# REDUCING EATING DISORDER RISK FACTORS IN MEMBERS OF A NATIONAL SORORITY: A BENCHMARKING STUDY

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Abstract

This study examined the transportability and generalizability of "Reflections," an evidence-based eating disorder prevention program developed for undergraduate women. Previous trials of "Reflections" have been conducted at one local university in the Southern portion of the United States and with members of the TriDelta sorority at a Southern University. The program's applicability to other sororities and to collegiate campuses in distinct geographical regions is therefore an important empirical question. This study also examined whether analyzing data with repeated measures ANOVA and latent growth curve modeling would yield similar results. Participants were undergraduate women recruited from one sorority at Rutgers University and were 18 years of age or older. Participants who took part in "Reflections" were assessed at three time points: baseline, post-treatment, and 5-month follow-up. Primary outcomes were body dissatisfaction (assessed using the Satisfaction and Dissatisfaction of Body Parts Scale), thin ideal internalization (assessed using the Ideal Body Stereotype Scale – Revised), negative affect (assessed using the Positive and Negative Affect Scale), and eating disorder psychopathology (assessed using the Eating Disorder Examination – Questionnaire). Results suggest that "Reflections" is transportable and generalizable, as the majority of eligible students participated in the program and evidenced statistically significant reductions in thin ideal internalization, eating disorder psychopathology, and body dissatisfaction at post-treatment and statistically significant reductions in thin ideal internalization and eating disorder psychopathology at 5-month follow-up. Participants did not show reductions in negative affect and rates of participation were lower than those obtained in previous studies. When data were analyzed using a latent growth curve model, participants evidenced statistically significant reductions in thin ideal

internalization, eating disorder psychopathology, and body dissatisfaction from baseline through 5-month follow-up. Implications of the findings and future directions are discussed.

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Chapter I

# Introduction

## Brief Overview of "Reflections"

"Reflections" is an empirically supported body image program originally developed for undergraduate sorority women that has been shown to reduce eating disorder risk factors. The program is based on a dual pathway model of bulimia nervosa that posits that sociocultural pressures to be thin and investment in the thin ideal (i.e., thin ideal internalization) lead to body dissatisfaction. This can lead to dieting and negative affect which in turn can lead to bingeing (and purging) behaviors (Stice, 2001). "Reflections" centers on challenging the thin ideal via dissonance-producing activities. According to the theory of cognitive dissonance (Festinger, 1957), when an individual's actions and beliefs are inconsistent it elicits a state of psychological discomfort. As a result, the individual alters his or her beliefs (in line with his or her actions) to alleviate this discomfort. Application of this theory to the model of bulimia nervosa suggests that if individuals act in ways that are inconsistent with the thin ideal they should experience a cognitive shift (i.e., reduction in thin ideal internalization), which will lead to a reduction in the other eating disorder risk factors. Consistent with this hypothesis, all activities in "Reflections" encourage participants to challenge the thin ideal.

**History of Eating Disorder Prevention**

Eating disorders are associated with severe medical and psychological consequences (Wilson, Becker, & Heffernan, 2002). Empirically supported treatments have been developed for several eating disorders; however, not all patients respond to these treatments and currently no evidence-based treatments exist for anorexia nervosa (Wilson, Grilo, & Vitousek, 2007). Furthermore, eating disorder patients do not always seek treatment (Becker, Franko, Nussbaum, & Herzog, 2004; Meyer, 2005). Thus, the development of eating disorder prevention programs, in addition to treatment interventions, is critical. Full threshold eating disorders are relatively rare. Subthreshold eating disorders are more common, particularly among college age women. Subthreshold eating disorders are independently associated with negative affect and body dissatisfaction (McKnight Investigators, 2003) and research suggests as many as 30% of college age women with partial presentations develop full threshold eating disorders (Taylor, Bryson, Luce, et al., 2006). The development of eating disorder prevention programs targeting college age women is therefore important.

Initial eating disorder prevention programs consisted primarily of psychoeducation and were ineffective at reducing eating disorder behaviors (Pearson, Goldklang, & Striegel – Moore, 2002; Stice & Shaw, 2004). Recent advances in eating disorder prevention have yielded positive results and several eating disorder prevention programs have been shown to reduce eating disorder risk factors (Stice, Shaw, & Martic, 2007). Cognitive-dissonance based eating disorder prevention programs currently have the most empirical support (Stice & Shaw, 2004).

The first cognitive-dissonance based eating disorder prevention program, based on the dual-pathway model of bulimic pathology, was initially developed and tested by Stice and colleagues (2001) with middle school and high school girls. Efficacy trials demonstrated that this program, known as "The Body Project," reduced eating disorder risk factors including thin ideal internalization, dietary restraint, body dissatisfaction, negative affect, and eating pathology through 2-year follow-up (Stice, Chase, Stormer, & Appel, 2001; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Mazotti, Weibel, & Agras, 2000; Stice, Shaw, Burton, & Wade, 2006; Stice, Trost, & Chase, 2003).

Becker and colleagues adapted the program for undergraduate sorority women by incorporating discussions about how the thin ideal negatively impacts sororities and how sorority women can collectively challenge the thin ideal. The program was referred to as "The Sorority Body Image Program" (SBIP). Initial research demonstrated that SBIP, similar to "The Body Project," reduced eating disorder risk factors among women in a local sorority at Trinity University, a small liberal arts college (Becker Jilka, & Polvere, 2002). Additional research trials have consistently supported the effectiveness of this program, which is now being implemented with all local sorority members on the Trinity campus (Becker, Bull, Schaumberg, Cauble, & Franco, 2008; Becker, Smith, & Ciao, 2005; Becker, Smith, & Ciao, 2006; Becker, Wilson, Williams, Kelly, McDaniel, & Elmquist, 2010).

In 2005 TriDelta, which is a national sorority, approached Becker about implementing SBIP with its members. Becker subsequently pilot tested SBIP with members of TriDelta chapters at Southwestern colleges in the United States. Research

yielded results comparable to previous trials at Trinity University (Perez, Becker, & Ramirez, 2010) and as a result TriDelta decided to facilitate widespread distribution of the program. In 2007 Becker and Stice, in collaboration with TriDelta, created a peer leader training manual and participant workbook for the program, which they renamed "Reflections" (Becker & Stice, 2008). TriDelta underwrote the cost of publishing materials required for 20,000 undergraduate women to complete the program and opened the program to all sorority members. Becker and TriDelta also created Body Image Academy, which is a training workshop for sorority women and campus professionals interested in implementing "Reflections" on their campuses. "Reflections" has been implemented by chapters of 10 national sororities at 84 undergraduate universities throughout the United States and over 10,000 participant workbooks have been sold to date.

**Research on "Reflections"**

Six key research studies on "Reflections," conducted under increasingly naturalistic conditions, have been published. One aspect of this "naturalistic" continuum centers on who conducts the program and who trains these leaders. In the initial studies the program was led by Becker and undergraduate research assistants (RAs). In later studies the program was implemented by sorority members trained by Becker to be peer leaders. In the most recent study a doctoral level psychologist (other than Becker) trained the initial cohort of peer leaders who were then responsible for training a second wave of peer leaders. A second aspect of generalizability involves the number and type of participants. Research participants in the initial study of "Reflections" were members of

one sorority at Trinity University with high body image concerns. Subsequent studies examined the program's effect on members of all local sororities at Trinity (with both high and low body image concerns) and at a TriDelta chapter in the Southern United States. A third aspect of the "naturalistic" continuum centers on the transportability of "Reflections." Five of the six research studies on SBIP and "Reflections" have been conducted with local sorority members at Trinity University where the program was developed. In the sixth study, Perez and colleagues (2010) examined whether it was feasible to transport the peer-led program to a new university, implement it with members of a national sorority (TriDelta), and obtain results comparable to those found at Trinity University. Each study is detailed below.

Becker and colleagues (2002) conducted a pilot trial at Trinity University in which 24 sorority members with high body image concerns were randomly assigned to a dissonance based intervention (DBI) or media advocacy intervention (MA). The latter intervention, MA, was identical to DBI except it excluded the dissonance-inducing activities). DBI and MA were conducted by Becker and undergraduate RAs. Results indicated that both interventions significantly reduced eating pathology, dietary restraint, and body dissatisfaction, at post-treatment and reduced eating pathology and dietary restraint at 1-month follow-up. Only DBI reduced thin ideal internalization at post-treatment and reduced thin ideal internalization and body dissatisfaction at 1-month follow-up. This study demonstrated that DBI could be adapted for undergraduate sorority women with high body image concerns and that it conferred some advantages over MA.

Becker and colleagues (2005) conducted a second trial in which 161 sorority members with high and low body image concerns were randomly assigned to DBI, MA, or a waitlist control condition. DBI and MA were implemented by Becker and undergraduate RAs. This study expanded upon the pilot trial by increasing the sample size, adding a waitlist control condition, and including sorority members with both high and low levels of body image concerns. DBI and MA produced significantly greater reductions in dietary restraint, body dissatisfaction, and eating pathology at 1-month follow-up as compared to the waitlist controls. Only DBI produced significantly greater reductions in thin ideal internalization as compared with the waitlist condition. Level of body image concern (i.e., high vs. low) did not moderate treatment outcome. These results supported the use of both DBI and MA with sorority members who have both high and low levels of body image concerns.

