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**DIFFERENCES IN PERCEPTUAL AND SUBJECTIVE BODY IMAGE
BETWEEN WEIGHT CYCLING AND NONCYCLING
GRADUATE STUDENTS**

by

Karen Casebeer

**A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
Department of Counselor Education
and Counseling Psychology**

**Western Michigan University
Kalamazoo, Michigan
December 1997**

DIFFERENCES IN PERCEPTUAL AND SUBJECTIVE BODY IMAGE BETWEEN WEIGHT CYCLING AND NONCYCLING GRADUATE STUDENTS

Karen Casebeer, Ed.D.

Western Michigan University, 1997

This research began as an exploratory investigation into body image differences between individuals who were weight cyclers and those who were non-cyclers. Participants were female and male graduate students ($n=444$) who completed the Multidimensional Body-Self Relations Questionnaire (Cash, 1990a), the Contour Drawing Rating Scale (M.A. Thompson & Gray, 1995), and the Weight History Questionnaire (WHQ), a researcher developed self-report survey of weight, dieting, and demographic information. Data gathered from the WHQ were used to identify pairs of individuals who were matched on cycling status, gender, age, and body mass index. Fifteen such pairs were identified and matched among the females; however, due to lower numbers of males in the sample and also lower levels of weight cycling and dieting among these males, the matching process was not able to be accomplished for the males. Therefore, the study was completed only with the female portion of the sample. Data gathered from two body image measures were analyzed using correlated samples t -tests with the researcher controlling for an overall experimental error rate of 5%. Findings indicated there were statistically significant differences between female weight

cyclers and noncyclers on seven of 12 body image variables, including appearance evaluation, body-size dissatisfaction, body-areas satisfaction, health evaluation, body-size perception, self-classified weight, and overweight preoccupation. These finding support other empirical and clinical accounts which attest to the psychologically disruptive force of weight change and weight cycling on various facets of body image.

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ACKNOWLEDGEMENTS

Many individuals have offered wise and supportive counsel during my doctoral program and dissertation process. I wish to acknowledge this assistance with heartfelt appreciation.

Several people have contributed to the "nuts-and-bolts" aspects of this research project. Early in my graduate training, Dr. Jim Croteau gave strong encouragement both to my academic writing endeavors and to continued doctoral work when I wavered on that intent. Dr. John Geisler played an important role in helping me sort out the many designs and statistical analyses possible for this project. Dr. Carman Stark was invaluable with his technical assistance regarding word processing and computer usage. P. J. Albro was very helpful in duplicating and collating the questionnaires used in the investigation. Julie Scott provided excellent statistical consultation throughout the design and analysis portions of this project. And finally, my research assistant Lynne Stevens deserves special appreciation for all her efforts prior to and during the data collection process. Your work, Lynne, was truly an important and integral part of this research study.

I also acknowledge the excellent consultation provided by my two internship supervisors, Dr. John Howie and Dr. Merry Carson. Both of these individuals furnished me with learning experiences which matched my needs and challenged me to stretch into new growth areas. Thank you for your wisdom,

Acknowledgements--Continued

honesty, kindness, and friendship.

I also wish to honor the work of my committee members: Dr. Elaine Phillips, Dr. Edward Trembley, and Dr. Suzanne Hedstrom, my advisor and chairperson. You have each been helpful in providing support, fresh ideas to my perspectives, and discriminating opportunities for new learning and self-understanding. Suzanne, especially, you have offered a unique blend of professional expertise and personal caring; these abilities have encouraged me throughout my program.

And finally, I wish to acknowledge my dear friends, Catherine Ellis and Alma Muxlow. Thank you both for serving as steadfast personal foundations while I have been completing this passage.

While gratitude is freely acknowledged to the individuals involved in this dissertation process, I alone take full responsibility for what has been written here.

Karen Casebeer

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CHAPTER I

INTRODUCTION

Background of the Problem

Dieting is a widely prevalent phenomenon in American culture. Two recent national surveys indicated that approximately 24% of men and 40% of women were currently trying to lose weight (Brownell & Rodin, 1994a). Another study tracking the dieting practices among high school students, found 63% of high school girls and 16.2% of high school boys were on diets (Rosen & Gross, 1987). Surveys consistently have shown that at least half of the young women questioned were actively engaged in weight loss efforts (Polivy & Herman, 1992). These high rates of dieting become even more troublesome when compared to current obesity rates of approximately 34% (D. F. Williamson, 1995b). Dieting is clearly a common practice, even in the nonobese, and particularly among women.

Both cultural factors and health concerns appear to fuel this widespread dieting phenomenon. Cultural norms idealizing an extremely thin aesthetic appearance force women to resort to repeated dieting in order to achieve thinness when their bodies actually dispose them to be heavier because of fat composition, metabolic rate, and set point (Brownell, 1991; Brownell & Rodin, 1994a;

McNamara, 1989; Rothblum, 1994). These cultural norms are further supported by a \$30 billion per year weight loss industry that supplies diet books, programs, videos, foods, pills, and devices to those trying to lose weight (Brownell & Rodin, 1994a). Health concerns also have contributed to this extensive occurrence of dieting. Serious health risks, such as hypertension, hypercholesterolemia, coronary heart disease, and diabetes, have been associated with being overweight (Manson et al., 1990; Van Itallie, 1985) and dieting has been the regularly recommended form of treatment for weight loss (Brownell & Rodin, 1994a; Brownell & Wadden, 1991, 1992; Foreyt, 1987; Wing, 1992).

Recently, however, the efficacy of dieting as a weight loss method has been called into question. Goodrick and Foreyt (1991) cited only a 5% success rate of significant and lasting weight losses for individuals participating in behavioral self-management training, considered the state of art obesity treatment method. Grilo, Shiffman, and Wing (1989) also reported low dieting weight loss success rates with the majority of individuals who lose weight relapsing within 6 months. Garner and Wooley (1991) concluded that "decades of research on the biology of weight reduction make clear the unlikelihood of success with dietary treatment" for obesity (p. 729).

In addition to the evidence that diets have been ineffective treatment methods for obesity, some researchers and practitioners in the obesity treatment field (Bouchard, 1991; Bray, York, & DeLany, 1992; Brownell & Rodin, 1994b; Burgard & Lyons, 1994; Rossner, 1989; Wing, 1992, 1993) have even voiced

concern that risks may be associated with these highly prevalent repeated cycles of weight loss and regain, known as weight cycling or yo-yo dieting (Brownell & Rodin, 1994a, 1994b). These possible risks include whether weight cycling has physiological effects, such as metabolic consequences or increased vulnerability to morbidity or mortality, or psychological effects, such as lower life satisfaction, increased depression, and more disturbed eating patterns (Brownell, 1995b; Brownell & Rodin, 1994a, 1994b; Foreyt et al., 1995; Wing, 1992).

One possible psychological effect of weight cycling which has not been investigated much is the association between weight cycling and body image. Body image has been defined as "the psychological aspects of body experience, or the mental image the individual has of the physical appearance of his or her body" (Rosen & Srebnik, 1990, p. 246). Body image is generally considered to have at least two dimensions: a perceptual aspect involving body size distortion, and a subjective (attitudinal/cognitive/affective) aspect encompassing evaluation, disparagement, and/or aggrandizement of the body (Garner & Garfinkel, 1981; Rosen & Srebnik, 1990; J. K. Thompson, 1990, 1996a). Just as dieting and weight cycling have been associated with disordered eating practices (Brunner et al., 1994; Heatherton, Polivy, & Herman, 1991; Kiernan, Rodin, Brownell, Wilmore, & Crandall, 1992; Polivy & Herman, 1985; Rodin, Schank, & Striegel-Moore, 1989; Striegel-Moore, Silberstein, & Rodin, 1986), disturbance of body image has also been strongly associated with disordered eating (J. K. Thompson, 1990; 1996b). In fact, the Diagnostic and Statistical Manual of Mental Disorders

(DSM-IV) includes disturbance of body image in the criteria for both anorexia nervosa and bulimia nervosa (American Psychiatric Association, 1994). But disturbance of body image is not exclusive to individuals with eating disorders. Rodin, Silberstein, and Striegel-Moore (1985) have labeled the pervasiveness of body size dissatisfaction among normal weight, non-eating disordered women as a "normative discontent" (p. 267).

With both weight cycling and body image dysphoria being so commonplace among both normal weight and eating disordered women, one wonders what association exists between these two constructs. Wooley and Wooley (1985) obliquely address this association between weight cycling and body image as they describe the circumstances facing young women of today:

. . . modern women have experienced life in many "bodies." Before the advent of widespread dieting, the experience of the body was relatively continuous for most women, marked only by the gradual change of normal growth, by a period of rapid qualitative as well as quantitative changes at puberty, and by pregnancy. . . . For young women today, the trauma of puberty is typically compounded by a discontinuous experience of the physical self. The majority of young adolescents go on weight loss diets, and, of course, the majority of weight loss diets are followed by regain of the lost weight, often with an "overshoot." Thus by midadolescence young women have cognitive and sensory memories of many forms of the body-self. This constant change may set the stage for the development of persistent susceptibilities to distortion. The individual's dissatisfaction with her body at the beginning of dieting may be relatively casual; but, whether it is great or not, it becomes intensified as a result of dieting and weight fluctuation. (p. 397)

In her qualitative study of eating problems among African American, Latina, and lesbian women, B. W. Thompson (1994) also describes the consequences of weight loss and gain on a woman's sense of her body's shape and size,

stating that "substantial and recurrent weight fluctuation raises complicated and painful questions about what it means to be 'embodied' since a woman's possession of a significant portion of her body may be in constant flux" (p. 20). She further asserts that "sudden weight gain and loss leaves a woman little time to adjust to changes in her body dimensions" (p. 40).

In his essay which attempts to conceptualize the nature of body image, Slade (1994) conceives of body image as a "loose mental representation of the body" (p. 500) which is influenced by several sets of factors, including a history of weight change and fluctuation. Slade asserts that anorectic and obese individuals have the most variable body image because "these are people who are most likely to have experienced major fluctuations in weight, the effect of which can be construed as loosening body image and leading to a broader 'finite range/band'" (p. 500).

In their articulation of several integrative themes emerging in the body image literature, Pruzinsky and Cash (1990) also have described the effect various trajectories have on body image change. These authors assert that gradual changes are more easy to assimilate psychologically than abrupt ones. One example of body image trajectory they describe regards vestigial body images in formerly overweight individuals who lose a great deal of weight, yet retain an image of themselves as still being overweight. Cash, Counts, and Huffine (1990) investigated these current and vestigial effects of overweight among women with respect to fear of fat, attitudinal body image, and eating behaviors. These researchers

found that normal weight women who had previously been overweight were more similar in body image parameters to currently overweight women than to normal weight women without an overweight history. Their results indicated that much of the "adverse body experience may not be shed with weight loss" (p. 164). In describing the limitations of their research, however, Cash et al. reported that the weight history questionnaire used in the study did not adequately describe the duration and fluctuation of overweight states. They further hypothesized that weight cyclers "who repeatedly lose and regain weight may be especially susceptible to body-image dysfunctions" (p. 165). The researchers recommended that future studies should assess weight history more precisely to ascertain the vestigial importance of prior weight loss. In a second study on body image and weight change, Cash (1994a) prospectively investigated obese participants' weight and body image changes over the course of a comprehensive very-low-calorie-diet (VLCD) program. Contrary to the prior, but limited research on the vestigial effects of weight loss, Cash found that clients who completed the reduction phase were improved in their feelings about their appearance, and had closer congruence between their perceived and ideal body size. These successful reducers continued, however, to remain as weight vigilant and weight phobic as when they entered the program. Cash furthermore reported that clients who experienced a modest but significant weight regain, also showed a significant, partial decline in their feelings about their appearance. Cash concluded:

Although weight loss fosters body-image improvements, such changes may be quite fragile. Clients may be as susceptible to body-image relapse as

they are to regaining weight. Indeed, the vestigial body-image phenomenon may actually involve this subtle sense of a precarious body image, rather than ubiquitous body-image disparagement, and may mirror self-perceived vulnerability to regain weight following its loss. (p. 251)

Cash again called for an examination of "body-image experiences in relation to weight histories (e.g., frequency of weight cycling)" (p. 251).

Clearly, there is a dearth of empirical research on what relationships might exist between weight cycling and body image. The research which currently exists often does not adequately or consistently assess the weight history of subjects with respect to the magnitude, frequency, intentionality, and fluctuations of their overweight states. Additionally, the present body of literature concerning weight cycling and body image has been directed only toward females. While cultural factors certainly have made females more vulnerable to dieting, body image disturbance, and eating disorders, some men are also susceptible to these concerns and the number of men with eating disorders appears to be increasing (J. K. Thompson, 1996b). Exploratory research on the relationship between weight cycling and body image in both women and men would answer some basic questions about the workings of these two constructs together, provide a foundation for future studies about weight cycling and body image, and inform clinical practice about treating individuals with eating and body image concerns.

Purpose of This Research

This research was designed to explore differences in body image between individuals who were weight cyclers and those who were noncyclers. It was

unique from previous studies in several ways. First, it investigated two constructs commonly prevalent in people with eating problems which had received little prior empirical inquiry together. This research also obtained fuller weight cycling histories from its participants than in some previous studies. Third, this research investigated differences on both perceptual and subjective measures of body image disturbance between weight cycling and noncycling groups. Finally, this research included both female and male individuals in its sample. While prior studies incorporated one or two aspects of this investigation, no research has examined the differences between weight cycling and noncycling in females and males on both perceptual and subjective measures of body image.

Overview of the Research Design

The basic design of this observational study was an analysis of the differences between weight cycling and noncycling individuals on perceptual and subjective measures of body image. Participants were male and female graduate students from the colleges of education and business at a large midwestern state-supported university. Thorough weight cycling histories for all participants were gathered following the completion of the Weight History Questionnaire (WHQ). Data gained from this researcher-developed self-report questionnaire were used to find pairs of females and males who were matched on cycling status, age, and body mass index (BMI). Participants also completed two body image measures: (1) the Contour Drawing Rating Scale (CDRS) (M. A. Thompson & Gray, 1995),

and (2) the Multidimensional Body-Self Relations Questionnaire (MBSRQ) (Cash, 1990a). The CDRS was used to assess body size perception and dissatisfaction. Using this procedure, participants first chose a female or male silhouette ranging from very thin (1) to obese (9) which reflected their current body size (CBS) and then a second silhouette which reflected their ideal body size (IBS). A discrepancy score (CBS-IBS) was also calculated. The MBSRQ was the second body image instrument used; it is a self-report inventory measuring attitudes toward various body areas, weight, and three somatic domains: (1) physical appearance, (2) fitness, and (3) health. Within each of the three domains, there are also two subscales: (1) evaluation (extent of satisfaction), and (2) orientation (degree of importance and attention paid to the domain). Both the CDRS and MBSQR were chosen as the body image measures because of their availability for use with both female and male subjects, acceptable psychometric qualities, and ease of administration. Data gathered from these two measures were statistically analyzed for differences between weight cyclers and noncyclers using correlated samples *t*-tests.

Research Questions

This study investigated two research questions:

1. Do adult female weight cyclers differ from adult female noncyclers on perceptual and subjective measures of body image?
2. Do adult male weight cyclers differ from adult male noncyclers on

perceptual and subjective measures of body image?

Definition of Terms

In this section, the researcher defines the terms most often used throughout this study.

1. Weight cycling, also commonly known as yo-yo dieting, refers to repeated cycles of weight loss and regain (Brownell & Rodin, 1994a, 1994b). For the purposes of this research, the following four responses from the WHQ defined weight cyclers as individuals who over the last 5 years: (1) reported patterns of steady gain or fluctuation in weight; (2) dieted very often, often, or sometimes; (3) yo-yo dieted a great deal, moderately, or somewhat; and (4) had gone through a minimum of 4-6 cycles of dieting, losing at least 10 pounds, and then regaining all or most of the weight lost. Additionally, these four weight change responses were not related to any medical conditions present during the 5 year span of time.

2. Noncyclers do not have repeated cycles of weight loss and regain. In this study, the following four responses from the WHQ defined noncyclers as individuals who over the last 5 years: (1) have had stable weight; (2) rarely or never dieted; (3) yo-yo dieted very little or not at all; and (4) had gone through zero or one cycle of dieting, losing, and regaining at least 10 pounds.

3. Body image is defined as "the psychological aspects of body experience, or the mental image the individual has of the physical appearance of his or her

body" (Rosen & Srebnik, 1990, p. 246).

4. Perceptual body image is the accuracy of body-size perception as determined by the selection of the current body size silhouette of the CDRS and the self-classified weight scale of the MBSRQ.

5. Subjective or attitudinal body image is the satisfaction individuals have toward their body size and specific body parts (Heinberg, 1996). It was measured two ways in this research: (1) the discrepancy between the current body size and the ideal body size on the CDRS; and (2) the body areas, overweight preoccupation, and somatic domain scales on the MBSRQ.

6. Body mass index (BMI) is a common index of adiposity and is expressed as weight in kilograms per height in meters squared (D. F. Williamson, 1995b).

Outline of the Dissertation

Chapter II of this dissertation reviews the related literature on the weight cycling and body image constructs. The weight cycling section examines the physiological and psychological risks associated with weight cycling. The body image section provides an overview of the conceptualization and assessment of body image, and also reviews the manifestation of body image in various populations, including eating disordered, obese, and nonclinical groups. Chapter III explains the methodology associated with this research. Included are the research design, participants, instrumentation, data analysis, and limitations of the study. Chapter

IV presents the findings of the study. Chapter V summarizes the research, discusses the findings, and offers final recommendations.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The purpose of this chapter is to examine the empirical and nonempirical literature concerning weight cycling and body image. In reviewing the weight cycling literature, particular attention will be paid to what physiological and psychological risks are associated with a history of repeated bouts of weight loss and regain (weight cycling). Several methodological limitations existing in the current research on weight cycling will also be addressed. In the review of the body image literature, consideration will be given to the conceptualization and the assessment of body image, and also to the manifestation of body image in various populations, including eating disordered, obese, and nonclinical groups.

Weight Cycling

Physiological Effects

Although weight cycling has emerged as a research topic only since the mid-1980s, considerable attention has been directed to the subject in just one decade (Brownell, 1995b). Most of that attention has focused on whether physiological risks are associated with a history of weight cycling. This section reviews the literature on the physiological risks of weight cycling, concentrating on

metabolic consequences and health-related outcomes.

Metabolic Consequences

Early research on the possible metabolic consequences of weight cycling focused on whether a history of weight cycling inhibited future efforts at weight loss and whether weight cycling altered the resting metabolic rate, and thus the rate of weight loss and regain (Wing, 1992). Other research investigated possible changes in body composition and distribution of body fat that might be associated with weight fluctuations.

