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# THE DEVELOPMENT OF ACADEMIC EFFICACY AMONG ASIAN, HISPANIC, BLACK, AND WHITE HIGH SCHOOL STUDENTS

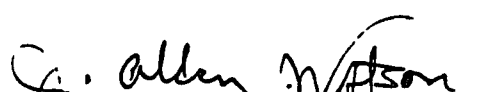
by

Sabrina Lynette Thomas

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
1994

Approved by



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The purpose of the current study was: 1) to examine the relationship between academic efficacy and academic achievement among students of different ethnic groups, 2) to examine if students from different ethnic groups differ in their degree of academic efficacy, 3) to examine if students' ethnicity, gender, family structure, or socioeconomic status made a significant contribution to academic efficacy beyond the influence of modeling, verbal, and prior mastery sources of academic efficacy information, and 4) to examine the differential contribution of modeling, verbal persuasion, and prior mastery sources of academic efficacy to students' academic efficacy based on ethnicity and gender.

In phase one of the subject selection procedure, the author selected only those students who reported that their current high school course work was "harder" than in prior academic years. The second, and final selection procedure, involved the creation of a balanced cell 2 (gender) X 2 (family structure) X 4 (ethnicity) X 4 (socioeconomic status) factorial design. An SPSS program was written which randomly selected subjects to create the balanced cell (n=6) design from among the 8,921 students who reported that

school work was "hard." The final sample used for the present study consisted of Asian (n=48), Hispanic (n=48), Black (n=48), and White (n=48) high school students. Males (n=96) and females (n=96) were equally represented across all ethnicities, family structures (one-adult vs two-adults), and socioeconomic groups ("high-high", "low-high", "high-low", and "low-low").

Results indicated a positive relationship between academic efficacy and academic achievement among students across all ethnic groups. ANOVA's revealed no significant differences in students' academic efficacy based on ethnicity. Forward stepwise regression procedures indicated: 1) that students' ethnicity, gender, family structure, or socioeconomic status offered a unique contribution to students' academic efficacy beyond the influence of prior performance, modeling, and verbal persuasion sources of academic efficacy information, and 2) prior performance, modeling, and verbal persuasion were significant predictors of academic efficacy development of White students, prior performance and modeling were significant predictors for Asian students, and only verbal persuasion was a significant predictor for Hispanic students. None of the sources of academic efficacy development were significant predictors for Black students' academic efficacy development.

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Dissertation Advisor J. Allen Watson

Committee Members Floyd Bond
Hugh Lodry
Sarah M. Shoffner

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# CHAPTER I

## INTRODUCTION

Identifying the determinants of students' academic achievement has preoccupied educational researchers for the past two decades. Of particular concern has been the low academic performance of students from minority group cultures. Early empirical findings suggested that minority students have lower self-esteem than their majority group peers, and that self-esteem is significantly related to academic achievement (for an extensive review of the literature see Purkey, 1970; Scheirer & Kraut, 1979; Gorrell, 1990). Such findings have led educational researchers to conclude that minority students' academic performance results, in part, from low self-esteem. The conclusion is further supported by self-concept theory's primary assertion that human behavior is motivated by individuals' perceptions of self-worth (Wylie, 1979). In light of empirical findings and self-concept theory, educational researchers and policy makers hypothesized that intervention programs designed to enhance self-esteem was the panacea to minority students' low academic achievement.

The remainder of the chapter will provide the reader with a more detailed review of the literature on educational intervention programs guided by self-concept theory, and

their effects on minority students' academic achievement. Following the review, the author will 1) discuss the significance of the present study in light of the previous review, 2) present the research questions and hypotheses guiding the present study, and 3) discuss the limitations of the present study.

## Self-Concept Theory and Academic Achievement

Self-concept theorists maintain that a change in self-esteem evaluation would facilitate a change in academic behavior (Gorrell, 1990; Wylie, 1979). Self-esteem refers to an individual's affective conceptions of self in terms of self-worth (Gecas, 1991). Embedded in Cooley's (1902) notion of the "looking-glass self," self-concept theorists specifically suggest that individuals' sense of self-worth develops through the process of reflected appraisals and social comparisons. Reflected appraisals refers to individuals' beliefs regarding significant others' (e.g., parent, teacher) perception of them. Social comparison is the process by which individuals evaluate their own virtues by comparing themselves to others of whose virtues they are aware (Gecas & Schwalbe, 1983).

Rolle (1990) examined the influence of self-esteem and academic achievement among African-American males ages eight to twelve. An intervention program which introduced the boys to cultural materials produced by African-American artists, and to African-American role models from various

professions, was implemented. The art work of the students was displayed in the school and community. In addition, faculty were lectured on the learning styles of African-American students in order to make them more culturally sensitive in their teaching; and parents were offered seminars on parenting to enhance self-esteem. Rolle reported that the students' self-esteem scores increased. However, teachers reported that enhanced self-esteem was not accompanied by improvement in students' academic performance or classroom behavior. Similar findings were reported for intervention programs designed to raise the self-esteem of at-risk school dropouts (O'Sullivan, 1990) and children of divorced parents (Howard & Scherman, 1990).

In an extensive review of educational intervention programs designed to increase students' self-esteem, Scheirer and Kraut (1979) concluded that failure of intervention programs to produce the hypothesized effects reflects inadequate theoretical specification of intervention procedures and their relationship to individuals' self-esteem and behavioral change. In the few studies that indicate an increase in self-esteem and academic achievement (e.g., Cicirelli & Westinghouse Learning Corporation, 1969; Reckless & Dinitz, 1972), researchers failed to indicate how specific classroom interactions or intervention strategies were implemented to enhance self-esteem.

Gorrell (1990) suggested that failure of educational researchers to find a significant relationship between students' self-esteem and academic achievement is partly due to researchers' focus on global measures of self-concept (e.g., I feel good about myself) as opposed to specific measures of academic self-concept (e.g., I am really good in math). In the few studies measuring specific domains of academic self-concept (e.g., Adkins, Payne, & Ballif, 1972; Marsh, Smith & Barnes, 1983; Purkey, Raheim, & Cage, 1983) findings suggested that an increase in academic self-concept was significantly related to students' improved academic achievement. However, like early interventionists, researchers fail to indicate the specific research strategies implemented to enhance academic self-esteem.

Because of shortcomings in measurement, inadequate elaboration of relevant constructs, and vagueness regarding the exact sources of self-esteem formation, the current body of self-concept research has offered no clear empirical support for self-concept principles as they relate to students' academic achievement (Gorrell, 1990; Scheirer & Kraut, 1979; Wylie, 1979).

## Significance of the Study

Because of the inconsistency of research findings addressing the relationship between students' academic achievement and self-concept evaluations, educational researchers have begun to seek alternative theoretical

approaches to explain students' academic behavior. Gorrell (1990) and others have speculated that self-efficacy theory may provide the theoretical and methodological focus that overcomes the major limitations of self-concept theory. Self-efficacy refers to individuals' beliefs regarding their ability to successfully accomplish a task or goal. Self-efficacy theory maintains that individuals' cognitive evaluation of personal efficacy plays an important role in the acquisition, retention, and alteration of designated behavior (Bandura, 1977, 1986).

Individuals' perception of self-efficacy, whether accurate or faulty, are based on four principle sources of information: 1) prior performances--individuals' past successes and failures regarding the task in question; 2) modeling experience--individuals' observation of others' successfully completing or failing at the task in question; 3) social persuasion--any type of encouragement (e.g., verbal) that individuals are given to attempt a task; and 4) physiological status--changes in individuals' visceral state (e.g., anxiety, blood pressure).

In testing propositions about the origins and influence of individuals' perception of academic efficacy, self-efficacy research has been characterized by inquiries related to very specific subdomains of academic achievement (e.g., math achievement only) and a focus on the influence of specific sources of efficacy information (Gorrell, 1990;

Schunk, 1987). Findings of efficacy-based educational research have consistently supported self-efficacy theory's postulate that individuals' academic performance and self-percept of academic efficacy are positively related. Research findings have also illustrated that sources of self-efficacy information have differential effects on students' academic efficacy.

The consistency in findings among efficacy-based educational research and the identification of the influence of particular sources of efficacy information suggest that self-efficacy theory offers more explanatory power and predictive utility regarding students' academic behavior than self-concept theory. However, self-efficacy research has not yet examined the development of academic performance for minority group students, nor its relationship to academic performance. It is possible that various sources of self-efficacy information may not have equal relevance across all student populations.

Furthermore, self-efficacy theory suggests that the status of individuals' social group membership (e.g., gender, ethnicity) in the broader macro social structure influences evaluations of personal efficacy. Individuals' social interactions are, in part, based on others' perceptions of them, which in turn are influenced by their social group membership. Despite such an assumption, researchers have not attempted to disentangle the influence

of various sources of self-efficacy at the micro-environmental level of interaction and the influence of social group membership at the macroenvironmental level on self-efficacy development. Clarification of the influence of social group membership and various sources of self-efficacy information on students' self-efficacy development would provide invaluable insight for the development of more appropriate educational intervention programs designed to enhance students' academic performance, as well as contribute to the growth and development of self-efficacy theory.

Research Questions

In light of the observed gap in the literature, the present study is directed toward exploring the answers to the following research questions:

1. What is the relationship between academic efficacy and academic achievement among students of different ethnic groups?

2. Do students from different ethnic groups differ in their degree of academic efficacy?

3. Beyond the influence of microinteractive sources of self-efficacy (modeling, verbal, and prior mastery), how well does social group membership (ethnicity,

gender, family structure, socioeconomic status) in the broader society influence students' academic efficacy?

4. Do modeling, social persuasion, and prior mastery sources of efficacy information have differential effects on the academic efficacy of students based on gender and ethnicity?

Hypotheses

It is hypothesized that:

H1: There will be a significant positive relationship between academic efficacy and academic achievement for students across all ethnic groups.

H2: Black and Hispanic students will have lower self-evaluations of academic efficacy than Asian and White students.

H3: Students' social group membership (ethnicity, gender, family structure, socioeconomic status) will significantly contribute to academic efficacy beyond the influence of prior mastery, modeling, and verbal sources of self-efficacy information.

H4: Prior mastery, modeling, and verbal sources of efficacy information will have differential effects on

the academic efficacy of students based on gender and ethnicity.

## Limitations of the Study

While the present study will contribute to efficacy-based educational research by providing insight to the generalizability of self-efficacy principles across different student populations, it is not without its shortcomings. A major limitation of this study is related to the usage of a secondary sample. The items used in the database were not specifically selected to examine self-efficacy principles. Therefore, they do not reflect the traditional items used in past efficacy-based educational research. However, the lack of resemblance between the database items and past research items is not of great concern to the author because 1) the items used were selected based on specific theoretical principles and their interrelationship as expounded in self-efficacy theory. Secondly, the author's primary interest was related to examining the validity of self-efficacy theory as a guide to increase academic achievement across different populations of students, as opposed to examining the effects of different sources of self-efficacy information on students' self-efficacy evaluation and subsequent task performance. Nevertheless, it must be acknowledged that the general nature (global academic efficacy) of the items used may in some way obscure the actual relationship among the variables

examined. This, however, is an empirical question which can be addressed by future examinations of global efficacy constructs.

An additional weakness of the present study is that it fails to explore additional predictors of academic efficacy across student populations--beyond the traditionally examined demographic characteristics of ethnicity, gender, family structure, and socioeconomic status. Clearly, priority should be given to this task by future efficacy-based researchers.

# CHAPTER II

# REVIEW OF LITERATURE

## Self-efficacy Theory

The major purpose of this chapter is to provide an overview of self-efficacy theory and research most relevant to the phenomenon of academic achievement. In instances where particular propositions of self-efficacy theory have not been empirically applied to educational research, the author will draw on literature from related fields in order to illustrate the empirical characteristic of the proposition in question. Of central interest to self-efficacy theorists is how individuals' self-evaluation of ability influence their behavior. Self-efficacy theory maintains that individuals' beliefs about their ability to obtain a desired goal influence their decision to engage in goal-oriented behavior. Individuals who are confident in their ability to achieve a goal are more likely to engage in the necessary course of behavior to do so, than individuals who lack confidence. Thus, self-efficacy evaluations serve as a source of behavioral motivation (Bandura, 1977, 1982, 1986).

Although great emphasis is placed on individuals' perceived ability, the perception of competence is not the sole determinant of individual behavior (Bandura, 1977).

Three cognitive processes mediate individuals' decision to engage in goal-oriented behavior: a) self-efficacy evaluation, b) outcome expectation, and c) outcome value (Bandura, 1977). These mediating processes serve as important predictors of individuals' choice of behavior, effort expenditure, persistence, and emotional experience relevant to a particular task (Bandura, 1977; Seas, 1991).

Cognitive Processes of Self-efficacy Evaluation

Self-efficacy evaluation. Self-efficacy evaluation refers to individuals' perception of their ability to accomplish a task. Evaluations of self-efficacy do not necessarily reflect individuals' actual ability, but rather their beliefs about the abilities they possess and what they believe they can accomplish with them (Bandura, 1986). When faced with obstacles, individuals who have a strong sense of self-efficacy will exert greater effort and persistence in order to overcome barriers to goal accomplishment. In contrast, individuals who entertain doubtful self-efficacy will decrease their effort, or simply give up in the face of adversity. Thus a strong sense of self-efficacy produces high perseverance for goal achievement (Bandura, 1986; 1982; 1977).

Self-efficacy judgments may hinder or nurture the growth of personal competence. Doubtful self-efficacy influences individuals to avoid enriching environments and challenging activities. Such aversive behavior retards

individuals' development of potentialities (Bandura, 1986). On the contrary, individuals with high percepts of self-efficacy will actively engage in challenging activities which will, in turn, foster the growth of additional skills and perceptions of competency. However, gross overestimation of ability can expose an individual to needless experiences of failure which undermine future efficacy. Positive evaluations of self-efficacy are most effective when individuals engage in activities slightly above their actual ability level. Such appraisals allow for realistic challenges to their present level of ability; and, in turn, allow the individual to progressively develop more advanced skills (Bandura, 1986).

