

THE RELATIONSHIP AMONG EATING SELF-EFFICACY,  
EATING URGES, AND EXERCISE CATEGORY  
OF COLLEGE STUDENTS

By

DAWNELLA MARIE RUST

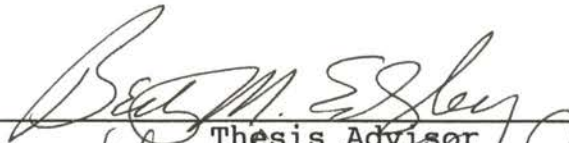
Bachelor of Science  
Oklahoma State University  
Stillwater, Oklahoma  
1986

Master of Science  
Emporia State University  
Emporia, Kansas  
1989

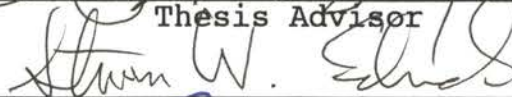
Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
DOCTOR OF EDUCATION  
July, 1994

THE RELATIONSHIP AMONG EATING SELF-EFFICACY,  
EATING URGES, AND EXERCISE CATEGORY  
OF COLLEGE STUDENTS

Thesis Approved:

  
\_\_\_\_\_

Thesis Advisor

  
\_\_\_\_\_

  
\_\_\_\_\_

  
\_\_\_\_\_

Thomas C. Collins

Dean of the Graduate College

## ACKNOWLEDGMENTS

Words cannot express my gratitude to my dissertation chair, Dr. Betty Edgley. Her encouragement and friendship will not be forgotten. A thank you is extended to Dr. Steve Edwards for his support of this dissertation topic from day one and his advice throughout the process. I also would like to thank Dr. Betty Abercrombie and Dr. Thomas Karman for serving on my committee.

In addition I would like to thank Wah-See Ho for his much needed advice and support. This study could have not been completed without the help of the professors of the School of Health, Physical Education, and Leisure who allowed me to distribute this survey in their classes and the students who took the time to participate. I cannot forget the support of the Wellness Center Gang - thanks guys!

I also would like to acknowledge my husband and my parents. Rusty thank you for believing in me! Mom and dad thank you - you were always just a phone call and a hug away!

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION .....	1
Statement of the Problem .....	5
Hypothesis .....	5
Limitations of the Study .....	7
Delimitations .....	7
Assumptions .....	8
Definition of Terms .....	8
II. A SELECTED REVIEW OF LITERATURE .....	10
Theory of Self-Efficacy .....	10
Application of Self-Efficacy .....	13
Urges .....	22
Eating Disorders .....	25
Exercise and Eating Disorders .....	27
Classification of Exercise Excessive .....	33
Summary .....	38
III. METHODS AND PROCEDURES .....	40
Selection of Subjects .....	40
Instrumentation .....	40
Situational Appetite Measures:	
SAM-E and SAM-U .....	41
Data Collection Procedures .....	42
Statistical Analysis .....	43
IV. ANALYSIS AND DISCUSSION OF DATA .....	44
Introduction .....	44
Demographic Results .....	45
Hypothesis Analysis .....	50
Secondary Findings .....	56
Discussion .....	65

Chapter	Page
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS .....	71
Introduction .....	71
Conclusions .....	74
Recommendations for Further Research .....	74
BIBLIOGRAPHY .....	76
APPENDIXES .....	83
APPENDIX A - INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL .....	84
APPENDIX B - INFORMATION SHEET .....	86
APPENDIX C - SITUATIONAL APPETITE MEASURE .....	88
APPENDIX D - DEMOGRAPHIC SHEET .....	91

## LIST OF TABLES

Table	Page
1. Diagnostic Criteria for Anorexia Nervosa .....	25
2. Diagnostic Criteria for Bulimia Nervosa .....	26
3. Criteria for Exercise Dependence .....	36
4. Relationship Between Eating Self-efficacy and Eating Urges .....	51
5. Relationship Between Eating Self-efficacy and Exercise Category .....	52
6. Relationship Between Eating Urges and Exercise Category .....	53
7. Relationship Between Eating Self-efficacy and Weight Control .....	54
8. Relationship Between Eating Urges and Weight Control .....	55
9. SAM-E and SAM-U by Exercise Category .....	59
10. Correlation Matrix for SAM-E Subscales .....	62
11. Correlation Matrix for SAM-U Subscales .....	62
12. Self-efficacy When Stomach Grows .....	63
13. Self-efficacy When Starving .....	64
14. Urge When Dying of Hunger .....	64
15. Urge When Have Not Eaten for a Long Time .....	65
16. Urge When Starving .....	65

## LIST OF FIGURES

Figure		Page
1.	Self-efficacy Model .....	13
2.	Distribution of Subjects by Gender .....	45
3.	Exercise Category by Gender .....	47
4.	Exercise Experience by Exercise Category .....	48
5.	Weight Control by Exercise Category .....	50
6.	SAM-E and SAM-U by Gender .....	56
7.	SAM-E Subscales by Gender .....	57
8.	SAM-U Subscales by Gender .....	58
9.	SAM-E Subscales by Exercise Category .....	60
10.	SAM-U Subscales by Exercise Category .....	61

## CHAPTER I

### INTRODUCTION

Albert Bandura's (1977) notion of self-efficacy is an outgrowth of his version of the social learning theory that emphasizes the importance of vicarious processes in the acquisition and modification of behaviors. Self-efficacy is one's belief regarding the ability to perform a particular behavior (self-efficacy expectation) and the belief that if the behavior is performed it will lead to the anticipated outcome (Bezjak & Lee, 1990). Specifically, O'Leary (1985) believes that self-efficacy plays a significant role in such diverse forms of health behavior as smoking-cessation relapse, pain experience and management, control of eating and weight, success of recovery from myocardial infarction, and adherence to health programs.

An important aspect of the theory is distinguishing between self-efficacy expectations and outcome expectations. A self-efficacy expectation is the belief that one can execute successfully the behavior required to produce the desired outcome (Bandura, 1977). This may refer to a person's belief that she or he is capable of losing weight, (i.e., restricting calories and/or increasing exercise). An outcome expectation is the belief that a given behavior will



lead to a particular outcome (Bandura, 1977) (i.e., a person's belief that increasing exercise will cause the person to be thinner.) However, according to Bandura (1977, 1982) self-efficacy expectation is a more central determinant than outcome expectation in determining subsequent behavior. Thus, self-efficacy expectations may be more useful than using past performance in predicting subsequent performance because of the success in predicting the desired behavior. Research has suggested that self-efficacy expectations are important determinants in eating habits (Glynn & Ruderman, 1986) and exercise habits (Bezjak & Lee, 1990; Desharnais, Bouillon, & Godin, 1986; Ewart, Taylor, Reese, & Debusk, 1984).

The hallmark of obsessions and addictions is the subjective experience of compulsion or cravings with an increased drive towards the behavior which increases after the period of abstention (Wardle, 1987). For example, the urge to drink an alcoholic beverage has been associated with drinking outcome (Rohsenow et al, 1992), and patients with bulimia nervosa complained about an uncontrollable urge to eat (Huon & Brown, 1988). Because alcoholics and bulimics refer to "cravings" and "urges," both disorders have been classified as addictive; however, it has not been equivocally demonstrated that eating disorders are addictive (Wilson, 1991).

Exercise is another area that has been linked to addiction. Numerous studies (Greenspan, Fitzsimmons, & Biddle, 1991; Morris, Steinberg, Sykes, & Salmon, 1990; Hailey & Bailey, 1982) have addressed exercise as an addictive behavior, while others (Yates, 1991; Veale, 1987; Kagan, 1987) suggested that exercise is a compulsive behavior. Veale (1987) proposed the term exercise dependence and suggested a set of diagnostic criteria. He distinguished between two types of exercise dependence: primary and secondary. Primary exercise dependence exists when exercise is an end in itself, and any associated weight loss or manipulations of diet is for the enhancement of performance. Secondary exercise dependence exists when the dependence is related to an eating disorder such as anorexia nervosa or bulimia nervosa.

The association between exercise and eating disorders has received much attention (Davis, 1990; Beumont, Arthur, Russell, & Touyz, 1994). The advantage in athletic performance of maintaining a healthy minimal level of fatness and the strong negative connotations of overfatness in our society combine to create strong pressures to maintain and reduce body fatness. Some researchers (Nagel & Jones, 1992; Yates, 1991; Nassar, 1988) have speculated that society's emphasis on physical fitness and leanness may promote preoccupation with low or extremely low body weight and may even result in the development of eating disorders.

The controversy between exercise dependence and eating disorders was found throughout the literature. Some researchers have concluded that participation in strenuous physical activity is not always secondary to weight concern, but can occupy a central role in the development and etiology of clinical eating disorders (Yates, 1992). Katz (1986) has suggested that extreme exercise, such as long distance running, can serve as a trigger for eliciting anorexia nervosa in persons who are at risk psychologically and biologically for developing an eating disorder. According to Kron, Katz, Gorzynwski, and Weiner (1978) hyperactivity is an early and enduring clinical feature of anorexia nervosa and not merely secondary to either a conscious attempt to lose weight or weight per se.

There has been some attempt to differentiate between persons having eating disorders and those with an obsessive attitude towards eating. In a study conducted by Thompson and Schwartz (1982) college women with anorexic-like eating attitudes showed no overt signs of psychological dysfunction on other psychometric tests. Thompson and Schwartz's study supported the idea that anorexic attitudes do not necessarily translate into anorexia nervosa. They believed there exists either a continuum or several categories of anorexia nervosa. Fairbanks (1987) further supported this continuum theory by stating that athletes usually do not have anorexia nervosa or bulimia, but are entering into a

realm of disordered eating that may lead to poor development, depression, and altered moods.

A few investigators are beginning to utilize self-efficacy scales to predict addictive behaviors such as eating disorders (Bennett, Spoth, & Borgen, 1992). The relationship between urges and addictive behaviors, such as smoking and substance abuse has already received much attention; however, little research has focused on the role of urges and eating behavior.

#### Statement of the Problem

Western society's preoccupation with eating and exercise has been well documented (Collins, 1988; Fontaine, 1991); hence, it is of interest and relevance to investigate the relationships of eating behavior, specifically eating self-efficacy and eating urges, and exercise category. This study was designed to examine the relationship of eating self-efficacy, eating urges, and exercise category of college students.

#### Hypothesis

The following hypotheses were tested at the 0.01 level of significance. Statements of the substantive null hypothesis for this research were:

1. There is no significant relationship between eating self-efficacy and eating urges of college students.
2. There is no significant relationship between eating self-efficacy and exercise category of college students.
3. There is no significant relationship between eating urges and exercise category of college students.
4. There is no significant relationship between eating self-efficacy and past weight control experience of college students.
5. There is no significant relationship between eating urges and past weight control experience of college students.
6. There is no significant relationship between eating self-efficacy and past exercise experience of college students.
7. There is no significant relationship between eating urges and past exercise experience of college students.

### Limitations of the Study

The results of this study may be affected by the following:

1. The investigation relied on self-report.
2. Subjects were not selected randomly.
3. Subjects were not representative of a specific level of exercise category nor eating behavior.
4. The particular time in the school semester that the data was collected.

### Delimitations

This study was delimited to:

1. A sample of male and female volunteer Spring 1994 college students enrolled in a health and physical education class.
2. Measurement of eating self-efficacy and eating urges via the Situation Appetite Measure.
3. Subjects were students attending a state supported institution of higher education in the state of Oklahoma during the Spring of 1994.

### Assumptions

The following assumption were made:

1. The subjects completed the questionnaire accurately and honestly.
2. The subjects carefully read and properly followed the directions of the instrument.
3. The testing environment was conducive to accurate testing.
4. The subjects' exercise category and eating behavior varied.

### Definitions of Terms

For the purpose of this study, the following definitions are provided:

Addiction. Unhealthy continued involvement with a mood-altering object or activity that creates harmful consequences (Prussian, Harvey, & DeGeronimo, 1992).

Eating Disorders. An encompassing definition of the psychopathological behavior of over-controlling eating and/or overeating.

Eating Self-Efficacy. A measurement of the degree to which subjects expect to be able to control overeating in the same situation.

Eating Urge. A measurement of the degree to which subjects feel the urge to eat in various situations.

Efficacy Expectation. The belief that one can execute successfully the behavior required to produce the desired outcome.

Exercise Addiction. Psychological and/or physiological dependence upon a regularly experienced regimen of physical activity and is characterized by recognizable withdrawal symptoms when the need to exercise remains after 24-36 hours (Sachs and Pargman, 1979, p. 143).

Exercise Category. A level of exercise determined by time and frequency involvement in physical activity.

Outcome Expectation. The belief that a given behavior will lead to a particular outcome.

Self-Efficacy. One's belief regarding his or her ability to perform a particular behavior and the belief that if the behavior is performed, it will lead to the anticipated outcomes.



## CHAPTER II

### A SELECTED REVIEW OF LITERATURE

Self-efficacy scales have been documented as reliable and valid predictors of health-related outcomes (Holden, 1991; Kingery, 1990) and as useful constructs for exploring successful change in addictive behaviors (DiClemente, 1986). The construct of urge also has been used to diagnose addictive behaviors (Tiffany, 1990). Exercise and the eating disorders, anorexia nervosa, bulimia nervosa, and obesity have been categorized as addictive behaviors (Yates, 1991; Mills & Medlicott, 1992).

This chapter includes a review of the literature pertinent to the relationship of eating self-efficacy, eating urges, and the exercise participation in college students. The theory of self-efficacy, application of self-efficacy theory, urges, exercise and eating disorders, and the classification of exercise dependence were examined.

#### The Theory of Self-Efficacy

In 1977 Albert Bandura developed the self-efficacy theory, a theory which could explain behavior change. In the literature the term "efficacy" is used to describe an individual's objective ability to perform a specific

behavior. Efficacy can be measured by observing whether or not an individual actually exhibits the behavior (Lawrence & McLeroy, 1986). "Perceived self-efficacy" is an individual's judgement of one's ability to do the behavior (Bandura, 1977). Thus, efficacy is an objective measure of performance and perceived self-efficacy is a judgement an individual makes about one's ability to do the behavior. Bandura and others frequently used "self-efficacy" to mean "perceived self-efficacy," since an individual's perception is implied in most contexts in which the concept is used (Lawrence & McLeroy, 1986).

