Treatment Acceptability and Psychosocial Outcomes of a Randomised Controlled Trial of a Cognitive Behavioural Lifestyle Intervention for Overweight and Obese Adolescents

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This study explores the impact of a cognitive behavioural lifestyle program, the CHOOSE HEALTH Program, on psychosocial wellbeing in overweight and obese adolescents. The sample comprised 29 male and 34 female adolescents aged 11.5 to 18.9 years ($M = 14.3$, $SD = 1.9$) and classified as overweight ($n = 15$) or obese ($n = 48$). Participants were randomly allocated to treatment or wait-list control conditions; participants allocated the wait-list condition were offered treatment after 6 months. Adolescents and parents completed self-report measures of psychopathology, psychosocial and family functioning. Treatment did not have detrimental effects on the psychosocial factors assessed. It resulted in significant improvements in weight control behaviour, impulse regulation, social support from family and parent–adolescent problem communication ($p < .05$). Similar results were obtained with completer and intention-to-treat analyses. Treatment acceptability was high, with all respondents indicating that they made progress. Combined, results indicate that treatment did not have detrimental effects on psychopathology, psychosocial functioning, or family functioning. Treatment resulted in significant improvements in impulse regulation, social support from family and parent–adolescent communication. Thus, parents and professionals can be assured that a comprehensive, multifaceted, parent-supported, cognitive behavioural intervention for overweight and obese adolescents does not cause psychological harm.

■ *Keywords:* cognitive behaviour therapy, adolescent, parent, overweight, obese, psychosocial wellbeing, randomised controlled trial, treatment acceptability

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Research exploring the treatment of adolescent overweight and obesity has largely focused on physiological (e.g., body composition) and behavioural (e.g., eating and activity habits) outcomes of treatment (Oude Luttikhuis et al., 2008). Psychosocial consequences are likely to be more immediate than physiological consequences of excess weight in adolescents (Lobstein, Baur, & Uauy, 2004) and are often the reason for seeking intervention (Lobstein, et al.), yet few studies have comprehensively explored the impact of treatment on adolescent psychosocial wellbeing. The absence of research exploring psychosocial outcomes in adolescent obesity has been highlighted in recent reviews (e.g., Oude Luttikhuis et al.).

Psychosocial outcomes of adolescent obesity interventions are of interest for two reasons. First, research is needed to ensure that treatment does not have a detrimental effect on adolescent psychosocial wellbeing. Parental concern about negative impacts of weight management interventions are commonly cited as reasons for not seeking treatment for overweight and obese adolescents (Reilly & Wilson, 2006). Second, research is needed to assess the impact of treatment on promoting improved psychosocial functioning. Weight loss alone is unlikely to result in improved psychosocial wellbeing and weight management interventions need to directly target improved psychosocial outcomes (Reilly & Wilson, 2006). Additionally, poor psychosocial wellbeing contributes to further weight gain (Stice, Cameron, Killen, Howard, & Taylor, 1999) and negatively impacts on treatment adherence, completion and outcome (Zeller et al., 2004).

The CHOOSE HEALTH Program (Brennan, Walkley, Fraser, Greenway, & Wilks, 2008), a healthy lifestyle program for adolescents, was developed to meet the need for effective interventions for adolescent overweight and obesity and was designed to be consistent with recommendations of systematic reviews (Oude Luttikhuis et al., 2008) and clinical guidelines (National Health and Medical Research Council, 2003). Previous research suggests that this program is effective in improving body composition (Brennan, Walkley, Wilks, Fraser, & Greenway, in press). This study aimed to explore the impact of The CHOOSE HEALTH Program on psychosocial wellbeing in overweight and obese adolescents. Central to the study was the intention to investigate both desirable and detrimental impacts on adolescent psychosocial wellbeing. It was hypothesised that participation in the program would result in sustained improvements in psychopathology, psychosocial functioning and family functioning.

Methods

This article reports a randomised controlled trial with a single cross-over design. The full methodology of this trial has been described in detail elsewhere (Brennan et al., 2008). The trial is registered with the Australian New Zealand Clinical Trials Registry (ACTRN12610000111077). Ethical approval for the project was obtained from relevant Human Research Ethics Committees. Voluntary written informed consent was obtained from both parent and adolescent participants.

Recruitment

Information about the CHOOSE HEALTH Program was circulated throughout the community, requesting that interested parents call to register. Parents calling about the program were first assessed for eligibility. Adolescents were eligible to participate if they met the following inclusion criteria: (a) aged 11 to 19 years, (b) overweight or

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obese according to the international cut-off points for BMI in children (Cole, Bellizzi, Flegal, & Dietz, 2000), and (c) living with a parent or adult caregiver who was prepared to be fully involved in treatment. Participants were excluded from the study if they had a disability or illness that prevented them from participating in the program. Eligible families were provided with a detailed outline of the research procedures and administered a phone-based intake survey collecting basic demographic information. They were then mailed parent and adolescent plain language statements and a consent form and were asked to return this form to participate in the study.

Allocation to Condition

Following completion of pretreatment assessments, participants were randomly allocated to a treatment or wait-list control condition. Participants were asked to select a number from 1 to 3 and this number was compared to an investigator randomly selected number and was then used to allocate the participant to the treatment or control condition. Twice as many participants were allocated to treatment and they commenced treatment immediately. The treatment group was larger than the control group as a secondary aim of the larger study was to explore the impact of a pretreatment motivational interview on CBT treatment outcomes. Of those allocated to treatment, half received a standard assessment interview and half a motivational interview. These two groups did not differ in terms of baseline characteristics, retention or outcomes (Brennan, 2008) and thus were combined for all analysis.

Assessments were repeated 6 months after allocation, and wait-listed participants were then offered treatment while those in the treatment condition participated in a maintenance program and were followed up 6 months later. This allowed for comparisons between treatment and control conditions immediately following the treatment period (post), and for an analysis of changes from pre to post to maintenance (maintenance) in the treatment condition.

Assessment

Assessment interviews were conducted prior to commencing the study. All other assessments were completed: (1) after the assessment interview and prior to randomisation; (2) after the completion of the treatment phase of the intervention (or the end of wait-list); and (3) after completion of the maintenance phase of the intervention. All assessments were conducted by trained independent assessors blind to participant's group allocation, treatment adherence, and stage of intervention.

Assessment Interview

Assessment interviews were conducted over a 60-minute period with both the adolescent and the parent present. At the completion of the initial interview, adolescent and parent participants were given the option of continuing with the assessments or terminating their involvement in the project.

Physical and Behavioural Assessment

Adolescent participants completed a range of assessments of body composition and function, and self-monitored their eating and physical activity for 7 days at each assessment period. Details of these assessments are provided elsewhere (Brennan, et al., 2008) and results have been reported in a previous publication (Brennan et al., in press).

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Psychosocial Assessments

Adolescent and parent participants completed comprehensive survey assessments at each assessment period. All the survey assessments were scored by an independent research assistant who was blind to treatment stage and condition. The Parent and Adolescent Health and Weight History surveys (PAHWH; Brennan, 2006) were used to obtain general demographic information. The PAHWH surveys were designed specifically for the purpose of this study to provide general demographic information such as age and ethnic background, dieting and weight history, mental and physical health history.