Outcome expectancies. Individuals' behavior is in part influenced by the anticipated consequences of their actions. Similarly, perception of consequences depend on individuals' beliefs about their ability to accomplish the task (Bandura, 1986). Individuals who believe that they are physically trained to run a marathon are more likely to have the outcome expectancy of at least finishing the race. Individuals who doubt their physical ability to run a marathon are less likely to enter the race, or assume that they will not finish it. Because outcome expectancies are strongly influenced by self-efficacy judgments, they contribute little additional predictive utility in the

presence of self-efficacy measures (Barling & Abel, 1983; Bandura, 1986; Manning & Wright, 1983).

Despite their empirical relationship, self-efficacy judgments and outcome expectations are conceptually distinct. Behavior based on self-efficacy evaluation is a reflection of individuals' perception of personal competence. Outcome expectancy evaluation is the anticipated consequences of efficacious or inefficacious behavior. The above described relationship between outcome expectancies and self-efficacy judgment presupposes that behavioral consequences are tightly linked to levels of performance.

In instances where level of performance is loosely linked to consequences, outcome expectancies can be disassociated from judgments of self-efficacy. Bandura (1986) gives the example "when athletes were rigidly segregated by race, black athletes could not gain entry to major league baseball no matter how well they pitched or batted (p.393)." It follows that individuals may perceive themselves capable of achieving a goal but give up because they doubt that they will be rewarded appropriately (Bandura, 1977). Outcome expectancies which hinder individuals' efficacious behavior is primarily focused not on their disbelief regarding self but rather their evaluation of the environment as a nonresponsive agent (Bandura, 1982).

Outcome value. Willingness to engage in a behavior presupposes that the potential consequence of the behavior is valued. It is assumed that in order for self-efficacy expectancy and outcome expectancy to influence goal-oriented behavior, individuals must value the anticipated outcome of their behavior. Outcome value has not been extensively studied in self-efficacy literature because researchers logically assume that individuals will not engage in behavior in which the consequence is ascribed no relevant importance (Bandura, 1986; Maddux, 1991).

The preceding discussion of the cognitive processes which mediate individuals' behavior suggests that while self-efficacy evaluation is presumed to be the more powerful predictor of individuals' choice of behavior, it is not the sole determinant. Individuals may perceive themselves capable of performing certain tasks, but believe, despite their ability and effort, that they will not be appropriately rewarded. Under such circumstances an individual is unlikely to engage in the task in question. Similarly, individuals will avoid engaging in behavior whose outcome they do not value. Finally, individuals who believe they have the ability to perform the necessary course of action to achieve a goal; who value the potential outcome; and who believe that their environment will reward them accordingly, will expend effort and energy towards goal accomplishment. Thus, self-efficacy evaluation, outcome

expectancy, and outcome value function to influence individuals' goal-oriented behavior.

Sources of Self-efficacy Information

Four principle sources of information influence individuals' self-efficacy evaluations: 1) prior performance, 2) modeling, 3) verbal persuasion, and 4) emotional or physiological arousal (Bandura, 1977, 1986).

Prior performance. Prior performance or enactive mastery has the greatest influence on individuals' self-efficacy evaluation. Prior performance provides individuals with a personal record of successes and failures regarding a particular type of task or domain of human functioning (Bandura, 1982). Individuals who have a high success rate relative to a particular type of behavior, or tasks, will be more confident in their ability to successfully perform the same task in the future (Bandura, 1982). Once established, self-efficacy tends to generalize to other activities of human functioning (Bandura, Adams, & Beyer, 1977). Generalization effects occur most frequently among activities that are most similar in nature (Bandura, 1986). Experiences of failure within a particular behavioral domain serve to confirm individuals' inadequate capability, and therefore diminishes their perceptions of efficacy. However, occasional experiences of failure by individuals who perceive themselves to be highly efficacious will not necessarily undermine self-efficacy evaluation. Instead,

individuals who believe they have the skills needed to complete a task, will interpret occasional failures as reflective of a lack of effort, or inappropriate problem solving strategies (Bandura, 1986).

Modeling. Modeling or social comparison, allows individuals to judge personal efficacy based on the observed performance of others. The effects of observational appraisal of self-efficacy depend on individuals' perceptions of similarity between self and model (e.g., age, ability level), and the degree to which they view the model's task as being similar to their own. Individuals use the observed failure or success of the model as an indicator of their own performance capability (Bandura, 1982). If individuals perceive a successful model as similar to themselves, they will persuade themselves that if "they" can do it so can I. On the other hand, if individuals perceive themselves similar to an unsuccessful model, they become doubtful of their own capabilities to successfully perform the task. Social comparison, however, is assumed to have a weaker influence on individuals' perception of efficacy than prior experiences (Bandura, 1986; 1982).

Verbal persuasion. Verbal persuasion, or social persuasion, serves to encourage individuals to participate in goal-oriented behavior. Such participation may serve to promote skill development and increase evaluations of self-efficacy (Bandura, 1986; 1982). The effectiveness of verbal

persuasion as a source of self-efficacy evaluation is dependent on factors such as the significance of the persuader to the individual; the perceived power and attractiveness of the persuader; and the perceived trustworthiness of the persuader. Verbal persuasion is most effective within realistic bounds. Individuals who are persuaded to attempt a task that exceeds their actual skills/ability are likely to experience failure. The consequence of failure will serve to undermine self-efficacy evaluation to the specific task, and other related tasks.

In many instances verbal persuasion and enactive mastery sources of self-efficacy are closely related. Individuals are oftentimes praised on the basis of the persuader's perception or knowledge of their prior performances; individuals use the persuader's appraisal as an indicator of their own capabilities (Gecas & Schwalbe, 1983). Relative to prior mastery and social comparison, verbal persuasion is the least effective in sustaining positive self-efficacy evaluations.

Emotional or physiological arousal. Emotional or physiological arousal indicates feelings of fatigue, anxiety, or relaxation regarding a particular task. If individuals experience fear or anxiety when approaching a particular task requirement, they are more likely to doubt their ability to successfully accomplish the task. Feelings of relaxation are more likely to convey feelings of

competence (Bandura, 1977). Self-efficacy theory maintains that individuals' behavior will correspond to personal evaluations of efficacy regardless of the particular source used to enhance self-efficacy judgment (Bandura, 1982).

In testing propositions about the origins and sources of individuals' self-efficacy judgments, self-efficacy research has been primarily characterized by inquiries related to therapeutic intervention for dysfunctional inhibitions, psychological maladjustment, and behavioral problems (for summaries see Bandura, 1977, and Maddux, 1991). As mentioned earlier, the following review will focus on efficacy-based research relative to the issue of academic achievement.

## Self-efficacy Theory and Academic Behavior

Educational research embedded in self-efficacy theory has sought to illustrate the relationship between students' self-percepts of academic efficacy and academic behavior/performance. The traditional methodological approach that characterized earlier efficacy research in the field of clinical psychology has maintained its vitality in educational research. Individuals are presented with a list of tasks related to a specific academic subject. On a 100-point scale, in intervals of ten, subjects indicate their degree of certainty for successfully performing each of the task items. The self-efficacy scale ranges from high uncertainty (10) to completely certain (100). After the

pretest measure of self-efficacy has been observed, subjects are exposed to a treatment condition (e.g., modeling, verbal persuasion) which is then followed by a post-test self-efficacy assessment. When students' persistence and effort behavior are of interest, researchers measure persistence by summing the total time subjects spend on the task; effort scores are observed by subjects indicating how hard they feel they've worked on the task ranging from not hard (10) to really hard (100).

Like methodological consistency, homogeneity of subjects across research samples has characterized self-efficacy based educational research. (Samples have predominantly consisted of subjects who have been identified as learning disabled or academic underachievers relative to the academic domain in question). Therefore, to avoid redundancy, an independent discussion of methodological and sample selection across studies will not occur. In instances where researchers use significant variations of the above design, distinctions will be explicitly stated.

The following review of self-efficacy research will be discussed under three major headings: 1) Verbal Persuasion, 2) Modeling, and 3) Prior Performance.

Verbal Persuasion

Verbal feedback associated with students' task activity serves as a persuasive source of self-efficacy information. Effort and ability feedback are widely used in achievement

oriented environments (Schunk, 1987). Schunk (1982) compared effects of prior effort feedback (You've been working hard") and future oriented effort feedback ("You need to work hard") on students' self-efficacy evaluation for math subtraction, subtraction performance, and task persistence. Findings indicated that students who had received the prior effort feedback had higher post-test scores of subtraction efficacy, higher performance scores, and demonstrated higher task persistence than students who received the future oriented effort feedback, or no feedback treatment.

In a later study, Schunk (1983) examined the influence of ability feedback ("You're good at this"), effort feedback ("You've been working hard"), effort and ability feedback combined ("You're good at this, and you've been working hard"), and no verbal feedback on forty-four predominantly middle-class third grade students' perceived subtraction efficacy and performance achievement. Students who received the ability feedback treatment reported higher post-test measures of substraction efficacy and higher level substraction performance than the other two treatment groups and the control group.

Effort analysis indicated that effort-only and effort and ability feedback groups reported significantly higher measures of effort expended than the ability-only and control groups. Ability feedback students reported

significantly higher evaluations of subtraction-efficacy than control group students. Schunk suggested that findings could indicate that the effort feedback may exaggerate students' sensitivity to the effort measure in the positive direction, while ability feedback, similarly, influences students' tendency to rate themselves as causal agents. No significant difference in efficacy and performance scores were observed between students exposed to the effort-only and the effort and ability treatment groups, but both scored higher than the control group on all measures.

Persistence scores yielded no main effect for task performance or self-efficacy evaluation. Persistence scores were negatively correlated with efficacy and performance scores. Schunk explained that this contradiction to his earlier finding may be partially explained by the fact that the students were "quite perseverant on the pretest despite their lack of skill and instructions . . . Given the high initial persistence, we actually might expect that students would spend less time on problems as they acquire skills and a sense of competence (p.855)."

Schunk and Rice (1991) examined the effects of goal setting feedback on Hispanic (63%), African-American (19%), and white (18%) students' achievement and self-efficacy for reading comprehension. All students' received a lecture on the "Five Step Comprehension Strategy" which outlined strategies which would increase children's comprehension

skills. After the lecture, students received either process goal feedback ("While you're working, it helps to keep in mind what you're trying to do. You'll be trying to learn how to use the steps to answer questions about what you've read"), or product goal feedback ("While you're working, it helps to keep in mind what you're trying to do. You'll be trying to answer questions about what you've read"). Results indicated that students' self-efficacy for reading comprehension and comprehension performance benefitted more from process oriented feedback than product goal feedback.

Similarly, Schunk and Rice (1992) in a later study examined the influence of strategy-value feedback which linked children's correct answers with proper application of the "Five Step Reading Comprehension Strategy" (e.g. "You got it right because you followed the steps in the right order"), and strategy-instruction feedback in which researchers gave feedback reminding children of particular comprehension strategies but did not link strategies with students' responses. The sample consisted of lower middle class Hispanics (40%), African-Americans (28%), White (26%), and Asian (6%) fourth and fifth graders (N=33). Schunk and Rice reported that students receiving the strategy-value feedback had higher post-test self-efficacy and skill performance scores than the strategy-instruction feedback group.

In order to investigate the differential effects of sequential verbal feedback on perceived subtraction-efficacy and performance, Schunk (1984) assigned third grade students to four feedback conditions: 1) ability feedback, 2) effort feedback, 3) ability feedback during the first half of the session, and effort feedback during the second half, or 4) effort feedback during the first half of the session, and ability feedback during the last half of the session. Students initially receiving ability feedback persuasion reported higher post-test measures of subtraction efficacy, high performance scores, and higher ability attributions than students who received effort ability feedback only, or initial effort feedback.

Expanding self-efficacy research to various developmental levels, Gorrell and Partridge (1985) examined the effects of effort feedback on college students' writing efficacy, writing performance, and persistence. The self-efficacy instrument for writing varied from the traditional Likert scale format. Students were given forced choice statements such as: "When you find it easy to write your ideas in an essay, is it usually a) because you are able to write well on certain topics or, b) because you have prepared yourself well for expressing yourself in an essay (p.228)?" Two measures of persistence were observed, one was the total amount of time spent writing the essay; the other was the number of words written in the total essay.

All students had previously failed the essay portion of the English Proficiency Exam, and were assigned to the experimental or control group based on flexibility of their class schedules. The experimental condition involved researchers giving effort feedback such as "You've really improved your organization of the essay because of the extra attention and care you are taking."

Gorrell and Partridge (1985) reported no significant differences between the control and experimental group on post-test self-efficacy scores. Persistence (amount of time writing the essay) yielded no significant differences; however, persistence (number of words written) were significantly higher for the experimental group. Finally, both groups demonstrated significant increases in actual writing performance, based on a word count-to-error ratio.

Gorrell and Partridge (1985) stated that their findings did not support self-efficacy theorists' belief that self-efficacy serves as a mediator of students' academic performance. Although both the experimental and control group students improved their writing performance, neither group reported an increase of self-efficacy judgment for writing. Gorrell and Partridge suggested that such findings may reflect the abstract nature and complexity of writing compared to the objective evaluation processes used for judging mathematic skills. In addition, the reliability and validity of the forced choice format of the self-efficacy

measure is questionable. Finally, findings could reflect the lack of randomization into groups, as well as the more advanced developmental age of the sample.

Modeling

Observation of models is an important medium for students' appraisal of self-efficacy. Schunk and Hanson (1985) compared the effects of rapid successful demonstration accompanied by statements such as "I'm good at this" (peer mastery modeling); gradual development of mastery performance through trial and error accompanied by statements such as "I'll have to pay attention to what I am doing" (peer coping modeling); and demonstration of subtraction skills with only instructional verbalizations (teacher modeling) on children's self-efficacy and achievement in subtraction using regrouping skills. Children were asked to rate their perceived similarity to the peer model on a scale ranging from not at all (0) to a whole lot (100). Children were paired with the same sex model for the peer modeling conditions.

