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Weight and shape concern impacts weight gain prevention in the SNAP trial: Implications for tailoring intervention delivery

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Abstract

Objective: The SNAP trial demonstrated that two self-regulatory interventions prevented weight gain in young adults. Weight and shape concern (WSC) at baseline was evaluated as a moderator of weight outcomes at 24-months.

Methods: Young adults (n=599) were randomized to self-regulation with Small Changes (SC; to create 200 kcal/day deficit), self-regulation with Large Changes (LC; to facilitate pre-emptive weight loss of 5–10 lbs.) or self-guided control (C). WSC was assessed using one item from the Eating Disorder Assessment. Analysis of variance was used to examine whether the association between baseline level of WSC and percent weight change over 24-months differed across treatment conditions.

Results: Approximately 22% of participants reported high WSC (37%-moderate; 41%-low). WSC and treatment condition interacted to influence weight change at 24 months ($p=0.03$). Individuals with high WSC gained weight in LC (high WSC LSM $\pm$ SE: $+0.73\pm1.19\%$, moderate: $-2.74\pm0.84\%$, low: $-2.41\pm0.79\%$). SC was particularly effective for those with high WSC (high WSC: $-2.49\pm1.16\%$, moderate: $-0.60\pm0.88\%$, low: $-0.71\pm0.80\%$). WSC did not impact weight change among control participants.

Conclusions: Individuals with high WSC have better weight control outcomes in SC than LC. These findings suggest that WSC may be used to match individuals to weight gain prevention treatment conditions.

Trial registration:

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Keywords

Weight gain prevention; young adults; weight/shape concern; precision medicine

Introduction

Obesity is a major public health concern in the United States as over one-third of adults have a BMI ≥ 30 (1). While weight loss treatments have proliferated, fewer efforts have focused on prevention, especially among adults. Young adults between the ages of 18–35 represent a vulnerable group as trends consistently reflect accelerated weight gain during this period culminating in increased likelihood of reaching obesity (2–3). These individuals are at increased risk for negative health outcomes as a result of this accelerated weight gain trajectory (4). Therefore, targeting prevention in this group may be particularly advantageous for mitigating obesity and associated medical comorbidity. Further, prevention programs have been effective for reducing weight gain and preventing onset of obesity among other at-risk groups such as adolescent females at risk for eating pathology (5–7).

The Study of Novel Approaches to Weight Gain Prevention (SNAP; 8) trial identified two behavioral interventions that prevented weight gain among young adults. Self-weighing was a key strategy prescribed in both treatments, but one of the programs focused on making larger behavioral changes to create a weight loss buffer (Large Changes) while the other focused on making relatively smaller changes in daily eating and activity (Small Changes). Compared to the control condition, individuals in both treatment groups had less weight gain and even maintained an average weight loss over an average follow-up of 3-years (Large Changes $-2.37\text{kg} \pm 0.22$; Small Changes $-0.56\text{kg} \pm 0.22$; Control $0.26\text{kg} \pm 0.22$). Because both interventions were effective for preventing weight gain, identifying factors that could be used to guide treatment matching is of clinical interest. Although treatment matching is a major priority for obesity prevention and treatment, few baseline contributors to individual difference in treatment response have been identified. A priori moderators (age, sex, and baseline weight) were examined in the SNAP trial but did not moderate treatment effects (8). In other trials, baseline demographic, behavior, psychosocial and genetics have all been examined, but few replicated factors have been identified (9–11).