Adolescents completed a range of measures of psychosocial functioning and psychopathology. The Rosenberg Self-Esteem Scale (RSE, Rosenberg, 1965) was included as the measure of self-esteem. The RSE includes 10 items. Respondents indicate their level of agreement to each item on a 4-point Likert scale ranging from 1 (*Strongly agree*) to 4 (*Strongly disagree*). A high score on the RSE indicates a positive self-attitude while a low score indicates a negative attitude towards the self. The RSE has been extensively used in both the adolescent and adult literature. The RSE has acceptable psychometric properties (McCarthy & Hoge, 1982; Rosenberg, 1965). The Perceived Social Support Scale (PSS, Procidano & Heller, 1983) was included as a measure of the individual's perceptions of the adequacy of their social support. The PSS consists of two scales, Social Support from Friends (PSS-Fr), and Social Support From Family (PSS-Fa). Each scale contains 20 statements describing feelings or experiences common in relationships. Respondents answer 'yes', 'no' or 'don't know' to indicate whether they believed each of these forms of support occur in their family and friend relationships. A high score on a PSS scale indicates high perceived social support. This scale has acceptable psychometric properties (Lyons, Perrotta, & Hancher-Kvam, 1988; Procidano & Heller) and has been widely used in a range of populations including adolescents (e.g., Gavazzi, 1994).

The Family and Friend Influence on Health Behaviour Scale (FFHB, based on Redding et al., 1999) was used as a measure of the involvement of family and friends on adolescents' adoption of health behaviour. It includes four subscales: Family Support for Healthy Eating (FFHB–FaHE), Family Support for Physical Activity (FFHB–FaPA), Friend Support for Healthy Eating (FFHB–FrHE), and Friend Support for Physical Activity (FFHB–FrPA). Each scale contains four items describing supporting behaviours. Respondents indicate their level of agreement to each item on a 5-point Likert scale ranging from 1 (*Almost never*) to 4 (*Almost always*). A high score on the FFHB scales indicates strong support.

General psychopathology was measured using the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995). The DASS is a self-report measure of state depression (DASS–D), anxiety (DASS–A) and stress (DASS–S). Each scale includes 14 items and respondents are asked to use a 4-point severity/frequency scale to rate the extent to which they had experienced each of these states over the past week. A high score on any scale indicates a high prevalence of the core symptoms of the emotional disturbance measured by the scale. The DASS has acceptable psychometric properties (Brown, Chorpita, Korotitsch, & Barlow, 1997; Lovibond & Lovibond, 1995), has been used with both nonclinical and clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown et al., 1997), and is appropriate for use as a screening tool with adolescents (Lovibond & Lovibond, 1995).

Eating and weight specific psychopathology was measured using the Adolescent Dieting Scale (ADS; G. C. Patton et al., 1997) and the Eating Disorders Inventory- II

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(EDI-II, Garner, 1990) . The ADS lists eight common dieting behaviours to which respondents are required to indicate how often they use each of these strategies. High scores on the ADS indicate more dieting behaviours. This survey differs from other dieting measures as it does not include extreme weight control strategies more characteristic of eating disorders, thus it allows for identification of non-clinical dieting weight control behaviours (G. Patton, Selzer, Coffey, Carlin, & Wolfe, 1999; Patton et al., 1997).

The EDI-II is a measure of the psychological traits or symptoms common in anorexia nervosa and bulimia nervosa. The survey consists of nine scales. Respondents are required to use a 6-point scale, ranging from *Always* to *Never*, to respond to 91 items about eating attitudes, feelings and behaviours. The Drive for Thinness scale (EDI-II-DT) assesses excessive concern with dieting, preoccupation with weight, and fear of weight gain. The Bulimia (EDI-II-B) scale measures thoughts about or occurrences of bingeing or uncontrollable overeating. The Body Dissatisfaction scale (EDI-II-BD) provides a measure of dissatisfaction with overall body shape or specific body parts. The Ineffectiveness scale (EDI-II-I) measures feelings of aloneness, emptiness, worthlessness, and inability to control one's life. The Perfectionism scale (EDI-II-P) assesses the belief that only the achievement of perfect standards is acceptable and that the respondent must perform better than others. The Interpersonal Distrust (EDI-II-ID) scale measures the respondent's hesitance to share thoughts and feelings with others. The Interoceptive Awareness scale (EDI-II-IA) assesses lack of understanding and correct response to internal states. The Maturity Fears scale (EDI-II-MF) assesses the fear of adult physical and psychological experiences. The Asceticism scale (EDI-II-A) measures the perceived virtue of self-denial and self-restraint. The Impulse Regulation scale (EDI-II-IR) assesses poor impulse regulation resulting in recklessness, hostility and destructiveness. The Social Insecurity scale (EDI-II-SI) measures beliefs that social relationships are disappointing, unrewarding and insecure. Scale scores are obtained by adding the scores of all the items for the scale, and higher scale scores indicate higher levels of the variable being measured. The EDI-II has acceptable psychometric properties (Garner, 1990) and has been used with both obese (Chandarana, Holliday, Conlon, & Deslippe, 1988; Garner, Olmstead, & Polivy, 1983) and adolescent populations (Rosen, Silberg, & Gross, 1988; Shore & Porter, 1990).

The Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980) was included as a general measure of negative cognitions. This survey includes measures of personal maladjustment and desire for change, negative self-concept and expectations, and helplessness. The ATQ consists of 30 items answered on a 5-point scale, indicating the frequency of each thought in the past week. Scores on the survey have been shown to decrease following cognitive therapy. The ATQ has acceptable psychometric properties (Hollon & Kendall).

Both adolescents and parents completed social and family functioning measures. Assessment of social skills was conducted using the pupil and parent versions of the Social Skills Questionnaire (SSQ; Spence, 1995) and the Social Competence Questionnaire (SCQ; Spence). The SSQ consists of 30 items and respondents are asked to answer *Not true*, *Sometimes true* or *Mostly true* to each item. The SCQ consists of 10 items focusing on the consequences of social interactions. Respondents are asked to answer *Not true*, *Sometimes true* or *Mostly true* to each item. These surveys have adequate psychometric properties (Spence, 1995).

Family interaction and communication was measured using the Parent Adolescent Communication Scale (PAC; H. Barnes & Olsen, 1982) and the Family

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Problem Solving Communication Index (FPSC; McCubbin, McCubbin, & Thompson, 1988). The PAC is a 20-item, true/false, adolescent- and parent-rated survey, designed to assess communication between parent and adolescents. The survey provides measures of open communication (PAC-O) and problems in communication (PAC-P). Ten items contribute to each scale, with high scores indicating positive communication patterns. The PAC-O provides an indication of the freedom of expression, understanding and satisfaction during family communications. The PAC-P focuses on negative interaction styles and constraints in communication. The survey has acceptable psychometric properties (Barnes & Olsen, 1982, 1985; Jackson, Bijstra, Oostra, & Bosma, 1998). The FPSC was included as a measure of problem solving and coping during family interactions. It has two scales measuring incendiary (FPSC-I) and affirming (FPSC-A) communication. A high score on the FPSC-I indicates high levels of problematic communication styles that inflame a difficult interaction. A high score on the FPSC-A indicates high levels of supportive communication styles that calm a difficult interaction. The FPSC has acceptable psychometric properties (Leske & Jiricka, 1998; McCubbin et al., 1988).

Parents also completed the Parenting Scale (PS; Arnold, O'Leary, Wolf, & Acker, 1993; Irvine, Biglan, Smolkowski, & Ary, 1999), a measure of parenting practices. The PS yields a total score and three factors: laxness (PS-L), over-reactivity (PS-O), and verbosity (PS-V) This 30-item survey is included so the effectiveness of parent training can be examined. Respondents use a 7-point scale to indicate their level of agreement with each of the double-anchored statements. High scores indicate high levels of parenting practice. This scale has been adapted for use with adolescents and has adequate psychometric properties when used with this population (Irvine et al.).