Becker and colleagues (2006) conducted a third trial in which 90 sorority members were randomized to MA or DBI. Sessions were implemented by sorority members who were trained as peer leaders. This study was distinct from the previous trial because participation in the program was semi-mandatory (though research participation was voluntary), peer leaders were undergraduate sorority members (instead of Becker and RAs), and the waitlist condition was eliminated (to accommodate the semi-mandatory nature of the program). Ninety percent of eligible sorority women participated in the study and retention rates for participants assigned to DBI through 7-week follow-up (89%) and 8-month follow-up (74%) were strong. Results indicated that both DBI and MA reduced dietary restraint, eating pathology, thin ideal internalization,

and body dissatisfaction at post-treatment and 7-week follow-up. At 8-month follow-up only participants who received DBI maintained significant reductions in dieting, thin ideal internalization, and body dissatisfaction. Both DBI and MA maintained significant reductions in eating pathology at 8-month follow-up. These results indicated that although both interventions reduced eating disorder risk factors DBI was advantageous because its participants evidenced significantly greater maintenance of these reductions at follow-up. This study also provided preliminary evidence that peer leaders, trained by Becker, could effectively implement DBI.

Becker and colleagues (2008) conducted a fourth trial in which 188 new sorority members were randomized to DBI or MA. Sessions were implemented by sorority members who were trained as peer leaders. This study expanded upon previous research by increasing the sample size, examining whether level of body image concern moderates outcome when the program is peer led, and reevaluating MA. Ninety-two percent of eligible sorority members participated in the program and, for participants assigned to DBI, 90.5% of those who completed the first session also completed the second session. Retention rates of participants through 7-week follow-up (87.3%) and 8-month follow-up (74.5%) were strong. Results indicated that DBI resulted in significant reductions in dietary restraint, eating pathology, thin ideal internalization, and body dissatisfaction through 8-month follow-up. DBI resulted in reductions in all four constructs for high and low risk members. There was a decrease in effect sizes between 7-week follow-up and 8-month follow-up for all constructs except body dissatisfaction. MA significantly reduced all constructs for high risk members but low risk members only evidenced reductions in

thin ideal internalization. These results favored the use of DBI (over MA) for eating disorder prevention with sorority members because the sorority community wanted to implement a universal program (i.e., a program that would benefit participants of varying levels of body image concerns). This study also provided further evidence that peer leaders, trained by Becker, could effectively implement DBI.

Perez and colleagues (2010) examined the transportability and generalizability of the program by studying whether DBI could be implemented on a semi-mandatory basis at a large state university with national sorority members (i.e., TriDelta members) and whether the program would yield results similar to those obtained with local sorority members at Trinity (Becker et al., 2008; Becker et al., 2002; Becker et al., 2005, 2006). This study also examined whether a clinical psychologist other than Becker could train peer leaders and whether these peer leaders could train other peer leaders the following year. One hundred and eighty four members of TriDelta who participated in DBI were assessed at four time points: baseline, post-treatment, 5-month follow-up and 1-year follow-up. The percentage of eligible sorority women who participated in the first session of the program was not reported. There was a reduction in the percentage of participants who completed the second session (79.1%) and 1-year follow-up (62.6%) as compared to trials conducted at Trinity University. Results indicated that DBI reduced body dissatisfaction, thin ideal internalization, dietary restraint, and bulimic behaviors and these results were maintained at 5-month and 1-year follow-up. Effect sizes for thin ideal internalization and body dissatisfaction were less than those obtained in previous studies (Becker et al., 2008; Becker et al., 2005, 2006). It is unclear why this study

yielded smaller effect sizes than previous trials; however, it suggests that having someone other than Becker conduct peer leader training or transporting the program to a new university may reduce the program's effectiveness. Overall, these results provided evidence that this program can be implemented with undergraduate women outside Trinity University. It also suggested that peer leaders could be trained by someone other than Becker and that peer leaders could assume responsibility for training other peer leaders. This was particularly important given that the program was being implemented on a large scale and Becker could no longer train all peer leaders.

Becker and colleagues (2010) compared DBI to a modified version of the Healthy Weight (MHW) prevention program, which is another empirically supported eating disorder prevention program, at Trinity University. The study sought to examine whether peer leaders could effectively deliver MHW and the comparative effectiveness of MHW versus DBI. The study also extended follow-up data on "Reflections" by examining outcome through 14-month follow-up. One hundred and six sorority members were randomized to DBI or MHW. Ninety-seven percent of eligible sorority members participated in the first session of the program and 98.1% of participants who completed the first session also completed the second session. Retention of participants through 8-week follow-up (81%), 8-month follow-up (81%), and 14-month follow-up (74%) was strong. Results indicated that DBI decreased negative affect, thin ideal internalization, and bulimic pathology to a greater degree than MHW post-intervention. DBI and MHW decreased negative affect, thin ideal internalization, body dissatisfaction, dietary restraint, and bulimic pathology at 14 months. These results suggested that MHW could be

delivered by endogenous providers (e.g., peer leaders) and that DBI produced larger post-treatment effects than MHW. DBI and MHW reduced eating disorder risk factors at 14-month follow-up. These results also supported the long term effectiveness (i.e., 14-month follow-up) of DBI.

In summary, several research studies indicate that DBI significantly reduces body dissatisfaction, thin ideal internalization, dietary restraint and bulimic pathology and these results are largely maintained through 14-month follow-up. These results were obtained when the program was implemented by peer leaders (i.e., sorority members, without a specific background in psychology) on a semi-mandatory basis with participants of varying levels of body image concerns (Becker et al., 2008; Becker et al., 2002; Becker et al., 2005, 2006; Becker et al., 2010). One study of DBI examined the program's impact on participant's level of negative affect and found significant reductions in this construct as well (Becker et al., 2010). One study has provided preliminary evidence that participants experience significant reductions in the aforementioned eating disorder risk factors when the program is implemented with members of TriDelta at a new undergraduate university in the Southwestern portion of the United States (Perez et al., 2010). The study also suggested that a doctoral level psychologist other than Becker could train peer leaders and these leaders could train other members of their sorority to become peer leaders. Effect sizes for some dependent variables were lower in this study, as compared to previous trials. Participation in the program and retention rates of participants were lower as well, suggesting that the

program's effectiveness and rates of participation may be reduced when the program is implemented at a new university (Perez et al., 2010).

**Current Study: Aims**

The first aim of this study is to examine the transportability and generalizability of the DBI program, currently referred to as "Reflections." Specifically, this study examined whether the "Reflections" program can be transported to a non-Southern University (i.e., Rutgers – The State University of New Jersey) with members of a national sorority other than TriDelta (i.e., Alpha Chi Omega) and whether the program would produce outcomes similar to previous trials of "Reflections." Members of sororities other than TriDelta have implemented the program on university campuses. Researchers have yet to determine whether the same positive results obtained with TriDelta chapters extends to other national sororities. TriDelta was involved in the development of "Reflections" and therefore the program's applicability to other sororities is an important empirical question. The program has only been tested on collegiate campuses in the Southwestern portion of the United States. Therefore, examining the effectiveness of "Reflections" in distinct geographical regions is an important aspect of generalizability. Given the results of one previous trial which also examined the transportability and generalizability of the program (Perez et al., 2010), it was hypothesized that effect sizes and retention rates of participants might be smaller than those found in previous trials conducted at Trinity University (e.g., Becker et al., 2008; Becker et al., 2005, 2006; Becker et al., 2010).

The second aim is to analyze the data using both repeated measures ANOVA and latent growth curve modeling (LGCM) and to compare the results. All previous trials of "Reflections" were analyzed using repeated measures ANOVA. It is therefore important to analyze this data using the same approach in order to facilitate comparison with previous trials. Repeated measures ANOVA, however, has several limitations. It assumes homogeneous baseline scores, individual trajectories, and rates of change throughout the study which creates measurement error bias. In contrast, LGCM is a more sophisticated type of analysis which accounts for these factors (Bollen & Curran, 2006). LGCM also has greater statistical power to detect change within a sample and therefore confers several advantages over repeated measures ANOVA. The current study will examine whether results obtained using LGCM are comparable to results obtained using repeated measures ANOVA. It was hypothesized that the results of the two types of analyses would be comparable.

Chapter II

# Methods

## Participants

Members of The Alpha Chi Omega (AXO) Sorority at Rutgers- The State University of New Jersey who were 18 years or older and participated in "Reflections" were eligible to participate in this open trial. AXO members could participate in "Reflections" and elect not to participate in the research study. Of the 124 eligible sorority members (i.e., all members of AXO except those who volunteered to be peer leaders), 72 members of AXO participated in "Reflections" between Spring 2009 and Spring 2010 and all members who participated in the program also consented to the study and completed the baseline assessment (T1). Women who met criteria for an eating disorder (n=8) were removed from analyses, resulting in a total sample of 64 participants. Of the 64 participants, 46 (71.9%) completed the second session of "Reflections" and all members who completed the second session also completed the post-treatment assessment (T2). Twenty-eight (43.8%) participants completed 5-month follow-up assessments (T3). See Figure 1.