Kiernan and colleagues (12) demonstrated that negative body image was associated with reduced weight loss in a behavioral program targeting diet and physical activity. Similarly, in the Look AHEAD trial, individuals who reported high weight and shape concern which is a facet of body image, were less likely to achieve clinically significant weight loss in the lifestyle intervention (13). Weight and shape concern (WSC) refers to the degree to which body weight or shape is valued as an important part of self-evaluation (14). This can vary from no importance to a high degree of concern, referred to as ‘overvaluation’ of weight and shape (15). In the context of obesity it is commonly believed that concern about body weight and shape would be motivating in the context of weight control efforts. However, a high level of concern is consistently linked to dysregulated weight-related behaviors (16) which

may undermine ability to implement effective weight loss strategies. In fact, WSC is associated with more frequent dieting but poorer weight control outcomes over time (17). Consequently, individuals who endorse a high level of WSC may be at risk for poor treatment outcomes when trying to modify behavior in accordance with typical behavioral weight loss recommendations. Given the overlap of weight loss recommendations and weight gain prevention strategies, WSC may be relevant for outcomes in the SNAP trial.

This secondary analysis of the SNAP trial was conducted to evaluate the a priori hypothesis that body image may be a pre-treatment variable that interacts with treatment condition to influence weight outcomes. The goal of this study is to evaluate the 1) presence and severity of WSC among a non-eating disordered cohort of normal and overweight young adults enrolled in the SNAP trial, 2) to evaluate demographic correlates of weight and shape concern in this population as well as mood and eating variables which have been correlated with WSC in other samples, and 3) to evaluate the impact of baseline weight and shape concern on weight change across treatment conditions. It is hypothesized that WSC will interact with treatment condition to predict weight outcomes over the follow-up period. Specifically, we hypothesize that individuals who endorse high weight and shape concern will have poorer weight outcomes at 24 months in the large changes condition (as this condition is most similar to traditional weight management recommendations) compared to individuals with lower levels of WSC.

Methods

Participants

Participants were young adults enrolled in the SNAP trial. Eligible individuals were 18–35 years old with a BMI between 20–30.9 kg/m². Recruitment and eligibility/exclusion criteria are reviewed at length in previous publications (See 8, 18). The resulting sample (n=599) was primarily female (78.3 %) and 27.7±4.4 years old with an average (±SD) BMI of 25.4 ±2.6kg/m². Over one-quarter of the sample identified as minority (26.9%).

Procedures

Enrolled participants were randomly assigned to one of three treatment conditions including the Large Changes (LC) condition, a Small Changes (SC) condition, and a minimal contact control condition (See Wing and colleagues for CONSORT flow diagram; 18). Both LC and SC were delivered in 10 face-to-face group sessions over the first 4 months and prescribed daily monitoring of body weight. Regular self-weighing was utilized within a self-regulation model to guide use of behavioral strategies selected to prevent weight gain. Behavioral recommendations varied by intervention condition as individuals in the LC group were encouraged to make dietary and physical activity changes to facilitate a 5–10 pound weight loss over 4 months. Individuals assigned to the SC condition were encouraged to make small adjustments in dietary intake (i.e., leaving a few bites of food on plate at each meal) to create a 100 calorie deficit daily and to expend additional energy through lifestyle changes (e.g., taking the stairs) resulting in a 200 calorie/day deficit (see Wing and colleagues (8) for detailed description of study design and intervention content). Participants assigned to the control condition attended one face-to-face group session during which the LC and SC

strategies were introduced along with daily weighing as a preventative tool. Participants were directed to choose whichever approach was more appealing and encouraged to implement that approach during the study. They were given access to the study website where newsletters and links to additional resources were made available. Participants completed assessments at baseline and post-intervention (at 4-months), and follow-up assessments at 12-months and 24-months. Procedures were approved by institutional review boards of all three participating sites; Lifespan-the Miriam Hospital, University of North Carolina at Chapel Hill, and Wake Forest University Health Sciences (Coordinating Center). All study procedures were conducted at The Miriam Hospital (Providence, RI), and University of North Carolina at Chapel Hill (Chapel Hill, North Carolina).

Measures

Weight was measured in light clothing or hospital gown, without shoes, on calibrated scales at each assessment. The average of two measures was used. If the difference between the two measures was greater than 0.2 kg, a third measure was taken. Percent weight change was utilized as the dependent variable for all analyses evaluating treatment outcome.

