Exercise and Body Image Disturbance

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Abstract

The relationship between body image disturbance and exercise behaviour was examined. One hundred and fifty five women from Introductory Psychology completed an exercise inventory, four measures of body image disturbance, and had their height and weight measured. The women were divided into three groups based on whether they 1) participated in aerobic activity only, 2) weight trained in addition to doing aerobic activity, or 3) did not exercise at all. Aerobic exercise alone was not associated with less body image disturbance. In contrast, women who weight trained in addition to doing aerobic exercise showed significantly lower scores on the Body Dissatisfaction scale of the Eating Disorder Inventory - 2. Reasons for exercising were also compared across groups. Weight training seemed to be associated with a reduction in negative motivations for exercise such as weight loss and physical appearance. The potential implications of the findings for the eating disordered population are discussed.

Introduction

Body image has received a great deal of attention in the last few years, from both the scientific community as well as the media. This attention is a result of the apparent role of body image disturbance in the development and maintenance of disordered eating behaviours. Disordered eating is considered to be a serious national health problem. One percent of adolescent girls suffer from anorexia nervosa at any given time (Anderson, 1985), a number which is considered to be on the increase by many (Mitchell & Eckert, 1987; Tolstrup, 1990). The incidence of disordered eating increases greatly if sub-clinical forms of eating disorders are considered. Mintz and Betz (1988) reported that within a population of female University undergraduate students, 61% were classified as having intermediate forms of eating-behaviour problems, that is, chronic dieting, while only 33% could be considered to have normal eating behaviours.

There has been growing interest in exercise as a means to improve body image. This prospect is important for the eating disordered population because disturbed body image is one of the factors associated with the development and maintenance of eating disorders. Exercise has generally been viewed as synonymous with aerobic

exercise. The benefits to cardiovascular health associated with aerobic exercise have resulted in the generally accepted opinion that aerobic exercise is the "best" exercise. Exercise has been shown to improve body image, but there is concern that aerobic exercise may be abused by eating disordered individuals, and excessive exercise used as a method for weight control (Kerr, Skok & McLaughlin, 1991; Marshall, 1989). Other forms of exercise which improve body image and are not associated with weight loss may be beneficial to the eating disordered population and therefore need to be investigated.

Attention has been directed at possible health benefits of other types of exercise such as anaerobic exercise, e.g., weight training (Gettman & Pollock, 1981; Mayhew & Gross, 1974; Wilmore, 1974). Some of the health benefits of weight training include improving muscular strength and increasing bone density, which protects against osteoporosis. The purpose of the present study is to evaluate whether weight training in addition to aerobic exercise is associated with less body image disturbance than purely aerobic exercise.

Body Image Disturbance

The term body image has been used in a number of different ways throughout the years. The various definitions converge upon the idea of

body image being the way in which one perceives, experiences, and feels about one's own body. Body image disturbance therefore, describes a maladjustment in the way one perceives, experiences or feels about one's body (Williamson, 1990).

By a surprisingly young age, females apparently learn that they should be dissatisfied with their physical appearance. Maloney, McGuire, Daniels and Specker (1989) found that 55 percent of their seven to 12 year old female subjects wanted to be thinner, and nearly 80 percent of older girls expressed the same desire. Evidently, such dissatisfaction quickly leads to action. Hill, Oliver and Rogers (1992) found that children as young as nine share adult discontent with their bodies and subsequently pursue dieting. This overwhelming obsession with weight control and body shape may lay the groundwork for the development of eating disorders (Hill, Weaver & Blundell, 1990). Patton, Johnson-Sabine, Wood, Mann and Wakeling (1990) reported that women who have dieted before the age of fifteen are eight times more likely to later develop eating disorders than their non-dieting peers.

Body image disturbance is one of the defining features of eating disorders. According to the DSM-III-R, one of the essential diagnostic criteria for anorexia nervosa is, "Disturbance in the way in which one's

body weight, size, or shape is experienced, eg., the person claims to "feel fat" even when emaciated, believes that one area of the body is "too fat" even when obviously underweight." (American Psychological Association, 1987, p.67). The DSM-III-R also specifies that to receive a diagnosis of bulimia nervosa, one of the necessary criteria is "persistent overconcern with body shape and weight." (p. 69).

Early research treated body image disturbance as a unitary construct. More recent investigations have attempted to identify and analyze various components of body image disturbance. Body image disturbance can be understood as consisting of three interrelated components: (1) body size distortion, (2) preference for thinness, and (3) body size dissatisfaction.

Body size distortion. Body size distortion refers to a distorted perception of one's actual body size. Distortion is generally measured by comparing the perception of body size to actual body size measurements (Williamson, 1990). For many years, body size distortion was the sole focus in the investigation of body image disturbance in eating disordered individuals. It was initially found that anorexics overestimated their body size (Halmi, 1987; Muuss, 1985).

In contrast to earlier findings, many researchers have shown that the

amount of distortion is not a function of eating disorders, but rather of body weight (Dolan, Birtchnell & Lacey, 1987; Gustavson, Gustavson, Pumariega, Reinarz, Dameron, Gustavson, Pappas & McCaul, 1990; Gustavson, Gustavson, Pumariega, Herrera-Amighetti, Pate, Hester & Gabaldon, 1993). Penner, Thompson and Coovert (1991) found that when anorexics were matched with individuals from the non-anorexic population for weight, there was no difference in the amount of distortion. Both groups of low weight individuals substantially overestimated their body size. Thus, it now appears that body size distortion has little relevance to eating disorders. The two other components of body image disturbance, preference for thinness and body size dissatisfaction, are now considered more central to the development and maintenance of eating disorders.

Preference for thinness. Preference for thinness is the second component of body image disturbance, although it has received only limited attention. This construct may be conceptualized as an individual's "ideal body size," or a body size which is used by the individual as an ideal standard for judging satisfaction with current perceived body size. Research related to this construct suggests that individuals who intensely fear weight gain, such as those with varying

degrees of eating disorders, prefer a body size which is significantly thinner that those who do not have such fears (Williamson, 1990).

Preference for thinness can be subdivided into a perceptual and a cognitive/affective component. The perceptual aspect of preference for thinness is most easily measured by allowing subjects to visually display a body size they consider to be their "ideal body image". This can be achieved using body-part size estimation techniques, which allow the subject to independently portray their ideal widths of various body parts. Another way of measuring the perceptual component of preference for thinness is the use of distorting image techniques which require subjects to distort a picture of themselves until it represents their ideal body size. The most widely used method for measuring preference for thinness, the Figure Rating Scale, employs silhouettes. This scale consists of nine male and nine female schematic figures ranging in size from very thin to very overweight (Stunkard, Sorenson & Schulsinger, 1983). Subjects are asked to choose the figure that best represents their ideal body size.