Treatment Acceptability

Adolescent and parent consumer satisfaction were measured at the completion of the treatment phase of the intervention using the CHOOSE HEALTH Consumer Satisfaction Survey designed for the current study. Respondents rated the level of overall progress on 5-point rating scale ranging from 1 (*Problems got worse*), to 5 (*Great deal of progress*). They were also asked to rate the program on a number of items measuring satisfaction with the program and the clinician. Scores can range from 1 (*Strongly disagree*) to 5 (*Strongly agree*) with a higher score indicating higher treatment acceptability.

Intervention

The CHOOSE HEALTH Program was developed for the purpose of this study. It aims to facilitate small and sustainable lifestyle changes to improve eating and physical activity habits. Cognitive behavioural principles are used to assist the adolescent and their family to manage the environmental, social and psychological barriers to change with the aim of promoting maintained improvements and positive psychosocial well-being. The nutritional component of the intervention aimed to promote eating habits consistent with the *Australian Guide to Healthy Eating* (Smith, Kellett, & Schmerlaib, 1998), which recommends the consumption of a variety of foods from each of the five food groups (cereals, vegetables, fruit, diary and meat products and alternatives), the selection of low fat alternatives, and the consumption of water. The physical activity component of the intervention aimed to promote physical activity habits consistent with the *Australian Physical Activity Guidelines for Children and Young People* (Department of Health and Ageing, 2004a), which recommends adolescents achieve at least

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60 minutes of moderate to vigorous physical activity per day and spend no more than 2 hours per day in noneducational screen activities. Rather than promote rapid unsustainable changes, the program aimed to instigate small maintainable improvements in nutritional intake and physical activity habits to promote sustained changes in body composition, cardiovascular fitness, and psychosocial wellbeing (Brennan et al., 2008).

Treatment was conducted on an individual basis. The intervention program consisted of a treatment and a maintenance phase. The treatment phase consisted of twelve 60-minute face-to-face sessions and one phone call session. The first 10 treatment sessions were conducted weekly. The remaining sessions were conducted every second week. Both parents and adolescents were required to attend the first six treatment sessions. Adolescents were then given the choice of attending the remaining sessions alone, or with the support of a parent.

The maintenance phase consisted of two 60-minute maintenance clinic sessions and seven 15-minute maintenance phone call sessions. Following the last treatment session, phone call sessions were completed every second week and a face-to-face session was scheduled 3 months after the last treatment session. This was followed by monthly phone call sessions and a final face-to-face session conducted 6 months after the last treatment sessions.

Treatment was provided by a single clinician, the developer of the program. The clinician based each session on a structured session outline, which listed each of the topics to be discussed and information about how to complete the tasks. Table 1 briefly outlines the content of each treatment session. Parents and adolescents also received a program workbook, which included information, tasks and home practice activities for each treatment session. At the end of each session, adolescents and parents recorded their self-selected behaviour change goals. Adolescents were encouraged to set goals relating to their own behaviour change, and parents were encouraged to set goals relating to them assisting their adolescent to change their behaviour. These behaviour change goals were used to individualise treatment, ensuring it was appropriate for the adolescents' lifestyle and developmental needs (Brennan et al., 2009). Between sessions, adolescents were encouraged to monitor their behaviour change goals and record their eating and physical activity habits. See Brennan et al. (2008) for a more detailed description of this intervention.

Statistical Analyses

The limited related research, failure to report effect sizes, and huge variation in the methodologies of studies in this area at the time of the study (Summerbell et al., 2003) prevented valid a priori sample size requirement calculations. The sample size used in the current study was determined by resources availability. Based on the number of participants randomised, post-hoc power analysis indicated that the study had 49% chance of a medium effect ($f = .25$)(Faul, Erdfelder, Lang, & Buchner, 2007). Body composition, as measured by DEXA, was the primary outcome for this study and results have been reported previously (Brennan, et al., under review). The psychopathology, psychosocial and family functioning variables reported in this article are secondary outcomes therefore no alpha adjustments have been made to account for multiple comparisons.

All analyses were preceded by data cleaning and checking. Both completer and intention-to-treat analyses were conducted. The first value carried forward method

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TABLE 1

CHOOSE HEALTH Treatment and Maintenance Session Outlines

	Topic	Content
Treatment		
1	Psycho-education	Information about definition, prevalence, causes and consequences of overweight and obesity, and common weight loss methods, CHOOSE HEALTH program strategies and aims, assessment findings, and setting treatment outcome goals.
2	Eating behaviour	Behavioural strategies to change eating habits, self-monitoring eating and physical activity habits, external control strategies to manage eating cues, behaviours and consequences.
3	Physical activity	Behavioural strategies to reduce sedentary time and increase daily physical activity, external control strategies to managing activity cues, behaviours and consequences.
4	Healthy food choices	Information based on the Australian Guide to Healthy Eating (AGHE), to improving diet quality and reducing fat consumption. Adolescent dietary monitoring used to target material.
5	Exercise	Strategies to establish a regular exercise routine and tackle the many barriers to exercise.
6	Behaviour charts and barriers	Review of program, behaviour change goals and progress towards self-measured treatment outcome goals. Develop reward system for goal achievement, identify environmental, social, personal (cognitive and emotional) and organisational barriers to behaviour change.
7	Recognising thoughts and emotions	Introduction to the cognitive behavioural model, recognise and record thoughts and emotions related to eating and physical activity habits.
8	Helpful thoughts and emotions	Identify and use positive coping strategies and statements to deal with difficult situations, challenge the validity and utility of negative cognitions.
9	Assertive communication	Use of assertive communication strategies when making a request, denying a request and acknowledging someone's assistance.
10	Problem-solving and planning	Practice decision-making and problem-solving, time management, activity scheduling and planning.
11	Staying on track	Relapse prevention, identifying high risk situations, planning ahead to manage these situations.
PC1	Maintaining change	Review behaviour change goals and coping plans, identify strengths and weaknesses, plan for high risk situations.
12	Maintenance and closure	Review of program material, self-measured treatment goals and results of physical assessment, set goals for maintenance.
Maintenance		
PC1	Maintaining change	Review behaviour change goals and coping plans. Identify strengths and weaknesses. Plan for high risk situations.

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TABLE 1
Continued

	Topic	Content
PC2	Maintaining change	As per phone call 1.
PC3	Maintaining change	As per phone call 1.
PC4	Maintaining change	As per phone call 1.
PC5	Maintaining change	As per phone call 1.
13	Maintenance	Review of self-measured treatment goals and behaviour change goals.
PC7	Maintaining change	As per phone call 1.
PC8	Maintaining change	As per phone call 1.
14	Maintenance	Review of program material, self-measured treatment goals, results of physical assessment and behaviour change goals. Set goals for maintenance.

Note: PC = Phone Call Session
Adapted from Brennan, L., Walkley, J., Fraser, S., F, Greenway, K., & Wilks, R. (2008). Motivational interviewing and cognitive behaviour therapy in the treatment of adolescent overweight and obesity: Study design and methodology. *Contemporary Clinical Trials, 29,* 359–375. Reprinted with permission.

was used to impute missing data for intention-to-treat analysis. Treatment efficacy was assessed by comparing outcomes of the control and treatment conditions post treatment using between subjects Analysis of Covariance (ANCOVA); pretreatment data was the covariate and condition (treatment, control) the factor. For completer analyses, follow-up analyses were conducted to determine statistically significant differences across assessment periods within the treatment conditions where post-treatment group differences were evident. Repeated measures Analyses of Variance, with time (pre-, postmaintenance) as the within subjects factor, and subsequent post hoc analysis were used to assess maintenance. These follow-up analyses were conducted for all intention-to-treat analyses.

