AN ABSTRACT OF THE THESIS OF

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Title: Effects of Stress Management Training Using Biofeedback For Treatment of Eating Disordered Behaviors

Abstract approved: 

The purpose of this study was to determine whether stress management training using biofeedback would be an effective treatment method in reducing eating disordered behaviors. The sample consisted of 42 female students at a small, midwestern state university. The participants were screened for stress, using the Hassles Scale, and for eating disordered behaviors, using the Eating Disorder Inventory-2. Qualifying participants were randomly assigned to either a treatment or a control group. The treatment group engaged in three sessions of biofeedback and the control group was assigned to a wait list condition. Results indicated that the biofeedback was not effective in reducing eating disordered behaviors relative to the control group. The lack of significant findings can possibly be attributed to the short duration of the treatment method and an insufficient sample size.

EFFECTS OF STRESS MANAGEMENT TRAINING USING BIOFEEDBACK FOR TREATMENT OF EATING DISORDERED BEHAVIORS

A Thesis

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CHAPTER 1

Introduction

Stress is something everyone experiences in life. People are affected by stress in various ways. Some people become depressed. Others lose their appetite. The different methods people use to deal with stress is astounding. Stress management training using biofeedback is one method some clinicians use in the treatment of individuals who have high levels of stress in their lives.

Biofeedback is defined as information about one's body fed back through machines attached to the body. The person using biofeedback must want to voluntarily change the displayed signals on the machine to meet the goals that have been set in order for biofeedback to be successful.

Most clinicians use biofeedback in combination with other techniques. A solid foundation for biofeedback is provided by the role of the brain in the health of the body. Different levels of the brain control functions range from release of hormones, modulation of the immune system, heart rate, blood pressure, and breathing, through emotional responses and motor skills, up to learning and the highest intellectual functions.

The purpose of this study was to research whether stress management training using biofeedback was an effective treatment in reducing eating disordered behaviors. The plan was to employ stress management training using biofeedback for individuals who had a considerable amount of

stress and elevated levels of eating disordered behavior. The hypothesis of the study was that stress management training using biofeedback would reduce eating disordered behaviors.

Although biofeedback has been used in the treatment of some psychological problems, it had not been applied to this particularly significant problem--eating disordered behaviors. It is important to distinguish between actual eating disorders and eating disordered behaviors. Eating disorders mean the individual has met the criteria to be clinically diagnosed with this disorder, whereas eating disordered behaviors are subclinical behaviors of an eating disorder in which the individual engages. Although there are many factors that contribute to these behaviors, this paper addresses the factor of stress.

The causes of eating disordered behaviors are classified into two categories: traumatic events model and the restrictive model. The traumatic events model is when a person experiences a traumatic event and then begins to distort and dislike his/her body image. For example, a 15-year-old girl who has been raped may develop eating disordered behaviors due to the traumatic event experience. In other words, the stress from this type of event is expressed in eating disordered behavior.

The restrictive model deals with eating disordered behaviors that develop due to the expectations of the body image. These expectations are held by American culture and

society. An example of this model is when a mother tells her daughter she needs to lose weight because she needs to stay thin in order to be pretty and be liked by the boys.

As mentioned previously, biofeedback is commonly used in reducing stress, but had not been recognized as an effective tool in reducing eating disordered behaviors. Perhaps the use of biofeedback in eating disordered behaviors had been overlooked because it was not obvious that these behaviors were linked to stress.

The significance of this research was three-fold. First, eating disordered behaviors have been difficult to treat. Biofeedback in the treatment of eating disordered behaviors is important because it may result in providing individuals with awareness of these behaviors, feelings of comfort with their body, relaxation, and self-regulation (control over their body).

Second, significant findings would mean a new potentially successful treatment for individuals with subclinical eating disordered behaviors, particularly in the college population where these behaviors are very common. With significant findings, this would also provide a preventive measure for eating disorders. Third, biofeedback is a simple, short-term treatment that may be effective in its own right or as an adjunct to psychotherapy in treating these behaviors.

Literature Review

Stress and Eating Disorders

Stressful daily events and major life events are related to psychological and behavioral problems. Stress is believed to be an important antecedent to eating disorders, in particular, because it may disrupt normal appetite regulation, intensify body image preoccupation, or provoke maladaptive coping responses such as binge eating (Cattanach & Rodin, 1988; Shatford & Evans, 1986). Rosen, Compas, and Tacy (1993) found that eating disorder symptoms are predictive of subsequent psychological stress over short periods of time.