Preference for thinness also has a cognitive/affective component. The way an individual thinks and feels about whether or not they have to lose weight can be evaluated by administering a paper and pencil self-report questionnaire such as the Drive for Thinness scale of the Eating

Disorder Inventory-2 (Garner, 1991). The Drive for Thinness scale includes statements such as "I am terrified of gaining weight" and "I am preoccupied with the desire to be thinner", and the subject is asked the degree to which they agree or disagree.

Due to the fact that preference for thinness is a relatively new concept, its operationalization and measurement have not been extensively studied.

Body size dissatisfaction. The third aspect of body image disturbance is body size dissatisfaction. Several research groups have operationalized this construct as the discrepancy between actual body size estimate and ideal body size estimate (Garner, Garfinkel & O'Shauhnessy, 1985; Touyz, Beaumont, Collins & Cowie, 1985; Williamson, Kelley, Davis, Ruggiero & Blouin, 1985; Williamson, 1990; Thompson, 1992). Many researchers suggest that this is the most important aspect of body image disturbance in relationship to eating disorders (Garner, 1991; Klemchuk, Hutchinson & Frank, 1990; Leon, Fulkerson, Perry & Cudeck, 1993).

In addition to the important role that body size dissatisfaction is hypothesized to play in the development and maintenance of eating disorders, it is also considered to be a problem in itself. In terms of

prevalence, severe body size dissatisfaction is considered to be a greater problem than eating disorders among college women (Strober & Yager, 1989). Researchers have reported an association of body and weight dissatisfaction to poor self-esteem and depression (Dykens & Gerrard, 1986; Rosen, Gross & Vara, 1987). Based on these associations, other authors such as Klemchuk, Hutchinson and Frank (1990) have underscored the importance of body size dissatisfaction as a significant dimension in its own right and as an appropriate focus for primary and secondary prevention.

Body size dissatisfaction can also be subdivided into perceptual and cognitive/affective components. The Figure Rating Scale (Stunkard, Sorenson & Schulsinger, 1983) has been used to measure the perceptual component of body size dissatisfaction. Subjects are asked to choose the figure that best represents their current body size, and this is compared to the ideal body size already chosen. The difference between these two figures is referred to as the figural discrepancy rating, and is indicative of the amount of body size dissatisfaction from a perceptual perspective. Other researchers have used the Figure Rating Scale to obtain these measures of body image disturbance (Fallon & Rozin, 1985; Hallinan, Pierce, Evans, DeGrenier & Andres, 1991;

Hallinan & Schuler, 1993).

The cognitive/affective component of body size dissatisfaction describes an individual's positive and negative attitudes towards their body. This dimension has been assessed using a paper and pencil self-report tools. The Body Dissatisfaction scale of the Eating Disorder Inventory-2 (Garner, 1991) is the most specific in terms of dissatisfaction with the size of body parts that are of particular interest to individuals with eating disorders or women with severe body size dissatisfaction. Some of the statements on this scale with which the subject is asked to rate degree of agreement or disagreement include "I feel satisfied with the shape of my body" and "I think my thighs are too large".

These two measures of body size dissatisfaction, a questionnaire along with the figural discrepancy rating, are the two most important measures related to eating disturbance (Altabe & Thompson, 1992).

Exercise

The term aerobic exercise refers to "any activity that requires dramatically increased oxygen consumption over an extended period of time" (Brannon & Feist, 1992, p. 427). Traditionally, aerobic exercise has been viewed as the most beneficial type of exercise because of its causal role in the improvement of cardiovascular health. A major

drawback of aerobic exercise is that in some very extreme cases, it may play a role in the development and maintenance of eating disorders. Eating disorders may be used as a way to drastically reduce weight for the purpose of maximizing performance of aerobic activities (Davis, 1990, 1992). Conversely, aerobic exercise may be utilized as a means of weight control by women with eating disorders. Many eating disordered individuals report compulsive exercise rituals as one of their tools for weight loss (Marshall, 1989; Kerr, Skok & McLaughlin, 1991).

In contrast to aerobic exercise, anaerobic exercise requires short, intensive bursts of energy rather than dramatically increased oxygen consumption. The type of exercise that is most often equated with anaerobic exercise is weight training. There are various types of weight training depending upon the type of equipment used. For example, free weights, and machines such as Nautilus or Cybex, are just two examples of types of weight training that can be utilized. Weight training offers health benefits such as improved muscular strength, improved muscular endurance, increased bone density, and improved cardiac exercise tolerance (Brannon & Feist, 1992; Dubbert, 1992; McArdle & Foglia, 1969). Increased bone density provides protection from osteoporosis which is especially important to the anorexic population because both

osteoporosis and pathologic bone fractures may appear in this group of women (Brotman & Stern, 1985).

Another benefit of weight training is that it increases lean body weight while reducing body fat (Gettman & Pollock, 1981). Thus while body fat is decreased, actual body weight is either maintained or increased (Mayhew & Gross, 1974; Wilmore, 1974). This is of potential value to women who suffer from body image disturbance, especially body size dissatisfaction. Weight training affords them the opportunity to reduce fat, which is why they are dissatisfied with particular parts of their body, without reducing their weight.

Exercise and Body Image

Comparisons of women who are sedentary to women who exercise have generally found that exercise is associated with a more positive body image (Snyder & Kivlin, 1975; Seggar, McCammon & Cannon, 1988). In addition to correlational data, studies which have experimentally manipulated exercise also have shown improved body image. For example, Salusso-Deonier and Schwarzkopf (1991) measured individuals before beginning an exercise program and then again after having been involved in a fitness improvement class for a number of weeks. They were able to conclude that regular exercise

yielded a significant improvement in body image.

Weight training and body image. A number of researchers have investigated the relationship between weight training and body image. The majority of these studies considered a unitary construct of body image and were not sensitive to the components of body image disturbance now understood to be salient with respect to the eating disordered population. The results of such investigations were mixed. Some researchers reported that when compared to sedentary women, women who weight trained demonstrated significant improvements in body image (Brown & Harrison, 1986; Melnick & Mookerjee, 1991). Others found that exercise in general improved body image, but that weight training did not offer any additional benefits (Caruso & Gill, 1992), and some reported that no type of exercise improved body image (Ford, Puckett, Blessing & Tucker, 1989).

Body image disturbance has only been investigated in one study of weight training. Pasman and Thompson (1988) evaluated two of the three components of body image disturbance in obligatory runners, obligatory weightlifters, and sedentary controls. Body size distortion was measured with the adjustable light beam technique. Results indicated that individuals in the weight training group were significantly more

accurate in estimating body size, thereby demonstrating less distortion, than either runners or controls. Body size dissatisfaction was measured using the Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead & Polivy, 1983) and the Physical Appearance Evaluation subscale of the Body Self Relations Questionnaire (BSRQ; Noles, Cash & Winstead, 1985). Women in the weight training group had lower dissatisfaction scores than women in either the running or control groups, suggesting that the women who weight train are the most satisfied with their bodies.