Inhibition of Future Weight Loss Efforts. In their study which analyzed demographic, social, psychological, and behavioral correlates of weight loss and maintenance in a group of 89 middle-aged men, Jeffery et al. (1984) found that those participants who had never previously participated in a weight-loss program lost significantly more weight initially and through each follow-up period. While this early study stimulated thought that a history of prior dieting might inhibit future weight loss efforts, it was not a good measure of that supposition since it "compared two groups of men who might differ from each other on many dimensions, and did not directly address the question of repeated bouts of weight loss in the same individual" (Wing, 1992, p. 113).

Blackburn et al. (1989) attempted to address this issue of the effect of weight cycling on the rate of weight loss in the same individual through their retrospective study of 43 obese outpatient individuals and 14 obese inpatient

individuals who had lost weight on very-low-calorie-diet (VLCD) programs, regained at least 20% of their weight loss, and then had undergone the same treatment a second time. The authors also made an effort to include for data interpretation only those individuals who had demonstrated adherence to both diets by losing a minimum of 1 kg/wk and exhibiting < 1 mmol ketones in a hydrogen breath test. Blackburn et al. found that the velocity of weight loss was significantly slower in the second cycle of dieting than in the first for both the inpatient and outpatient samples and concluded that a slowing of the rate of weight loss had occurred with successive diets, perhaps due to the body's response to dieting the way it does to famine by increasing food efficiency and decreasing energy expenditure. In interpreting the results of these data, Wing (1992) urged some caution since the patients were older on the second diet than on the first, the time between the two diets differed dramatically, and the percent of weight loss regained between the two diets varied tremendously.

Beeson, Ray, Coxon, and Kreitzman (1989) also examined whether rates of weight loss are compromised after two similar clinical trials using a VLCD regimen. In their study, four subjects participated in an 8-week trial of the 330 calorie per day Cambridge Diet, followed 18 months later by an additional 8-week trial of the 405 calorie per day Cambridge Diet Extra. Variable weight regain occurred in the participants between the two trials. The authors found that the percent of body weight reduction was identical for the two diet regimens and concluded that there was no impairment in ability to lose weight in

subsequent dieting after weight loss on a VLCD. Although the results of this study challenge some assumptions made about the negative effect of weight cycling on future weight loss efforts, the power of this study is limited by the sample size of only four subjects.

In another study also using a small sample, van Dale and Saris (1989) followed 6 females with a history of dieting and weight regain (yo-yo dieters) and 14 female non-yo-yo subjects through a regimen of diet and exercise and then compared the two groups on body composition, resting metabolic rate (RMR), and lipolytic activity of abdominal adipocytes. The authors observed no differences in weight losses at 5 weeks and at 14 weeks between the yo-yo dieters and the non-yo-yo dieters and thus did not find support that weight cycling inhibited future weight loss efforts.

Similar to the study of van Dale and Saris (1989), but using a larger sample size of 50 subjects, Wadden et al. (1992) also examined the influence of dieting history on weight loss in a subsequent clinical trial, which combined behavior therapy and a VLCD as the treatment approach. Wadden et al. observed no statistically significant relationships between dieting history and weight loss and concluded that a history of weight cycling was not associated with an impaired ability to lose weight.

Of the four studies which attempted to discover whether a history of weight cycling inhibited future weight loss efforts, three found no difference in weight loss between cyclers and noncyclers or between individuals who

participated in two separate diet regimens. However, two of the three studies which found no differences must be viewed with caution due to the poor statistical power associated with small sample sizes.

Alteration of Metabolic Rate. Since weight losses and weight gains are accompanied by metabolic adaptations designed to restore body weight equilibrium or set point (Garner, Rockert, Olmsted, Johnson, & Coscina, 1985), some researchers have hypothesized that repeated cycles of weight loss and regain might also alter the metabolic rate by increasing the efficiency of food utilization, thus becoming the mechanism which makes future weight loss efforts more difficult (Brownell & Rodin, 1994a, 1994b; Jebb, Goldberg, Coward, Murgatroyd, & Prentice, 1991; Manore, Berry, Skinner, & Carroll, 1991; Steen, Oppliger, & Brownell, 1988; van Dale & Saris, 1989; Wadden et al., 1992; Wing, 1992, 1993). Several studies have investigated this potential relationship between weight cycling and metabolic rate. In two previously described studies, van Dale and Saris found no significant differences between yo-yo dieters and non-yo-yo dieters in RMR at baseline and during the experimental period of weight loss, and Wadden et al. reported that in their sample of 50 obese women, the total number of diets and life-time weight loss were not significantly associated with a reduced RMR.

In a third study assessing the effects of repeated periods of dieting on permanent or cumulative changes in metabolic rate, Jebb et al. (1991) investigated 11 obese women who had participated in an 18 week treatment program consisting of three consecutive cycles of 2 weeks of a VLCD (445 calories per day)

followed by 4 weeks of ad libitum (free) eating. Basal metabolic rates were measured by continuous indirect whole-body calorimetry at the beginning and end of the study, at the end of each diet period, and at the end of the ad libitum eating periods. Mean weight loss on the three consecutive diet cycles were 4.44 kg, 3.29 kg, and 2.98 kg, respectively. The authors clarified that the differences in weight loss between the three diet cycles were due to differences in adherence to the regimen and not to differences in metabolic rate. Although Jebb and her colleagues found that basal metabolism rates decreased during the periods of dieting and weight loss, they returned to normal after each ad libitum eating period. They concluded that in this group of obese women there was no evidence that repeated cycles of energy restriction and free eating led to decreases in metabolic rate. Wing (1992) found this study important because it prospectively assessed the effect of weight cycling on metabolism, and she encouraged that it be repeated in a hospital setting with tighter controls for dietary adherence.

In contrast to these three studies which investigated the effects of weight cycling on metabolic rates in obese women, Manore et al. (1991) examined these same variables in normal weight females. Using a sample of 11 nonobese female cyclical dieters who had dieted for 7-10 days at least four times during the past year and a control group of 12 nondieting women, the researchers determined the subjects' resting energy expenditures by indirect calorimetry on two separate occasions. The authors reported that since the resting energy expenditures were not significantly different between the two groups, dieting did not appear to increase

metabolic efficiency at rest.

Steen et al. (1988) also tested the hypothesis that repeated cycles of weight loss and regain would be associated with reduced metabolic rates, but they used a sample of adolescent wrestlers. Adolescent wrestlers were chosen as subjects for this study because they typically restrict food and fluid to "make weight" for competitions. The researchers used indirect calorimetry to measure the RMRs of a sample of 27 high school wrestlers and found the rates of the wrestlers with high cycling frequency were significantly lower than those of the noncyclers. While these data suggested that weight cycling might be the mechanism producing a decline in metabolic rate, Steen et al. have cautioned that the low metabolic rates might have preceded the weight cycling and made the dieting necessary for these cycling wrestlers to achieve a competitive weight class.

Of the five studies which examined the relationship between weight cycling and metabolic rate, four revealed no evidence that weight cycling affected RMR. Only the Steen et al. (1988) research provided any support for weight cycling being associated with reduced energy requirements. Wing (1992), however, urged caution in interpreting this study as support for weight cycling being related to lowered RMRs, since this sample consisted of subjects who were young, lean, and physically fit, used dehydration and strenuous exercise to lose weight, and thus were very different metabolically from typical older, obese individuals.

Changes in Body Composition. Another concern about the effects of weight cycling involves the potential changes a history of weight cycling has on

body composition. Brownell and Rodin (1994b) reported that while individuals lose both lean and fat tissue during weight loss, little is known about weight regain. They hypothesized that "if more body fat is regained than is lost originally, successive cycles of loss and regain would lead to altered body composition" (p. 1328). Four previously described studies (Jebb et al. 1991; Manore et al., 1991; van Dale & Saris, 1989; Wadden et al., 1992) and one additional study (Prentice et al., 1992) have investigated whether a history of weight cycling resulted in changed body composition.

Jebb and her colleagues (1991) determined the body composition of their 11 subjects at the beginning and end of the study by a variety of standard methods, including underwater weighing and skinfold thickness calibrations, and found they did not lose an excessive proportion of lean tissue as a consequence of weight cycling. van Dale and Saris (1989) and Wadden et al. (1992) also concluded that weight cycling did not lead to an increase in proportion of body fat. In contrast, Manore and her colleagues (1991) found that the nonobese cyclical dieters in their sample had more body fat than the nondieting control subjects, and offered that "repeated bouts of dieting (approximately four diets per year) in the cyclical dieters could be one explanation for their greater body fat" (p. 44).

Prentice and his colleagues (1992) used two separate studies to examine the relationship of weight cycling to long-term changes in body composition. In the first, the authors presented data from longitudinal studies conducted in a rural African village where inhabitants undergo profound weight cycling caused by an

annual "hungry season" occurring when the yearly food supplies have run out. Prentice et al. reported that this hungry season resulted in average seasonal weight fluctuations of 6 kg for women of child-bearing age and a cycling of 50-60% of their fat stores each year. From examinations of cross-sectional data on body composition, as assessed by measurements of four skinfold-thickness sites, the researchers observed no more of a detrimental effect of this seasonal weight cycling on loss of lean tissue than in noncycling populations. Prentice et al. also presented data from an 18-week prospective study in which 11 moderately obese women underwent three 2-week cycles of VLCD-induced weight loss followed by two 4-week periods of free eating. These researchers assessed body composition changes by a variety of standard techniques and found no evidence of an excessive loss of lean tissue as a result of the simulated weight cycling procedures.

In the literature examining whether successive cycles of weight loss and regain would lead to altered body composition, five of the six studies clearly point to no differences in body composition between cycling and noncycling individuals. Only in the study of nonobese women by Manore and her colleagues (1991) did the researchers report that cyclical dieters had a higher percentage of body fat than the nondieters.

Distribution of Body Fat. Another important question about the possible effects of weight variability concerns whether a history of weight cycling changes body fat distribution. Wing (1992) explained that understanding the association between weight cycling and body fat distribution is important because "upper body

fat obesity, in which there is increased fat in the abdominal area relative to the gluteal area, has been shown to be related prospectively to the development of diabetes and coronary heart disease and to overall mortality" (p. 115).

Two previously described studies evaluated this relationship between weight cycling and body fat distribution as measured from calculations of the waist-to-hip ratio (WHR). van Dale and Saris (1989) reported no differences in fat distribution between the yo-yo and non-yo-yo dieters in their sample of 20 women. Wadden et al. (1992) also found that weight cycling was not associated with increased abdominal obesity in their prospective clinical trial with 50 obese women.

In contrast to these two studies, Rodin, Radke-Sharpe, Rebuffe-Scrive, and Greenwood (1990) found that a higher WHR was significantly associated with a higher degree of weight cycling. Using a sample of 87 normal weight women aged 21 to 40, the researchers used a trained anthropometrist to determine each subject's WHR. They also asked the subjects to respond to a series of questions concerning their history of weight variability, including the magnitude (0-5 lb, 5-10 lb, etc.) and frequency (never, 1-5, 6-10 times) of weight loss, both in an average year and in the subjects' lifetime. From the responses to these questions, Rodin et al. developed a weight cycling index by multiplying the median amount of weight loss by the number of times that weight loss was achieved, summed over the various weight loss categories. Using standard correlation analysis, the authors found a positive association ($r = .37$) between WHR and the incidence

of weight cycling, and suggested that repeated bouts of weight loss and regain may promote abdominal adiposity and possible risks to health.

Jeffrey, Wing, and French (1992) used a sample of 101 obese men and 101 obese women to examine the relationship between weight cycling and various cardiovascular risk factors, including blood pressure, cholesterol, triglycerides, glucose values, WHR, and percent of dietary calories from fat. Using standard procedures, all subjects were assessed for the six risk factors and completed three measures of weight cycling. Jeffrey and his colleagues reported no evidence that weight cycling was adversely associated with increased cardiovascular risk factors, including a higher WHR.

Lissner, Andres, Muller, and Shimokata (1990) investigated the association between weight fluctuation and "intermediate" health endpoints, such as cardiovascular risk factors and metabolic rate, and "hard" endpoints, including coronary heart disease, cancer, and mortality. WHR was among the cardiovascular risk factors considered in this research. Using data from 846 men enrolled in the Baltimore Longitudinal Study of Aging, the subjects were examined at least three times over a follow-up period of 2 to 27 years with a comprehensive clinical, physiological, biochemical, social, and psychological evaluation. Lissner et al. reported that body weight variability was not significantly associated with rates of change in WHR ($p > 0.05$), but was related to increases in the ratio of subscapular to tricep skinfolds.

In the five studies which examined whether a history of weight cycling was

associated with changes in body fat distribution, the majority found no positive relationship between weight fluctuation and increases in upper body fat obesity. Only in one study (Rodin et al., 1990), did findings suggest that repeated bouts of weight loss and regain may promote abdominal adiposity.

Health-Related Outcomes

In addition to investigations about the metabolic consequences of weight variability, other research has examined the effects of weight cycling on health-related outcomes. These particular studies attended to whether a history of weight cycling was associated with increased vulnerability to morbidity or mortality.

Increased Vulnerability to Morbidity. Several studies have examined the association between a history of weight cycling and increased vulnerability to disease. Three studies investigated the relationship between weight fluctuation and the development of cardiovascular or coronary heart disease. Another study considered the effects of weight cycling on metabolic control and need for hypoglycemic medication in male outpatients with non-insulin-dependent diabetes mellitus.

In a previously mentioned study with a sample of 101 obese men and 101 obese women, Jeffrey et al. (1992) examined the relationship between weight cycling and several common cardiovascular risk factors. To ascertain information about weight cycling histories, the subjects completed three retrospective self-report measures which asked the number of previous weight losses of 4.5 kg or

more, the total weight loss in prior attempts, and the difference between highest and lowest weights as an adult. Participants also were assessed using standard clinical procedures on eight cardiovascular risk factors, including blood pressure, total and high-density-lipoprotein cholesterol, triglycerides, fasting and two-hour glucose values, WHR, and percent of dietary calories from fat. The researchers conducted a total of 88 separate analyses on the data and found only seven that were significant at $p < .05$ level; six of those seven were opposite in direction to the hypothesis that weight cycling would negatively affect cardiovascular risk factors. The only positive correlation was between weight cycling and triglyceride levels in women. From these results, Jeffrey et al. concluded that "concerns about the hazards of dieting-related weight fluctuations are at present premature" (p. 643).

In another study described in a prior section, Lissner et al. (1990) used data from the 846 men enrolled in the Baltimore Longitudinal Study of Aging to investigate any association between weight fluctuation, as measured by the coefficient of variation (i.e., the standard deviation of the subject's weight divided by that person's mean weight), and changes in the cardiovascular risk factors of cholesterol, triglycerides, systolic blood pressure, WHR, glucose tolerance, and subscapular-triceps skinfold ratio. The researchers reported that body weight variability was not significantly related to changes in systolic blood pressure, triglycerides, cholesterol, or WHR, but was associated with decreases in glucose tolerance and increased regional adipose distribution. Wing (1992), however, has voiced

concerns about the use of the coefficient of variation (CV) as the measure of weight cycling in this and other studies. She stated:

First, it is very important to realize that individuals who continually gain weight over the study have a high CV despite the fact that they have had no weight cycles in conventional terms. Second, the CV is particularly influenced by frequent smaller changes; hence one 20 lb weight gain-loss cycle yields a higher CV than two 10 lb weight gain-loss cycles. (p. 116)

While the CV may be a useful statistical summary for quantifying some types of data, it does not appear to describe patterns of weight fluctuation clearly enough to be used as a measure of weight cycling.

In a study viewing weight fluctuation from another perspective, St. Jeor et al. (1995) investigated 385 normal weight and obese adults over 5 annual visits in order to characterize the weight maintainers and compare them with the non-maintainers in respect to changes in weight and body composition, selected dieting behaviors, and associated health risk factors (total cholesterol, high density and low density lipoprotein cholesterol level, resting pulse rate, and systolic and diastolic blood pressure). The subjects were drawn from the RENO Diet-Heart Study, a longitudinal investigation of the association between energy, nutrition, obesity and cardiovascular disease risk factors, and were classified according to Maintainer/Gainer/Loser (MGL) categories and a Fluctuation Index, determined by counting the number of years in which a subject's body weight changed. The MGL categories were based on a 5 lb. or more weight change between the first and fifth year visits. Because the purpose of this study was to better define weight maintainers, the researchers further refined the MGL categories into True

Maintainers, Year-to-Year Maintainers, End-Point Maintainers, and Non-Maintainers. Weight variability was measured by three methods, including the sum of absolute weight changes, intraperson standard deviation, and CV. In reporting the results of the study, St. Jeor et al. noted that only 19% of the subjects were categorized as True Maintainers, those having all weight changes within 5 lbs. during the 5 year period. This group also included three times as many normal weight as obese subjects; obese subjects comprised only 25% of the True Maintainer group, but 60% of the Non-Maintainer group. True Maintainers also had the lowest standard measures of weight variability and lower BMI, percent body fat, and WHRs. True Maintainers did not, however, exhibit significant differences in the health risk factors compared to Non-Maintainers.

Schotte, Cohen, and Singh (1990) examined the effects of weight cycling on metabolic control and need for hypoglycemic medication in 327 adult male outpatient veterans with non-insulin-dependent diabetes mellitus (Type II diabetes). The subjects all had been involved in diabetes treatment for at least 1 year (mean of 3.4 years) and had been medically evaluated on at least four occasions during their treatment. For the purpose of this study, weight cycling was defined both continuously with a CV for each subject and categorically based on changes in body weight from intake of at least 10%. The categories used for weight cycling definition included weight loss, weight gain, weight maintenance, weight loss and regain, and weight gain and reloss. But because only 14.1% of the subjects maintained their weight losses or weight gains, data analyses were

limited to subjects in the latter three categories. Schotte et al. reported that although they found weight cycling to be common in their patients, no significant correlations were obtained between weight cycling and either metabolic control or medication requirements.

In the four studies just described, researchers found no positive association between a history of weight cycling and increased vulnerability to disease, particularly cardiovascular or coronary heart disease. Three of those studies, however, must be viewed with some caution since they quantified weight cycling at least in part by the CV, which may not delineate fluctuational patterns precisely enough. Furthermore, two other recent and more well-designed studies (Blair, Shaten, Brownell, Collins, & Lissner, 1993; Lissner et al. 1991), which will be fully described in the next section, found clear associations between weight variability and risk for cardiovascular or coronary heart disease. Therefore, it appears that at least some evidence suggests a positive relationship between weight cycling and increased vulnerability to cardiovascular morbidity.