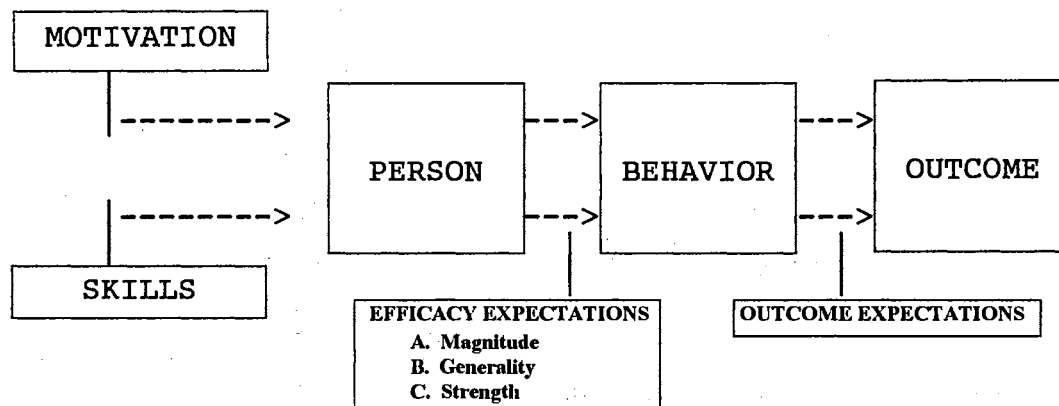
Bandura (1977) believed the level of self-efficacy is determined by four sources of information: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Performance accomplishments were the most influential source of perceived self-efficacy because successful experiences provided tangible evidence that one can accomplish the behavior. Vicarious experience, the second source of information, involved modeling or watching others perform the task with little adversity. The third source of information was verbal persuasion or convincing an individual that she or he was capable of accomplishing the task. Emotional arousal, the final source of perceived self-efficacy, referred to the emotional state of the individual and how that state affected their behavior.

Expectations are not the only determinants of behavior. Bandura (1978) suggested that the individual must have the

skills and motivation to perform the behavior. For example, a person must know how to do the behavior (skills) and want to do the behavior (motivation). However, given skill and motivation, perceived self-efficacy may determine (1) whether one attempted to perform a given task, (2) how persistent one was when difficulties were encountered, and (3) ultimately how successful one was in performing the task.

Furthermore, efficacy expectations vary in magnitude, generality, and strength (Bandura, 1977). Whereas, (1) magnitude referred to the difficulty level of the task involved, (2) generality referred to the ability to generalize the efficacy expectation to other behaviors, and (3) strength of the efficacy expectation referred to the resoluteness of the person's conviction.

Bandura (1977) contended self-efficacy was not a global theory, but was linked to specific behavior. Thus, self-efficacy was divided into two components: A belief that one could perform the behavior (self-efficacy expectation) and a belief that the behavior would lead to a desired outcome (outcome expectation). The relationship is shown on the following page:



**Figure 1. The Self-Efficacy Model**

*Source: Modified from Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.*

Geis (1991) interpreted the self-efficacy theory to read as follows:

a person receives information from one or more sources, which in turn determines a person's magnitude, generality, and strength of perceived self-efficacy. If the person believes that this particular course of action will lead to a desired outcome and also believes she or he has the ability to perform the action, the action will be performed.

#### Application of Self-Efficacy Theory

Bandura's theory of self-efficacy has been applied in many areas of health education. Upon examining the role of perceived self-efficacy in five areas of behavioral medicine: smoking cessation/substance abuse, pain

management, eating disorders (including obesity), cardiac rehabilitation, and adherence to medical regiments, O'Leary (1985) found that the effects of therapeutic interventions on health behavior were partly mediated by changes in perceived self-efficacy. O'Leary suggested that perceived self-efficacy was a reliable predictor of (1) substance abuse relapse, (2) success in overcoming an eating disorder, (3) recovery from a cardiac event, and (4) adherence to medical regimens. Lawrence and McLeroy (1986) reviewed applications of self-efficacy theory and concluded that despite the range of health applications in which self-efficacy theory had been applied, remarkable consistency existed in its ability to predict behavior.

More recently, Holden (1991) examined eleven databases for citations referring to self-efficacy. The results of the meta-analysis examining studies which employed self-efficacy as a predictor of health related outcomes were positive. In the literature examined, ratings of self-efficacy were found to consistently predict subsequent health related outcomes.

Specifically, several studies have examined the relationship between self-efficacy and weight control. Kingery (1990) administered a self-efficacy measure and a five-day self-monitor measure to undergraduate students. The self-efficacy measure included dietary and exercise questions. The self-monitor measure was divided into sections on exercise and eating habits. The results

indicated that self-efficacy proved to be a moderately strong predictor of self-monitored performance of dietary and exercise behaviors.

Leon and Rosenthal (1984) attempted to identify a number of behavioral, personality, and attitudinal factors predictive of weight loss outcome and relapse. Measures examining weight and diet, eating patterns, self-efficacy, relapse, life-events, addiction-proneness, and self-control were administered to 47 participants of a commercial weight loss program. As predicted, self-efficacy attitudes prior to treatment exhibited a strong relationship to the perception of self-control in a variety of situations. However, pre-treatment self-efficacy attitudes were not significantly related to outcome at the completion of treatment, but were related to weight loss progress at the follow-up.

The Eating Self-Efficacy Scale (ESES) was developed to assess eating behaviors (Glynn & Ruderman, 1986). The ESES underwent five separate studies to establish usefulness. The five studies included: development of instrument items, examination of psychometric properties of the scale, difference between sexes in response to the instrument, and assessment of predictive validity in both laboratory and clinical settings. The findings concluded that the scale has adequate internal consistency, test-retest reliability, and convergent validity. In summary, an increase on the

ESES was found to be predictive of weight loss by participants.

Sallis, Pinski, Grossman, Patterson, and Nader (1988) also developed self-efficacy scales to assess health-related diet and exercise behavior. The authors of these scales concluded that the scales should be used to study the mediating effects of self-efficacy in exercise and dietary behavior change studies. Furthermore, these scales could be used to identify component behaviors that may be perceived as difficult to change or situations in which there was an increased risk of relapse.

Slater (1989) analyzed a subset of data from the Five City Project of the Stanford Heart Disease Prevention Program to form a model to predict eating behavior. Age, gender, and income were strong predictors of eating behavior in the model. Health knowledge, also proved to be a useful predictor of eating behavior even after controlling for demographic variables and social influences. However, self-efficacy proved to be the best predictor of diet behavior even when demographic variables, social influences, and health knowledge were used as statistical controls.

Shannon, Bagby, Wang, and Trenkner (1990) examined the plausibility of models to explain eating behaviors. These authors proposed that the environmental factors could directly influence eating behavior or indirectly influence it through self-efficacy which could directly influence eating behavior or indirectly influence it through outcome

expectancy. Analysis of the data did not confirm any of the proposed full models; but, in reduced models self-efficacy contributed significantly to various eating behaviors. The results indicated that self-efficacy may be an important factor to address in nutrition education programs assigned to changing eating behavior.

Another component of weight control is exercise. Several studies have addressed the relationship between self-efficacy and exercise. Desharnais, Bouillon, and Godin (1986) surveyed 98 young adults to identify measures of exercise adherence. Measure of both outcomes and self-efficacy expectations were evaluated. Their study supported Bandura's theory of self-efficacy by showing that self-efficacy expectation is a more central determinant of adherence than outcome expectation.

Through the Physical Fitness Opinion Questionnaire, Bezjak and Lee (1990) measured locus of control beliefs, self-efficacy, values placed on physical fitness, expectancy of reinforcement, and value of reinforcement specific to physical fitness behaviors of college students. Results indicated that specific locus of control measures combined with general values placed on fitness were not effective in predicting college students' participation in physical fitness. Only self-efficacy and specific reinforcement for fitness appeared to predict college students' participation in health-related physical fitness activities. Increases in



fitness self-efficacy were significantly related to participation in health-related fitness activities.

Dzewaltowski, Noble, and Shaw (1990) assessed 254 undergraduates enrolled in physical education classes. Assessment consisted of a seven-day recall of physical activity, questions concerning "intent" to exercise (Theory of Reasoned Action), and questions regarding self-evaluation of participants' physical activity participation (Social Cognitive Theory). The results indicated that self-efficacy was the best predictor of physical activity participation.

In contrast, Yordy and Lent (1993) found that the Theory of Reasoned Action and the Social Cognitive Models were significantly predictive of future exercise intention and behavior. Yordy and Lent refuted Dzewaltowski, Noble, and Shaw's (1990) earlier study which reported that the Social Cognitive Model was superior to the Theory of Reasoned Action in predicting exercise behavior.

Sallis, Hovell, Hofstetter, and Barrington (1992) examined determinants of vigorous physical activity in a community sample of adults over a 24-month period. A seven-page baseline survey assessed a large number of variables based on a social cognitive model of the determinants of physical activity. Assessment of physical activity was based on the recommendations of the American College of Sports Medicine. The results of the study confirmed that self-efficacy, perceived barriers, family support, and friend support are significant predictors of

exercise behavior. Using the same data pool Sallis, Hovell, and Hofstetter (1992) found predictors of exercise were different for men and women. In multivariate analysis adoption of vigorous exercise by sedentary men was predicted by self-efficacy, age and neighborhood environment. Adoption by sedentary women was predicted by education, self-efficacy, and friend and family support for exercise. Maintenance of physical activity was predicted by self-efficacy and age for initially active men and by education for initially active women.

In a study investigating the importance of personal determinants such as self-efficacy, beliefs about the contribution of exercise, health locus of control, and dispositional optimism for leisure-time exercise Rabinowitz, Melamed, Weisberg, Tal, and Ribak (1992) found that the main predictors of exercise were beliefs and self-efficacy. In addition, the results indicated that exercise self-efficacy was positively associated with other forms of health behaviors, such as eating correctly.

Desmond and Price (1988) conducted a comprehensive search of the literature through the *Index Medicus* and the *Psychological Abstracts* to find articles examining self-efficacy as a predictor of weight loss. After reviewing the articles, Desmond and Price concluded that the application of Bandura's self-efficacy theory to predict weight loss was compounded by two problems: (1) lack of valid and reliable instruments and (2) misconceptions

regarding theory components, i.e., confusing self-efficacy expectations with outcome expectations and visa versa. Desmond and Price believe more comprehensive and well-planned self-efficacy studies are warranted.

Another research interest is the application of the self-efficacy theory to addictive behaviors. However, applying the self-efficacy theory to addictive behavior change is not a straightforward matter. Problems encountered when using the self-efficacy theory with addictive behaviors were: (1) Defining the target behavior for which self-efficacy is to be assessed (DiClemente, 1986). In defining the target behavior the researcher must ask the question, "Which stage of the target behavior/addiction (i.e., treatment, recovery, control, or abstinence) do I wish to assess? (2) Applying self-efficacy to the abstinence stage of a addictive behavior. Usually, self-efficacy expectations are measured for a specific task, such as walking for thirty minutes three times a week. Whereas, abstinence self-efficacy focuses on the subject's confidence in her or his ability to abstain from engaging in an addictive behavior. The researcher must ask the question, "Is the self-efficacy construct robust enough to measure the generality, strength, and magnitude of the self-efficacy expectation in the specific situation?"

Marlatt and Gordon (1979) developed a cognitive-behavioral model of the relapse process to address the problem of abstinence. In the cognitive-behavioral

model, successful coping with high-risk situations bolsters one's self-efficacy and lowers the probability of relapse. Stanton, Garcia, and Green (1990) asserted that if coping is not initiated or is ineffective, control over the behavior falters as does self-efficacy. In summary, DiClemente (1986) stated:

... results of current studies indicate that self-efficacy is a valuable and useful construct for exploring successful change in addictive behaviors. Self-efficacy evaluations not only predict successful abstinence, but are also related to coping activities during maintenance.

Eating disorders are commonly viewed as addictive disorders (Wilson, 1991). Historically, most self-efficacy research has been conducted on obesity (O'Leary, 1985). In 1990, Stanton, Garcia, and Green developed instruments to assess cue strength and self-efficacy relevant to weight loss attempts based on a system which categorized high risk situations for relapse in addictive behaviors. Two versions of the Situational Appetite Measure (SAM) were developed, one to assess urges to overeat in selected situations and the other to assess self-efficacy in controlling urges to overeat. In a sample of college students and clients of a commercial diet center the measures were found to be highly correlated. Consummatory urges increased and self-efficacy to control eating decreased. High-risk situations were represented by five relatively distinct and reliable subscales: relaxation, food present, hunger, reward, and

negative feelings. Low cue strength and high self-efficacy for controlling overeating in situations involving negative feelings predicted weight reduction among female dieters in treatment.

In a recent investigation conducted by Bennett, Spoth, and Borgen (1992) high school students completed the Bulimia Test, Trait Anxiety Scale, Beck Depression Inventory, a general efficacy scale, a specific (eating) self-efficacy scale, and the Goldfarb Fear of Fat Scale. Students with high symptoms of bulimia reported binge eating and self-induced vomiting at least weekly as well as depression, anxiety, fear of fat, and low self-efficacy. Specific self-efficacy and fear of fat were most strongly correlated with the Bulimia Test. In summary, specific self-efficacy, fear of fat, and depression were the three most potent multivariate predictors of the bulimic symptom group.

Researchers (DiClemente, 1986; O'Leary, 1985) believe that while little research has been conducted on anorexia nervosa and bulimia nervosa, self-efficacy scales appeared to be useful in predicting behavior and relapse. The literature concluded that more research needed to be conducted on self-efficacy and the eating disorders, anorexia nervosa, and bulimia nervosa.

### Urges

It has been noted that urges and cravings are key explanatory concepts of the models of addiction

(Wardle, 1987; Tiffany, 1990; Tiffany, 1992). Urges have been linked to behaviors such as drug abuse (Jaffe, Cascella, Kumor, & Sherer, 1989; Tiffany, 1990), alcohol abuse (Rohsenow et al, 1992) and eating disorders (Wardle, 1987; Huon & Wooton, 1991; Halmi & Sunday, 1991).