## Procedures

This study commenced in March 2009 and data were collected through Spring 2010. The study and "Reflections" program were approved by the AXO president, the

Rutgers University Greek Council, and the Rutgers University Institutional Review Board. A member of AXO, referred to as the Body Image Coordinator, was appointed to serve as a liaison between the Rutgers research team and AXO. In January 2009, prior to the commencement of "Reflections," members of AXO attended a sorority chapter meeting where the content and history of "Reflections" was discussed. The peer-led nature of the program was explained and interested sorority members had the opportunity to volunteer for peer leader training. All members of AXO were encouraged to participate in "Reflections" though the program was not mandatory. The voluntary research study was described and AXO members were informed that they could participate in "Reflections" without participating in the study.

AXO members who agreed to participate in the study in Spring 2009 (n=49) completed the consent form and baseline questionnaires (see "Measures" section, below) directly prior to the first "Reflections" session. Members generated their own ID numbers so that data would be anonymous. Participants completed post-treatment questionnaires directly after completion of the second "Reflections" session. Five-month follow-up data were collected at a sorority meeting. "Reflections" sessions were audio-recorded to assess peer leader adherence to the treatment protocol.

After AXO's initial implementation of "Reflections" in Spring 2009 sorority officers decided to implement the program each semester with new sorority members. New peer leaders were trained using the same training protocol to replace peer leaders who had graduated. Data were collected on "Reflections" participants who joined AXO in Fall 2009 (n=11) and Spring 2010 (n=12).

**Peer facilitators and facilitator training.** AXO members who volunteered to be peer leaders (n=12) attended a separate peer leader training session in February 2009. The training was led by the author and was 10 hours in duration over the course of three days. Peer leaders were trained in teams of three to four by members of the Rutgers research team (Rutgers research team members were trained by Becker in the Fall of 2008). During training, peer leaders implemented abbreviated program sessions (i.e., 40 minutes instead of 2 hours) while the other teams acted as participants. Peer leaders received supervision from the research team regarding their simulated session.

**Intervention.** "Reflections" consisted of two, 2-hour group sessions administered by two to four peer leaders to groups consisting of five to nine participants. During the first session, participants identified the thin ideal, discussed the origin of the thin ideal and how it is perpetuated in our society, discussed the costs of pursuing the thin ideal, and delineated past situations when they felt pressure to pursue the thin ideal and how they would currently respond to that pressure. Between the first and second session participants were asked to stand in front of a mirror and list their positive physical and emotional qualities. The second session consisted of role-plays in which peer leaders acted as a "thin idealist" and small groups of participants attempted to challenge their pursuit of the thin ideal. Participants also discussed ways to challenge common "fat talk statements," discussed ways that sorority members can resist the thin ideal both on an individual level and collectively (i.e., body activism), discussed possible barriers to body activism and how to overcome these barriers, and committed to a self affirmation homework exercise.

## Measures

The primary dependent variables were thin ideal internalization, negative affect, body dissatisfaction, and bulimic pathology.

**Thin ideal internalization.** Thin ideal internalization was assessed using an 8-item modified version of the Ideal-Body Stereotype Scale-Revised (IBSS-R; Stice, Ziemba, Margolis, & Flick, 1996). Participants responded to statements such as "Thin women are more attractive" using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items are summed and then averaged. The IBSS-R has good internal consistency (alpha = .83 to .91), test-retest reliability (r=.67 to .80) and convergent and predictive validity (Stice & Agras, 1998; Stice et al., 1996). The internal consistency of the IBSS-R in the present study was 0.77 at baseline, 0.86 at post-treatment, and 0.76 at 5-month follow-up.

**Negative affect.** Negative affect was assessed using the Positive and Negative Affective Schedule (PANAS). Participants reported whether they had experienced 20 negative emotions during the past week using a 5-point Likert scale ranging from 1 (not at all) to 5 (extremely). PANAS has demonstrated good internal consistency ($\alpha = .95$), reliability and validity (Watson & Clark, 1992). The internal consistency of the PANAS in the present study was 0.91 at baseline, 0.94 at post-treatment, and 0.97 at 5-month follow-up.

**Body dissatisfaction.** Body dissatisfaction was assessed using the Satisfaction and Dissatisfaction with Body Parts Scale (SD-BPS; Berscheid, Walster, & Bohrnstedt, 1973). Participants rated their dissatisfaction with nine body parts (e.g. stomach, thighs,

hips) using a Likert scale ranging from 1 (extremely satisfied) to 5 (extremely dissatisfied). This scale has good internal consistency (α = .94), 3-week test-retest reliability (*r*=.90) and predictive validity for bulimic symptom onset (Stice et al., 2006). The internal consistency of the Satisfaction and Dissatisfaction with Body Parts Scale in the current study was 0.95 at baseline, 0.92 at post-treatment, and 0.94 at 5-month follow-up.

**Bulimic pathology**. Bulimic pathology was assessed using the bulimic composite score of the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) which assesses eating behaviors and attitudes over the past 28 days (e.g., "Over the past 28 days how many times have you made yourself sick (vomit) as a means of controlling your shape or weight?"). The EDE-Q is a self-report version of the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993), a semi-structured interview used to assess eating disorders. The EDE-Q has good test-retest reliability (r=0.81 to 0.94) and internal consistency (α = .78 to 0.93) (Luce & Crowther, 1999; Mond, Hay, Rodgers, Owen, & Beaumont, 2004). The bulimic pathology subscale was derived by summing the diagnostic items of the EDE-Q and then computing an average score. The internal consistency of this subscale was 0.80 at baseline, 0.78 at post-treatment, and 0.72 at 5-month follow-up.

Chapter III

# Results

## Sample Characteristics

Of the 72 women who participated in the study, eight participants were excluded because they met criteria for a current eating disorder. This resulted in a final sample of 64 participants with a mean age of 19.86 (SD = 1.32). Participants' mean body mass index (BMI), based on self-reported height and weight, was 25.38 (SD = 4.93) with a range from 17.33 to 36.90. The majority of participants identified their ethnicity as Caucasian (78.1%). The remainder of participants identified themselves as Hispanic (12.5%), Asian (4.7%), Black (1.6%) and "Other" (3.1%). The grade level of participants was as follows: 34.4% were in their sophomore year of college, 25% were juniors, 18.8% were seniors, and 17.2% were freshman.

## Statistical Analyses

In all six prior research studies on "Reflections" data analysis was conducted using repeated measures ANOVA. Data from this study were analyzed using repeated measures ANOVA to facilitate comparison with previous trials. Data from this study were also analyzed using LGCM, which is a more sophisticated form of analysis that confers several advantages over repeated measures ANOVA.

**Repeated Measures ANOVA**

All analyses were conducted on an intent-to-treat basis using baseline forward data. Similar to previous trials of "Reflections," univariate repeated measures ANOVAs were calculated to examine differences across the three time points, within each individual, for each of the dependent variables. If the overall ANOVA was found to be significant, follow-up pair wise t-tests were conducted to assess differences between baseline, post-treatment, and 5-month follow-up. Effect sizes for baseline to post-treatment and 5-month follow-up were calculated using partial eta-squared values and Cohen's *d*.

Table 1 consists of the participants' means and standard deviations for the four dependent variables (thin ideal internalization, negative affect, body dissatisfaction, and bulimic pathology) at all three time points (baseline, post-treatment, and 5- month follow-up) and the results of the repeated measures ANOVA for each dependent variable. Table 2 consists of the mean differences, outcomes of the post hoc t-tests, and Cohen's *d* for each dependent variable. Cohen's *d* effect sizes from three previous trials of "Reflections" (i.e., Becker et al., 2008; Becker et al., 2010; Perez et al., 2010) are also reported to facilitate comparison with previous studies.

**Thin ideal internalization (IBSS-R).** The ANOVA for the IBSS-R Scale, $F(1, 63) = 17.13$, $p < 0.001$, $n^2 = 0.21$, yielded a significant time effect. Note that the data violated the Mauchley assumption of sphericity and therefore a lower bound correction was used because this is the most conservative correction option (Meyers, Gamst, & Guarino, 2006). Post hoc t-tests indicated that participants demonstrated a significant

reduction in thin ideal internalization after completion of the program ($p<0.001$) and at 5-month follow-up ($p<0.05$). Cohen's *d* effect size was 0.63 at post-treatment and 0.31 at 5-month follow-up.

**Negative affect (PANAS).** PANAS baseline data was skewed, so a logarithmic transformation was performed to normalize the data. The ANOVA for the PANAS Scale, $F (1, 63) = 2.34$, $p =0.13$, $n^2 =0.04$, did not yield a significant time effect. Note that the data violated the Mauchley assumption of sphericity and therefore a lower bound correction was used. Cohen's *d* effect size was 0.19 at post-treatment and 0.00 at 5-month follow-up.

