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A randomized trial comparing two approaches to weight loss: Differences in weight loss maintenance

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Abstract

This study compared treatment outcomes for a new weight loss program that emphasized reducing unhealthy relationships with food, body image dissatisfaction, and internalized weight bias (New Perspectives) to a weight loss program that emphasizes environmental modification and habit formation and disruption (Transforming Your Life). Fifty-nine overweight and obese adults (body mass index ≥ 27 kg/m²) were randomly assigned to either a 12-week New Perspectives or Transforming Your Life intervention. Despite equivalent outcomes at the end of treatment, the Transforming Your Life participants were significantly more effective at maintaining their weight loss than New Perspectives participants during the 6-month no-treatment follow-up period.

Keywords

body image; habits; internalized weight bias; obesity; relationships to food; weight loss treatment

Introduction

Obesity reduction is one of the most important health-care initiatives of our time. With levels of obesity reaching epidemic proportions, the need for effective and innovative weight loss treatment is becoming increasingly important. Effective weight loss treatments are especially important given the negative physical (e.g. diabetes, coronary heart disease, hypertension, stroke; NHLBI Obesity Education Initiative Task Force Members, 1998) and psychological (e.g. depression, disordered eating, poor body image, internalized weight bias; Fabricatore and Wadden, 2011) consequences associated with being overweight and obese.

Behavioral weight loss programs (BWLPs) have traditionally been considered the treatment of choice for mild to moderate obesity (Wing, 2002). These programs generally focus on self-monitoring, diet, and exercise with prescribed calorie-deficit goals (e.g. a reduction of 500–1000 calories per day) and utilize a group treatment format taught by health professionals (Wing and Polley, 2001). BWLPs vary in length and generally result in an 8–9 percent weight loss at the end of a 6-month program (Perri and Corsica, 2002). Although participants evidence diminished psychological distress (Grave et al., 2010), traditional BWLPs commonly do not focus greatly on maladaptive relationships with food, internalized weight bias, and body image/ objectification concerns.

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Beliefs about food and eating are often culture-bound and learned over time through “food rules” perpetuated by parents and family members (Brink et al., 1999; Puhl and Schwartz, 2003). The negative impact of food rules on adult overweight and obesity has recently been observed. For example, Puhl and Schwartz (2003) found that individuals who recalled parental use of food to control their behavior as a child reported increased rates of binge eating and dietary restraint as adults. In addition, maladaptive eating behaviors, such as emotional eating and binge eating, have frequently been observed among weight loss participants and can adversely affect weight loss attempts (Blair et al., 1990; Marcus, 1995; Varnado et al., 1997).

Similarly, it is well established that overweight and obesity are linked to body dissatisfaction, with risk factors including degree of overweight, binge eating, and being female (Schwartz and Brownell, 2004). Poor body image may inhibit ability to lose weight, as a cycle of negative self-talk can obstruct positive change (Heinberg et al., 2001). Moreover, exposure to pervasive media images promoting the thin ideal has been implicated in negatively affecting body image (Yamamiya et al., 2005). Particularly, self-objectification, a way of valuing oneself as an appearance-based object instead of performance, has been associated with a variety of poor outcomes, including negative affect, maladaptive eating, and poorer body image (Frederickson and Roberts, 1997; Nolls and Fredrickson, 1998).

Additionally, little research has attempted to raise awareness of and combat internalized weight bias among treatment-seeking adults. The pervasiveness of weight-based stereotypes and biases among obese persons seeking weight loss treatment is strikingly high (Carels et al., 2009a; Puhl and Heuer, 2009; Schwartz et al., 2006). High levels of internalized, implicit, and explicit weight bias have been documented in overweight and obese individuals seeking weight loss treatment, often resulting in poorer outcomes (Carels et al., 2009b). Research suggests that when weight stigma is experienced, the internalization of antifat attitudes is associated with more frequent binge eating, refusal to diet (Puhl et al., 2007), and avoidance of exercise (Vartanian and Novak, 2011). Internalization of antifat attitudes is also associated with greater psychological distress (e.g. depression, low self-esteem, and poor body image; Friedman et al., 2005).

While a number of prior programs, for example, nondieting approaches (Foster, 2002), body image (Cash and Hrabosky, 2003), Health at Every Size (Bacon, 2008; Provencher et al., 2007), have emphasized body acceptance and reducing unhealthy relationships to food, these programs have not commonly emphasized the goal of weight loss. As this body of literature suggests, relationships with food, body image, and beliefs about weight could impact one’s ability to lose weight, thus a focus on these constructs may be important factors in bolstering the effectiveness of BWLPs.

Therefore, in this study, the authors introduced a novel weight loss program, New Perspectives (NP), directed at changing unhealthy relationships with food, body image, and attitudes about weight. The primary aim of this study was to compare treatment outcomes (e.g. weight loss, self-monitoring, psychological variables) between this novel treatment approach and a previously validated program. The comparison program (i.e. Transforming Your Life (TYL); Carels et al., 2010) was designed to help participants develop and maintain healthy habits, disrupt unhealthy habits, and enable participants to create a personal food and exercise environment that increases exposure to healthy eating and physical activity while encouraging automatic responding to goal-related cues. The TYL program was chosen as a comparison intervention because it has been associated with positive weight loss outcomes in prior weight loss treatment outcome research (e.g., Carels et al., 2010) and because it presented advice on nutrition and exercise consistent with the NP, but with

minimal overlap with the psychological content of the NP program. This allowed for a comparison of differential outcomes with the NP program emphasizing participant relationships to food, their bodies, and their attitudes about weight and the TYL program emphasizing healthy habit formation, unhealthy habit disruption, and environmental modification.