Phillips (1988) specifically considered the effects of weight training on anorexic individuals. While the results of her investigation must be considered anecdotal due to the fact that only two subjects were involved, it does offer some interesting findings. The project was undertaken by Phillips because she had suffered from anorexia for 18 months, and had used weight training as a tool for her own recovery. She found that gradually her attitude towards eating and exercise changed from wanting to be "skinny" to wanting to be "fit and healthy". As her weight increased, she felt in control of her body shape through training with the weights. The actual study offered results for only one subject because the second subject moved away, but the outcome

supported the positive effects of weight training as personally reported by Phillips (1988).

While research has suggested that weight training will result in a less disturbed body image, the existing data are limited. Pasman and Thompson (1988) studied a rather extreme population (compulsive exercisers) and found less body image disturbance in weightlifters. The report by Phillips (1988) only followed one subject, but provided some additional anecdotal evidence. She chronicled a reduction in body image disturbance associated with a weight training program she undertook to self-treat her own anorexia. However, whether weight training has benefits for reducing body image disturbance in the more general female University population remains uncertain.

The Present Study

The present study examined the relationship between weight training and body image disturbance in a more representative sample of female University students, to evaluate whether weight training might be of value for alleviating body image disturbance in this population. In order to evaluate this potential benefit of weight training, three groups of women were compared, based on the type of exercise they engaged in. Weight training was not considered in isolation because there are very few

women who only weight train. Rather, the comparison was between women who weight trained in addition to doing aerobic activities and women who only participated in aerobic exercise. A third group of women, those who were sedentary, served as controls.

In order to determine if weight training was associated with reduced body image disturbance, the three groups were compared on preference for thinness and body size dissatisfaction measures. The correlational nature of this design does not permit causal inferences. However, information about the relationship between type of exercise and amount of body image disturbance reported may lead to a greater understanding of the role of exercise in the reduction of body image disturbance.

Method

Subjects

Female university students between the ages of 17 and 25 were the target population for this study. Within this population, three specific groups were of interest. The first was made up of women who exercised less than twice per month and could be classified as belonging to the no exercise group. The aerobic exercise group consisted of women who were regularly involved in some form of aerobic activity (i.e., aerobics classes, jogging/running, swimming, stationary cardiovascular training equipment such as bicycles or stair-climbers, etc.) for at least one hour a week and who did not participate in any anaerobic exercise such as weight training. The weight training group consisted of women who regularly participated in some form of weight training (free weights, nautilus equipment) at least once a week. All but three of the women who weight trained also participating in aerobic exercise.

One hundred and sixty-six subjects were gathered from the Introductory Psychology classes at Lakehead University. There were 66 women in the no exercise group, 48 in the aerobic only group, and 52 in the weight training group. Seven sedentary subjects were excluded because they had Body Mass Indexes of greater that 33, and no other

group contained comparable individuals. Four women were excluded because they fell between the criteria for the no exercise and aerobic exercise groups (exercised more than twice a month, but less than one hour per week). The women's scores on the Eating Disorder Inventory-2 were screened to identify eating disordered individuals. None of the participants matched the eating disorder profile. However, this exclusion criteria only addressed clinical eating disorders and did not focus on the milder eating problems common to the college-aged female population.

The final sample included 155 women, 59 in the no exercise group, 44 in the aerobics only group, and 52 in the weight training group. All subjects received one course mark as compensation for their time.

Apparatus

An exercise inventory (Appendices A and B) was developed for this study. Questions assessed if respondents engaged in regular exercise, and if so, the type, frequency, duration, and intensity of exercise. The duration of aerobic and anaerobic exercise in years was also reported. If not active on a regular basis, they were asked to consider eight types of exercise (jogging/running, stationary cardiovascular equipment, weight training, swimming, cycling, aerobics classes, racquet sports, and fitness walking), and rate each on a scale from one to five representing their

likelihood of participation. A question also asked about how important each of six potential motivations for exercising (lose weight, increase aerobic capacity, be generally healthier, be stronger/more flexible, increase muscle tone, and improve physical appearance) were in terms of why respondents exercised or would consider beginning to exercise. This question was also rated on a scale from one to five.

On the basis of the information reported in the exercise inventory, the number of hours per week of aerobic exercise was calculated for both exercise groups. The number of hours per week of anaerobic exercise was calculated for the weight training group. From the list of aerobic activities participated in, aerobic intensity was rated on a scale from one to three. A rating of one was least intense and included such activities as swimming, water aerobics, figure skating, ballet, and jazz or tap dancing. An intensity level of two included aerobics, step aerobics, and cycling. An intensity rating of three included activities such as stationary cardiovascular training equipment i.e., stairmaster or rowing, and jogging or running.

The Figure Rating Scale (Stunkard, Sorenson & Schulsinger, 1983) was used to obtain Ideal, Current, and Discrepancy ratings. The women were shown the nine female figures of the Figure Rating Scale (Appendix

C) and asked to report the numbers that corresponded to the figure best representing their current body size and their ideal body size, thereby providing Current and Ideal ratings. The Discrepancy value was obtained by subtracting their Ideal number from their Current number. This tool has been used by other researchers to assess body image disturbance (Fallon & Rozin, 1985; Hallinan, Pierce, Evans, DeGrenier & Andres; Hallinan & Schuler, 1993), and is reported to have good test-retest reliability and adequate validity (Thompson and Altabe, 1991).

The Eating Disorder Inventory-2 (Garner, 1991) was administered (Appendix D). This is a 91 item self-report measure of symptoms commonly associated with eating disorders. Questions are presented in a six-point forced choice format. Respondents answer whether each item applies "always," "usually," "often," "sometimes," "rarely," or "never."

While the entire EDI-2 was administered, only the Drive for Thinness and Body Dissatisfaction subscales were of interest. The Drive for Thinness subscale consists of seven questions and assesses excessive concern with dieting, preoccupation with weight, and fear of weight gain. The Body Dissatisfaction subscale includes nine questions and measures dissatisfaction with overall shape and with the size of those regions of the body that are of greatest concern to individuals with eating disorders.

Both of these subscales have excellent psychometric characteristics (Altabe & Thompson, 1991).

A mechanical weigh scale that also had an attachment to measure height was used to record the height and weight of all subjects. Body Mass Index was calculated by dividing weight in kilograms by the square of height in metres.

Procedure

When subjects were recruited from the Introductory Psychology classes, they were asked to sign up for various pre-arranged testing times. Groups of approximately five to ten women were tested together.

Subjects met in the specified room, where they read the cover letter (Appendix E) and signed an informed consent form (Appendix F) before beginning the testing. Subjects were asked to fill out the exercise inventory, EDI-2, and Figure Rating Scale. In the final stage of testing, the height and weight of the subjects were measured.

Results

The three groups did not differ significantly in either age or BMI (see Table 1). The two exercise groups did not differ significantly in hours per week of aerobic exercise, or duration in years of aerobic exercise. However the weight training group reported significantly higher aerobic intensity levels (see Table 1).