Results indicated that children in the four peer modeling conditions had higher post-test self-efficacy scores, persistence scores, and skill performance than children receiving the teacher modeling treatment, or no modeling. Children who received some form of peer modeling did not differ from each other on either outcome measure. Children who received teacher modeling scored higher on

post-test measures than control group children. Schunk and Hanson concluded that the observed benefits of observing a peer model demonstrate that perceived similarity to models (e.g., age, sex) affect children's self-efficacy judgments more than type of instructional modeling (coping vs mastery). Persistence scores were negatively correlated with post-test efficacy and performance measures. No significant sex differences were observed on any measure.

In an investigation of the influence of opposite sex modeling on children's efficacy for solving fractions, Schunk et al. (1986) reported no sex of model and sex of child interaction effects. These findings suggested that the prior benefits observed for children who received peer modeling in the Schunk and Hanson (1985) study may not have been solely based on children's perceived similarity to the models. As suggested by Schunk and Hanson (1985), children could have been focused more on the fact that all the peer models eventually demonstrated mathematical competence independent of the instructional context in which competency was displayed. Children in turn could have concluded if the peer model eventually solved the problems so could they.

In a follow up study designed to disentangle the effects of children's perceived similarity to models' gender and perception of competence similarity, Schunk, Hanson, and Cox (1987) reported that children observing single models

perceived themselves more similar in competence to the coping than the mastery models. Schunk and his colleagues reported that children's observation of multiple coping or mastery models enhanced self-efficacy perception and performance as well as observations of single coping models, but better than observation of a single mastery model. These findings indicated that children's perceived competence similarity may have greater effect on children's percepts of self-efficacy than perceived similarity to models on such attributes as sex and age.

Zimmerman and Ringle (1981) examined the attribute of model persistence on lower class African-American and Hispanic first and second graders' self-efficacy judgment for puzzle solving. Self-efficacy was measured by asking children to look at three picture-cards of facial expressions suggesting that: a) the person is very happy because they are certain they can solve the puzzle; b) the person is not sure of their ability; c) the person is very unhappy because they are certain they cannot solve the puzzle. Children were asked to select the picture that best represented their beliefs about their own ability to solve the puzzle.

Children were randomly assigned to one of four treatment modelling groups: 1) high persistence/high confidence, 2) low persistence/high confidence, 3) high persistence/low confidence, or low persistence/low

confidence. The fifth group was for control purposes. The same male adult model was used for each condition. High persistence was defined as a five minute attempt to solve the puzzle (separating two wire rings), while thirty seconds constituted low persistence. High confidence modelling used statements such as "I am sure I can separate these wires; I just have to keep trying different ways, and then I will find the right one." Before quitting the task the model said "I am going to stop now but I know I will be able to separate these wires the next time I try." Low confidence modelling used statements such as "I don't think I can separate these wires; I have tried many different ways and nothing seems to work." Before quitting the task the model said that "I don't think I will ever be able to separate these wires."

The control group and all experimental groups--except the low persistence/high confidence group--reported significantly lower post-test efficacy scores. Zimmerman and Ringle (1981) stated that the lower self-efficacy judgments of the other groups may reflect the fact that children viewed five minutes as a substantial amount of time to attempt the task. Given that the model was still unsuccessful the children concluded that the task was indeed difficult despite the high confidence statement made by the model. On the other hand, children's observation of a thirty second trial period left possible doubt in the

children's mind about the outcome if a little more time had been taken.

A second component of the Zimmerman and Ringle study was to examine the generality of children's self-efficacy for solving the wire puzzle to their perceived self-efficacy for solving a word puzzle. Again, the control group and all experimental groups reported lower perceived efficacy than the low persistence/high confidence group. No significant differences were observed between the control group and the other three experimental groups. In light of the "transfer findings", Zimmerman and Ringle stated that "researchers who wish to conduct naturalistic studies of modelling effects of adults on children's achievement motivation should not limit themselves to task-specific components" (p.490).

Both Omizo et al. (1985) and Schunk and Hanson (1989) examined the effects of modelling on children's self-efficacy evaluations but allowed children to assume a more active role in the research design. Omizo et al. (1985) examined the influence of modelling (children observed a model work problems and explain relevant arithmetic concepts), participant modelling (children worked problems and verbal solutions along with the model), and no modelling (children independently solved problems) on white lower middle class first, second, and third graders. Participant modeling was the superior group. Overall, children assigned to treatment conditions reported higher scores of self-

efficacy evaluations and higher performance scores than the control group.

Schunk and Hanson (1989) examined the influence of self-modeling on children's self-efficacy for learning subtraction skills. Subjects were elementary-aged children (46% white, 42% African-American, and 12% Mexican) from various socioeconomic backgrounds. Schunk and Hanson reported that observation of peer-model, self-model, and peer- + self-model treatments all had significant main effects on children's post-test subtraction performance and perceived self-efficacy for learning subtraction. All treatment conditions scored significantly higher than the control group but no significant treatment differences were observed for either post-test measure.

Prior Performance

Actual experience of successful accomplishment is the most predictive variable of students' evaluation of academic efficacy. Meece et al. (1990) examined the influence of past math grades on seventh and ninth grade students' mathematic efficacy and performance. Math grades were observed from students' previous school year record. Meece et al. reported that students' past mathematic achievement had direct positive effects on students' math efficacy and direct negative effects on students' physiological arousal towards mathematics.

Examining the unique contribution of various sources of self-efficacy, Matsui et al. (1990) observed the mathematics efficacy of Japanese undergraduate students. Students' high school mathematics grade point average was used as the measure of prior math achievement. Results indicated that after controlling for the influence of modeling, verbal persuasion, and emotional arousal sources of self-efficacy, past mathematics performance demonstrated a unique contribution to the prediction of students' current self-efficacy judgments for math.

Fassinger (1990) used high school grade point average and a composite math ACT/SAT score to predict undergraduates' self-efficacy for math. The findings of Fassinger and Matsui et al. were consistent with the earlier findings of Hackett (1985). Students' math ACT scores were significantly related to their self-efficacy judgments for math as college students.

There exist a paucity of research studies which employ a causal model for examining the influence of various sources of self-efficacy information on students' academic achievement and self-evaluation of academic efficacy. With the exception of such studies cited above, much of self-efficacy research has been correlational in nature. Therefore, the role of enactive mastery on students' perceived task efficacy has been inferred from the

relationship between experimental performance and post-test efficacy scores.

The previously discussed findings of Zimmerman and Ringle (1981) suggested that since children reported high pretest self-efficacy scores of puzzle solving, they maintained high self-efficacy beliefs even after observing the unsuccessful performances of models. (Zimmerman and Ringle measured children's self-efficacy immediately after observing the models and after the children had personally attempted to solve the wire puzzle). However, after experiencing failure in their attempt to solve the puzzle children reported significantly lower post-test scores of efficacy. The influence of enactive mastery is particularly credible given that the control group also reported significantly lower post-test efficacy scores after attempting the puzzle task. Thus, Zimmerman and Ringle's findings also lend support to the superiority of enactive performance over vicarious experience in enhancing children's self-efficacy evaluation.

Similarly, Omizo et al.'s (1985) observation, also previously discussed, that children in the participant modeling group demonstrated superior performance compared to children in the observation and control group conditions suggest the importance of enactive mastery opportunities for children's self-percepts of efficacy. Finally, Schunk and Hanson's (1989) observation that children in the self-

modeling condition demonstrated superior subtraction performance compared to children in the control group also suggest the role of enactive mastery on children's self-efficacy evaluation.

The above literature review indicates that efficacy-based educational research has primarily investigated the influence of prior performance/ prior mastery, modeling/social comparison, and verbal/social persuasion sources of efficacy information on students' perceived academic efficacy and, in turn, academic achievement. Findings support self-efficacy theory's postulate that various sources of efficacy information may function either to enhance or undermine students' academic efficacy. Moreover, students' academic behavior consistently corresponds to their level of perceived academic efficacy independent of the source of self-efficacy information. Although experimental demonstrations that students' academic efficacy evaluations are functionally related to their academic behavior increase confidence in the predictive and explanatory power of self-efficacy theory within the educational setting, they do not establish firmly the validity of self-efficacy theory in explaining students' academic behavior within the context of dynamic classroom interactions. Furthermore, while examining the influence of various sources of efficacy information on students' perceived academic efficacy and academic performance,

educational researchers employed samples of diverse demographic characteristics or diverse social group memberships (e.g., ethnicity, sex, socioeconomic status). However, no empirical analyses were conducted to explore the interrelationship between sources of academic efficacy information, students' perceived academic efficacy, and social group membership.

Self-efficacy theory proposes that individuals' awareness of their personal group membership in microsocial environments (e.g., classrooms) as well as macrosocial environments (e.g., broader society) will influence evaluations of personal efficacy (Bandura, 1986). Self-efficacy theory further postulates that the status of individuals' social group membership may influence others' perception of their ability. Others' perceptions of individuals' ability will influence the nature of their verbal persuasion, tendency to model, and creation of opportunities for enactive mastery in respect to a particular goal. Therefore, individuals who belong to a social group that is perceived as subordinate, or has been assigned inferior roles and negative labels by others in their environment, are less likely to have social experiences which promote positive self-efficacy development than individuals who belong to a social group held in higher social esteem (Bandura, 1982).

Empirical evidence of the relationship between classroom interactions, social group membership and perceived self-efficacy within the educational setting is implicitly addressed in ability grouping and career development research. The remainder of this chapter will review ability grouping and vocational research within the context of self-efficacy theory.

## Self-efficacy Theory and Ability Grouping

Educational research has not directly examined the interrelationship between students' microsocial or macrosocial group membership and academic efficacy development. However, ability grouping research indirectly suggests the nature of such a relationship. Research findings addressing qualitative differences in classroom characteristics (e.g., teacher verbal persuasion, academic curriculum, peer and teacher modeling) across ability groupings suggest that students' academic placement may have differential effects on their development of academic efficacy and academic achievement. (Because the relationship between academic achievement and students' ability group has been well documented, it will receive only peripheral attention in the following review). In summary, high ability grouped students demonstrate higher academic accomplishment than their low-ability grouped peers. For an extensive review of the ability grouping research see

Spencer & Allen, 1988; University Press of America, 1989; and Vanfossen et al. (1987).

The following discussion will incorporate principles of self-efficacy theory to past findings of ability group research. Specific attention will be given to sources of self-efficacy information (verbal persuasion, modeling, and prior performance) and implications for students' development of academic efficacy.

Verbal Persuasion

Several researchers (Freiberg, 1971; Morgan, 1977; Oakes, 1981) have reported that teachers of low ability grouped students employ more verbal criticism and show less enthusiasm than teachers of high ability grouped students. Teachers of high ability grouped students praise students for classroom participation (expressions of ideas, or answers) more frequently than teachers of low ability grouped students. Because teachers function as figures of authority in the classroom, students are likely to perceive teachers' perceptions and verbal appraisals of their academic ability as accurate and credible. According to self-efficacy theory, teachers' verbal encouragements would serve to enhance students' perceived academic efficacy for learning and problem solving, while discouraging remarks would serve to undermine students' perceived academic efficacy for learning and problem solving.

Furthermore, it can be argued that the higher achievement scores of high ability grouped students is mediated by their positive cognitive appraisals of their efficacy to learn, which is in turn nurtured and maintained through their teachers' use of positive verbal persuasion. Thus the lower academic achievement of low ability grouped students is due, at least in part, to their negative cognitive appraisal regarding their efficacy to learn which is nurtured and maintained through teachers' use of verbal criticism.

In sum, self-efficacy theory identifies verbal persuasion as a source of academic efficacy development (Schunk, 1987). Ability group research findings regarding the frequency and nature of verbal appraisals used by teachers of low and high ability grouped students, suggest that placement of students into a low ability group exposes them to more negative verbal appraisals. Therefore low-ability group placement is likely to undermine positive self-evaluation of academic efficacy, whereas high ability group placement is more likely to nurture positive academic efficacy.

Modeling

Ability group research findings further suggest distinctions in students' opportunity to observe peer and teacher modeling of successful academic accomplishments. Low ability grouped students are more often asked to work

silently and independently at their desks, while high ability grouped students are more often engaged in classroom (e.g., going to the board to work problems) and group discussions (French, 1990; Metz, 1978). In addition, less instruction time is used by teachers of low ability grouped students than high ability grouped students (Randlett, 1989).

According to self-efficacy theory, students' observation of models' successful task performance serves to enhance self-percepts of efficacy. Because high ability grouped students have more frequent opportunity to observe successful peer academic performance, as well as their teachers' modeling of appropriate problem solving strategies, they are more likely to make positive cognitive appraisals of their academic efficacy than their low ability grouped peers. In cases where high ability grouped students may observe peer failure, there are other classroom characteristics that may prevent a decrease in students' self-percepts of academic efficacy. Because high ability group classroom teachers frequently use praise and encouragement, it is reasonable to assume that they will communicate that success will come with additional practice--not that failure resulted as a lack of ability.

The tendency of low ability grouped students to work independently on task does not allow them to observe successful peer academic performance. In addition, low

ability group teachers' shorter use of instruction time give students fewer opportunities to observe appropriate problem solving strategies. In sum, differences found in the manner in which teachers instruct and ask low and high ability grouped student to complete assignments may function to undermine positive self-evaluation of academic efficacy for low ability grouped students.

Prior Performance

Research examining the curriculum content across ability groups suggests that the curriculum of low ability group classrooms focuses more on basic learning skills, while the curriculum of high ability group classrooms encourages higher order thinking (Alexander & McDill, 1976; Oakes, 1985, 1981; University Press of America, 1989). For example, when discussing the concept of taxes, teachers of low ability grouped students primarily focused on teaching them how to fill out tax forms. Teachers of high ability grouped students were more likely to encourage students to understand the taxation process (Keddie, 1971).

According to self-efficacy theory, prior experience is the most effective source of efficacy development. In order for students to acquire skills of higher order thinking they must first be assigned academic tasks which require higher order thought processes. Students' continued practice with tasks requiring abstract thought increases their ability and confidence to apply such reasoning during appropriate

problem solving tasks. If the curriculum of low ability group classrooms fails to incorporate tasks requiring higher order skills development, low ability grouped students fail to gain experience and confidence in their ability to apply abstract thinking. They may perceive the absence of such material as a credible evaluation of their learning capacity. Therefore, in making cognitive appraisals of their academic efficacy, low ability grouped students may internalize the academic ceiling ascribed for them by their educational curriculum and view themselves less competent than their high ability grouped peers.