**Body dissatisfaction (SD-BPS).** The ANOVA for the SD-BPS Scale, $F (2, 126) = 5.02$; $p<0.01$; $n^2=0.07$, yielded a significant time effect. Post hoc t-tests indicated that participants demonstrated a significant reduction in body dissatisfaction after completion of the program ($p< 0.01$). These reductions were no longer significant at 5-month follow-up ($p = 0.185$). Cohen's *d* effect size was 0.36 at post-treatment and 0.17 at 5-month follow-up.

**Bulimic pathology (EDEQ-BN)**. The ANOVA for the EDEQ-BN, $F (2, 126) =12.00$; $p<0.001$; $n^2=0.16$, yielded a significant time effect. Post hoc t-tests indicated that participants demonstrated a significant reduction in bulimic pathology after completion of the program ($p<0.001$) and at 5-month follow-up ($p<0.01$). Cohen's *d* effect size was 0.61 at post-treatment and 0.40 at 5-month follow-up.

Analyses were conducted to determine if there were baseline differences on thin ideal internalization, negative affect, body dissatisfaction, bulimic pathology, and BMI

between participants in cohort 1 (i.e., Spring 2009), cohort 2 (i.e., Fall 2009) and cohort 3 (i.e., Spring 2010). T-tests did not reveal statistically significant differences on participants' baseline scores on the IBSS-R, PANAS, SD-BPS, EDEQ-BN, or baseline BMI between cohort 1, cohort 2, or cohort 3.

Analyses were conducted to determine if there were baseline differences on thin ideal internalization, negative affect, body dissatisfaction, bulimic pathology, and BMI between: 1) participants who completed T1 only vs. participants who completed T1 and T2; 2) participants who completed T1 only vs. participants who completed T1, T2, and T3; 3) participants who completed T1 and T2 only vs. participants who completed T1, T2, and T3. T-tests did not reveal statistically significant differences on participants' baseline scores on the IBSS-R, PANAS, SD-BPS, EDEQ-BN, or baseline BMI between 1) those who completed T1 only vs. those who completed T1, T2, and T3; 2) those who completed T1 only vs. those who completed T1 and T2. With regard to those who completed T1 and T2 only versus those who completed T1, T2, and T3, participants' baseline PANAS score was significantly higher for the latter group, $t(44) = -2.165$, $p < 0.05$. T-tests did not reveal statistically significant differences between these two groups on participants' baseline scores for IBSS-R, SD-BPS, EDEQ-BN, or baseline BMI.

**Comparison of this study with previous studies of "Reflections"**

Analyses were conducted to determine if there were baseline differences in thin ideal internalization, negative affect, body dissatisfaction, bulimic pathology, and BMI

between participants in this study as compared to participants in Becker et al. (2008), Becker et al. (2010), and Perez et al. (2010).

The participants in the current study had a significantly higher baseline thin ideal internalization score [M=3.47 (SD=0.47), t (250) = 2.04, p <0.05] and a significantly higher BMI [M=22.01 (SD=2.82), t (250) = 6.70, p <0.001] than the Becker et al. (2008) sample. Comparisons could not be made with the other baseline DVs because they were either not assessed in the Becker et al. (2008) study or were assessed using a different measure.

The participants in the current study had a significantly higher baseline thin ideal internalization score [M=3.37 (SD = 0.61), t (168) = 2.67, p <0.001] and had a significantly higher BMI [M = 22.07 (SD = 0.72), t (168) = 5.22, p <0.001] than the Becker et al. (2010) sample. Comparisons could not be made with the other baseline DVs because they were either not assessed in the Becker et al. (2010) study or were assessed using a different measure.

The participants in the current study had a significantly higher baseline thin ideal internalization score [M=3.44 (SD = 0.62), t (244) = 1.99, p<0.05] than the Perez et al. (2010) sample. There was no significant difference on baseline bulimic pathology scores [M=1.38 (SD = 0.62), t (244) = 0.58, p =0.87]. Comparisons could not be made with other baseline DVs because they were either not assessed in the Perez et al. (2010) study or were assessed using a different measure.

Comparisons were made between the effect sizes of this study and the effect sizes found in Becker et al. (2008), Becker et al. (2010), and Perez et al. (2010) (See Table 2).

In this study the reduction in participants' level of thin ideal internalization at 5-month follow-up ($d$=0.31) was comparable to those in the other three studies ($d$ = 0.21 – 0.40). Reduction in levels of body dissatisfaction in this study was significant at post-treatment but not at 5-month follow-up and the effect size at 5-month follow-up ($d$=0.17) was significantly lower than in the previous trials ($d$=0.24-0.59). Note that body dissatisfaction was assessed using a different measure in previous trials. In this study there was no significant change in participants' levels of negative affect at post-treatment or 5-month follow-up and the effect size at 5-month follow-up ($d$=0.00) was lower than in Becker et al. (2010) ($d$=0.35). Note that negative affect was not assessed in the other two previous trials. Reductions in bulimic pathology in this study at 5-month follow-up ($d$= 0.40) were comparable to those in the three previous trials ($d$ = 0.37-0.55).

**Latent Growth Curve Model (LGCM)**

Separate latent growth curve models for each of the four dependent variables at three time points (i.e., baseline, post-treatment, and 5-month follow-up), controlling for BMI, were constructed using a non-linear spline to estimate deceleration of change over follow-up. BMI was centered on the grand mean to make the intercept more interpretable. Table 3 reports the results from these analyses.

A separate graph for each dependent variable consisting of the means of the dependent variable at each time point was constructed. See Figures 2, 3, 4, and 5.

**Thin ideal internalization (IBSS-R).** The slope of the model for IBSS-R ($\mu_{slope}$ = -0.316, $SE$=0.069, $p$ <*0.001*) indicates that there was a significant reduction in participants' levels of thin ideal internalization from baseline to 5-month follow-up.

**Negative affect (PANAS)**. The slope of the model for PANAS ($\mu_{slope=}$-0.086, *SE*=0.061, *p* = 0.157) indicates that there was not a significant change in the level of participants' negative affect from baseline to 5-month follow-up.

**Body dissatisfaction (SD-BPS)**. The slope of the model for SD-BPS ($\mu_{slope=}$-0.27, *SE*=0.075, *p* <0.01) indicates that there was a significant reduction in participants' levels of body dissatisfaction from baseline to 5-month follow-up.

**Bulimic pathology (EDEQ-BN).** The slope of the model for EDEQ-BN ($\mu_{slope=}$ -0.231, *SE*=0.058, *p* <0.001) indicates that there was a significant reduction in participants' levels of bulimic pathology from baseline to 5-month follow-up.

**Adherence**

All "Reflections" sessions were audio-recorded and fifty percent of tapes were coded by the author for adherence to the intervention manual. An adherence measure was used which lists specific tasks that peer facilitators were intended to implement (e.g., discussed origins of the thin ideal and elicited sources such as media, fashion industry, weight loss industry). Each task was rated on a 4-point Likert scale which ranged from 0 (did not complete) to 3 (fully completed). All coded tapes exhibited strong adherence to the treatment protocol.

# Chapter IV

## Discussion

The study examined whether the "Reflections" program could be effectively implemented at a new university (i.e., the transportability of the program) and whether participants would evidence improvements similar to those found in previous trials of Reflections (i.e., the generalizability of the program). Seventy-two out of the 124 eligible members of AXO participated in the first session of the "Reflections" program. The results indicate that transporting the program to a new university with non-TriDelta sorority members is feasible; however, the percentage of eligible students who participated in the program at Rutgers (58%) is significantly lower than in previous trials of "Reflections" (Becker et al., 2008; Becker et al., 2005, 2006; Becker et al., 2010; Perez et al., 2010). Retention rates of participants through the second session of the program (71.9%) and 5-month follow-up (43.8%) were also significantly lower than in previous studies.

The reduced rates of initial participation in "Reflections" and retention of participants as compared to previous trials of "Reflections" may be due to several factors. First, in previous trials of "Reflections" program participation was semi-mandatory (i.e., sorority members were expected to attend both sessions of the program unless they had an excused absence and were penalized for not doing so). In this study participation was

voluntary though strongly encouraged. Second, all prior studies have been conducted at Trinity University, where the program is well established, or with members of the TriDelta National Sorority, who helped create this program. In contrast, this study was conducted with members of a non-TriDelta National Sorority at Rutgers University. As a result, students in this study may have felt a weaker sense of allegiance towards "Reflections" which in turn may have reduced their motivation to participate in the program. Third, though formal data was not collected on this issue, leaders within the AXO sorority at Rutgers stated that member attendance at the majority of activities, beyond "Reflections," had been very low in the past few years. This suggests that low rates of participation among AXO members at Rutgers may reflect the social environment of this particular sorority rather than less interest in the program outside of Trinity University or the TriDelta sorority.