Height was assessed at each visit using a wall mounted stadiometer. Two measures of height were taken and the average value was calculated and used for all analyses. If the two measures differed by 0.5 cm or greater, a third measurement was taken. The weight and height measures were used to calculate Body Mass Index (weight in kilograms divided by height in meters squared).

Weight and Shape Concern was assessed with one item from the Eating Disorders Assessment (19), a questionnaire designed to assess binge eating symptoms in the Look AHEAD trial (20). Participants were asked “During the past 6 months, has your weight or the shape of your body mattered to how you feel about yourself? Compare this to how you feel about other parts of your life—like how you get along with family and friends, and how you do at your job.” Respondents choose one of four levels of concern (not important, somewhat important, pretty important, or very important). Because frequency of rating WSC as ‘not important’ was so low (n=22), the ‘not important’ and ‘somewhat important’ categories were combined into one group for analyses. Using data from a study of n=61 we found that responses to this single item assessing weight and shape concern was correlated ($r=0.60$, $p<.0001$) with scores on the 34-item Body Shape Questionnaire (21), one of the most commonly used measures of WSC. Thus this single item demonstrates face and construct validity.

Depressive symptoms was assessed with the Center for Epidemiologic Studies Depression Scale (CES-D; 22). The CES-D is a self-report scale designed to measure depression symptoms in the general population. The questionnaire includes 20 items that assess feelings and behaviors indicative of depressive symptomatology during the past week.

Eating behavior was assessed with the Eating Inventory (TFEQ; 23) which is a 51-item self-report measure that evaluates the degree to which an individual reports applying conscious control over eating behaviors (Restraint factor: range 0–21) as well as loss of control over eating (Disinhibition factor: range 0–16).

Weight Control Strategies was assessed using questions compiled from multiple sources including Pound of Prevention (24), NHANES (25) and the Weight Loss Maintenance trial (26). The 24 items include self-reported use of primarily healthy strategies (e.g. record what you eat daily, cut out between meal snacking) but also select unhealthy (e.g. skipping meals) strategies for weight control. Participants indicated whether or not they used each strategy within the past 4 months, and if so, how frequently with responses of “Always,” “Much of the time,” “About half the time,” “Some of the time,” or “Never or hardly ever”. The total number of these 24 individual strategies used at baseline and follow-up, with separate measures for ever using the strategy and frequent use (“Always” or “Much of the time”), were used as an indicator of engagement.

Self-weighing was assessed with two different single-item questions. Participants were asked “How often did you weigh yourself in the last month?” with responses “Never,” “Less than 1/week,” “1/week or several/week,” or “1/day or several/day”. The responses to this question were dichotomized to “1 time per week or more” or “less than 1 time per week” for analysis. Participants were also asked how often they weigh themselves daily on the weight control strategies form (see above). Responses of “Always or almost always” and “Much of the time” were combined while the remaining “About half the time,” “Some of the time,” and “Never or hardly ever” were combined to create a dichotomous daily self-weighing measure of “Much of the time or always” or “Less than much of the time.” In combination, these two questions provide an estimate of self-weighing behavior in the past month as well as adherence to daily self-weighing recommendations.