Body Image Disturbance

Four measures were used to assess body image disturbance. To determine if these four devices were all measuring the same construct, their inter-correlations were compared (see Table 2). The Body Dissatisfaction and Drive for Thinness subscales of the EDI-2, and the Discrepancy measure from the Figure Rating Scale were all significantly correlated. However, the Ideal rating on the Figure Rating Scale was not significantly correlated with Body Dissatisfaction or Discrepancy, and was only weakly correlated with Drive for Thinness. Therefore the Ideal rating is probably not measuring the same construct of body image disturbance as the other three.

Table 2 shows that BMI was positively correlated with all four measures of body image disturbance. Therefore, in order to compare the three groups on these measures, BMI was used as a covariate. A

Table 1

Comparison of Age, BMI and Exercise Variables Between Groups

	No Exercise		Aerobic Only		Weight Training		
	M	SD	M	SD	M	SD	F ratio
Age	19.54	1.32	19.09	0.91	19.25	0.88	2.366
BMI	24.16	3.29	24.15	3.61	24.55	3.51	.226
Aerobic							
hrs/wk			3.39	3.13	3.73	1.91	.387
duration (yrs)			3.00	4.46	2.50	3.32	.362
intensity			1.93	0.73	2.63	0.53	27.542*

*$p < .05$.

Table 2

Inter-correlations of the Measures of Body Image Disturbance and BMI

	Body Dissatisfaction	Drive for Thinness	Discrepancy	Ideal
Body Dissatisfaction		.669**	.671**	.012
Drive for Thinness			.449**	-.187*
Discrepancy				-.091
Ideal				
BMI	.456**	.187*	.623**	.406*

*$p < .05$. **$p < .01$.

multivariate analysis of covariance showed that the three groups differed significantly on the four measures of body image disturbance, taken together, $F(8,304)=2.80$, $p=.005$. Follow up analyses of covariance showed that the groups differed only on the Body Dissatisfaction measure, $F(2, 151)=5.42$, $p=.005$. Newman Keuls comparisons on the adjusted scores showed that the weight training group had significantly lower Body Dissatisfaction that did the other two groups (see Table 3 for the means).

Other Correlations

As shown in Table 4, duration of aerobic exercise was significantly correlated with Current body size ratings, Discrepancy ratings, and BMI. Women who had participated in aerobic exercise for a longer period of time saw their bodies as smaller, their BMIs were lower, and the discrepancy between the size that they saw themselves and the size that they would have liked to be also got smaller.

Reasons for Exercising

The two exercise groups had rated each of six reasons why they do exercise. The no exercise group rated each of the same six reasons for why they would consider becoming more physically active.

Figure 1 shows the mean ratings for each group. For this, and all

Table 3

Measures of Body Image Disturbance in the Three Groups

	No Exercise		Aerobic Only		Weight Training			
	M	SD	M	SD	M	SD	F ratio	F ratio[1]
BD	13.71	8.02	12.93	8.99	9.73	8.36	3.353[b*]	5.412[bc**]
DT	5.53	5.09	5.75	5.90	5.65	6.12	.020	.025
D	.93	.72	.95	.90	.76	.73	.959	2.711
I	2.95	.49	2.93	.53	2.94	.65	.012	.056

Note. F ratio[1] is from analysis of covariance.

[a] "No Exercise" differs significantly from "Aerobic Only".

[b] "No Exercise" differs significantly from "Weight Training".

[c] "Aerobic Only" differs significantly from "Weight Training".

*$p < .05$. **$p < .01$.

Table 4

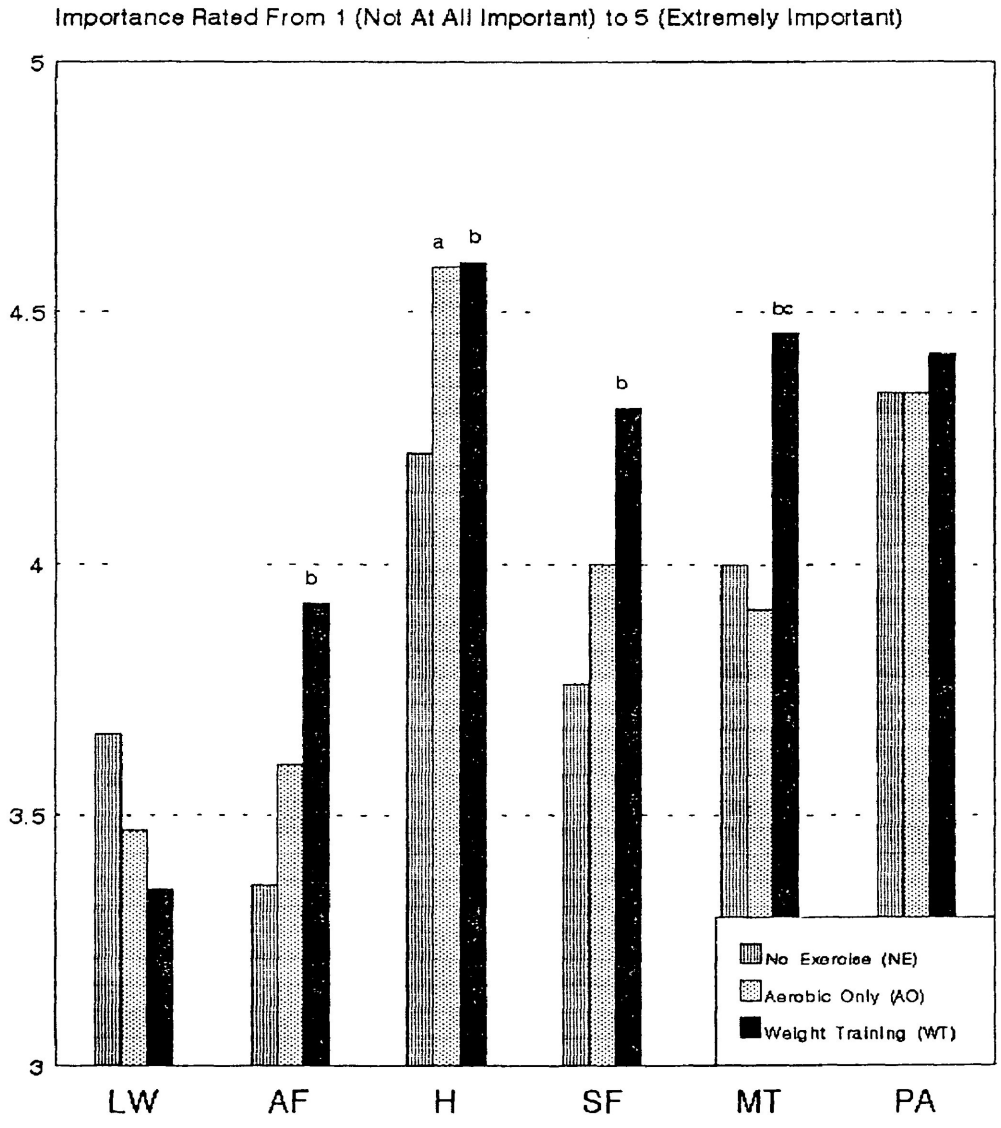
Correlations Between Exercise Variables and Measures of Body Image Disturbance

	AH	AD	AI	ANH	AND
Body Dissatisfaction	-.117	-.141	-.093	.059	-.192
Drive for Thinness	.013	-.039	.050	.164	-.078
Current	-.192	-.335**	-.078	-.068	-.129
Discrepancy	-.189	-.327**	-.050	-.057	-.221
BMI	-.116	-.285**	-.033	-.001	.030

Note. AH = aerobic hours per week, AD = aerobic duration, AI = aerobic intensity, ANH = anaerobic hours per week, AND = anaerobic duration.

