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The effect of group-based weight control intervention on adolescent psychosocial outcomes: Perceived peer rejection, social anxiety and self-concept

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Abstract

This paper examines the effectiveness of group-based weight control treatment on adolescent social functioning. Eighty-nine adolescents who were randomized to group-based cognitive behavioral treatment (CBT) with aerobic exercise (CBT+EXER) or peer enhanced adventure therapy (CBT+PEAT) completed measures of social functioning at baseline, end of treatment, and 12-month follow-up. Results demonstrated significant reductions in adolescent perceptions of peer rejection and social anxiety over time with no significant demonstrated group differences. Improvements in social functioning were related to increases in self-concept dimensions. Findings demonstrate benefits of group-based weight control treatment for enhancing adolescent self-perceived social functioning across multiple domains.

Pediatric obesity has increased dramatically over the past thirty years. Data from the National Health and Nutrition Examination Survey (NHANES) indicate that 31.7% of U.S. children 2-19 years old are either overweight or obese, defined as BMI ≥ 85th percentile for age and gender (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Pediatric obesity negatively affects a number of systems within the body, including the cardiovascular, metabolic, pulmonary, gastrointestinal, and skeletal systems (Daniels, 2006; Daniels et al., 2005). Moreover, pediatric obesity is associated with increased risk for obesity in adulthood (Singh, Mulder, Twisk, van Mechelen, & Chinapaw, 2008; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997), which is more difficult to treat and is associated with increased morbidity and mortality (Bray, 2004; Hill & Trowbridge, 1998).

Being overweight during childhood and adolescence is also associated with a number of negative emotional correlates, including impaired health related quality of life (Schwimmer, Burwinkle, & Varni, 2003; Williams, Wake, Hesketh, Maher, & Waters, 2005), negative self-concept (French, Story, & Perry, 1995; Lowry, Sallinen, & Janicke, 2007), depressive symptoms (Erermis et al., 2004; Zeller et al., 2004), decreased physical self-worth, and higher body dissatisfaction (Thompson et al., 2007; Wardle & Cooke, 2005). Overweight and obese adolescents are also at increased risk for problematic peer relationships. This includes an increased incidence of overt (i.e. physical) and relational (i.e. damage to friendships) victimization compared to average weight peers (Pearce, Boergers, & Prinstein, 2002), as well as being both victims and perpetrators of verbal bullying in interactions with

peers (Janssen, Craig, Boyce, & Pickett, 2004). A significant percentage of obese (BMI > 95th%) adolescents endorse weight related teasing by peers (Neumark-Sztainer et al., 2002) and data from the National Longitudinal Study of Adolescent Health (Add Health) Study indicate that obese adolescents are less likely than normal weight teens to be nominated by peers as friends (Strauss & Pollack, 2003). Furthermore, global and physical self-worth appear to influence the relationship between weight status and verbal/social bullying among adolescents (Fox & Farrow, 2009).

A psychosocial dimension that has received less attention in studies of overweight and obese youth is that of anxiety. Recent studies suggest a positive relationship between overweight/obesity and increased risk for anxiety in adolescent samples. Obese adolescents seeking weight control treatment were found to be at risk, or in the clinical range, for a number of internalizing concerns including anxiety and social withdrawal when compared to national norms (Zeller, Saelens, Roehrig, Kirk, & Daniels, 2004). Similarly, two investigations of adolescents across the BMI continuum found positive relationships between trait anxiety and BMI in adolescent girls (Hillman, Dorn, & Huang 2010) as well as any anxiety disorder and BMI z-score (Anderson, Cohen, Naumova, & Must, 2006). Furthermore, a small scale qualitative study with obese adolescent girls documented a relationship between peer victimization and anxiety in peer relationships (Griffiths & Page, 2008), suggesting that obese youth may be at particular risk for anxiety in social settings. While not specifically investigated in adolescents, a link was documented between obesity and social phobia, along with other psychiatric disorders, in a community sample of adults (Mather, Cox, Enns, & Sareen, 2009). Taken together, these findings combined with the increased likelihood of peer victimization, suggest that obese adolescents may be at particular risk for anxiety related to interpersonal relationships or social anxiety. This is a potentially important and understudied construct.