As both interventions emphasized nutritional information, self-monitoring of caloric intake and expenditure, and weekly lessons relevant to weight loss, it was hypothesized that both interventions would evidence similar weight loss and self-monitoring outcomes. However, given the greater focus on participants' psychological relationships to food, their bodies, and attitudes about weight in NP, greater decreases in emotional eating, binge eating, body image dissatisfaction, and weight bias compared to the TYL program were hypothesized. Conversely, given the greater emphasis on behavioral and environmental modification in the TYL program, greater increases in healthy eating and exercise habits and environments, and corresponding decreases in unhealthy habits and environments compared to the NP program were hypothesized.

Methods

Participants

Participants were recruited for a free 12-week group weight loss program via local newspaper advertisements, community bulletin boards, and emails sent to faculty, staff, and students at a mid-sized Midwestern University. Participants had to meet the following study inclusion criteria: (1) be overweight/obese (body mass index (BMI) ≥ 27 kg/m²), (2) be free from major medical conditions, and (3) provide written permission from their doctor to participate. The investigation received full Institutional Review Board approval, and all participants consented to participate.

Of the 268 individuals that responded to the advertisements, 59 eligible overweight and obese adults elected to participate (see Figure 1 for participant flow diagram). The sample size is sufficient to detect a moderate effect-size (Cohen's $d = 0.3$) for a repeated measures between-subjects analysis using a two-tailed test, a power of 0.80, and an alpha of .05. Participants' mean age was 44.3 (standard deviation (SD) = 13.2; range: 18–65) years. The majority of the participants were Caucasian (86%), female (78%), and married or living with a partner (65%). Annual income exceeded US\$30,000 for approximately 60 percent of participants, and approximately 50 percent had at least a baccalaureate degree. Mean weight at baseline was 242.1 lb (SD = 71.3; range: 142.0–472.0), and mean BMI was 39.7 (SD = 10.3; range: 27.7–79.7).

Study design

Using a random number generator prior to beginning the program, participants were randomized by a graduate student who was unaware of condition assignment into one of two intervention groups. One group, NP, emphasized healthy relationships to food, body, and weight, and the other, TYL, emphasized healthy habit formation and unhealthy habit disruption, environmental modification, and motivation. Both of the programs included weekly weight assessments and provided a combination of didactic instruction, group and individual in-class activities, and take home assignments. Additionally, both groups were given Caltrac accelerometers to track energy expenditure and were instructed to self-monitor and report their daily caloric intake and output, as well as amount of physical activity in which they engaged. Each group met for approximately 90 minutes weekly for 12 weeks. Groups of 12–16 individuals were led by a licensed clinical health psychologist and/or graduate students in psychology.

Weight loss interventions

NP—The NP approach to weight loss emphasized (1) a disruption of unhealthy relationships to food, (2) body image acceptance, and (3) becoming aware of and challenging internalized weight bias (see Table 1 for a description of individual classes). Factors influencing participants' psychological relationships with food were addressed, including physiological versus psychological hunger, emotions that may elicit overeating, and family culture and traditions surrounding food (e.g. consumption norms). Instruction about body image included education about the impact of interpersonal, media, and cultural influences on body image; myths about weight and shape; and consequences of striving for shape; consequences of striving for an ideal body; and forming a broader perspective about health that promotes the body's optimal functioning (e.g. focus on one's body for performance rather than for appearance). To address internalized weight bias, participants were taught to identify and debunk implicit and explicit negative attitudes and stereotypes about overweight persons (e.g. overweight persons are lazy) and to compare weight bias to other forms of discrimination. Overall, this program aimed to facilitate weight loss goals through the systematic deconstruction of misinformation, encouraging willingness to explore attitudes that contribute to an unhealthy lifestyle, and providing tools to rebuild a healthier and more adaptive attitude toward food, weight, and one's body. In addition, weekly tips included the discussion of topics important to successful weight loss (e.g. carbohydrate, protein and fiber intake; the Glycemic Index; resting metabolic rate; physical activity). While much of the weight loss manual was constructed for the purpose of this intervention, several extant sources also informed the construction of the manual (Bacon, 2008; Cash, 2008; Kabat-Zinn, 1990; McKay et al., 2010; Tribole and Resch, 2003).

TYL (Carels et al., 2010)—The TYL program emphasized (1) helping participants develop and maintain healthy habits and disrupt unhealthy habits, (2) enabling participants to create a personal food and exercise environment that increases exposure to healthy eating and physical activity and encourages automatic responding to goal-related cues, and (3) facilitating participants' weight loss motivation.

Instruction on forming healthy habits was accomplished by teaching participants how to (1) develop predictable and sustainable weight loss-related routines, (2) anticipate and minimize potential disruptions to routines, (3) follow performance of weight loss-related behaviors with immediate positive reinforcement, and (4) form implementation intentions where habit-related cues are linked to performance of weight loss promoting behaviors (e.g. 'If I am craving candy, then I will eat a piece of fruit instead'). Similarly, disruption of unhealthy habits was accomplished by teaching participants to (1) disrupt/change established routines that support unhealthy habits, (2) make unhealthy behaviors less reinforcing (e.g. make sure unhealthy snacks require substantial preparation, time, and effort), (3) identify/remove triggers for unhealthy habits, and (4) form implementation intentions to perform healthy behaviors in response to cues that have historically signaled unhealthy behaviors.

