU'RE SMART IN THIS SUBJECT, how PROUD
do you feel about getting a good mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

2b. "Because YOU'RE SMART IN THIS SUBJECT, how SATISFIED
do you feel about getting a good mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

2c. "Because YOU'RE SMART IN THIS SUBJECT, how
SURPRISED do you feel about getting a good mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

2d. "Because YOU'RE SMART IN THIS SUBJECT, how THANKFUL
do you feel about getting a good mark?"

very much _____     very little _____
quite a bit_____     not at all _____
somewhat _____

2e. "Because YOU'RE SMART IN THIS SUBJECT, how HAPPY
do you feel about getting a good mark?"

very much _____     very little _____
quite a bit_____     not at all _____

somewhat ____

2f. "Because YOU'RE SMART IN THIS SUBJECT, how RELIEVED
do you feel about getting a good mark?"

very much ____     very little ____
quite a bit ____     not at all ____
somewhat ____

go to next item

3. "How much do you think that your good mark on this
test was due to GOOD LUCK ON YOUR PART?"

very much ____
quite a bit ____
somewhat ____
very little ____
not at all ____

IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR
"SOMEWHAT" TO QUESTION #3, COMPLETE QUESTIONS
3a THROUGH 3f BELOW.

3a. "Because you HAD GOOD LUCK ON THIS TEST, how PROUD
do you feel about getting a good mark?"

very much ____     very little ____
quite a bit ____     not at all ____
somewhat ____

3b. "Because you HAD GOOD LUCK ON THIS TEST,
how SATISFIED do you feel about getting
a good mark?"

very much ____      very little ____
quite a bit ____     not at all ____
somewhat ____

3c. "Because you HAD GOOD LUCK ON THIS TEST,
    how SURPRISEDdo you feel about getting a
    good mark?"

very much ____      very little ____
quite a bit ____     not at all ____
somewhat ____

3d. "Because you HAD GOOD LUCK ON THIS TEST,
    how THANKFUL do you feel about getting a
    good mark?"

very much ____      very little ____
quite a bit ____     not at all ____
somewhat ____

3e. "Because you HAD GOOD LUCK ON THIS TEST, how HAPPY
    do you feel about getting a good mark?"

very much ____      very little ____
quite a bit ____     not at all ____
somewhat ____

3f. "Because you HAD GOOD LUCK ON THIS TEST,
    how RELIEVED do you feel about getting a
    good mark?"

very much ____      very little ____
quite a bit ____     not at all ____
somewhat ____

4. "How much do yuou think that your good mark on this test
   was due to the fact that the TEST WAS EASY?"

    very much _____
    quite a bit _____
    somewhat   _____
    very little _____
    not at all   _____

### IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR "SOMEWHAT" TO QUESTION #4, COMPLETE QUESTIONS 4a THROUGH 4f BELOW.

    4a. "Because THE TEST WAS EASY, how PROUD
        do you feel about getting a good mark?"

        very much _____    very little _____
        quite a bit _____    not at all _____
        somewhat _____

    4b. "Because THE TEST WAS EASY, how SATISFIED
        do you feel about getting a good mark?"

        very much _____    very little _____
        quite a bit _____    not at all _____
        somewhat _____

    4c. "Because THE TEST WAS EASY, how SURPRISED
        do you feel about getting a good mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

4d. "Because THE TEST WAS EASY, how THANKFUL
do you feel about getting a good mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

4e. "Because THE TEST WAS EASY, how HAPPY
do you feel about getting a good mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

4f. "Because THE TEST WAS EASY, how RELEIVED
do you feel about getting a good mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

5.   "What mark do you expect to get on the next math test?" _____

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

STOP. PLEASE CLOSE YOUR BOOKLET.

**PLEASE COMPLETE THE FOLLOWING QUESTIONS IF YOU FEEL
THAT YOUR MARK IS A POOR MARK**

1.  "How much do you think that your poor mark on this test was
    due to you NOT TRYING HARD ENOUGH?"

    very much ____
    quite a bit ____
    somewhat ____
    very little ____
    not at all ____

         IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR
         "SOMEWHAT"TO QUESTION #1, COMPLETE QUESTIONS
         1a THROUGH 1f BELOW.