The reduced rates of participation in this study have implications for implementation of "Reflections" on a new campus. Based on the results of this study, it appears that mandatory implementation of the program may result in higher participation and retention of participants. Future studies should be conducted to confirm this finding; however, sororities should be informed that preliminary evidence suggests mandatory participation may be the most effective manner of implementation. Strategies should also be used to enhance participants' initial and ongoing interest in the program particularly when sorority members may have weaker allegiance to the program due to lack of affiliation with TriDelta or Trinity University. For example, members of Trinity University compiled testimonials from women who have completed the "Reflections"

program and distributed these testimonials to new sorority members in an effort to motivate them to participate in the program. These testimonials are available to the public and may be used to encourage program participation among sorority members on new campuses. TriDelta's marketing team created materials to help facilitate dissemination of the "Reflections" program and these materials may be effectively used to enhance motivation to participate in the program. TriDelta created an interactive website which contains information about the "Reflections" program as well as brochures which provide "packageable results" (i.e., "results that a lay person can comprehend in less than 30 seconds") regarding research findings related to the program (Becker, Stice, Shaw, & Woda, 2009). It may be advantageous to provide these materials to sorority members when the "Reflections" program is first presented to the sorority chapter. After the program has been successfully implemented in a sorority, it may be beneficial to arrange for members who have completed the program to speak to the sorority about their experience with "Reflections" as another method for enhancing motivation to participate in the program.

In addition to utilizing strategies to increase program participation with sorority members, it may also be advantageous to consider ways to disseminate the program beyond the sorority system. Sororities have been an effective organization within which to disseminate "Reflections" in part because women often participate in programs associated with their sorority. For sororities or universities in which this is not the case, as in this study, sororities may not be the ideal organization within which to implement "Reflections." Many universities do not have a Greek system and many women choose

not to participate in the Greek system when it is present on campus. Therefore, implementing Reflections solely with sororities excludes a significant number of undergraduate women from participating in the program. The feasibility of implementing "Reflections" in alternative ways, such as through college dormitories, is currently being tested. This may be a viable option for universities that do not have sororities or universities in which there is low student participation in sorority programs.

The reduced rate of program participation coupled with the relatively high rate of participant dropout in this study makes it difficult to draw strong conclusions about the program's effectiveness because it is unknown how members who did not participate in, or dropped out early from, the study would have responded to "Reflections." The sample size is also small which reduces statistical power. Consistent with the study's hypotheses, participants demonstrated significant reductions in thin ideal internalization, bulimic pathology and body dissatisfaction at post-treatment when data were analyzed using repeated measures ANOVA. Reductions for thin ideal internalization and bulimic pathology remained statistically significant at 5-month follow-up. The effect sizes for reductions in thin ideal internalization and bulimic pathology at 5-month follow-up in this study were comparable to previous trials (Becker et al., 2008; Becker et al., 2010; Perez et al., 2010). These results support the generalizability of "Reflections" to undergraduate women in non-TriDelta sororities in the Northeastern United States and therefore support current attempts to implement the program with women in different sororities across the country.

In several prior studies of "Reflections" the authors reported significant reductions in body dissatisfaction among participants (Becker et al., 2008; Becker et al., 2006; Becker et al., 2010; Perez et al., 2010). Negative affect has not been examined as frequently in "Reflections" trials; however, in one prior study of "Reflections" (Becker et al., 2010) and several studies of the Body Project (Stice et al., 2001; Stice et al., 2000; Stice et al., 2006) participants showed significant reductions in this construct. In this study participants evidenced significant reductions in body dissatisfaction at post-treatment but not at 5-month follow-up and participants did not evidence significant reductions in negative affect at post-treatment or at 5-month follow-up when data were analyzed using repeated measures ANOVA. It is unclear why the results from this study are distinct from previous trials on "Reflections." This may be due to the small sample size or the high rate of participant dropout. Another possibility is that the program's effectiveness is compromised when peer leaders are trained by someone other than the program's developer or when participants are not undergraduates at Trinity University or members of the TriDelta sorority and therefore may not have as strong an allegiance to, or investment in, the program. In the only other study of "Reflections" conducted outside Trinity University in which someone other than Becker trained peer leaders (Perez et al., 2010) the authors reported a statistically significant reduction in body dissatisfaction. The effect sizes for this construct as well as the other eating disorder risk factors were smaller than those found in studies conducted at Trinity University (negative affect was not assessed in the Perez et al. [2010] study). Further research examining the impact of

these variables (i.e., who trains peer leaders; where the program is implemented) on participant outcomes is warranted.

The results of the LGCM indicate that participants experienced statistically significant reductions in thin ideal internalization, body dissatisfaction, and bulimic pathology at post-treatment and 5-month follow-up. Consistent with study's hypothesis, the results obtained when the data were analyzed using a latent growth curve model were similar to those obtained when the data were analyzed using repeated measures ANOVA.

In repeated measures ANOVA individual differences in participants' baseline scores, individual trajectories among participants, or rates of change that occur within an individual are assumed to be due to chance and are accounted for via the standard deviation of the mean. LGCM, in contrast, assesses whether differences in the aforementioned properties are due to chance or due to meaningful discrepancies among participants thereby eliminating the measurement error bias found in repeated measures ANOVA (Bollen & Curran, 2006). The similarity between the results of the repeated measures ANOVA and LGCM suggests that individual differences between participants in this study were not due to meaningful discrepancies among participants and therefore the results of the repeated measures ANOVA are valid. Future data regarding "Reflections" should be analyzed using repeated measures ANOVA (for benchmarking purposes) and LGCM and this data should include a minimum of four time points to facilitate the use of LGCM.

There was one difference between the results of the two types of analyses. When the data were analyzed using repeated measures ANOVA, reductions in participants'

levels of body dissatisfaction were significant at post-treatment but were no longer significant at 5-month follow-up. When the data were analyzed using LGCM, reductions in participant's levels of body dissatisfaction were significant at both post-treatment and at 5-month follow-up. LGCM has greater statistical power to detect changes in growth trajectories than repeated measures ANOVA which is particularly important in this study, given the relatively small sample size. The greater statistical power of LGCM likely accounts for the aforementioned discrepancy in results between the two types of analyses.

**Limitations**

There are several limitations to this study. First, the percentage of eligible sorority members (58%) who participated in "Reflections" is significantly lower than in previous trials and there was significant attrition from baseline to post-treatment and from post-treatment to 5-month follow-up. Second, the follow-up period of 5 months is relatively short for a prevention program. Third, the outcome measures were based on self-report and therefore social desirability could be a potential confound. Fourth, this was an open trial and there was no control group. Therefore, it is possible that the results are due to regression to the mean or other factors that are not associated with "Reflections." However, previous studies of cognitive dissonance interventions used waitlist conditions (e.g., Becker et al., 2005) and comparison of the results obtained in this study with previous waitlist conditions support the effectiveness of "Reflections." Finally, while this study examined several aspects of generalizability it was conducted in a specific sample (i.e., sororities) and future research should examine whether this

program can be effectively implemented with other undergraduate women (e.g., through undergraduate residence halls).

**Conclusion**

In summary, this study suggests that the "Reflections" program can be implemented in the Northeastern United States with non-TriDelta sorority women. Undergraduate women who participate in the program evidence reductions in three eating disorder risk factors (i.e., thin ideal internalization, bulimic pathology, and body dissatisfaction) at post-treatment and these reductions remain statistically significant for thin ideal internalization and bulimic pathology at 5-month follow-up. Fewer sorority members elected to go through "Reflections" as compared to previous trials. Participants did not evidence significant reductions in body dissatisfaction at 5-month follow-up and did not evidence significant reductions in negative affect at post-treatment or 5-month follow-up when results were analyzed using repeated measures ANOVA. This suggests that participation in the program and its effectiveness may be compromised when the program is implemented on a non mandatory basis at a new university. Similar results were obtained when data were analyzed using repeated measures ANOVA and LGCM, which supports the validity of the former type of analysis.

# References

Becker, A.E., Franko, D.L., Nussbaum, K., & Herzog, D.B. (2004). Secondary prevention of eating disorders: The impact of education, screening, and referral in a college-based screening program. *International Journal of Eating Disorders, 36*, 157-162.

Becker, C.B., Bull, S., Schaumberg, K., Cauble, A., & Franco, A. (2008). Effectiveness of peer-led eating disorder prevention: A replication trial. *Journal of Consulting and Clinical Psychology, 76*, 347-354.

Becker, C.B., Jilka, K., & Polvere, L. (2002, November). *Cognitive dissonance vs. media psychoeducation: A pilot study of eating disorder prevention in sorority members*. Paper presented at the annual convention of the Association for Advancement of Behavior Therapy, Reno, NV.

Becker, C.B., Smith, L.M., & Ciao, A.C. (2005). Reducing eating disorder risk factors in sorority members: A randomized trial. *Behavior Therapy, 36*, 245-253.

Becker, C.B., Smith, L.M., & Ciao, A.C. (2006). Peer-facilitated eating disorder prevention: A randomized effectiveness trial of cognitive dissonance and media advocacy. *Journal of Counseling Psychology, 53*, 550-555.

Becker, C.B., & Stice, E. (2008). *Sorority body image program: Group leader guide*. New York: Oxford University Press.

Becker, C. B., Stice, E., Shaw, H., & Woda, S. (2009). Use of empirically-supported interventions for psychopathology: Can the participatory approach move us

beyond the research-to-practice gap? *Behaviour Research and Therapy*, 47, 265-274.

Becker, C.B., Wilson, C., Williams, A., Kelly, M., McDaniel, L., & Elmquist, J. (2010). Peer-facilitated cognitive dissonance versus healthy weight eating disorders prevention: A randomized comparison. *Body Image*, 7, 280-288.