**$p < .01$.

Figure 1
Reasons for Exercising in the Three Groups



LW = lose weight, AF = aerobic fitness, H = health, SF = strength/flexibility, MT = muscle tone
PA = physical appearance
Significant differences: a = NE and AO, b = NE and WT, c = AO and WT

analyses to follow, the alpha levels were kept at .05 because of their exploratory nature. The findings should be viewed as hypotheses to be confirmed, not as conclusions. Analyses of variance revealed a significant interaction between group and reason, $F(5,750) = 31.42$, $p<.01$, as well as differences among the six reasons, $F(10,750) = 2.71$, $p<.01$. One way analyses of variance followed by Newman Keuls post hoc comparisons showed that the weight training group rated aerobic fitness, health, strength/flexibility, and muscle tone significantly higher than did the no exercise group (Table 5). The weight training group also rated muscle tone significantly higher than did the aerobic only group. The aerobic group only differed from the no exercise group in giving a significantly higher rating for health. Across the three groups, losing weight and aerobic fitness were generally the least important reasons for exercising, while health and physical appearance were the highest (Figure 1).

The Importance of Physical Attractiveness as a Reason for Exercising

There was a significant correlation between the duration in years of weight training and the importance of physical attractiveness (see Table 6). The longer women participated in weight training, the lower they rated the importance of physical attractiveness as a reason for

Table 5

Reasons for Exercising Compared Between the Three Groups

	No Exercise		Aerobic Only		Weight Training		
	M	SD	M	SD	M	SD	F ratio
Lose Weight	3.66	1.31	3.41	1.47	3.35	1.27	.816
Aerobic Fitness	3.36	1.04	3.60	.95	3.92	.93	4.523[b]*
Health	4.22	.77	4.59	.54	4.60	.66	5.387[ab]**
Strength/Flexible	3.76	.88	4.00	.81	4.31	.85	5.696[b]**
Muscle Tone	4.00	.88	3.91	.77	4.47	.78	6.639[bc]**
Appearance	4.34	.83	4.34	.96	4.42	.72	.158

Note. [a] "No Exercise" differs significantly from "Aerobic Only".

[b] "No Exercise" differs significantly from "Weight Training".

[c] "Aerobic Only" differs significantly from "Weight Training".

*$p < .05$. **$p < .01$.

Table 6

Correlations of Duration of Aerobic and Anaerobic Exercise and Reasons for Exercising

	AH	AD	AI	ANH	AND
Lose Weight	-.039	-.159	.016	-.048	-.149
Aerobic Fitness	.135	.032	.235*	-.040	.115
Health	.057	.088	-.001	-.073	-.112
Strength/Flexibility	.108	.220*	-.033	.152	.163
Muscle Tone	.031	.064	.074	.058	.113
Physical Appearance	-.064	.025	.091	.173	-.388**

Note. AH = aerobic hours per week, AD = aerobic duration, AI = aerobic intensity, ANH = anaerobic hours per week, AND = anaerobic duration.

*$p < .05$. **$p < .01$.

exercising. Aerobic intensity was positively correlated with aerobic fitness as a reason for exercising. The only other significant correlation was between strength/flexibility, and duration of aerobic exercise.

Potential Predisposing Factors to Type of Exercise Engaged In

In order to determine whether or not there were any factors that predisposed women to choose particular types of exercise, the women in the no exercise group had been asked to consider eight possible types of exercise, and to rate each on a scale from one to five indicating how likely they would be to participate in each type of exercise. Correlations between ratings of each type of exercise and the four measures of body image disturbance as well as BMI are presented in Table 7. The two strongest correlations were both related to swimming. Swimming was negatively correlated with both body dissatisfaction and drive for thinness. Women who were more dissatisfied with their bodies and who had a greater drive for thinness were less likely to choose swimming as a possible exercise. Women with a greater drive for thinness were more likely to prefer jogging/running or aerobics. Those with a greater discrepancy score were more likely to prefer cycling. It is important to note that weight training was not significantly correlated with body dissatisfaction, implying that it is not the case that women who are

Table 7

Correlations Between Potential Exercise and Measures of Body Image Disturbance and BMI in the "No Exercise" Group

	BD	DT	D		BMI
Jogging/running	.167	.295*	.031	-.117	.056
Cardio Training	-.028	.021	1.128	-.076	-.131
Weight Training	-.086	.108	-.045	-.007	.055
Swimming	-.345**	-.373**	-.081	.223	.017
Cycling	.152	-.142	.284*	.215	.247
Aerobics	.114	.295*	.021	-.181	-.163
Racquet Sports	.183	.124	.092	-.057	.107
Walking	.066	-.027	.155	-.074	.122

Note. BD = Body Dissatisfaction, DT = Drive for Thinness, D = Discrepancy, I = Ideal, BMI = Body Mass Index.

*$p < .05$. **$p < .01$.

initially less dissatisfied with their bodies would be those who choose to weight train.

For the no exercise group, correlations were examined between the ratings of each type of exercise they might engage in and reasons for possibly beginning to exercise (Table 8). Both aerobics and racquet sports were positively correlated with the desire to improve aerobic capacity. Weight training was more likely to be chosen by those who wanted to increase aerobic fitness, increase strength/flexibility, and increase muscle tone. The other significant finding was that walking was more likely to be chosen by those who most wanted to lose weight.

Table 8

Correlations Between Potential Exercise and Reasons for Exercising in the "No Exercise" Group

	LW	AF	H	SF	MT	PA
Jogging/running	.044	.256	.137	.121	.180	.159
Cardio Training	-.091	.016	.121	.033	.252	.023
Weight Training	-.131	.298*	-.088	.276*	.285*	-.031
Swimming	-.193	-.153	-.154	-.025	-.064	-.129
Cycling	.169	-.099	.153	-.161	-.108	-.133
Aerobics	.238	.461**	.257	-.010	.093	-.001
Racquet Sports	.127	.337**	-.036	-.179	.103	-.001
Walking	.314*	-.006	.200	.089	.054	.024

Note. LW = lose weight, AF = aerobic fitness, H = health, SF = strength/flexibility, MT = muscle tone, PA = physical appearance.

*$p < .05$. **$p < .01$.