    1a. "Because you DIDN'T TRY HARD ENOUGH, how GUILTY
         do you feel about getting a poor mark?"

              very much ____    very little ____
              quite a bit ____   not at all ____
              somewhat ____

    1b. "Because you DIDN'T TRY HARD ENOUGH, how ASHAMED
         do you feel about getting a poor mark?"

              very much ____    very little ____
              quite a bit ____   not at all ____
              somewhat ____

    1c. "Because you DIDN'T TRY HARD ENOUGH, how SURPRISED
         do you feel about getting a poor mark?"

              very much ____    very little ____
              quite a bit ____   not at all ____
              somewhat ____

1d. "Because you DIDN'T TRY HARD ENOUGH, how ANGRY do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

1e. "Because you DIDN'T TRY HARD ENOUGH, how EMBARRASSED do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

1f. "Because you DIDN'T TRY HARD ENOUGH, how HUMILIATED do you feel about getting a poor mark?

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

go to next item

2. "How much do you think that your poor mark was due to you NOT BEING SMART ENOUGH in this subject?"

very much _____
quite a bit _____
somewhat _____
very little _____
not at all _____

IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR "SOMEWHAT" TO QUESTION #2, COMPLETE QUESTIONS 2a THROUGH 2f BELOW.

2a. "Because you WERE NOT SMART ENOUGH, how GUILTY
   do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somehwhat _____

2b. "Because you WERE NOT SMART ENOUGH, how ASHAMED
   do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somewhat _____

2c. "Because you WERE NOT SMART ENOUGH, how SURPRISED
   do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somewhat _____

2d. "Because you WERE NOT SMART ENOUGH, how ANGRY
   do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somewhat _____

2e. "Because you WERE NOT SMART ENOUGH, how
   EMBARRASSED do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somewhat _____

2f. "Because you WERE NOT SMART ENOUGH, how
   HUMILIATED do you feel about getting a poor mark?"

       very much _____      very little _____
       quite a bit _____     not at all _____
       somewhat _____

3. "How much do you think that your poor mark was due to the fact that you HAD BAD LUCK on this test?"

        very much \_\_\_\_
        quite a bit \_\_\_\_
        somewhat   \_\_\_\_
        very little \_\_\_\_
        not at all   \_\_\_\_

## IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR "SOMEWHAT" TO QUESTION #3, COMPLETE QUESTIONS 3a THROUGH 3f BELOW.

3a. "Because YOU HAD BAD LUCK, how GUILTY do you feel about getting a poor mark?"

      very much \_\_\_\_    very little \_\_\_\_
      quite a bit \_\_\_\_    not at all \_\_\_\_
      somewhat \_\_\_\_

3b. "Because YOU HAD BAD LUCK, how ASHAMED do you feel about getting a poor mark?"

      very much \_\_\_\_    very little \_\_\_\_
      quite a bit \_\_\_\_    not at all \_\_\_\_
      somewhat \_\_\_\_

3c. "Because YOU HAD BAD LUCK, how SURPRISED do you feel about getting a poor mark?"

      very much \_\_\_\_    very little \_\_\_\_
      quite a bit \_\_\_\_    not at all \_\_\_\_
      somewhat \_\_\_\_

3d. "Because YOU HAD BAD LUCK, how ANGRY do you feel about getting a poor mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

3e. "Because YOU HAD BAD LUCK, how EMBARRASSED
do you feel about getting a poor mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

3f. "Because YOU HAD BAD LUCK, how HUMILIATED
do you feel about getting a poor mark?"

very much _____    very little _____
quite a bit _____    not at all _____
somewhat _____

go to next item

4. "How much do you think that your poor mark was due to the
fact that the TEST WAS TOO DIFFICULT?"

very much _____
quite a bit _____
somewhat _____
very little _____
not at all _____

IF YOU ANSWERED "VERY MUCH", "QUITE A BIT", OR
"SOMEWHAT"TO QUESTION #4, COMPLETE QUESTIONS
4a THROUGH 4f BELOW.