Increased Vulnerability to Mortality. Whether a history of weight cycling is related to increased vulnerability to mortality has received strong attention in the literature concerning the health-related outcomes of weight fluctuation. Six studies have examined the association between weight variability and various types of mortality, including coronary heart disease, cancer, and all-cause mortality.

In addition to using the 846 men in the Baltimore Longitudinal Study of Aging to investigate the metabolic and cardiovascular risk factors associated with

weight cycling, Lissner et al. (1990) also examined the relationship between body weight variability and rates of coronary heart disease, cancer mortality, and all-cause mortality in this same sample. They reported the data provided no indication that the CV of body weight was predictive of increased incidence for these three types of mortalities.

Stevens and Lissner (1990) analyzed data from the Charleston Heart Study to determine the relationship between weight fluctuation and all-cause mortality. Using a random sample of residents from Charleston County, South Carolina, body weight variability, age, mean body mass index, and change in body mass index were investigated as predictors of mortality in four groups: white males ($n = 291$), white females ($n = 300$), black males ($n = 153$), and black females ($n = 184$). Body weight variability was calculated by the CV of three successive body mass indices, including reported body weight at age 25, and measured body weights in 1960 and 1963. Stevens and Lissner reported that the CV was not a significant risk factor for mortality in any of the four groups.

In contrast to the prior two studies which reported no association between weight cycling and increased vulnerability to mortality, four other studies found positive associations. Hamm, Shekelle, and Stamler (1989) compared the 25-year mortality of four groups of 2,107 middle-aged men who had participated in the Western Electric Study from 1957 through 1983. From each man's report of his weight at ages 20, 25, 30, 35, and 40, the four groups were formed: (1) Gain and Loss group (98 men who reported the maximum gain during any one 5-year

period and the maximum loss during another were each 10% or more); (2) Gain Only group (133 men whose weight increased during each 5-year period and who had a maximum weight gain during at least one 5-year period of 10% or more); (3) No Change group (178 men whose largest gain and largest loss were each less than 5% and whose weight at initial examination differed by less than 5% from the reported weight at age 20); and (4) All Others Group (1,550 men). When compared to the other three groups, Hamm and her colleagues found that the Gain and Loss group was associated with an increased relative risk of coronary death of 1.8. Risk of death from cancer was substantially elevated (3.4 relative risk) for the Gain Only group. The four groups did not differ significantly in risk of death from causes other than coronary heart disease or cancer. Hamm et al. concluded that these results "raise concerns about lifestyles that lead to large gains in weight during young adulthood, and about weight reduction programs that lead to large losses followed by large gains" (p. 318).

With two independent samples of 1,268 women and 697 men in Gothenburg, Sweden, Lissner et. al (1989) conducted separate, but similar studies about the associations between mortality and body weight fluctuation. The women in the study recalled their weight 5 years prior to the study and were then weighed at two other intervals, separated by 6 years. The men also had three measures of weight, but at 4-year intervals. The CV of the three body weight measures was used to predict mortality. The researchers reported that the CV was positively associated with subsequent mortality in both independent samples and that the

overall change in BMI was negatively associated with mortality. Lissner et al. concluded that "this analysis does suggest that individuals undergoing extreme body weight fluctuations are at higher risk of death than individuals with moderate levels of fluctuation" (p. 59).

In a very well-designed study, Lissner et al. (1991) used the data from 1,367 males and 1,804 females involved in the Framingham Heart Study to examine associations between weight variability and total mortality, mortality from coronary heart disease, and morbidity due to coronary heart disease and cancer. The researchers expressed the degree of weight variability by the CV, which was calculated from each subject's measured BMI values taken at 8 biennial measures of weight and the recalled body weight at age 25. In addition to these more frequent weight measurements, Lissner and colleagues also attempted to control for possible preexisting illnesses by excluding all deaths that occurred in the first 4 years after the last measured weight and adjusting for known coronary heart disease risk factors, such as smoking, physical-activity level, serum cholesterol concentration, results of glucose-tolerance tests, and systolic blood pressure. The researchers reported that subjects with highly variable body weights had increased total mortality, mortality from coronary heart disease, and morbidity due to coronary heart disease, even when they controlled for obesity, trends in weight over time, and the indicators of cardiovascular risk. Furthermore, they found that the "relative risks attributable to fluctuation in weight were comparable in magnitude to the risks attributable to being overweight for total mortality, cardiovascular

disease, and coronary heart disease" (p. 1843). In an additional analysis of their data, Lissner et al. reviewed the medical charts of the 40 subjects with the greatest body weight variability and found that dieting was documented in 50% of these subjects. They concluded that "these results raise the possibility that weight cycling by dietary means may have a role in the development of chronic disease" (p. 1843).

In a study which D. F. Williamson (1995a) described as having the strongest analytic design of studies examining the association between weight fluctuation and mortality, Blair et al. (1993) tested the hypothesis that weight change is associated with an increased risk for all-cause and cause-specific mortality in high-risk, middle-aged men participating in the Multiple Risk Factor Intervention Trial (MRFIT). A total of 361,662 men 35 to 57 years old were initially screened at 22 clinical centers; 12, 866 who were in the upper 10-15% of risk for coronary heart disease were selected for the trial, and randomly assigned to either the special lifestyle intervention (SI) or the usual care (UC) group. Following exclusions for missing annual visits, cancer diagnoses, or having three or fewer recorded weights, 5, 350 men remained in the SI group and 5,179 remained in the UC group. Men in the UC group had weight measurements taken annually over the 6 to 7 years of the trial, while men participating in the SI group were measured every 4 months and had 18-21 weights available. These more frequent weight measurements allowed for a more precise index of weight variability than in other studies. Blair et al. calculated the weight changes in two ways: (1)

continuously, by the intrapersonal standard deviation (ISD) of weight measurements taken at each visit; and (2) categorically, based on percent changes in weight between weighings. Researchers evaluated the MRFIT participants for morbidity and mortality at a follow-up 9 to 12 years after the trial began and found that increases in weight variability were positively associated with significant increases in risk for cardiovascular disease, and all-cause and coronary heart disease mortality. One additional finding which Blair et al. reported was that the effects of weight variability were least deleterious in men whose BMI was in the upper tercile; this finding led researchers to continue recommendations of weight loss for high-risk, overweight men.

Six studies have examined the associations between a history of weight cycling and increased vulnerability to mortality. Four of these investigations have provided some persuasive evidence that weight fluctuation is negatively related to mortality, especially cardiovascular mortality. Limited understanding currently exists, however, concerning how weight cycling impacts cardiovascular mortality, especially since several studies have not shown clear effects of weight cycling on common cardiovascular risk factors (Wing, 1993).

Summary of the Physiological Effects of Weight Cycling

Investigations into the metabolic consequences of weight variability provide convincing data that individuals with a history of weight cycling are not inhibited in future weight loss efforts, and do not exhibit reduced metabolic rates, changed

body composition or fat distribution. Less consensus exists, however, in the research regarding the effects of weight cycling on health. Although the majority of studies examining weight cycling and morbidity report no significant positive associations between these two variables, imprecise quantification of weight fluctuation and more recent, better-designed research challenge this finding. Research considering the relationship between weight fluctuation and increased mortality is more convincing, with four of six studies indicative of heightened death rates in fluctuating samples. Data from morbidity and mortality investigations, therefore, allow guarded conclusions to be drawn concerning possible negative health consequences of weight cycling.

Psychological Effects

While the literature on the physiological effects of weight cycling clearly falls into categories of metabolic consequences and health-related outcomes, the literature on the psychological effects is sparser and less well-defined, with much consisting of brief references embedded in the practice and research literature on eating disorders, dieting, and obesity treatment. Very few studies have been wholly devoted to the psychological consequences associated with weight variability. The meager research which does exist, however, appears to focus on whether weight cycling is associated with more psychological disturbance or increased disordered eating patterns.

Psychological Disturbance

In the only study currently available assessing the psychological correlates of weight cycling, Foreyt et al. (1995) examined the overall relationship between weight fluctuation and selected psychological factors in a sample of 497 normal weight and obese healthy adults enrolled in the RENO Diet-Heart Study. Subjects were initially classified as weight maintainers, gainers, or losers based on their weight changes over a one-year period, and then were further classified as weight fluctuators or nonfluctuators based on historical self-report. Participants were also stratified by age, gender, and obesity. The selected psychological variables assessed in the study included self-reported health, weight fluctuation, general well-being, depression, eating self-efficacy, and stressful life events. Foreyt and his colleagues reported that weight fluctuation was strongly associated with negative psychological attributes in both normal weight and obese individuals. Specifically, they found nonfluctuators, regardless of body weight, had significantly greater general well-being, increased feelings of eating self-efficacy, and less life stress than fluctuators.

The conclusions drawn by Foreyt et al. (1995) that weight fluctuation was associated with negative psychological attributes concur with clinical impressions given by others in the obesity treatment literature. Brownell and Wadden (1992) described the shame and failure their patients experienced from cycles of weight loss and regain:

Our patients have undertaken an average of five major diets on which they

lost (and eventually regained) a total of 56 kg. Despite their efforts, they have watched their weight increase from 70 kg at age 17 to 100 kg at age 40. . . . Regrettably, these failed efforts have occurred in full view of family, friends, and employers, not to mention health care practitioners. Few other conditions occur in such public view or are thought by lay persons to result from personal weakness. (p. 513)

Garner and Wooley (1991) also have found the effects of repeated failures at weight loss to be "profoundly devastating even for those who are psychologically robust" (p. 758). They have argued that obesity treatment has the adverse psychological consequence of moving patients toward inevitable failure experiences which patients often attribute to personal inadequacies rather than to ineffective treatment regimens (Wooley and Garner, 1991). Likewise, Wadden, Stunkard, and Liebschutz (1988) found that at a 3-year follow-up of patients treated by VLCD and behavior therapy, subjects reported that weight regain had unfavorable effects on their self-esteem, self-confidence, and happiness. Foreyt (1987) further asserted that while the results of psychological testing generally have shown no greater psychopathology between obese and matched nonobese control groups, the anxiety and depression which some obese individuals suffer may be related to their self-confidence being undermined by the difficult process of trying to lose weight or maintain weight loss. Finally, in their article integrating relapse knowledge from the alcoholism, smoking, and obesity fields, Brownell, Marlatt, Lichtenstein, and Wilson (1986) reported that relapse has been accompanied by such negative emotional effects as disappointment, frustration, and self-condemnation.

Disordered Eating Patterns

Another field of inquiry into the psychological effects of weight fluctuation has focused on the association between weight cycling and increased disordered eating practices. Some researchers and practitioners in the eating disorder field (Polivy & Herman, 1985; Rodin, Schank, & Striegel-Moore, 1989; Striegel-Moore, Silberstein, & Rodin, 1986) have implicated dieting as a causal antecedent for increased disordered eating patterns, such as binge eating or bulimia. And since dieting is often associated with high rates of relapse, and perhaps weight cycling (Burgard & Lyons, 1994; Brownell, 1991; Lissner et al. 1991), concerns have been raised about the associations between weight cycling, dieting, and disordered eating practices. Three recent studies have examined these associations.

Heatherton et al. (1991) investigated the hypothesis that chronic dieters display greater weight cycling than nondieters because they alternate between patterns of dieting and overeating and not just because they are overweight. Using a sample of college women, 10 subjects were classified as restrained (dieters) if they received a score higher than 16 on the Restraint Scale, and 17 were classified as unrestrained. In addition to the Restraint Scale, participants filled out the Eating Disorders Inventory. They were also weighed daily for a 6 week period and again 6 months later to determine if dietary restraint or relative body weight was a better predictor of weight cycling. Heatherton et al. reported that restraint (dieting) was a better predictor of weight variability than was relative weight. Additionally, they found that the Concern for Dieting and the Weight

Fluctuations factors of the Restraint Scale were significant predictors of weight cycling. The researchers also reported that the restrained subjects were not successful in their weight loss efforts since they had not registered weight loss over the 6 week period or at the 6 month follow-up. Heatherton and his colleagues proposed that "exaggerated weight fluctuations are not a natural concomitant of higher body weight but possibly the consequence of a cycling of dieting and over-eating, which seems to preclude actual weight loss" (p. 78).

Kiernan et al. (1992) investigated the relationships between exercise level, age, weight cycling history and degree of weight and eating preoccupation in a large sample of 2,459 male and 1,786 female runners. The subjects, recruited by a national running magazine, completed the Eating Attitudes Test (EAT), a self-report measure of attitudinal and behavioral characteristics commonly found among anorexic and bulimic individuals. They were also assessed for weekly running mileage, weight cycling history (number of times they had lost the number of pounds in specific categories), weight and height to calculate BMI, age, and gender. Kiernan et al. found that male runners with high weekly running mileage were significantly more likely to have symptomatic EAT scores (20 or above) than were moderate mileage runners. Level of exercise did not, however, differentiate between females with symptomatic EAT scores and those with normal scores. The researchers also reported that runners of both genders who reported a history of weight cycling were three times as likely as noncyclers and nearly two times as likely as infrequent cyclers to have symptomatic EAT scores. Kiernan

et al. concluded that these data support the hypothesis that "a history of weight cycling may put athletes and others at increased risk for excessive weight concerns" (p. 420).

Kuehnel and Wadden (1994) investigated differences with respect to cognitive functioning and dieting history among 70 obese females classified as binge eaters, nonbingers, or problem eaters. The subjects were participants in a university based weight control program and completed a questionnaire packet comprised of the Questionnaire on Eating and Weight Patterns, Weight and Lifestyle Inventory, Beck Depression Inventory, Dysfunctional Attitude Scale, Automatic Thoughts Questionnaire, Beck Hopelessness Scale, Eating Disorder Inventory-2, Eating Inventory, and the Eating Self-Efficacy Scale. Kuehnel and Wadden found that subjects in the binge eating group, whose members met full diagnostic criteria for Binge Eating Disorder (BED), exhibited greater psychopathology, including significantly higher scores on scales measuring depression and cognitive dysfunction, than did the other two groups. The binge eating group also reported significantly greater preoccupation with thinness, more dietary disinhibition, greater feelings of general ineffectiveness, more difficulty in interpreting bodily sensations related to hunger and satiety, and a higher likelihood of overeating in response to negative emotions and social situations. The researchers did not, however, find evidence of an association between binge eating and weight cycling. No significant differences were found between the high cycling and the low cycling groups with respect to depression, cognitive dysfunction, or weight and eating related

concerns. Kuehnel and Wadden concluded that "the pernicious experiences of frustration, chronic ineffectiveness, and depression that are often assumed to be correlates or outcomes of weight cycling, may more properly be attributed to BED" (p. 327).

Summary of the Psychological Effects of Weight Cycling

While relatively little is known about the psychological consequences of weight cycling, Brownell (1995b) has asserted the importance of examining this issue because of its potential impact on public health. Early empirical investigations combined with clinical impressions of those working in the obesity treatment field lend some initial support for hypotheses which have associated weight cycling with negative psychological attributes, dieting, and disordered eating practices. Further research is needed, however, to confirm the validity of these early studies and to determine "whether cycling causes these problems, whether these problems lead to dieting and regain, or whether cycling and psychological problems are correlated but not related in a causal fashion" (Brownell & Rodin, 1994b, p. 1329).

Methodological Limitations of Weight Cycling Research

In less than 10 years the topic of weight cycling has generated widespread attention from the lay press, practitioners in the eating disorder field, and empirical researchers. Despite the strong interest recently given this new topic, methodological shortcomings in the current body of weight cycling literature have

contributed to such mixed results across studies that it has been difficult for researchers and practitioners alike to arrive at uniform conclusions about what consequences are associated with a history of weight cycling. In order for this literature to mature to a point where clear patterns begin to emerge, these methodological shortcomings must be addressed. Critics of the present body of weight cycling literature have generally described these methodological shortcomings as using inconsistent research procedures and measuring weight variability instead of weight cycling (Bouchard, 1991; Brownell, 1995b; Brownell & Rodin, 1994b; Wing, 1992).

Use of Inconsistent Research Procedures

The current body of weight cycling research has been plagued by the use of inconsistent research methodology. Broad differences exist across studies concerning the use of recorded or self-reported weights, the frequency and time span of recorded weights, and the period over which weight fluctuation is measured (Brownell & Rodin, 1994b). The inconsistency of greatest significance, however, is that no clear definition of weight cycling and how to measure it has been developed. Some researchers have defined and measured weight cycling categorically according to weight loss magnitude (0-5 lb., 5-10 lb., etc.) and frequency (never, 1-5 times, 6-10 times, etc.). But great variation exists across studies as each investigator has classified patterns of weight change in different ways, and many individuals' weight change patterns have not fit neatly into predefined categories (D.

F. Williamson, 1995a). Other researchers have defined and measured weight variability statistically with such measures as the intraindividual coefficient of variation or the standard deviation. Brownell and Rodin (1994b) have explained, however, that each of these types of statistical summaries presents a different picture of weight variability:

One method might be sensitive to the number of times an individual changes weight, while another is more influenced by the magnitude or direction of the changes. An individual might lose 22.5 kg and then regain, while another might lose only 2.25 kg and regain, but do so 10 times. Studies to date have not separated different patterns of variability. (p. 1328)

The use of inconsistent research procedures has made it difficult to compare results from study to study and arrive at clear conclusions about the consequences associated with a history of weight cycling.

Measurement of Weight Variability Instead of Weight Cycling

Concerns about the risks of weight cycling were originally voiced by practitioners in the obesity treatment field who watched their patients undergo various dieting regimens, lose weight, and then gain back the weight lost. These practitioners wondered what possible dangers might be associated with the cycles of dieting and regain and whether those dangers might be even greater than the risks often associated with obesity itself. Yet many studies in the weight cycling literature have really not investigated intentional weight loss resulting from dieting situations. Of the 26 studies described in this review, for example, only 10 measured weight cycling from a dieting perspective. Moreover, 9 of those 10 were

investigating the metabolic effects of weight cycling, and not the health consequences. Most of the studies which examined the health consequences of weight cycling were epidemiological studies designed to measure weight variability in large samples. These studies found that persons who maintained stable body weights had lower morbidity and mortality rates than those who had fluctuating weights. But weight variability is not the same as weight cycling or yo-yo dieting, which results from intentional weight loss. D. F. Williamson (1995a) has reported that in no published epidemiological study has intentional weight loss been separated from unintentional weight loss, which may result from general poor health or preexisting illness. He concluded that "this methodological shortcoming may seriously bias epidemiologic studies toward a finding of a spuriously increased risk of morbidity and mortality associated with general weight loss" (p. 412). It is important for researchers to develop designs which focus on the effects of voluntary weight loss cycles and that also control for possible variables which might confound the results.