Results

Participant Characteristics

The sample comprised 29 male and 34 female adolescents classified as overweight (n = 15) or obese (n = 48) according to the international reference standard BMI cut-off points (Cole, et al., 2000). Adolescent participants were aged 11.5 to 18.9 years (M = 14.3, SD = 1.9), and parent participants were aged 28 to 61 years (M = 44.8, SD = 5.0). Ninety-four per cent of parent respondents were biological mothers, 5% were biological fathers, and 2% were step-mothers. Seventy-three per cent of parents (n = 43) provided height and weight information. Their BMI ranged from 20.5 kg/m^2 to 52.7 kg/m^2 (M = 28.5, SD = 6.3); 35% were overweight and 33% were obese. A more detailed description of participant characteristics is provided elsewhere (Brennan et al., 2008). All participants were asked to complete all psychosocial assessments; however, there is missing data due to incomplete completion and/or nonreturn of questionnaires.

Forty-two participants were allocated to the treatment condition and 21 to the wait-list control condition. Fourteen (67%) wait-listed participants completed the

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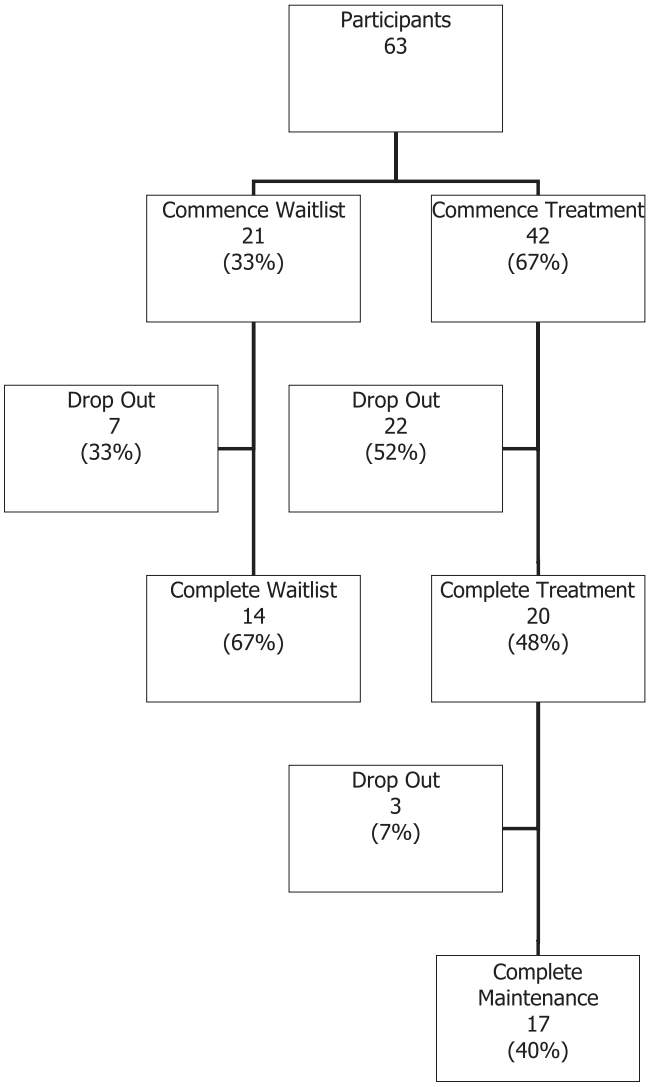

FIGURE 1

Participant flow through the trial.

6-month wait-list period. Twenty (48%) completed the treatment phase and 17 (40%) completed the maintenance phase (Figure 1). Six (10%) adolescents did not complete the intervention/wait-list as they were referred for clinically significant pre-existing depression, anxiety, disordered eating and/or family difficulties identified during assessment and/or intervention.

Participants in the two conditions did not differ significantly in terms of baseline adolescent (gender, age, pubertal status, weight status, ethnicity), parent (relationship with child, age, BMI, ethnicity, education, employment status, hours of employment),

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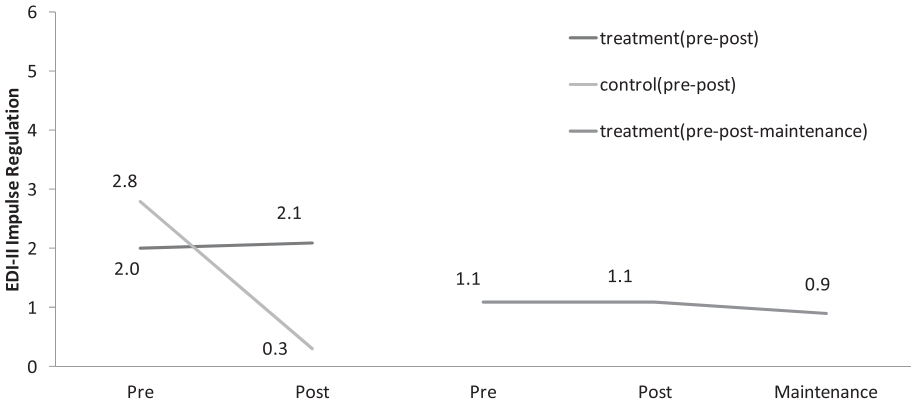

FIGURE 2

Eating Disorders Inventory-2 Impulse Regulation post-treatment and maintenance outcomes.

or family (family status, partner employment status, hours of employment, education, family income) characteristics ($p > .05$). The treatment and control condition differed significantly on a number of outcome variables (Table 2), thus an ANCOVA was used to control for pre-treatment differences when comparing outcomes of the control and treatment conditions.

Adolescent Completed Measures

Results of completer analyses are described below. Similar results were obtained with intention-to-treat analysis displayed in Table 3.

Psychopathology

After controlling for pretreatment differences, those in the intervention condition obtained significantly increased scores on the EDI-II-IR Impulse Regulation subscale, $F(1,29) = 13.43$, $p = .001$, partial $\eta^2 < .33$, following treatment relative to the control condition. However, analysis of pre, post and maintenance data for those in the treatment condition indicated that the effect of treatment phase was not significant for the EDI-II-IR, Wilks' $\lambda = .99$, $F(2, 12) = 0.05$, $p = .995$, partial $\eta^2 < .01$. These results are displayed in Figure 2.

After controlling for pretreatment differences, the treatment and control condition did not differ in terms of obtained scores on any other EDI-II subscales following treatment; EDI-II-DT, $F(1,29) = 0.08$, $p = .777$, partial $\eta^2 < .01$; EDI-II- B, $F(1,29) = 2.40$, $p = .133$, partial $\eta^2 = .08$; EDI-II-BD, $F(1,29) = 0.13$, $p = .726$, partial $\eta^2 < .01$; EDI-II-I, $F(1,29) = 1.34$, $p = .257$, partial $\eta^2 = .05$; EDI-II-P, $F(1,29) < 0.01$, $p = .981$, partial $\eta^2 < .01$; EDI-II-ID, $F(1,29) = 0.06$, $p = .803$, partial $\eta^2 < .01$; EDI-II-IA, $F(1,29) = 0.43$, $p = .517$, partial $\eta^2 = .02$; EDI-II- MF; $F(1,29) = 1.42$, $p = .244$, partial $\eta^2 = .05$; EDI-II-A, $F(1,29) = 0.01$, $p = .930$, partial $\eta^2 < .01$; EDI-II-SI, $F(1,29) = 0.02$, $p = .904$, partial $\eta^2 < .01$.