Many studies have found that eating disordered individuals report being exposed to more stress than non-eating disordered people (Soukup, Beiler, & Terrell, 1990). Recently, it has been proposed that bulimia and possibly other forms of eating disorders also may be due, at least in part, to differences in cognitive styles (Cattanach & Rodin, 1988). Cattanach and Rodin suggested that an individual's perception and cognitive capacity to cope with stress mediate the relationship between stress and eating disorders. At least one study has found specific cognitive and perceptual characteristics among eating disordered individuals that might suggest poor coping ability and difficulties in problem solving among these individuals (Soukup, Beiler, & Terrell, 1990).

Crisp and Bhat (1982) examined responses on the Crown-Crisp Experimental Index (CCEI) (Crown & Crisp, 1979) of restrictor anorexics and anorexics who also binged and purged. The CCEI assesses several dimensions of anxiety, somatic complaints, depression, and hysteria. In general, participants who binged and purged tended to be more anxious than restrictor anorexics, and anorexics at low body weight reported less anxiety than those at higher weights. The authors interpreted the low levels of anxiety in underweight anorexics as being secondary to a sense of control resultant from the successful weight restriction. Those who habitually purged were reported to be the most socially anxious.

A study by Fairburn and Cooper (1982) found that women diagnosed with bulimia nervosa demonstrated high levels of anxiety. Other researchers have found evidence for a posttraumatic stress disorder in which exposure to severe trauma (e.g., the violent death of a loved one) can trigger intense feelings of anxiety and thus, lead to eating pathology (Davison & Neale, 1986; Green, Lindy, & Grace, 1985). The current study supports the traumatic events model of eating disorders.

Bulik, Beidel, Duchmann, Weltzin, and Kaye (1991) studied the anxiety levels of social phobics and eating disordered patients. Their findings indicated that social phobics fear some aspect of their behavior or social performance may be perceived by others as inadequate or

socially inept. However, for eating disordered patients (in particular anorexic patients) the anxiety about social scrutiny tends to be from a fear others would perceive their body or weight as inconsistent with social norms.

Another interesting result of the investigation (Bulik et al., 1991) is that both anorexic and the bulimic patients scored significantly higher on the agoraphobia subscale than the social phobics or college students, suggesting significantly more distress in nonsocial, as well as social situations. The anxiety felt by these eating disordered patients was responsible for an increase, or maintenance, of the eating disordered behavior.

Abrams, Allen, and Gray (1993) studied the eating disordered attitudes and behaviors of a white female population compared with a black female population. All measures of disordered eating in this study, except binging, were found to be related to three measures of pathology (low self-esteem, anxiety, and depression) in both the white and black groups. It is likely a young woman who is dissatisfied with her appearance and engages in severe dietary behaviors is also troubled by low self-esteem, anxiety, and depression, or, conversely, if she had low self-esteem, anxiety, and depression, she might focus on dissatisfaction with her appearance (Abrams et al., 1993). The association between disordered eating and other pathology had been found before in a white college sample (Orleans & Barnett, 1984), but was found for the first time

by Abrams et al. for a sample of black female college students.

Another psychological problem manifested by stress is depression. While the presence of several maladaptive eating practices can be associated with depressive symptoms, the nature of this association is not particularly well delineated in the literature (Cooper & Fairburn, 1986; McDermott, Hawkins, & Duncan, 1987; McDermott, Hawkins, Littlefield, & Murray, 1989; Swift, Andrews, & Barklage, 1986). Persons with anorexia nervosa or bulimia nervosa have been shown in psychiatric testing to score higher on depression scales than the normal population, but lower than a primarily depressed population (Stonehill & Crisp, 1977; Weiss & Ebert, 1983). Some authorities (Hendren, 1983; Hudson, Laffer, & Pope, 1982) have proposed that eating disorders are variants of affective disorders, while others have refuted this assertion (Strober & Katz, 1987). Depression related to eating behavior may not have a common mechanism of cause. Swift et al. suggested that for the person with anorexia nervosa, depression stems from the physiological consequences of self-starvation. For the person with bulimia nervosa, depression may be associated with feelings of guilt and loss of control over eating behavior (Johnson, Lewis, & Hagman, 1984).

Among college students, the practice of eating disordered behaviors has been shown to be associated with some indicators of depression (McDermott et al., 1987).