Tiffany (1992) maintained that almost all theories of drug urges assume that urges are subjective states that represent the primary motivational processes in addictive behaviors. Jaffe, Cascella, Kumor, & Sherer (1989) support Tiffany's contention upon examining the urge to use cocaine or other drugs following a 40 milligram dose of intravenous cocaine with and without oral pretreatment of 2.5 milligram bromocriptine. The urge to use cocaine was assessed with a questionnaire constructed to assess both "wanting" and "craving" for cocaine or other drugs. Fifteen minutes after the administration of cocaine (but not after the placebo) subjects' ratings for both drug "wanting" and "craving" were significantly increased. The results demonstrated an increase in the urge to use drugs in a laboratory demonstration.

Halmi and Sunday (1991) investigated internal and external cues of eating behaviors after eating an experimental liquid meal in eating disordered patients (29 anorectic-restrictors, 25 anorectic-bulimics, 30 normal weight bulimics, and 19 normal weight controls). The results indicated that the anorectic-restrictors and anorectic-bulimics had lower hunger ratings than controls.

At the end of the experimental meal the anorectic-bulimics were more preoccupied with thoughts of food and anorectic-restrictors had a lower urge to eat, as compared with the controls. Furthermore, the eating disorders patients had predominately "abnormal" patterns of hunger and fullness curves, indicating a confusion of these concepts. In conclusion, Halmi and Sunday (1991) emphasized that the disturbed eating in eating disordered patients was not psychodynamic in nature, but directly influenced by disturbance in internal and external cues can be measured and subjected to experimentation.

In a review of the urge research Tiffany (1992) reported that the assessment of verbal reports of urges have been limited to the use of single item-scales with low statistical value. Tiffany contends these single-item scales are problematic in studies where urge report is the dependent variable for the following reasons: (1) low reliability and (2) one or even two items may not adequately represent the dimensions that addicts may use to describe their urges. Thus, Tiffany supported a composite urge score derived from several urge relevant items for the following reasons: (1) this strategy yields a more reliable estimate of urge report; (2) the inclusion of a variety of items of diverse content might allow for the identification of multidimensional aspects of urge report; (3) the use of multiple items in the assessment of urge report would

circumvent the controversy of wording (i.e., "urges" versus "cravings").

### Eating Disorders

In the past two decades the eating disorders anorexia nervosa and bulimia nervosa have emerged as a major health problem. Lucas (1992) referred to the increasing incidence of eating disorders as "a cultural obsession with thinness," while others have concluded that eating disorders have now reached epidemic proportions, at least in Western society (Gordon, 1990). Anorexia nervosa and bulimia nervosa affect between one to ten percent of adolescents and college age women (Haller, 1992). The criteria for diagnosing anorexia nervosa and bulimia nervosa are listed in Tables 1 and 2 (American Psychiatric Association, 1987).

TABLE I

#### DIAGNOSTIC CRITERIA FOR ANOREXIA NERVOSA

- 
- \* Refusal to maintain body weight over a minimal normal weight for age and height.
  - \* Intense fear of gaining weight or becoming fat, even though underweight.
  - \* Disturbance in the way in which body weight, size, or shape is perceived.
  - \* In women, the absence of at least three consecutive menstrual cycles when otherwise expected to occur.
-



TABLE II  
DIAGNOSTIC CRITERIA FOR BULIMIA NERVOSA

- 
- \* Recurrent episodes of binge eating - rapid consumption of a large amount of food in a discrete period of time.
  - \* A feeling of lack of control over eating behavior during the eating binges.
  - \* Regularly engages in either self-induced vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise to prevent weight gain.
  - \* A minimum average of two binge-eating episodes a week for at least three months.
  - \* Persistent concern with body shape and weight.
- 

The similarities between eating disorders and addictive behaviors have been well documented (Lacey & Evans, 1986; Wardle, 1987). This linkage is suggested on the basis of the following areas:

1. Phenomenology (and course of illness): bulimic patients show an addiction-like behavior (craving, preoccupation with obtaining the substance, loss of control, adverse social and medical consequences, ambivalence towards treatment, and risk of relapse). They tend to abuse alcohol or drugs at some point of their history.

2. Family studies: a higher than expected prevalence of substance abuse was reported among the relatives of bulimic patients.
3. Biological level: animal studies and therapeutic trials with opiate antagonists suggested the involvement of endogenous opioid systems in the pathogenesis of bulimia (Vandereycken, 1990).

Despite the similarities not all authors believe eating disorders are addictive behaviors (Vandereycken, 1990; Wilson, 1991). Mills and Medlicott (1992) view eating disorders as a compulsive behavior. Schernhorn (1990) summarized the difference between addictive and compulsive behaviors:

Addictive behaviors run out of control because of an overpowering but initially welcome desire; compulsive behavior, on the other hand, is controlled by an unwelcome pressure which the person experiences alien to himself... Here "compulsion" means that one feels pressed to do and repeat something even against one's will, i.e., to wash hands obsessively, whereas "addiction" is viewed to be driven by an irresistible urge which one experiences as one's own want or need.

#### Exercise and Eating Disorders

Historically, researchers have linked "hyperactivity" to the development of anorexia nervosa (Kron, Katz, Gorzynski, & Weiner, 1978). Others have proposed a theory of activity-based anorexia (Epling, Pierce, & Stefan, 1983;

Epling & Pierce, 1988). However, an article written by Yates, Leehey, and Shisslak (1983) brought the controversy of exercise and eating disorders to the forefront of research. Yates, Leehey, and Shisslak explored apparent psychological similarities between patients with anorexia and a subgroup of male athletes designated as "obligatory runners." Case examples were provided from interviews with more than 60 marathon and trail runners. Yates, Leehey, and Shisslak concluded that the obligatory runners resemble anorexic women in terms of family background; socioeconomic class; and such personality characteristics as inhibition of anger, tolerance of physical discomfort, denial of potentially serious disability and a tendency towards depression.

Immediately the research world refuted the analog of running and anorexia nervosa. According to Blumenthal, Rose, and Chang (1985) the interpretation of Yate's research was difficult for the following reasons: (1) methodological ambiguities make it difficult to evaluate legitimacy of the findings, (2) the three case histories presented in the article did not represent any specific individual, but rather an example of the background, lifestyles, and personality of all the subjects, (3) no definition and selection procedures for "obligatory runners" were provided, and (4) no objective personality measures were used to assess the runners.

Because of these ambiguities researchers responded. Blumenthal, O'Toole, and Chang (1984) assessed patients with anorexia nervosa (N=24) and obligatory runners (N=43) using the Minnesota Multiphasic Personality Inventory (MMPI). Results indicated that the obligatory runners generally scored within the MMPI normal range, while the anorectic patients did not score within the normal range. The anorectic patients obtained more pathological scores than runners on eight of the ten clinical subscales of the MMPI. In conclusion, obligatory runners did not suffer from the same degree of psychopathology as did patients with anorexia nervosa.

Wheeler, Wall, Belcastro, Conger, and Cummings (1986) conducted a cross-sectional study of 31 high mileage runners, 18 low mileage runners, and 18 non-runner controls to determine if anorexic tendencies were prevalent in the habitual runner. Subjects completed the Jackson Personality Inventory (JPI), the Eating Attitudes Test (EAT), underwent a body image test, and a blood sample was obtained for measurement of reproductive, thyroid, and adrenal hormones. High mileage runners scored significantly higher in frequency scores on the JPI than sedentary controls, but there was no evidence of psychopathology. Also, the high mileage runners significantly overestimated waist width, and there was a small but statistically different EAT score between the control group and the runner groups. The results suggest that running may have a chronic effect on

serum testosterone and prolactin levels in high mileage but not low mileage runners. Although there was no significant evidence of anorexia nervosa in runners according to the EAT, the overestimation of waist size provided some evidence of a distortion of body image in high mileage runners.

Weight and Noakes (1986) administered the Eating Attitudes Test (EAT) and the Eating Disorder Inventory (EDI) to 125 competitive female runners. Weight and Noakes postulated that in a group of competitive runners a high incidence of anorexia nervosa would support Yate's (1983) hypothesis that running was an analog of anorexia nervosa. However, Weight and Noakes' findings refuted Yate's hypothesis and is in accordance with Blumenthal, O'Toole and Chang's (1984) study showing that personality of a non-obligatory runner was normal and unlike that of a person with anorexia nervosa.

Goldfarb and Plante (1984) postulated that runners adhere to rigid diets to maximize their performance and have a fear of fat. Goldfarb and Plante assessed distance runners (136 men and 64 women) with the Goldfarb Fear of Fat Scale, personality characteristics using the Activity Vector Analysis, and biographical and running history. The finding did not support the analog of obligatory runners and anorexic patients because the fear of fat in runners was not significantly different than the anorexic patients. The findings did support Yates, Leehey, and Shisslak's (1983) contention that obligatory runners are characterized by high

obsessive-compulsive and anxious tendencies. However, the findings indicated that runners, as a group, represented diverse personalities who train and compete without signs of pathology.

In a review of the related literature Nash (1987) concluded:

despite anecdotal evidence that seems to support the premise that a small percentage of compulsive runners share personality traits with anorexic patients, research suggests that there is virtually no connection between the two groups.

Recent articles contend that exercise increases the likelihood of developing an eating disorder. Davis and Cowles (1989) assessed thin build athletes, normal build athletes, and a control group of college students. Assessment was comprised of the Eating Disorder Inventory (EDI), the Eysenck Personality Inventory, Edwards Personal Preference Schedule, and the Lifestyle Questionnaire. The finding indicated that strenuous exercise may increase the likelihood of developing an eating pathology among female athletes whose sport demands a thin body build.

Davis (1990) examined the relationships among certain personality characteristics and variables which assess weight, diet, and appearance for two groups: avid exercisers (N=86) and subjects with little or no exercise (N=72). Multiple regression analysis indicated that Body Mass Index (BMI) predicted weight preoccupation for the non-exerciser

while the opposite relationship was found for exercisers. In the exercise group subjective body shape and not BMI influence weight preoccupation. It was also found that greater body dissatisfaction was related to poorer emotional well-being in the exercise group. These women reported that their physical appearance was important to self-esteem at a significantly greater degree than non-exercisers. Davis concluded that

A focus of attention in an exercise program on the relationship between body size and maximal performance may, in susceptible individuals, increase the likelihood of developing an obsessive attitude toward weight control.

Refuting these findings Prussian and Harvey (1991) assessed 174 female runners on their level of dietary restraint, depression, binge eating, and a number of exercise variables. Nineteen percent of the women in the sample met the diagnostic criteria for DSM-III-R Bulimia Nervosa. The data indicated that the level of exercise was not associated with any of the other variables. In conclusion, the data suggested that runners manifest a relatively high prevalence of bulimia nervosa, and that the distribution of the bulimia nervosa in the runners was not associated with any aspects of specific exercise or weight variables.

Krejci and others (1992) classified subjects as either a symptomatic bulimic group or an obligatory exercise group

based upon scores from the BULIT and the Blumenthal Obligatory Exercise Questionnaire. The groups were compared on symptoms of eating disorders, body image distortion, behavioral traits, depression, and nutrient intake. Results from this study indicated that the obligatory exercisers did not resemble the females with symptoms of bulimia.

To help clarify the ambiguities surrounding exercise and eating disorders, Eisler and Grange (1990) proposed four different models for studying the supposed link between excessive exercise and eating disorders. The four models were: (1) anorexia nervosa and excessive exercise form distinct diagnostic groups, (2) anorexia nervosa and excessive exercise are overlapping groups and excessive exercise can lead to the development of anorexia nervosa, (3) anorexia nervosa as well as excessive exercise are both related to some underlying disorder, and (4) excessive exercise is a variant of the eating disorders. In the discussion Eisler and Grange propose that excessive exercise needs to be defined and classified in order to clarify the ambiguities.

#### Classification of Excessive Exercise

The issue of defining and classifying excessive exercise has generated much debate. There are numerous terms to describe this phenomenon including negative addiction, compulsive jogging, commitment, exercise dependence, and obligatory running



(Hauck & Blumenthal, 1992). Just as there are numerous labels of the phenomenon there are various classifications. As recently as 1990 researchers had classified excessive exercise as an addiction. Chapman and De Castro (1990) constructed and evaluated the Running Addiction Scale (RAS) to investigate the psychological correlations of running addiction. The RAS, the symptoms checklist, the locus of control scale, the commitment to running habits, and the degree of addiction were administered to 32 male and 15 female runners. The results indicated that the RAS was reliable and valid, correlating with self-rated addiction. Running addiction was found to be associated with high frequency running and with positive personality characteristics, but not with mood enhancement. The duration of running was found to be associated with mood enhancement. Chapman and De Castro suggested that the benefits of running for mood enhancement may be obtained without addiction.

Morris, Steinberg, Sykes, and Salmon (1990) also viewed excessive exercise as an addiction. They divided 40 regular male runners into two similar groups and studied them for six weeks. One group continued normal running, but the other group stopped running for the middle two weeks of the study. Questionnaires were completed at the end of each week. Symptoms of depression were greater in the exercise withdrawn group than in the control group at the end of the second week of no running. Somatic symptoms were greater in

the withdrawn group after both the first and second weeks of not running. The groups did not differ in the final two weeks when running had resumed. Morris, Steinberg, Sykes, and Salmon concluded that the results strengthen the view that stopping regular exercise produces a withdrawal syndrome; therefore, exercise might be regarded as addictive.

Historically, Glasser (1976) popularized the idea of addiction to exercise. More specifically, Glasser indicated that exercise addiction was a positive addiction. A positive addiction because of the capacity of exercise to promote psychological strength and well-being for the runner. On the other hand, Morgan (1979) argued that running addiction is a negative addiction. Morgan believed running was a negative addiction because: (1) the person must feel that running is necessary in order to cope with daily life; (2) the person believes it is impossible to live without a daily run; and (3) the person must experience withdrawal symptoms if deprived of running.