In addition, individuals were taught to create their personal food and exercise environment in a manner that minimizes unhealthy eating and sedentary behavior cues/choices, maximizes healthy eating and exercise-related cues/choices, and encourages automatic responding to goal-related cues. Each week, selected environmental factors that have been empirically recognized to influence eating (e.g. salience, variety, serving utensils, abundance, and convenience) were systematically targeted for modification. For a full description of the TYL program, please refer to Carels et al. (2010).

Measures

Participants completed assessments of height and weight at baseline, posttreatment, and follow-up (6 months following treatment) and completed questionnaires at baseline and posttreatment.

Weight and BMI—Participants' weight was measured using a digital scale (BF-350e; Tanita, Arlington Heights, IL) at pre- and post-intervention as well as at the 6-month follow-up. Height was measured in inches to the closest 0.5 in using a height rod on a standard spring scale at baseline. BMI was calculated from those measurements in kilogram per square meter.

Caloric intake—All participants were instructed to self-monitor their daily dietary intake for meals, snacks, and beverages. They were also provided with demonstrations of common food measurement procedures, written instructions for measurement estimation, and were referred to food and beverage calorie guides or Internet dietary analysis programs, such as Calorie King (<http://www.calorieking.com>) and Nutrition Data (<http://www.nutritiondata.com>) to aid in their self-monitoring efforts.

Energy expenditure—Additionally, participants were instructed to self-monitor total daily energy expenditure (kilocalorie) and energy expended during purposeful physical activity using a Caltrac accelerometer, which provides a reliable assessment of total energy expenditure (Pambianco et al., 1999).

Binge eating—The Binge Eating Scale (BES; Gormally et al., 1982) is a 16-item, self-report measure designed to identify binge eating behaviors. In this study, Cronbach's α was .85.

Emotional eating—The Emotional Eating Scale (EES; Arnow et al., 1995) was used to assess the extent to which negative emotions influence people to eat as a coping strategy. The EES demonstrates strong internal consistency and construct validity (Arnow et al., 1995). The EES includes three subscales that were used in this study: anger/frustration ($\alpha = .92$), anxiety ($\alpha = .87$), and depression ($\alpha = .75$).

Body image—The Multidimensional Body Self-Relations Questionnaire (MBSRQ; Cash, 2000) is a 69-item, self-report questionnaire comprising 10 subscales designed to measure the cognitive, behavioral, and affective components of body image. In this investigation, the following subscales were administered: Appearance Evaluation (AE; satisfaction with one's appearance; $\alpha = .77$), Appearance Orientation (AO; preoccupation with looks, appearance, and grooming; $\alpha = .87$), Body Area Satisfaction Scale (BASS; satisfaction with discrete aspects of appearance; $\alpha = .74$), Overweight Preoccupation (OP; preoccupation with fat, weight, and dieting and eating restraint; $\alpha = .48$), and self-classified weight (perception and labeling of weight; $\alpha = .55$). The subscales have demonstrated adequate reliability and validity (Cash, 2000).

Self-objectification—The Trait Self-Objectification Questionnaire (TSOQ; Nolls and Fredrickson, 1998) consists of 10 items in two categories: appearance-based (observable body attributes, e.g. sex appeal) and competence-based (unobservable body attributes, e.g. strength). Participants rank ordered the 10 items from that which has the greatest impact (ranked as a "9") to least impact (ranked as a "0") on their physical self-concept. Scores were then obtained by separately totaling the ranks for appearance-based items and competence-based items and then subtracting the sum of competence ranks from the sum of appearance ranks. The Objectified Body Consciousness Scale–Control Beliefs Subscale

(OBCS; McKinley and Hyde, 1998) is designed to measure endorsement of the belief that individuals can control their weight and appearance if they work hard enough. Participants were asked to rate their agreement with eight self-report items using a 7-point Likert scale ranging from “strongly agree” to “strongly disagree.”

Explicit weight bias—The Obese Person Trait Survey (OPTS; Puhl et al., 2005) consists of 20 items listing stereotypical traits, including 10 negative (OPTS-N; e.g. lazy) and 10 positive (OPTS-P; e.g. sociable) characteristics. Participants estimated the percentage (between 0% and 100%) of obese and normal weight persons who possess these traits. Additionally, participants were asked to indicate how accurately each trait represented oneself. In this study, Cronbach’s α ’s were adequate: OPTS-N for obese ($\alpha = .77$), OPTS-P for obese ($\alpha = .87$), OPTS-N for normal ($\alpha = .88$), OPTS-P for normal ($\alpha = .86$), OPTS-N for self ($\alpha = .86$), and OPTS-P for self ($\alpha = .85$).

Internalized weight bias—The Weight Bias Internalization Scale (WBIS; Durso and Latner, 2008) consists of 11 self-report items designed to assess internalized weight bias in overweight and obese individuals. The WBIS demonstrates satisfactory validity, correlating with scales that measure similar constructs, including the dislike subscale of Crandall’s Antifat Attitudes Questionnaire as well as the shortened version of the Body Shape Questionnaire (Durso and Latner, 2008). For this study, Cronbach’s α was .83.