This same practice also has been significantly, although weakly, correlated with broader measures of depression (McDermott et al., 1989).

Hawkins, McDermott, Seeley, and Hawkins (1992) conducted a study that focused on the relationship of less severe mood of depression and maladaptive eating behaviors in a non-clinical group. The findings from this study indicated specific maladaptive eating practices were related to depressive symptoms for female participants only. The maladaptive eating practice most associated with depression among females in the sample, "upset or nervous eating," followed from the relationship between eating disorders and insecurity, stress, confusion, fragility of self, and other feelings of inadequacy advanced by Lucas, Beard, Kranz, and Kurland (1983). Finally, Hawkins et al. suggested that stress management strategies could be useful therapeutic interventions for individuals who are depressed and engaged in maladaptive eating.

Stress and Biofeedback

Goldstein (1990) defined stress as "a condition where expectations--whether genetically programmed, established by prior learning, or deduced from circumstances--do not match the current or anticipated perceptions of the internal or external environment, and this discrepancy between what is observed or sensed and what is expected or programmed elicits patterned, compensatory responses" (p. 260). The influence of stress on various diseases has become

increasingly obvious in recent years (Dantzer, 1991; Lehrer, Carr, Sargunaraj, & Woolfolk, 1994), and various stress management techniques are becoming accepted components in treatment programs. As part of their efforts to improve worker health and productivity, industries are becoming aware of the detrimental effects of stress, and are turning to stress management educators to train their employees to reduce it. Thus, stress management is rapidly becoming a specialization within the mental health field (Lehrer et al.). With the increasingly widespread professional application of stress management methods, it becomes increasingly necessary to document the effectiveness of various stress management techniques, and to delineate the array of methods that stress management therapists must learn in order to practice effectively.

The field of stress management employs a variety of methods. One of these methods is biofeedback. Basmajian (1989) defined biofeedback as "the technique of using equipment (usually electronic) to reveal to human beings some of their internal physiological events, normal and abnormal, in the form of visual and auditory signals in order to teach them to manipulate these otherwise involuntary or unfelt events by manipulating the displayed signals" (p. 211).

It is beneficial to understand the relationship between stress and biofeedback. Recall that the basic idea in biofeedback training is to use sensitive detectors to tell

one what is happening inside ones own body (Basmajian, 1989). Individuals suffering from stress or stress-related disorders typically show more than one symptom. According to Basmajian, in addition to tension headache, patients may report indigestion, insomnia and anxiety. In this regard it can be emphasized to the patient that when he feels under stress, it is not just one part of the body that reacts; a whole cluster of processes, known as a sympathetic nervous system response, is set in motion. This acts to energize the individual. Not only do the muscles become active, but heart rate increases, blood pressure goes up, and there is an increase in blood sugar. At the same time parasympathetic activities, including those concerned with digestion, slow down. This emergency reaction is innately common to all and is a basic survival reaction (Basmajian, 1989).

The fundamental idea behind biofeedback training is when people learn to become deeply relaxed, the effects are opposite to those produced by psychological stress. The fight or flight response slows down. Patients first learn to relax with biofeedback, then learn to do it without biofeedback. All this involves regular and consistent practice on one's own.

Eating Disorders and Relaxation Training

Stress management training using biofeedback is related to behavior therapy. No stress management studies using biofeedback with eating disorders could be found. However,

a few studies have looked at behavior therapy and eating disorders.

Two reports provided evidence that Group Behavior Therapy (GBT) held promise in solving the difficult problem of bulimia. Conners, Johnson, and Stuckey (1984) employed a multiple baseline design with two groups of bulimic women to examine the effects of GBT, including education, self-monitoring, goal setting, assertion training, relaxation, and cognitive restructuring, on the frequency of binge-purge episodes. After 12 weeks of treatment, a 70% decrease in the number of episodes was observed. While this seems mostly to have been behavior therapy in a group, it appears group members did join in reinforcing appropriate changes.

Schneider and Agras (1985) used GBT with self-monitoring, record keeping, relaxation training, and the development of alternative behaviors, especially good eating habits, to significantly reduce the number of vomiting episodes of 13 women after 16 weeks of treatment. The lack of any control condition in this study makes it difficult to draw firm conclusions from these data, but this group (Lukas, Agras, & Schneider, 1986) reported a 30-month follow-up which showed that 10 of the original 13 women had been able to maintain, for the most part, their previous successes.