While obese youth are at increased risk for negative peer relationships and potentially increased social anxiety, there are also data to suggest that peers may provide positive support for weight control behaviors. For example, in a sample of young adolescents (i.e. 12-14 years), the presence of a friend served to differentially increase motivation for physical activity as well as actual involvement in physical activity for overweight compared to non overweight youth (Salvy et al., 2009). Similarly, in examining predictors of physical activity for adolescents, Reynolds and colleagues (1998) found that the greater the activity level of family and friends, the higher the level of activity engaged in by adolescent females. It has also been shown that peers may influence participation in physical activity through joint involvement as well as through a focus on physical activity in conversations (Finnerty et al., 2009).

Given both the increased risk for psychosocial (e.g. peer relationships) and emotional (e.g. self-concept, anxiety) concerns and the potential for positive impact of peer influence among obese youth, an obesity intervention that capitalizes on peer involvement may have particular benefits for psychosocial functioning. Recognizing the importance of peer influence, a number of interventions targeting health promotion during adolescence have been delivered in a peer setting (Huba & Melchior, 1998). Behavioral weight control (BWC) interventions for adolescents enlist peers to the extent that they are delivered in a group setting. However, peers are not typically used as an active component of the intervention and little is known about how peer involvement may affect treatment outcomes, either in terms of weight outcomes or changes in emotional/psychosocial measures. While not consistent, there is some evidence that BWC combined with an activity intervention that capitalized on social supports developed through group intervention may have a positive impact on weight loss, while also demonstrating positive effects on self concept (Jelalian et al., 2006, Jelalian et al., in press). Moreover, a recent review documents that participation in

weight control interventions is generally related to improved self-concept in children and adolescents at the end of treatment, at least partially due to the group format of many intervention formats (Lowry, Sallinen, & Janicke, 2007). Taken together, these findings suggest that involvement of peers in a weight control intervention may be an active component contributing to documented improvements in self-concept among overweight adolescents.

Previous studies have documented a relationship between peer victimization and self-concept and quality of life (Janicke et al., 2007; Robinson, 2006) in overweight/obese youth but have not examined how the relationship between these dimensions is impacted through participation in a weight control intervention. While there is clear support for improvements in self-concept related to participation in weight control treatment, to our knowledge there are no existing studies examining the impact of a group BWC intervention, which capitalizes on peer involvement, on adolescent social functioning, including peer rejection and social anxiety. The objectives of the current study were to examine the effects of a group-based BWC intervention on dimensions of peer rejection and social anxiety, and to explore relationships between these domains of social functioning and self-concept in a sample of overweight adolescents. We have previously shown that this intervention results in reduction in BMI and improved self-concept (Jelalian et al., in press). Objectives of this study were examined across two treatment conditions: 1) a standard group-based BWC intervention combined with supervised aerobic exercise and 2) a group-based BWC intervention combined with adventure therapy that seeks to actively enlist peer support (see Jelalian et al., 2006). It was hypothesized that adolescents assigned to both treatment conditions would demonstrate reduction in self reported peer rejection and social anxiety. It was further hypothesized that these improvements would be more pronounced in the peer based treatment condition and that reduction in peer rejection and social anxiety would be related to improvements in self-concept.

Method

Participants

This study included 89 adolescents who were randomized to a group-based BWC intervention and had complete data for the baseline, 4 month, and 12 month evaluations. Eligibility criteria for participation at the time of study entry was as follows: 13 – 16 years old, English speaking, 30 – 90 % overweight, with respect to median BMI (kg/m^2) for gender and age, and at least one parent available to participate in the intervention. Adolescents who met criteria for a major psychiatric disorder, were already enrolled in a weight control program, were developmentally delayed, or had a medical condition that interfered with the prescribed dietary or exercise plan were excluded from study participation. Of the 118 adolescents who were randomized to intervention, 93 youth had BMI data available at 12 month follow up (79% retention). In addition, 2 participants were excluded from the present analyses due to incomplete psychosocial data at 4 month follow-up and 2 participants were excluded due to incomplete psychosocial data at 12 month follow-up. Consequently, analyses for this study were conducted with a sample of 89 (75%) participants.