Habit index—The Self-Report Habit Index (SRHI; Verplanken and Orbell, 2003) uses 12 items to measure habitual action and has previously been applied to eating and physical activity habits. In this study, the following habits were assessed: healthy eating ($\alpha = .94$), unhealthy eating ($\alpha = .93$), exercise ($\alpha = .97$), and sedentary behavior ($\alpha = .96$).

Household food inventory—A revised version of the Household Food Inventory (HFI; Gorin et al., 2007) comprises 34 common food categories that are either high or low in fat content. Participants indicated whether or not the food category was currently available in their home. The HFI has demonstrated strong test–retest reliability, and a significant association was shown between the availability of high-fat items and dietary fat intake (Raynor et al., 2004). In this investigation, Cronbach’s α for high-fat and low-fat food availability were .77 and .81, respectively.

Data analysis

To assess the effect of the treatment programs on key outcome measures, a series of 2×2 repeated measures analyses of variance (ANOVAs) were conducted with time (pretreatment, posttreatment) as the within-subjects factor and treatment program (TYL, NP) as the between-subject factor. Weight loss, energy intake and expenditure (e.g. calories burned), and psychosocial outcomes (e.g. internalized weight bias, depression) were the dependent variables for these repeated measures. Using multivariate analysis of variance (MANOVA), the two-way interaction between time and treatment was used to examine differences between the TYL and NP treatment programs. Main effects of treatment were examined by conducting within-subjects ANOVAs.

Results

Pre- to posttreatment data

Demographic factors and attrition—Fifty-nine participants were randomized to either the TYL program ($N = 30$) or NP program ($N = 29$). Forty-three (73%) participants remained in the program through the 12-week treatment (TYL = 20; NP = 23). There were no significant differences between TYL and NP participants in attrition from baseline to

posttreatment or in baseline demographics (i.e. age, marital status, gender, education, income, race, BMI). Similarly, there were no significant differences between treatment completers and dropouts on any psychosocial variables or demographic factors, including baseline weight.

Weight loss, energy intake, and energy expenditure—A repeated measures ANOVA indicated a significant overall treatment effect for weight loss for both intervention groups from baseline to posttreatment (pounds), $F(1, 41) = 66.38, p < .001$, Cohen's $d = 2.72$.¹ Participants lost a significant amount of weight from baseline to posttreatment, $t(42) = 8.30, p < .001$, Cohen's $d = 0.96$ ($M = 14.6, SD = 11.6$), than at baseline (6.5%; $SD = 4.3$). There were no significant differences between the weight lost between the TYL and NP participants from baseline to post-treatment, $F(1, 41) = 0.03, p = .87$ (Figure 2).

ANOVA indicated that there were no between-group differences (TYL, NP) for self-monitoring frequency or energy intake and expenditure. Across groups, participants recorded an average of 52.7 ($SD = 36.1$; 62.7%) out of 84 possible caloric intake and physical activity diaries over 12 weeks. Participants reported an average daily energy intake of 1523 kcal ($SD = 414$), an average energy expenditure of 2540 kcal ($SD = 605$), and an average energy expenditure from physical activity of 615 kcal ($SD = 315$). Participants reported an average exercise duration of 26.7 minutes ($SD = 18.7$) for each instance of purposeful exercise.

Behavioral and psychosocial variables—Means and SDs for pre- and posttreatment psychosocial variables across programs can be found in Table 2.

Improvements in emotional (i.e. eating when depressed, anxious, or angry) and binge eating were seen in both groups. From pre- to post-treatment, there was a significant decrease in emotional eating scores for depression, $F(1, 38) = 10.63, p < .005$, Cohen's $d = 1.09$; anxiety, $F(1, 38) = 4.51, p < .05$, Cohen's $d = 0.71$; and anger/frustration, $F(1, 38) = 12.54, p < .001$, Cohen's $d = 1.18$. Additionally, binge eating (BES) was significantly reduced pre- to post-treatment, $F(1, 38) = 30.87, p < .001$, Cohen's $d = 1.85$. The group-by-time interaction effect was not significant for emotional or binge eating.

In general, body image improved in both conditions following treatment. However, there was a significant interaction between time and treatment program on one's preoccupation with feeling overweight (MBSRQ-OP), $F(1, 38) = 38.00, p < .001$, Cohen's $d = 2.05$, with scores *decreasing* pre- to posttreatment in the NP intervention and *increasing* pre- to posttreatment in the TYL intervention; this finding should be interpreted with caution as internal consistency of the dependent measure was low ($\alpha = .48$). In addition, for both groups, there was a significant increase in satisfaction with most areas of one's body (MBSRQ-BASS), $F(1, 38) = 35.61, p < .001$, Cohen's $d = 1.99$, pre- to posttreatment, with no significant differences by treatment group. For self-objectification measures, no significant main effects or interactions on appearance and focus on body emerged. However, there was a significant increase in one's perceived responsibility for his or her physical characteristics (OBCS), $F(1, 38) = 27.24, p < .001$, Cohen's $d = 1.74$, across both treatment groups.