Weight Cycling Conclusions

Results from the current body of weight cycling literature indicate that individuals with a history of weight cycling most likely do not face metabolic effects of their weight fluctuation, but may suffer possible health or psychological consequences. These results, however, must be viewed less confidently due to the methodological shortcomings associated with many weight cycling studies. At this

time we do not have sufficient knowledge to determine whether weight cycling from intentional weight loss attempts is harmful to individuals or not. Therefore, it seems premature to completely abandon dieting as a weight loss method, especially for obese individuals who face serious health problems related to their overweight.

Body Image

Cash (1996) has aptly described the negative body image which pervades Western culture today:

Our society's unrelenting emphasis on physical appearance drives many people's pursuits of physical perfection. They are consumers of the newest fashions in clothing, the latest promises of lasting weight loss, the exercise products and programs for attaining the "right shape," and ultimately the sculpting services of cosmetic surgeons. One would think that with all these tools for transforming appearance, people would like their looks. But this could not be further from the truth. (p. 83)

Congruent with Cash's assertions, results from a 1985 national body image survey indicated that two of every five women and one of every three men exhibit dissatisfaction with their overall appearance (Cash, Winstead, & Janda, 1986). Additionally, most respondents were unhappy with at least one aspect of their appearance; only 28% of men and 15% of women were satisfied with all body areas listed in the survey. This section of the literature review attempts to gain a fuller understanding of this pervasive cultural force, negative body image, and will focus on three particular areas: (1) conceptualization of body image; (2) assessment of body image; and (3) body image in various populations (eating

disordered, obese, and nonclinical groups).

Conceptualization of Body Image

The earliest conceptualizations of body image focused on the perceptual distortions of body size often found in patients with anorexia nervosa. In her work with these patients, Bruch (1962) described this distortion as "the absence of concern about emaciation, even when advanced, and the vigor and stubbornness with which the often gruesome appearance is defended as normal and right" (p. 189). The popular press further promulgated this notion of body image disturbance through its pictures of emaciated young women staring into mirrors with obese images reflecting back. Perceptual distortion, as defined by body size overestimation, consequently became both the hallmark of body image disturbance and the focus of most early body image research (Cash & Brown, 1987; Hsu & Sobkiewicz, 1991).

This unidimensional conceptualization of body image was soon challenged, however, by other theorists who saw a second form of expression to body image disturbance. In their early work with body image in anorexia nervosa, Garner and Garfinkel (1981), for example, described this second aspect as involving "cognitive and affective ingredients" in which patients often "react to their bodies with extreme forms of disparagement or occasionally aggrandizement" (p. 265). These researchers further characterized this cognitive and affective ingredient as extraordinary loathing, revulsion, and disparagement; they reported that it occurred both

independently of and conjointly with the perceptual component to body image. Thus, a subjective aspect, encompassing body dissatisfaction, along with the perceptual aspect, referring to accuracy of size estimation, have evolved as the two most prevalent ways to conceptualize body image (Garner & Garfinkel, 1981; Rosen & Srebnik, 1990; J. K. Thompson, 1990, 1996a).

More recently, theorists and researchers working with body image have begun to view the construct from even more complex and multidimensional perspectives (Gleaves, Williamson, Eberenz, Sebastian, & Barker, 1995; Keeton, Cash, & Brown, 1990; Pruzinsky & Cash, 1990; Rosen, 1990; Slade, 1994; J. K. Thompson, 1996a; D. A. Williamson, 1990). In addition to the perceptual and subjective components, both J. K. Thompson (1996a) and Rosen (1990) have postulated that body image disturbance also features a behavioral component, consisting of "a lifestyle that revolves around the individual's physical self-consciousness" (Rosen, p. 196). Behaviors comprising such a lifestyle include avoiding social outings where individuals believe their bodies will be scrutinized, favoring baggy over tight fitting clothes, refraining from physical intimacy, and frequent weighing and mirror inspections.

D. A. Williamson (1990) developed another multidimensional model of body image disturbance, also with three components: (1) body size distortion, (2) preference for thinness, and (3) body size dissatisfaction. Consistent with the other models, body size distortion involves the individual's ability to perceive her or his current body size. Williamson conceptualized preference for thinness as

"an individual's ideal body size, or a body size which is used as an ideal standard for judging satisfaction with current body size" (p. 65). Finally, body size dissatisfaction was defined by the degree of discrepancy between actual body size estimates and ideal body size estimates. The validity of Williamson's conceptual model has been tested in several studies (Gleaves et al., 1995; D. A. Williamson, Davis, Bennett, Goreczny, & Gleaves, 1989; D. A. Williamson, Gleaves, Watkins, & Schlundt, 1993). In the most recent validation, Gleaves et al. (1995) used structural modeling methodology to further refine and clarify the Williamson model. These researchers found support for a model of body-image disturbance incorporating four dimensions: (1) body-size distortion, (2) preference for thinness, (3) body dissatisfaction, and (4) fear of fatness.

Slade (1994) has developed yet another conceptual model identifying the nature of body image, which he views as very complex and open to influence by many factors. He has argued that "body image is not a simple perceptual phenomenon and that even when we set out to measure an individual's perception of their own body, the judgements the individual makes are highly influenced by cognitive, affective, attitudinal and other variables" (p. 497). Rather than viewing body image as fixed and implacable, Slade has conceived of body image more as a "loose mental representation of the body which is influenced by a least seven sets of factors" (p. 500): (1) history of sensory input to body experience, (2) history of weight change or fluctuation, (3) cultural and social norms, (4) individual attitudes to weight and shape, (5) cognitive and affective variables, (6)

individual psychopathology, and (7) biological variables.

Assessment of Body Image

Just as body image has been conceptualized in various ways, body image assessment also has received multidimensional treatment. In this section, the review will provide both an overview of body image assessment procedures and a description of current methodological issues relevant to these procedures.

Assessment Procedures

Several researchers have written comprehensive reviews about the procedures often used in body image assessment (Ben-Tovim & Walker, 1991; Rosen & Srebnik, 1990; J. K. Thompson, 1996a; J. K. Thompson, Penner, & Altabe, 1990). Congruent with the conceptualization of body image, procedures used for assessing body image will also be categorized and described from perceptual and subjective perspectives. More comprehensive information on assessment procedures, including the names, authors, descriptions, standardization samples, and psychometric properties of specific instruments, can be found in previously cited reviews.

Perceptual Assessment Procedures. Perceptual assessment procedures focus on the size perception accuracy of body image (J. K. Thompson, 1996a). J. K. Thompson et al. (1990) have divided size-estimation accuracy techniques into two broad categories: (1) body-part procedures, and (2) distorting image

(whole-body) procedures. Body-part procedures require subjects to estimate the width of a specific body site. One type of the body-part procedure involves subjects moving calipers or light beams to match estimates of their body site widths; another requires subjects to draw estimates of body widths on paper attached to a wall. The distorting image (whole-body) procedure presents subjects with photographic or video images that have been modified to be smaller or larger than reality and then requires them to select the stimulus matching their body size perception. In both the body-part and distorting image procedures, the subject's estimate of the site or whole-body is compared to actual widths in order to compute a ratio of size over- or underestimation.

Subjective Assessment Procedures. Subjective assessment procedures attempt to capture the attitudes, affect, cognitions, and behaviors related to body image disturbance. Most subjective measures are in the form of written questionnaires, although a few structured interviews yield similar information (see, for example, the Eating Disorder Examination 12.00 by Fairburn & Cooper, 1993). Some measures provide global estimates of satisfaction with size, weight, appearance, fitness, and health (Brown, Cash, & Mikulka, 1990), while others tap into more specific domains. For example, the Body Image Automatic Thoughts Questionnaire (Cash, 1991) has subjects rate the frequency of 52 appearance-related cognitions; the Body Shape Questionnaire (Cooper, Taylor, Cooper, & Fairburn, 1987) is a 34-item measure of concerns about body shape; the Body Image Anxiety Scale (Reed, Thompson, & Brannick, 1990) assesses subjects' state and

trait anxiety about weight and non-weight-relevant body sites; the Sociocultural Attitudes Toward Appearance Questionnaire (Heinberg, Thompson, & Stormer, 1995) assesses women's recognition and acceptance of societally sanctioned standards of appearance. Rosen, Srebnik, Saltzberg, and Wendt (1991) developed the Body Image Avoidance Questionnaire to assess the behavioral tendencies that often accompany body image disturbance. This 19-item measure yields information regarding avoidance behaviors in four areas: (1) clothing, (2) social activities, (3) eating restraint, and (4) grooming and weighing.

Subjective body image can also be measured with schematic figures or silhouettes, a method which J. K. Thompson et al. (1990) states is the most widely used method of determining overall size/weight satisfaction. Using this methodology, subjects are presented with figures of body sizes ranging from very thin to very obese. Subjects choose figures which reflect their perception of their current body size (CBS) and their ideal body size (IBS). The difference between the two drawings (CBS - IBS) represents the level of body size dissatisfaction. While silhouette methodology has most often been categorized with the subjective procedures, a few researchers have also used these figure drawings as perceptual measures. D. A. Williamson et al. (1989), for example, converted subjects' CBS silhouette choices to z scores from height/weight normative tables; the researchers considered the degree to which the CBS scores were elevated from those norms as indicative of body image distortion. Using another strategy, Keeton et al. (1990) photographed subjects from a six-foot distance and then had four

independent judges provide objective ratings of the subjects' actual body sizes. These ratings, when compared to the CBS silhouette choices, denoted the amount of body-size distortion. In examining the previously cited reviews of body image assessment procedures, it is evident that researchers have created many kinds of silhouette measures. One of the most widely used and researched is the Body Image Assessment (BIA) procedure (Gleaves et al., 1995; Keeton et al., 1990; D. A. Williamson, Barker, Bertman, & Gleaves, 1995; D. A. Williamson, Cubic, & Gleaves, 1993; D. A. Williamson et al., 1989; D. A. Williamson et al., 1993; D. A. Williamson, Prather, McKenzie, & Blouin, 1990). Despite the extensive use of the BIA, M. A. Thompson and Gray (1995) have criticized the unrealistic representations of the human form in both the BIA and other sets of silhouette drawings, which often exhibit poorly defined facial and bodily features. To improve upon the present selection of silhouette drawings, M. A. Thompson and Gray developed the CDRS, which was designed with more detailed features, precisely graduated sizes, and realistic increases in waist-to-hip ratio.

Methodological Issues

Researchers have raised several methodological issues regarding body image assessment procedures:

1. J. K. Thompson et al. (1990) have cautioned that some body image assessment procedures have not demonstrated acceptable psychometric properties. Additionally, the majority of procedures were developed and validated on a

narrow range of subject samples, mostly Caucasian females (J. K. Thompson, 1996a). Before using any particular instrument, researchers should check the validity and reliability of the measure to make certain it meets acceptable psychometric standards and that the procedure reflects the gender, age, and ethnicity of the sample intended for the study.

2. J. K. Thompson et al. (1990) have urged caution in choosing the type of perceptual assessment procedure. For example, since research has indicated that body-size overestimation is very site specific, whole-image procedures might not adequately capture that specificity because they produce a single, global index. Individuals undergoing a distorting image procedure might also become distressed at the sight of themselves becoming larger and thus invalidate the test. Generally, the cost, time, and technical expertise needed to operate some of the perceptual assessment procedures may restrain researchers from using them widely.

3. Contextual problems might also affect the validity of body image assessment procedures. Slade (1994) has reported that subjects estimate larger when asked to rate based on how they feel, rather than on how they think, or when presented with descending trials (comparison starts as fat and becomes progressively thinner) over ascending trials. J.K. Thompson (1996a) has described other contextual factors affecting some body image assessment measures, including visuo-spatial abilities, repeated testing, type of clothing worn, available illumination, food consumption, and the actual size of the subject being tested.

4. Presently there are over 40 instruments for assessing body image (J. K.

Thompson, Altabe, Johnson, and Stormer, 1994). Many of these instruments purport to measure some unique aspect of body image. Recently, however, factor analytic studies have found considerable overlap among some of these measures. J. K. Thompson et al., for example, conducted two studies using seven common measures of body image disturbance. In the first study with an adolescent sample, one factor emerged and accounted for 54% of the variance associated with all scales. A second, weaker factor accounted for an additional 17% of the variance. In the second study using an adult female sample, analysis revealed just one strong factor accounting for 66% of the variance. Also using factor analysis, D. A. Williamson et al. (1995) found considerable overlap among six measures of dietary restraint, body dissatisfaction, and body image. In selecting measures for body image assessment, therefore, it is important for researchers to be knowledgeable about the variety of instruments available and to avoid those measures which overlap to the point of redundancy.

5. Recent research has examined the relationship between perceptual and subjective measures of body image disturbance. Although the data are somewhat inconsistent, most support the distinction between perceptual and subjective body image components (Altabe & Thompson, 1992; Keeton et al., 1990; Rosen & Srebnik, 1990; J. K. Thompson et al., 1990). Additionally, subjective measures of body image have been found to be more strongly correlated with eating dysfunction than perceptual measures (Altabe & Thompson, 1992; Keeton et al., 1990; J. K. Thompson, 1996a; J. K. Thompson et al., 1990). Because of the

methodological concerns particularly associated with perceptual procedures, and the research more clearly linking subjective measures and eating disturbance, the trend in body image assessment is toward greater use of subjective measures (Hsu & Sobkiewicz, 1991; J. K. Thompson, 1996a).

Body Image in Various Populations

Body image disturbances manifest themselves differently in various populations. This section of the review will focus on the features of body image disturbance in eating disordered individuals, with particular attention given to anorexia nervosa and bulimia nervosa. The review will also examine body image disturbance in obese and nonclinical populations.

Eating Disordered Populations

Research has indicated that women, particularly White women, are at greater risk for developing eating disorders and negative body image. Wolf (1991) reported women with eating disorders outnumber men by a 9 to 1 ratio. Because of the higher incidence of these disturbances in women, most studies have focused primarily on female samples.

Features of Body Image Disturbance in Eating Disorders. The DSM-IV (1994) includes body image disturbance in the diagnostic features of eating disorders. The diagnostic criteria related to body image for anorexia nervosa include both an intense fear of gaining weight or becoming fat and a distortion of the

experience and significance of body weight and shape. The diagnostic features for bulimia nervosa also include an excessive emphasis on body weight and shape, with self-esteem often determined by these factors. The DSM-IV further states that "individuals with this disorder may closely resemble those with Anorexia Nervosa in their fear of gaining weight, in their desire to lose weight, and in the level of dissatisfaction with their bodies" (p. 546). Clearly, the eating disorder diagnostic criteria manifest several perceptual and subjective components of body image disturbance.

Development of Body Image Disturbance in Eating Disorders. Since both body image disturbance and eating disorders are complex, multifaceted constructs, many factors interact and contribute to their development. Rosen (1990, 1992) has summarized several of the factors which contribute to body image disturbance in women with eating disorders.

1. The widespread dissatisfaction women feel about their weight, body, and shape is partially attributable to the prevailing, but often unattainable standard in Western cultures which equates beauty with thinness.
2. The pursuit of thinness characteristic of body image disturbance may be an adaptive response to the developmental changes of adolescence. Bruch (1962), in particular, has asserted that weight may be one issue that remains within self-control and provides feelings of self-effectiveness when other elements of self are out of control.
3. Body image disturbance in eating disordered females may also represent

underlying sexual issues. Some anorexic individuals, for example, may restrict their eating in an effort to remain thin and thus deny physical evidence of emerging sexuality. In contrast, bulimic individuals' strong feelings of disgust for their body may reflect a history of physical or sexual trauma.

4. Striving to achieve the perfect ideal of a thin outward appearance may also help eating disordered young women compensate for inner feelings of low self-esteem, worthlessness, and defectiveness.

5. Eating disordered women with body image disturbance may also have received negative social feedback in connection with their appearance. Critical incidents involving parental and/or peer teasing and belittlement regarding overweight status or appearance defects may have an impact on young women's body image.

Research on Body Image Disturbance in Eating Disorders. While the research literature has been clear that concerns about weight and appearance play a role in eating disorder development and maintenance (Brown, Cash, & Lewis, 1989; J. K. Thompson, 1996b), inconsistencies abound in this literature. Garner and Garfinkel (1981), for example, reviewed over 20 early empirical studies of body image in anorexia nervosa which primarily involved perceptual assessment using movable caliper, image-marking, and distorting photograph techniques. They reported widespread inconsistency in the ability of these perceptual methods to differentiate between anorexic and nonclinical control subjects; they attributed these inconsistencies across studies to methodological shortcomings in

the procedures and measurement tools. In a more recent review of body image in both anorexia nervosa and bulimia nervosa, Cash and Brown (1987) also reported inconsistent findings with perceptual assessment methodology. Importantly, however, they found that attitudinal measures provided "more consistent evidence that anorexics and bulimics report greater body image dissatisfaction/dysphoria than various comparison groups" (p. 493). Cash and Brown recommended that future research use multiple assessment procedures, report subject characteristics and methodology more clearly, and improve data analysis to separate out variables that might be highly intercorrelated. Using silhouette methodology, D. A. Williamson et al. (1993) found that both anorexic and bulimic subjects judged CBS to be larger and IBS to be thinner relative to control subjects. Yet, these researchers also cautioned that their results join a large number of studies with mixed findings of body image disturbance in anorexia and bulimia and concluded that "a pattern of results from these studies is emerging that suggests that the method of measuring the body image construct may be the most important determinant of conflicting findings across studies" (p. 179). A few more recent studies (Gleaves et al., 1995; Keeton et al., 1990; J. K. Thompson et al., 1994; D. A. Williamson et al., 1995) appear to be taking body image research in new directions with greater focus on the assessment instruments and methodological procedures themselves. For example, D. A. Williamson et al. employed factor analysis to identify and confirm the primary constructs in several assessment methods commonly used to measure dietary restraint, body dissatisfaction, and body image.

Information gleaned from this study will provide empirical guidance for better matching targeted research populations to specific assessment procedures. Additionally, this study used a sample of nonsymptomatic women in an attempt to better define the characteristics of eating, dieting, and body image in "normal" women. This type of study is important since body image research often has compared anorexic or bulimic subjects to normal controls without actually having empirical data which define these controls.

Obese Populations

While obese individuals generally do not show greater psychological disturbance than nonobese, they may suffer from psychological problems specific to their obesity, such as disparagement of body image (Foreyt, 1987; Stunkard & Sobal, 1995; Wadden & Stunkard, 1987). Stunkard and Sobal reported that persons with body image disparagement "view their bodies as grotesque and loathsome and believe that others can view them only with hostility and contempt" (p. 418). Not all obese individuals experience this body image disparagement, however. Most susceptible are young women of middle and upper-middle class socioeconomic status where obesity is less prevalent and more stigmatized (Foreyt; Stunkard & Sobal; Wadden & Stunkard, 1985, 1987). Also at risk are those who have been obese since childhood, have a generalized neurotic disturbance, and have been criticized by parents and peers for their overweight (Foreyt; Stunkard & Sobal; Wadden & Stunkard).