Procedure

Participants were recruited through advertisements in local newspapers and from area pediatrician's offices. Adolescents completed a baseline assessment battery, including anthropometric variables and psychosocial measures, and one-week dietary record run-in period between August 2003 and May 2006. Adolescents were randomized to one of two group-based BWC conditions after the baseline assessment, using an urn randomization

procedure (Stout, Wirtz, Carbonari, & Del Boca, 1994), with percent over BMI and gender as covariates. The first condition, group-based cognitive behavioral treatment (CBT) with aerobic exercise (CBT+EXER), involved CBT plus supervised aerobic activity once per week within the clinic setting. The second condition, group-based CBT with peer enhanced adventure therapy (CBT+PEAT), included CBT plus peer-based activity sessions based on the Outward Bound adventure therapy model. This condition included group activities developed to foster positive peer relationships within the group and develop social skills, self-confidence, and problem solving. Both the CBT+EXER and the CBT+PEAT conditions consisted of 16 one-hour weekly treatment sessions during which adolescents and parents attended separate concurrent meetings, and then 4 bi-weekly maintenance sessions. Adolescents in both conditions were prescribed a balanced deficit diet with gradually increasing physical activity. The CBT component, which remained the same for both conditions, incorporated a range of behavioral topics including goal setting, self-monitoring, stimulus control, motivation, and relapse prevention. For both conditions, parallel content was presented in the co-occurring parent groups. All but two of the adolescent and parent groups were conducted separately. Written informed consent was obtained from parents of all adolescents, and adolescents provided assent for study participation. Participants received monetary compensation for completing baseline and follow-up assessments. This study was approved by the hospital institutional review board. The present paper represents secondary data analysis. Please see Jelalian et al. (in press) for additional description of the methods for the larger study.

Measures

Anthropometric variables and psychosocial measures were collected at baseline (at the time of randomization), at the end of intervention (4 months following randomization), and 12 months following randomization.

Anthropometric variables—Trained research staff obtained participants' weight and height, which were used to calculate body mass index (BMI; kg/m²). Adolescents' height was measured without shoes using a stadiometer (Perspective Enterprises), and weight was measured on a balance beam scale without shoes and in a hospital gown. Unadjusted BMI was used to examine weight status, as this is an easily interpretable index that is based on actual growth patterns and allows for more power in statistical analyses than BMI z score (Berkey & Colditz, 2007).

Peer rejection—A revised 15-item version of the Peer Experiences Questionnaire (PEQ; Vernberg, Jacobs, & Hershberger, 1999) was used to assess peer rejection. Items assessed relational aggression and victimization developmentally appropriate for adolescents (e.g., "a teen played a mean trick to scare or hurt me," "a teen told put-downs or rumors about me"). Adolescents were asked to report how often they had experienced each type of peer rejection using a five-point scale (1 = *never*, 2 = *once or twice*, 3 = *a few times*, 4 = *about once a week*, 5 = *a few times a week*). A total score was calculated by summing all 15 items, with higher scores indicating greater peer rejection. Previous research has demonstrated good internal consistency and validity of the PEQ (Prinstein, Boergers, & Vernberg, 2001; Vernberg et al., 1999). Internal consistency reliability of the PEQ at baseline in this study was $\alpha = 0.84$.

Social anxiety—Social anxiety was assessed with the Social Anxiety Scale for Adolescents (SAS-A; LaGreca & Lopez, 1998), originally adapted from the Social Anxiety Scale for Children-Revised (La Greca & Stone, 1993). The SAS-A contains 18 self-statements (e.g., "I worry about doing something new in front of others," "I feel that peers talk about me behind my back") rated on a 5-point Likert type rating scale ranging from 1

(not at all) to 5 (all the time). A total score is calculated by summing responses across all 18 items; scores can range from 1 to 90 with higher scores indicating greater levels of social anxiety. Alpha reliability for the SAS-A total score used in this study was excellent ($\alpha = 0.91$).