After controlling for pretreatment differences, those in the intervention condition obtained significantly increased scores on the ADS, $F(1,29) = 5381$, $p = .023$, partial

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TABLE 2

Psychopathology, Psychosocial and Family Functioning Variables at Baseline for Treatment and Control Condition

	Intervention		Control		
Outcome	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis
Adolescent completed psychopathology					
Automatic Thoughts Questionnaire	42	55.1(26.8)	20	40.6(10.8)	$t(58.9) = 3.03$, $p = .004$
Depression Anxiety Stress Scale — Depression	40	8.3(9.5)	21	3.1(3.7)	$t(55.8) = 3.03$, $p = .004$
Depression Anxiety Stress Scale — Anxiety	40	8.3(7.7)	21	5.81(4.9)	$t(56.5) = 1.55$, $p = .127$
Depression Anxiety Stress Scale — Stress	40	12.4(10.5)	21	7.1(5.6)	$t(58.9) = 2.54$, $p = .014$
Adolescent Dieting Scale	38	5.5(3.9)	20	5.2(3.0)	$t(56) = 0.30$, $p = .768$
EDI-II Drive for Thinness	41	5.6(5.2)	19	5.2(4.4)	$t(58) = 0.31$, $p = .758$
EDI-II Bulimia	41	3.2(4.1)	19	2.4(4.7)	$t(58) = 0.17$, $p = .870$
EDI-II Body Dissatisfaction	41	15.2(7.5)	19	15.6(6.1)	$t(58) = -0.20$, $p = .845$
EDI-II Ineffectiveness	41	4.6(5.5)	19	2.0(2.6)	$t(57.9) = 2.50$, $p = .015$
EDI-II Perfectionism	41	3.8(3.3)	19	4.4(4.2)	$t(58) = -0.61$, $p = .542$
EDI-II Interpersonal Distrust	41	3.1(3.8)	19	2.4(2.5)	$t(58) = 0.80$, $p = .429$
EDI-II Interpersonal Awareness	41	3.8(5.9)	19	2.3(2.6)	$t(57.9) = 1.42$, $p = .162$
EDI-II Maturity Fears	41	6.3(4.6)	19	5.9(5.8)	$t(58) = 0.26$, $p = .793$
EDI-II Asceticism	41	2.6(2.4)	19	1.8(2.4)	$t(58) = 1.13$, $p = .265$
EDI-II Impulse Regulation	41	2.3(4.2)	19	1.9(1.9)	$t(58) = 0.34$, $p = .736$
EDI-II Social Insecurity	41	4.1(3.9)	19	3.4(3.3)	$t(58) = 0.64$, $p = .528$
Psychosocial functioning					
Rosenberg Self-Esteem Scale	42	21.5(5.4)	21	18.8(4.7)	$t(61) = 1.95$, $p = .056$
Perceived Social Support Scale — Friend	41	13.2(6.0)	20	14.4(3.9)	$t(59) = 0.70$, $p = .485$
Perceived Social Support Scale — Family	41	12.9(5.8)	19	16.1(3.1)	$t(56.3) = -2.75$, $p = .008$
Influence on Health Behaviour — Family Eating	42	12.1(4.1)	20	12.0(4.0)	$t(60) = -0.13$, $p = .897$
Influence on Health Behaviour — Family Exercise	42	12.6(4.4)	20	11.4(3.9)	$t(60) = 0.62$, $p = .321$
Influence on Health Behaviour — Friend Eating	41	6.8(3.5)	20	6.4(2.8)	$t(59) = 0.47$, $p = .637$
Influence on Health Behaviour — Friend Exercise	41	7.4(3.7)	20	7.1(3.0)	$t(59) = 0.28$, $p = .779$

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TABLE 2

Continued

Outcome	Intervention		Control		Statistical analysis
	n	*M (SD)*	*n*	*M (SD)*	
Social Skills Questionnaire	42	73.3(9.09)	20	77.0(6.0)	$t(53.4) = -1.93$, $p = .059$
Social Competence Questionnaire	42	23.9(4.4)	20	25.5(3.1)	$t(60) = -1.45$, $p = .151$
Family functioning					
Parent–Adolescent Communication — Open	41	8.0(2.3)	20	8.5(2.1)	$t(59) = -0.86$, $p = .394$
Parent–Adolescent Communication — Problem	41	4.7(2.4)	20	6.1(2.3)	$t(59) = -2.07$, $p = .043$
Family Problem Solving Communication — Affirming	40	8.7(3.6)	20	11.2(2.9)	$t(58) = -2.70$, $p = .009$
Family Problem Solving Communication — Incendiary	40	7.3(3.0)	20	5.9(2.6)	$t(58) = 1.87$, $p = .067$
Parent completed psychosocial functioning					
Social Skills Questionnaire	42	74.6(11.3)	21	75.3(10.1)	$t(61) = -0.34$, $p = .814$
Social Competence Questionnaire	42	21.3(4.9)	21	22.7(4.1)	$t(61) = -1.13$, $p = .264$
Influence on Health Behaviour — Family Eating	42	13.4(3.5)	21	13.7(1.4)	$t(61) = -0.342$, $p = .737$
Influence on Health Behaviour — Family Exercise	42	12.1(4.0)	21	12.5(4.6)	$t(61) = 0.29$, $p = .771$
Family Functioning					
Parent–Adolescent Communication — Open	42	8.7(1.5)	21	8.2(1.5)	$t(61) = 1.35$, $p = .183$
Parent–Adolescent Communication — Problem	42	7.0(1.8)	21	6.0(2.1)	$t(61) = 1.86$, $p = .068$
Family Problem Solving Communincation — Affirming	42	10.7(2.7)	21	11.0(1.9)	$t(61) = -0.47$, $p = .641$
Family Problem Solving Communication — Incendiary	42	5.8(3.0)	21	6.0(2.5)	$t(61) = -0.38$, $p = .705$
Parenting Scale — Laxness	41	2.9(1.2)	19	3.0(0.9)	$t(58) = 0.05$, $p = .964$
Parenting Scale — Overreactivity	41	3.0(0.7)	19	3.4(0.6)	$t(58) = -2.19$, $p = .028$

Note: Eating Disorders Inventory – 2 (EDI-II).

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TABLE 3

Psychopathology, Psychosocial and Family Functioning Variables Post-Treatment and Maintenance Intention to Treat Descriptives and Analyses