Rosen, Orosan, and Reiter (1995) reported several ways that obese individuals differ from normal weight individuals in body image: (a) they overestimate their body size more, (b) they are more dissatisfied and preoccupied with their physical appearance, and (c) they avoid social situations more because of their appearance. They concluded that the perceptual, subjective, and behavioral components of body image "can be more troublesome for obese persons" (p. 25). Faith and Allison (1996), however, have tempered these assertions with research citations indicative of accurate body estimates by obese subjects, and obese subjects having overestimation rates comparable to or even lower than nonobese subjects. Given the widespread inconsistencies already extant in the body image literature, especially with respect to perceptual assessment procedures, incongruity within the obesity literature also seems a reasonable expectation.

Nonclinical Populations

In addressing the relationship women have with their bodies, Hutchinson (1994) has stated that "We live in a culture where it is normal for us to feel that we should be thinner, prettier, firmer, younger, and in all ways better" (p. 152). Rodin et al. (1985) have labeled this pervasive body dissatisfaction among normal weight, non-eating disordered women as "normative discontent" (p. 267). But while women certainly appear to be at greater risk for weight- and appearance-related problems (J. K. Thompson, 1996b), men too experience concern with these issues. Using the MBSRQ, Cash et al. (1986) surveyed over 30,000

individuals and found widespread body image concerns in both genders. These researchers reported 31% of the women and 24% of the men reported negative feelings about their appearance. Moreover, 93% of the women and 82% of the men had strong appearance orientations, involving valuing, thinking about, paying attention to, and being behaviorally active in appearance management. Additionally, when Cash and his colleagues analyzed the data according to age, they found adolescents, particularly females, had the strongest appearance orientations and the most negative appearance evaluations.

While both genders exhibit high levels of body image concerns, these concerns are manifested somewhat differently for each gender. Cash et al. (1986) reported that 34% of men and 38% of women were dissatisfied with their overall appearance, and 50% of the men and 57% of the women were dissatisfied with the mid-torso region of their bodies. Half the women, however, also expressed dissatisfaction with their lower torsos, as compared to only 21% of the men. Drewnowski and Yee (1987) also studied body image dissatisfaction with 226 male and female freshman college students. They reported that 85% of the women wished to lose weight. The men, however, expressed conflicting views on weight loss, with 40% wanting to lose weight, and 45% wishing to gain. For men, there appeared to be as much dissatisfaction with being underweight as with being overweight. Drewnowski and Yee also found differences in how males and females attempted weight control, with women resorting to dieting more often and men using exercise. These authors hypothesized that using dieting as the prominent

female weight control method may contribute to the greater risk and incidence of eating disorders in women. Silberstein, Striegel-Moore, Timko, and Rodin (1988) also found that 43% of their male sample wanted to be larger as often as they wanted to be smaller (35%); only 2% of the women, however, wanted to be larger. In a study devoted wholly to body image concerns in males, Kearney-Cooke and Steichen-Asch (1990) studied 112 male college students, whom they divided into three groups: (1) normal, (2) at risk for eating disorders, and (3) clinical subjects who already met diagnostic criteria for eating disorders. The researchers reported that the men in all three groups reported being most ashamed of their stomach or belly area, followed by upper and lower extremities. The normal and at risk groups favored an ideal male body shape of muscular, strong, and broad shouldered, while the eating disordered men envisioned a lean, toned, and thin shape as ideal. All three groups of men chose their ideal female body shape as thin, slim, and slightly underweight.

Body Image Conclusions

Body image has been conceptualized and assessed from multidimensional perspectives. Most often it is described as having two basic components, perceptual and subjective. While the diversity of assessment procedures has contributed to inconsistent results across studies, subjective measures appear to be especially useful because of their more uniform findings and stronger correlations with eating dysfunction. Research also has indicated that women seem to be more

susceptible to body image disturbances in eating disordered, obese, and non-clinical populations. Men, too, experience high levels of body dissatisfaction, although this population exhibits nearly equal concern with underweight as with overweight. Finally, the ideal body image for both genders appears to be strongly influenced by current cultural standards, with women striving for thin body shapes and men seeking traditional V-shaped bodies with broad, muscular shoulders narrowing to small waists.

CHAPTER III

METHODOLOGY

In this chapter, the researcher describes the methodology employed in this study, including the research design, the participants involved, and the instruments used in measuring the variables. Additionally, she details the procedures followed for data analysis, and offers several limitations associated with this study.

Research Design

In this observational study, the researcher examined the differences between weight cyclers and noncyclers on perceptual and subjective measures of body image. Two separate samples were used in the study, one of females and the other of males. Weight cycling and noncycling were the independent variables and the body image measures were the dependent variables. A total of 24 null hypotheses were tested in this research.

Independent Variables

Weight cycling and noncycling made up the independent variables for this research. The following four responses from the Weight History Questionnaire (WHQ) defined weight cyclers as individuals who over the last 5 years: (1) reported patterns of steady gain or fluctuation in weight; (2) dieted very often,

often, or sometimes; (3) yo-yo dieted a great deal, moderately, or somewhat, and; (4) had gone through a minimum of 4-6 cycles of dieting, losing at least 10 pounds, and then regaining all or most of the weight lost. Additionally, these four weight change responses were not related to any medical conditions present during the 5 year span of time. The four WHQ responses used to define noncyclers included: (1) stable weight over the last 5 years; (2) rarely or never dieted; (3) yo-yo dieted very little or not at all; and (4) had gone through zero or one cycle of dieting, losing, and regaining at least 10 pounds.

Dependent Variables

The 12 dependent variables included the perceptual and subjective measures of body image. These variables were grouped into five areas, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation. They are listed and described below.

Appearance Satisfaction

Appearance satisfaction included four variables: (1) body-size dissatisfaction, (2) appearance evaluation, (3) appearance orientation, and (4) body-areas satisfaction.

Body-Size Dissatisfaction. Body size dissatisfaction is the "degree to which one's percept of current body size and shape differs from the individual's perceived ideal body size and shape" (D. A. Williamson et al., 1989, p. 434). Body

size dissatisfaction was measured by the discrepancy score (CBS - IBS) of the CDRS.

Appearance Evaluation. Appearance evaluation is the extent of satisfaction or dissatisfaction with one's looks (Cash, 1994b) and was measured by the Appearance Evaluation subscale of the MBSRQ.

Appearance Orientation. Appearance orientation is the degree of cognitive-behavioral investment in maintaining and improving facets of appearance (Brown et al., 1990) and was measured by the Appearance Orientation subscale of the MBSRQ.

Body-Areas Satisfaction. Satisfaction with various body areas (face, hair, lower torso, midtorso, upper torso, muscle tone, weight, height, and overall appearance) was measured by the Body Areas Satisfaction Scale (BASS) of the MBSRQ (Brown et al., 1989).

Fitness

The fitness area included the fitness evaluation and fitness orientation variables.

Fitness Evaluation. Fitness evaluation is the extent of feeling physically fit or unfit (Cash, 1994b) and was measured by the Fitness Evaluation subscale of the MBSRQ.

Fitness Orientation. Fitness orientation is the extent of investment in being physically fit or athletically competent (Cash, 1994b) and was measured by the Fitness Orientation subscale of the MBSRQ.

Health

The health area included three variables: (1) health evaluation, (2) health orientation, and (3) illness orientation.

Health Evaluation. Health evaluation is the feelings of physical health and/or the freedom from physical illness (Cash, 1994b) and was measured by the Health Evaluation subscale of the MBSRQ.

Health Orientation. Health orientation is the extent of investment in a physically healthy lifestyle (Cash, 1994b) and was measured by the Health Orientation subscale of the MBSRQ.

Illness Orientation. Illness orientation is the extent of reactivity to being or becoming ill (Cash, 1994b) and was measured by the Illness Orientation subscale of the MBSRQ.

Body-Size Perception

Body-size perception included two variables: (1) body-size perception, and (2) self-classified weight.

Body-Size Perception. Body-size perception is one's percept of current body size and shape and was determined by the selection of the current body size (CBS) silhouette on the CDRS (M. A. Thompson & Gray, 1995).

Self-Classified Weight. Classification of how one perceives and labels one's weight, from very underweight to very overweight, was measured by the Self-Classified Weight Scale (Cash, 1994b) of the MBSQR.

Overweight Preoccupation

The overweight preoccupation area contained only one variable.

Overweight Preoccupation. Satisfaction and attitudes about various weight-related concerns (fat anxiety, weight vigilance, dieting, and eating restraint) was measured by the Overweight Preoccupation Scale (OPS) of the MBSRQ (Cash, Wood, Phelps, & Boyd, 1991).

Null Hypotheses

A total of 24 null hypotheses were generated from the original research questions. The 12 null hypotheses tested on the female sample stated there were no differences between female weight cyclers and female noncyclers on: (1) Current Body Size, (2) Body Size Dissatisfaction, (3) Appearance Evaluation, (4) Appearance Orientation, (5) Fitness Evaluation, (6) Fitness Orientation, (7) Health Evaluation, (8) Health Orientation, (9) Illness Orientation, (10) Body

Areas Satisfaction, (11) Overweight Preoccupation, and (12) Self-Classified Weight. The same 12 null hypotheses were applied to the sample of male cyclers and noncyclers.

Participants

Participants for this research were drawn from a population of graduate students enrolled in the colleges of education and business at a large state-supported midwestern university. Graduate students were chosen as the population of interest for this study because they tend to be older and therefore have had more opportunities for weight cycling than would younger populations. The graduate programs in the College of Education include offerings from six departments: (1) Counselor Education and Counseling Psychology; (2) Education and Professional Development; (3) Educational Leadership; (4) Family and Consumer Sciences; (5) Health, Physical Education, and Recreation; and (6) Special Education. The five graduate programs in the College of Business include: (1) Accountancy, (2) Business Information Systems, (3) Finance and Commercial Law, (4) Management, and (5) Marketing. In order to protect the rights and confidentiality of all participants, a proposal for this study was submitted to and approved by the university's Human Subjects Institutional Review Board (HSIRB) prior to the actual initiation of the project (Appendix A).

Sampling Procedures

The researcher began the sampling process by mailing letters (Appendix B) to all 102 faculty members from the colleges of education and business who were listed in the schedule of classes as teaching graduate courses during winter semester of 1997. These letters, mailed at three different points during the early and middle parts of the semester, described the nature of the research, and requested participation in the study. Following the mailings, the researcher contacted all faculty members by telephone and requested permission for their students to participate in the research. If the instructors indicated a willingness to have their classes participate in the study, dates and times were determined for the researcher or her assistant to visit the classes and administer the questionnaire packets which contained the three measurement instruments (WHQ, CDRS, and MBSRQ).

Forty-five faculty members volunteered their classes for participation in the sampling. This number constituted a 44% response rate from the initial mailing of 102 letters. Thirty-nine of the 45 participating classes were from the College of Education and 6 were from the College of Business. Of the 39 classes from the College of Education, the breakdown of participation by department included 22 from Counselor Education and Counseling Psychology, 6 from Education and Professional Development, 8 from Educational Leadership, 1 from Family and Consumer Sciences, 1 from Health, Physical Education, and Recreation, and 1 from Special Education. Departmental participation in the College of Business

involved 2 classes from Accountancy, 1 from Business Information Systems, and 3 from Finance and Commercial Law.

Data Collection

Once the 45 faculty members' classes were scheduled by telephone, the actual data collection process began with the researcher or her assistant personally visiting each classroom to give a brief overview of the study, explain the informed consent (Appendix C) and secure the necessary signatures, and administer the questionnaire packets to all willing participants. The data collection process took approximately 15-20 minutes for each visit.

A total of 514 questionnaires were administered during the sampling process. However, 70 of those questionnaires were disqualified from further use in the study, including 54 for medical reasons, and 16 for improperly completed questionnaires. The remaining, usable 444 questionnaires comprised the sample for this study.

Sample Description

The complete sample included 444 participants. Of these participants, 278 individuals, or 63% of the sample, were females and 166, or 37%, were males. Table 1 describes the ages of the sample participants and Table 2 details their ethnicity.

In the overall sample of 444 participants, approximately 81% were

Table 1

Ages of the Overall Sample

	Overall (n=444)	Females (n=278)	Males (n=166)
Range of Ages	22-61	22-61	22-51
Mean Ages	31.07	31.07	31.08

Table 2

Ethnicity of the Overall Sample

	Overall (n=444)	Females (n=278)	Males (n=166)
African-American	24	15	9
Asian	43	20	23
Caucasian	360	236	124
Hispanic	3	1	2
Other	14	6	8

Caucasian, 10% were Asian, 5% were African-American, 1% was Hispanic, and 3% identified themselves as other. Of the 278 females in the sample, 85% were Caucasian, 7% were Asian, 5% were African-American, 1% was Hispanic and 2% identified as other. Among the 166 males, 75% were Caucasian, 14% were Asian, 5% were African-American, 1% was Hispanic, and 5% identified as other.

Matching Procedures

Once the complete sample of 444 participants had been determined, the researcher's next task was to identify those individuals who fit into either a weight cyler or a noncyler category and then match individuals from these categories on age and body mass index (BMI).

Identifying Cyclers and Noncyclers

The researcher used the weight history and dieting questions on the WHQ as criteria for identifying those individuals who fit into either a weight cyler group or a noncyler group.

Weight Cyler and Noncyler Group Criteria. The four WHQ responses needed for assignment to the weight cyler group included: (1) patterns of steady gain or fluctuation in weight; (2) dieting very often, often, or sometimes; (3) yo-yo dieting a great deal, moderately, or somewhat; and (4) having gone through a minimum of 4-6 cycles of dieting, losing at least 10 pounds, and then regaining all or most of the weight lost. The four responses needed for noncyler group assignment included: (1) pattern of stable weight, (2) dieting rarely or never, (3) yo-yo dieting very little or not at all, and (4) having zero or one 10 lb. weight cycle over the last 5 years. Since the purpose of this study was to examine differences in body image between weight cyclers and noncyclers, only the questionnaires of those participants meeting the requirements for each of the two groups

were used further in this research.

Criteria Modification Process. In the initial planning for this study, the researcher set the original requirements for the weight cyclers category to include patterns of weight fluctuation, dieting very often or often, yo-yo dieting a great deal or moderately, and having 7 or more 10 lb. weight cycles over the past 5 years. These criteria were based both on clinical judgment and the review of the weight cycling and dieting research, which is also predominantly clinical in nature. However, upon accumulation of the data from this particular nonclinical population, the researcher discovered that this group had higher levels of stability in its weight patterns, and exhibited lower levels of dieting and weight cycling than had been anticipated. For example, Table 3 summarizes the weight patterns in this sample as tabulated from responses to question 1 on the WHQ: What pattern best describes your weight over the last five years? The four possible responses included:

1. My weight has remained fairly stable (stayed within a five pound range).
2. I have steadily gained weight.
3. I have lost weight and kept it off.
4. My weight has fluctuated (gone up and down beyond a five pound range).

Nearly half of the participants in this sample indicated stable weight was their predominant weight pattern over the last five years.

Table 4 summarizes the responses to WHQ question 2: How frequently

Table 3
Weight Patterns in the Overall Sample

	Overall n=444		Females n=278		Males n=166	
	Number	%	Number	%	Number	%
Stable	208	47	128	46	80	48
Fluctuating	143	32	92	33	51	31
Gained	73	16	41	15	32	19
Lost	20	5	17	6	3	2

Table 4
Prevalence of Dieting in the Overall Sample

	Overall n=444		Females n=278		Males n=166	
	Number	%	Number	%	Number	%
Very Often	18	4	15	5	3	1
Often	53	12	43	16	10	6
Sometimes	111	25	78	28	33	20
Rarely	134	30	85	31	49	30
Never	128	29	57	20	71	43

have you intentionally dieted over the last five years? Almost 60% of the sample reported rarely or never dieting.

Table 5 illustrates the responses to WHQ question 4, which asked the participants: How many times over the last five years have you gone through a cycle of intentional dieting, lost at least 10 pounds, and then regained all or most of it?

Table 5
Prevalence of Weight Cycling in the Overall Sample

	Overall n=444		Females n=278		Males n=166	
	Number	%	Number	%	Number	%
0-1 cycles	344	77	208	74.8	136	82
2-3 cycles	61	14	40	14.4	21	13
4-6 cycles	27	6	20	7.2	7	4
7-10 cycles	8	2	6	2.2	2	1
11-15 cycles	1	.3	1	0.4	0	0
15+ cycles	3	.7	3	1.0	0	0

The data summarized in Tables 3-5 illustrate that this nonclinical sample had lower levels of frequent dieting and weight cycling than originally had been anticipated. Based on these data, therefore, the researcher modified the original criteria for weight cycling group membership in four ways: (1) reduced the minimum

number of weight cycles from 7 or more to a minimum of 4-6; (2) included "sometimes" as a possible response to WHQ question #2, "How frequently have you intentionally dieted over the last five years?"; (3) included "somewhat" as a possible response to WHQ question #3, "To what extent do you consider yourself a yo-yo dieter?"; and (4) included steady gainers in the possible pool of weight cyclers. Modifications 2-4 were made because these responses were very common among those participants who indicated at least a minimum of 4-6 weight cycles.

Description of the Weight Cyclers and Noncyclers. From the 278 females who comprised the sample of 444 participants in this study, 26 met the weight cycling criteria and 90 met the noncycling criteria. Table 6 describes the range and mean age and BMI of the cycling and noncycling females.

Of the 166 males in the complete sample, 5 met the weight cycling criteria and 69 met the noncycling criteria. Table 7 describes the range and mean age

Table 6
Age and BMI of Weight Cycling and Noncycling Females

	Cycling (n=26)	Noncycling (n=90)
Age Range	22-50	22-50
Mean Age	32.35	28.79
BMI Range	20-40	17-43
Mean BMI	28.9	21.51

Table 7
Age and BMI of Weight Cycling and Noncycling Males

	Cycling (n=5)	Noncycling (n=69)
Age Range	22-47	22-45
Mean Age	29.8	29.99
BMI Range	19.5-35	18-35
Mean BMI	26	24.33

and BMI of the cycling and noncycling males.

Independent sample *t*-tests were also used to compare the differences between the entire sample of female weight cyclers (n=26) and noncyclers (n=90) on age and BMI. Tables 8 and 9 summarize the data on age and BMI.

No significant differences at the .05 level existed between female weight cyclers and noncyclers on age, although the *p* value of 0.053 is very close to the significance level.