Analytic plan

Differences in baseline WSC among treatment assignments, baseline characteristics, and psychosocial scores were assessed using ANOVA F-tests for continuous measures and chi-square tests for categorical measures. To evaluate the effect of baseline WSC and treatment condition on average weight change across the 24-month follow-up period, a longitudinal mixed model adjusted for baseline covariates including age, gender, baseline weight, treatment site and correlation between repeated measures was examined. Given that our follow-up measures taken at 4-, 12-, and 24-months were unequally spaced, additional analyses were conducted evaluating the interaction of weight and shape concern with treatment condition stratified at each time point to better understand the effect of time after adjusting for age, gender, and baseline weight. Similar longitudinal and stratified analyses were conducted for the number of weight control strategies used “Ever” or “Frequently”. Both categorical measures of self-weighing, “Frequent” daily-self weighing and “Weekly or more” self-weighing, were modeled longitudinally using GEE logistic regression accounting for repeated measures adjusting for age, gender, and baseline weight as well as in a logistic regression stratified by follow-up visit also adjusted for age, gender, and baseline weight. Sensitivity analyses evaluating the effect of psychosocial effects of depression and dietary restraint and disinhibition on the relationship between percent weight change and WSC were also examined. To account for selection bias potentially caused by dropout and missing outcomes, the inverse probability of being included in the analysis sample for all randomized participants was calculated based on baseline characteristics (age, gender, and clinical site). A sensitivity analysis including the inverse probability of inclusion as a

covariate in the models predicting weight change was performed. As an alternative to inverse probability weighting, multiple imputation analyses were also performed to assess the impact of missing follow-up weights on the analysis results. Because both the Small and Large Changes conditions resulted in significantly fewer individuals reaching a BMI in the obese range (7.9% and 8.6% respectively) compared to the Control group (16.9%), post-hoc analyses were conducted to evaluate the relationship between baseline WSC and likelihood of becoming obese. Change in WSC over time by treatment group was assessed with chi-square test. All analyses were conducted using SAS v9.4 (SAS Institute, Cary, NC) and a significance level of 0.05 was utilized.

Results

Participants in the SNAP trial endorsed a range of WSC with approximately 22% reporting that weight and shape was ‘very important’ to how they feel about themselves (‘high’ WSC). Conversely, 37% reported that it was ‘pretty’ important (‘moderate’ WSC) while 41% reported it was ‘somewhat’ or ‘not at all’ important (‘low’ WSC). As shown in Table 1, WSC was not associated with age, Race/Ethnicity, or BMI. However, level of WSC did vary by gender, with a higher percentage of men reporting weight and shape was ‘somewhat’ or ‘not important at all’ while a higher percentage of women than men reported weight and shape was ‘very’ important. Depression significantly varied across levels of WSC with those individuals who reported weight and shape was ‘very important’ also endorsing greater depressive symptoms. While no differences in dietary restraint were observed across level of WSC, there was a significant difference across groups in regard to disinhibition ($p<.001$) with those reporting low WSC endorsing lower levels of disinhibition than those with moderate or high concern.

In the analysis of percent weight change over time, there was no interaction between WSC over time (time*randomization group*WSC $P=0.673$), yet there was a differential effect of baseline WSC across treatment conditions (WSC*randomization group $P=0.033$). In the models stratified by time, the interaction of baseline WSC with treatment condition on percent weight change (see table 2 for percent weight change across treatment conditions, level of WSC, and time points) was approaching significance at 4-months ($p=.077$) and 12 months ($p=.081$), and became significant at 24-months ($p=.026$). At 24-months, in LC those with high WSC were unable to lose weight compared to those with lower WSC (high WSC: $+0.73\pm1.19\%$, moderate: $-2.74\pm0.84\%$, low: $-2.41\pm0.79\%$; high vs moderate -3.47% $p=0.013$, high vs low -3.14% $p=0.024$). In contrast, those with high WSC in SC lost weight over 24-mos and observed greater reductions than those with lower levels of WSC (high WSC: $-2.49\pm1.16\%$, moderate: $-0.60\pm0.88\%$, low: $-0.71\pm.80\%$; high vs moderate -3.09% $p=0.176$, high vs low -3.20% $p=0.193$). In sensitivity analyses controlling for the psychosocial correlates (e.g., depression and disinhibition), the relationships between WSC and treatment condition in regard to percent change in weight were unchanged at 4-months ($p=0.06$), 12-months ($p=0.08$), and 24-months ($p=0.03$). Sensitivity analyses including the inverse probability of inclusion yielded similar WSC*treatment group results at 4-months ($p=0.06$), 12-months ($p=0.08$), and 24-months ($p=0.02$) (data not shown). There was no main effect of WSC or interaction with treatment condition influencing odds of transitioning to obesity.