Self-perception—The Self-Perception Profile for Adolescents (SPPA; Harter, 1988) was used to assess adolescents' perceptions of their competence in eight domains. In the present study, we focused on five subscales, including Global Self-Worth (5 items), Social Acceptance (5 items), Physical Appearance (5 items), Romantic Appeal (5 items) and Close Friendship (5 items). Internal consistency for the five subscales used in this study ranged from $\alpha = 0.75 - 0.88$. This is consistent with previous research (Harter, 1988) demonstrating that the individual subscales have good to excellent internal consistency ($\alpha = 0.74$ to 0.92).

Analytic Plan

Independent samples *t*-tests were used to evaluate for potential group differences on baseline BMI and the psychosocial measures (i.e., PEQ, SAS-A, SPPA). Mixed factor analyses of variance (ANOVA) on youth who had complete data from baseline to 12 month follow-up ($N = 89$) were conducted, with time as the repeated measures (3 time points; baseline, end of treatment (i.e., 4 months), 12 month follow up) and intervention condition as the between subjects factor. Outcomes for mixed factor ANOVAs included changes in: BMI, adolescent ratings of their peer experiences (i.e., PEQ total score), and social anxiety (i.e., SAS-A total score). Mixed factors (group $\times$ time) multivariate analysis of variance (MANOVA) was conducted to examine change in self-concept (i.e., global self-concept, social acceptance, close friend, physical appearance and romantic appeal subscales from the SPPA) at baseline, end of treatment, and 12 month follow up. Significant MANOVA results were followed with univariate ANOVAs and planned comparisons. The Greenhouse-Geisser estimate of sphericity was used to correct degrees of freedom in cases where Mauchly's test indicated that the assumption of sphericity had been violated. First-order Pearson correlations were calculated to examine the association between change in the psychosocial measures over the course of treatment (baseline to 4 months) and longer-term changes in adolescent BMI (baseline to 12 months).

Results

Baseline Characteristics

A total of 89 adolescents were included in this study. Participants were primarily female (68.5%) and Caucasian (78.7% Caucasian, 12.4% African American, 5.6% Hispanic, 3.4% other). The average age of participants at baseline was 14.20 years ($SD = 0.93$ years). Mean adolescent BMI at baseline was 31.45 ($SD = 3.53$), and mean percent overweight (calculated as actual BMI divided by 50th %ile for age and gender) at baseline was 62.16% ($SD = 17.45\%$). There were no baseline differences between groups on BMI, PEQ, SAS-A, SPPA Global Self-Worth, Social Acceptance, Physical Appearance, or Close Friend scales. However, differences did emerge on the SPPA Romantic Appeal subscale, with youth in the CBT+EXER group showing higher baseline levels of Romantic Appeal compared to youth in the CBT+PEAT group ($t = -2.07$, $p < .05$).

Adolescent BMI Change

Participants in both conditions evidenced significant reduction in BMI over time, $F(1.50, 130.86) = 41.20$, $p < .01$, with no significant time by group interaction, $F = 1.39$, $df = 2, 174$. Planned comparisons demonstrated a significant decrease in BMI from baseline to the end of treatment ($p < .01$), and a significant increase from end of treatment to 12 month follow up ($p < .01$). Despite this increase, a significant decrease in BMI remained from baseline to 12

month follow up ($p < .01$). See Table 1 for a summary of BMI values by group at each of the three time points.

Psychosocial Outcomes from Baseline to One year Follow-Up

A summary of means and standard deviations for each of the psychosocial variables is presented in Table 1.

Peer experiences—Significant decreases on the PEQ total score were observed over time, $F(2, 174) = 4.33$, $p < .05$, with no effect of group. Lower scores on the PEQ represent reductions in experiences of perceived peer rejection. Planned comparisons revealed a significant decrease in perceptions of peer rejection from baseline to end of treatment ($p < .05$), which remained significant at 12 month follow up ($p < .01$).