4a. "Because THE TEST WAS TOO DIFFICULT, how GUILTY
do you feel about getting a poor mark?"

very much _____    very little _____
quite a bit _____    not at all _____

somewhat _____

4b. "Because THE TEST WAS TOO DIFFICULT, how ASHAMED
do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

4c. "Because THE TEST WAS TOO DIFFICULT, how
SURPRISED do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

4d. "Because THE TEST WAS TOO DIFFICULT, how ANGRY
do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

4e. "Because THE TEST WAS TOO DIFFICULT, how
EMBARRASSED do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

4f. "Because THE TEST WAS TOO DIFFICULT, how
HUMILIATED do you feel about getting a poor mark?"

very much _____     very little _____
quite a bit _____     not at all _____
somewhat _____

-------------------------------------------------------------

5.  "What mark do you expect to get on the next math test?"_____

-------------------------------------------------------------

<u>STOP</u> PLEASE CLOSE YOUR BOOKLET.

## Directions

Circle the number above the word which you feel is the best answer for each of the following questions.

1. We get to work with each other in small groups when we do math.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

2. Some kids try to be the first ones to answer math questions the teacher asks.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

3. I compare my math ability to other students in my math class.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

4. We can suggest projects or topics to study in math.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

5. Most students in this class do the same math homework.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

6. The teacher cares how we feel.

|  1  |  2  |  3  |  4  |  5  |
| :---: | :---: | :---: | :---: | :---: |
| never | seldom | occasionally | frequently | always |

7. During work time, we can move around the classroom when we want to.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

8. Some kids try to be the first ones done in math.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

9. I like to know how my math ability compares to other students in my math class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

10. In this class, we are allowed to help choose the instructional materials we use in math.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

11. In this class, all students work on the same math lesson at the same time.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

12. The teacher is friendly to us.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

13. We get to pick which students we want to work with in math.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

14. Doing better in math than other students in my classroom is important to me.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

15. We can decide which order to do our math work in.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

16. We use the same math textbooks and materials as other students in this class.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

17. The teacher treats boys and girls differently.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

18. We can talk to each other during math time.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

19. I compare how hard I try in math to how hard other students try in my classroom.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| never | seldom | occasionally | frequently | always |

20. We help each other with math work.

| 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- |
| never | seldom | occasionally | frequently | always |

21. The teacher criticizes us when we do poor work.

| 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- |
| never | seldom | occasionally | frequently | always |

22. The teacher grades our math work fairly.

| 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- |
| never | seldom | occasionally | frequently | always |

23. The teacher treats some kids better than other kids.

| 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- |
| never | seldom | occasionally | frequently | always |

24. Trying harder in math than other students in my classroom is important to me.

| 1 | 2 | 3 | 4 | 5 |
| --- | --- | --- | --- | --- |
| never | seldom | occasionally | frequently | always |

<u>Directions:</u> Check the response that best desribes you.


1.  How good at math are you?

    7   very good                    _____
    6   way above average            _____
    5   slightly above average       _____
    4   average                      _____
    3   slightly below average       _____
    2   way below average            _____
    1   not good at all              _____


2.  Compared to most of your other school subjects, how good are you at math?

    7   much better        _____
    6   better             _____
    5   slightly better    _____
    4   the same           _____
    3   slightly worse     _____
    2   worse              _____
    1   much worse         _____


3.  If you were to rank all the students in your math class from the worst to the best, where would you put yourself?

    7   the best                     _____
    6   near the top                 _____
    5   slightly above the middle    _____
    4   the middle                   _____
    3   slightly below the middle    _____
    2   near the bottom              _____
    1   the worst                    _____

Appendix C
Teachers' Rank-Ordering
of Students' Math Ability

# TEACHER'S RANK-ORDERING OR MATH ABILITIES

Name _____

Gender: Male_____Female_____

Class: _____

## DIRECTIONS

Please enter the names of the students in your math class into one of the following 5 categories below: (a) Top of class, (b) Above average, (c) Average, (d) Below average, (e) Bottom of class. Please enter the names so that #1 in each category is the top person in that grouping, the #2 person is the second brightest, and so on. Please fill in "Top of class" and "Bottom of class" categories first, and "Above average" and "Below average" next. The idea is to work your way toward the middle so that the "average" students are those who are left after the extremes have been filled. Each category contains a maximum number of students allowed (i.e., 3 for "Top of Class" and "Bottom of Class, 6 for "Above" and "Below Average", and 10 for "Average").