To address the hypothesis that WSC may change as a function of participating in weight gain prevention treatment, the percentage of individuals who reported change was evaluated. Approximately 50% of individuals reported the same level of concern across assessments while 25% reported a decrease and 25% reported an increase. There were no differences in change in WSC across treatment condition at 4-months ($p=.17$), 12-months ($p=.16$), or 24-months ($p=.77$).

Post hoc analyses were conducted evaluating behavioral factors that may help clarify the role of WSC including report of self-weighing and use of weight control strategies. At baseline, individuals who reported WSC was 'somewhat or not important' used significantly fewer strategies than the two other groups ($p<.0001$) however there was no difference in self-weighing across the three groups. The interaction of WSC at baseline and treatment condition on weight control strategies or self-weighing was not significant at 4-months, 12-months, or 24-months.

Discussion

The current study provides evidence that an individual's level of WSC upon entry into one of two self-regulatory weight gain prevention programs can be used as a clinically meaningful predictor of treatment response. Individuals who endorsed a high level of WSC gained weight in a program that promoted initial weight loss using common behavioral weight management strategies (i.e., LC condition) to create a buffer against expected weight gains. This finding is discrepant from the primary results of the trial that indicated the LC approach was more effective than SC (or the control) for preventing weight gain (18). Thus, these individuals represent an at risk group who contribute to variability in treatment outcome. In contrast, when assigned to a program that encourages smaller changes to diet and activity level, individuals with high WSC were able to prevent weight gain (see figures 1-3). In fact, the average weight reduction maintained among those with high WSC in SC (-2.49%) was comparable to and not significantly different from what was observed in the LC approach among those with low WSC (-2.41% , $p=.95$) or those who said WSC was "pretty important" (-2.74% ; $p=.85$). The poorer results observed in the LC condition was consistent with the primary hypothesis of the study, however the relative benefit of the SC condition among those with high concern was unexpected.

The findings indicate that implementation of these weight gain prevention programs may be more effective if treatment matching is utilized. Specifically, if treatment matching is based upon WSC, this would not require a more intensive or costly intervention to address high WSC as a risk factor in the LC approach. This is discrepant from the typical approach to addressing poor treatment outcomes, which often require supplementary treatment as an adjunct to the current standard of care. For example, individuals who report emotional eating may be directed to attend additional treatment to address this eating behavior prior to or in combination with behavioral weight loss treatment. However, in the current study, although WSC is associated with poorer outcomes in the LC condition, individuals who endorse this risk factor can prevent weight gain simply by participating in the SC approach. Instead of warranting the development of a new intervention, the current study offers an alternative intervention that is clearly efficacious for those with a high level of WSC.

These results are timely given the current impetus to develop and deliver interventions that can be tailored to the individual. One barrier to implementing treatment matching is the relative dearth of pre-treatment factors that reliably differentiate individuals who succeed or fail in weight control programs. In fact, in the primary results presented in the SNAP trial, multiple potential treatment moderators were included in the planned analyses; however none of the pre-defined variables (e.g., sex, age, or baseline weight) interacted with treatment condition to predict weight outcomes (18). Although the primary focus of precision medicine at this time is on molecular contributors to variability in treatment response (27), this study highlights the value of considering psychosocial factors for understanding variability in outcomes and for guiding treatment matching.