Table 8
Differences Between Female Weight Cyclers and Noncyclers on Age

Group	N	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Cycler	26	32.35	8.40	2.00	33	0.053
Noncycler	90	28.79	6.24			

Table 9

Differences Between Female Weight Cyclers and Noncyclers on BMI

Group	N	Mean	SD	t	df	p
Cycler	26	28.90	6.63	5.43	30	0.000*
Noncyclers	90	21.51	3.84			

*p < .05

Statistically significant differences at the .05 level were found between female weight cyclers and noncyclers on BMI. This significance indicates a higher level of obesity in the female weight cycler group than in the female noncyclers group.

Matching Cyclers to Noncyclers

The next step in the matching procedures was to match participants in the weight cycling group with participants in the noncycling group on age and body mass index (BMI). BMI is a common index of adiposity and is expressed as weight in kilograms per height in meters squared (D. F. Williamson, 1995b). Age and BMI were chosen as matching variables because they have been shown to be highly correlated with weight cycling measures (Brunner et al., 1994; Rebuffe-Scrive et al., 1994).

Matching Criteria. Weight cyclers and noncyclers were to differ by no

more than 5 years of age. They were also to be within the same category of BMI. BMI categories (Moore & Greenwood, 1995; D. F. Williamson, 1995b) included underweight (BMI below 19.8), normal weight (BMI 19.8-26), overweight (BMI range of 27-29), obese (BMI range of 30-38), and morbidly obese (BMI above 39). Participants also met the matching criteria for BMI if they were not in the same category, but were within one BMI point of each other. For example, a BMI of 26 (top end of normal) and 27 (low end of overweight) constituted a match. The researcher determined the age of each individual from question 8 on the WHQ. She calculated each individual's BMI using a nomogram for body mass index (Brownell, 1995a) with the weight and height given in question 5 on the WHQ.

Description of the Matched Pairs. It was the researcher's goal to obtain one sample of 15 female weight cyclers who were matched by age and BMI to another 15 female noncyclers. The researcher also intended to obtain a second sample of 15 male weight cyclers who were homogeneously matched to 15 male noncyclers in the same way as the females. However, since only five males met the weight cycling criteria, obtaining 15 matched pairs of male cyclers and noncyclers was not possible. Although it was possible to find matches for these five male cyclers, it would be difficult to make meaningful inferences based on data derived from only five pairs. Unfortunately, therefore, male weight cyclers and noncyclers were not able to be analyzed for differences in perceptual and subjective body image.

However, from the female sample of 26 weight cyclers and 90 noncyclers, 15 pairs were identified, all matched on age and BMI. The female pairs were also able to be matched on ethnic background. Although many issues remain to be researched and understood regarding ethnic diversity and body image (Altabe, 1996), including ethnicity as a matching variable helped prevent possible confounding of results. Table 10 provides a description of the 15 female pairs of cyclers and noncyclers and Table 11 gives a summary of these same pairs on age and BMI range and mean scores.

Of the 26 females who were identified as weight cyclers, 15 became part of the matched pairs. The remaining 11 weight cyclers were unable to be matched to participants from the noncycler group. Of these 11, one was normal range BMI, two were in overweight BMI category, 6 were in the obese BMI range, and 2 were morbidly obese. Finding matches beyond the 15 intended pairs was not possible, therefore, since there did not appear to be the corresponding level of high BMI ranges in the noncycling group.

Instrumentation

Three instruments were used in this research. The researcher-developed Weight History Questionnaire (Appendix D) was used to gather participants' weight and dieting histories, and also their demographic backgrounds. The Contour Drawing Rating Scale (M.A. Thompson & Gray, 1995) was used to assess body size perception and dissatisfaction. The Multidimensional Body-Self

Table 10
Description of the Female Pairs of Cyclers and Noncyclers

Pair Number	Cyclers			Noncyclers		
	Age	BMI	Ethnicity	Age	BMI	Ethnicity
1	31	22	Caucasian	28	22	Caucasian
2	49	27	Af.-Am.	45	26	Af.-Am.
3	50	24	Caucasian	48	23	Caucasian
4	42	39	Caucasian	40	41	Caucasian
5	25	22	Caucasian	25	22	Caucasian
6	26	24.5	Caucasian	25	24	Caucasian
7	26	21	Caucasian	26	21	Caucasian
8	28	28	Caucasian	27	28	Caucasian
9	28	26.5	Caucasian	28	26.5	Caucasian
10	27	20	Caucasian	28	20	Caucasian
11	27	21	Caucasian	25	21	Caucasian
12	27	24	Caucasian	28	24	Caucasian
13	34	23.5	Caucasian	32	24	Caucasian
14	38	25	Asian	35	25.5	Asian
15	24	40	Caucasian	24	43	Caucasian

Relations Questionnaire (Cash, 1990a) was used to measure several dimensions of perceptual and attitudinal body image.

Table 11
Summary of Cycling and Noncycling Female Pairs

	Age	Cycler BMI	Noncycler Age	BMI
Range	24-50	20-40	24-48	20-43
Mean	32.13	25.83	30.93	26.07

Weight History Questionnaire

The researcher-developed Weight History Questionnaire (WHQ) contained six questions regarding participants' weight and dieting history and three demographic questions about gender, age, and ethnicity. The weight history section asked respondents to state their current height and weight and describe their predominant weight pattern over the last 5 years (stable weight, steady weight gain, weight loss, or weight fluctuation). The dieting section required respondents to describe their dieting frequency (very often, often, sometimes, rarely, or never), the extent to which they considered themselves yo-yo dieters (a great deal, moderately, somewhat, very little, and not at all), and the number of times over the last 5 years they had experienced a 10 pound weight cycle (0-1, 2-3, 4-6, 7-10 11-15, or more than 15 times). As has been previously stated, the weight history and dieting questions were used as criteria for separating participants into either a weight cyclist group or a noncyclist group.

A major difficulty demonstrated in the previous weight cycling research has been the lack of a clear, consistent definition of weight cycling. In developing the WHQ, this researcher attempted to achieve more clarity and consistency of weight cycling definition in several ways.

1. Both Wing (1992) and D. F. Williamson (1996) have criticized previous weight cycling research as focusing less on intentional weight cycling due to dieting and more on weight variability or weight fluctuation, which might occur for other reasons, such as pregnancy, illness, depression, or smoking cessation. The WHQ addressed the intentionality of weight cycling in Questions 2, 3, and 4, which all made reference to dieting. The WHQ also captured more specifically the cyclical spirit of weight cycling as periods of weight loss and regain. Questions 3 and 4 referred to cycles of dieting and losing, followed by regain.

2. Both Wing (1992) and the National Task Force on the Prevention and Treatment of Obesity (NTFPTO) (1994) have emphasized that the number of weight cycles is more important than the magnitude of weight cycles. G. R. Cutter (cited in NTFPTO, 1994) proposed that "the number of weight cycles be used as the primary measure, using an arbitrary minimal threshold (e.g., 2.3 kg [5 lb.] as a cycle" (p. 1198). Muls, Kempen, Vansant, and Saris (1995) confirmed that counting of self-reported weight losses and regains is the most common criteria used in the definition of weight cycling. Consistent both with the recommendations of Wing (1992) and NTFPTO (1994) and most other weight cycling research (Muls et al., 1995), the WHQ used the number of weight cycles as the

primary measure of weight cycling, rather than an index combining the number of changes with the magnitude of change, a method which dilutes the picture of cycling when a few large weight losses have occurred. The selection of 10 pounds as the arbitrary threshold was also congruent with the 4.5 kg [9.9207 lbs.] used as the most consistent weight change measure in research studies measuring the metabolic and psychological effects of weight cycling (Holbrook, Barrett-Connor, Wingard, 1989; Jeffery et al., 1992; Melby, Schmidt, & Corrigan, 1990; Rebuffe-Scrive et al., 1994; Schmidt, Corrigan, & Melby, 1993; Rodin et al., 1990; Steen et al., 1988; Wadden et al., 1992).

3. Typical time span ranges for reporting weight and diet histories in the weight cycling literature included 3 months, 6 months, 1 year, 3 years, 5 years, adulthood since the completion of puberty, and an entire lifetime. Because the literature gave no consistent direction on choosing a typical time span, the researcher decided upon a 5 year time span for the WHQ since this increment represented an amount of time large enough to encompass several weight cycles, but small enough for more accurate memory recollection. Two research studies have shown that people are able to remember and describe their dieting and weight loss histories with reasonable reliability (French, Jeffery, Folsom, Williamson, & Byers, 1995; Wadden et al., 1992), although both of these studies used a shorter, 9 month assessment period. Unfortunately, the literature does not provide clear guidance as to an appropriate time span for accurate recall of dieting and weight loss histories.

4. The questions of the WHQ were written after a thorough study both of other weight cycling research questionnaires and the critiques of these methodologies by literature reviewers. The questionnaires and methodologies of several research studies had particular influence on the WHQ's development, including Brunner et al. (1994), Foreyt et al. (1995), Kiernan et al. (1992), Rebuffe-Scrive et al. (1994), Rodin et al. (1990), Steen et al. (1988) and the Yale/Consumer Reports Weight Survey (1995).

Contour Drawing Rating Scale

The CDRS (M.A. Thompson & Gray, 1995) is body-image assessment tool which employs sets of silhouettes to measure body-size perception and degree of body-size dissatisfaction. This set of contour drawings uses both male and female figures developed with precisely graduated sizes and realistic increases in WHR. To use this tool, participants first choose a female or male silhouette ranging from very thin (1) to obese (9) which reflects their current body size (CBS) and then a second silhouette which reflects their ideal body size (IBS). A discrepancy score (CBS-IBS) is also calculated. The CDRS is easily administered in large group settings.

In contrast to several other sets of human figure drawings which often do not demonstrate sound psychometric qualities, M.A. Thompson and Gray (1995) provide strong initial evidence for the validity and reliability of the CDRS. Fifty-one females who participated in the validity studies were asked to order the

contour drawings from thinnest to heaviest and report any drawings they believed to be obese or anorexic. These participants were also asked to select the same-sex contour drawing they perceived to most accurately depict their current body size. Of the 459 responses for each set of drawings, 95.2% and 96.1% of the responses indicated correctly positioned, rank-ordering of the female and male sets of drawings, respectively. Additional analysis of percentages revealed male drawings identified as anorexic (Drawings 1 to 3: 96.1%, 78.4%, 13.7%) and female drawings identified as anorexic (Drawings 1 to 4: 98.0%, 86.3%, 17.6%, 2.0%) were only thin and never large. Likewise, only male drawings 7-9 (17.7%, 51.0%, 88.2%) and female drawings 7-9 (15.7%, 53.0%, 90.2%) were rated as obese. Concurrent validity was examined by the degree of correspondence between the participants' reported weights and current self ratings. The CDRS selections were strongly correlated with reported weight, $r(n = 32) = .71$ ($p < .0005$). Finally, in another analysis of concurrent validity conducted between current self ratings and BMI, the results were $r(n = 32) = .59$ ($p < .0005$). Test-retest administration of the scale was conducted for a subsample of 32 subjects with an intervening period of 1 week. The Pearson product-moment reliability correlation for current body size was clearly acceptable, $r = .78$ ($p < .0005$). Thus the CDRS has shown good test-retest reliability and acceptable validity through its accuracy in differentiating drawing sizes and its significant associations between actual and perceived body size.

Multidimensional Body-Self Relations Questionnaire

The MBSRQ (Cash, 1990a) is a 69-item measure of attitudinal body image that takes into account cognitive, affective, and behavioral components of the construct. The questionnaire employs a five-point response format with answer choices ranging from definitely disagree (1) to definitely agree (5). The MBSRQ contains four groups of subscales: (1) the eight-item Body Area Satisfaction Scale; (2) the four-item Overweight Preoccupation Scale; (3) the two-item Self-Classified Weight Scale; and (4) the 54-item Body-Self Relations Scale (BSRQ), which has often been used as a short form of the MBSRQ. The BSRQ measures attitudes within the three domains of appearance, physical fitness, and health/illness. Within each of these domains are two subscales: (1) Evaluation, or the extent of liking, attainment, and satisfaction; and (2) Orientation, which is the degree of cognitive importance of, and attention to the domain, as well as the behaviors related to maintaining or improving facets of the domain (Brown et al., 1990). Thus, the seven BSRQ subscales include: (1) Appearance Evaluation, (2) Appearance Orientation, (3) Fitness Evaluation, (4) Fitness Orientation, (5) Health Evaluation, (6) Health Orientation, and (7) Illness Orientation.

The MBSRQ has been rated one of the most comprehensive and widely validated measures of attitudinal body image (J. K. Thompson, 1996a; J. K. Thompson et al. 1990). Favorable psychometric qualities, including reliabilities and convergent, discriminant, and construct validities, have been established in several investigations with both clinical and nonclinical samples (Brown et al.,

1990). In reliability studies, for example, Keeton et al. (1990) report Cronbach reliability alpha coefficients for internal consistency of 0.87 for men and 0.91 for women in a sample of 125 subjects; Brown et al. (1989) report reliability alpha coefficients for internal consistency ranging from 0.73 to 0.88 in their sample of 228 adolescent females; and J. K. Thompson et al. (1990) report internal consistency alpha coefficients ranging from 0.75 to 0.91, and test-retest alpha coefficients ranging from 0.78 to 0.94 following a 2 week period for their sample of 2,000 adult respondents to a magazine survey. Validity studies also have been widespread using the MBSRQ and its subscales. For example, factor analysis of the BSRQ revealed an impressively stable structure of seven factors, quite consistent with the original conceptual basis of the instrument (Brown et. al., 1990). The only difference emerging from the analysis was an Illness Orientation, distinct from the original combined Health/Illness Orientation. Additionally, Keeton et al. (1990) reported reasonable, significant convergence of the Appearance Evaluation subscale of the BSRQ with several other attitudinal body image indices (correlations ranging .46 to .66, $p < .001$) and negligible relationships with the perceptual measures, a finding which lends further credence to the varied dimensionality of the body image construct. These authors also reported stronger evidence for the validity of attitudinal measures over perceptual measures due to their stronger convergence with other clinically relevant measures of eating disorders and psychological adjustment. Specifically, they reported more negative body image attitudes were linked with poorer adjustment and more eating disturbance;

14 of 16 correlations were significant with r values ranging from .29 to .61. In a final example of validity research regarding the MBSRQ, Cash et al. (1991) correlated the Overweight Preoccupation Scale (OPS) with several measures of anxiety about being fat, negative body image affect and avoidance, restrained and bulimic eating, and depression. In this study with 79 female college students, the researchers reported all correlations attained significance, with r values ranging from .24 to .67, and that "greater preoccupation with overweight was associated with greater fear of fatness, more body-image dissatisfaction and avoidance, both restrained and bulimic eating behaviors, stronger appearance investment, and more depression" (p. 238). Cash et al. concluded that the significant correlates of the OPS "reflect favorably upon its concurrent and construct validities" (p. 239).

Data Analysis

The data collected from this research was analyzed both descriptively and inferentially. In both types of analyses, since the purpose of this investigation was to examine body image differences between weight cyclers and noncyclers, the male and female samples were treated separately. All statistical analyses were performed using Minitab statistical software (Schaefer & Farber, 1991-1992). Both demographic data related to age, BMI, and ethnicity, and the results of the 12 body image measures were descriptively analyzed for the weight cycler and noncyclers groups, with means and standard deviations (SD) reported whenever

pertinent. In the inferential analyses, the paired weight cyclist/noncyclist responses on the 12 body image measures were analyzed for differences using correlated samples *t*-tests. These measures were grouped according to similar characteristics into five areas, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation. Within each area the researcher controlled for an overall experiment error rate of 5% to reduce the likelihood of chance occurrences of significance when they didn't really occur. To control for this overall experiment error rate of 5%, *p* values within each area were adjusted according to the Bonferroni approach.

Limitations

This research was meant to be an initial investigation into body image differences between weight cycling and noncycling participants. Due to the exploratory nature of this study, this study was limited in several ways.

1. Because the participants for this research were drawn from graduate students in the colleges of education and business, results may not be generalized beyond this particular population.

2. As has been demonstrated in the literature review, a clear, consistent definition of weight cycling has not yet emerged for use in weight cycling studies. While this research has attempted in several ways to improve definitionally upon some prior investigations, certain factors (e.g. magnitude, duration, and frequency of cycles) continue to be diversely treated in recent studies. Therefore, any

results obtained in this research may not be generalized beyond the parameters used to categorize weight cyclers and noncyclers in this study.

3. The measurement of body image in this investigation has a decided slant toward attitudinal body image, with ten subscales measuring subjective body image and only two perceptual indices chosen for the battery. While this bias toward more subjective measures may limit new knowledge about weight cycling and perceptual body image, this researcher's decision to concentrate more on attitudinal assessment is consistent with current trends in body image research (J. K. Thompson, 1996a).

CHAPTER IV

FINDINGS

This chapter contains two main sections. The first section is a presentation of the statistical analysis of the data. The second section offers an evaluation of the hypotheses as they pertain to the results of this study.

Analysis of the Data

The purpose of this study was to analyze the differences between weight cycling and noncycling individuals on perceptual and subjective measures of body image. Weight cycling and noncycling individuals were matched on age and BMI. Responses from each weight cyclist and noncyclist matched pair were recorded for all 12 body image variables. Differences between each matched pair were computed by subtracting the noncyclist response scores from the cyclist scores; correlated samples *t*-tests were then performed on these differences. Five areas of perceptual and subjective body image were examined, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation. Within each area the researcher controlled for an overall experimental error rate of 5% to reduce the likelihood of chance occurrences of significance when they didn't really occur. To control for this overall experimental error rate of 5%, *p* values within each area were adjusted according to the Bonferroni approach.

Additionally, independent sample t-tests were used to compare the differences between the entire sample of female weight cyclers and noncyclers on age and BMI. All statistical analyses were performed using Minitab statistical software (Schaefer & Farber, 1991-1992).

Areas of Body Image Examined

In this study, five areas of body image were examined, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation.

Appearance Satisfaction

The researcher grouped together four variables related to the participants' satisfaction of or behavioral investment in maintaining their physical appearance. These four variables included the body-size dissatisfaction (CBS-IBS) score of the CDRS, and the appearance evaluation, appearance orientation, and body-areas satisfaction subscales of the MBSRQ.

Fitness

Both the fitness evaluation and fitness orientation subscales of the MBSRQ were included in the fitness area. These two scales measure both the feelings of and the behavioral investment in being physically fit or unfit.

Health

Three scales of the MBSRQ comprised the health grouping, including health evaluation, health orientation, and illness orientation. These scales measure feelings of and behavioral investment in a physically healthy lifestyle, and also the extent of reactivity to being ill.

Body-Size Perception

Two scales were included in the body-size perception group. The first was the body-size perception scale of the CDRS, which asked participants to select the silhouette mostly closely representing their current body size. The second scale used was the self-classified weight scale of the MBSRQ, which reflects how the participants perceived and labeled their weights, from very underweight to very overweight.