Regarding weight bias, participants' ratings of *themselves* as possessing negative traits on the Obese Persons Trait Survey were significantly lower posttreatment compared to pre-

¹Repeated measures analysis of variance (ANOVA) using intent-to-treat analyses indicated a similar overall treatment effect for weight loss from baseline to posttreatment, $F(1, 57) = 46.77, p < .001$, Cohen's $d = 0.89$. Participants (including dropouts) weighed significantly less on average at posttreatment than at baseline.

treatment, $F(1, 37) = 33.97, p < .001$, Cohen's $d = 1.94$. However, a significant interaction emerged between treatment groups, indicating that negative self-ratings decreased more in the NP intervention than in the TYL group, $F(1, 37) = 7.59, p < .01$, Cohen's $d = 0.92$. Similarly, there was a significant decrease in participants' ratings of *obese people* possessing certain negative personality traits pre- to posttreatment, $F(1, 37) = 12.33, p < .01$, Cohen's $d = 1.17$. Again, a significant interaction emerged between treatment groups, indicating that negative ratings of *obese people* decreased more in the NP intervention than in the TYL group, $F(1, 37) = 10.58, p < .005$, Cohen's $d = 1.08$. No significant changes were found for ratings of obese people and themselves on positive traits. Finally, a significant decrease in internalized weight bias (WBIS) pre- to posttreatment for both groups, $F(1, 38) = 23.13, p < .001$, Cohen's $d = 1.60$, was observed. Taken together, consistent with the hypotheses presented earlier, the belief that obese people and the participants themselves possess negative personality traits decreased to a greater degree in the NP intervention compared to the TYL intervention. Internalized weight bias decreased significantly following both treatment programs, $F(1, 38) = 27.5, p < .001$, Cohen's $d = 1.75$.

For eating and physical activity habits (SRHI), results indicated an overall pre- to post-treatment effect for an increase in healthy eating habits, $F(1, 38) = 64.21, p < .001$, Cohen's $d = 2.60$, and a decrease in unhealthy eating habits, $F(1, 37) = 46.24, p < .001$, Cohen's $d = 2.21$. There was no significant interaction between groups by time. Additionally, there was an overall pre- to posttreatment effect for an increase in exercise habits, $F(1, 38) = 31.43, p < .001$, Cohen's $d = 1.82$, and decrease in sedentary behavior habits, $F(1, 38) = 19.96, p < .001$, Cohen's $d = 1.48$. There was no interaction effect, indicating that the change in exercise and sedentary behavior habits was similar for the two treatment groups. No changes emerged for reports of high-fat or low-fat food availability. These results indicate, generally, that healthy habits increased and unhealthy habits decreased in both groups.

Weight loss maintenance: posttreatment follow-up

There were no statistically significant differences between TYL and NP participants in attrition from baseline to posttreatment (dropouts: TYL = 9; NP = 15). Thirty-five (60%) participants attended the 6-month follow-up (TYL = 20; NP = 15). No TYL participants were lost from posttreatment to 6-month follow-up. The number of dropouts from posttreatment to follow-up in the NP intervention was significantly greater than in the TYL (dropouts: TYL = 0; NP = 8), $\chi^2(2, N = 35) = 8.55, p = .003$, Cohen's $d = 1.02$. A repeated measures ANOVA indicated a significant overall treatment effect for weight loss from baseline to 6 months ($M = 14.5$ lb, $SD = 22.0$; 5.9%; $SD = 6.7$), $F(1, 33) = 16.47, p < .001$, Cohen's $d = 1.41$. Despite a 12-lb weight loss difference by the end of the posttreatment follow-up period favoring TYL participants, the treatment group effect of weight loss only approached significance (TYL: $M = 19.6$ lb, $SD = 26.4$; NP: $M = 7.7$ lb, $SD = 11.9$), $F(1, 33) = 2.62, p = .08$, Cohen's $d = 0.58$. However, when examining weight change from posttreatment to the 6-month follow-up period, TYL participants were significantly more effective at maintaining their weight loss ($M = -4.8, SD = 9.7$) than NP participants ($M = +4.7, SD = 16.2$), $F(1, 33) = 4.07, p = .05$, Cohen's $d = 0.70$.

All demographic and psychosocial variable baseline scores were examined with ANOVAs for differences between participants who completed the entire program including the follow-up and those who did not complete the 6-month follow-up. Participants' ratings of their own negative traits (OPTS-N for self) were higher among those who dropped out ($M = 53.7, SD = 17.5$) than those who completed the follow-up ($M = 44.0, SD = 17.7$; $F(1, 57) = 4.2, p = .045$). There were no other variables that were significantly different between these groups.

Discussion

The primary aim of this study was to compare treatment outcomes for a new weight loss program, NP, to an existing weight loss program, TYL (Carels et al., 2010). Traditional BWLPs commonly do not focus on internalized weight bias and body image/objectification concerns, which are not only associated with weight loss treatment outcomes but also with participant quality of life. NP emphasized reducing unhealthy relationships with food, body image dissatisfaction, and internalized weight bias, while TYL underscored healthy habit formation, unhealthy habit disruption, environmental modification, and motivational enhancement. Contrary to hypotheses, both groups demonstrated similar improvements in body image, depression, binge eating, emotional eating, healthy habit formation, unhealthy habit disruption, and explicit and internalized weight bias. The only between-group differences during treatment were a greater reduction in explicit negative weight bias and weight preoccupation in the NP group relative to the TYL group. Weight loss during active treatment (i.e. defined as pretreatment to posttreatment, excluding follow-up) was similar for the NP and TYL interventions. In addition, during treatment, there were no differences between groups in self-monitoring frequency, energy expenditure, and energy intake. In contrast, while weight loss in both groups from baseline to 6-month follow-up treatment period was significant, weight loss/ regain outcomes following treatment between the TYL and NP interventions were significantly different. By 6 months post treatment, weight loss maintenance significantly favored the TYL intervention relative to the NP intervention. TYL participants lost an additional 4.8 lb (1.3% total body weight) during the 6-month follow-up period, while NP participants regained 4.7 lb (2.0% total body weight). Also, the number of dropouts from posttreatment to follow-up in the NP intervention was significantly greater than in the TYL. Because people who do not return for follow-up often evidence poor weight loss outcomes, it is likely that NP participants who did not return for follow-up were failing to maintain their weight loss.