Assessment of WSC with a single-item question is a limitation of the current study as is the conceptualization of WSC as a categorical construct. This approach is discrepant from conceptual and theoretical models that operationalize this variable from a dimensional standpoint. Because the current findings are from secondary analysis of the SNAP trial, evaluation of WSC was limited to variables pre-identified for inclusion in the study protocol. However, as discussed in the methods, this single item is highly correlated with the overall score on the Body Shape Questionnaire (21). Further, there are a number of advantages related to the clinical utility of a brief and categorical assessment tool. When considering the potential effectiveness of an efficacious intervention, ease of translation is an integral factor. While lengthier assessments offer the advantage of increased validity, these same assessments become prohibitive if too difficult or time-intensive to implement in real world settings. A single-item screening tool that can be easily administered and scored offers a low-burden method for allocating individuals to the self-regulatory program that is likely to result in weight gain prevention. Additionally, the practical task of defining clinical cutoffs when assessing a construct of interest eventually necessitates categorization. Because weight and shape was evaluated from a categorical perspective, arbitrary cutoffs can be avoided in the translation for use more widely. In considering limitations of the current study, it is also of note that the sample was relatively homogenous which may represent a threat to external validity (see reference 18 for sample-related limitations).

Understanding the mechanisms through which WSC impacts weight control is an important area for future exploration. This is especially true as this facet of body image remains relatively understudied in the context of non-eating disordered adult weight control. In the transdiagnostic Cognitive Behavioral model of eating pathology, overly valuing weight and shape is thought to drive maintenance of unhealthy weight control practices and especially a rigid or strict approach to dieting and other weight control behaviors (28). In the current study we explored behavioral strategies that have been shown to influence weight control success (e.g., use of weight control strategies and regular self-weighing). While use of these strategies varied by WSC cross-sectionally at baseline, there were no differences in use across treatment conditions related to level of WSC. Similarly, the effects of WSC on weight change were not accounted for by depression or disinhibited eating, both of which have been linked to weight management outcomes in previous research (29–30). It may be that individuals with elevated WSC approached the LC treatment guidelines, which were consistent with typical weight loss interventions, in a manner that was too rigid or inflexible

to maintain over time. Conversely, the SC approach may have prevented them from entering a rigid ‘dieting’ mindset.

Among adolescents and especially individuals diagnosed with eating pathology, WSC is considered a robust predictor of maladaptive eating and exercise behaviors implemented in an effort to control body weight (31). However, eating pathology was an exclusion criteria in SNAP trial, and participation in the self-regulatory interventions was not associated with subsequent onset of eating pathology (32). Yet, it may be the case that subclinical levels of dysfunctional weight-related behaviors are present and contributing to variability in outcomes. Further, the weight control strategies assessed in the SNAP trial were primarily adaptive in nature and therefore unhealthy techniques would not be detected in the current study. Because individuals with a high degree of WSC were able to achieve successful outcomes in the SC condition, perhaps the magnitude of behavior change that was prompted in the LC approach became dysregulating.

The self-regulatory weight gain prevention programs tested in the SNAP trial demonstrate that vulnerable age groups can be targeted to reduce onset of obesity in the United States. The results of the current study hold promise for augmenting the effects of the SNAP trial by providing insight about a novel psychosocial factor that contributes to variability in treatment outcome and in turn can be used to match individuals to the intervention that may be most likely to prevent weight gain. Additional research is required to implement a treatment matching design in order to empirically test the relationships observed in the current study. Beyond the promising implications for weight control, the current findings speak to the relevance of psychosocial factors for precision medicine and highlight the need to expand the dialogue beyond molecular contributors to individual variability.

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What is already known about this subject? (or for Review Proposals/Reviews, what major reviews have already been published on this subject?)

- Young adults are at risk for accelerated weight gain, increasing risk of obesity and weight-related morbidity.
- The SNAP trial demonstrated that two different self-regulatory interventions (one encouraging small daily changes in eating and exercise and another encouraging weight loss to create a weight buffer) resulted in reduced weight gain over three years compared to a self-guided control condition.
- Few baseline predictors of weight outcomes have been identified to guide treatment matching in obesity treatment or prevention.

What does your study add?