In sum, research findings suggest that while students in high ability groups are expected to develop and demonstrate higher order thinking, low ability grouped students are not given the opportunity to master higher order thinking. Their curriculum content limits them to rudimentary thought processes. Therefore, low ability group placement may function to undermine students' academic efficacy particularly in reference to tasks requiring abstract reasoning skills.

Overall, the above integration of self-efficacy theory and ability group research suggests that high ability grouped students are more likely to have classroom interactions (e.g., teachers' verbal encouragement, peer modeling of high academic achievement, and mastery of higher order thinking) which enhance their self-evaluation of

academic efficacy, while low ability grouped students are more likely to experience interactions which impede positive development of academic efficacy.

More specifically, application of self-efficacy theory to ability group research underscores the relationship between students' microsocial group membership within the educational setting--ability group classrooms--and students' development of academic efficacy. However, it should be noted that self-efficacy theory does not propose that it is the ability group itself but rather the social interactive processes which function to undermine or enhance students' perceived academic efficacy.

In addition, ability group research implicates students' ethnicity and socioeconomic status as potential macrosocial group variables which may influence students' development of academic efficacy. The demographic characteristics of students' ability group assignment indicate that working class and minority students are disproportionately over represented in low ability group classrooms (Schneider, 1989). Students in high socioeconomic groups (mainly middle-class whites) have a 53% chance of being placed in a high ability group, and a 10% chance of being placed in a low ability group. Those in the lower socioeconomic groups (mainly poor and minorities) have a 19% chance of being placed in a high ability group, and a 30% chance of being placed in a low ability group. Because

of the close interrelationship among ethnicity, socioeconomic status, and family structure a more general description of low ability grouped students is that they are low socioeconomic minorities from single parent households (Vanfossen, Jones, & Spade, 1987).

Self-efficacy theory states that the status of individuals' social group membership in the broader social structure may influence others' perception of their ability in microenvironmental contexts. Because the American society has traditionally viewed its minority group individuals as socially and intellectually inferior, the disproportionate placement of minority students into low ability group classrooms appear to reflect the status of minority ethnic groups in the broader social structure (Bempechat, 1989; Oakes, 1985; Ogbu, 1979; University Press of America, 1989). Given that low ability grouped students are less likely to experience classroom interactions which enhance academic efficacy, and that minority students are disproportionately represented in low ability group classrooms, ability grouping represents an educational practice which tends to "convert instructional experiences into education in inefficacy" for minority group students (Bandura, 1986, p.416).

Self-efficacy theory further proposes that individuals' awareness of others' perception of their social group membership in broader society or immediate environmental

structures will influence evaluations of personal self-efficacy (Bandura, 1986). Within the educational setting, minority students may perceive educators' evaluations of their ability (i.e., low ability group placement) as a credible and accurate evaluation of their learning capacity. Therefore in making cognitive appraisals of their academic efficacy, they may attribute lack of skills and knowledge to an inability to learn as opposed to the fact that they have not been granted an opportunity to fully participate in the learning process (Bempechat, 1989; Oakes, 1985; University Press of America, 1989).

Early research on minority children's self-esteem indicates that as early as the preschool years, minority students demonstrate awareness of social inequalities among different ethnic groups by their doll choice behavior. Researchers have argued that children internalize their perception of society's view of them as individuals and therefore are likely to choose symbols unlike themselves in preference-choice situations (for a review of this literature see Baldwin, 1979; Powell-Hopson & Hopson, 1988; Spencer, 1983). Because children are aware that it is on the basis of their social group membership (e.g. ethnicity) that society oftentimes basis its evaluation, it follows that factors which influence individuals' social group status in society may be important factors influencing students'

perceived academic efficacy beyond sources of efficacy information in their immediate school environment.

## Self-Efficacy Theory and Vocational Behavior

Efficacy-based vocational literature offers additional support for the potential importance of students' social group membership to academic efficacy development. More specifically, research findings underscore the importance of gender as a macrostructural variable which may influence students' academic efficacy (Taylor & Popma, 1990).

Betz and Hackett (1981) conducted the first empirical investigation of gender differences and career efficacy. They measured college students' perceived self-efficacy to complete educational requirements and job duties associated with 10 traditionally male occupations (e.g., engineer, accountant, lawyer) and 10 traditionally female occupations (social worker, secretary, travel agent). Self-efficacy was measured on a ten-point scale ranging from completely unsure (1) to completely sure (10) for each occupation. No overall gender differences were observed for the self-efficacy measure. However, females reported higher self-efficacy perception of completing educational requirements for traditional female occupations and significantly lower evaluations of self-efficacy for the traditionally masculine occupations. Males reported equivalent self-efficacy evaluations for both occupational groupings. Academic ability (American College Test Math and English subtest

scores) did not make a significant contribution after the self-efficacy scores had been entered.

Lent et al. (1986) reported similar findings among college students' perceived career efficacy and academic persistence. Academic persistence was defined as students' perceived ability to overcome particular "academic milestones." Results indicated that students with high academic efficacy tended to anticipate more technical career options and reported higher perceived persistence in meeting academic challenges, than did students with low self-percepts of career efficacy. However, contrary to Betz and Hackett (1981), Lent and his colleagues found no significant gender differences in students' career efficacy for technical/scientific occupations.

Lent et al. stated that failure to observe gender differences may be due to the homogeneity of their sample in terms of academic status. All of their undergraduates were considered high ability students while the sample of Betz and Hackett (1981) was more heterogeneous in academic ability status. Steward and Jackson (1990) reported findings that are comparable to those of Lent et al. in an assessment of self-efficacy and academic persistence among Black college students. They reported that students who perceived themselves as personally competent tended to be more academically persistent and to have higher grade point

averages than students with low self-efficacy evaluations. Gender differences were not reported.

Ayres (1980), using a slight variation of the procedure constructed by Betz and Hackett, measured college students' efficacy perception regarding specific duties related to the occupations of physician, nurse, college professor, and elementary school teacher. No overall gender differences were observed; however, men reported higher self-efficacy evaluation on mathematical and scientific oriented duties. Females' self-efficacy evaluations were higher for occupational duties such as teaching and caring for the sick. Correlations between self-efficacy judgments and measures of ability (ACT scores) were nonsignificant. Deboer (1984) observed a similar relationship between college students' ability and technical course selection behavior. He reported that although female undergraduates chose to enroll in significantly fewer science courses than males, they outperformed males in the courses they did select. Deboer concluded that females' course selection was related to a socialized self-percept of efficacy that females are less likely to succeed in technical fields than males.

Deboer's interpretation of his findings was later supported by Scott. Scott (1988) investigated differences in male and female course-taking behavior and anticipated college major. Females were found to have lower perceptions

of self-efficacy than males regarding their math and science aptitudes. They took fewer courses in math and science and were less likely to anticipate technical college majors than males despite having comparable ability.

With the intent of extending efficacy-based vocational research to various levels of academic attainment and socially diverse populations of students, Post-Kammer and Smith (1985) examined sex differences among eighth and ninth graders' career self-efficacy. Like the procedure of Betz and Hackett (1981), subjects were presented with a list of 20 occupations (10 traditionally male and 10 traditionally female). Similarly, strength of self-efficacy was assessed on a 10-point scale ranging from completely unsure (1) to completely sure (10) for each occupation. Analysis revealed significant sex differences for only a particular cluster of traditionally male and female occupations. Boys indicated a higher perception of self-efficacy in the traditional male occupations of drafter and engineer. Girls indicated higher percepts of self-efficacy for the traditional female occupations of dental hygienist, physical therapist, and secretary.

Maintaining the goal of establishing the generalization of self-efficacy research across various populations, Post-Kammer and Smith (1986) reported that among "disadvantaged" high school students career interest predicted students' occupational choices. Gender was not a significant predictor

of career self-efficacy. Despite the diversity of the sample's ethnic/racial group composition (e.g. 41% African-American, 9% Hispanics), Post-Kammer and Smith did not investigate the relationship between ethnicity, students' career interest, or career efficacy.

Extending the vocational literature to specific consideration of the effects of ethnic group membership on perceptions of career efficacy, Lauver and Jones (1991) examined factors associated with perceived career options in American Indian, White, and Hispanic rural high school students. Career self-efficacy was measured using the Betz and Hackett (1981) career efficacy questionnaire. Gender differences were observed. Girls' self-efficacy reports were higher than boys for the traditional masculine occupation of accountant. Males reported higher career efficacy than females on the traditional female occupation of X-ray technician. Overall, students reported higher evaluations of career-efficacy for traditionally same-sex occupations. Differences in self-efficacy measures based on ethnic group membership indicated that American Indians reported the lowest self-percepts of efficacy, followed by Hispanics, across the occupational categories.

Examining socioeconomic status as a social group variable on students' career efficacy, Hannah and Kahn (1989) found that socioeconomic status correlated highly with self-efficacy judgments. High SES girls reported

higher efficacy estimates for male dominated careers than low SES girls.

In discussing the differences in career efficacy among students of different ethnic groups, several researchers echo concerns similar to those associated with the issue of ability grouping and its effect on minority students' development of academic efficacy. For example, researchers have reported that members of "subordinate" ethnic groups are more likely to encounter school experiences which undermine efficacy for high status careers (e.g., professionals and managerial officials). Using the concept of job ceiling, Ogbu (1978) suggest that the educational system differentially prepares students for future careers. The education of minority group students are more likely to prepare them for lower socioeconomic career opportunities while students belonging to the dominant ethnic group are more likely to be prepared for more technological and higher socioeconomic status careers. Because academic achievement or educational attainment is closely linked to occupational status, it follows that students' low career self-efficacy may be a byproduct of low academic efficacy.

## Conclusions

Collectively, educational and vocational research findings support self-efficacy theory's basic premise that individuals' perception of their ability influences human behavior. Educational research examining the effects of

different sources of self-efficacy information indicates that modeling, prior experience, and verbal persuasion may function to enhance students' academic self-efficacy which, in turn, influences academic performance. Although educational researchers neglected to address adequately the empirical relationship between students' social group membership (e.g., gender, ethnicity, socioeconomic status), perceived self-efficacy, and various sources of efficacy information, vocational and ability group research suggests the need for such an examination.

Application of self-efficacy theory to ability group research suggests the potential importance of macrosocial group variables (ethnicity and socioeconomic status) in students' development of academic efficacy. Minority and majority group students have differential opportunity to develop positive self-perceptions of academic efficacy. This contrast is, in part, due to the fact that a disproportionate number of minority and low socioeconomic status students are placed in low ability grouped classrooms (Schneider, 1989).

Because the standards by which students are perceived as competent within the educational setting oftentimes coincide with their social group status in the broader society, and students' awareness of their group membership in the broader social structure may function to impede academic self-efficacy, it can be argued that students'

academic efficacy is influenced by their social experiences at the microsocial level (e.g., classroom interactions) as well as macrosocial level (e.g., group membership in the broader society). In light of such an assumption, the question may be posed whether or not there are particular macrostructural factors (gender, ethnicity, socioeconomic status) which influence individuals' self-efficacy development beyond sources of self-efficacy experienced in microenvironmental contexts.

Like ability group research, the vocational literature questions educational researchers' emphasis on sources of self-efficacy information at the microenvironmental level of human interaction. The disproportionate number of women in traditionally male occupations in the broader society may serve as a modeling or social persuasive source of career-efficacy at the macrostructural level. In this sense, females' lower evaluations of technical career efficacy--despite their demonstration of competence related to skills required in such careers--may reflect their efficacy evaluation of women as a social group to successfully pursue traditionally male careers.

Application of self-efficacy theory to vocational research further illustrates the relationship between gender and students' development of career-efficacy. Although females have been observed to perform comparable to males in math and science classes, they generally report lower self-

evaluations of career-efficacy than their male counterparts towards tasks (e.g., technical occupations, course selection) requiring math and science skills (Betz & Hackett, 1981). It is implied that modeling (e.g., presence of females in traditionally male occupations) or verbal persuasion (e.g., communicated through career counseling) may be more effective sources of information for females' career-efficacy than enactive mastery. Such findings pose the question of whether sources of self-efficacy information have differential effects on self-efficacy development based on social group membership (e.g., gender).

A final empirical question suggested relates to self-efficacy assessment. Self-efficacy theory focuses on perceived ability related to highly specific types of behaviors (Bandura, 1977; 1986). Accordingly, measurements of self-efficacy are employed which observe perceived competence for the specific behavior in question. Therefore, generalizations of self-efficacy are by design restricted to the specific behavior under investigation (Maddux, 1991; Gorrell, 1990; Bandura, 1977). The limitation imposed by such an assessment is that little or nothing can be concluded about the empirical characteristics of global self-efficacy--if such a construct does in fact exist (Gorrell, 1990; Zimmerman & Ringle, 1981).

Research Questions

In light of the above discussion, the present study is multipurpose:

1) to examine the relationship between academic efficacy and academic achievement among students of different ethnic group.

2) to examine if students differ in their degree of academic efficacy based on ethnicity.

3) to examine if students' ethnicity, gender, family structure, or socioeconomic status make a significant contribution to academic efficacy beyond the influence of modeling, verbal, and prior mastery sources of academic efficacy information.

4) to examine the differential contribution of modeling, verbal persuasion, and prioi performance sources of academic efficacy to students' academic efficacy based on ethnicity and gender.

Hypotheses

The following hypotheses will be tested:

H1: There will be a significant relationship between academic efficacy and academic achievement for students across all ethnic groups.

H2: Black and Hispanic students will have lower self-evaluations of academic efficacy than Asian and White students.

H3: Students' social group membership (ethnicity, gender, family structure, socioeconomic status) will significantly contribute to academic efficacy beyond the influence of prior performance, modeling, and verbal persuasion sources of self-efficacy information.

H4: Prior performance, modeling, and verbal persuasion sources of efficacy information will have differential effects on the academic efficacy of students based on gender and ethnicity.