In support of the negative addiction theory Hailey and Bailey (1982) quantified the concept of negative addiction and demonstrated differences in its occurrence among runners grouped by length of running history. Sixty male volunteers who finished a race were administered a questionnaire which contained the Negative Addiction Scale. Subjects were assigned to groups on the basis of running history. An analysis of variance revealed significant difference between

groups. Results showed that the mean addiction scores linearly increased between groups of runners thereby demonstrating progression through stages of the development of addiction.

Perry (cited in Moriarty, Ford, & Rawlings, 1991) classified individuals who take fitness/sport too far as obligatory exercisers. Perry promoted that,

The obligatory exercisers behaves in a way similar to eating disordered athletes in that they must have an exercise fix before they allow themselves to eat anything, use exercise to burn off calories, and will not stop exercising even when they are exhausted or injured. For them, exercise is excessive and a compulsive pursuit of the ideal body, not an activity that enhances well-being.

Veale (1987; 1991) preferred the term "exercise dependence" as it did not refer to any particular sport and classified the phenomenon with other compulsive behaviors. Veale developed diagnostic criteria for exercise dependence (see Table 3).

TABLE III

CRITERIA FOR EXERCISE DEPENDENCE

---

- \* Narrowing of repertoire leading to a stereotyped pattern of exercise with a regular schedule once or more daily.
- \* Salience with the individual giving increasing priority over other activities to maintaining the pattern of exercise.

TABLE III (contd.)

- 
- \* Increased tolerance to the amount of exercise performed over the years.
  - \* Withdrawal symptoms related to a disorder of mood following the cessation of the exercise schedule.
  - \* Relief or avoidance of withdrawal symptoms by further exercise.
  - \* Subjective awareness of a compulsion to exercise.
  - \* Rapid reinstatement of the previous pattern of exercise withdrawal symptoms after a period of abstinence.
  - \* Either the individual continues to exercise despite a serious physical disorder known to be caused, aggravated or prolonged by exercise, and is advised as such by a health professional, or the individual has arguments or difficulties with his partner, family, friends, or employer.
  - \* Self-inflicted loss of weight by dieting as a means of improving performance.
- 

Hauck and Blumenthal (1992) reviewed studies pertaining to both sport and personality, with particular attention to obsessive and compulsive traits and behaviors among athletes and regular exercisers. Of the findings it was agreed that it was necessary to define and measure compulsive exercise behavior. However, Hauck and Blumenthal found it difficult to do so because existing exercise addiction scales were inadequate. Reasons for the inadequate scales were: (1) lack of psychometric validation, (2) little evidence to support the contention that truly addicted runners comprised

the validation samples, and (3) reliance upon single item questions of self-perceived addiction as evidence of concurrent or discriminant validity. Hauck and Blumenthal proposed that more objective measures of exercise behavior be developed, and that researchers needed to investigate all types of physical activity, not just running.

Furthermore, Beumont, Arthur, Russell, and Touyz (1994) found several factors that are important in deciding whether the level of activity of an eating disorder patient is excessive. Factors for consideration are: (1) current nutritional state; (2) habits of exercise which inhibits a person's interpersonal, social, educational, and vocational activities; (3) use of exercise merely to lose weight and dispose of calories; (4) increased anxiety when prevented from exercising; (5) rigid, inflexible schedule, and (6) admission of feelings of chronic fatigue.

#### Summary

In summary, the self-efficacy theory has been used to explain behavior changes (Bandura, 1977). Self-efficacy being the belief that one could perform a behavior and the belief that the behavior would lead to a desired outcome. Self-efficacy scales are reliable and valid predictors of health-related and addictive behaviors (O'Leary, 1985; Lawrence & McElroy, 1986; Holden, 1991). Urges scales also have been used to explain concepts of addiction models (Wardle, 1987; Tiffany, 1990; Tiffany, 1991).

Research is conflicting as to whether exercise and eating disorders are addictive behaviors (Lacey & Evans, 1986; Wardle, 1987) Mills and Medlicott (1992) view eating disorders as a compulsive disorder. Others have concluded that there is no link between exercise and the development of eating disorder (Weight & Noakes, 1986; Prussian & Harvey, 1991; Krejci et al., 1992). Eisler and Grange (1990) concluded that excessive exercise needs to be defined and classified in order to clarify the ambiguities surrounding exercise and eating disorders.

## CHAPTER III

### METHODS AND PROCEDURES

The purpose of this study was to examine the relationship among eating self-efficacy, eating urges, and exercise category of college students. This chapter explains the selection of subjects, the instrumentation, the procedures used in collecting the data, and the statistical analysis of the data which was used.

#### Selection of Subjects

A total of 310 male and female subjects between the ages of 18 and 54 participated in this study. Subjects were volunteers solicited from health and physical education classes in a state supported institution of higher learning in the state of Oklahoma.

#### Instrumentation

The questionnaire that was administered was a three page paper and pencil type survey which measured three distinct components. The first component measured frequency and duration of physical activity. Via self-report, subjects described their exercise category as determined by frequency and duration of physical activity. The

instrument used to measure the second and third component was the Situational Appetite Measure (SAM) (Stanton, Garcia, & Green, 1990). The SAM-E measured the degree to which individuals expect to control overeating, i.e., eating self-efficacy and the SAM-U measured the degree to which individuals feel the urge to eat in various situations, i.e., urge to eat.

#### Situational Appetite Measure (SAM): SAM-E and SAM-U

The instrument used in this study to measure eating self-efficacy and eating urges is the Situational Appetite Measure (SAM) developed by Stanton, Garcia, and Green (1990). Two versions of the SAM were developed: (1) one version asks individuals the degree to which they feel the urge to eat in various situations (SAM-U), and (2) a second version asks the degree to which they expect to be able to control overeating in the same situation (SAM-E).

Three studies were conducted to provide reliability and validity of the SAM. Study one explored the psychometric characteristics of the SAM-U by examining its factorial structure, reliability, and correlations with other measures, such as the Bulimia Test, the Eating Self-Efficacy Scale, the Restraint Scale, the Beck Depression Inventory, and the Sensation Seeking Scale. Item-analysis yielded the following subscales for the SAM-U and SAM-E: relaxation, food present, hunger, reward, and negative feelings.



Coefficient alpha for males and females and test-retest reliabilities were acceptable for all scales ( $>.70$ ) and were high ( $>.90$  for the Reward and Negative Feelings scales. Test-retest coefficients were  $\geq .70$ . A two-way analysis of variance was conducted with sex as between-subjects factor and the five SAM-U subscales as a within subject factor. The dependent variable was the SAM-U scores. Neither the sex factor,  $F(1, 223) = 1.10, p > .05$ , nor the sex-by-scale interaction,  $F(4, 892) = 1.84, p > .05$ , was significant, but the scale main effect was significant,  $F(4, 892) = 244.89, p > .001$ .

Study two evaluated the relationship between the SAM-U, SAM-E, and the Eating Self-Efficacy Scale (ESES) (Glynn & Ruderman, 1986). Correlations between the scales of the SAM-U and SAM-E was  $>.80$ . There was also a high correlation (.89) between the Negative Feelings scale of the SAM-E and the Negative Affect scale of the ESES.

Study three assessed the predictive validity of the SAM and the ESES. Results indicated that the SAM-E and Sam-U were substantially correlated, indicating that the higher the urge to eat, the lower the perceived efficacy for controlling overeating.

#### Data Collection Procedures

Prior to the study approval was sought and obtained from Oklahoma State University's Institutional Review Board. Permission was sought and obtained to enter into various

health and physical education classes. Data collection occurred during a two week time span. Upon entering into the classes subjects were briefed by the researcher on the purpose of the study and the testing procedures. Prior to data collection an information sheet (see Appendix B) was circulated to clarify any questions.

The Situational Appetite Measure (SAM) Questionnaire (see Appendix C), and the Demographic Sheet (see Appendix D) were distributed to each subject. On the Demographic Sheet there was a question which asked the subjects to describe their exercise habits. This question was used for describing exercise category. Detailed and standardized instructions for completing the SAM were explained. Subjects were asked to respond to each question honestly and to ask for assistance if they had any questions. Once the questionnaires were completed the subjects were instructed to return the survey to the researcher.

#### Statistical Analysis

Analysis of all data was carried out on an IBM micro-computer using the System for Statistics (SYSTAT) package. Both the usual descriptive treatment and regression analysis was used to examine the strength of relationships among eating self-efficacy, eating urges, and exercise category. In order to lower the probability of committing Type I errors due to multiple comparisons, an alpha level of 0.01 was used to test all hypotheses.

## CHAPTER IV

### ANALYSIS AND DISCUSSION OF DATA

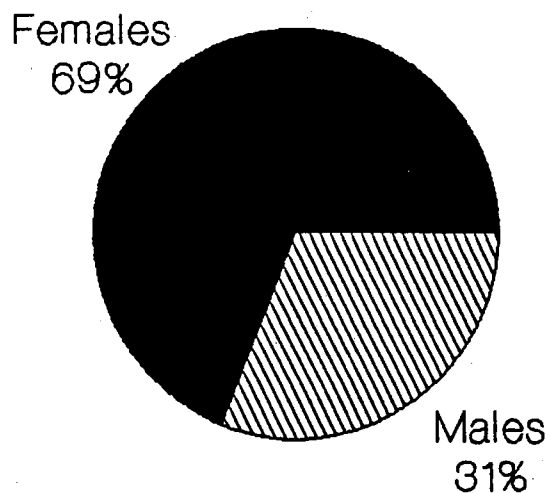
#### Introduction

The purpose of this study was to investigate the relationships of eating behavior, specifically eating self-efficacy and eating urges, and exercise category of college students. Subjects were Spring 1994 college students enrolled in a health or physical education class in a state-supported institution of higher learning in the state of Oklahoma. A three page paper and pencil type survey was administered to 310 college students. The survey categorized subjects' exercise participation and measured eating self-efficacy and eating urges.

Of the 310 subjects, 68% were females and 30% were males. Subjects' age ranged from 18 to 54 years. The researcher administered the survey during a two week time span in April of 1994. Administrative procedures were designed to protect the subjects' privacy and allow for voluntary, confidential participation. Subjects did not represent a specific level of exercise category nor a specific eating behavior. Once the questionnaire was completed it was returned to the researcher.

### Demographic Results

A total of 310 students enrolled in a health or physical education class were volunteer subjects for this study. The ages of the participants ranged from 22 years to 54 years (mean age 22.04 years). A majority of the subjects (68.1%) were females (refer to Figure 2). Approximately 31% of the subjects were males.



**Figure 2. Distribution of Subjects  
By Gender**

Of the 310 subjects, 67.4% (N=214) were single, 12.9% (N=40) were married or remarried, 3.2% (N=10) were separated

or divorced, 13.9% (N=43) were involved in a committed relationship, 1.0% (N=3) responded to the "other category", and 1.6% (N=5) did not provide their marital status.

Sixty-three percent (N=196) of the subjects lived off campus, 28.4% (N=94) lived on campus, 6.5% (N=20) were commuters, and 1.9% (N=6) did not provide a place of residence.

Subjects were asked to categorize their exercise participation. Approximately 21% (N=66) of the subjects described their exercise habits as occasional. The description of an occasional exerciser is one who never participates in exercise (N=8) and/or exercises less than once a week (N=58). The category of low exercise was represented by 31.3% (N=97) of the subjects. Low level exercise is described as 2 to 3 times per week for 30 minutes. The category of moderate exercise was represented of 32.6% (N=101) of the subjects. Moderate level exercise is described as four to five times per week for 30 to 45 minutes. The category of heavy exercise was represented by 12.3% (N=38) of the subjects. Heavy exercise is described as daily for 45 to 60 minutes.

Figure 3 represents the exercise category by gender. Percentage of female subjects who are occasional exercisers is 87.9% (N=58), low exercisers is 72.2% (N=70), moderate exercisers is 61.4% (N=62), and heavy exercisers is 47.4% (N=18). Percentage of male subjects who are occasional

exercisers is 12.1% (N=8), low exercisers is 27.8% (N=27), moderate exercisers is 38.6% (N=39), and heavy exercisers is 52.6% (N=38).

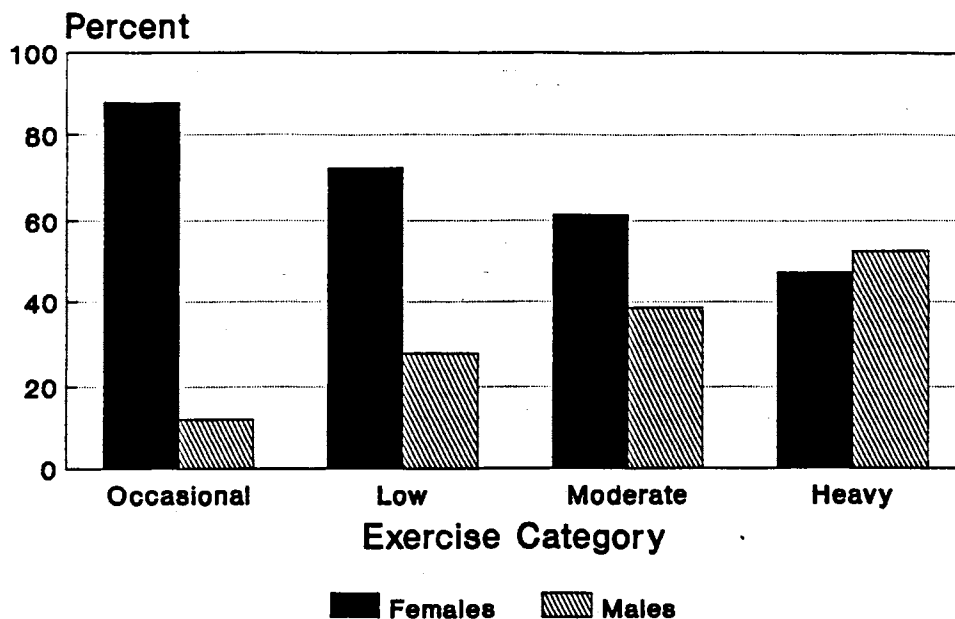


Figure 3. Exercise Category By Gender

Subjects were asked if their past experience with exercise had been successful. The answer to this question is based upon the subjects subjective opinion of success in their experience with exercise. The question did not operationally define "successful." Of the respondents, 82.6% (N=256) reported that their past experience with

exercise was not successful. A successful past experience with exercise was reported by 14.5% (N=45) of the subjects.