Overweight Preoccupation

The overweight preoccupation scale of the MBSRQ was the only scale in this category. It assesses fat anxiety, weight vigilance, dieting, and eating restraint.

Results

In this section the researcher presents the results of the data gathered on the five areas of body image and analyzed utilizing correlated sample t-tests for differences in body image scores between weight cyclers and noncyclers matched

on age and BMI.

Appearance Satisfaction

This section describes the findings of the data analysis on the appearance satisfaction grouping, comprised of appearance evaluation, appearance orientation, body-areas satisfaction, and body-size dissatisfaction. Table 12 presents the means and standard deviations for cyclers and noncyclers on the four variables, and Table 13 describes the analyses of differences.

Statistically significant differences were found on three of the scales in the appearance satisfaction area, including appearance evaluation, body-areas satisfaction, and body-size dissatisfaction. On appearance evaluation, weight cyclers feel

Table 12
Appearance Satisfaction Means and Standard Deviations

Scales	Cyclers		Noncyclers	
	Mean	SD	Mean	SD
Appearance Evaluation	2.30	0.83	3.46	0.68
Appearance Orientation	3.82	0.69	3.60	0.62
Body-areas Satisfaction	2.60	0.58	3.55	0.47
Body-size Dissatisfaction	2.83	1.26	1.60	1.37

Table 13

Appearance Satisfaction Differences Between Cyclers and Noncyclers

Scales	Differences			
	Mean	SD	t	p
Appearance Evaluation	-1.16	0.76	-5.96	0.0000*
Appearance Orientation	0.22	0.64	1.34	0.20
Body-areas Satisfaction	-0.95	0.68	-5.40	0.0001*
Body-size Dissatisfaction	1.23	1.36	3.52	0.0034*

*statistically significant when compared with p value of 0.00625

significantly less positive and satisfied with their appearance than do noncyclers. With respect to body-areas satisfaction, weight cyclers feel significantly less content with the size or appearance of several areas of their body than do noncyclers. On body-size dissatisfaction, cyclers have a significantly larger discrepancy between their current body size and their ideal body size than do noncyclers. No statistically significant differences between cyclers and noncyclers were found on appearance orientation, which involves the extent of behavioral investment in one's appearance.

Fitness

Tables 14 and 15 describe the findings of the analysis of the fitness grouping. The two variables comprising this group included fitness evaluation and fitness orientation.

No statistically significant differences between weight cyclers and

Table 14

Fitness Means and Standard Deviations

Scales	Cyclers		Noncyclers	
	Mean	SD	Mean	SD
Fitness Evaluation	2.99	1.16	3.58	0.64
Fitness Orientation	2.93	0.87	3.18	0.81

Table 15

Fitness Differences Between Cyclers and Noncyclers

Scales	Mean	SD	Differences	
			t	p
Fitness Evaluation	-0.58	1.15	-1.95	0.072
Fitness Orientation	-0.25	1.20	-0.81	0.43

noncyclers were found on either the fitness evaluation or the fitness orientation scale of this grouping when compared to the p value of .0125.

Health

Tables 16 and 17 describe the findings of the analysis of the three variables in the health grouping. The variables in this group included health evaluation, health orientation, and illness orientation.

Statistically significant differences were found between weight cyclers and noncyclers on one scale in this grouping, health evaluation. On health evaluation, weight cyclers feel their bodies are in significantly less good health than noncyclers; cyclers also feel more unhealthy and experience more bodily symptoms of illness and vulnerability to illness than do noncyclers. No statistically

Table 16
Health Means and Standard Deviations

Scales	Cyclers		Noncyclers	
	Mean	SD	Mean	SD
Health Evaluation	3.27	0.48	3.97	0.55
Health Orientation	3.25	0.45	3.56	0.82
Illness Orientation	3.28	0.87	3.13	0.68

Table 17
Health Differences Between Cyclers and Noncyclers

Scales	Differences			
	Mean	SD	t	p
Health Evaluation	-0.70	0.77	-3.52	0.0034*
Health Orientation	-0.31	0.87	-1.37	0.19
Illness Orientation	0.15	0.96	0.59	0.56

*statistically significant when compared with p value of .0083333

significant differences between cyclers and noncyclers were found on health orientation, which involves the extent of behavioral investment in a physically healthy lifestyle, or illness orientation, which includes the extent of reactivity to being or becoming ill.

Body-Size Perception

Tables 18 and 19 describe the findings of the analysis of the two variables in the body-size perception grouping. The variables comprising this group included body-size perception and self-classified weight.

Statistically significant differences were found between weight cyclers and noncyclers on both scales in this grouping. On body-size perception, weight

Table 18

Body-Size Perception Means and Standard Deviations

Scales	Cyclers		Noncyclers	
	Mean	SD	Mean	SD
Body-size Perception	6.70	1.46	5.53	1.89
Self-classified Weight	4.12	0.49	3.57	0.65

Table 19

Body-Size Perception Differences Between Cyclers and Noncyclers

Scales	Mean	SD	Differences	
			t	p
Body-size Perception	1.17	1.48	3.04	0.0087*
Self-classified Weight	0.55	0.57	3.75	0.0022*

*statistically significant when compared to p value of .0125

cyclers chose significantly larger current body size silhouettes than noncyclers. With respect to self-classified weight, cyclers perceived and labeled their weight significantly higher than noncyclers.

Overweight Preoccupation

Tables 20 and 21 describe the findings of the analysis of the final variable overweight preoccupation.

Table 20

Overweight Preoccupation Means and Standard Deviations

Scales	Cyclers		Noncyclers	
	Mean	SD	Mean	SD
Overweight Preoccupation	3.70	0.58	2.12	0.54

Table 21

Overweight Preoccupation Differences Between Cyclers and Noncyclers

Scales	Mean	SD	Differences	
			t	p
Overweight Preoccupation	1.58	0.75	8.20	0.0000*

*statistically significant when compared to p value of .025

Statistically significant differences were found between weight cyclers and non-cyclers on the overweight preoccupation scale. On this measure, weight cyclers reflected significantly more fat anxiety, weight vigilance, dieting, and eating restraint than did noncyclers.

Evaluation of the Hypotheses

This research examined the differences between weight cyclers and noncyclers on 12 perceptual and subjective body image variables. Twelve null hypotheses predicted there would be no differences between female weight cyclers and female noncyclers on: (1) Current Body Size, (2) Body-Size Dissatisfaction, (3) Appearance Evaluation, (4) Appearance Orientation, (5) Fitness Evaluation, (6) Fitness Orientation, (7) Health Evaluation, (8) Health Orientation, (9) Illness Orientation, (10) Body-Areas Satisfaction, (11) Overweight Preoccupation, and (12) Self-Classified Weight. The same 12 null hypotheses were applied to the sample of male cyclers and noncyclers.

Null Hypotheses Tested on the Female Sample

Utilizing correlated sample *t*-tests on the differences between female weight cycler and noncyclers scores on 12 perceptual and subjective body image variables, this research found significant differences at the 95% level on seven variables and no significant differences on five variables. Therefore, the following null hypotheses were rejected: There will be no significant difference between female weight cyclers and noncyclers on appearance evaluation, body-areas satisfaction, body-size dissatisfaction, health evaluation, body-size perception, self-classified weight, and overweight preoccupation. On these seven variables, this research demonstrated differences between the female weight cyclers and noncyclers. On another five variables, however, this research did not

demonstrate significance. These five null hypotheses were retained: There will be no significant difference between female weight cyclers and noncyclers on appearance orientation, fitness evaluation, fitness orientation, health orientation, and illness orientation.

Null Hypotheses Tested on the Male Sample

Since this sample did not yield enough male weight cyclers to undergo the matching process with male noncyclers, correlated sample t-tests were not performed on male pairs matched on age and BMI. Therefore, the null hypotheses on the male subjects stand untested.

CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

In this final dissertation chapter, the researcher summarizes the research project and discusses its findings. She also makes recommendations for future research and offers suggestions to practitioners working with eating related issues in clinical settings.

Summary

The early research on weight cycling focused mainly on the physiological effects of weight cycling as they pertained to metabolism and health. Very few studies examined what psychological consequences might be associated with weight cycling. This study intended to augment that scant body of research about the psychological consequences of weight cycling by exploring differences in perceptual and subjective body image between individuals who were weight cyclers and those who were noncyclers. This research also seemed clinically relevant, since weight cycling has been linked to dieting, and because both dieting and body image dysphoria have been associated with eating disorders.

Participants in this study were female and male graduate students who completed two body image measures (CDRS and MBSRQ) and a weight and dieting history questionnaire (WHQ). Data obtained from the WHQ were used

to identify individuals who met weight cyclist and noncyclist criteria and match these individuals on age and body mass index. The researcher intended to find 15 pairs of females and another 15 pairs of males who were matched on cycling status, age, and body mass index. However, since there were fewer males than females in this sample, and the males did not exhibit the same levels of dieting and weight cycling as the females, only five male pairs were identified. Because it would have been difficult to make meaningful inferences based on data derived from only five pairs, differences in perceptual and subjective body image were, therefore, not able to be examined in the male pairs. The researcher was able to complete the comparative analyses of the body image variables on the 15 pairs of female participants who were matched on cycling status, age, and BMI.

The researcher used correlated samples *t*-tests to analyze the data from the 15 weight cycling and noncycling female pairs for differences on five areas of perceptual and subjective body image, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation. Within each area the researcher controlled for an overall experimental error rate of 5%; *p* values were adjusted according to the Bonferroni approach. Results of the analyses indicated there were statistically significant differences between weight cyclers and noncyclers on seven of the variables from the affective, perceptual, and overweight preoccupation dimensions of body image.

Discussion of the Findings

In this section, the researcher discusses the findings from two areas of this study. The discussion from the first area pertains to data obtained from the quantification of several questions from the Weight History Questionnaire. These data were used in the preliminary matching procedures to identify the cyclers and the noncyclers from the complete sample of 444 participants. The researcher also discusses the data resulting from the correlated samples *t*-test analyses performed on the 15 female pairs matched on cycling status, age, and BMI.

Data Obtained From Matching Procedures

Interesting data were acquired from the preliminary matching procedures which involved quantification of the responses from questions 1, 3, and 4 of the WHQ. These questions asked participants to describe their predominant weight pattern over the last 5 years (stable, steady gain, lost weight, or fluctuating weight), frequency of intentional dieting (very often, often, sometimes, rarely, or never), and the number of 10 pound weight cycles (0-1, 2-3, 4-6, 7-10, 11-15, or more than 15) during the same 5 year time period. One finding of this study was that stable weight was the most commonly reported pattern in this sample. Forty-seven percent of the sample reported stable weight patterns over the last five years, with both genders being near that percent (females at 46% and males at 48%). Participants reported fluctuating weight as the second most prevalent pattern (32%), with steady weight gain third (16%), and loss in weight (5%) being

the least common pattern. Although stable weight was the predominant pattern reported, another 53% of this sample reported weight that was unstable, either fluctuating, gaining, or losing. This finding is disturbing, especially in light of epidemiological studies which have reported higher mortality rates among persons with unstable body weights than for persons whose body weights are relatively stable (Blair et al., 1993; Hamm et al., 1989; Lissner et al., 1989; Lissner et al., 1991; D. F. Williamson, 1996).

Approximately 59% of the entire sample reported the frequency of dieting as rarely or never. Some variation between the genders was observed, however, with 73% of the men versus 51% of the women reporting rarely or never dieting. As to the levels of actual dieting in this sample, 41% reported at least some dieting. This percentage was somewhat higher among the female participants, with 49% dieting, than among the males, who reported 27% dieting. These percentages appear consistent with and perhaps even a little higher than the dieting literature, which has placed dieting levels at approximately 40% for females and 24% for males (Brownell & Rodin, 1994a). In examining the dieting responses even more closely, only a small percentage of participants reported dieting very often (4%); another 12% reported dieting often, and 25% said they dieted sometimes. It appears the frequency of dieting that occurred with these participants was of a moderate level. Nevertheless, the high percentage of participants in this sample who reported some level of dieting is quite troublesome, especially since restrained eating has been shown to place individuals at greater risk for eating

problems (Polivy & Herman, 1995).

In spite of the fact that 41% of the individuals in this sample reported at least moderate levels of dieting, 77% of the participants overall reported they had zero or only one 10 lb. weight cycle over the past 5 years. Another 14% reported 2-3 weight cycles of the same magnitude and time duration. Therefore, 91% of the participants in this sample reported three or fewer 10 lb. weight cycles. Only 9% of the participants reported four or more 10 lb. weight cycles over the past 5 years. Although 9% is still a substantial portion of the sample to have experienced weight cycling, the levels of dieting were much higher than the levels of weight cycling. Participants in this sample were 4.55 times more likely to have dieted, than to have weight cycled. This finding appears to be an important clarification for the weight cycling literature, particularly since the popular press has often equated dieting with weight cycling. While dieting has clearly been associated with high failure and relapse rates, dieting may not be synonymous with weight cycling, at least as it has been defined in this research.

Data Resulting From Correlated Samples T-Test Analyses

Body image has been defined as "the psychological aspects of body experience" (Rosen & Srebnik, 1990, p. 246). Various models have been developed to describe this complex, multidimensional construct. Early models of body image focused on its perceptual and subjective components (Bruch, 1962; Garner & Garfinkel, 1981). As the models of body image evolved, a behavioral component

consisting of a lifestyle revolving around physical self-consciousness was added (Rosen, 1990). The most recent and sophisticated models have defined the four dimensions of body image disturbance as body-size distortion, preference for thinness, body dissatisfaction, and fear of fatness (Gleaves et al., 1995).

This particular study sheds some light on which components of body image are especially vulnerable to weight change and fluctuation, as defined by the weight cycling criteria employed in this investigation. The researcher used correlated samples *t*-tests to analyze the data from 15 weight cycling and noncycling female pairs for differences on 12 variables grouped into five areas of perceptual and subjective body image, including appearance satisfaction, fitness, health, body-size perception, and overweight preoccupation. Within each area the researcher controlled for an overall experimental error rate of 5%, with *p* values adjusted according to the Bonferroni approach. This section discusses both the statistically significant and the nonsignificant results of the data analyses. It also offers some concluding remarks about the findings of this investigation.

Discussion of Statistically Significant Results

Results of the analyses indicated there were statistically significant differences between female weight cyclers and noncyclers on seven of the twelve body image variables. From the appearance satisfaction grouping, statistically significant differences between female weight cyclers and noncyclers were found on appearance evaluation, body-areas satisfaction, and body-size dissatisfaction.

Female weight cyclers felt less positive and content with both their overall appearance and the size and appearance of several body areas than did the noncyclers. Cyclers also demonstrated a larger discrepancy between their current body size and their ideal body size than did noncyclers. From the health grouping, statistically significant differences were found between female cyclers and noncyclers on health evaluation. Weight cyclers felt their bodies were in less good health and experienced more bodily symptoms of illness than did noncyclers. From the perceptual grouping, statistically significant differences were found between female cyclers and noncyclers on both body-size perception and self-classified weight. On these variables, weight cyclers chose larger current body size silhouettes and perceived and labeled their weight higher than noncyclers. From the final grouping, there were also statistically significant differences between female cyclers and noncyclers on overweight preoccupation, with the cyclers exhibiting greater fat anxiety, and more weight vigilance, dieting, and eating restraint than the noncyclers.

It appears, therefore, that this research indicates that the affective, perceptual, and overweight preoccupation components of body image are most vulnerable to weight cycling. Weight cyclers felt less liking toward and satisfaction with facets of their appearance and health than did noncyclers. They perceived themselves as larger and more overweight than did the noncyclers, even when the two groups were carefully matched in size on body mass index. Weight cyclers also showed more vigilance toward their weight and eating patterns than did

noncyclers.

While this study has furnished valuable information regarding on which dimensions of body image weight cyclers differ from noncyclers, these findings are particularly significant when viewed in terms of the body-self relationship. Several researchers have attested to the importance of this relationship. Krueger (1990) has described four normal body-self developmental stages through which individuals progress to achieve more complete, integrated body schema:

First, the body self is the *function* of another (a caretaker). Next, it is immediate, felt *experience*: the emerging experience of unsatisfied need (e.g., hunger). Next, the body self is *form*, objectively distinct patterns of behavior, as well as the subjective and systematic experience of reality. Finally it is *concept*, a relatively enduring internal frame of reference, comprised of bodily and emotional images, concepts, and experiences. The quality of relative stability over time comprises the aspect of identity. (p. 257)

In Krueger's final stage, the body-self has become a stable frame of reference for the identity. Pruzinsky and Cash (1990) also have highlighted the importance of the body-self relationship. They state, "Our most fundamental sense of ourselves is as a body (Mahler & McDevit, 1982). The sense of self is based on the experience that one is embodied and differentiated from the outside world and from others" (p. 340). And finally, Hutchinson (1994) has asserted that "the relationship to our bodies is the first relationship we have and the foundation of our selves" (p. 152). She further states:

To be embodied is to experience the body as the center of existence--not as focus, but as a reference point for being in the world. It is to feel alive, to perceive bodily states as they change from pleasure to pain, from hunger to satiety, from energy to fatigue, from vitality and excitement to calm and tranquility. Everything we think, feel, or do registers in our bodies

through subtle changes in the musculature and bodily functions. There is no emotion without motion, however small: a change in pulse or body temperature, a restriction of the breathing, a tensing of the musculature. Body awareness helps us perceive changes that signal emotional shifts; intuition is also based on awareness of the subtle, felt shifts in our bodies. (p. 155)

The body thus becomes the major cornerstone or reference point from which self identity develops.

In this study, however, it appears that female weight cyclers may not experience their bodies as the solid reference point from which a positive self-identity and body image can emerge. Weight cyclers, for example, feel less satisfied with their body parts and their overall body size and shape than do noncyclers. They also experience more distortion of their physical boundaries and exhibit more anxiety about the maintenance of those boundaries. Perhaps, just as children may develop anxious attachments to others when their caregivers have not provided consistent parenting (Bowlby, 1988), weight cycling females may similarly have developed anxious, insecure attachments to their bodies as a result of poor attachment patterns in childhood, such as early physical and/or sexual trauma, and rejection of their bodies by important others. Additionally, the body experience of weight cyclers may be stressed even further in adolescence and adulthood from the constant flux in size and shape due to yo-yo dieting. Several researchers and clinicians (Pruzinsky & Cash, 1990; B. W. Thompson, 1994; Wooley & Wooley, 1985) have described how various changes to the body, including fluctuations in weight, have the potential for psychological disruption to the self. This researcher wonders whether weight cyclers may be vulnerable not only to the body image

disturbances found in this study, but to other afflictions of the self as well, such as disordered eating practices, low self-esteem, and depression. As Cash (1990b) has so aptly stated, "if one dislikes the body one lives in, it's difficult to be satisfied with the self who lives there" (p. 61).