	Post-treatment					Maintenance		
	Intervention		Control			Intervention		
Measure	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis	*n*	*M (SD)*	Statistical analysis
Adolescent Completed Psychopathology								
Automatic Thoughts Questionnaire	42	53.5(28.6)	20	40.40(10.02)	$F(1,61) = 0.03$, $p = .870$, partial $\eta^2 < .01$	42	53.8(27.6)	Wilks' $\lambda = 0.97$, $F(2, 40) = 0.64$, $p = .533$, partial $\eta^2 = .03$
Depression Anxiety Stress Scale — Depression	40	7.9(9.6)	21	4.2(5.9)	$F(1,60) = 0.44$, $p = .508$, partial $\eta^2 = .01$	40	8.1(9.7)	Wilks' $\lambda = 0.99$, $F(2, 38) = 0.26$, $p = .775$, partial $\eta^2 = .01$
Depression Anxiety Stress Scale — Anxiety	40	7.0(7.4)	21	6.8(6.0)	$F(1,60) = .1.56$, $p = .217$, partial $\eta^2 = .03$	40	7.4(6.9)	Wilks' $\lambda = 0.93$, $F(2, 38) = 1.52$, $p = .232$, partial $\eta^2 = .07$
Depression Anxiety Stress Scale — Stress	40	9.9(10.2)	21	7.7(7.3)	$F(1,60) = 1.40$, $p = .242$ partial $\eta^2 = .02$	40	11.0(10.1)	Wilks' $\lambda = 0.87$, $F(2, 38) = 3.0$, $p = .064$, partial $\eta^2 = .14$
Adolescent Dieting Scale	38	7.2 (4.6)	20	5.90(3.40)	$F(1,57) = 1.56$, $p = .216$, partial $\eta^2 = .03$	38	6.9(4.1)	Wilks' $\lambda = .74$, $F(2, 36) = 6.21$, $p = .005$, partial $\eta^2 = .26$
EDI-2 Drive for Thinness	41	5.3(5.2)	19	4.5(4.2)	$F(1,59) = 0.44$, $p = .510$, partial $\eta^2 = .01$	41	5.2(5.4)	Wilks' $\lambda = 0.97$, $F(2, 39) = 0.66$, $p = .520$, partial η^203
EDI-2 Bulimia	41	2.5(4.0)	19	2.6(3.9)	$F(1,59) < 0.01$, $p = .946$, partial $\eta^2 < .01$	41	2.7(4.0)	Wilks' $\lambda = 0.89$, $F(2, 39) = 2.49$, $p = .096$, partial $\eta^2 = .11$
EDI-2 Body Dissatisfaction	41	14.1(7.7)	19	13.8(7.2)	$F(1,59) = 0.79$ $p = .379$, partial $\eta^2 = .01$	41	14.4(7.7)	Wilks' $\lambda = 0.94$, $F(2, 39) = 1.28$, $p = .291$, partial$\eta^2 = .06$

TABLE 3

Continued

	Post-treatment					Maintenance		
	Intervention		Control			Intervention		
Measure	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis	*n*	*M (SD)*	Statistical analysis
EDI-2 Ineffectiveness	41	4.2(5.4)	19	2.3(2.3)	$F(1,59) = 0.60$, $p = .441$, partial $\eta^2 = .01$	41	4.4(5.4)	Wilks' $\lambda = 0.95$, $F(2, 39) = 0.97$, $p = .387$, partial $\eta^2 = .05$
EDI-2 Perfectionism	41	3.1(3.3)	19	3.4(3.1)	$F(1,59) < 0.01$, $p = .967$, partial $\eta^2 < .01$.	41	3.0(3.3)	Wilks' $\lambda = 0.88$, $F(2, 39) = 2.6$, $p = .088$, partial $\eta^2 = .12$
EDI-2 Interpersonal Distrust	41	3.4(3.6)	19	2.9(2.9)	$F(1,59) = 0.07$, $p = .788$, partial $\eta^2 < .01$	41	3.0(3.8)	Wilks' $\lambda = 0.98$, $F(2, 39) = 0.38$, $p = .689$, partial $\eta^2 = .02$
EDI-2 Interpersonal Awareness	41	3.4(5.7)	19	2.2(2.4)	$F(1,59) = 0.02$, $p = .893$, partial $\eta^2 < .01$	41	3.6(5.8)	Wilks' $\lambda = 0.95$ $F(2, 39) = 0.96$, $p = .393$, partial $\eta^2 = .05$
EDI-2 Maturity Fears	41	5.7(4.7)	19	5.4(4.2)	$F(1,59) = 0.02$, $p = .891$, partial $\eta^2 < .01$.	41	6.2(4.7)	Wilks' $\lambda = 0.89$, $F(2, 39) = 2.53$, $p = .092$, partial $\eta^2 = .12$
EDI-2 Asceticism	41	2.2(2.8)	19	1.4(1.6)	$F(1,59) = 0.19$, $p = .663$, partial $\eta^2 < .01$	41	2.1(2.5)	Wilks' $\lambda = 0.92$, $F(2, 39) = 1.81$, $p = .176$, partial $\eta^2 = .09$
EDI-2 Impulse Regulation	41	2.3(4.7)	19	0.42(0.84)	$F(1,59) = 14.81$, $p < .001$, partial $\eta^2 = .21$	41	2.3(4.2)	Wilks' $\lambda = 0.99$, $F(2, 39) = 0.02$, $p = .983$, partial $\eta^2 < .01$
EDI-2 Social Insecurity	41	4.2(4.0)	19	3.5(3.3)	$F(1,59) = .06$, $p = .809$, partial $\eta^2 < .01$	41	3.8(3,8)	Wilks' $\lambda = 0.98$, $F(2, 39) = 0.51$, $p = .607$, partial $\eta^2 = .03$

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TABLE 3

Continued

	Post-treatment					Maintenance		
	Intervention		Control			Intervention		
Measure	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis	*n*	*M (SD)*	Statistical analysis
					Psychosocial Functioning			
Rosenberg Self-esteem Scale	42	20.6(6.3)	21	19.2(4.7)	$F(1,62) = 1.73$, $p = .193$, partial $\eta^2 = .03$	42	20.2(6.4)	Wilks' $\lambda = 0.84$, $F(2, 40) = 3.96$, $p = .027$, partial $\eta^2 = .17$
Perceived Social Support Scale — Friend	41	13.7(5.5)	20	14.8(3.8)	$F(1,60) = 0.12$, $p = .734$, partial $\eta^2 < .01$	41	13.9(6.3)	Wilks' $\lambda = 0.94$ $F(2, 39) = 1.29$, $p = .286$, partial $\eta^2 = .06$
Perceived Social Support Scale — Family	41	13.1(6.1)	19	13.6(4.2)	$F(1,59) = 12.47$, $p = .001$, partial $\eta^2 = .18$	41	13.4(6.0)	Wilks' $\lambda = 0.89$, $F(2, 39) = 2.38$, $p = .106$, partial $\eta^2 = .11$
Influence on Health Behaviour — Family Eating	42	11,8(4.2)	20	11.3(4.3)	$F(1,61) = 0.46$, $p = .500$, partial $\eta^2 = .01$	42	12.3(4.1)	Wilks' $\lambda = 0.96$, $F(2, 40) = 0.86$, $p = .429$, partial $\eta^2 = .04$
Influence on Health Behaviour — Family Exercise	42	12.1(4.3)	20	10.8(3.6)	$F(1,61) = 0.43$, $p = .517$, partial $\eta^2 = .01$	42	13.0(4.5)	Wilks' $\lambda = 0.91$, $F(2, 40) = 2.00$, $p = .149$, partial $\eta^2 = .09$
Influence on Health Behaviour — Friend Eating	41	7.1(4.1)	20	7.3(3.3)	$F(1,60) = 0.25$, $p = .621$, partial $\eta^2 < .01$	41	6.9(3.7)	Wilks' $\lambda = 0.99$, $F(2, 39) = 0.21$, $p = .815$, partial $\eta^2 < .01$
Influence on Health Behaviour — Friend Exercise	41	7.9(4.4)	20	7.7(3.4)	$F(1,60) < 0.01$, $p = .999$, partial $\eta^2 < .01$	41	7.8(4.2)	Wilks' $\lambda = 0.98$, $F(2, 39) = 0.31$, $p = .733$, partial $\eta^2 = .02$
Social Skills Questionnaire	42	75.7(10.3)	20	77.3(7.4)	$F(1,61) = 0.14$, $p = .713$, partial $\eta^2 < .01$	42	76.7(9.2)	Wilks' $\lambda = 0.86$, $F(2, 40) = 3.33$, $p = .046$, partial $\eta^2 = .14$