Figure 4 depicts exercise experience by exercise category. Approximately 34% (N=24) of the occasional exercisers reported that their past experience with exercise was not successful, whereas 66% (N=66) reported success in their past experience. Low exercisers reported that their past experience was not successful 16.5% of the time (N=17), whereas 83.55% (N=97) reported success in their past experience. Moderate exercisers reported that their past experience was not successful 6.9% of the time (N=7), whereas 93.1% (N=94) reported success in their past experience. Heavy exercisers reported that their past

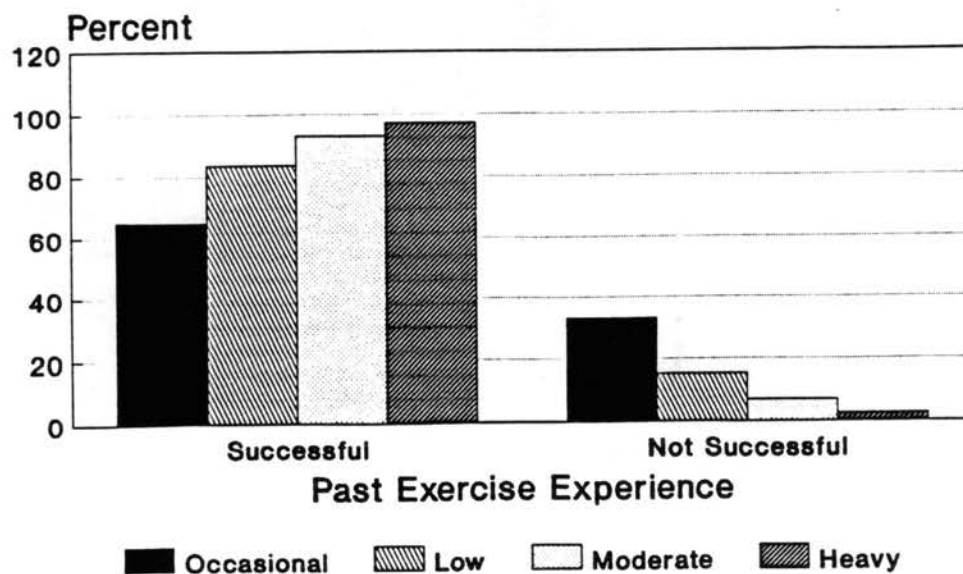


Figure 4. Exercise Experience By Exercise Category

exercise experience was not successful 2.6% of the time (N=1), whereas 97.4% (N=38) reported success in their past exercise experience.

Subjects were asked if their past experience with weight control been had successful. The answer to this question was based upon the subjects' subjective opinion of success in their experience with weight control. The question did not operationally define "weight control or successful." Of the respondents, 76.8% (N=238) reported that their past experience with weight control was not successful. A successful past experience with weight control was reported by 19.7% (N=61) of the subjects.

Figure 5 represents reported past weight control experience by exercise category. Approximately 30.3% (N=23) of the occasional exercisers reported that their past experience with weight control was not successful, whereas 65.2% (N=66) reported success in their past experience with weight control. Low exercisers reported that their past experience was not successful 25.8% (N=26) of the time, whereas 73.2% (N=97) reported success in their past experience. Moderate exercisers reported that their past experience was not successful 12.9% (N=13) of the time, whereas 87.1% (N=101) reported success in their past experience. Heavy exercisers reported that their past weight control experience with weight control was not successful 7.9% (N=4) of the time, whereas 92.1% (N=38) reported success in their past weight control experience.



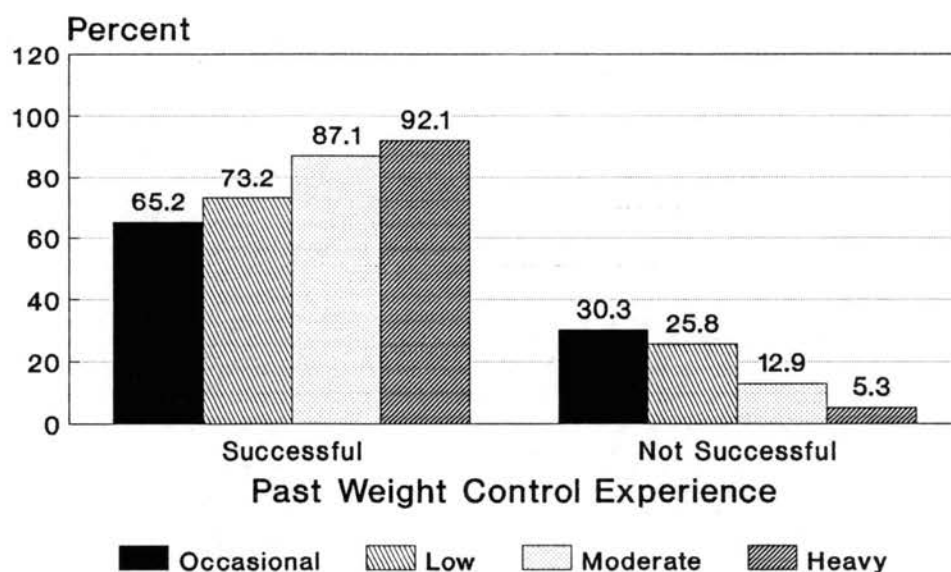


Figure 5. Weight Control By Exercise Category

#### Hypothesis Analysis

Regression analysis using the System for Statistics (SYSTAT) was carried out on an IBM compatible micro-computer to evaluate the seven null hypotheses for this study at an alpha level of 0.01.

1. There is no significant relationship between eating self-efficacy and eating urges of college students.

Results of the regression analysis relating eating efficacy as the dependent variable and eating urges as the independent variable is presented in Table IV. Based upon the information indicated in the data, it was concluded that there is strong evidence to support that eating

self-efficacy is significantly related to eating urges of the college students ( $F_{1, 308} = 435.483$ ;  $p < 0.01$ ). Therefore hypothesis 1 was rejected.

TABLE IV  
RELATIONSHIP BETWEEN EATING SELF-EFFICACY  
AND EATING URGES

Dep. Var: Self-Efficacy		$R^2 = 0.586$		
Variable	Coefficient	T-value	p	
Constant	0.612	5.739	0.000	
Eating Urges	0.826	20.868	0.000	
Analysis of Variance				
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F-ratio</u>	<u>p</u>
Regression	1	71.774	435.483	0.000
Residual	308	50.763		

2. There is no significant relationship between eating self-efficacy and exercise category of college students.

The results of the regression analysis is shown in Table V. The dependent variable is eating self-efficacy and the independent variable is exercise category. The evidence in the data indicated that there is a significant relationship between eating self-efficacy and exercise

category among the college students ( $F_{3, 298} = 7.338$ ;  $p < 0.01$ ). Therefore, hypothesis 2 was rejected.

TABLE V  
RELATIONSHIP BETWEEN EATING SELF-EFFICACY  
AND EXERCISE CATEGORY

Dep. Var: Self-Efficacy		$R^2 = 0.069$		
Variable	Coefficient	T-value	p	
Constant	3.161	34.075	0.000	
Eating Urges	-0.164	-2.709	0.000	
Analysis of Variance				
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F-ratio</u>	<u>p</u>
Exer. Cat.	3	8.084	7.338	0.000
Residual	298	109.428		

3. There is no significant relationship between eating urges and exercise category among college students.

Results of the regression analysis relating eating urges to exercise category is presented in Table VI. The data provided sufficient evidence that eating urges is significantly related to exercise category among the college students ( $F_{3, 298} = 4.754$ ;  $p < 0.01$ ). Therefore, hypothesis 3 was rejected.

TABLE VI  
RELATIONSHIP BETWEEN EATING URGES  
AND EXERCISE CATEGORY

Dep. Var: Eating Urges		R <sup>2</sup> = 0.046		
Variable	Coefficient	T-value	p	
Constant	2.917	33.844	0.000	
Eating Urges	-0.127	-2.180	0.003	
Analysis of Variance				
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F-ratio</u>	<u>p</u>
Exercise Category	3	4.543	4.754	0.003
Residual	298	94.926		

4. There is no significant relationship between eating self-efficacy and past weight control experience among college students.

The results of the regression analysis is shown in Table VII. The evidence in the data indicated that there is a significant relationship between eating self-efficacy and past weight control experience among the college students ( $F_{1, 297} = 26.821$ ;  $p < 0.01$ ). Therefore, hypothesis 4 was rejected.

TABLE VII  
RELATIONSHIP BETWEEN EATING SELF-EFFICACY  
AND WEIGHT CONTROL

Dep. Var: Self-Efficacy		$R^2 = 0.083$		
Variable	Coefficient	T-value	p	
Constant	3.139	40.347	0.000	
Wt. Control	-0.452	-5.179	0.000	
Analysis of Variance				
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F-ratio</u>	<u>p</u>
Exer. Cat.	1	9.903	26.821	0.000
Residual	297	109.664		

5. There is no significant relationship between eating urges and past weight control experience among college students.

Results of the regression analysis relating eating urges of college students to past weight control experience is presented in Table VIII. The data provided sufficient evidence that there is a significant relationship between eating urges and past weight control experience among the college students ( $F_{1,297} = 20.883$ ;  $p < 0.01$ ). Therefore, hypothesis 5 was rejected.

TABLE VIII  
RELATIONSHIP BETWEEN EATING URGES  
AND WEIGHT CONTROL

Dep. Var: Eating Urges		$R^2 = 0.066$		
Variable	Coefficient	T-value	p	
Constant	2.917	40.400	0.000	
Wt. Control	-0.370	-4.570	0.000	
Analysis of Variance				
<u>Source</u>	<u>df</u>	<u>SS</u>	<u>F-ratio</u>	<u>p</u>
Exer. Cat.	1	6.643	20.883	0.000
Residual	297	94.479		

6. There is no significant relationship between eating self-efficacy and past exercise experience among college students.

Based on the evidence obtained in the regression analysis, there is insufficient evidence to demonstrate that eating self-efficacy of college students related significantly to their past exercise experience. Therefore, hypothesis 6 was not rejected.

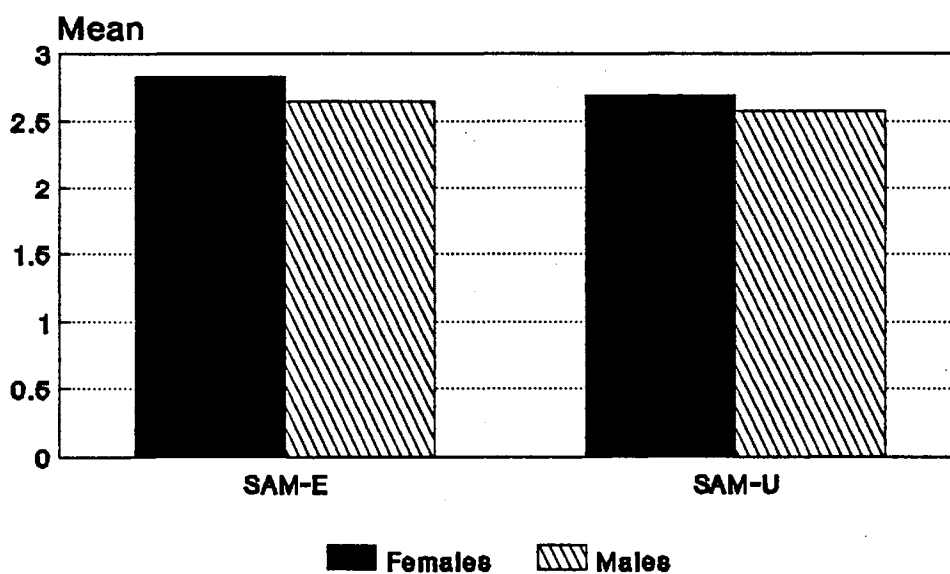
7. There is no significant relationship between eating urges and past exercise experience among college students.

The results of the analysis suggested that there is a lack of evidence to indicate that eating urges are

significantly related to past exercise experience among college students. Therefore, hypothesis 7 was not rejected.

### Secondary Findings

Notable findings were discovered when looking at the SAM-E and SAM-U by gender. As Figure 6 depicts, the SAM-E



**Figure 6. SAM-E and SAM-U  
By Gender**

mean was 2.687 for males and 2.820 for females. The SAM-U mean was 2.571 for males and 2.644 for females. An F-test revealed that there was no significant difference in the SAM-E or SAM-U between gender.