# CHAPTER III

## METHODS

Subjects for this study were sampled from the first follow-up survey of the 1988 National Education Longitudinal Study (NELS:88) sponsored by the National Center for Education Statistics (NCES). The NELS:88 study was designed to identify personal and school attributes associated with academic achievement and to provide trend data about the various transitions experienced by students from eighth grade to secondary school (National Center for Education Statistics, 1992). The remainder of this chapter will first provide a brief description of the NELS: 88 sample and the data collection procedures conducted by the NCES and the National Opinion Research Center (NORC). Second, a description of the subsample used for the present study, and the selection procedures employed by the present author will be discussed. Third, both independent and dependent variables of interest in the present study will be described.

The reader should note that while some of the measures of interest were preconstructed by the coding procedures of the NCES staff, others were constructed by the manipulation of various items by the present author. More specifically, as will be noted in their description, students' ethnicity,

gender, family structure, and academic achievement was based on the preestablished codes used by the NCES. However, the measures for the academic efficacy variable and the different sources (prior experience, modeling, and verbal persuasion) of academic efficacy was based on the author's manipulation of students' responses to various items existing in the NELS first year follow-up database.

## Subjects

### Description of Primary Sample and Procedure

NCES used a two-stage stratified probability design to select a nationally representative sample of schools and students. The first stage resulted in 1,743 school selections with 1,052 participating schools, including 815 public and 237 private schools. The second stage produced a random selection of 26,432 students among participating sampled schools, resulting in participation by 24,599 eighth grade students. On average, each of the participating schools was represented by 23 student participants.

NCES gathered family background and educational information through the use of self-administered questionnaires and a battery of cognitive tests. After receiving parents' and school administrators' permission, student questionnaires and cognitive tests were administered in group sessions at each of the schools (usually in a library or empty classroom). Two National Opinion Research Center (NORC) staff members, a "team leader" and a clerical

assistant, monitored each initial group session. Students were instructed to complete the student questionnaire. After all students completed the questionnaire, a ten-minute break was given. During the break the NORC staff reviewed questionnaires for missing responses and/or multiple responses. Students were asked to complete any involuntarily skipped items or correct multiple-response items.

After the questionnaires had been reviewed and completed, students were administered an 85-minute battery of cognitive tests consisting of four timed sections relating to mathematics, reading, science, and social studies (history/government). After the students completed the battery of tests, NORC staff members reviewed the sections for completeness and appropriate responses, and asked students to make the necessary changes/corrections before leaving the classroom.

Make-up sessions were arranged by NORC for those students who were expected to attend the group session but were absent for some reason. Those students whose parents initially refused to allow them to participate in the study but later changed their minds, were administered the student questionnaire through a telephone interview. Students interviewed by telephone were not administered the battery of cognitive tests at any time.

Description of Secondary Sample and Procedure

The present study constitutes a secondary data analysis using subjects selected from the first follow-up survey of the 1988 National Education Longitudinal study. In phase one of the selection procedure, the present author selected only those students who reported that their first year high school course work was "harder" than in the prior academic years (N=8,921). This criterion was established because of the nature of some of the items used to construct the academic efficacy variable. Some of the items used to construct the academic efficacy variable refer to the amount of effort and persistence students expend towards their school work.

According to self-efficacy theory, in a learning situation, highly efficacious students who view a given academic task(s) as "difficult" are more likely to exert greater effort and persistence towards task accomplishment than students who perceive themselves to be less competent (Gorrell & Partridge; Schunk & Hanson, 1985; Lent et al. 1986; Steward & Jackson, 1990). However, students who perceive themselves to be highly efficacious but view the academic material(s) to be "easy" will feel little need to exert much effort and persistence towards task completion (Bandura, 1986; Salomon, 1984).

Thus, the theoretical and empirical literature suggest a clear distinction between high and low efficacious

individuals' expenditure of effort and persistence under conditions in which the targeted task is perceived as "difficult", but suggest a somewhat obscure relationship when the task is perceived as "easy." Therefore, the author would not be able to clearly interpret the relationship among variables for those students who reported that their current school work was "easy."

The second, and final selection procedure, involved the creation of a balanced cell 2 X 2 X 4 X 4 factorial design of the different variable levels of gender, family structure, ethnicity, and socioeconomic status (SES), respectively. An SPSS program was written which randomly selected an equal number of males and females for each cell (n=6) from the remaining 8,921 students. Final selection yielded a subsample consisting of one hundred ninety-two (N=96 boys and N=96 girls) high school students classified as living in one-adult (N=96) or two-adult (N=96) family structures. Subjects were of diverse ethnic backgrounds (Asian-American, Hispanic, African-American, and White) and SES groups ("high-high" (HL), "low-high" (LH), "high-low" (HL), and "low-low" (LL)).

## Independent Variables

### Social Group Membership

Membership in different social groups for the present study was determined based on demographic characteristics as reported and coded by the NCES staff for the NELS: 88

database. NCES staff members determined students' gender and ethnicity based on students' self-designation of ethnic group membership and sex. In cases where gender was originally coded as missing, NCES coded students' gender as it appeared on their respective school roster. In cases where students' ethnicity was originally coded as missing or unknown, NCES inferred students' ethnic group membership from parents' report of ethnicity on the parent questionnaire form.

NCES constructed students' socioeconomic status using parent questionnaire data (father's education level, mother's education level, father's occupation, mother's occupation, and family income) whenever available. Education-level data were recoded using the highest level of education accomplished by either parent. If parent questionnaire data were not available, NCES used students' report of parents' educational accomplishment was used. If neither student nor parent data were available, NCES coded parents' education level as missing. Occupational data were recoded using the Duncan Social Economic Index Scale (SEI). Family income was based on parents' report of the range of annual income. After all necessary recoding, NCES standardized the nonmissing parent/student data were standardized to a mean of 1 and standard deviation of zero. Standardized components were then averaged to form an SES composite. Socioeconomic status ranged from -2.97 to 2.56.

In addition, NCES created four SES groups based on students' SES composite scores: 1) "high-high' (HH), 2) "low-high" (LH), 3) "high-low" (HL), and 4) "low-low" (LL). In cases where all parent information was missing and at least one component based on student questionnaire data was not available, NCES coded students' socioeconomic status as missing.

Sources of Efficacy Information

The measures for the different sources of academic efficacy information were constructed by the present author by summing students' responses across items representative of the particular efficacy source. Prior mastery refers to students' prior performance regarding a particular task (Bandura, 1986). Prior mastery was scored by summing students' reports of their past grades in Math and English since the beginning of their ninth grade year. Response categories for prior grades ranged from 1 (mostly below D's) to 8 (mostly A's). The remaining two efficacy sources of modeling and social persuasion were measured by summing students' responses across items relating to relative experiences both inside and outside of the school setting.

Observing, or simple awareness of, the task performance of others whom you view to be significant or similar to yourself can raise self-evaluation of efficacy (Bandura, 1986). Therefore, the modeling source of academic efficacy was measured by asking students to respond to questions such

as "In your most recent, or current math class, how often do/did you copy the teacher's notes from the blackboard?", or "In each of your current classes (Math and English), how often are you asked to show that you really understand the materials, rather than just give an answer?" For the former, response categories ranged from 1 (never) to 3 (often). For the latter, response categories ranged from 0 (never) to 4 (almost everyday).

Social persuasion, or verbal encouragement, often leads individuals to believe that they can successfully accomplish the task in question (Bandura, 1986). Verbal source of academic efficacy was measured by asking students to respond to questions (e.g. "How far in school do you think your father/mother wants you to go?", or "When I work hard on school work, my teacher praises my efforts?") indicating the type of academic persuasion they receive from their friends, parents, and teachers.

## Dependent Variables

### Academic Self-efficacy

Individuals' self-evaluation of efficacy influences whether or not they will voluntarily engage in a particular task, and the amount of persistence and effort they will expend towards task accomplishment. Individuals with high evaluations of self-efficacy will exert greater effort and persistence towards task completion than individuals with low self-efficacy evaluations (Brown & Inouye, 1978; Schunk,

1984b). Thus, academic self-efficacy was partially constructed based on the sum of students' responses across questions (e.g., "In each of your current classes, how often do you try as hard as you can?", or "What is the total amount of time you spend on homework both in and out of school?") indicating the amount of effort and persistence they expend towards their academic work. Students' summed responses of items relating to effort and persistence were added to the summed responses of items assessing their perception their academic ability
(e.g., "I am hopeless in English", or "Math is one of my best subjects"), and their response to the question "As things stand now, how far do you think you will get in school?" Students' responses for academic self-concept items ranged from 13 to 83. Higher scores indicated higher self-concept. (For a more detailed description of the author's construction of the academic efficacy variable and the measures for the different sources of academic efficacy, see Appendix A).

Academic achievement

Academic achievement was assessed using students' standardized test composite scores for reading and mathematics as reported by the NCES staff. NCES constructed students' composite scores by using two overall ratings which assessed students' reading and math proficiency. Proficiency scores were based on a student weight which

adjusted for the condition that all students who completed the student questionnaire did not complete the cognitive tests. Standardized test composite scores ranged from 29.92 to 69.25, with high scores indicating high achievement.

## Data Analysis

The secondary analyses were conducted using the SPSS (Statistical Package for the Social Sciences) statistical package (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Preliminary analyses of variance (ANOVAs) were conducted in order to examine possible differences among students' academic achievement and exposure to different sources of academic efficacy information based on students' gender, ethnicity, family structure, and socioeconomic status. Correlational analyses were performed in order to investigate the relationship between academic efficacy and students' academic achievement among students of different ethnic groups. Analysis of Variance was performed in order to investigate if students from different ethnic groups differed in their degree of academic efficacy. The means for academic efficacy across ethnic groups were compared.

A two step forward regression analysis was performed in order to investigate if social group membership (ethnicity, gender, family structure, and socioeconomic status) in the broader society influences students' academic efficacy beyond the influence of microinteractive sources of self-efficacy information (prior mastery, modeling, verbal

persuasion). The first forward stepwise procedure regressed academic efficacy on prior mastery, modeling, and verbal persuasion sources of academic efficacy. In the second forward stepwise procedure, sources of academic efficacy information found to be significant predictors in the first stepwise procedure were force-entered into the regression equation, and a forward stepwise selection was conducted using students' ethnicity, gender, family structure, and socioeconomic status as independent variables.

A forward stepwise regression analysis was performed in order to investigate if modeling, social persuasion, and prior mastery sources of self-efficacy information have differential influence on the academic efficacy of students based on ethnicity and gender.

# CHAPTER IV

# RESULTS

Before addressing the specific hypotheses of the present study, preliminary analyses were conducted in order to examine possible differences among students' academic achievement and exposure to the different sources of academic efficacy information based on students' gender, ethnicity, family structure, and socioeconomic status. Table 1 presents the means and standard deviations for academic achievement, academic efficacy, and the sources of academic efficacy information based on gender, ethnicity, family structure, and socioeconomic status.

## Preliminary Findings

### Academic achievement

Analysis of variance using academic achievement as the dependent variable and gender, ethnicity, family structure, and SES as independent variables showed an overall $F(63,128)=1.48$, $p<.05$. Significant main effects were observed for ethnicity [$F(3,128)=3.27$, $p<.05$], and SES [$F(3,128)=8.77$, $p<.0001$]. No significant interaction effects were observed. Post hoc analyses indicated that Black ($M=48.40$) and Hispanic ($M=49.75$) students did not differ significantly on academic achievement. Asian ($M=53.54$), White ($M=52.60$), and Hispanic ($M=49.75$) students

Table 1

Means and Standard Deviations of Academic Efficacy (AEFF), Academic Achievement (ACH), Prior Mastery (PRIOR), Modeling (MODEL), and Verbal (VERBAL) Sources of Academic Efficacy by Social Group Membership

| | | ACH | | AEff | | PRIOR | | MODEL | | VERBAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Social Group Membership | n | M | SD | M | SD | M | SD | M | SD | M | SD |
| Gender (female) | | | | | | | | | | | |
| Asians | 24 | 52.42 | 10.15 | 57.08 | 9.29 | 7.17 | 1.88 | 12.70 | 2.84 | 14.81 | 1.41 |
| Hispanics | 24 | 51.58 | 8.84 | 56.13 | 10.76 | 6.42 | 1.74 | 10.66 | 2.18 | 13.83 | 2.23 |
| Blacks | 24 | 47.00 | 11.73 | 58.33 | 8.14 | 7.21 | 1.61 | 11.96 | 3.04 | 14.54 | 1.75 |
| Whites | 24 | 53.38 | 9.43 | 56.67 | 5.73 | 6.96 | 1.68 | 10.96 | 3.08 | 13.77 | 2.30 |
| Gender (male) | | | | | | | | | | | |
| Asians | 24 | 54.67 | 8.87 | 57.00 | 10.51 | 6.42 | 1.84 | 11.29 | 2.44 | 14.15 | 1.73 |
| Hispanics | 24 | 47.92 | 9.20 | 56.58 | 7.96 | 7.13 | 1.45 | 11.29 | 2.65 | 14.00 | 1.35 |
| Blacks | 24 | 49.79 | 10.06 | 57.04 | 7.90 | 7.42 | 1.82 | 12.58 | 2.45 | 14.04 | 1.78 |
| Whites | 24 | 51.83 | 9.66 | 54.88 | 9.79 | 7.25 | 1.78 | 11.54 | 3.27 | 12.92 | 2.39 |
| Ethnicity | | | | | | | | | | | |
| Asians | 48 | 53.54 | 9.50 | 57.04 | 9.82 | 6.79 | 1.88 | 12.00 | 2.71 | 14.48 | 1.59 |
| Hispanics | 48 | 49.75 | 9.11 | 56.35 | 9.37 | 6.77 | 1.63 | 10.98 | 2.42 | 13.92 | 1.83 |
| Blacks | 48 | 48.40 | 10.90 | 57.69 | 7.96 | 7.31 | 1.70 | 12.27 | 2.75 | 14.29 | 1.77 |
| Whites | 48 | 52.60 | 9.48 | 55.77 | 7.99 | 7.10 | 1.72 | 11.25 | 3.16 | 13.43 | 2.36 |
| Family Structure | | | | | | | | | | | |
| One-Adult | 96 | 51.21 | 9.94 | 57.18 | 8.83 | 7.06 | 1.70 | 11.56 | 2.77 | 13.80 | 2.25 |
| Two-Adult | 96 | 50.94 | 10.37 | 56.25 | 8.76 | 6.93 | 1.77 | 11.69 | 2.84 | 14.22 | 1.56 |
| Socioeconomic Status | | | | | | | | | | | |
| High-High | 48 | 56.29 | 10.28 | 59.46 | 7.59 | 6.73 | 1.95 | 13.52 | 2.30 | 14.57 | 1.71 |
| Low-High | 48 | 50.54 | 9.43 | 56.17 | 8.24 | 6.93 | 1.73 | 11.27 | 2.65 | 13.71 | 1.98 |
| High-Low | 48 | 50.73 | 7.83 | 55.10 | 8.52 | 7.38 | 1.76 | 11.15 | 2.77 | 13.89 | 1.59 |
| Low-Low | 48 | 46.73 | 9.83 | 56.15 | 10.21 | 6.94 | 1.45 | 10.56 | 2.60 | 13.85 | 2.34 |

did not differ significantly on academic achievement. However, mean academic achievement for Black studentsdiffered significantly from Asian and White students, $p<.05$.