Discussion

The purpose of this study was to evaluate whether weight training might be of value for alleviating body image disturbance in young adult female University students who do not have clinical eating disorders. In order to determine if weight training was associated with less body image disturbance, women who did not exercise, women who did aerobic exercise only, and women who weight trained in addition to doing aerobic exercise were compared on four measures of body image disturbance. Women who weight trained reported significantly less body size dissatisfaction (as measured by the Body Dissatisfaction scale of the EDI-2) than did the no exercise group. When BMI was held constant, the weight training group also showed significantly less body size dissatisfaction than the aerobic exercise group.

Only one of the four measures of body image disturbance showed significant differences between groups. The reason for this is unclear. Three of the four measures were significantly inter-correlated but the fourth measure, Ideal, was not strongly related to the other three. Two of the four measures, Drive for Thinness and Ideal were both attempting to measure the preference for thinness component of body image disturbance. This is a newly developed theoretical component and the

potential for modification has never been experimentally measured or tested, so including it in the present study was exploratory in purpose.

The Discrepancy measure, which along with the Body Dissatisfaction subscale of the EDI-2 was supposed to measure body size dissatisfaction, also did not differ significantly between groups. Discrepancy is a perceptual measure, and may not be assessing the salient psychological features of body size dissatisfaction. For example, the duration in years of aerobic exercise was negatively and significantly correlated with Current and Discrepancy ratings as well as BMI. In other words, women who have participated in aerobic exercise for a greater number of years saw their bodies as smaller. They also saw themselves as being closer to their ideal body size. This seems accurate because they also had lower BMIs, so in reality, they were smaller than women who had not been involved in aerobic exercise for as long a period of time. However, the Body Dissatisfaction scores of long-time aerobic exercisers did not reflect these differences. They were not any less dissatisfied with their bodies than were the shorter term aerobic exercisers, even though they were smaller and accurately saw themselves as such. Thus, the Discrepancy measure and the Body Dissatisfaction subscale were not measuring the same things.

The Body Dissatisfaction score of the EDI-2 has been reported to be the most important score for identifying eating-related problems in nonclinical college samples (Garner, 1991; Klemchuk, Hutchinson & Frank, 1990). Even in a much younger sample of seventh to tenth graders, a high level of body size dissatisfaction was one of the strongest predictor variables for risk of development of eating disorders (Leon, Fulkerson, Perry & Cudeck, 1993).

The present study was limited by its correlational nature which prevents direct causal inferences. Correlational methodology was used in order to determine whether or not there was an association between weight training and less body image disturbance. A correlational design allowed the inclusion of women who had been exercising for a long period of time, and who participated in a variety of aerobic exercise intensities. Due to the increased variance of exercise variables, this correlational design was more powerful than a brief experiment could have been, and was therefore useful for exploratory purposes.

Causal inferences are limited in correlational research, since variables other than those under investigation can sometimes be the cause of the relationships. However other variables can always be examined to evaluate whether they may plausibly explain the relationship

of interest. In the present study, the groups were not significantly different in age or BMI. As well, when BMI was statistically controlled for, the difference between groups in body size dissatisfaction increased, indicating that this difference is not simply due to the exercise groups having a lower BMI.

One limitation of correlational studies of exercise is the self selection nature of exercise. People choose whether or not to exercise. They also differ in the type of exercise they choose. Because different kinds of people might choose different exercise programs, any differences found in correlational research could be due to these pre-existing characteristics. To address this issue, the present study included a question for the group who did not exercise, to determine what type of exercise they might engage in. The likelihood of weight training was not significantly associated with body size dissatisfaction. This indicates that the differences found between the three groups was not simply due to weight training being chosen by women who initially were more satisfied with their bodies. Thus, the main finding that weight training was associated with reduced body size dissatisfaction is more parsimoniously viewed as an effect of weight training, not as a pre-existing factor which leads one to choose weight training.

The present findings are consistent with earlier reports that weight training is associated with less body image disturbance. However, the previous studies of body image disturbance both focussed on disordered populations. Pasman and Thompson (1988) studied compulsive exercisers and found less body image disturbance in weightlifters. Phillips (1988) also found less disturbed body image in women suffering from anorexia nervosa. Her particular study was further limited because the results were based on only one subject in addition to the chronicling of her own experiences of overcoming anorexia through weight training. The present study showed that weight training is associated with lower body image disturbance in the more general female University population.

The finding of reduced body image disturbance in women who weight train has possible implications for alleviating one of the conditions which predisposes women to eating disorders. Through weight training, women may become less dissatisfied with their bodies thereby removing one of the important motivations related to the development and maintenance of eating disorders. Weight training serves this purpose while maintaining or slightly increasing body weight, which is especially important when the eating disorder is anorexia nervosa.

Weight training may be beneficial with respect to the prevention or treatment of eating disorders, but it may also be very valuable on much more widespread basis. Some authors have suggested that severe body size dissatisfaction has reached almost epidemic proportions among college women (Strober & Yager, 1989). And unfortunately, body and weight dissatisfaction are not isolated problems because they are associated with both poor self-esteem and depression (Dykens & Gerrard, 1986; Rosen, Gross & Vara, 1987). Therefore, further research is needed to determine if weight training may be beneficial to the "normal" female college-aged population as a means of reducing body size dissatisfaction. The present study supported this possibility.

Future research which utilizes experimental methodologies to measure body size dissatisfaction before and after a long term weight training program may further add to our understanding of this type of exercise as a potential protector against disordered eating. Experimental research with individuals who already display the symptoms of eating disorders may also provide information with respect to the usefulness of weight training in the treatment of existing eating disorder problems.

Reasons for Exercising

The three groups were also questioned about their reasons for

exercising. Of the six potential motivations suggested, the groups differed significantly on their ratings of four. They did not differ significantly on their ratings of either the weight loss or physical appearance motivators.

However, it is interesting to note that the weight training group was the only group in which the other five reasons were all significantly more important than losing weight. Additionally, while the differences were not significant, physical appearance was ranked differently among the three groups. The no exercise group rated this as the most important motivation for exercising, the aerobic only group rated it as second, and the weight training group rated it as third.

Interestingly, the significant differences that did emerge were on the variables that could be described as health-oriented such as aerobic fitness, health, strength/flexibility, and muscle tone. The weight training group placed more emphasis on each of these motivations for exercising than did either of the other two groups. Therefore, it might be suggested that weight training promotes the idea of exercising for heath and physical benefit as opposed to reasons related to vanity.

In conclusion, the present study found that weight training was associated with less body size dissatisfaction. This is a significant

finding because a high level of body dissatisfaction is one of the strongest predictors for risk of development of eating disorders (Garner, 1991; Klemchuk et al., 1990; Leon et al., 1993). It is also important because body size dissatisfaction is problematic in itself, and is related to other problems such as self-esteem and depression (Dykens et al., 1986; Rosen et al., 1987). Weight training also seems to be associated with more positive, health-oriented motivations for exercise. The current study supports the concept that weight training may be a method for reducing body size dissatisfaction. Whether this may be useful in the prevention or treatment of clinical eating disorders is a possibility that deserves future investigation.