|  |  |  |  |  |
|---|---|---|---|---|
|  |  | 1. _____ |  |  |
|  |  | 2. _____ |  |  |
|  |  | 3. _____ |  |  |
|  |  | 4. _____ |  |  |
|  | 1. _____ | 5. _____ | 1. _____ |  |
|  | 2. _____ | 6. _____ | 2. _____ |  |
|  | 3. _____ | 7. _____ | 3. _____ |  |
| 1. _____ | 4. _____ | 8. _____ | 4. _____ | 1. _____ |
| 2. _____ | 5. _____ | 9. _____ | 5. _____ | 2. _____ |
| 3. _____ | 6. _____ | 10. _____ | 6. _____ | 3. _____ |
| **Top of Class** | **Above-Average** | **Average** | **Below-Average** | **Bottom of Class** |

Appendix D

Information Sheet regarding

Ethnic Background of Students

## Ethnic Background of your Students

Directions: Please indicate the ethnic background of
the students in your math class by writing
the appropriate number in the spaces provided.


1. Caucasian _____

2. Asian _____

3. South East Asian _____

4. Central American _____

5. East Indian _____

6. Native Indian _____

7. Other (please indicate ethnicity and number)


_____


_____


_____

Appendix E

Eight-Item Math Quiz

<u>GRADE 7 MATH QUIZ</u>

NAME: _____

SCHOOL: _____

1. What is the place value for the underlined digit?

   43<u>4</u>526 _____

2. Add:

   5.3 + 28 + 6.25 + 4.126 + 6 = _____

3. Multiply:

   89.1
   X  7.3

4. Solve: Nine airplanes that were completely full carried 1350 passengers to Vancouver. All planes carried the same number of people. How many passengers were there per plane? _____

5. Find the perimeter.

   6 cm      2 cm

   5 cm
              3 cm

   8 cm

   Perimeter = _____

6. Answer the following question:

$(2 \times 72)/(720/5) =$ _____

7. Find the answer for N:

$\dfrac{32}{512} = \dfrac{N}{128}$

$N =$ _____

8. During their vacation, Sarah's family spent $785.75 for hotel rooms and $398.64 for food. How much more did they spend for hotel rooms? _____
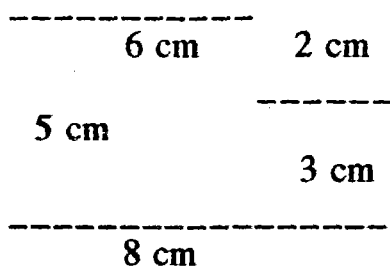
Appendix F

Parent Consent Form

# PARENT CONSENT FORM

Dear Parent:

I am a Ph.D. student in the Faculty of Education at S.F.U. in the field of educational psychology, as well as an Elementary School Counsellor in the school district of Vancouver. As part of my thesis requirement for my doctoral degree, I am requesting permission for your son and/or daughter to participate in a study I am conducting.

In this study, your son or daughter will be asked to complete three short questionnaires. The first questionnaire deals with students' impressions of successful and unsuccessful testing situations. The second questionnaire asks students about their classroom climate, while the third asks students about their strengths in mathematics. In total, the questions take approximately 30 minutes to respond to. Students simply read each item and respond by circling or checking the number which corresponds to their answer. No actual writing is required and all students' answers are kept anonymous. Classroom teachers will also be asked to provide information about their students' ability levels in mathematics. Both the School Principal and your child's teacher have examined the three questionnaires and have given their approval for their use in the classroom.

I sincerely appreciate your cooperation and support in this educational study. If you wish to ask any questions or register any concerns about this research please call Dr. Stan Shapson, Associate Dean of Education, S.F.U., at 291-4517. If you would like further information or a copy of the results of the study, feel free to contact me at 437-3791.

Sincerely,

John Woudzia
Area Counsellor, V.S.B.