Berscheid, E., Walster, E., & Bohrnstedt, G. (1973). The happy American body: A survey report. *Psychology Today*, 7, 119-131.

Bollen, K.A., & Curran, P.J. (2006). Latent curve models: A structural equation approach. Hoboken, NJ: Wiley.

Fairburn, C.G., & Beglin, S. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders, 16*, 363-370.

Fairburn, C.G., & Cooper, Z. (1993). The Eating Disorder Examination (twelfth edition). In: C.G. Fairburn & G.T. Wilson (eds.). *Binge Eating: Nature, Assessment, and Treatment*. (pp. 317-360). New York: Guilford Press, 1993.

Festinger, L. (1957). *A theory of cognitive dissonance*. Oxford, England: Row, Peterson.

Luce, K.H., & Crowther, J.H. (1999). The reliability of the Eating Disorder Examination – Self-report Questionnaire Version (EDE-Q). *International Journal of Eating Disorders, 25*(3), 349-351.

Meyers, L.S., Gamst, G., & Guarino, A. (2006). *Applied multivariate research: Design and interpretation***.** Thousand Oaks, CA: Sage Publishers.

Mond, J.M., Hay, P.J., Rodgers, B., Owen, C., & Beumont, P.J.V. (2004). Temporal stability of the Eating Disorder Examination Questionnaire. *International Journal of Eating Disorders, 36* (2), 195-203.

McKnight Investigators. (2003). Risk factors for the onset of eating disorders in adolescent girls: Results from the McKnight Investigators longitudinal risk factor study. *American Journal of Psychiatry, 160* (2), 248-254.

Meyer, D.F. (2005). Psychological correlates of help seeing for eating-disorder symptoms in female college students. *Journal of College Counseling, 8*(1), 20-30.

Myers, L.S., Gamst, G., & Guarino, A.J. (2006). *Applied multivariate research: design and interpretation*. Thousand Oaks, CA: Sage Publications, Inc.

Pearson, J., Goldklang, D., & Striegel-Moore, R.H. (2002). Prevention of eating disorders: Challenges and opportunities. *International Journal of Eating Disorders, 31,* 233-239.

Perez, M., Becker, C.B., & Ramirez, A. (2010). Transportability of an empirically supported dissonance-based prevention program for eating disorders. *Body Image, 7,* 179-186.

Stice, E. (2001a). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology, 110,* 124-135.

Stice, E., & Agras, W.S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29* (2), 257-276.

Stice, E., Chase, A., Stormer, S., & Appel, A. (2001). A randomized trial of a dissonance-based eating disorder prevention program. *International Journal of Eating Disorders, 29*, 247-262.

Stice, E., Marti, N., Spoor, S., Presnell, K., & Shaw, H. (2008). Dissonance and healthy weight eating disorder prevention programs: Long-term effects from a randomized efficacy trial. *Journal of Consulting and Clinical Psychology, 76*, 329-340.

Stice, E., Mazotti, L., Weibel, D., & Agras, W.S. (2000). Dissonance prevention program decreases thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms. A preliminary experiment. *International Journal of Eating Disorders, 27*, 206-217.

Stice, E., & Shaw, H. (2004). Eating disorder prevention programs: A meta-analytic review. *Psychological Bulletin, 130*, 206-227.

Stice, E., Shaw, H., & Marti, C. N. (2007). A meta-analytic review of eating disorder prevention programs: Encouraging Findings. *Annual Review of Clinical Psychology, 3*, 233-257.

Stice, E., Shaw, H., Burton, E., & Wade, E. (2006). Dissonance and healthy weight eating disorders prevention programs: A randomized efficacy trial. Journal *of Consulting and Clinical Psychology, 74*, 263-275.

Stice, E., Trost, A., Chase, A. (2003). Healthy weight control and dissonance-based eating disorder prevention programs: Results from a controlled trial. *International Journal of Eating Disorders, 33*, 10-21.

Stice, E., Ziemba, C., Margolis, J., & Flick, P. (1996). The dual pathway model differentiates between bulimics, subclinical bulimics, and controls: Testing the continuity hypothesis. *Behavior Therapy, 27*, 531-549.

Taylor, C.B., Bryson, S., Luce, K.H., Cunning, D., Doyle, A.C., Abascal, L.,B., et al. (2006). Prevention of eating disorders in at-risk college-age women. *Archives of General Psychiatry, 63*, 881-888.

Watson, D., & Clark, L.A. (1992). Affects separable and inseparable: On the hierarchical arrangement of the negative affects. *Journal of Personality and Social Psychology, 62*, 489-505.

Wilson, G.T., Becker, C.B., & Heffernan, K. (2002). Eating disorders. In E.J. Mash & A.R. Barkley (Eds)., *Child psychopathology* (2nd ed., pp. 687-715). New York: Guilford Press.

Wilson, G.T., Grilo, C., & Vitousek, K. (2007). Psychological treatment of eating disorders. *American Psychologist, 62*, 199-216.

Table 1

*Means, Standard Deviations, and ANOVA for Dependent Variables*

| Measure | Baseline *M(SD)* | Post-Tmt *M(SD)* | 5-Mo FU *M(SD)* | ANOVA |
|---|---|---|---|---|
| IBSS-R[2] | 3.61 (0.49) | 3.22 (0.60) | 3.50 (0.48) | **F (1, 63) = 17.13; p <0.001; $\eta^2$=0.21*** |
| SD-BPS | 3.35 (1.02) | 3.10 (0.92) | 3.26 (1.03) | **F (2, 126) = 5.02; p <0.01; $\eta^2$=0.07**** |
| PANAS[1,2] | 1.82 (0.55) | 1.71 (0.62) | 1.82 (0.69) | F (1, 63) = 2.34; p = 0.13; $\eta^2$=0.04 |
| EDEQ-BN | 1.36 (0.85) | 1.05 (0.74) | 1.18 (0.84) | **F (2, 126) = 12.00; p <0.001; $\eta^2$=0.16*** |

*Note*. [1]PANAS baseline data was skewed, so a logarithmic transformation was performed. [2]IBSS-R and PANAS data violated the Mauchley assumption of sphericity, so a lower bound correction was used. *p < 0.001; **p< 0.01.

Table 2

*Paired T-Test Comparisons of Current Study with Previous Research*

| Measure | Baseline-Post *MD(SE)* | Baseline-5-Mo FU *MD(SE)* | Cohen's *d* Post | Cohen's *d* 5-Mo FU | Cohen's *d* 5-Mo FU Perez et al. (2010) | Cohen's *d* 8-Mo FU Becker et al. (2008) | Cohen's *d* 8-Mo FU Becker et al. (2010) |
|---|---|---|---|---|---|---|---|
| IBSS-R | **0.38 (0.08)*** | **0.11 (0.04)***** | 0.63 | 0.31 | 0.21 | 0.40 | 0.30 |
| SD-BPS | **0.25 (0.09)**** | 0.09 (0.07) | 0.36 | 0.17 | 0.24[1] | 0.37[1] | 0.59[1] |
| PANAS | 0.11 (0.07) | 0.00 (0.06) | 0.19 | 0.00 | N/A | N/A | 0.35 |
| EDEQ-BN | **0.30 (0.06)*** | **0.17 (0.05)**** | 0.61 | 0.40 | 0.41 | 0.37 | 0.55 |

*Note*. [1]A different measure was used to assess body dissatisfaction in these studies.
*p< 0.001; **p<0.01; ***p<0.05.

Table 3

*Latent Growth Curve Model*

| Measure | CFI | TLI | RMSEA EST. | BMI→ Slope (*SE*) | Intercept (*SE*) | Slope (*SE*) |
|---|---|---|---|---|---|---|
| IBSS-R | 0.981 | 0.942 | 0.091 | 0.000 (0.013) | **3.611 (0.063)*** | **-0.316 (0.069)*** |
| PANAS | 0.983 | 0.966 | 0.072 | -0.023 (0.012) | **1.831 (0.069)*** | -0.087 (0.061) |
| SD-BPS | 0.961 | 0.922 | 0.182 | **-0.032 (0.015)*****| **3.356 (0.106)*** | **-0.205 (0.075)**** |
| EDEQ-BN | 0.970 | 0.940 | 0.151 | **-0.032 (0.012)**** | **1.342 (0.100)*** | **-0.229 (0.058)*** |