When designing this intervention, many of the psychological outcomes were specifically chosen to assess concepts relevant to those targeted in either the NP or TYL treatment program. It was anticipated that each intervention would differentially impact behavioral and psychosocial outcomes, and it was surprising to see comparable changes in most psychological factors for both treatments emerge. It is plausible that some intervention changes may have had synergistic effects. For example, an individual who develops healthy eating habits may be less susceptible to binge eating, and someone who reduces binge eating may be better able to develop healthy eating habits. In fact, a post hoc correlation between the increase in health habits and the decrease in binge eating was statistically significant ($r = -.44, p = .005$).

Another plausible explanation is that while on the surface the two weight loss programs appeared quite dissimilar, the content and structure that they shared represented the active ingredients contributing to successful weight loss outcomes during active treatment. Both programs included identical information on nutrition and physical activity. Additionally, both groups provided weekly weight assessments, and participants were instructed to self-monitor and report their daily caloric intake, energy expenditure, and physical activity. Some research suggests that self-monitoring is a cornerstone of BWLPs (Wing and Polley, 2001), and recent research has highlighted the importance of regular weighing (Linde et al., 2005). Finally, while the group content was quite different for nearly all the sessions, the groups shared many intangible common experiences. For example, the participants received a reputable program delivered by competent and caring personnel as well as support, accountability, and weekly attention. In the end, many of these overlapping or relatively intangible factors may have been the active ingredients for successful weight loss during treatment.

This explanation runs parallel to the common factors argument in psychotherapy research that has grown prominent (Wampold, 2010). For example, it is regularly observed that very different approaches to therapy across varied psychological diagnoses and domains often yield equivalent outcomes. These findings have led psychotherapy researchers to suggest that the common factors (e.g. emotionally charged and confiding relationship to a healer, instillation of hope, rapport between client and therapist) may account for treatment successes, more so than differences in treatment perspective or modality. While the common factors in weight loss treatment outcomes may differ relative to psychotherapy research, a search for the common factors in successful weight loss treatments might be worthwhile. These factors might include psychological variables, such as support, accountability, a cogent and powerful rationale for weight loss, or behavioral factors, such as self-monitoring and self-weighing.

Even if the common factors for weight loss during active treatment are revealed to account for equivalent weight loss from pre- to post-treatment, the findings from this investigation suggest that differing skills and practices learned during each program may have a significant influence on long-term weight loss outcomes. These findings are consistent with a small group of studies suggesting that practices that support weight loss during active treatment may differ from practices that support weight maintenance (Rothman, 2000; Sciamanna et al., 2011). In this investigation, it is possible that TYL participants learned skills and/or made changes during treatment that contributed to their superior weight loss maintenance, even though there was no evidence of between-group differences in weight loss outcomes during active treatment. The TYL program emphasizes developing and maintaining healthy habits and disrupting unhealthy habits as well as creating a personal food and exercise environment that increases exposure to healthy eating and physical activity and encourages automatic responding to goal-related cues. This emphasis may have contributed to the development of skills or the creation of an environment that promoted weight loss maintenance. This interpretation is consistent with research suggesting that automatic and unconscious environmental cues regularly contribute to overeating and a sedentary lifestyle (Rothman et al., 2010). Similarly, a number of health behaviors are independently predicted by the degree to which a behavior is habitually performed, even after controlling for important variables, such as the intention to perform the behavior (Ouellette & Wood 1998). When environments are redesigned to support automatic responding to goal pursuits, weight loss can be enhanced with fewer self-regulatory resources. Alternatively, the NP program, which emphasized reducing participants' unhealthy relationships to food, their body, and their weight, may have failed to help participants develop skills that were sustained over time. Future research is needed to determine whether there are common factors for successful weight loss maintenance.

It is important to note some limitations to this study. The modest sample size and relatively high attrition rates limited the statistical power to detect small to moderate effects. The majority of the participants were Caucasian women, and it is unclear whether a similar pattern of results would be found in a more diverse sample. In addition, the self-selected sample of treatment-seeking adults choosing to participate in university-sponsored weight loss research may limit generalizability to individuals attempting to lose weight on their own or those using commercial weight loss programs. While both treatments showed improvements in a number of important psychological outcomes, it is also unclear whether the strategies emphasized in the NP or TYL intervention directly addressed the problems they were designed to change. Also, without a completely nonpsychological weight loss intervention to serve as a comparison group, it is possible that the psychological changes observed in both groups in this study were caused by factors independent of these interventions' unique content (e.g. taking part in a weight loss program). Finally, in order to reduce participant burden, participants did not complete behavioral and psychosocial

questionnaires at the 6-month posttreatment assessment. Therefore, changes in these critical processes during the follow-up period could not be examined.