SAM-E subscales scores for male subjects follow: relaxation (mean=2.684), food present (mean=2.798), hunger (mean=3.621), reward (mean= 2.241), and negative feelings (mean=2.066). Female subscales scores follow relaxation (mean=2.840), food present (mean=2.870), hunger (mean=3.503), reward (mean=2.368), and negative feelings (mean=2.434) (See Figure 7). An F-test revealed that there is a significant difference between females and males for the subscale of negative feelings ( $F_{1, 303} = 8.805$ ;  $p < 0.01$ ). However, there were no significant difference

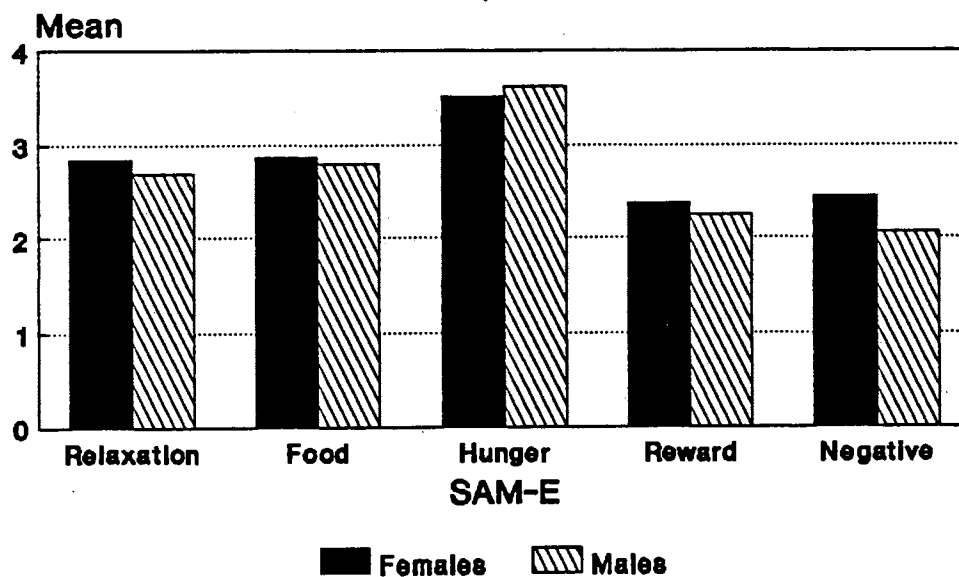
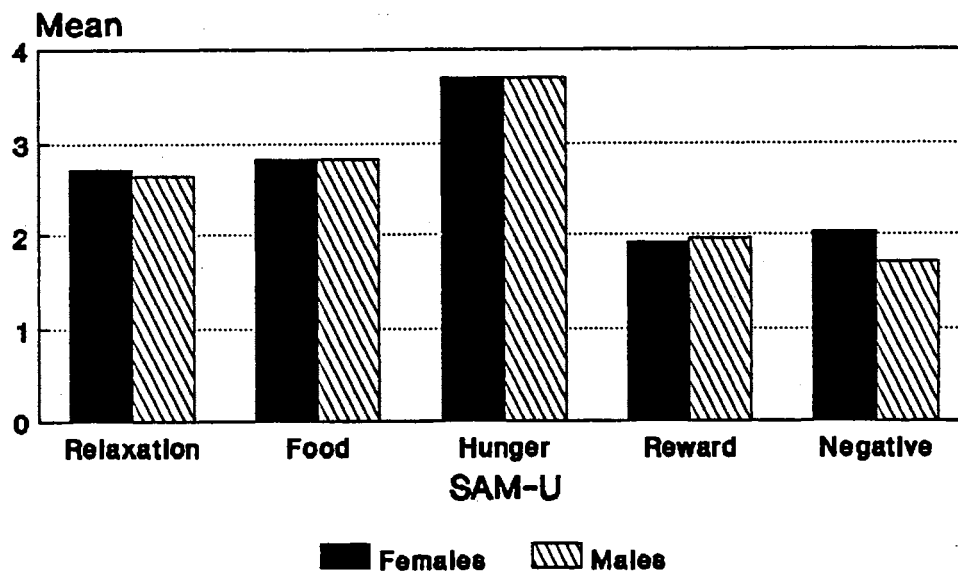


Figure 7. SAM-E Subscales By Gender



between gender for the other four subscales.

SAM-U subscales by gender are shown in Figure 8. Male subscales scores follow: relaxation (mean=2.651), food



**Figure 8. SAM-U Subscales  
By Gender**

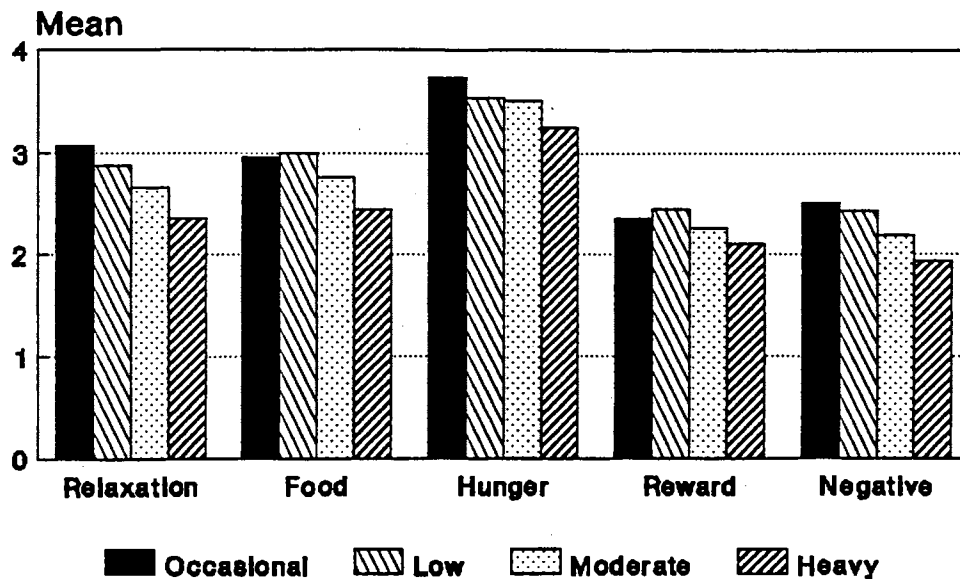
present (mean=2.828), hunger (mean=3.686), reward (mean=1.966) and negative feelings (mean=1.718). Female subscales scores follow relaxation (mean=2.721), food present (mean=2.830), hunger (mean=3.689), reward (mean=1.918), and negative feelings (mean=2.034). A F-test revealed no SAM-U subscale scores differences between gender.

Table IX shows the means and standard deviations of SAM-E and SAM-U by exercise category. Subjects who exercised occasionally had the highest mean on both the SAM-E and SAM-U.

TABLE IX  
SAM-E AND SAM-U BY EXERCISE CATEGORY

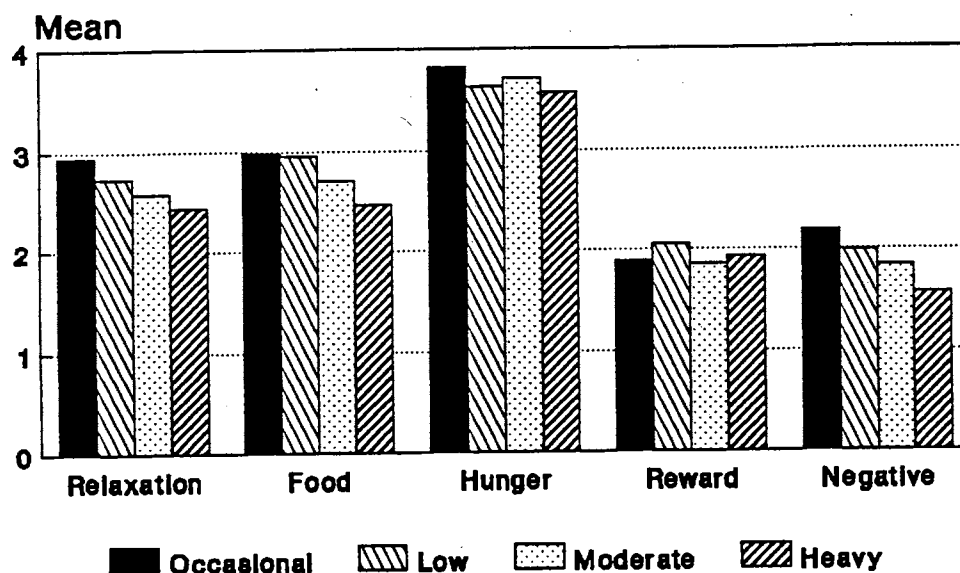
Exercise Category	n	SAM-E		SAM-U	
		Mean	SD	Mean	SD
Occasional	66	2.945	0.555	2.774	0.590
Low	97	2.873	0.629	2.678	0.562
Moderate	101	2.692	0.625	2.536	0.567
Heavy	38	2.429	0.579	2.393	0.517

Figure 9 shows the SAM-E subscale mean scores by exercise category. As revealed in the figure all the subscale scores for subjects categorized as heavy exercisers had the lowest SAM-E subscale scores (low SAM-E score = high eating self-efficacy).



**Figure 9. SAM-E Subscales  
By Exercise Category**

SAM-U subscale mean scores by exercise category is graphically depicted in Figure 10. Subjects categorized as heavy exercisers had lower SAM-U subscale scores on all of the subscales (low SAM-U score = low eating urge).



**Figure 10. SAM-U Subscales  
By Exercise Category**

Correlational Relationships among SAM-E subscales are shown in Table X. A high positive relationship was noted between relaxation and the following subscales: food present, reward, and negative feelings. The following high positive relationship were present also: food present and reward; reward and negative feelings.

TABLE X  
CORRELATION MATRIX FOR SAM-E SUBSCALES

	R	F	H	W	N
Relaxation (R)	1.00				
Food (F)	0.68	1.00			
Hunger (H)	0.31	0.39	1.00		
Reward (W)	0.50	0.50	0.12	1.00	
Negative (N)	0.56	0.43	0.10	0.58	1.00

Table XI shows the relationship of the SAM-U subscales. There was a high positive relationship between food present and relaxation.

TABLE XI  
CORRELATION MATRIX FOR SAM-U SUBSCALES

	R	F	H	W	N
Relaxation (R)	1.00				
Food (F)	0.66	1.00			
Hunger (H)	0.30	0.32	1.00		
Reward (W)	0.42	0.40	0.18	1.00	
Negative (N)	0.43	0.34	0.09	0.41	1.00

Subjects were asked to respond to the question: Rate the degree to which you would feel confident that you could resist the urge to overeat when stomach growls. Table XII shows a summary of the responses to the question.

TABLE XII  
SELF-EFFICACY WHEN STOMACH GROWLS

	Number of Respondents	Percent
Extremely Confident	14	4.6%
Very Confident	27	8.7%
Moderately Confident	59	19.0%
Slightly Confident	67	21.6%
Not at all Confident	143	46.1%

Another question the subjects to responded to was: Rate the degree to which you would feel confident that you could resist the urge to eat when starving. Table XIII provides the summary of responses to the question.

TABLE XIII  
SELF-EFFICACY WHEN STARVING

	Number of Respondents	Percent
Extremely Confident	13	3.9%
Very Confident	28	8.7%
Moderately Confident	54	17.1%
Slightly Confident	89	28.7%
Not at all Confident	126	40.6%

In addition, the following questions were asked: Rate the degree to which you feel the urge to eat when I am "dying" of hunger; when I have not eaten for a long time and are craving something to eat, and; when "starving." Table XIV through Table XVI show the results to these questions respectively.

TABLE XIV  
URGE WHEN DYING OF HUNGER

	Number of Respondents	Percent
No Urge	11	3.5%
Slight Urge	20	6.5%
Moderately Urge	46	14.8%
Strong Urge	104	33.5%
Extreme Urge	129	41.6%

TABLE XV  
URGE WHEN HAVE NOT EATEN FOR A LONG TIME

	Number of Respondents	Percent
No Urge	12	3.5%
Slight Urge	24	7.7%
Moderately Urge	47	15.2%
Strong Urge	113	36.5%
Extreme Urge	114	36.8%

TABLE XVI  
URGE WHEN STARVING

	Number of Respondents	Percent
No Urge	4	1.3%
Slight Urge	17	5.5%
Moderately Urge	49	15.8%
Strong Urge	105	33.9%
Extreme Urge	135	43.5%

### Discussion

The purpose of this study was to investigate the relationship among exercise category, eating self-efficacy, and eating urges of college students. Regression analysis was utilized to determine whether any relationships stated



in the seven null hypotheses were statistically significant. Based upon the results of this study, the following statements are warranted.

Exercise and diet have been shown to be important factors in health promotion and disease prevention. There is abundant evidence to support the contention that changing the composition of one's diet (i.e., reducing dietary sodium or saturated fat) or increasing the level of physical activity can reduce the risk of cardiovascular disease. However, changing a health-related behavior is difficult to initiate and harder to maintain. This study reflected this difficulty as approximately 21% of the subjects are occasional exercisers (never participates in exercise or exercises less than once a week) and 31.3% described their exercise behavior as low level (two to three times per week for thirty minutes).

The results of the data analysis suggested that there is a statistically significant relationship between eating self-efficacy and eating urges of college students. Interpretations of these results warrant the following SAM-E and SAM-U explanation. On the SAM-E scales, higher scores represent greater self-efficacy. On the SAM-U scales, higher scores represent greater urge. Hence, the results indicate that the higher the urge to eat, the lower the perceived efficacy for controlling overeating.

The evidence from the data also suggested that both eating self-efficacy and eating urges were significantly

related to exercise category. Although the relationships were low, an additional study descriptively revealed that subjects who were categorized as heavy exercisers had the lowest SAM-E subscale score (low SAM-E score = high self-efficacy) and lower SAM-U subscale scores (low SAM-U score = lower eating urge). These findings could support the contention that eating self-efficacy can be generalized to exercise participation which suggests that individuals who are able to eat correctly may be able to exercise correctly.

Both eating self-efficacy and eating urges were also significantly related to past weight control experience. Of the subjects who were categorized as heavy exercisers, 92.1% reported success in their past weight control experience, whereas 65.2% of the occasional exercisers reported success in their past weight control experience. Although the relationships were statistically low, health educators can descriptively see the importance of performance accomplishments. Performance accomplishments (i.e., past experience with weight control) provided tangible evidence that one can accomplish the behavior.

If, as the data indicated, eating self-efficacy and eating urges are factors in eating behavior and exercise participation, then health educators must identify strategies to enhance individuals' confidence in their ability to eat and exercise in accordance with recommendations that promote health. Educational programs

should focus on increasing individuals level of self-efficacy through examining the four sources which influence self-efficacy: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. An example of a strategy which employs the four sources of self-efficacy is a situation where an individual can place reduced calorie dressing, rather than regular dressing, on a salad and then actually eat the salad to confirm that reduced calorie dressing tastes good.

In contrast, both eating self-efficacy and eating urges were not significantly related to past exercise experience. Reaffirming, but not disclaiming the contention that eating and exercise are different constructs.

Responses to questions on the SAM-E hunger scale revealed that a majority of the subjects had "slight or no confidence" in resisting the urge to eat when starving or when their stomach growls. In addition, responses to questions on the SAM-U hunger scales revealed that a majority of the subjects had a "strong or extreme urge" to eat when they were hungry, when they had not eaten for along time, or when starving. This study revealed the role of urges in eating behavior in college students. This study supported nutrition education which describes hunger, appetite, and satiety. Not only will education describe these constructs but will show individuals how to deal with eating urges.