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Appendix A

Exercise Inventory for Nonexercisers

PACKAGE FOR WOMEN WHO **DO NOT EXERCISE**

Exercise Inventory

Age:

1. (a) Would you consider becoming more physically active?

YES NO

(b) If you answered "yes" to part (a), please indicate how likely you would be to take part in the activities listed below, if you were to become more physically active.

	not at all likely	not very likely	somewhat likely	quite likely	extremely likely
jogging/running	1	2	3	4	5
stationary cardio-vascular equipment (ie. stairclimber, bike, rowing machine, etc.)	1	2	3	4	5
weight training (ie. nautilus, free weights, hydragym, etc.)	1	2	3	4	5
swimming	1	2	3	4	5
cycling	1	2	3	4	5
aerobics classes	1	2	3	4	5
racquet sports	1	2	3	4	5
fitness walking	1	2	3	4	5

(c) If there are any other physical activities that you would consider taking part in on a regular basis, please list them below.

(d) If you answered "yes" to part (a), on a scale from one to five, where one is "not at all important" and five is "extremely important", please rate the following possible reasons for exercising as to how important each is to why YOU would consider starting to exercise.

	not at all important	slightly important	moderately important	quite important	extremely important
a) lose weight	1	2	3	4	5
b) increase aerobic capacity	1	2	3	4	5
c) be generally healthier	1	2	3	4	5
d) be stronger/ more flexible	1	2	3	4	5
e) increase muscle tone	1	2	3	4	5
f) improve physical appearance	1	2	3	4	5

Appendix B

Exercise Inventory for Exercisers

PACKAGE FOR WOMEN WHO **EXERCISE**

Exercise Inventory

Age:

1. (a) Do you generally engage in aerobic exercise two or more times per week? (In this section, please only consider strictly aerobic activities such as aerobics or step aerobics classes, running/jogging, stationary cardiovascular training equipment - eg. stairclimbers, cycling, etc.)

YES NO

(b) If you answered yes to question 1 (a), briefly describe the type of exercise, length (in minutes) of average session, number of sessions per week, and how long you have been engaging in each activity on a regular basis. Please list all aerobic activities you regularly participate in.

TYPE OF EXERCISE	MINUTES/SESSION	SESSIONS/WEEK	HOW LONG

2. (a) Do you generally engage in anaerobic exercise at least once a week? (ie. weight training - free weights, nautilus equipment, hydragym, etc.)

YES NO

(b) If you answered yes to question 2 (a), briefly describe the type of weight training, length (in minutes) of average session, number of sessions per week, and how long you have been engaging in each activity on a regular basis.

TYPE OF EXERCISE	MINUTES/SESSION	SESSIONS/WEEK	HOW LONG

3. (a) Do you generally engage in any other types of physical activities (ie. other sports, fitness walking, etc.) at least once a week?

YES NO

(b) If you answered yes to question 3 (a), briefly describe the type of activity, length (in minutes) of average session, number of sessions per week, and how long you have been engaging in each activity on a regular basis. Please list all other physical activities you regularly participate in that are not already listed above.

TYPE OF EXERCISE	MINUTES/SESSION	SESSIONS/WEEK	HOW LONG

4. On a scale from one to five, where one is "not at all important" and five is "extremely important", please rate the following possible reasons for exercising as to how important each is to why YOU exercise.

	not at all important	slightly important	moderately important	quite important	extremely important
a) lose weight	1	2	3	4	5
b) increase aerobic capacity	1	2	3	4	5
c) be generally healthier	1	2	3	4	5
d) be stronger/ more flexible	1	2	3	4	5
e) increase muscle tone	1	2	3	4	5
f) improve physical appearance	1	2	3	4	5

Appendix C

Nine female figures from the Figure Rating Scale

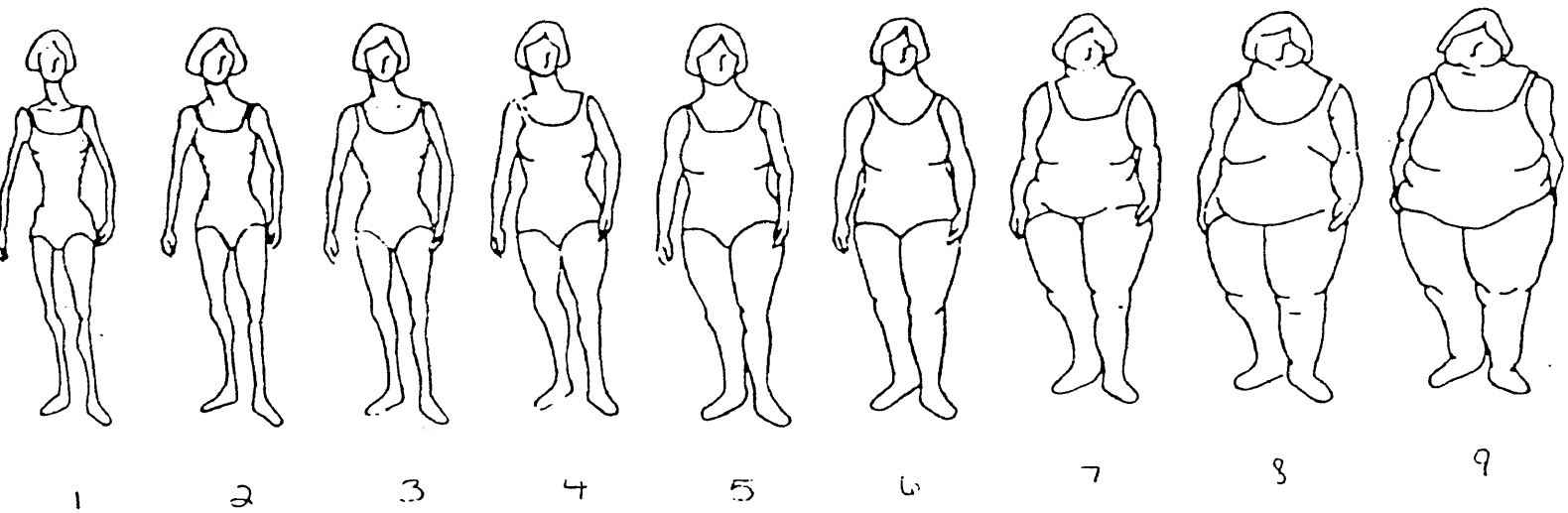
Figure Rating Scale

Pictured below are nine female silhouettes. Please specify the number that corresponds to the silhouette that best represents your current body shape and size.

Current: _____

Please consider the silhouettes again, and specify the number that corresponds to the silhouette that best represents the shape and size that you would <u>like</u> your body to be.

Ideal: _____



Appendix D

Eating Disorder Inventory - 2

EDI-2

The items below ask about your attitudes, feelings, and behaviour. For each item, decide if the item is true about you ALWAYS (A), USUALLY (U), OFTEN (O), SOMETIMES (S), RARELY (R), or NEVER (N). Circle the rating that corresponds to your answer.