Mean academic achievement of students in the "high-high" (HH) socioeconomic group (M=56.29) and "low-low" (LL) socioeconomic group (M=46.73) differed significantly from each other and from students in the "high-low" (HL) (M=50.73) and "low-high" (LH) (M=50.54) socioeconomic groups. Students in the HL and LH socioeconomic groups did not differ significantly from each other.

Sources of Academic Efficacy and Social Group Membership

Analysis of variance employing prior mastery as the dependent variable indicated no significant main or interaction effects due to ethnicity, gender, family structure, or socioeconomic status. The overall observed F of .81 did not reach significance.

Analysis of Variance employing modeling as the dependent variable indicated a significant main effect due to SES [$F(3,128)=11.48$, $p<.0001$]. Post hoc comparisons of mean modeling scores indicated that HH socioeconomic group students (M=13.52) differed significantly from the other students. However, students in the LL (M=10.56), HL (M=11.15), and LH (M=11.27) socioeconomic groups did not differ significantly from each other. No significant interaction effects were observed. The overall F of 1.33 for

the modeling source of academic efficacy did not reach significance.

Analysis of variance using the verbal source of academic efficacy as the dependent variable indicated an overall [$F(63,128)=1.82$, $p<.01$]. A significant main effect due to ethnicity was observed $F(3,128)=4.05$, $p<.01$. In addition, ethnicity X gender X SES, $F=(9,128)=2.48$, $p<.01$, and ethnicity X SES X family structure $F(9,128)=2.47$, $p<.01$ interactions were observed. Mean verbal source of efficacy score for Asians (M=14.48), Blacks (M=14.29), and Hispanics (M=13.92) did not differ significantly. The mean verbal score for Whites (M=13.34) differed significantly from Blacks and Asians.

Academic Efficacy, Sources of Academic Efficacy, and Ethnicity

Correlational analyses (see Table 2) indicated that the modeling source of academic efficacy was significantly correlated with academic efficacy for Asians ($r=.39$, $p<.01$), Hispanics ($r=.31$, $p<.05$) and Whites ($r=.35$, $p<.01$). The verbal source of efficacy was significantly correlated with academic efficacy for both Hispanics ($r=.42$, $p<.01$) and Whites ($r=.41$, $p<.01$). The prior mastery source and academic efficacy was inversely related across all ethnic groups with significant relationships being observed for Asians ($r=-.33$, $p<.01$) and Whites ($r=-.35$, $p<.01$). For

Table 2

Intercorrelational Matrix of Dependent and Independent Interval-level Variables by Ethnicity

| Ethnicity | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. **ACH** | | | | | | |
| Asians | - | .40** | -.24 | .23 | .39** | .44** |
| Hispanics | - | .28* | .03 | .08 | .20 | .23 |
| Blacks | - | .41** | -.20 | .40** | .25 | .49*** |
| Whites | - | .36** | -.39** | .24 | .41* | .44*** |
| 2. **AEFF** | | | | | | |
| Asians | | - | -.33** | .39** | .21 | .18 |
| Hispanics | | - | -.06 | .31* | .42** | .12 |
| Blacks | | - | -.14 | .23 | .21 | .07 |
| Whites | | - | -.35** | .35** | .41** | .54*** |
| 3. **PRIOR** | | | | | | |
| Asians | | | - | -.12 | -.04 | -.24 |
| Hispanics | | | - | -.00 | -.20 | .00 |
| Blacks | | | - | -.10 | .09 | -.08 |
| Whites | | | - | .30 | .00 | .01 |
| 4. **MODEL** | | | | | | |
| Asians | | | | - | .32 | .23 |
| Hispanics | | | | - | .16 | .30* |
| Blacks | | | | - | .16 | .53*** |
| Whites | | | | - | .48*** | .51*** |
| 5. **VERBAL** | | | | | | |
| Asians | | | | | - | -.03 |
| Hispanics | | | | | - | .11 |
| Blacks | | | | | - | .09 |
| Whites | | | | | - | .45*** |
| 6. **SES** | | | | | | |
| Asians | | | | | | - |
| Hispanics | | | | | | - |
| Blacks | | | | | | - |
| Whites | | | | | | - |

Note. ACH = academic achievement; AEFF = academic efficacy; PRIOR = prior mastery source of academic efficacy; MODEL = modeling source of academic efficacy; VERBAL = verbal source of academic efficacy; SES = socioeconomic status. $N$=192; $n$=48 for each ethnic group.

*$p$<.05; **$p$<.01; ***$p$<.001.

Blacks, neither of the academic efficacy sources weresignificantly related to academic efficacy.

Sources of Academic Efficacy, Academic Efficacy and Gender

Correlational analyses based on gender indicated that a significant positive relationship between academic efficacy and both modeling and verbal sources of academic efficacy for males (r's=.33 and .35, respectively, p<.001) and females (r's=.34, .30, respectively p<.01). The prior mastery source of academic efficacy was inversely related for males (r=-.36, p<.001). The relationship between prior mastery and academic efficacy for females was virtually zero (r=-.07).

The following analyses addressed the specific hypotheses of the present study:

Hypothesis 1. It was hypothesized that there would be a significant positive relationship between academic efficacy and academic achievement for students across all ethnic groups (see Table 2). Correlational analyses indicated that students' self-evaluation of academic efficacy was positively related to academic achievement across all ethnic groups (Asian r=.40, p<.01; Hispanic r=.28, p<.05; Blacks r=.41, p<.01; and Whites r=.36, p<.01). Separate analyses based on gender indicated a stronger relationship between academic efficacy and academic achievement for females (r=.47, p<.001) than males (r=.23, p<.05).

Hypothesis 2. It was hypothesized that Black and Hispanic students would have lower self-evaluations of academic efficacy than Asian and White students. Visual comparison of mean academic efficacy across ethnic groups indicated that Blacks had slightly higher academic efficacy (M=57.68) than Asians (M=57.04) but Asians were higher than Hispanics (M=56.35). Whites had higher academic efficacy scores (M=55.77) than all other ethnic groups. Analysis of variance using students ethnicity, gender, family structure, and SES as independent variables indicated no significant main or interaction effects due to ethnicity. The overall observed F of .59 did not reach significance.

Hypothesis 3. It was hypothesized that students' social group membership (ethnicity, gender, SES, and family structure) would significantly contribute to academic efficacy beyond the influence of prior mastery, modeling, and verbal sources of academic efficacy information. To investigate whether students' ethnicity, gender, SES, or family structure influenced students' self-percepts of academic efficacy beyond the influence of prior mastery, modeling, and verbal sources of academic efficacy, two stepwise procedures were employed. Table 3 presents a summary of the forward stepwise analyses. In the first stepwise regression, academic efficacy was regressed on prior mastery, verbal persuasion, and modeling sources of academic efficacy information. All three sources of

efficacy information produced a significant increment in the explained variance $R^2$=.21 [F(3,191)=16.97, p<.001].

The second stepwise procedure entered the sources of efficacy information as the first three variables and performed a forward selection on the social group variables of ethnicity, gender, family structure and socioeconomic status.

Table 3

Summary of Stepwise Procedure Using Verbal, Modeling, and Prior Mastery Sources of Efficacy as Predictors of Academic Efficacy

| Predictor[a] | F(df) | B | $R^2$ |
|---|---|---|---|
| Verbal | 11.49(3,188) | 2.04 | .21 |
| Model | 23.51(1,190) | 2.91 | .11 |
| Prior | 26.22(2,189) | -2.06 | .16 |

Note: N=192
[a] For all variables, p<.001.

None of the social group variables offered significant additional information to the prediction of students' self-evaluation of academic efficacy.

An examination of the sample correlation matrix suggested that SES did not enter the equation because of its relatively high correlation with the modeling source of efficacy (r=.41, p<.0001). To test this possibility the

contribution of SES was examined through stepwise regression with modeling excluded from the model. A regression analysis was conducted with the verbal and prior mastery sources forced entered into the equation, and a forward stepwise procedure conducted on the four social group variables (ethnicity, gender, family structure, and socioeconomic status). Results indicated that SES contributed a significant increment in R-square, $p<.01$. This finding suggests that the high correlation of modeling with SES had canceled the unique contribution of SES to academic efficacy in the initial analysis.

Hypothesis 4. It was hypothesized that prior mastery, modeling, and verbal sources of efficacy information will have differential effects on the academic efficacy of students based on gender and ethnicity. Table 4 presents

Table 4

Summary of Stepwise Procedure Using Prior Mastery, Modeling, and Verbal Sources as Predictors of Academic Efficacy By Ethnicity

| | Hispanic | | Asian | | White | |
|---|---|---|---|---|---|---|
| Predictor[a] | F(1,46) | B | F(2,45) | B | F(3,44) | B |
| Verbal | 9.91 | 4.19 | -- | -- | 9.66 | 2.74 |
| Modeling | -- | -- | 8.69 | 4.04 | 7.24 | 2.70 |
| Prior | -- | -- | 5.04 | -2.66 | 8.31 | 2.90 |
| $R^2$ | .18 | | .25 | | .40 | |

Note. N = 48 for all ethnic groups.
[a] For all variables, $p<.05$.

the significant predictors emerging from the stepwise regression analyses examining differences in academic efficacy development based on students' ethnicity. The greatest amount of explained variance in academic efficacy was observed for Whites ($R^2$=.40) and the least amount for Blacks ($R^2$=.11). Neither source of academic efficacy entered the equation for Blacks.

Only the verbal source of academic efficacy entered the equation for Hispanics, $p<.01$. Modeling ($p<.01$) and prior mastery ($p<.05$) sources of academic efficacy, respectively, entered the equation for Asians. All three sources of academic efficacy entered the equation for Whites. The prior mastery source was observed to have a negative relationship with academic efficacy for both Asians and Whites with verbal persuasion being the most effective, followed by prior mastery, then modeling.

Because of the small amount of variance explained in academic efficacy by the sources of efficacy information across all ethnic groups, an additional stepwise procedure was conducted using ethnicity, gender, family structure, and SES as dependent variables. Efficacy sources making a significant contribution for each ethnic group were respectively forced entered into the equations. Results indicated that SES and family structure made unique contributions respectively to academic efficacy for Whites

($R^2$=.40 vs $R^2$=.49) and Hispanics ($R^2$=.18 vs $R^2$=.24), $p<.05$. No additional variables entered for Blacks and Asians.

Stepwise regression analysis based on gender indicated that prior mastery, modeling, and verbal sources of academic efficacy entered the equation for both males and females. Modeling made the greatest contribution for females followed by verbal information. Prior mastery explained the greatest amount of variance in academic efficacy for males followed by modeling. Both prior mastery and modeling had an inverse relationship with academic efficacy for males. Verbal entered the equation last for males; and for females, prior mastery entered last being negatively related to academic efficacy.

# CHAPTER V

# DISCUSSION

The present study used a portion of a preexisting national sample of high school students representing diverse social group membership (ethnicity, gender, family structure, socioeconomic status). The present study had several goals: 1) to examine the relationship between academic efficacy and academic achievement among students of different ethnic groups, 2) to examine if students from different ethnic groups differ in their degree of academic efficacy, 3) to examine if students' ethnicity, gender, family structure, or socioeconomic status make a significant contribution to academic efficacy beyond the influence of modeling, verbal, and prior mastery sources of academic efficacy information, and 4) to examine the differential contribution of modeling, verbal persuasion, and prior performance sources of academic efficacy to students' academic efficacy based on ethnicity and gender.

## Preliminary Findings

Preliminary findings suggest that students' academic achievement is a function of ethnicity and socioeconomic status. It is further suggested that students' exposure to prior mastery, modeling, and verbal sources of academic efficacy are a function of students' social group membership

(ethnicity, gender, family structure, and socioeconomic status). Given the higher level interactions, it appears that students' ethnicity, gender, family structure, and socioeconomic status have the most complex relationship with the verbal source of academic efficacy. Correlational analyses suggest that the strength of the relationship between academic efficacy and prior mastery, modeling, and verbal sources of academic efficacy are differentially influenced by students' ethnicity and gender. While the preliminary findings do not directly address the specific research hypotheses, they no doubt provide insight to the interpretation of findings relative to the specific research questions and their respective hypotheses.

Academic Efficacy, Academic Achievement, and Ethnicity

What is the relationship between academic efficacy and academic achievement among students of different ethnic groups? It was hypothesized that there would be a significant positive relationship between academic efficacy and academic achievement for students across all ethnic groups. Hypothesis 1 was supported. Correlational analyses demonstrated a significant positive relationship across all ethnic groups. Consistent with previous research that applied self-efficacy theory to achievement contexts (Schunk, 1984; Schunk & Hanson, 1985; Zimmerman & Ringle, 1981), data reported herein support self-efficacy theory's general postulate that individuals' self-percept of efficacy

will relate positively to task performance. However, present findings did suggest that the strength of the relationship varies according to ethnicity. Additional analyses based on gender demonstrated that the strength of the relationship between academic efficacy and achievement is differentiated by gender. The relationship was stronger for females than males. This finding is inconsistent with past findings which demonstrated that males reported higher math self-efficacy than females (Matsui, Matsui, & Ohnishi, 1990; Betz & Hackett, 1983). The inconsistency in findings, however, may reflect differences in the specificity of the dependent variable being examined. The dependent variable for the present study reflects a global academic efficacy construct compared to the more subject-specific (e.g., math) efficacy constructs of past studies.