Finally, the data analysis indicated that there was a significant difference between gender on the negative feelings subscale of the SAM-E. These findings indicated gender differences in response to negative feelings. For example, females and males respond differently to the following questions, "How confident could you resist the urge to overeat when you: (1) have had an argument with someone, (2) feel upset, (3) are frustrated, (4) are worried, (5) feel nervous, and (6) feel angry with yourself." Although Figure 7 revealed a low relationship, health educators should ask the question; "Are these findings indicative of society?" For example, does western society propagate gender differences in response to celebration and mourning? If the results are heeded as important, nutrition education needs to instill in females that there are other methods of rewarding negative feelings.

The literature has shown that self-efficacy scales are valid predictors of health-related and addictive behaviors. Urge scales have also been used to explain concepts of the addiction models. This is not to say that scores derived from self-efficacy and urge scales can absolutely predict various health-related and addictive behaviors. However, it can support the contention that with refinement self-efficacy and urge scales can be used as a screening tool for identifying individuals with a predisposition towards addictive behaviors. More importantly the scales can be used to tailor educational programs for individuals.

The subjects in this study who could not resist the "urge" to eat could be taught strategies, i.e., eating before they go out on Saturday night, for coping with urges.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

#### Introduction

This chapter contains a summary of the study, the findings derived from the analysis of data, a discussion of the findings, and recommendations for further studies. The study was designed to examine the relationship among eating self-efficacy, eating urges, and exercise category in college students. The sample included subjects (N=310) enrolled in a health or physical education class in a state supported institution of higher learning in the State of Oklahoma during the Spring of 1994.

Of the 310 subjects 69% were females and 31% were males. The range of subjects' age was from 18 to 54 years. Subjects' exercise category were determined by self-report. Eating self-efficacy and eating urges were determined by the Situational Appetite Measure. Administrative procedures were designed to protect the subjects' privacy and allow for voluntary, confidential participation. Students in health and physical education were asked to complete the questionnaire. Upon completion of the questionnaire the researcher collected it from the subjects.

Statistical analysis was completed on an IBM micro-computer using the System for Statistics (SYSTAT) package. In addition to the usual descriptive treatment of demographic data, multiple regression analysis was used to examine the strength of relationships among exercise category, eating self-efficacy, and eating urges.

The data collected in this study were analyzed and yielded the following findings:

1. There was a statistically significant relationship between eating self-efficacy and eating urges among college students.
2. There was a statistically significant relationship between eating self-efficacy and exercise category among college students.
3. There was a statistically significant relationship between eating urges and exercise category among college students.
4. There was a statistically significant relationship between eating self-efficacy and past weight control experience among college students.
5. There was a statistically significant relationship between eating urges and past weight control experience among college students.

6. There was no statistically significant relationship between eating self-efficacy or eating urges and past exercise experience.
7. An F-test revealed a statistical difference between females and males for the SAM-E subscales of negative feelings.
8. Of the four exercise categories, those who exercised occasionally scored the highest mean score on both the SAM-E and SAM-U.
9. Findings from the SAM-E subscale mean scores by exercise category revealed that subjects categorized as heavy exercisers had lower SAM-E subscale scores (low SAM-E score = high eating self-efficacy).
10. Findings from the SAM-U subscale mean scores revealed that subjects categorized as heavy exercisers had lower SAM-U scores on all of the subscales (low SAM-U score = low eating urge).
11. Correlational techniques revealed a high positive relationship among the following SAM-E subscales: relation and food present; relaxation and reward; relaxation and negative feelings; food present and reward, and; reward and negative feelings.



## Conclusions

In conclusion, the subjects involved in this study were students enrolled in a health or physical education class. It is conceivable that they have the knowledge base to eat and exercise according to health recommendations. However, less than 50% of the subjects from this study exercised at the recommended level for health benefits.

The conclusions of this study should be a wake-up call for health educators. No longer can health educators just impart knowledge, health educators must be concerned with the initiation and maintenance of health-related behaviors. The statistical design used in this study demonstrated a relationship among eating self-efficacy, eating urges, and exercise participation. This data suggested self-efficacy and urge scales can be used as a ladder to bridge the gap between knowledge and behavior.

## Recommendations for Further Research

Although the results of this study presented some significant findings, it must be remembered that these findings can only be generalized to the population of the college students enrolled in the health or physical education classes from the state supported institution of higher learning which was involved in the study. It is therefore recommended that the study be replicated using a sample more representative of college students in general.

The following are additional recommendations for further research:

1. A replication of this study using a random sample of college students to gain a more accurate view of the exercise, eating self-efficacy, and eating urges relationships of college students.
2. A replication of this study using a non-college population.
3. A study to investigate the relationship among eating and exercise self-efficacy and the eating disorders.
4. A study to investigate the relationship between self-efficacy and exercise dependence.
5. A study to investigate the relationship between eating urges and the eating disorders.
6. A study which employs direct measurement of exercise and eating behavior.
7. A longitudinal study which examines the effect of self-efficacy strategies on health-related behavior.

## BIBLIOGRAPHY

- American Psychiatric Association. (1987). Diagnostic and Statistical Manual of Mental Disorders (3rd ed.). Washington, DC: Author.
- Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1978). Reflections on self-efficacy. Advances in Behavioral Research Therapy, 1, 237-269.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.
- Bennett, N.A., Spoth, R.L., & Borgen, F.H. (1992). Bulimic symptoms in high school females: Prevalence and relationships with multiple measures of psychological health. Journal of Community Psychology, 19(1), 13-28.
- Beumont, P.J.V., Arthur, B., Russell, J.D., & Touyz, S.W. (1994). Excessive physical activity in dieting disorder patients: Proposals for a supervised exercise program. International Journal of Eating Disorders, 15(1), 21-36.
- Bezjak, J.E. & Lee, J.W. (1990). Relationships of self-efficacy and locus of control constructs in predicting college students' physical fitness behavior. Perceptual and Motor Skills, 71(2), 499-508.
- Blumenthal, J.A., O'Toole, L.C., & Chang, J.L. (1984). Is running an analog of anorexia nervosa? An empirical study of obligatory running and anorexia nervosa. Journal of the American Medical Association, 252(4), 520-523.
- Blumenthal, J.A., Rose, S., & Chang, J.L. (1985). Anorexia nervosa and exercise: Implications from recent findings. Sports Medicine, 2, 237-247.
- Chapman, C.L. & DeCastro, J.M. (1990). Running addiction: Measurement and associated psychological characteristics. The Journal of Sports Medicine and Physical Fitness, 30(3), 283-290.

- Collins, M.E. (1988). Education for healthy body weight: Helping adolescents balance the cultural pressures for thinness. Journal of School Health, 58(6), 227-231.
- Davis, C. (1990). Weight preoccupation: A comparison between exercising and non-exercising women. Appetite, 15, 13-21.
- Davis, C. & Cowles, M. (1989). A comparison of weight and diet concerns and personality factors among female athletes and non-athletes. Journal of Psychomatic Research, 33(5), 527-536.
- Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. Psychological Reports, 59(3), 1155-1159.
- Desmond, S.M. & Price, J.H. (1988). Self-efficacy and weight control. Health Education, 19(1), 12-18.
- DiClemente, C.C. (1986). Self-efficacy and the addictive behaviors. Journal of Social and Clinical Psychology, 4(3), 302-315.
- Dzewaltowski, D.A., Noble, J.M., & Shaw, J.M. (1990). Physical activity participation: Social cognitive theory versus the theories of reasoned action and planned behavior. Journal of Sport and Exercise Psychology, 12(4), 388-405.
- Eisler, I. & Grange, D.I. (1990). Excessive exercise and anorexia nervosa. International Journal of Eating Disorders, 9(4), 377-386.
- Epling, W.F. & Pierce, W.D. (1988). Activity-based anorexia: A biobehavioral perspective. International Journal of Eating Disorders, 7(4), 475-485.
- Epling, W.F., Pierce, W.D., & Stefan, L. (1983). A theory of activity-based anorexia. International Journal of Eating Disorders, 3(1), 27-46.
- Ewart, C.K., Taylor, C.B., Reese, L.B., & Debusk, R.F. (1984). Effects of early postmyocardial infarction exercise testing on self-perception and subsequent physical activity. American Journal of Cardiology, 51, 1076-1080.
- Fairbanks, G. (1987). Eating disorders among athletes. The Physical Educator, 44(3), 377-380.

- Fontaine, K.L. (1991). The conspiracy of culture: Women's issues in body size. Nursing Clinics of North America, 26(3), 669-676.
- Geis, K.P. (1991). The psychology of exercise behavior: A comprehensive approach. (Doctoral dissertation, California School of Professional Psychology, 1991). Dissertation Abstracts International, AAC 9134277.
- Glasser, W. (1976). Positive Addiction. New York: Harper & Row.
- Glynn, S.M. & Ruderman, A.J. (1986). The development and validation of an eating-efficacy scale. Cognitive Therapy and Research, 10(4), 403-420.
- Goldfarb, L.A. & Plante, T.G. (1984). Fear of fat in runners: An examination of the connection between anorexia nervosa and distance running. Psychological Reports, 55, 296.
- Gordon, R.A. (1990). Anorexia and Bulimia: Anatomy of a Social Epidemic. Cambridge, MA: Basil Blackwell.
- Greenspan, M., Fitzsimmons, P., & Biddle, S. (1991). Aspects of psychology in sports medicine. British Journal of Sports Medicine, 25(4), 178-180.
- Hailey, B.J. & Bailey, L.A. (1982). Negative addiction in runners: A quantitative approach. Journal of Sport Behavior, 5(3), 150-154.
- Haller, E. (1992). Eating disorders: A review and update. The Western Journal of Medicine, 157(6), 658-662.
- Halmi, K.A. & Sunday, S.R. (1991). Temporal patterns of hunger and fullness ratings and related cognitions in anorexia and bulimia. Appetite, 16(3), 219-237.
- Hauck, E.R. & Blumenthal, J.A. (1992). Obsessive and compulsive traits in athletes. Sports Medicine, 14(4), 215-227.
- Holden, G. (1991). The relationship of self-efficacy appraisals to subsequent health related outcomes: A meta-analysis. Social Work in Health Care, 16(1), 53-93.
- Huon, G.F. & Brown, L.B. (1988). Fighting With Food: Overcoming Bulimia Nervosa. Sydney: University of New South Wales Press.

- Huon, G.F. & Wootton, M. (1991). The role of dietary carbohydrate and of knowledge of having eaten it in the urge to eat more. International Journal of Eating Disorders, 10(1), 31-42.
- Jaffe, J.H., Cascella, N.G., Kumor, K.M., & Sherer, M.A. (1989). Cocaine-induced cocaine craving. Psychopharmacology, 97(1), 59-64.
- Kagan, D.M. (1987). Addictive personality factors. Journal of Psychology, 121, 533-538.
- Katz, J.L. (1986). Long-distance running, anorexia nervosa, and bulimia: A report of two cases. Comprehensive Psychiatry, 27(1), 74-78.
- Kingery, P.M. (1990). Self-efficacy and the self-monitoring of selected exercise and eating behaviors of college students. Health Education, 21(1), 26-29.
- Krejci, R.C., Sargent, R., Forand, K.J., Ureda, J.R., Saunders, R.P., & Durstine, J.L. (1992). Psychological and behavioral differences among females classified as bulimic, obligatory exerciser, and normal control. Psychiatry, 55(2), 185-193.
- Kron, L., Katz, J.L., Gorzywnski, G., & Weiner, H. (1978). Hyperactivity in anorexia nervosa: A fundamental clinical feature. Comprehensive Psychiatry, 19(5), 433-440.
- Lacey, J.H. & Evans, C.D. (1986). The impulsivist: A multi-impulsive personality disorder. British Journal of Addiction, 81, 641-649.
- Lawrence, L. & McLeroy, K.R. (1986). Self-efficacy and health education. Journal of School Health, 56(8), 317-321.
- Leon, G.R. & Rosenthal, B.S. (1984). Prognostic indicators of success or relapse in weight reduction. International Journal of Eating Disorders, 3(4), 15-24.
- Lucas, A.R. (1992). The eating disorder "epidemic": More apparent than real? Pediatric Annals, 21(11), 746-751.
- Marlatt, G.A. & Gordon, J.R. (1979). Determinants of relapse: Implications for the behavior change. In P. Davidson (Eds.), Behavioral Medicine: Changing Health Lifestyles (pp. 410-452). New York: Brunner/Mazel.

- Mills, I.H. & Medlicott, L. (1992). Anorexia nervosa as a compulsive behavior disease. Quarterly Journal of Medicine, 84(303), 507-522.
- Morgan, W.P. (1979). Negative addiction in runners. The Physician and Sportsmedicine, 7(2), 57-70.
- Moriarty, D., Ford, C., & Rawlings, J. (1991). Recent Research on Eating Disorders and Body Image Distortion among Aerobic Dance Instructors and Exercise Participants. Canada. (ERIC Document Reproduction Service No. ED 335 601 CG 023 594).
- Morris, M., Steinberg, H., Sykes, E.A., & Salmon, P. (1990). Effects of temporary withdrawal from regular running. Journal of Psychomatic Research, 34(5), 493-500.
- Nagel, K.L. & Jones, K.H. (1992). Sociological factors in the development of eating disorders. Adolescence, 27(105), 107-113.
- Nash, H.L. (1987). Do compulsive runners and anorectic patients share common bonds? The Physician and Sportsmedicine, 15(12), 162-167.
- Nassar, M. (1988). Culture and weight consciousness. Journal of Psychomatic Research, 32, 573-577.
- O'Leary, A. (1985). Self-efficacy and health. Behavior Research Therapy, 23(4), 437-451.
- Prussin, R.A. & Harvey, P.D. (1991). Depression, dietary restraint, and binge eating in female runners. Addictive Behaviors, 16, 295-301.
- Prussian, R., Harvey, P., & DeGeronimo, D. (1992). Hooked On Exercise: How To Understand and Manage Exercise Addiction. Park Ridge, IL: Parkside.
- Rabinowitz, S., Melamed, S., Weisberg, E., Tal, D., & Ribak, J. (1992). Personal determinants of leisure-time exercise activities. Perceptual and Motor Skills, (Pt. 2), 779-784.
- Rohsenow, D.J., Monti, P.M., Abrams, D.B., Rubonis, A.V., Niaura, R.S., Sirota, A.D., & Colby, S.M. (1992). Cue elicited urge to drink and salivation in alcoholics: Relationship to individual differences. Advances in Behavior Research and Therapy, 14(3), 195-210.