*Note*. *p<0.001;** p<0.01; ***p <0.05

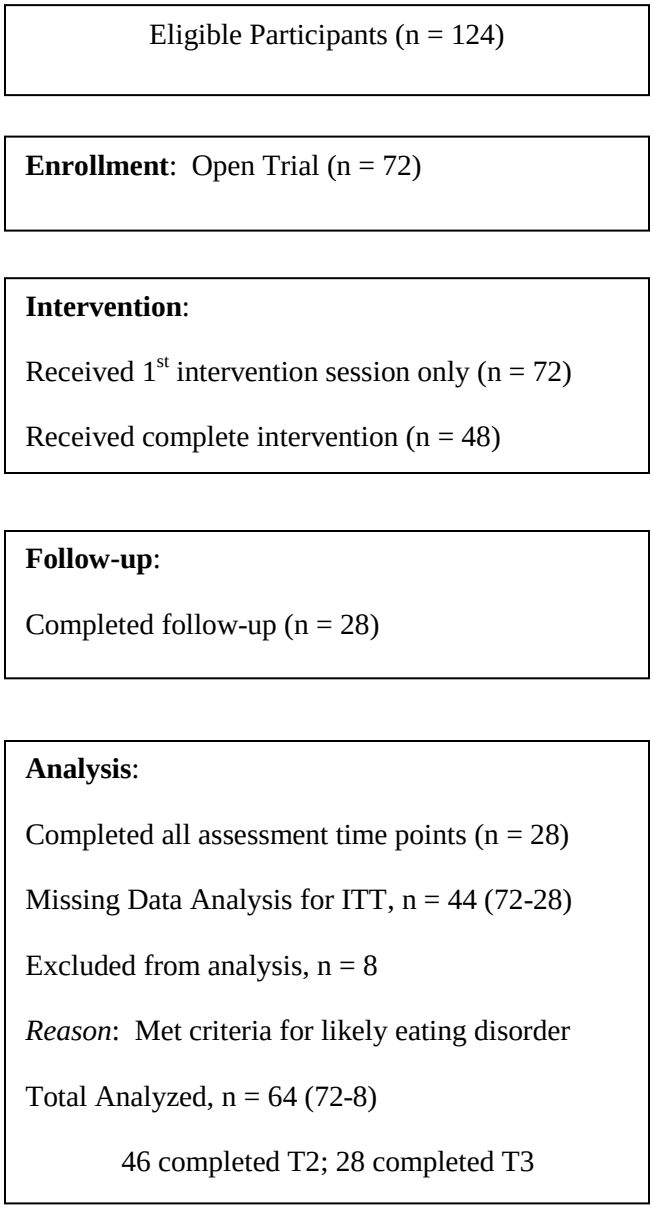


*Figure 1*. Consort flowchart showing participant movement through study.

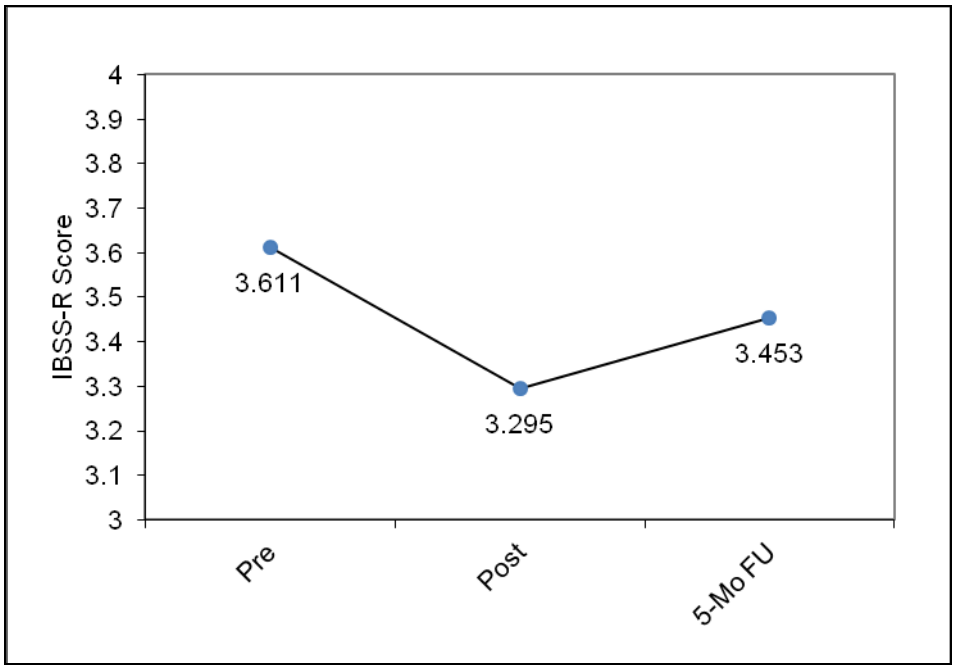


*Figure 2*. IBSS-R estimated model mean scores at each assessment time point.

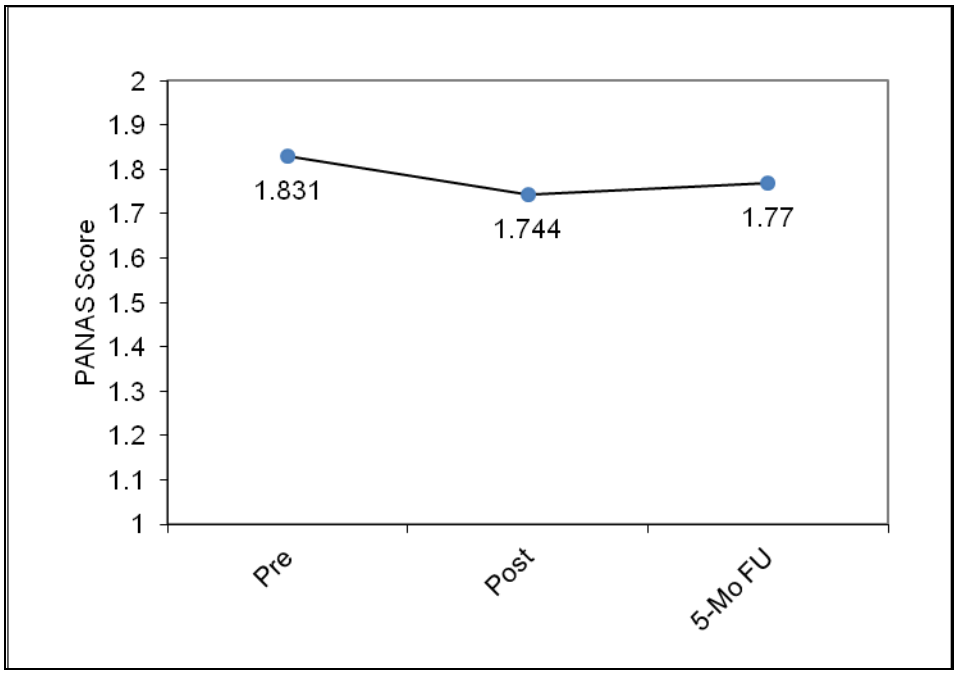


*Figure 3*. PANAS estimated model means at each assessment time point.

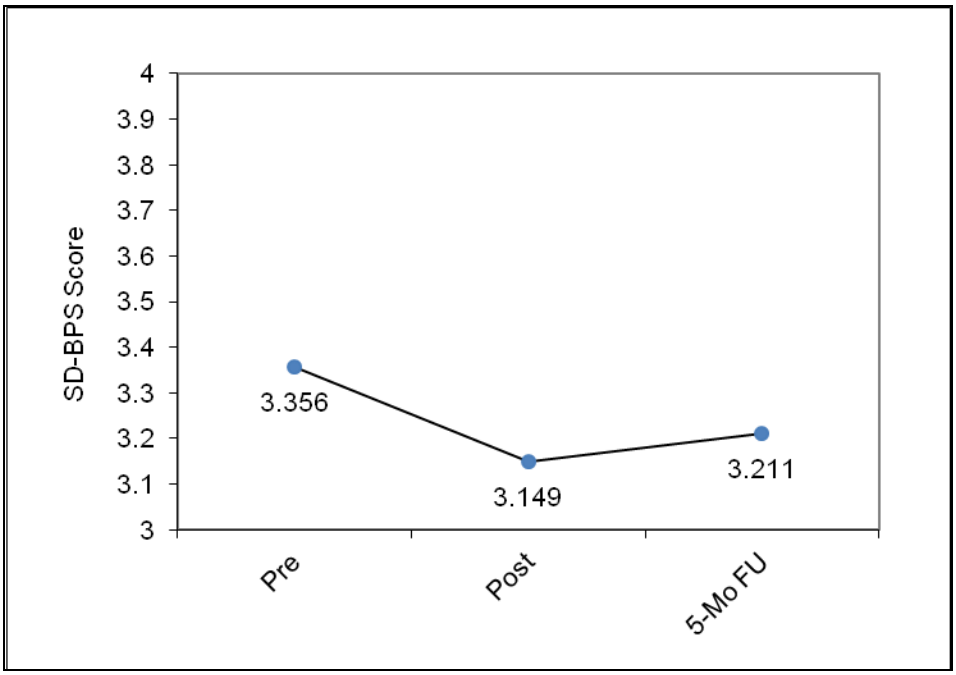


*Figure 4.* SD-BPS estimated model means at each assessment time point.