----------------------------------------------------------------

I give my permission for my son and/or daughter to participate in the study as described.
Yes_____   No_____
Signature of Parent and/or Guardian _____

Appendix G

Instructions to Students

# PROTOCOL FOR STUDENTS REGARDING CONSENT

The following statement should be read to the students prior to distributing the questionnaires in class.

"Good morning (afternoon). Today I am requesting your permission to have you complete three short questionnaires. The first one has to do with your opinions and perceptions of success and failure situations. The second one asks you about the atmosphere in your classroom, while the third asks you about your ability in math. When answering the questions, you simply need to circle or check the appropriate number that corresponds to your answer. No actual writing is required. If you agree to respond to all three questionnaires, it should take you approximately 30 minutes to answer all the questions.

You are under no obligation to complete all of the questions in the questionnaires, and only me and my professors at Simon Fraser University will be able to look at your answers. Neither your teacher nor your principal will have access to your responses. If you decide that you do not want to take part in this study, your teacher has arranged another activity for you to do for the next 25 to 30 minutes. Please be aware that not taking part in this study will not hurt your mark in this class, just as taking part in it will not improve your mark. After I've collected your answers and transfered the information into my computer, your answer booklets will be disposed of.

Finally, if you have any complaints about any part of the research study, I've given your teacher the name of the Associate Dean of Education at S.F.U. who either you or your parents can get in contact with to discuss your concern. Thank you."

Appendix H

Path Coefficents for all Variables

Present in Series One and Two

Table 1.

Path Coefficients for the Variables of Predictive Accuracy,

Low Effort, Negative Emotions, Future Expectancy, and

Obtained Score for a Failure Outcome.

| Variables | | Low Effort | Negative Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.10 | -.09 | .30 | .25 |
| Accuracy | (p.) | (.34) | (.35) | (.002) | (.01) |
| Low | (ß) | | .15 | .20 | 26 |
| Effort | (p.) | | (.15) | (.04) | (.01) |
| Negative | (ß) | | | -.16 | -.23 |
| Emotions | (p.) | | | (.11) | (.02) |
| Future | (ß) | | | | .47 |
| Expectancy | (p.) | | | | (.001) |

Note. ß = Beta level; p. = Probability level.

Table 2.

Path Coefficients for the Variables of Predictive Accuracy,

Low Ability, Negative Emotions, Future Expectancy, and

Obtained Score for a Failure Outcome.

| Variables | | Low Ability | Negative Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.04 | -.22 | .08 | .26 |
| Accuracy | (p.) | (.72) | (.06) | (.48) | (.02) |
| Low | (ß) | | .23 | -.14 | -.17 |
| Ability | (p.) | | (.04) | (.23) | (.13) |
| Negative | (ß) | | | .05 | .11 |
| Emotions | (p.) | | | (.70) | (.33) |
| Future | (ß) | | | | .36 |
| Expectancy | (p.) | | | | (.001) |

Note. ß = Beta level; p. = Probability level.

Table 3.

Path Coefficients for the Variables of Predictive Accuracy,

Poor Luck, Negative Emotions, Future Expectancy, and Obtained

Score for a Failure Outcome.

| Variables | | Poor Luck | Negative Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.07 | -.08 | .20 | .28 |
| Accuracy | (p.) | (.63) | (.56) | (.14) | (.03) |
| Poor | (ß) | | .30 | -.02 | -.19 |
| Luck | (p.) | | (.02) | (.90) | (.15) |
| Negative | (ß) | | | -.17 | -.18 |
| Emotions | (p.) | | | (.22) | (.18) |
| Future | (ß) | | | | .65 |
| Expectancy | (p.) | | | | (.001) |

Note. ß = Beta level; p. = Probability level.

Table 4.