Participant characteristics will always be an important consideration. It is unlikely that one treatment approach will provide all individuals interested in losing weight with the tools they need to initiate and maintain successful weight control. The NP intervention may be viewed as an alternative approach to a traditional BWLP. While similar in many respects to nondieting approaches (Foster, 2002), body image interventions (Cash and Hrabosky, 2003), and the Health at Every Size approach (Bacon, 2008; Provencher et al., 2007), the NP's emphasis on unhealthy relationships with food, body image, and internalized weight bias in relation to weight loss sets this program apart from the others. It is clear that many weight loss participants struggle with unhealthy relationships to food, their body, and their weight, and also for a variety of reasons, they are very interested in losing weight. Anecdotally, the content of the New Perspective's program was well-received, and the participants were quite engaged in the discussions on emotional eating, body image, and weight bias. As such, matching individuals based on preexisting conditions, including preference for type and modality of treatment, may maximize therapeutic outcomes (Wadden et al., 2002). Thus, individuals may differentially benefit from programs, such as NP, that address significant contributors to quality of life. Although the weight regain associated with the NP treatment is comparable to other published studies (e.g. McGuire et al., 1999), the findings from this investigation suggest that this program would be improved by paying additional attention to habit formation and disruption and environmental modification.

The findings from this investigation suggest that differing skills and practices learned in the two interventions may have a significant influence on long-term weight loss outcomes even though equivalent weight loss outcomes were observed during treatment. Not only do these findings suggest that practices that support weight loss during active treatment may differ from practices that support weight maintenance but also that the addition of a no-treatment follow-up may yield critical information about the differential effectiveness of weight loss programs. Given that the development of a successful weight loss maintenance program has been an elusive goal for many years (e.g. McGuire et al., 1999), observing significant differences in weight loss outcomes at 6 months between programs is noteworthy. A 6-month follow-up period is relatively brief; however, the continued weight loss in the TYL program during this no-contact posttreatment period suggests that habit- and environment-based programs have merit in helping participants maintain weight loss and deserve further attention.

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Figure 1.
Participant flow diagram.

Figure 2.

Weight change from baseline to follow-up in TYL and NP groups.

TYL: Transforming Your Life; NP: New Perspectives.

* $p = .05$, NP versus TYL: Posttreatment to follow-up.

Table 1

New Perspectives—weight loss program outline

Lesson 1	Maintaining a Healthy Lifestyle and Achieving Weight Loss Goals: The Importance of Examining Attitudes toward Food, Weight, and Your Body <i>Participants are provided with the rationale for considering psychological aspects of being overweight and attempting to lose weight. Discussion and writing exercises focus on how individuals think about and use food for reasons other than fuel and nutrition.</i>
Lesson 2	Relationships with Food: Food, Hunger, and Awareness <i>This lesson begins with a discussion of how to recognize when one is physically in need of food versus when one eats because of boredom, habit, nervousness, and so on. Mindful eating is also discussed in-depth and participants engage in a mindful eating exercise. Also, an introduction to the factors that affect an individual's caloric needs including basal metabolic rate, thermic effect of food, and physical activity. Instruction is given in how to determine calorie needs and create a daily calorie deficit sufficient to promote weight loss. Finally, a discussion of macronutrients that spans two lessons begins with basic education about carbohydrates.</i>
Lesson 3	Relationships with Food: Food and Negative Emotions <i>A discussion of how people sometimes use food to cope with negative emotions begins with participants writing about times they have used eating to feel better in times of stress, anger, sadness, and so on. More healthful strategies for coping are discussed. Finally, participants complete a guided progressive muscle relaxation exercise. Also, the education in macronutrients is continued with basic education about dietary fat and protein. Information includes how macronutrients are metabolized and used differently in the body and how dietary sources of each.</i>
Lesson 4	Relationships with Food: Food and Pleasure <i>The pleasurable nature of food is discussed including information about central nervous system responses to food (e.g. reward centers of the brain) and how eating for enjoyment can be part of healthful eating.</i>
Lesson 5	Relationships with Food: Food, Family, and Culture <i>This lesson focuses on components of our culture that places food at the center of social life. Additionally, this lesson also provides strategies for eating more healthfully at family gatherings.</i>
Lesson 6	The Impact of Media and Culture on Body Image <i>The concept of positive body image is introduced and media portrayals of weight, beauty, and the thin ideal are discussed. The impact of advertising on body satisfaction is also introduced.</i>
Lesson 7	The “Thin is Healthy and Preferred” Myth <i>The discussion of cultural values related to body weight is continued. The components of mental and physical health that are not related to body weight are topics of interest for this lesson. The negative consequences of solely focusing on weight loss at the expense of health are also discussed.</i>
Lesson 8	Body and Self-Acceptance <i>This lesson focuses on shame and acceptance of one's physical body and how these competing forces may impact physical health and weight loss efforts. Special attention is paid to activities, goals, plans, hopes, and so on that participants may be putting off until they think they are “thin enough.”</i>
Lesson 9	Body for Performance <i>The nonappearance capabilities of the body are discussed (e.g. movement, strength, balance). Education about kinesthesia and mindful movement are provided. Participants complete a mindful movement exercise.</i>
Lesson 10	Debunking Stereotypes about Weight <i>Negative stereotypes related to extra body weight are discussed and debunked. The personal and societal impact of these stereotypes (i.e. weight stigma and discrimination) is discussed.</i>
Lesson 11	Don't Believe Everything You Hear: Internalized Weight Bias <i>The possible negative effects of coming to believe hurtful stereotypes are true about oneself (internalized weight bias/stigma) are the focus of discussion. Implicit (unconscious) biases against individuals who are overweight are also discussed.</i>
Lesson 12	Excess Weight is Not a Destiny: Protect Yourself Against Self-Fulfilling Prophecy Red-Flag Action Plan/Summing-Up/Saying Good-bye <i>This lesson provides education in the impact of expectation on achievement. Discussion is on individual strengths and how they can best be used after completion of the weight loss program. Participants are instructed in the use of proactive and reactive coping strategies related to excessive eating, diminished exercise, and weight gain after the program is complete.</i>