Social anxiety—Reductions in social anxiety were also observed over time. Specifically, significant decreases on the SAS-A total score were observed over time, $F(2, 174) = 16.11$, $p < .01$, with no effect of treatment condition. Planned contrasts indicated a significant decrease in social anxiety from baseline to end of treatment ($p < .01$) and also a significant decrease from end of treatment to 12 month follow up ($p < .05$).

Self-concept—Results of the repeated measures MANOVA on measures of self-concept indicated a significant effect of time $F(10, 76) = 6.89$, $p < .01$, with no significant time by group interaction, $F(10, 76) = 1.48$, $p = 0.17$. Follow up univariate ANOVAs indicated significant increases on Global Self-Concept, $F(1.71, 145.71) = 9.02$, $p < .001$, Social Acceptance, $F(1.72, 146.42) = 3.84$, $p < .05$, Physical Appearance, $F(1.73, 147.05) = 39.20$, $p < .001$, and Romantic Appeal $F(1.87, 159.08) = 11.11$, $p < .001$, subscales over time. Significant increases on Global Self-Concept, Social Acceptance, Physical Appearance, and Romantic Appeal self-worth were detected from baseline to end of treatment, $p < .01$. The only significant increase from end of treatment to 12 month follow up was in Physical Appearance self-concept, $p < .01$. The improvements on the Global Self-Concept, Physical Appearance, and Romantic Appeal subscales remained significantly increased at 12 month follow up in comparison to baseline, $p < .01$.

Associations between Change in BMI and Psychosocial Variables

Pearson correlations were conducted to examine associations between changes in psychosocial variables that occurred over the course of treatment (baseline to 4 month follow up), with longer term BMI change as defined by change from baseline to 12 month follow up. Given that group differences were not detected on BMI change or change on the psychosocial variables, Pearson correlations were examined for the overall associations between these variables (i.e., grouping participants from the two treatment conditions together). Please see Table 2 for the full summary of correlations. As seen in the Table, increases in Global Self-Worth ($r = -0.30$, $p < .01$) and Physical Appearance related self-concept ($r = -0.21$, $p = .05$) during treatment were inversely correlated with decreases in BMI.

Decreases in peer rejection were inversely correlated with increases in several dimensions of self-concept, including Global Self-Worth ($r = -0.52$, $p < .01$), Social Acceptance ($r = -0.24$, $p < .05$), Physical Appearance ($r = -0.36$, $p < .01$), and Romantic Appeal ($r = -0.35$, $p < .01$). Similarly, decreases in social anxiety were inversely correlated with the Global Self-Worth ($r = -0.39$, $p < .01$), Social Acceptance ($r = -0.34$, $p < .01$), Physical Appearance ($r = -0.49$, $p < .01$), Romantic Appeal ($r = -0.33$, $p < .01$), and Close Friend ($r = -0.23$, $p < .05$) subscales of the SPPA. Finally, decreases in peer rejection were positively correlated with decrease in social anxiety ($r = 0.40$, $p < .01$). Hierarchical linear regression was used to examine the

proportion of variance in adolescent BMI change to 12 month follow up accounted for by changes in psychosocial variables during treatment (i.e., changes in peer rejection, social anxiety, and self-concept from baseline to 4 months), after controlling for treatment condition, baseline BMI, age and gender. This model failed to reach significance ($p = 0.14$).

Discussion

Participation in group-based weight control intervention led to reduction in adolescent perception of peer rejection and self reported social anxiety. Reduction in experiences of peer rejection were observed at the end of treatment and maintained at 12 month follow up, while decreases in social anxiety were observed during treatment, with further reduction at follow up. These findings extend results from previous studies indicating treatment related improvements in self-concept (Jelalian et al., in press; Lowry et al., 2007) and suggest that similar benefits are seen with regard to perceived peer rejection and social anxiety.