Path Coefficients for the Variables of Predictive Accuracy,

Task Difficulty, Negative Emotions, Future Expectancy, and

Obtained Score for a Failure Outcome.

| Variables | | Task Difficulty | Negative Emotions | Future Expectancy | Obtained Score |
|-----------|------|------|------|------|------|
| Predictive | (ß) | .02 | -.39 | .13 | .42 |
| Accuracy | (p.) | (.90) | (.001) | (.26) | (.001) |
| | | | | | |
| Task | (ß) | | .27 | -.15 | -.20 |
| Difficulty | (p.) | | (.02) | (.21) | (.06) |
| | | | | | |
| Negative | (ß) | | | -.36 | -.21 |
| Emotions | (p.) | | | (.01) | (.07) |
| | | | | | |
| Future | (ß) | | | | .34 |
| Expectancy | (p.) | | | | (.002) |

Note.  ß = Beta level;  p. = Probability level.

Table 5.

Path Coefficients for the Relationships among Variables
in the Test of Weiner's Model for Failure Outcomes.

Variables

| | PA-Att | PA-Aff | PA-Exp | PA-P | Att-Aff | Att-Exp | Att-P | Aff-P | Exp-P |
|---|---|---|---|---|---|---|---|---|---|
| Effort | -.10 | -.09 | .30 | .25 | .15 | .20 | .26 | -.23 | .47 |
| | (.34) | (.35) | (.01) | (.01) | (.15) | (.04) | (.01) | (.02) | (.001) |
| Ability | -.04 | -.22 | .08 | .26 | .23 | -.14 | -.17 | .11 | .36 |
| | (.72) | (.06) | (.48) | (.02) | (.04) | (.23) | (.13) | (.33) | (.001) |
| Luck | -.07 | -.08 | .20 | .28 | .30 | -.02 | -.19 | -.18 | .65 |
| | (.63) | (.56) | (.14) | (.03) | (.02) | (.90) | (.15) | (.18) | (.001) |
| Task Diffic. | .02 | -.39 | .13 | .42 | .27 | -.15 | -.20 | -.21 | .34 |
| | (.90) | (.001) | (.26) | (.001) | (.02) | (.21) | (.06) | (.07) | (.002) |

PA-Att = Predictive Accuracy-Attributions
PA-Aff = Predictive Accuracy-Affects
PA-Exp = Predictive Accuracy-Expectancies
PA-P = Predictive Accuracy-Performance
Att-Aff = Attributions-Affects
Att-Exp = Attributions-Expectancies
Att-P = Attributions-Performance
Aff-P = Affects-Performance
Exp-P = Expectancies-Performance

Table 6.

Path Coefficients for the Variables of Predictive Accuracy,

High Effort, Positive Emotions, Future Expectancy, and

Obtained Score for a Successful Outcome.

| Variables | | High Effort | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.14 | .24 | -.16 | -.08 |
| Accuracy | (p.) | (.08) | (.003) | (.06) | (.33) |
| High | (ß) | | .29 | .13 | -.06 |
| Effort | (p.) | | (.001) | (.11) | (.44) |
| Positive | (ß) | | | .01 | .07 |
| Emotions | (p.) | | | (.91) | (.43) |
| Future | (ß) | | | | .43 |
| Expectancy | (p.) | | | | (.001) |

Note.   ß = Beta level;  p. = Probability level.

Table 7.

Path Coefficients for the Variables of Predictive Accuracy,
High Ability, Positive Emotions, Future Expectancy, and
Obtained Score for a Successful Outcome.

| Variables | | High Ability | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.10 | .18 | -.19 | -.09 |
| Accuracy | (p.) | (.24) | (.04) | (.03) | (.28) |
| High | (ß) | | -.05 | .47 | .37 |
| Ability | (p.) | | (.56) | (.001) | (.001) |
| Positive | (ß) | | | -.01 | -.05 |
| Emotions | (p.) | | | (.91) | (.56) |
| Future | (ß) | | | | .28 |
| Expectancy | (p.) | | | | (.002) |

Note.  ß = Beta level; p. = Probability level.

Table 8.

Path Coefficients for the Variables of Predictive Accuracy,

Good Luck, Positive Emotions, Future Expectancy, and Obtained

Score for a Successful Outcome.

| Variables | | Good Luck | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | .28 | .16 | -.18 | -.03 |
| Accuracy | (p.) | (.02) | (.18) | (.13) | (.83) |
| Good | (ß) | | .28 | -.01 | -.18 |
| Luck | (p.) | | (.02) | (.96) | (.15) |
| Positive | (ß) | | | -.02 | -.09 |
| Emotions | (p.) | | | (.84) | (.47) |
| Future | (ß) | | | | .38 |
| Expectancy | (p.) | | | | (.001) |

Note. ß = Beta level; p. = Probability level.