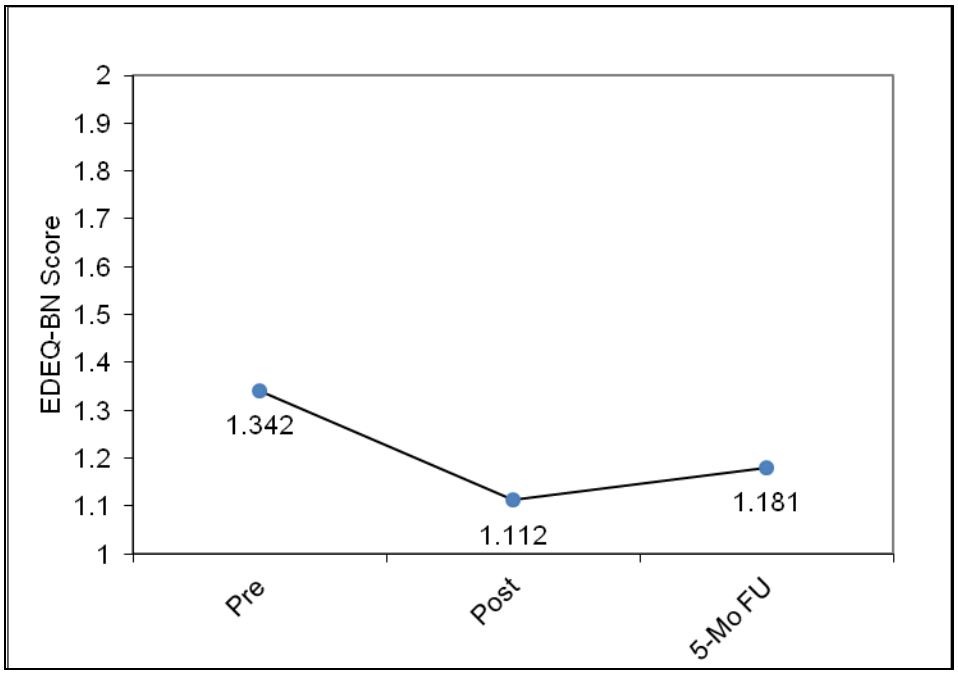


*Figure 5*. EDEQ-BN estimated model means at each assessment time point.

# Appendix A

REFLECTIONS: BODY IMAGE PROGRAM

**PLEASE ANSWER ALL THE QUESTIONS BELOW. THESE QUESTIONS WILL ASK ABOUT YOUR THOUGHTS AND BEHAVIORS.**

**Date:** _____
**ID #:** __ __ __ __ __ __ __
**Age**:
**Grade**:
**Ethnicity**: Asian _____ Black _____ Hispanic _____ Native American _____
White _____ Other _____

## Thin-Ideal Internalization Scale

| **Please circle the response that reflects your agreement with these statements over the past <u>week</u>:** | strongly agree | agree | neutral | disagree | strongly disagree |
|---|---|---|---|---|---|
| 1. Slim women are more attractive . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2. Tall women are more attractive. . . . . | 1 | 2 | 3 | 4 | 5 |
| 3. Women with toned bodies are more attractive . . . . . | 1 | 2 | 3 | 4 | 5 |
| 4. Women who are in shape are more attractive . . . . . | 1 | 2 | 3 | 4 | 5 |
| 5. Slender women are more attractive. . . . . | 1 | 2 | 3 | 4 | 5 |
| 6. Women with long legs are more attractive . . . . . | 1 | 2 | 3 | 4 | 5 |
| 7. Curvy women are more attractive.. . . . . | 1 | 2 | 3 | 4 | 5 |
| 8. Shapely women are more attractive. . . . . | 1 | 2 | 3 | 4 | 5 |

## Positive and Negative Affect Schedule

**Please circle the response that indicates how you have felt during the <u>past week.</u>**

| | not at all | a little | moderately | a lot | extremely |
|---|---|---|---|---|---|
| 1. Disgusted with self . . . . | 1 | 2 | 3 | 4 | 5 |
| 2. Sad. . . . . | 1 | 2 | 3 | 4 | 5 |
| 3. Afraid . . . . . | 1 | 2 | 3 | 4 | 5 |
| 4. Shaky. . . . . | 1 | 2 | 3 | 4 | 5 |
| 5. Alone. . . . . | 1 | 2 | 3 | 4 | 5 |
| 6. Blue. . . . . | 1 | 2 | 3 | 4 | 5 |
| 7. Guilty . . . . . | 1 | 2 | 3 | 4 | 5 |
| 8. Nervous. . . . . | 1 | 2 | 3 | 4 | 5 |
| 9. Lonely. . . . . | 1 | 2 | 3 | 4 | 5 |
| 10. Jittery. . . . . | 1 | 2 | 3 | 4 | 5 |
| 11. Ashamed . . . . . | 1 | 2 | 3 | 4 | 5 |
| 12. Scared . . . . . | 1 | 2 | 3 | 4 | 5 |
| 13. Angry at self . . . . . | 1 | 2 | 3 | 4 | 5 |
| 14. Downhearted. . . . . | 1 | 2 | 3 | 4 | 5 |
| 15. Blameworthy. . . . . | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 16. Frightened . . . . . | 1 | 2 | 3 | 4 | 5 |
| 17. Dissatisfied with self. . | 1 | 2 | 3 | 4 | 5 |
| 18. Anxious. . . . . | 1 | 2 | 3 | 4 | 5 |
| 19. Depressed . . . . . | 1 | 2 | 3 | 4 | 5 |
| 20. Worried . . . . . | 1 | 2 | 3 | 4 | 5 |

**Satisfaction and Dissatisfaction with Body Parts Scale**

| **Over the past <u>week</u>, how satisfied were you with your:** | extremely dissatisfied | moderately dissatisfied | neutral | moderately satisfied | extremely satisfied |
|---|---|---|---|---|---|
| 1. Weight . . . . . | 1 | 2 | 3 | 4 | 5 |
| 2. Figure. . . . . | 1 | 2 | 3 | 4 | 5 |
| 3. Appearance of stomach. . . . . | 1 | 2 | 3 | 4 | 5 |
| 4. Body build. . . . . | 1 | 2 | 3 | 4 | 5 |
| 5. Waist . . . . . | 1 | 2 | 3 | 4 | 5 |
| 6. Thighs . . . . . | 1 | 2 | 3 | 4 | 5 |
| 7. Buttocks. . . . . | 1 | 2 | 3 | 4 | 5 |
| 8. Hips. . . . . | 1 | 2 | 3 | 4 | 5 |
| 9. Legs. . . . . | 1 | 2 | 3 | 4 | 5 |

**Eating Disorder Examination Questionnaire (EDE-Q)**

**DIRECTIONS: For questions #1a thru #2c, please circle the appropriate number on the right**

| | No Day | 1-5 Days | 6-12 Days | 13-15 Days | 16-22 Days | 23-27 Days | Every Day |
|---|---|---|---|---|---|---|---|
| 1a). On how many of **the past 28 days** have you had a definite fear that you might gain weight? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| b). What about **the 28 days prior to that (month 2)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| c). What about **the 28 days prior to that (month 3)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| 2a). On how many of **the past 28 days** have you felt fat? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| b). What about **the 28 days prior to that (month 2)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| c). What about **the 28 days prior to that (month 3)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |

**DIRECTIONS: For question #3 thru #9c: please write in the appropriate number to the right**

3. Over **the past 28 days**, how many **times** have you eaten what other people would regard as an unusually large amount of food (given the circumstances)? _____

4. …On how many of these **times** did you have a sense of having lost control over your eating (at the time that you were eating)? _____

5a). Over **the past 28 days**, on how many **DAYS** have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food **and** have had a sense of loss of control at the time)? _____

b). What about **the 28 days prior to that (month 2)**? _____

c). What about **the 28 days prior to that (month 3)**? _____

6a). Over **the past 28 days**, how many **times** have you made yourself sick (vomit) as a means of controlling your shape or weight? _____

b). What about **the 28 days prior to that (month 2)** _____

c). What about **the 28 days prior to that (month 3)**? _____

7a). Over **the past 28 days**, how many **times** have you taken laxatives as a means of controlling your shape and weight? _____

b). What about **the 28 days prior to that (month 2)**? _____

c). What about **the 28 days prior to that (month 3)**? _____

8a). Over **the past 28 days**, how many **times** have you taken diet pills or any other pills designed to effect shape, weight, or body fat? _____

b). What about **the 28 days prior to that (month 2)**? _____

c). What about **the 28 days prior to that (month 3)**? _____

9a). Over **the past 28 days,** how many **times** have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat, or to burn off calories? _____

b). What about **the 28 days prior to that (month 2)**? _____

c). What about **the 28 days prior to that (month 3)**? _____

**DIRECTIONS: For question #10a thru question #11c, please circle the appropriate number on the right**

| | not at all | | slightly | | moderately | | markedly |
|---|---|---|---|---|---|---|---|
| 10a). Over **the past 28 days** has your **weight** influenced how you think about (judge) yourself as a person? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| b). What about **the 28 days prior to that (month 2)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| c). What about **the 28 days prior to that (month 3)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| 11a). Over **the past 28 days** has your **shape** influenced how you think about (judge)yourself as a person? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| b). What about **the 28 days prior to that (month 2)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| c). What about **the 28 days prior to that (month 3)**? | **0** | **1** | **2** | **3** | **4** | **5** | **6** |

What is your weight at present? (Please give your best estimate). _____

What is your height? (Please give your best estimate). _____

Over **the past three to four months**, have you missed any menstrual periods? _____
1 = Yes
2 = No

If so, how many? _____

Have you been taking the pill? _____
1 = Yes
2 = No