- Sachs, M. L. & Pargman, D. (1979). Running addiction: A depth interview examination. Journal of Sport Behavior, 2, 143-155.
- Sallis, J.F., Hovell, M.F., & Hofstetter, C.R. (1992). Predictors of adoption and maintenance of vigorous physical activity in men and women. Preventative Medicine, 21(2), 237-251.
- Sallis, J.F., Hovell, M.F., Hofstetter, C.R., & Barrington, E. (1992). Explanation of vigorous physical activity during two years using social learning variables. Social Science and Medicine, 34(1), 25-32.
- Sallis, J.F., Pinski, R.B., Grossman, R.M., Patterson, T.L., & Nader, P.R. (1988). The development of self-efficacy scales for health-related diet and exercise behaviors. Health Education Research, 3(3), 283-292.
- Schernhorn, G. (1990). The addictive trait in buying behavior. Journal of Consumer Policy, 13(1), 33-51.
- Shannon, B., Bagby, R., Wang, M.Q., & Trenkner, L. (1990). Self-efficacy: A contributor to the explanation of eating behavior. Health Education Research, 5(4), 395-407.
- Slater, M.D. (1989). Social influences and cognitive control as predictors of self-efficacy and eating behavior. Cognitive Therapy and Research, 13(3), 231-245.
- Stanton, A.L. Garcia, M.E., & Green, S.B. (1990). Development and validation of the situational appetite measures. Addictive Behavior, 15, 461-472.
- Thompson, M.G. & Schwartz, D.M. (1982). Life adjustment of women with anorexia nervosa and anorexic-like behavior. International Journal of Eating Disorders, 1, 46-60.
- Tiffany, S.T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes. Psychological Review, 97(2), 147-168.
- Tiffany, S.T. (1992). A critique of contemporary urge and craving research: Methodological, psychometric, and theoretical issues. Advances in Behavior Research and Therapy, 14(3), 123-139.



- Vandereycken, W. (1990). The addiction model in eating disorders: Some critical remarks and a selected bibliography. International Journal of Eating Disorders, 9(1), 95-101.
- Veale, D.M.V. (1987). Exercise dependence. Addiction, 82, 735-740.
- Veale, D.M.W. (1991). Psychological aspects of staleness and dependence on exercise. International Journal of Sports and Medicine, 12(Suppl. 1), S19-S22.
- Wardle, J. (1987). Compulsive eating and dietary restraint. British Journal of Clinical Psychology, 26(1), 47-55.
- Weight, L.M. & Noakes, T.D. (1986). Is running an analog of anorexia? A survey of the incidence of eating disorders in female distance runners. Medicine and Science in Sports and Exercise, 19(3), 213-216.
- Wheeler, G.D., Wall, S.R., Belcastro, A.N., Conger, P., & Cummings, D.C. (1986). Are anorexic tendencies prevalent in the habitual runner? British Journal of Sports Medicine, 20(2), 77-81.
- Wilson, G.T. (1991). The addiction model of eating disorders: A critical analysis. Advances in Behavior Research and Therapy, 13(1), 27-72.
- Yates, A. (1991). Compulsive Exercise and the Eating Disorders. New York: Brunner/Mazel.
- Yates, A. (1992). Biologic considerations in the etiology of eating disorders. Pediatric Annals, 21(11), 739-744.
- Yates, A., Leehey, K., Shisslak, C. (1983). Running - An analogue of anorexia? The New England Journal of Medicine, 308(5), 251-255.
- Yordy, G.A. & Lent, R.W. (1993). Predicting aerobic exercise participation: Social cognitive, reasoned action, and planned behavior models. Journal of Sport and Exercise Psychology, 15, 363-374.

**APPENDIXES**

**APPENDIX A**

**INSTITUTIONAL REVIEW BOARD LETTER OF APPROVAL**

OKLAHOMA STATE UNIVERSITY  
INSTITUTIONAL REVIEW BOARD  
HUMAN SUBJECTS REVIEW

Date: 08-09-94

IRB#: ED-94-004

**Proposal Title:** THE RELATIONSHIP OF EATING SELF-EFFICACY,  
EXERCISE SELF-EFFICACY, EXERCISE DEPENDENCE, AND CHARACTERISTICS  
OF EATING DISORDERS IN FEMALE AEROBIC DANCE INSTRUCTORS

**Principal Investigator(s):** Betty Edgley, DawnElla M. Rust

**Reviewed and Processed as:** Exempt

**Approval Status Recommended by Reviewer(s):** Approved

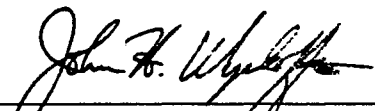
APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL. ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

---

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature:

  
\_\_\_\_\_  
Chair of Institutional Review Board

Date: March 31, 1994

**APPENDIX B**

**INFORMATION SHEET**

## INFORMATION SHEET

Hello, my name is DawnElla Rust. I am completing my doctorate in Health Promotions and I need your assistance. For completion of my degree I am conducting research on eating and exercise behaviors of college students. The questionnaire that will be distributed shortly is about you health behavior related to your diet and exercise. The information from this survey will be used to develop better educational programs related to diet and exercise.

Completing the questionnaire is voluntary. Whether or not you answer the questionnaire will not affect your standing in this class.

If you wish to participate DO NOT WRITE YOUR NAME ON THE QUESTIONNAIRE. The answers you give will be kept private. I do ask that you answer the questions based on what you really feel and do.

The questions that ask about you personally will only be used to describe the types of subjects completing the questionnaire. The information will not be used to find out your name. No names will be reported.

Place all your answers on the questionnaire. When finished, seal the questionnaire with the adhesive tabs provided and return it to me.

I will be glad to discuss the results of this survey with you at a later date. THANK YOU FOR YOUR TIME AND HELP!

**APPENDIX C**

**SITUATIONAL APPETITE MEASURE**

**PART I**  
**SAM-E**

People who are trying to lose weight often encounter situations in which they feel the urge to eat. Listed below are a number of such potential situations. Please read each item and rate the degree to which you feel confident that you could resist the urge to overeat in that situation by circling the number that corresponds to how you feel in that situation.

Extremely confident	Very confident	Moderately confident	Slightly confident	Not at all confident			
1	2	3	4	5			
9. When I am watching television.			1	2	3	4	5
10. When I pass a restaurant, store, or vending machine where food is available.			1	2	3	4	5
11. When my stomach growls.			1	2	3	4	5
12. When I want to reward myself for something good I've done.			1	2	3	4	5
13. When I just had an argument with someone.			1	2	3	4	5
14. When I get home from being at school or work.			1	2	3	4	5
15. When I am around food or food is easily available.			1	2	3	4	5
16. When I have stomach pains.			1	2	3	4	5
17. When something good has happened.			1	2	3	4	5
18. When I feel upset.			1	2	3	4	5
19. When it's late at night.			1	2	3	4	5
20. When I try to eat just a little of some good food.			1	2	3	4	5
21. When I feel hungry.			1	2	3	4	5
22. When I've succeeded at something.			1	2	3	4	5
23. When I am frustrated.			1	2	3	4	5
22. When I am relaxed and reading at home.			1	2	3	4	5
25. When I am cooking for others.			1	2	3	4	5
26. When I am "dying" of hunger.			1	2	3	4	5
27. When I have done well at work or on a test.			1	2	3	4	5
28. When I am worried.			1	2	3	4	5
29. When I am lying around at home.			1	2	3	4	5
30. When I am in a restaurant and I'm asked for my order, even when I'm not planning to eat.			1	2	3	4	5
31. When I have not eaten for a long time and I am craving something to eat.			1	2	3	4	5
32. When I have learned some good news.			1	2	3	4	5
33. When I feel nervous.			1	2	3	4	5
34. When I am unwinding at home.			1	2	3	4	5
35. When I see others eating.			1	2	3	4	5
36. When I am "starving".			1	2	3	4	5
37. When I feel good about having done something well.			1	2	3	4	5
38. When I feel angry with myself.			1	2	3	4	5



**PART II**  
**SAM-U**

People who are trying to lose weight often encounter situations in which they feel the urge to eat. Listed below are a number of such potential situations. Please read each item and rate the degree to which you feel the urge to eat in that situation by circling the number that corresponds to how you feel in that situation.

No urge	Slight urge	Moderate urge	Strong urge	Extreme urge
1	2	3	4	5
39. When I am watching television.			1 2 3 4 5	
40. When I pass a restaurant, store, or vending machine where food is available.			1 2 3 4 5	
41. When my stomach growls.			1 2 3 4 5	
42. When I want to reward myself for something good I've done.			1 2 3 4 5	
43. When I just had an argument with someone.			1 2 3 4 5	
44. When I get home from being at school or work.			1 2 3 4 5	
45. When I am around food or food is easily available.			1 2 3 4 5	
46. When I have stomach pains.			1 2 3 4 5	
47. When something good has happened.			1 2 3 4 5	
48. When I feel upset.			1 2 3 4 5	
49. When it's late at night.			1 2 3 4 5	
50. When I try to eat just a little of some good food.			1 2 3 4 5	
51. When I feel hungry.			1 2 3 4 5	
52. When I've succeeded at something.			1 2 3 4 5	
53. When I am frustrated.			1 2 3 4 5	
54. When I am relaxed and reading at home.			1 2 3 4 5	
55. When I am cooking for others.			1 2 3 4 5	
56. When I am "dying" of hunger.			1 2 3 4 5	
57. When I have done well at work or on a test.			1 2 3 4 5	
58. When I am worried.			1 2 3 4 5	
59. When I am lying around at home.			1 2 3 4 5	
60. When I am in a restaurant and I'm asked for my order, even when I'm not planning to eat.			1 2 3 4 5	
61. When I have not eaten for a long time and I am craving something to eat.			1 2 3 4 5	
62. When I have learned some good news.			1 2 3 4 5	
63. When I feel nervous.			1 2 3 4 5	
64. When I am unwinding at home.			1 2 3 4 5	
65. When I see others eating.			1 2 3 4 5	
66. When I am "starving".			1 2 3 4 5	
67. When I feel good about having done something well.			1 2 3 4 5	
68. When I feel angry with myself.			1 2 3 4 5	

APPENDIX D

DEMOGRAPHIC SHEET

**PART III  
DEMOGRAPHICS**

69. Your age: \_\_\_\_\_ years \_\_\_\_\_ months
70. Gender: \_\_\_\_\_ female \_\_\_\_\_ male
71. Marital status: \_\_\_\_\_ single \_\_\_\_\_ remarried  
 \_\_\_\_\_ married \_\_\_\_\_ committed  
 \_\_\_\_\_ separated \_\_\_\_\_ relationship  
 \_\_\_\_\_ divorced \_\_\_\_\_ other
72. Residence: \_\_\_\_\_ on campus \_\_\_\_\_ off campus  
 \_\_\_\_\_ commuter (out of town)
73. Do you exercise? \_\_\_\_\_ yes \_\_\_\_\_ no
74. If yes, approximately how many minutes per week do you participate in each activity?
- |                        |               |
|------------------------|---------------|
| bicycling (stationary) | _____ minutes |
| bicycling (outdoor)    | _____ minutes |
| walking                | _____ minutes |
| jogging/running        | _____ minutes |
| swimming               | _____ minutes |
| weight training        | _____ minutes |
| aerobics               | _____ minutes |
| others (specify):      |               |
| _____                  | _____ minutes |
| _____                  | _____ minutes |
| _____                  | _____ minutes |
| _____                  | _____ minutes |
75. Which category do you feel best describes you and your exercise habits?
- |       |   |
|-------|---|
| _____ | Sedentary (never exercise)                      |
| _____ | Occasional exerciser (less than once a week)    |
| _____ | Low level exerciser (2-3 times/week, 30 min.)   |
| _____ | Moderate exerciser (4-5 times/week, 30-45 min.) |
| _____ | Heavy exerciser (daily, 45-60 min.)             |
76. How long have you been exercising regularly?  
 (three or more times per week considered regular exercise)  
 \_\_\_\_\_ months
77. Has your past experience with exercise been successful?  
 \_\_\_\_\_ yes \_\_\_\_\_ no
78. Has your past experience with weight control been successful?  
 \_\_\_\_\_ yes \_\_\_\_\_ no
79. Your weight: \_\_\_\_\_ lbs.

2  
VITA

DawnElla Marie Rust

Candidate for the Degree of

Doctor of Education

Thesis: THE RELATIONSHIP AMONG EATING SELF-EFFICACY,  
EATING URGES, AND EXERCISE CATEGORY OF COLLEGE  
STUDENTS

Major Field: Higher Education

Minor Field: Health Promotion

Biographical:

Personal Data: Born in Liberal, Kansas, August 16,  
1963, the daughter of William R. and Laura L.  
Braley. Married to Raymond (Rusty) H. Rust III  
on June 2, 1990. Have one dog, Outback, born  
September 30, 1991.

Education: Graduated from Gage High School, Gage,  
Oklahoma in May, 1981; received a Bachelor of  
Science Degree in Health Education from  
Oklahoma State University in December 1986;  
received Master of Science Degree from Emporia  
State University in May 1989; received Doctor  
of Education Degree from Oklahoma State  
University in July 1994.

Professional Experience: Research Assistant, Emporia  
State University, August 1987 to May 1989;  
Exercise Specialist, Diabetes Treatment Center,  
September 1989 to January 1990; Supervisor,  
Kerr-McGee Corporate Fitness Center, January  
1990 to May 1991; Graduate Assistant, Oklahoma  
State University Wellness Center, May 1991 to  
July 1993; Teaching Assistant, Oklahoma State  
University, August 1993 to 1994.

Professional Organizations: American Alliance of  
Health, Physical Education, Recreation, and Dance;  
Phi Epsilon Kappa, Honorary Health and Physical  
Education Fraternity.