Table 9.

Path Coefficients for the Variables of Predictive Accuracy,

Task Ease, Positive Emotions, Future Expectancy, and Obtained

Score for a Successful Outcome.

| Variables | | Task Ease | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | .05 | .11 | -.23 | -.08 |
| Accuracy | (p.) | (.56) | (.17) | (.05) | (.35) |
| Task | (ß) | | -.01 | .29 | -.05 |
| Ease | (p.) | | (.90) | (.001) | (.55) |
| Positive | (ß) | | | -.15 | -.22 |
| Emotions | (p.) | | | (.053) | (.01) |
| Future | (ß) | | | | .41 |
| Expectancy | (p.) | | | | (.001) |

Note.  ß = Beta level;  p. = Probability level.

Table 10.

Path Coefficients for the Relationships among Variables

in the Test of Weiner's Model for Success Outcomes.

Variables

| | PA-Att | PA-Aff | PA-Exp | PA-P | Att-Aff | Att-Exp | Att-P | Aff-P | Exp-P |
|---|---|---|---|---|---|---|---|---|---|
| Effort | -.14 | .24 | -.16 | -.08 | .29 | .13 | -.06 | .07 | .43 |
| | (.08) | (.01) | (.06) | (.33) | (.01) | (.11) | (.44) | (.43) | (.001) |
| Ability | -.10 | .18 | -.19 | -.09 | -.05 | .47 | .37 | -.05 | .28 |
| | (.24) | (.04) | (.03) | (.03) | (.56) | (.001) | (.01) | (.56) | (.002) |
| Luck | .28 | .16 | -.18 | -.03 | .28 | -.01 | -.18 | -.09 | .38 |
| | (.02) | (.18) | (.13) | (.83) | (.02) | (.96) | (.15) | (.47) | (.001) |
| Task Ease | .05 | .11 | -.23 | -.08 | -.01 | .29 | -.05 | -.22 | .41 |
| | (.56) | (.17) | (.06) | (.35) | (.90) | (.01) | (.55) | (.06) | (.001) |

PA-Att = Predictive Accuracy-Attributions
PA-Aff = Predictive Accuracy-Affects
PA-Exp = Predictive Accuracy-Expectancies
PA-P = Predictive Accuracy-Performance
Att-Aff = Attributions-Affects
Att-Exp = Attributions-Expectancies
Att-P = Attributions-Performance
Aff-P = Affects-Performance
Exp-P = Expectancies-Performance

Table 11.

Path Coefficients for the Variables of Predictive Accuracy,

 Unstable Causes, Negative Emotions, Future Expectancy, and

Obtained Score for a Failure Outcome.

| Variables | | Unstable Causes | Negative Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | .002 | -.02 | .11 | .23 |
| Accuracy | (p.) | (.99) | (.92) | (.53) | (.18) |
| Unstable | (ß) | | .24 | -.08 | -.17 |
| Causes | (p.) | | (.16) | (.64) | (.29) |
| Negative | (ß) | | | -.01 | -.04 |
| Emotions | (p.) | | | (.96) | (.82) |
| Future | (ß) | | | | .67 |
| Expectancy | (p.) | | | | (.001) |

Note.  ß = Beta level; p. = Probability level.

Table 12.

Path Coefficients for the Variables of Predictive Accuracy,

 Stable Causes, Negative Emotions, Future Expectancy, and

Obtained Score for a Failure Outcome.

| Variables | | Stable Causes | Negative Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | .11 | -.38 | .01 | .39 |
| Accuracy | (p.) | (.44) | (.01) | (.92) | (.004) |
| Stable | (ß) | | .10 | .03 | -.12 |
| Causes | (p.) | | (.48) | (.85) | (.35) |
| Negative | (ß) | | | -.14 | -.09 |
| Emotions | (p.) | | | (.40) | (.52) |
| Future | (ß) | | | | .27 |
| Expectancy | (p.) | | | | (.04) |

Note.  ß = Beta level; p. = Probability level.