Biofeedback has been proven to be a type of relaxation training. Relaxation training has been used to treat eating

disorders, but stress management training using biofeedback has not been used in the treatment of eating disorders.

Conclusion

It was established that stress management training using biofeedback has been extremely effective in the reduction of stress. It has also been established that stress (and its manifestations) may be causes of eating disordered behaviors. The next logical step was to apply biofeedback techniques to individuals with eating disordered behaviors. This study assigned college students identified as manifesting eating disordered behavior to either three sessions in biofeedback treatment or a wait list condition. It was expected that those in the biofeedback group would show a reduction in eating disordered patterns. The wait list group would show minimal, to no, improvement.

CHAPTER 2

Method

Participants

In order to obtain a sample, 133 college women were screened. Out of 133 women, 51 (mean age of 20.36, *SD* = 2.64 for the entire sample) of them met the criterion for selection, but only 42 completed the study. After screening, they were randomly assigned to either the treatment or the control group. The screening criteria was a score of 20 or more frequency points on the Hassles Scale and elevations on either the Drive For Thinness, Body Dissatisfaction, or Bulimia scales of the Eating Disorder Inventory-2 (EDI-2)(Garner, 1991). According to Weinberger, Hiner, and Tierney (1987), a frequency score of 20 or more on the Hassles Scale serves as a cut off mark between a moderately hassled individual and a severely hassled individual. Garner (1991) defined the elevations on the three main scales of the EDI-2 as: a raw score of 9 or more on the Drive For Thinness scale; a raw score of 16 or more on the Body Dissatisfaction scale; and a raw score of 4 or more on the Bulimia scale. Participants were told the Hassles Scale administered measured the daily stress in their lives and the EDI-2 was being administered to measure eating patterns.

Research Design

The type of design used in this study was the randomized pretest-posttest control group design. In this

case, two groups of participants were used, with both groups being measured or observed twice. The use of the EDI-2 pretest allowed for screening of individuals who met the specified criteria and was a measurement of where the individuals stand before treatment. The EDI-2 posttest served as a measurement of the effectiveness of the biofeedback treatment. The Hassles Scale was not used in the posttesting because it was simply used as a screening measure.

Instruments

The instruments used in this study were the Eating Disorder Inventory-2 (EDI-2) and the Hassles Scale (Appendix B). The Hassles Scale was used as a screening device to ensure that those participating were experiencing stress in their lives. The EDI-2 was the main measure of the study. The expected outcome of the study was that elevated scale scores on the EDI-2 would be lower on the posttest as a result of the stress management training.

The Eating Disorder Inventory-2 was published in 1991 by David Garner and has since gained widespread prominence in measuring eating disorders. Garner (1991) pointed out the EDI-2 does not yield a specific diagnosis of either Anorexia Nervosa or Bulimia Nervosa. Instead, it was aimed at the delineation and precise measurement of certain psychological traits or symptom clusters presumed to have relevance in the understanding and treatment of eating disorders. An advantage to this test is that in non-

clinical settings, it provides an economical means of identifying individuals who have subclinical eating problems or those who may be at risk for developing eating disorders.

The scales used from the EDI-2 for this study have good psychometric properties. The test-retest reliability for a non-patient sample on the three scales to be used in the study--Drive For Thinness, Bulimia, and Body Dissatisfaction scales--are .86, .88, and .90 respectively. Garner (1991) emphasized there has been consistent evidence that the EDI-2 is sensitive to clinical change and it may play a valuable role in clinical evaluations of eating disorder patients or those suspected of eating disorders.

The Drive For Thinness, Bulimia, and Body Dissatisfaction scales were defined by Garner (1991) as the three main measures of eating disorder pathology. Although there are 11 scales, these 3 scales assessed the primary symptoms of eating disordered behaviors. The other scales measure such aspects as perfectionism, ineffectiveness, interpersonal distrust, and others which were not necessary for the nature of this study.

The instrument used as a screening device that measures psychological stress was the Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981). The Hassles Scale is important to biofeedback because in order for biofeedback to be successful, individuals must perceive their lives as having stress. Basmajian (1983) asserted that although other instruments could be substituted for the Hassles Scale, it

has been one of the most desired for use in the biofeedback area for many reasons. This scale has not only been proven to be economical, easy to use, and contain adequate reliability, but has been one of the best measures of an individual's subjective experience to stress.