Contrary to prediction, an intervention that was designed to enhance peer support (CBT +PEAT) did not demonstrate additional advantage across domains of social functioning, with adolescents randomized to both treatment conditions demonstrating improvements in peer relationships, social anxiety, and romantic appeal and social acceptance dimensions of self-concept. This may have resulted from the fact the group exercise sessions that were offered as a component of the CBT+EXER intervention conferred similar benefits with regard to facilitating support among adolescent members. The current study does not allow for examination of the establishment of group cohesion and positive peer interactions within the group context, which would potentially provide important information. As hypothesized, there was a relationship observed between reported reduction in experienced peer rejection and social anxiety and improvements in several self-concept dimensions, including global self-worth, social acceptance, physical appearance, and romantic appeal. To some extent, this may result from the fact that social acceptance and romantic appeal are assessing dimensions of self-concept that relate to adolescent peer rejection and social anxiety. Given that concurrent improvements are observed in both self-concept and social functioning, it is not clear how these dimensions impact each other. In a sample of obese youth, peer victimization was cross-sectionally related to depressive symptoms, anxiety, and parent reported internalizing and externalizing problems (Storch et al., 2007). Similarly, in a prospective study, self-concept was found to mediate the relationship between peer victimization and increases in BMI and depressive symptoms in obese girls and BMI decreases in obese boys (Adams & Bukowski, 2008). Taken together, these findings suggest a complex relationship between peer rejection, self-concept, and weight status that is an important area for future research.

As previously documented, improvements in global self-worth and physical appearance related self-concept during treatment have been associated with overall change in BMI measured at 12 month follow up (Jelalian et al., in press). Of note, neither peer rejection nor social anxiety was related to level of success in the weight control intervention. This finding is in contrast to previous research with school age children, documenting a relationship between parent reported social problems and weight gain during follow up from a weight control intervention (Epstein, Wisniewski, and Weng, 1994). Based on the current study it appears that improvements in self-concept may be more closely connected to adolescents' progress with weight control, likely related to the particular dimensions of self concept impacted – i.e. physical appearance, while decreases in perceived peer rejection and social anxiety do not have the same implications for weight control. The decreases in social anxiety and peer rejection, observed regardless of group assignment, may have resulted from the opportunity to participate in a group with obese adolescents peers.

The study findings need to be considered in light of a number of limitations. As noted above, peer rejection and social anxiety were measured with regard to adolescent interactions in general and did not allow for evaluation of interactions within the group setting. The study did not include a control group to allow for naturalistic changes in dimensions of self-concept, social anxiety, and peer rejection that may have occurred independent of treatment effects – e.g. demand characteristics of multiple assessments. In addition, assessment relied on single person self report. Subsequent research in this area would benefit from multi-informant and multi-method evaluation, with attention to the manner in which peer interactions within the weight control intervention impact relationships with friends. Another future research direction is to understand the processes through which improvements in self-concept and social domains such as social acceptance, peer rejection and social anxiety are related, as the latter were unrelated to BMI change in the current study. Finally, evaluation of an intervention that directly intervenes with an adolescent's existing peer group, to enhance social functioning as well as to potentially impact weight outcomes through developing additional supports for healthy eating and activity patterns, would be of considerable interest.

Implications for Practice

Study findings indicate an apparent benefit to providing group-based activity to adolescents participating in a weight control intervention as a way of enhancing dimensions of social and emotional functioning. In the current study, a well supervised group exercise program was equally effective as an intervention specifically focused on improving dimensions of social functioning. The findings also suggest the utility of evaluating psychosocial dimensions beyond self-concept in overweight and obese youth, as these may be of particular relevance to adolescents and appear responsive to intervention effects.