Table 13.

Path Coefficients for the Relationships among Stable

and Unstable Variables in the Test of Weiner's Model

for Success and Failure Outcomes.

-----------------------------------------------------

Variables

| | PA-Att | PA-Aff | PA-Exp | PA-P | Att-Aff | Att-Exp | Att-P | Aff-P | Exp-P |
|---|---|---|---|---|---|---|---|---|---|
| **FAILURE** | | | | | | | | | |
| Stable | .11 | -.38 | .01 | .39 | .10 | .03 | -.12 | -.09 | .27 |
| | (.44) | (.01) | (.92) | (.004) | (.48) | (.85) | (.35) | (.52) | (.04) |
| Unstable | .01 | -.02 | .11 | .23 | .24 | -.08 | -.17 | -.04 | .67 |
| | (.99) | (.92) | (.53) | (.18) | (.16) | (.64) | (.29) | (.82) | (.001) |
| **SUCCESS** | | | | | | | | | |
| Stable | -.004 | .07 | -.18 | -.09 | -.02 | -.24 | -.05 | -.25 | .38 |
| | (.97) | (.48) | (.06) | (.31) | (.86) | (.01) | (.62) | (.01) | (.001) |
| Unstable | .33 | .21 | -.18 | -.07 | .27 | -.01 | -.16 | -.10 | .38 |
| | (.01) | (.09) | (.16) | (.58) | (.04) | (.94) | (.22) | (.45) | (.002) |

PA-Att = Predictive Accuracy-Attributions
PA-Aff = Predictive Accuracy-Affects
PA-Exp = Predictive Accuracy-Expectancies
PA-P = Predictive Accuracy-Performance
Att-Aff = Attributions-Affects
Att-Exp = Attributions-Expectancies
Att-P = Attributions-Performance
Aff-P = Affects-Performance
Exp-P = Expectancies-Performance

Table 14.

Path Coefficients for the Variables of Predictive Accuracy,

 Unstable Causes, Positive Emotions, Future Expectancy, and

Obtained Score for a Successful Outcome.

| Variables | | Unstable Causes | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | .33 | .21 | -.18 | -.07 |
| Accuracy | (p.) | (.01) | (.09) | (.16) | (.58) |
| Unstable | (ß) | | .27 | -.01 | -.16 |
| Causes | (p.) | | (.04) | (.94) | (.22) |
| Positive | (ß) | | | -.03 | -.10 |
| Emotions | (p.) | | | (.85) | (.45) |
| Future | (ß) | | | | .38 |
| Expectancy | (p.) | | | | (.002) |

Note. ß = Beta level; p. = Probability level.

Table 15.

Path Coefficients for the Variables of Predictive Accuracy,

Stable Causes, Positive Emotions, Future Expectancy, and

Obtained Score for a Successful Outcome.

| Variables | | Stable Causes | Positive Emotions | Future Expectancy | Obtained Score |
|---|---|---|---|---|---|
| Predictive | (ß) | -.004 | .07 | -.18 | -.09 |
| Accuracy | (p.) | (.97) | (.48) | (.06) | (.31) |
| Stable | (ß) | | -.02 | .24 | -.05 |
| Causes | (p.) | | (.86) | (.01) | (.62) |
| Positive | (ß) | | | -.19 | -.25 |
| Emotions | (p.) | | | (.06) | (.01) |
| Future | (ß) | | | | .38 |
| Expectancy | (p.) | | | | (.001) |

Note. ß = Beta level; p. = Probability level.

Appendix I

R Square Values for Success and

Failure Outcomes for both Series

Table 1.

R Square Values for Path Models tested in the

First Series for Success and Failure Outcomes.

---

Variables

| | Effort | Ability | Luck | Task |
|---|---|---|---|---|
| **FAILURE** | | | | |
| R Square | .35 | .28 | .54 | .38 |
| | | | | |
| **SUCCESS** | | | | |
| R Square | .20 | .21 | .20 | .20 |

Note: The R Square values for the second series were as follows: For Failure: a) Stable = .35, b) Unstable = .51. For Success: a) Stable = .20, b) Unstable = .20.