The original scale contained a list of 117 daily events which to some degree characterized everyday transactions with the environment. Items on the scale reflect the content areas of work (e.g., don't like work duties), social activities (e.g., unexpected company), the environment (e.g., pollution), family (e.g., not enough time for family), finances (e.g., someone owes you money), and health (e.g., not getting enough rest) (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982). Participants were instructed to indicate whether each event was either "a major hassle," "a moderate hassle," "somewhat of a hassle," or "not a hassle" over the past month based upon the definition that hassles are irritating, frustrating, and distressing daily demands.

The Hassles Scale was developed using a sample of 600 people between the ages of 40 and 64. The scale was revised to make it more appropriate for the ages of the participants. This revision consisted of 95 hassles out of the original 117 hassles. Omitted items related to such things as employment concerns and raising children. Similar revised scales have been used by Holahan, Holahan, and Belk (1984) and Weinberger, Hiner, and Tierney (1987).

A frequency and intensity score was calculated for the Hassles Scale. The frequency score was determined by counting the number of events indicated to be a hassle, regardless of the severity. The intensity score was the mean severity reported by the participant for all hassles reported. Kanner, Coyne, Schaefer, and Lazarus (1981) reported a test-retest reliability coefficient of .79 for hassles frequency and .48 for hassles intensity. It has been suggested this instrument is a valid measure of psychological stress (Ewedemi & Linn, 1987).

Procedure

To obtain participants, the researcher posted a sign-up sheet for undergraduate female students who wanted to participate in the study for extra credit. At that time the participants were also informed they might be recruited to participate in an in-depth study using biofeedback. Each participant signed a consent form which stated she understood the risks of participation and that the records and the names of the participants would be kept confidential.

The Hassles Scale, generally used in biofeedback as a measure of stress, was used as a screening device to ensure participants' subjective experiences of stress. The Eating Disorder Inventory-2 was also administered. The tests were hand scored by the researcher. Those individuals who met the criteria for high levels of stress as determined by the Hassles Scale and who had score elevations on either the

Drive For Thinness scale, Body Dissatisfaction scale, or Bulimia scale of the EDI-2, were placed on a master list. After the list was assembled, the researcher numbered the names and then used the table of random numbers to select 21 individuals for the treatment group and 21 individuals for the control group.

The director of the biofeedback laboratory at the Emporia State University Student Life and Counseling Center wrote a form letter to each selected individual. The letter simply stated that a graduate student was assisting the biofeedback laboratory in a research project designed to help reduce stress. She mentioned they were chosen for participation in the study based on the screening measure.

Approximately 10 days after the letters were sent, the researcher began contacting the individuals by phone to give a specific description of the project and explain exactly what was involved. The researcher elicited each individual's help and interest by pointing out that it was of great benefit to the biofeedback laboratory on campus, as well as a possible treatment throughout the nation with this problem. The individuals who participated were asked to come to the biofeedback laboratory at an agreed upon time and date. The members of the control group were kept on a waiting list and posttested after the treatment group had completed the treatment. During the posttesting session for the control group, participants were offered the opportunity to join an eating disorder support group or make an

appointment for stress management training with the biofeedback laboratory. However, they did not engage in an actual group meeting, because the likelihood of it being therapeutic was too large and the goal was to measure the effects of stress management training compared to no treatment at all. The treatment group attended one biofeedback training session per week for three weeks in group sessions (the whole group was divided into subgroups of three), with the posttesting occurring immediately following the third session.

The actual biofeedback training consisted of thermal training, or hand warming, and lasted approximately 30 minutes. After attaching the thermometer to the individual's middle finger of their non-dominant hand, it was explained to the participants what the feedback machine did, how it was used, and what the immediate temperature training goals were. The individual was instructed to repeat phrases such as, "I am relaxed," "I feel good," and "I am in control." During this time, recordings of their temperature were made. The machine was turned away from the client and it was suggested to them that it was usually easier to visualize the desired changes at first with the eyes closed. Participants were also asked to practice biofeedback on a daily basis between sessions.

In summary, the researcher and the director of the biofeedback laboratory met with the treatment group and provided stress management training using biofeedback (in

subgroups). The control group remained on the waiting list for three weeks, after which they were asked to join an eating disorder support group or stress management training on an individual basis. After the three sessions of biofeedback, a posttest was administered to both groups.