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Table 1

Descriptive Statistics (Means, Standard Deviations) for Participants From Baseline to 12-Month Follow-Up

		Baseline	End of Treatment	12-Month Follow-Up
BMI				
	CBT+PEAT	31.61 (3.77)	29.60 (3.97)	30.04 (4.19)
	CBT+EXER	31.28 (3.30)	29.73 (3.52)	30.36 (4.04)
	Total	31.45 (3.53)	29.66 (3.73) ^a	30.20 (4.10) ^{b, c}
PEQ				
	CBT+PEAT	22.22 (6.03)	20.98 (5.97)	19.82 (5.61)
	CBT+EXER	22.11 (5.63)	20.82 (4.67)	21.30 (6.27)
	Total	22.17 (5.80)	20.90 (5.34) ^a	20.55 (5.96) ^c
SAS-A				
	CBT+PEAT	42.11 (12.59)	36.47 (10.54)	34.11 (10.92)
	CBT+EXER	43.16 (12.58)	40.41 (12.57)	37.30 (12.85)
	Total	42.63 (12.52)	38.42 (11.69) ^a	35.69 (11.95) ^{b, c}
SPPA Global Self-Worth				
	CBT+PEAT	2.88 (0.68)	3.14 (0.52)	3.16 (0.55)
	CBT+EXER	2.97 (0.66)	3.14 (0.52)	3.14 (0.52)
	Total	2.93 (0.67)	3.14 (0.52) ^a	3.15 (0.54) ^c
SPPA Social Acceptance				
	CBT+PEAT	3.21 (0.67)	3.42 (0.52)	3.43 (0.50)
	CBT+EXER	3.26 (0.71)	3.35 (0.59)	3.25 (0.69)
	Total	3.23 (0.68)	3.39 (0.55) ^a	3.34 (0.60)
SPPA Physical Appearance				
	CBT+PEAT	1.84 (0.66)	2.40 (0.61)	2.47 (0.62)
	CBT+EXER	1.98 (0.58)	2.22 (0.50)	2.49 (0.52)
	Total	1.91 (0.62)	2.31 (0.56) ^a	2.48 (0.57) ^{b, c}
SPPA Romantic Appeal				
	CBT+PEAT	2.37 (0.62)	2.80 (0.59)	2.84 (0.62)
	CBT+EXER	2.64 (0.63)	2.72 (0.61)	2.83 (0.59)
	Total	2.51 (0.64)	2.76 (0.60) ^a	2.84 (0.60) ^c
SPPA Close Friendship				
	CBT+PEAT	3.59 (0.55)	3.67 (0.56)	3.73 (0.38)
	CBT+EXER	3.53 (0.76)	3.65 (0.59)	3.53 (0.66)
	Total	3.56 (0.66)	3.66 (0.57)	3.63 (0.54)

Note:

For CBT+EXER $n = 44$; For CBT+PEAT $n = 45$; except for SPPA Romantic subscale ($n = 43$)^a $p < .05$ baseline to end-of-treatment.

^b
p < .05 end-of-treatment to 12-month follow-up.

^c
p < .05 baseline to 12-month follow-up.

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Table 2

Pearson Correlations between Changes in Psychosocial Measures from Baseline to End of Treatment and BMI Change from Baseline to 12 Month Follow Up

	1	2	3	4	5	6	7	8
1. BMI Change During Treatment								
2. PEQ Total Score	0.07							
3. SAS-A Total Score	0.10	0.40 [*]						
4. SPPA Global Self-Worth	-0.30 [*]	-0.52 [*]	-0.39 [*]					
5. SPPA Social Acceptance	-0.04	-0.24 [*]	-0.34 [*]	0.45 [*]				
6. SPPA Physical Appearance	-0.21 [†]	-0.36 [*]	-0.49 [*]	0.62 [*]	0.36 [*]			
7. SPPA Romantic Appeal	-0.19	-0.35 [*]	-0.33 [*]	0.43 [*]	0.35 [*]	0.48 [*]		
8. SPPA Close Friendship	0.04	-0.17	-0.23 [*]	0.29 [*]	0.61 [*]	0.17	0.15	
Mean	-1.25	-1.27	-4.21	0.21	0.15	0.40	0.24	0.11
SD	2.39	5.24	11.75	0.64	0.49	0.66	0.72	0.64

^{*} p<.05

^ap<.01 (two-tailed)

[†]trend $p = .05$.