Table 2

Means and standard deviations of psychosocial variables between TYL and NP

Factors	TYL		NP		Total	
	Pre	Post	Pre	Post	Pre	Post
	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)
Weight bias						
OPTS negative	54.4 (13.5)	53.6 (15.2)	63.5 (15.1)	43.6 (23.4)	59.5 (15.0)	48.0 (20.6) ^a
OPTS negative—self	44.5 (16.7)	37.3 (15.6)	47.2 (20.0)	27.1 (18.5)	46.0 (18.5)	31.5 (17.9) ^a
OPTS positive	52.0 (12.9)	57.3 (10.3)	63.2 (12.1)	60.4 (20.0)	58.3 (13.6)	59.0 (16.4)
OPTS positive—self	70.0 (9.7)	71.3 (10.1)	75.2 (17.1)	72.1 (23.4)	73.0 (14.4)	71.7 (18.6)
Internalized weight bias	48.3 (10.4)	40.9 (13.9)	49.7 (11.8)	41.9 (12.9)	49.1 (11.1)	41.4 (12.2) ^b
Body image/objectification						
MBSRQ-BASS	2.4 (0.4)	2.7 (0.4)	2.5 (0.6)	3.0 (0.6)	2.5 (0.5)	2.8 (0.5) ^b
MBSRQ-OP	3.0 (0.7)	3.4 (0.7)	3.3 (0.7)	3.0 (0.8)	3.1 (0.7)	3.18 (0.8) ^a
MBSRQ-AO	3.5 (0.7)	3.5 (0.7)	3.4 (0.8)	3.3 (0.7)	3.4 (0.7)	3.4 (0.7)
Self-objectification	-3.8 (13.0)	-4.9 (10.6)	-7.0 (10.0)	-5.9 (12.1)	-5.6 (11.4)	-5.5 (11.3)
OBCS-control	4.0 (0.7)	5.0 (0.7)	3.6 (0.8)	4.9 (1.0)	3.8 (0.8)	4.9 (0.9) ^b
Emotional and binge eating						
Emotional eating—anger	2.5 (1.0)	2.0 (1.0)	2.4 (1.0)	2.1 (0.8)	2.5 (1.0)	2.1 (0.9) ^b
Emotional eating—depression	3.0 (1.0)	2.5 (0.9)	3.0 (1.0)	2.7 (0.8)	3.0 (1.0)	2.6 (0.9) ^b
Emotional eating—anxiety	2.5 (0.9)	2.1 (0.8)	2.3 (0.9)	2.3 (0.7)	2.4 (0.9)	2.2 (0.8) ^b
Binge Eating Scale	23.1 (8.8)	15.0 (7.2)	22.0 (10.8)	16.6 (8.5)	22.5 (9.9)	15.9 (7.9) ^b
Food and activity habits						
HI—healthy foods	3.1 (1.5)	5.0 (1.1)	3.1 (1.5)	4.4 (1.2)	3.1 (1.2)	4.7 (1.2) ^b
HI—unhealthy foods	4.6 (1.3)	3.0 (1.3)	4.7 (1.3)	3.5 (1.4)	4.7 (1.3)	3.3 (1.3) ^b
HI—physical activity	2.8 (1.7)	4.3 (1.8)	2.8 (1.6)	3.8 (1.7)	2.8 (1.6)	4.0 (1.7) ^b
HI—sedentary activity	4.8 (1.5)	3.8 (1.7)	4.8 (1.4)	3.8 (1.6)	4.8 (1.4)	3.8 (1.7) ^b
Food availability—high fat	6.9 (3.4)	6.8 (2.5)	8.0 (3.1)	7.9 (3.1)	7.5 (3.2)	7.4 (2.9)
Food availability—low fat	10.9 (4.4)	11.6 (3.3)	12.2 (3.2)	12.8 (3.9)	11.7 (3.8)	12.3 (3.6)

TYL: Transforming Your Life; NP: New Perspectives; OPTS: Obese Persons Trait Survey; MBSRQ-BASS: Multidimensional Body Self-Relations Questionnaire—Body Area Satisfaction Scale; MBSRQ-OP: Multidimensional Body Self-Relations Questionnaire—Overweight Preoccupation; MBSRQ-AO: Multidimensional Body Self-Relations Questionnaire—Appearance Orientation; OBCS: Objectified Body Consciousness Scale; HI: Household Environment Inventory; SD: standard deviation.

^aTwo-way (time $\times$ group) interaction, $p < .05$.

^bMain effect for time, $p < .05$.