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TABLE 3

Continued

	Post-treatment					Maintenance		
	Intervention		Control			Intervention		
Measure	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis	*n*	*M (SD)*	Statistical analysis
Social Competence Questionnaire	42	24.5(4.8)	20	26.3(3.3)	**$F(1,61) = 0.23$, $p = .630$, partial $\eta^2 = .01$**	42	24.7(4.8)	Wilks' $\lambda = 0.82$, $F(2, 40) = 4.29$, $p = .020$, partial $\eta^2 = .18$
Family Functioning								
Parent–Adolescent Communication — Open	41	8.0(2.6)	20	7.6(3.1)	$F(1,60) = 2.96$, $p = .091$, partial $\eta^2 = .05$	41	8.1(2.2)	Wilks' $\lambda = 0.97$, $F(2, 39) = 0.66$, $p = .525$, partial $\eta^2 = .03$
Parent–Adolescent Communication — Problem	41	5.0(2.6)	20	5.0(2.5)	$F(1,60) = 4.64$, $p = .035$, partial $\eta^2 = .07$	41	4.8(2.5)	Wilks' $\lambda = 0.95$, $F(2, 39) = 1.04$, $p = .364$, partial $\eta^2 = .05$
Family Problem Solving Communication—Affirming	40	9.4(3.8)	20	10.3(3.9)	$F(1,59) = 3.55$, $p = .065$, partial $\eta^2 = .06$	9.1(3.9)	9.5(4.0)	Wilks' $\lambda = 0.82$, $F(2, 38) = 4.23$, $p = .022$ partial $\eta^2 = .18$
Family Problem Solving Communication—Incendiary	40	6.8(3.2)	20	6.5(2.7)	$F(1,59) = 1.78$, $p = .188$, partial $\eta^2 = .03$	40	7.0(3.4)	Wilks' $\lambda = 0.94$, $F(2, 38) = 1.30$, $p = .285$, partial $\eta^2 = .06$
Parent Completed Psychosocial Functioning								
Social Skills Questionnaire	42	75.7(11.1)	21	76.2(9.7)	$F(1,62) < 0.01$, $p = .994$, partial $\eta^2 < .01$	42	75.9(11.9)	Wilks' $\lambda = 0.89$, $F(2, 40) = 2.37$, $p = .106$, partial $\eta^2 = .11$
Social Competence Questionnaire	42	21.5(5.1)	21	23.6(3.7)	$F(1,62) = 2.30$, $p = .135$, partial $\eta^2 = .04$	42	21.7(4.9)	Wilks' $\lambda = 0.91$, $F(2, 40) = 2.04$, $p = .143$, partial $\eta^2 = .09$

TABLE 3

Continued

	Post-treatment					Maintenance		
	Intervention		Control			Intervention		
Measure	*n*	*M (SD)*	*n*	*M (SD)*	Statistical analysis	*n*	*M (SD)*	Statistical analysis
Influence on Health Behaviour — Family Eating	42	13.9(3.1)	21	14.1(2.8)	$F(1,62) = 0.03$, $p = .866$, partial $\eta^2 < .01$	42	13.3(3.2)	Wilks' $\lambda = 0.89$, $F(2, 40) = 2.36$, $p = .107$, partial $\eta^2 = .11$
Influence on Health Behaviour — Family Exercise	41	12.8(4.1)	21	12.7(4.1)	$F(1,61) = 0.25$, $p = .618$, partial $\eta^2 < .01$	41	11.9(3.8)	Wilks' $\lambda = 0.89$, $F(2, 39) = 2.40$, $p = .104$, partial $\eta^2 = .11$
					Family Functioning			
Parent–Adolescent Communication — Open	42	9.0(1.3)	21	8.6(1.7)	$F(1,62) < 0.01$, $p = .998$, partial $\eta^2 < .01$	42	8.8(1.4)	Wilks' $\lambda = 0.91$, $F(2, 40) = 2.11$, $p = .135$, partial $\eta^2 = .10$
Parent–Adolescent Communication — Problem	42	6.9(2.1)	21	5.9(2.0)	$F(1,62) = 0.04$, $p = .850$, partial $\eta^2 < .01$	42	6.9(1.9)	Wilks' $\lambda = 0.97$, $F(2, 40) = 0.63$, $p = .536$, partial $\eta^2 = .03$
Family Problem Solving Communication— Affirming	42	10.6(2.4)	21	10.8(2.1)	$F(1,62) < 0.01$, $p = .949$, partial $\eta^2 < .01$	42	10.8(2.7)	Wilks' $\lambda = 0.96$, $F(2, 40) = 0.76$, $p = .473$, partial $\eta^2 = .04$
Family Problem Solving Communication— Incendiary	42	5.5(2.6)	21	5.1(2.2)	$F(1,62) = 2.21$, $p = .142$, partial $\eta^2 = .04$	42	5.8(3,2)	Wilks' $\lambda = 0.96$, $F(2, 40) = 0.85$, $p = .434$, partial $\eta^2 = .04$
Parenting Scale — Laxness	41	3.0(1.1)	19	3.0(0.78)	$F(1,59) = 0.05$, $p = .821$, partial $\eta^2 < .01$	41	3.0(1.1)	Wilks' $\lambda = 0.98$, $F(2, 39) = 0.45$, $p = .642$, partial $\eta^2 = .02$
Parenting Scale — Over-reactivity	41	2.9(0.8)	19	3.1(0.6)	$F(1,59) = 2.23$, $p = .141$, partial $\eta^2 = .04$	41	2.9(0.8)	Wilks' $\lambda = 0.99$, $F(2, 39) = 0.19$, $p = .831$, partial $\eta^2 = .01$

Note: Eating Disorders Inventory — 2 (EDI-II).

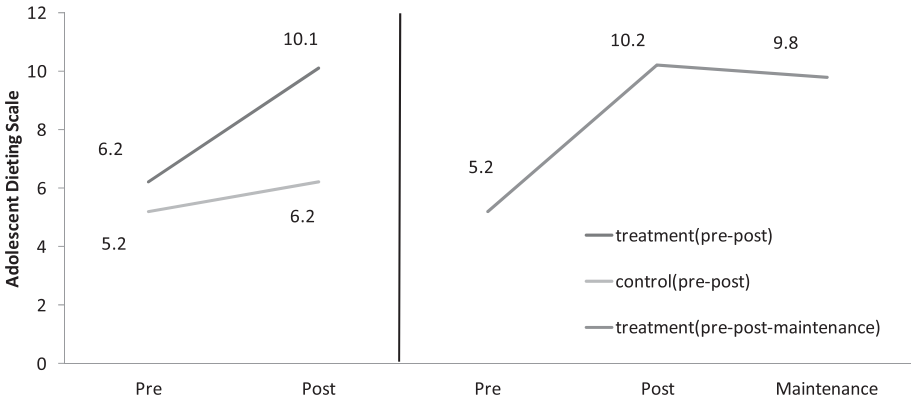

FIGURE 3

Adolescent Dieting Scale post-treatment and maintenance outcomes.

$\eta^2 = .12$, following treatment relative to the control condition. Analysis of pre-, post- and maintenance data for those in the treatment condition indicated that weight control behaviour increased significantly from pre- to post-treatment and remained higher at maintenance, Wilks' $\lambda = 0.23$, $F(2, 10) = 16.67$, $p < .001$, partial $\eta^2 = .77$. These results are displayed in Figure 3.