Discussion of Statistically Nonsignificant Results

Results of the analyses indicated there were no statistically significant differences between female weight cyclers and noncyclers on five of the twelve body image variables. No statistically significant differences between weight cyclers and noncyclers were found on any of the four orientation subscales (appearance, fitness, health, and illness) of the MBSRQ. The orientation subscales involve the degree of cognitive importance of, and behavioral attention given to the domain. Thus, the results indicate that female weight cyclers do not exhibit statistically significant differences from noncyclers in the amount of cognitive and behavioral investment given to their appearance, physical fitness, health, or illness. Additionally, there were no statistically significant differences between female cyclers and noncyclers on the fitness evaluation subscale of the MBSRQ, which measured the extent of liking, attainment, and satisfaction of physical fitness. While this scale purports to measure feelings, thus placing it loosely within an affective domain, an analysis of the items in this particular subscale indicate less affective content than the other evaluation subscales. Specifically, the three items comprising this subscale include "I easily learn physical skills, I do poorly in physical sports or

games, and I am very well coordinated" (Cash, 1990a, p. 2-3). These fitness evaluation items tap more into the attainment part of the evaluation subscale definition. And because attainment seems to be related to accomplishment and achievement, and thus to behavioral success, the fitness evaluation subscale actually seems more akin to the orientation subscales, than to the evaluation subscales. It appears, therefore, that weight cyclers did not have statistically significant differences from the noncyclers on subscales having a more behavioral orientation. So while weight cyclers did exhibit statistically significant differences from noncyclers on the affective, perceptual, and overweight preoccupation dimensions of body image, these differences did not seem to have an effect on the more behavioral domains of body image, at least at levels high enough to register statistical significance in this nonclinical sample.

Concluding Remarks

In this investigation, the researcher found negative differences between female weight cyclers and noncyclers on the affective, perceptual, and overweight preoccupation dimensions of body image. While the research on the psychological effects of weight cycling to body image is still in very exploratory stages, this study has provided additional evidence that weight cyclers may experience more psychologically disruptive effects to their body image than do noncyclers. In light of these findings, this researcher offers several recommendations both for future research efforts and for clinicians working with individuals struggling with eating,

dieting, and body image concerns.

Recommendations

In this section the researcher makes recommendations for further study of weight cycling and body image. These recommendations are intended to extend the meager empirical base on the combined workings of these two constructs and inform clinicians practicing with eating-related issues.

Research Recommendations

Recommendations for future research focus on using more sophisticated research designs that will yield added definitional information about weight cycling and body image, exploring weight cycling within the context of eating disorders, and finding ways to investigate weight cycling and body image concerns in male populations.

Developing Sophisticated Research Designs

This research was intended to be an exploratory study on what relationships might exist between weight cycling and body image. Since no prior studies have investigated these two constructs together, the results demonstrating differences between female weight cyclers and noncyclers on several body image dimensions are important findings. Additionally, the use of the WHQ helped clarify the definition of weight cycling by relating weight cycling specifically to dieting,

capturing the cyclical nature of weight cycling , and emphasizing the number of weight cycles as the primary weight cycling measurement criterion. However, in spite of these improvements to the weight cycling definition, other questions remain to be answered. For example, what criteria would most clearly differentiate cyclers from noncyclers? Was the 10 lb. criterion used in this study the best discriminator between the two groups, or would a 5 lb. measure have been more accurate? Also, was the quantity of four or more weight cycles employed in this research the best number to use, or would two or three cycles have been as satisfactory a measure? Clearly, in future studies more advanced statistical techniques are needed to answer some of these questions. Perhaps correlational analyses to see which variables are highly correlated with others or discriminant analyses to see how well various criteria help predict classification into weight cycler or noncyclers groups might be appropriate techniques to address these issues.

Another question future research might address concerns whether the differences in body image between cyclers and noncyclers hold true at different levels of BMI. For example, will there be differences between cyclers and noncyclers on body image at the lower levels of BMI category? Will these same differences be maintained at the normal, overweight, and obese categories of BMI? Such questions might be answered with more advanced research designs and statistical techniques. For example, a design using a two-factor analysis of variance might be used to test body image differences between weight cyclers and noncyclers at four categories of BMI (low, normal, overweight, and obese).

Eating Disorder Research

The findings of this research have highlighted differences between female weight cyclers and noncyclers on several dimensions of body image. These findings have made this investigator wonder how the negative body image which female weight cyclers experience may be related to the development of eating disorders, especially since six of the seven body image variables showing statistical significance were variables often associated with eating disorders. These six variables included appearance evaluation, body-areas satisfaction, body-size dissatisfaction, body-size perception, self-classified weight, and overweight preoccupation. Similarly, the DSM-IV (1994) eating disorder diagnostic criteria related to body image include fear of gaining weight or becoming fat, distortion of body weight and shape, excessive emphasis on body weight and shape, and body and shape dissatisfaction.

Another finding of this study was that there were much higher levels of dieting (41%) in this sample compared to levels of weight cycling (9%). While dieting has already been implicated as a causal antecedent to the development and maintenance of eating disorders (Rodin, Schank, & Striegel-Moore, 1989; Striegel-Moore, Silberstein, & Rodin, 1986; D. A. Williamson, 1990), not all individuals who diet develop eating disorders. Perhaps the weight cycling that often accompanies dieting may be the psychologically disruptive force which contributes to eating disorder development. Although eating disorder research is often quite complex, due to the multifactorial nature of the problem, it seems important to

begin including weight cycling as another dimension warranting study in future eating disorder investigations.

Weight Cycling and Body Image in Males

The biggest disappointment associated with this study was not being able to identify 15 matched pairs of male cyclers and noncyclers so that differences in men's body image could be studied. In fact, only five males met the weight cycling criteria due to lower numbers of males in the sample and lower levels of dieting among males compared to females. However, since nearly 32% of both genders reported fluctuational weight patterns, it seems important to better understand these fluctuational patterns in males. Perhaps sampling venues which are more traditionally male-inhabited, such as sporting events or university departments of math and science, might make a heavier concentration of male subjects available for weight cycling research. Additionally, it might be important to look at the causes of weight fluctuation in each gender. While females participated in dieting more often as a way to maintain or lose weight at higher levels than did males (49% to 27%, respectively), perhaps males attempt weight maintenance and loss through other means, such as exercise, or a combination of diet and exercise. It seems, therefore, that before the research questions on differences in body image between male weight cyclers and noncyclers can be addressed, a more pressing issue is to gain a better understanding of possible weight cycling patterns in male individuals.

Clinical Recommendations

This research has reported differences between female weight cyclers and noncyclers on several affective, perceptual, and overweight preoccupation dimensions of body image. Although this investigation was an exploratory study into what relationships might exist between weight cycling and body image, and not a causal analysis, the findings do lend support to other research about the possible psychologically disruptive nature of bodily change due to weight fluctuation. In light of these potential disruptions, it seems fitting, therefore, for this researcher to make recommendations for clinicians treating individuals struggling with eating, dieting, and body image concerns.

Treatment Approaches That Minimize Weight Fluctuation

Dieting as a weight loss method has recently come under fire due to its lack of efficacy. Dieters most often relapse and regain the weight lost from their dieting efforts. Many dieters enter into frustrating patterns of weight fluctuation characterized by repeated cycles of weight loss and regain commonly known as yo-yo dieting or weight cycling. Results from the current body of weight cycling literature indicate that individuals with a history of weight cycling most likely do not face metabolic effects of their weight fluctuation, but may suffer possible health or psychological consequences. This particular investigation, for example, found female weight cyclers to be negatively different from noncyclers on several dimensions of body image. Since we currently do not have sufficient knowledge

to determine conclusively whether weight cycling from intentional weight loss attempts is harmful to individuals or not, it seems premature to completely abandon dieting as a weight loss method, especially for obese individuals who face serious health problems related to their overweight. It does appear, however, that we need to minimize the possible effects of weight cycling by providing weight loss programs which emphasize improving maintenance and encouraging healthier lifestyles. Both of these approaches would promote weight loss as very slow process, thus allowing more time for bodily changes to become better integrated psychologically. Such approaches seem especially important in light of this investigation's findings that 53% of the sample reported unstable weight patterns, and that statistically significant differences existed between female weight cyclers and noncyclers on the affective, perceptual, and overweight preoccupation dimensions of body image.

Improving Maintenance. In order to reduce the possible negative effects of weight cycling on body image found in this investigation, several strategies can be used to improve maintenance during and following weight loss efforts. Brownell and Wadden (1992) and Perri (1995) have recommended extending the length of treatment from traditional eight-week programs to ones of 20-40 weeks duration. These longer programs would help patients better adhere to behaviors necessary for long-term weight loss and produce more successful outcomes. Prolonged therapist contact during such extended programs would also allow more time for a strong therapeutic alliance to develop, thus providing clients with

greater opportunities for sustained encouragement and support. Perri and Foreyt (1987) have also recommended enlisting social support to provide additional guidance, emotional support, and social reinforcement for the weight maintainer. Social supports might include training with spouse and family members, buddy systems with others attempting to maintain, self-help groups such as Overeaters Anonymous, and telephone networks. Brownell and Wadden, Perri, and Foreyt additionally have advised teaching patients coping skills to use in the face of potential relapse. Such coping skill strategies might include a review of past relapse patterns, formal problem-solving training, and practice in coping with high risk situations. These strategies for slowing the weight loss process to improve maintenance would minimize the amount of weight cycling and thus temper the ill effects of weight cycling on the body image dimensions reported in this study.

Encouraging Healthier Lifestyles. Burgard and Lyons (1994) and Garner and Wooley (1991) have offered several suggestions which focus on promoting healthier lifestyles instead of dieting. They recommend that individuals become involved in pleasurable physical activities, not only to contribute to weight change, but also to enhance medical conditions, reduce stress, increase self-confidence, and improve mood. Individuals struggling with weight loss issues should also be encouraged to normalize their food intake. Chronic dieting often has contributed to such disordered eating patterns as categorizing foods as acceptable and legal or bad and forbidden, craving food following severe dietary restriction and then binge eating, and determining the quantity, quality, and spacing of food intake

according to a diet plan. Individuals with these disordered eating patterns should be urged to normalize their food intake by eating healthy foods in moderation according to their body's hunger and satiety cues. Small, gradual nutritional changes, such as sodium reduction, lowering fat intake, and increased consumption of fruits and vegetables, may also have positive health consequences when recommended to and tried by overweight individuals. These suggestions which focus on encouraging healthier lifestyles might reduce the high levels of dieting found in this research by giving individuals alternative ways to control their weight, instead of relying so heavily on dieting for weight loss and maintenance, a method which has shown to possess dubious long-term efficacy.

Integrate Body Image Therapy Into Treatment Approaches

Research has indicated that negative body image is a pervasive force in our culture. It is often an underlying factor which drives disordered eating practices in normal weight and obese individuals in both clinical and nonclinical populations. In addition to recommending that clinicians who treat individuals with eating problems utilize weight loss methods that allow for weight loss at a very slow rate, thus allowing more time for better psychological adjustment of bodily changes, it also appears important that clinicians integrate a body image component into their weight loss and therapy programs. A body image component would address the self-loathing related to body shape and weight that is pervasive among individuals in treatment for eating problems, and help foster more self-

acceptance of a wider range of healthy weights and sizes. Having a body image component as an integral part of treatment is especially important since this research has reported negative body image aspects among weight cyclers, whose histories of yo-yo dieting often make them prime candidates for weight loss treatment programs.

Several body image therapy programs currently are available which could easily be integrated into treatment regimens. Components of such body image programs include examining the genesis of negative body image both from developmental and cultural perspectives and then working to change those negative body schemas. Kearney-Cooke (1996, November) has developed didactic and experiential approaches to work through body hatred and develop alternative, more positive body images. Cash (1991) also has written a unique audiotape series intended to help persons overcome negative body thoughts, feelings, and behaviors. This series utilizes a cognitive-behavioral approach and is designed to be carried out in a self-directed fashion, but under the leadership of a competent mental health professional. Finally, Hutchinson (1985, 1994) has developed feminist-informed treatment methodology for negative body image using guided imagery, journal processing, group sharing, movement, and expressive media.

Conclusion

This research began as an exploratory investigation into body image differences between female and male weight cycling pairs matched on age and body

mass index. However, due to lower numbers of males in the sample and also lower levels of weight cycling and dieting among these males, the study was able to be completed only with the female portion of the sample. Data gathered from two body image measures were analyzed using correlated samples *t*-tests. Findings indicated there were statistically significant differences between female weight cyclers and noncyclers on several affective, perceptual, and overweight preoccupation dimensions of body image. These finding support other empirical and clinical accounts which attest to the psychologically disruptive force of weight change and weight cycling on various facets of body image. Given the high rates of weight fluctuation found in this and other investigations, along with the potential for accompanying psychological disruption, it seems pressing, therefore, to continue both empirical and clinical investigations into the possible relationships between weight cycling and body image.

Appendix A
Protocol Clearance From the Human Subjects
Institutional Review Board

Human Subjects Institutional Review Board



Kalamazoo, Michigan 49006-3899

WESTERN MICHIGAN UNIVERSITY

Date: 31 January 1997

To: Suzanne Hedstrom, Principal Investigator
Karen Casebeer, Student Investigator

From: Richard Wright, Chair

Re: HSIRB Project Number 96-12-20

This letter will serve as confirmation that your research project entitled "Differences in Perceptual and Subjective Body Image between Weight Cycling and Noncycling Female and Male Graduate Students" has been **approved** under the **exempt** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you must seek specific approval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 30 January 1998

Appendix B
**Letter to Faculty Requesting
Participation in Study**

Winter Semester, 1997

Dear Faculty Member:

I hope your winter semester has been productive and enjoyable thus far! Although I know semester schedules are usually busy, I hope you'll be able to find the time to assist me in a current research effort.

I am presently a doctoral candidate in the Counselor Education and Counseling Psychology Department. While my main interest areas include eating disorders and body image concerns, my immediate focus is collecting data for my dissertation, which is a study of differences between weight cycling (yo-yo dieting) and noncycling individuals on various measures of body image. Dr. Suzanne Hedstrom is the chair of my doctoral committee.

I am seeking participants for my study and have chosen graduate students as my population of interest, since these individuals tend to be older and have a more varied weight and dieting history than would younger participants. The current Schedule of Classes lists your name as faculty of a graduate level class for winter semester of 1997. Would it be possible to take approximately 15 minutes of one class period sometime before this semester ends to administer to your students three short surveys about eating and health behaviors? The surveys will be completely anonymous with no individual responses identified in any way.

Since the empirical literature on weight cycling and body image is very sparse, this research will be important in answering some basic questions about the workings of these two constructs together, providing a foundation for future studies about weight cycling and body image, and informing clinical practice about treating individuals with eating and body image concerns. Findings from this study will also be made available to participants upon individual request.

I will follow up this letter and request with a phone call within the next week. At that time I will be happy to answer any further questions you might have regarding the study or the nature of your possible participation in it. Hopefully, I will also be able to schedule a time to come into your class and administer the surveys.

Thank you for your potential participation in this project. Your time and efforts are greatly appreciated. If you wish to contact me before my follow-up phone call, please feel free to call me at 382-3542.

Sincerely,

Karen Casebeer
3620 Old Colony Road
Kalamazoo, MI 49008

Appendix C
Informed Consent Form

Western Michigan University

Department Of Counselor Education and Counseling Psychology

Principal Investigator: Suzanne M. Hedstrom, Ed.D.

Research Associate: Karen Casebeer, M.A.

I have been invited to participate in a research project entitled "Differences in Perceptual and Subjective Body Image Between Weight Cycling and Noncycling Female and Male Graduate Students." I understand that this research is intended to explore differences in body image between individuals who are weight cyclers (yo-yo dieters) and those who are noncyclers. I further understand that this project is Karen Casebeer's dissertation project.

My consent to participate in this project indicates that I will be asked to spend no more than 25 minutes either during or immediately after my current class period filling out three brief surveys. These surveys include a Weight History Questionnaire, the Contour Drawing Rating Scale (labeled Current Body Size and Ideal Body Size), and the Multidimensional Body-Self Relations Questionnaire (MBSRQ).

As in all research, there may be unforeseen risks to the participant. If an accidental injury occurs while participating in this study, appropriate emergency measures will be taken; however, no compensation or treatment will be made available to me except as otherwise specified in this consent form. Karen Casebeer is also prepared to make a referral for counseling services should I become significantly upset by filling out these surveys, although this is highly unlikely to happen. I will be responsible for the cost of treatment if I choose to pursue it.

Since almost no research currently exists about how weight cyclers differ from noncyclers on body image, one way in which I may benefit from participating in this study will be to help increase the knowledge base on this subject. Increasing that knowledge base will also better inform those clinicians treating individuals with eating, weight, and body image concerns.

I understand that all information collected from me is anonymous. That means that my name will not appear on any papers on which this information is recorded. There will be no way to identify a particular survey with a particular individual. Once the data are collected and analyzed, the survey forms will be retained for three years in a locked file in the principal investigator's office.

I understand that I may refuse to participate or quit at any time during the study without prejudice or penalty. If I have any questions or concerns about this study, I may contact either Suzanne Hedstrom at 387-5114 or Karen Casebeer at 382-3542. I may also contact the Chair of Human Subjects Institutional Review Board at 387-8293 or the Vice President for Research at 387-8298 with any concerns that I have. My signature below indicates that I understand the purpose and requirements of the study and that I agree to participate.

Signature

Date

Appendix D
Weight History Questionnaire

Weight History Questionnaire

1. What pattern best describes your weight over the last five years?
 _____ My weight has remained fairly stable (stayed within a five pound range).
 _____ I have steadily gained weight.
 _____ I have lost weight and kept it off.
 _____ My weight has fluctuated (gone up and down beyond a five pound range).
2. How frequently have you intentionally dieted over the last five years?
 Very often Often Sometimes Rarely Never
3. To what extent do you consider yourself a yo-yo dieter (someone who intentionally diets, loses weight, and then often regains it)?
 A great deal Moderately Somewhat Very little Not at all
4. How many times over the last five years have you gone through a cycle of intentional dieting, lost at least 10 pounds, and then regained all or most of it.
 0-1 times _____ 4-6 times _____ 11-15 times _____
 2-3 times _____ 7-10 times _____ More than 15 times _____
5. My current weight is _____ pounds.
 My current height is _____ feet _____ inches.
6. Are any of the weight changes described in the previous questions related to any medical conditions you have experienced over the last five years?
 Yes _____ No _____
7. My gender is _____ female _____ male.
8. My age is _____ years old.
9. My ethnic background is:
 African-American Asian Caucasian Hispanic Other

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