A lottery system was implemented once the participants had been assigned to the treatment and control groups. Participants who attended all training sessions were eligible for a drawing for a $25 gift certificate. There was one winner per group. At the posttesting session, the winners of the lottery, for both the treatment and control group, were chosen by drawing out of the box where the names had been placed.

Statistical Design

The posttest scores were analyzed using Analysis of Covariance (ANCOVA) to find possible statistically significant differences between the treatment group and the control group. One ANCOVA was performed which included each scale of the EDI-2 (Drive For Thinness, Bulimia, and Body Dissatisfication) as dependent variables. The independent variable was the stress management training using biofeedback or wait list condition. The covariate was the pretest scores on the EDI-2. The Hassles Scale scores were only used for screening purposes.

CHAPTER 3

Results

An analysis of covariance (ANCOVA) was conducted to analyze the effect of the biofeedback treatment using three scales from the Eating Disorder Inventory-2 (EDI-2). The three scales being analyzed were Drive For Thinness, Bulimia, and Body Dissatisfaction scales. A multivariate test of significance revealed no statistically significant differences between treatment and control groups when analyzing the dependent variables simultaneously (F [3,35] = 2.67, p = .057). However, because the p value was .057, univariate statistics were examined for informational purposes only.

Univariate ANCOVAs revealed the following: $F(1,37)$ = 4.15, p = .05 for the Drive For Thinness scale; $F(1,37)$ = 7.43, p = .010 for the Bulimia scale; $F(1,37)$ = 1.35, p = .253 for the Body Dissatisfaction scale. The pre-adjusted means and standard deviations can be found on Table 1.

Table 1

Means and Standard Deviations for Treatment and Control Groups

Drive For Thinness Scale

	Pre-Treatment		Post-Treatment		
Group	Mean	SD	Mean	SD	Adjusted Mean
Treatment	11.95	6.57	9.19	6.10	7.83
Control	8.33	6.38	8.33	5.99	9.69

Bulimia Scale

	Pre-Treatment		Post-Treatment		
Group	Mean	SD	Mean	SD	Adjusted Mean
Treatment	3.29	3.66	1.62	2.31	1.70
Control	2.95	4.02	3.05	3.84	2.97

Body Dissatisfaction Scale

	Pre-Treatment		Post-Treatment		
Group	Mean	SD	Mean	SD	Adjusted Mean
Treatment	23.38	4.10	21.33	6.02	18.63
Control	17.0	4.87	17.67	4.51	20.37

CHAPTER 4

Discussion

The hypothesis of this study was that stress management training using biofeedback would reduce the eating disordered behaviors exhibited by college women. This hypothesis was not supported. The multivariate comparison of the mean posttreatment scores on the Drive For Thinness, Bulimia, and Body Dissatisfaction scales for those receiving biofeedback and no treatment failed to reach traditional levels of significance. However, the results were in the hypothesized direction. That is, there was some indication that those in the treatment condition had a reduction in eating disordered behavior compared to the control group. Although not significant in this study, these results may be informative for those interested in doing research in this area.

The primary limitation of the study could be the duration of treatment. The direction of the results may indicate that the treatment did have some small effect. The three sessions of biofeedback may not have been sufficient to cause significant changes in the test scores of the participants. Therefore, if the duration of treatment was increased, the chances of attaining statistically significant differences may also increase.

The sample size used in this study was small, which poses as another limitation. Due to the inaccessibility of large numbers of women college students with eating

disordered behaviors, the sample size was extremely limited. A number of studies have indicated that both anorexic and bulimic tendencies may occur in as many as 1% to 4% of female high school and college students (Drewnowski, Yee, & Krahn, 1988; Leichner & Gertler, 1988; Pyle, Halvorson, Neuman, & Mitchell, 1986; Szmukler, 1985). Consequently, when using students from an institution with an estimated 5,000 student body population, the number of accessible participants is quite small.

Although there were no participants in this present study who dropped out, there were some who refused to participate beyond the pretest. This is an important aspect future researchers might take into consideration. There were numerous reasons why qualifying participants did not participate. These included the study being too time consuming, not feeling comfortable engaging in biofeedback in a group session, or lacking the desire to acknowledge that they met the criteria for exhibiting eating disordered behaviors.

Although the results of this study were not statistically significant, these results should not be dismissed outright. There was a trend in the direction of biofeedback training being useful, especially regarding improvement in the areas of drive for thinness and bulimia. Therefore, additional inquiry seems warranted. Future research could hopefully remedy some of the limitations of

this study to provide a stronger test of the hypothesis that biofeedback is useful in treating eating problems.