Respond to all of the items, making sure that your circle the letter for the rating that is true about you.

A = ALWAYS U=USUALLY O=OFTEN S=SOMETIMES R=RARELY N=NEVER

1.	I eat sweets and carbohydrates without feeling nervous.	A U O S R N
2.	I think that my stomach is too big.	A U O S R N
3.	I wish that I could return to the security of childhood.	A U O S R N
4.	I eat when I am upset.	A U O S R N
5.	I stuff myself with food.	A U O S R N
6.	I wish that I could be younger.	A U O S R N
7.	I think about dieting.	A U O S R N
8.	I get frightened when my feelings are too strong.	A U O S R N
9.	I think that my thighs are too large.	A U O S R N
10.	I feel ineffective as a person.	A U O S R N
11.	I feel extremely guilty after overeating.	A U O S R N
12.	I think that my stomach is just the right size.	A U O S R N
13.	Only outstanding performance is good enough in my family.	A U O S R N
14.	The happiest time in life is when you are a child.	A U O S R N
15.	I am open about my feelings.	A U O S R N
16.	I am terrified of gaining weight.	A U O S R N
17.	I trust others.	A U O S R N
18.	I feel alone in the world.	A U O S R N
19.	I feel satisfied with the shape of my body.	A U O S R N
20.	I feel generally in control of things in my life.	A U O S R N
21.	I get confused about what emotion I am feeling.	A U O S R N
22.	I would rather be an adult than a child.	A U O S R N
23.	I can communicate with others easily.	A U O S R N
24.	I wish that I were someone else.	A U O S R N
25.	I exaggerate or magnify the importance of weight.	A U O S R N
26.	I can clearly identify what emotion I am feeling.	A U O S R N
27.	I feel inadequate.	A U O S R N
28.	I have gone on eating binges where I felt that I could not stop.	A U O S R N
29.	As a child, I tried very hard to avoid disappointing my parents and teachers.	A U O S R N
30.	I have close relationships.	A U O S R N

31.	I like the shape of my buttocks.	A U O S R N
32.	I am preoccupied with the desire to be thinner.	A U O S R N
33.	I don't know what's going on inside me.	A U O S R N
34.	I have trouble expressing my emotions to others.	A U O S R N
35.	The demands of adulthood are too great.	A U O S R N
36.	I hate being less than best at things.	A U O S R N
37.	I feel secure about myself.	A U O S R N
38.	I think about binging (overeating).	A U O S R N
39.	I feel happy that I am not a child anymore.	A U O S R N
40.	I get confused as to whether or not I am hungry.	A U O S R N
41.	I have a low opinion of myself.	A U O S R N
42.	I feel that I can achieve my standards.	A U O S R N
43.	My parents have expected excellence of me.	A U O S R N
44.	I worry that my feelings will get out of control.	A U O S R N
45.	I think my hips are too big.	A U O S R N
46.	I eat moderately in front of others and stuff myself when they're gone.	A U O S R N
47.	I feel bloated after eating a normal meal.	A U O S R N
48.	I feel that people are happiest when they are children.	A U O S R N
49.	If I gain a pound, I worry that I will keep gaining.	A U O S R N
50.	I feel that I am a worthwhile person.	A U O S R N
51.	When I am upset, I don't know if I am sad, frightened or angry.	A U O S R N
52.	I feel that I must do things perfectly or not do them at all.	A U O S R N
53.	I have the thought of trying to vomit to lose weight.	A U O S R N
54.	I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close).	A U O S R N
55.	I think that my thighs are just the right size.	A U O S R N
56.	I feel empty inside (emotionally).	A U O S R N
57.	I can talk about my personal thoughts or feelings.	A U O S R N
58.	The best years of your life are when you become an adult.	A U O S R N
59.	I think my buttocks are too large.	A U O S R N
60.	I have feelings I can't quite identify.	A U O S R N
61.	I eat or drink in secrecy.	A U O S R N
62.	I think that my hips are just the right size.	A U O S R N
63.	I have extremely high goals.	A U O S R N
64.	When I am upset, I worry that I will start eating.	A U O S R N
65.	People I really like end up disappointing me.	A U O S R N
66.	I am ashamed of my human weaknesses.	A U O S R N
67.	Other people would say that I am emotionally unstable.	A U O S R N
68.	I would like to be in total control of my bodily urges.	A U O S R N
69.	I feel relaxed in most group situations.	A U O S R N
70.	I say things impulsively that I regret having said.	A U O S R N
71.	I go out of my way to experience pleasure.	A U O S R N
72.	I have to be careful of my tendency to abuse drugs.	A U O S R N

73.	I am outgoing with most people.	A U O S R N
74.	I feel trapped in most relationships.	A U O S R N
75.	Self-denial makes me feel stronger spiritually.	A U O S R N
76.	People understand my real problems.	A U O S R N
77.	I can't get strange thoughts out of my head.	A U O S R N
78.	Eating for pleasure is a sign of moral weakness.	A U O S R N
79.	I am prone to outbursts of anger or rage.	A U O S R N
80.	I feel that people give me the credit I deserve.	A U O S R N
81.	I have to be careful of my tendency to abuse alcohol.	A U O S R N
82.	I believe that relaxing is simply a waste of time.	A U O S R N
83.	Others would say I get irritated easily.	A U O S R N
84.	I feel like I am losing out everywhere.	A U O S R N
85.	I experience marked mood shifts.	A U O S R N
86.	I am embarassed by my bodily urges.	A U O S R N
87.	I would rather spend time by myself than with others.	A U O S R N
88.	Suffering makes you a better person.	A U O S R N
89.	I know that people love me.	A U O S R N
90.	I feel like I must hurt myself or others.	A U O S R N
91.	I feel that I reall know who I am.	A U O S R N

Appendix E

Cover Letter

Dear Participant:

We are conducting a study of female university students between the ages of 17 and 25 on exercise and body image. Previous research has found relationships between exercise and how women view themselves.

The present research project is designed to examine this relationship in more detail by comparing women who weight train to women who engage in purely aerobic exercise or who do not exercise at all. To accomplish this goal, we would like to measure your height and weight and have you to complete a few questionnaires concerning your exercise habits and your attitudes about your body.

All information you provide will remain confidential. However, the findings of this project will be made available to you at your request upon the completion of the project.

Thank you for your cooperation.

Sincerely,

Joelle Mamuza

Appendix F

Consent Form

My signature on this sheet indicates I agree to participate in a study by Joelle Mamuza of Lakehead University, on EXERCISE AND BODY IMAGE and it also indicates that I understand the following:

1. I am a volunteer and can withdraw at any time from the study.
2. There is no risk of physical or psychological harm.
3. The data I provide will be confidential.
4. I will receive a summary of the project, upon request, following the completion of the project.

I have received explanations about the nature of the study, its purpose, and procedures.

Signature of Participant Date