Academic Efficacy and Ethnicity

Do students from different ethnic groups differ in degree of academic efficacy? It was hypothesized that Black and Hispanic students would have lower self-evaluations of academic efficacy than Asian and White students. No significant main or interaction effects based on ethnicity were observed. Thus hypothesis 2 was not supported. This finding is consistent with Poole and Cooney's (1985) finding of no significant differences in perceived career efficacy based on ethnicity among 9th and 10th grade students. However, present findings are in contrast to the Lauver and

Jones (1991) observation that 9th and 10th grade Hispanic and American Indian students reported lower career efficacy than their White peers.

Inconsistency among past researchers may reflect the distinct ethnicities represented in their respective samples. While the sample of Lauver and Jones consisted of American Indian, White, and Hispanic students, Poole and Cooney's sample consisted of Greek, Italian, Lebanese, Chinese, and Vietnamese students. Inconsistency between present findings and past researchers' findings regarding ethnic differences may also reflect the distinct ethnicities being compared as well as distinction in the efficacy construct being examined.

Sources of Academic Efficacy, Social Group Membership, and Academic Efficacy

Beyond the influence of microinteractive sources of self-efficacy (modeling, verbal, and prior mastery), how well does social group membership (ethnicity, gender, family structure, socioeconomic status) in the broader society influence students' academic efficacy? It was hypothesized that students' social group membership (ethnicity, gender, family structure, and socioeconomic status) would significantly contribute to academic efficacy beyond the influence of prior mastery, modeling, and verbal sources of academic efficacy information. This hypothesis was not supported. Prior mastery, modeling, and verbal

sources all made unique contributions to academic efficacy. Contrary to my prediction, students' ethnicity, gender, family structure, or socioeconomic status did not make unique contributions after the entry of the different sources.

It deserves mentioning that the amount of variance explained in academic efficacy by prior mastery, modeling, and verbal sources of academic efficacy was limited to 21%. The increments in $R^2$ values were modest at best. Matsui, Matsui, and Ohnishi (1990) reported similar findings in their examination of the influence of prior mastery, modeling, verbal, as well as emotional arousal efficacy sources on students' perceived math efficacy. The four sources only accounted for 29% of the variance in students' perceived math efficacy. This limited amount of explained variance suggests that variables beyond the actual theoretically defined sources of academic efficacy are important contributors to students' perceived academic efficacy. Although follow-up analyses suggest that the contribution of socioeconomic status was suppressed because of its high correlation with the modeling source, the relatively lower amount of variance accounted for by excluding modeling suggests that researchers' future search for the "missing" predictor variables go beyond a social address model.

Another interesting finding related to the above analyses is the order of variable entry into the prediction equation for academic efficacy. For the present sample, modeling demonstrated the greatest influence on academic efficacy, followed by prior mastery. This finding is not only inconsistent with self-efficacy theory's postulate that prior mastery is the most influential source of self-efficacy, but also with past empirical findings (Schunk & Hanson, 1985; Zimmerman & Ringle, 1981; Omizo et al., 1985; Matsui et al., 1990) which demonstrated prior mastery as the most effective source of efficacy information.

The inconsistency of the present findings may be related to differences in methodological approaches. Past research examining the relative influence of different sources of academic efficacy employed experimental designs. The present study employed a survey design. It is possible that extraneous variables which may moderate the influence of different sources of academic efficacy within a survey design are highly controlled in an experimental setting. Another possible explanation may be due to the fact that the present study examined a general academic efficacy, whereas past researchers have employed subject-specific academic efficacy (e.g., math). It is possible that the differential influence of academic efficacy sources of information may be a function of the specificity of the efficacy construct. However, an argument based on methodological differences or

specificity of variable construct differences should be adopted with caution.

Past vocational research employing a survey design and a subject-specific efficacy construct (career efficacy) has also questioned the superiority of prior mastery. Vocational researchers (Betz & Hackett, 1981; Deboer, 1984; Scott, 1988) reported that females, despite their superior or equivalent performance in technical subjects, reported lower career efficacy for technical fields than males. An examination of gender differences in perceived career efficacy therefore suggests that the differential priority of different sources of efficacy information may be a function of students' gender. This does not eliminate the possibility of methodological influences.

Sources of Academic Efficacy, Ethnicity, and Gender

Do modeling, social persuasion, and prior mastery sources of efficacy information have equal influence on the academic efficacy of students based on gender and ethnicity? It was hypothesized that prior mastery, modeling, and verbal sources of efficacy information would have differential effects on the academic efficacy of students based on gender and ethnicity. This hypothesis was supported for both gender and ethnicity. Results indicate that the predictive utility of prior mastery, modeling, and verbal sources of efficacy in relation to students' perceived academic efficacy differs across ethnic groups.

Findings demonstrate that while prior mastery, modeling, and verbal sources of efficacy information are all important predictors of academic efficacy for Whites, only modeling and prior mastery sources are important predictors for Asians, and only the verbal source for Hispanics. Interestingly, neither prior mastery, modeling, nor verbal sources of efficacy information significantly contribute to the prediction of academic efficacy for Blacks. Failure of efficacy sources to predict Black students' academic efficacy reflect the previously discussed failure to observe a significant relationship between sources of efficacy and academic efficacy among Blacks. The observed gender differences in the predictive utility of prior mastery, modeling, and verbal sources of academic efficacy further echo the above stated concerns based on ethnicity. Modeling made the greatest contribution to females' academic efficacy as opposed to prior mastery for boys.

Again, the order of variable entry into the prediction equations for academic efficacy is of particular interest. According to self-efficacy theory, prior mastery is the most effective source of efficacy development (Bandura, 1986). In the present study the modeling source has demonstrated superior predictive utility of students' academic efficacy for the sample as a whole as well as for specific ethnic groups. Although prior mastery entered the prediction equations for both Asian and White students, it was second

to the modeling source of academic efficacy. A similar pattern of entry was observed for the sample as a whole.

In addition, for Hispanic students the verbal persuasion source of academic efficacy was the only significant predictor of academic efficacy. Relative to prior mastery and modeling sources, verbal persuasion is assumed to be the least effective in sustaining positive self-efficacy evaluations (Gecas & Schwalbe, 1983). Yet, for Hispanic students verbal persuasion, demonstrated greater predictive utility of academic efficacy than either the modeling or prior mastery sources of academic efficacy.

These findings seriously question the importance self-efficacy theorists place on prior mastery as the most effective source of academic efficacy development. Within the context of the current study, students' opportunity to observe their teachers and peers model problem solving strategies as a greater influence on self-percepts of academic efficacy than students' past course grades. Futhermore, for Asian students the least effective source of efficacy development explained the greatest amount of variance in self-evaluations of academic efficacy. Therefore, in addition to questioning the importance of prior mastery specifically, these findings question the general assumption of self-efficacy theorist regarding the relative importance among all the sources of efficacy development.

## Future Implications

### Educational Intervention

The observed differences in the predictive utility of prior mastery, modeling, and verbal sources of academic efficacy across ethnic groups have important implications for educational intervention programs. A major assumption of self-efficacy theory is that positive experiences with different efficacy sources will increase students' self-evaluation of academic efficacy which will, in turn, increase academic achievement. The predominant approach of past empirical studies supporting this assumption has been to expose students to different sources and to compare pre- and post-test scores of achievement.

An important observation is that the curriculum of educational intervention programs oftentimes reflects the empirical methodology which supports their implementation. Given that the present findings demonstrate that the predictive utility of prior mastery, modeling, and verbal sources of efficacy vary across ethnic groups, future developers of educational programs designed to increase achievement should be cognizant that all sources of efficacy may not be of equal importance for all students; thus warranting their exclusion from certain curriculum designs. More specifically, present findings suggest that an intervention program which focuses on modeling and prior

mastery sources would be effective for Asians while one which focuses on verbal sources would be more effective for Hispanic students.

In point of fact, intervention curriculum developers should acknowledge that Bandura's theoretically defined sources of efficacy information may not be of any significance in the development of academic efficacy for some students. Present findings suggest that while prior mastery, modeling, and verbal sources of efficacy are all significant predictors for White students, they fail to be significant predictors for Black students. Thus, while self-efficacy theory may be an appropriate model for guiding achievement enhancement programs for White students, it may not be an appropriate theoretical framework for establishing educational intervention programs for Black students. In turn, observed differences in the relative importance of prior mastery and modeling to males and females self-percept of academic efficacy further suggest the possibility of a gender X ethnicity interaction effect regarding the influence of different sources of efficacy information. The need to consider such a possibility in developing educational intervention programs is supported, at least in part, by the preliminary finding of a significant gender X ethnicity X SES interaction effect for the verbal persuasion source of academic efficacy.

Empirical Research

Past researchers have failed to explore possible ethnic group differences in the relative influence of different sources of efficacy on students' academic efficacy development. The significance of the present study is that it underscores the urgency for such an examination. According to self-efficacy theory, students' self-evaluation of academic efficacy influences academic performance (Bandura, 1986; 1977). Present findings demonstrate that the predictive utility of prior mastery, modeling, and verbal sources of academic efficacy vary according to students' social group membership. Findings therefore suggest that other factors may be stronger determinants of academic efficacy, which will in turn influence academic achievement, especially for Black and Hispanic students.

Lauver and Jones (1991) observed that while life events significantly contributed to the prediction of career efficacy for American Indians it offered no significant prediction for Whites and Hispanics. Although the findings of Lauver and Jones did not address the relative importance of different sources of efficacy information across ethnic groups, they do offer support for the need to examine the relative contribution of different predictors of academic efficacy based on students' ethnicity.

Within the context of the present study, follow-up analyses were conducted in order to examine the unique

contribution of students' gender, family structure, and socioeconomic status beyond the influence of significant source predictors on students' academic efficacy. Socioeconomic status and family structure offered a unique contribution to academic efficacy for White and Hispanic students, respectively. No additional variables entered for Black and Asian students. This finding, along with the findings of Lauver and Jones, further affirms my earlier suggestion that researchers' future search for the "missing" predictor variables go beyond a social address model.

Future research identifying different factors which contribute to students' academic efficacy should be given priority. New findings should increase educators' understanding of the underlying processes of academic efficacy development for different student populations. In turn, educational intervention programs then could be developed which more effectively focus on predictor variables of relevance to the students being served. More specifically, the present study demonstrates that it would be misleading to examine the influence of different sources of self-efficacy on students' perceived academic efficacy outside the context of the students' culture--culture being defined as any social group membership (ethnicity, gender, family structure, socioeconomic status) that is inherently associated with specific types of social experiences.

One specific approach future efficacy-based educational researchers should implement in an effort to identify relevant predictors of academic efficacy development based on students' social group membership is referred to as "focus group" interviewing. Focus group interviewing, or guided group discussion, has proven to be a very effective tool for educational researchers interested in identifying determinants of school drop-out among teens. Past research aimed at identifying the determinants of school drop, has linked school drop-out to a complex topology of larger structural problems experienced by students. However, educational researchers have been unable to adequately identify specific determinants of school drop-out, and to develop effective intervention programs (Project on Equal Education Rights, 1988).

In an attempt to increase educators' insight into the beliefs, attitudes, and motivation of young women drop-outs, the Project on Equal Education Rights (1988) interviewed 75 women (24% White, 57% Black, 17% Hispanic, and 2% Other). All women in the discussion grouped were encouraged to share their life experiences inside and outside of the school with each other. Results indicated that in addition to the commonly expressed causes of school drop-out (e.g., schooling is boring, students' feel that they are dumb), the women expressed concern for racial/ethnic discrimination issues.

Interestingly, none of the women verbally expressed the terminology "racial/ethnic discrimination." Instead, both minority and White women shared observations of White and Asian students receiving preferential treatment by teachers and administrative staff. In addition to the race/ethnicity, students felt that social class was a contributing factor to preferential treatment.

While issues of racism, sexism, and social class differences have been identified as determinants of academic achievement, and have been associated with the demographic profile of school drop-outs, they have not been adequately addressed as actual concerns of student drop-outs. The findings suggest that in the establishment of training programs designed to promote teacher sensitivity to multicultural issues, program developers can use the shared experiences and perception of students drop-out to more effectively identify how such insensitivity is manifested by teachers and how it is in turn internalized by students making them at risk for school drop-out.

O'Sullivan (1993) further suggests that educators establishing intervention programs employ focus group methodology. She maintains that such an approach will allow researchers to assess students' perceptions of their needs regarding a particular phenomenon. Given that the present findings suggest that prior performance, modeling, and verbal persuasion are not of equal importance across all

ethnic groups, focus group methodology may prove a valuable vehicle for identifying additional relevant predictors of students' academic efficacy development based on social group membership. More specifically, since high self-percept of academic efficacy is positively associated with the amount of effort and persistence expended towards academic tasks, researchers could establish a focus group representative of the desired student population, and specifically pose the question "What motivates or demotivates you to try hard at school work?." Such an approach would allow researchers the opportunity to recognize the legitimacy of students' voices, particularly minority student voices, in identifying complex social structural dynamics both inside and outside of school which may have been typically been ignored by researchers as relevant predictors of academic efficacy development. In addition, not only will students be employed to identify relevant predictors but they can also be asked to provide a researcher with a conceptual understanding of the relative importance of the identified predictors (Project on Equal Education Rights, 1988).

## Conclusion

In conclusion, this study was guided by Self-efficacy theory's basic assumption that students' self-evaluation of academic efficacy is positively related to academic

achievement. Because of the consistency of support from past efficacy-based educational research regarding such an assumption, educational researchers began to suggest that Self-efficacy theory was a more appropriate model for enhancing students' academic achievement. This position was further encouraged given the inconsistency of findings across educational programs guided by Self-concept theory. These inconsistencies were the outcome of unclear relationships among the theoretical constructs and failure of researchers to identify and replicate specific research methodologies. Such an evaluation, in turn, led to the general consensus that such self-concept based intervention programs had failed to reach their goal. Self-efficacy theory offered an alternative theoretical framework which seemingly addressed the major limitations of Self-concept theory and research.