Recommendations for future research include using a larger sample of individuals with eating disordered behaviors, or even using this treatment in a controlled setting such as with inpatients at an Eating Disorder unit in a hospital. This treatment is likely to be more successful in a controlled setting for the simple fact that the clinician has control over limiting factors such as insufficient sample size and duration of the treatment method. Another suggestion would be to perform individual treatment sessions, instead of engaging in group sessions of biofeedback. This would serve as a solution to one of the problems of participants declining to participate. Finally, a future researcher may consider increasing the duration of treatment. It would be ideal to learn if more treatment would result in more significant results.

Summary

This study tested the hypothesis that stress management training using biofeedback would be an effective method of treatment for college women who exhibited eating disordered behaviors as measured by the EDI-2. Statistical findings did not support this hypothesis, but a noteworthy trend in the direction of biofeedback being a useful treatment method was discovered. The lack of significant findings can possibly be attributed to short duration of the treatment method and an insufficient sample size.

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Appendix A

Hassles Scale

THE HASSLES SCALE

Directions: Hassles are irritating, frustrating, and distressing demands that can range from annoyances to major pressures, problems, or difficulties. Listed on the following page are a number of minor events which occur daily. Please circle the appropriate number to indicate whether each event was either "not a hassle," "somewhat of a hassle," "a moderate hassle," or "a major hassle" over the past month.

---

0 - Not a hassle
1 - Somewhat of a hassle
2 - A moderate hassle
3 - A major hassle

1.	Misplacing or losing things	0	1	2	3
2.	Troublesome neighbors	0	1	2	3
3.	Social obligations	0	1	2	3
4.	Inconsiderate smokers	0	1	2	3
5.	Troubling thoughts about your future	0	1	2	3
6.	Thoughts about death	0	1	2	3
7.	Health of a family member	0	1	2	3
8.	Not enough money for clothing	0	1	2	3
9.	Not enough money for housing	0	1	2	3
10.	Concerns about owing money	0	1	2	3
11.	Concerns about money for emergencies	0	1	2	3
12.	Someone owes you money	0	1	2	3
13.	Financial responsibility for someone who doesn't live with you	0	1	2	3
14.	Smoking too much	0	1	2	3
15.	Use of alcohol	0	1	2	3
16.	Personal use of drugs	0	1	2	3
17.	Too many responsibilities	0	1	2	3
18.	Care for pet	0	1	2	3
19.	Planning meals	0	1	2	3
20.	Concerned about the meaning of life	0	1	2	3
21.	Trouble relaxing	0	1	2	3
22.	Trouble making decisions	0	1	2	3
23.	Problems getting along with fellow residents	0	1	2	3
24.	Home maintenance (inside)	0	1	2	3
25.	Not enough money for basic necessities	0	1	2	3
26.	Too many interruptions	0	1	2	3
27.	Unexpected company	0	1	2	3
28.	Too much time on hands	0	1	2	3
29.	Having to wait	0	1	2	3
30.	Concerns about accidents	0	1	2	3
31.	Being lonely	0	1	2	3
32.	Not enough money for health care	0	1	2	3
33.	Fear of confrontation	0	1	2	3
34.	Financial security	0	1	2	3
35.	Silly practical mistakes	0	1	2	3
36.	Inability to express yourself	0	1	2	3
37.	Physical illness	0	1	2	3
38.	Side effects of medication	0	1	2	3
39.	Concerns about weight	0	1	2	3
40.	Physical appearance	0	1	2	3
41.	Fear of rejection	0	1	2	3
42.	Sexual problems that results from physical problems	0	1	2	3
43.	Sexual problems other than those resulting from physical problems	0	1	2	3
44.	Concerns about health in general	0	1	2	3
45.	Not seeing enough people	0	1	2	3