- This study demonstrates that weight and shape concern moderates the effect of two different lifestyle interventions on weight gain prevention in young adults.
- Individuals with high weight and shape concern may be at risk for poor results in traditional weight control programs but are able to control weight more effectively with an approach that encourages relatively smaller behavior changes.
- While precision medicine efforts have largely focused on molecular contributors to variability in weight outcomes, this study emphasizes the potential utility of psychosocial constructs in delivering personalized obesity treatment.

Figure 1. Percent weight change among individuals with high, moderate, and low weight and shape concern in the Large and Small changes treatment conditions and control across time points.

Table 1.

Baseline demographic and psychosocial correlates of weight and shape concern among SNAP trial participants

Characteristic	Baseline Shape Importance			P-value*
	Not Important/ Somewhat	Pretty	Very	
Treatment Assignment, N(%)				0.5873
Control	79 (39.1)	73 (36.1)	50 (24.8)	
Small Changes	81 (40.5)	75 (37.5)	44 (22.0)	
Large Changes	86 (43.7)	74 (37.6)	37 (18.8)	
Age, years, mean $\pm$ SD	27.9 $\pm$ 4.4	27.7 $\pm$ 4.3	27.3 $\pm$ 4.6	0.5056
Gender, N(%)				0.0002
Male	69 (53.1)	46 (35.4)	15 (11.5)	
Female	177 (37.7)	176 (37.5)	116 (24.7)	
BMI, (kg/m ²), mean $\pm$ SD	25.4 $\pm$ 2.6	25.4 $\pm$ 2.6	25.7 $\pm$ 2.5	0.4289
Race/Ethnicity, N(%)				0.9755
African American	30 (45.5)	22 (33.3)	14 (21.2)	
Other/Mixed	17 (34.7)	18 (36.7)	14 (28.6)	
White	177 (40.4)	167 (38.1)	94 (21.5)	
Hispanic	22 (47.8)	15 (32.6)	9 (19.6)	
Depression, CESD mean $\pm$ SD	5.09 (4.93)	6.04 (4.52)	6.37 (5.02)	0.0223
Eating Inventory Restraint, mean $\pm$ SD	10.5 $\pm$ 2.0	10.5 $\pm$ 1.9	10.4 $\pm$ 1.9	0.7936
Eating Inventory Disinhibition, mean $\pm$ SD	8.8 $\pm$ 2.4	9.7 $\pm$ 2.5	9.8 $\pm$ 2.5	<.0001

Note: For N (%): Mantel-Haenszel Chi-Square test, for mean $\pm$ SD: ANOVA F-test

Table 2.

Percent weight change across treatment condition by level of weight and shape concern at 4-months, 12-months, and 24-months.

Weight and shape concern	Sample size (n)	Large Changes Percent weight change M (SE)	Small Changes Percent weight change M (SE)	Control Percent weight change M (SE)	p-value
4 month					
Very	124	-3.17 (0.64)	-2.39 (0.59)	-1.32 (0.55)	0.08
Pretty	213	-5.33 (0.45)	-2.20 (0.46)	-0.95 (0.45)	
Not Important/ Somewhat	235	-5.19 (0.42)	-2.14 (0.42)	-1.12 (0.43)	
12 month					
Very	110	-1.02 (1.00)	-2.92 (0.99)	-0.40 (0.85)	0.08
Pretty	197	-3.73 (0.68)	-1.09 (0.73)	-0.29 (0.72)	
Not Important/ Somewhat	212	-4.05 (0.65)	-2.07 (0.68)	-1.51 (0.68)	
24 month					
Very	99	0.73 (1.19)	-2.49 (1.16)	-0.32 (1.08)	0.03
Pretty	177	-2.74 (0.84)	-0.60 (0.88)	1.66 (0.85)	
Not Important/ Somewhat	196	-2.41 (0.79)	-0.71 (0.80)	0.68 (0.81)	

Note: P-value for ANOVA F-test testing interaction of treatment condition and baseline weight and shape concern on percent weight change