Self-efficacy theory is applauded for its contribution of methodological rigor and clarity of theoretical constructs and their interrelationship to educational research. However, this author is concerned that Self-efficacy theory, like Self-concept theory, will be hurriedly adopted as an appropriate guide to develop intervention programs designed to enhance academic achievement. Given that such educational intervention programs primarily serve Black and Hispanic students, a more specific concern is "How appropriate are the principles of Self-efficacy theory in

addressing the academic achievement of minority students?" It is from this general question that the specific research questions and hypotheses of the present study were constructed.

In essence, the author believes that an additional reason for the failure of past educational intervention programs to increase the academic achievement of minority students (Blacks and Hispanics) may simply be the lack of relevance of Self-concept theory to the phenomenon of minority student underachievement. The sources identified by Self-efficacy theory as important to academic achievement are similar to those suggested by Self-concept theory. It is therefore likely that findings based on educational intervention programs guided by self-efficacy theory will simply mirror those of self-concept research. That is to say that future intervention programs based on self-efficacy theory also may fail to increase the academic achievement of minority students. Failure will not be due to methodological shortcomings, but will suggest the inappropriateness of self-efficacy theory's theoretical principles for the population of students such programs generally serve.

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# APPENDIX A
# CONSTRUCTION OF VARIABLES

## CONSTRUCTION OF VARIABLES

This section provides a detailed description of the items used to construct the different sources of academic efficacy information as well as the academic efficacy variable for the present study. The items below were selected based on theoretical appropriateness and past researchers' operationalization of the respective variables. Because of the inconsistency of actual response range among items composing the various variables, prior to appropriate analyses all variables were standardized to a mean of zero and standard deviation of one.

### Sources of Efficacy Information

#### Modeling

Individuals' observation of the accomplishment of others in respect to a particular task(s) function to enhance or undermine self-efficacy evaluation. The items below were used to operationalize the modeling source of self-efficacy information.

1. In each of your current classes, how often are you asked to show that you really understand the materials, rather than just give an answer?

(CIRCLE ONE ON EACH LINE)

| | not taking subject | never | less than once a week | about once a week | few times a week | almost every day |
|---|---|---|---|---|---|---|
| a. math | 1 | 2 | 3 | 4 | 5 | 6 |
| b. english | 1 | 2 | 3 | 4 | 5 | 6 |

2. In your most recent or current math class, how often do/did you copy a teacher's notes from the blackboard?

(CIRCLE ONE)

Never . . . . . 1
Sometimes . . . . . 2
Never . . . . . 3

3. Of all the people you know personally, young or adult, think about the person you admire the most. How would you describe the person?

Person R admires the most is intelligent

(CIRCLE ONE)

Applies . . . . . 1
Does not apply . . . . . 2

4. Parents' highest education level

(CIRCLE ONE)

Did not finish high school . . . . . 1
High school graduate or GED . . . . . 2
Graduate high school & later 4 yr degree . . . . . 3
College graduate . . . . . 4
Master's degree or equal . . . . . 5
Ph.D., M.D. other advanced . . . . . 6

The above items were selected because they represent the diversity of origins from which students may observe models which influence their evaluation of academic self-efficacy. In addition, the above items reflect past researchers' (e.g., Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987; Omizo et al., 1985; Zimmerman & Ringle, 1981) operationalization of various modeling sources of academic efficacy. Item 1 suggests the frequency in which students had an opportunity to observe their peers/classmates as models of academic performance in Math and English. Item 1 also suggests students' opportunity to engage in participant modeling behavior. It is assumed that while they demonstrated an understanding of the material, the teacher assisted as necessary. Therefore, at some point, students would have

engaged in a learning activity in which they and the teacher were actively participating in problem solving behavior.

The academic subjects of History and Science were not included because of the relatively large percentage of students who reported that they were "not taking" the subjects. For example, based on the criterion of deleting subjects who responded "not taking" for a given subject, 26.1% (n=5,406) of the students would have been omitted from the study based on a "not taking" response relative to the subject of history. The percentage of students lost would have been further augmented to 41.4% (n=8,572) by reserved codes (e.g., missing, multiple responses). Based on students' "not taking" responses for Math and English combined less than 4% (n=646) of the sample was excluded from analyses. In addition, deletions based on "not taking" responses for History and Science made it impossible to obtain an equal balanced cell design with the criteria of cell size equal six with equal gender representation. Response categories for item 1 were recorded so that the range reflected never (1) to almost every day (5).

Item 2 suggests students' awareness and observation of their teacher as a modeling source of academic efficacy. Like item 1, item 2 also suggests students' past opportunity to engage in participant modeling behavior in that it is

assumed that they were free to ask questions as they copied the teachers' notes.

Items 3 and 4 suggest the importance of significant others as potential models of academic self-efficacy. In order to maintain consistency among the items that higher scores indicate more of a given attribute, item 3 was reverse coded prior to analyses. Because students' awareness of their parents' ultimate educational attainment was thought to be more important than their awareness of the time frame in which it was accomplished, students who initially responded 3 or 4 for parents' highest level of education were assigned a value of 3 prior to analyses. Thus the actual range of item 4 was 1 (did not finish high school) to 5 (Ph.D., M.D., other). A total score for the modeling source of self-efficacy was constructed by summing students' responses across the four items.

Social/Verbal Persuasion

Encouragement that individuals receive from significant others functions to enhance their self-evaluation of academic efficacy. The items below suggest the frequency with which the students receive positive encouragement from significant others.

1. How far in school do you think your mother wants you to go?

(CIRCLE ONE)

| | |
|---|---|
| Less than HS Graduation | 1 |
| Grad from HS only | 2 |
| Vocational trade, or business school after HS | 3 |
| Attend 2 yr college | 4 |

Attend 4 yr college . . . . . 5
Graduate from college . . . . . 6
Attend higher schooling after college . . . . . 7
Don't know . . . . . 8
Parent doesn't care . . . . . 9
Does not apply . . . . . 10

2. How far in school do you think your father wants you to go?

(CIRCLE ONE)

Less than HS Graduation . . . . . 1
Grad from HS only . . . . . 2
Vocational trade, or business school after HS . . . . . 3
Attend 2 yr college . . . . . 4
Attend 4 yr college . . . . . 5
Graduate from college . . . . . 6
Attend higher schooling after college . . . . . 7
Don't know . . . . . 8
Parent doesn't care . . . . . 9
Does not apply . . . . . 10

3. How much do you agree with the following statement about your current school and teacher?

When I work hard on schoolwork, my teachers praise my effort?

(CIRCLE ONE)

strongly agree . . . . . 1
agree . . . . . 2
disagree . . . . . 3
strongly disagree . . . . . 4

4. Do you agree with the following statements about why you go to school?

My teachers care about me and expect me to succeed in school.

(CIRCLE ONE)

strongly agree . . . . . 1
agree . . . . . 2
disagree . . . . . 3
strongly disagree . . . . . 4

5. In your most recent or current math class, how much emphasis does/did your teacher place on the following objective?

Preparing you for further study in math?

(CIRCLE ONE)

none . . . . . 1
minor . . . . . 2
moderate . . . . . 3
major . . . . . 4

6. Among the friends you hang out with, how important is it to get good grades?

(CIRCLE ONE)

not important . . . . . 1
somewhat important . . . . . 2
very important . . . . . 3

Items 1 and 2 reflect students' perceptions of how far each of their parents wants them to go in school. Past research findings indicate that the mother's educational level is more related to students' intellectual development than the

father's. However, within the context of self-efficacy theory, it does not necessarily follow that students will model their academic behavior and persistence more directly after the mother's educational history as opposed to the father's.

In the absence of theoretical and empirical guidance within the context of self-efficacy theory to guide the researcher's selection of the more dominant parental figure, the researcher elected to use the "average" of students' perception of their mother's and father's educational desire for them as the indicator of parental social persuasion. The decision to form an "average" index for parental social persuasion is further supported by the observation that the correlation between mother's and father's educational desire for their child was r=.83. In instances where students reported that they "did not know," "parent doesn't care" or "does not apply" for one parent but indicated an awareness of the other parent's wishes, their response was coded based on their perception of the parent whose wishes they were aware.

Items 3, 4, and 5 refers to the amount of verbal encouragement students receive from their teacher. Prior to analyses items 3 and 4 were reverse coded so that high scores indicated stronger agreement and low scores indicated higher agreement with the respective statements. Therefore for

items 3 and 4 the actual ranges were from 4 (strongly agree) to 1 (strongly disagree).

Item 6 refers to students' perceptions of the importance of grades to their friends. Because of the great influence of peer groups during adolescence, the researcher believed that the students' belief regarding the importance of grades to their friends served as a type of social persuasion for striving for good grades. A total social persuasion source index was constructed by summing students' responses across the six items. High scores indicated higher frequency of positive social persuasion.

Prior Mastery/Performance

"Prior mastery" refers to an individuals' past experience of failure or success in regard to a particular activity. The item below represents an integrated index of

1. For each of the school subjects listed below, mark the statement that best describes your grades from beginning of ninth grade until now.

(MARK ONE ON EACH LINE)

| | not taken | mostly A's | Half A's/B's | Mostly B's | Half B's/C's | Mostly C's | Half C's/D's | Mostly D's | Mostly below D's | grades not given |
|---|---|---|---|---|---|---|---|---|---|---|
| a. Math | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| b. English | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

students' past academic achievement across various high school subjects. Because an actual grade point average was not calculated based on students' initial responses, responses were recorded prior to analyses so that high scores would indicate high grades. Students who reported "grades

not given" were not used in analyses due to the researcher's inability to independently assess academic achievement across the subject areas. After recoding and exclusion of particular subjects the actual response range of this item was 1 (mostly below D) to 8 (mostly A's). A total prior mastery index was formed by summing students' responses for prior Math and English grades.

## Academic Self-efficacy

Individuals' perceived academic self-efficacy refers to their beliefs about their ability to do well on academic tasks. The items listed below were used to construct the variable "academic self-efficacy." According to self-

1. Harder

When you compare your first year in high school to the year before that, do you agree or disagree with the following statements?

Courses were harder in high school

| | (Circle One) |
|---|---|
| strongly agree | 1 |
| agree | 2 |
| disagree | 3 |
| strongly disagree | 4 |
| Reserved codes | |
| nonresponse, mult | 6 |
| missing | 8 |

2. Time spent on total homework.

| | (CIRCLE ONE IN EACH COLUMN) | |
|---|---|---|
| | Time in School | Time out of School |
| none | 1 | 1 |
| 1 hour or less | 2 | 2 |
| 2-3 hours | 3 | 3 |
| 4-6 hours | 4 | 4 |
| 7-9 hours | 5 | 5 |
| 10-12 hours | 6 | 6 |
| 13-15 hours | 7 | 7 |
| over 15 hours | 8 | 8 |

3. In each of your current classes, how often do you try as hard as you can?

(CIRCLE ONE ON EACH ROW)

| | not taking | never | less than once a week | once a week | few times a week | almost every day |
|---|---|---|---|---|---|---|
| a. math | 0 | 1 | 2 | 3 | 4 | 5 |
| b. english | 0 | 1 | 2 | 3 | 4 | 5 |

4. Choose the answer that is best for you.

(CIRCLE ONE ON EACH ROW)

| | false | mostly false | more false than true | more true than false | mostly true | true |
|---|---|---|---|---|---|---|
| b. Learn quickly in English | 1 | 2 | 3 | 4 | 5 | 6 |
| d. Mathematics is one of my best subjects | 1 | 2 | 3 | 4 | 5 | 6 |
| e. English is one of my best subjects | 1 | 2 | 3 | 4 | 5 | 6 |
| g. I get good marks in English | 1 | 2 | 3 | 4 | 5 | 6 |
| j. I have always done well in math | 1 | 2 | 3 | 4 | 5 | 6 |
| n. I'm hopeless in English | 1 | 2 | 3 | 4 | 5 | 6 |
| q. I get good grades in math | 1 | 2 | 3 | 4 | 5 | 6 |
| s. I do badly on test of math | 1 | 2 | 3 | 4 | 5 | 6 |

5. As things stand now, how far do you think you will get in school?

(CIRCLE ONE)

| | |
|---|---|
| Less than high school graduation | 1 |
| High School graduation only | 2 |
| Less than two years vocational trade | 3 |
| More than two years vocational trade | 4 |
| Less than two years of college | 5 |
| Associate degree | 6 |
| Four year college degree | 7 |
| Master's degree | 8 |
| Ph.D. or other advanced degree | 9 |

efficacy theory individuals' evaluation of self-efficacy functions to determine how long they will persist and expend effort towards a particular goal (Bandura, 1986). In a learning situation, highly efficacious students who view a given academic task(s) as "difficult" are more likely to exert greater effort and persistence towards task accomplishment that students who perceive themselves to be less competent (Gorrell & Partridge; Schunk & Hanson, 1985; Lent et al., 1986; Stewart & Jackson, 1990). However, students who perceive themselves to be highly efficacious but

view the academic material(s) to be "easy" will feel little need to exert much effort and persistence towards task completion (Bandura, 1986; Salomon, 1984).

Items 2 and 3 refer to the amount of effort and persistence students expend toward their school work. Because the researcher is unable to distinguish high and low efficacy students among those who view their school work as easy, the sample for this study consists only of students who reported that school work seemed harder (responded 1 or 2 to item 1) than in the previous year. Item 4 refers to students' general evaluations of academic efficacy relative to English and Math. A total academic efficacy score was constructed by summing students' responses across all items.

Item 5 refers to students' general outcome expectancy in regards to their educational attainment. According to self-efficacy theory outcome expectancies are strongly influenced by self-efficacy judgment. Perception of consequences depend on individuals' beliefs about their ability to accomplish the appropriate task(s). Students who perceive themselves as highly efficacious are more likely to have high educational outcome expectancies than students who doubt their academic ability. Therefore, in the present study, students' expected educational outcome was used as a partial indicator of their academic efficacy.