46.	Friends or relatives too far away.....	0	1	2	3
47.	Preparing meals.....	0	1	2	3
48.	Wasting time.....	0	1	2	3
49.	Auto maintenance.....	0	1	2	3
50.	Filling out forms.....	0	1	2	3
51.	Problems with employees.....	0	1	2	3
52.	Declining physical abilities.....	0	1	2	3
53.	Being exploited.....	0	1	2	3
54.	Concerns about bodily functions.....	0	1	2	3
55.	Rising prices of common goods.....	0	1	2	3
56.	Not getting enough rest.....	0	1	2	3
57.	Not getting enough sleep.....	0	1	2	3
58.	Problems with your children.....	0	1	2	3
59.	Problems with persons younger than yourself.....	0	1	2	3
60.	Problems with your lover.....	0	1	2	3
61.	Difficulties seeing or hearing.....	0	1	2	3
62.	Overloaded with family responsibilities..	0	1	2	3
63.	Too many things to do.....	0	1	2	3
64.	Unchallenging work.....	0	1	2	3
65.	Concerns about meeting high standards....	0	1	2	3
66.	Financial dealings with friends or acquaintances.....	0	1	2	3
67.	Trouble with reading, writing, or spelling abilities.....	0	1	2	3
68.	Too many meetings.....	0	1	2	3
69.	Problems with divorce or separation.....	0	1	2	3
70.	Trouble with arithmetic skills.....	0	1	2	3
71.	Gossip.....	0	1	2	3
72.	Legal problems.....	0	1	2	3
73.	Concerns about weight.....	0	1	2	3
74.	Not enough time to do the things you need to do.....	0	1	2	3
75.	Television.....	0	1	2	3
76.	Not enough personal energy.....	0	1	2	3
77.	Concerns about inner conflicts.....	0	1	2	3
78.	Feel conflicted over what to do.....	0	1	2	3
79.	Regrets over past decisions.....	0	1	2	3
80.	The weather.....	0	1	2	3
81.	Nightmares.....	0	1	2	3
82.	Concerns about getting ahead.....	0	1	2	3
83.	Difficulties with friends.....	0	1	2	3
84.	Not enough time for family.....	0	1	2	3
85.	Transportation problems.....	0	1	2	3
86.	Not enough money for entertainment and recreation.....	0	1	2	3
87.	Shopping.....	0	1	2	3
88.	Prejudice and discrimination from others.....	0	1	2	3
89.	Property, investments or taxes.....	0	1	2	3
90.	Not enough time for entertainment and recreation.....	0	1	2	3
91.	Concerns about news events.....	0	1	2	3
92.	Noise.....	0	1	2	3
93.	Crime.....	0	1	2	3
94.	Traffic.....	0	1	2	3
95.	Pollution.....	0	1	2	3

HAVE WE MISSED ANY OF YOUR HASSLES? IF SO, WRITE THEM IN BELOW:

96. _____ 0 1 2 3

ONE MORE THING: HAS THERE BEEN A CHANGE IN YOUR LIFE THAT AFFECTED HOW YOU ANSWERED THIS SCALE? IF SO, PLEASE TELL US WHAT IT WAS.

_____

Appendix B

Informed Consent Form

PARTICIPATION CONSENT LETTER

You are invited to participate in a study investigating the effect of biofeedback training on stress and eating patterns. To begin with, you will complete a Hassles Scale Test and Eating Disorder Inventory. You may then possibly be recruited to participate in a more in-depth study involving three sessions of biofeedback provided to groups of participants.

Information obtained in this study will be identified only by code number. Your name will be used only to indicate that you participated in the study in order to receive extra credit for participating. When interacting with other participants, you may choose not to use your real name or give only your first name.

Your participation in this study is completely voluntary. Should you wish to terminate your participation, you are welcome to do so at any point in the study. Termination of participation will have no bearing on your class standing. There is no risk or discomfort involved in completing the study. If you are selected for the additional sessions, you will be signed up for a drawing for a gift certificate and you may receive additional research points (determined upon your instructor).

If you have any questions or comments about this study, feel free to ask the experimenter. If you have any additional questions, please contact Dr. Kurt Baker, Division of Psychology and Special Education, 307 Visser Hall, 341-5811.

Thank you for your participation.

I, _____, have read the above information
(please print name)
and have decided to participate. I understand that my participation is voluntary and that I may withdraw at any time without prejudice after signing this form should I choose to discontinue participation in this study.

_____ _____
(Signature of Participant) (Date)

_____
(Signature of Experimenter)

THIS PROJECT HAS BEEN REVIEWED BY THE EMPORIA STATE UNIVERSITY COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS.

I, Sandra Gasca, hereby submit this thesis to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.

Sandra Gasca
Signature of Author

12-06-96
Date

Effects of Stress Management Using Biofeedback For Treatment of Eating Disordered Behaviors
Title of Thesis

Signature of Graduate Office Staff Member

12-6-96
Date Received