After controlling for pretreatment differences, the treatment and control condition did not differ in terms of obtained scores on any of the remaining psychopathology measures following treatment; ATQ, $F(1,30) = 0.12$, $p = .732$, partial $\eta^2 < .01$; DASS-D, $F(1,31) = 0.33$, $p = 0.573$, partial $\eta^2 = .01$; DASS-A, $F(1,31) = 2.66$, $p = .114$, partial $\eta^2 = .08$; DASS-S, $F(1,31) = 3.51$, $p = .071$, partial $\eta^2 = .11$.

Psychosocial Functioning

After controlling for pre-treatment differences, those in the intervention condition obtained significantly increased scores on the PSS-Fa scale, $F(1,29) = 10.96$, $p = .003$, partial $\eta^2 = .30$, following treatment relative to the control condition. Analysis of pre, post and maintenance data for those in the treatment condition indicated that the effect of treatment phase was not significant for the PSS-Fa, Wilks' $\lambda = .61$, $F(2, 11) = 3.59$, $p = .063$, partial $\eta^2 = .40$. These results are displayed in Figure 4.

After controlling for pretreatment differences, the treatment and control condition did not differ in terms of obtained scores on any of the remaining psychosocial measures following treatment; RSE, $F(1, 31) = 2.97$, $p = .096$, partial $\eta^2 = .09$; PSS-Fr, $F(1,29) = 0.02$, $p = .908$, partial $\eta^2 < .01$; FFHB-FaHE, $F(1, 30) = 0.45$, $p = .508$, partial $\eta^2 = .02$; or FFHB-FaPA, $F(1,30) = 0.72$, $p = .402$, partial $\eta^2 = .03$; FFHB-FrHE, $F(1, 29) = 0.36$, $p = .556$, partial $\eta^2 = .01$; FFHB-FrPA, $F(1,29) = 1.21$, $p = .281$, partial $\eta^2 = .04$; SSQ, $F(1,30) = 0.50$, $p = .487$, partial $\eta^2 = .02$; or SCQ, $F(1,30) = 0.02$, $p = .902$, partial $\eta^2 < .01$.

Family Functioning

After controlling for pretreatment differences, those in the intervention condition obtained significantly increased scores on the PAC-P, $F(1,29) = 5.45$, $p = .027$, partial $\eta^2 = .17$, following treatment relative to the control condition. Analysis of pre, post and maintenance data for those in the treatment

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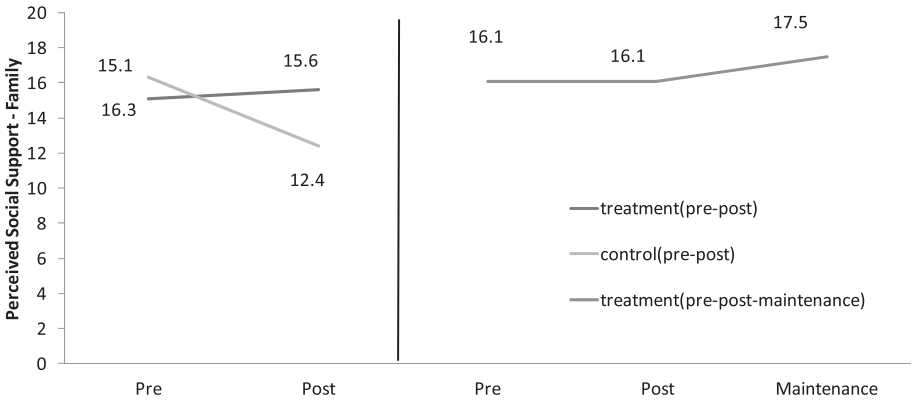

FIGURE 4

Perceived Social Support from Family Scale post-treatment and maintenance outcomes.

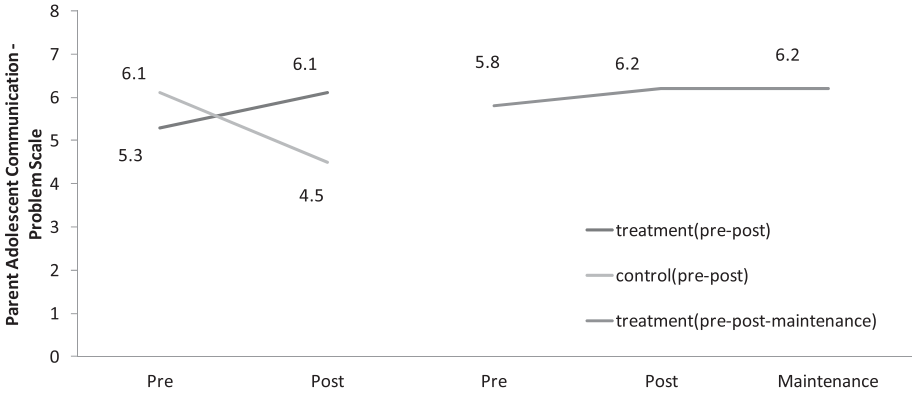

FIGURE 5

Parent Adolescent Communication Problem Scale post-treatment and maintenance outcomes.

condition indicated that the effect of treatment phase was not significant for the PAC-P, Wilks' $\lambda = .96$, $F(2, 11) = 0.23$, $p = .796$, partial $\eta^2 = .04$. These results are displayed in Figure 5.

After controlling for pretreatment differences, the treatment and control condition did not differ in terms of obtained scores on the remaining family functioning measures following treatment; PAC-O, $F(1,29) = 2.31$, $p = .140$, partial $\eta^2 = .08$; FPSC-A, $F(1,28) = 3.25$, $p = .083$, partial $\eta^2 = .11$; FPSC-I, $F(1,28) = 2.05$, $p = .164$, partial $\eta^2 = .07$.

Parent Completed Measures

Adolescent Psychosocial Functioning

After controlling for pretreatment differences, parents in the treatment and control condition did not differ in terms of obtained scores on any parent reported measures

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TABLE 4

Descriptive Statistics for Consumer Satisfaction Items

Item	Adolescent *M (SD)*	Parent *M (SD)*
1. Satisfaction with Quality of Service	4.71 (0.47)	4.25 (0.62)
2. Program met needs	4.06 (0.75)	4.08 (0.67)
3. Recommend to others	4.35 (0.79)	4.25 (0.75)
4. Return to the program if needed	3.81 (1.05)	3.75 (1.14)
5. Now able to deal more effectively with concerns	4.06 (0.56)	4.08 (0.79)
6. Able to focus on my concerns	4.00 (0.35)	3.92 (0.51)
7. Clinician listened to me	4.24 (0.56)	4.08 (0.79)
8. Involved in treatment planning/decision making	4.29 (0.47)	4.33 (0.65)
9. Clinician provided adequate explanations	4.41 (0.62)	4.50 (0.67)
10. Clinician was not negative towards us	4.59 (1.00)	4.50 (0.67)
11. Clinician knew what she was talking about	4.71 (0.47)	4.33 (0.78)
12. Clinician was friendly and warm	4.64 (0.49)	4.33 (0.78)
13. Felt free to express myself	4.41 (0.80)	4.17 (0.65)
14. Clinician understood my thoughts and feelings	4.25 (0.86)	4.17 (0.72)

of adolescent psychosocial functioning following treatment; the SSQ, $F(1,32) = 0.75$, $p = .394$, partial $\eta^2 = .02$; SCQ, $F(1,32) = 7.51$, $p = .344$, partial $\eta^2 = .03$; FFHB-FaHE, $F(1,32) = 0.25$, $p = .619$, partial $\eta^2 = .01$; FFHB-FaPA, $F(1,31) = 1.23$, $p = .276$, partial $\eta^2 = .04$.

Family Functioning

After controlling for pretreatment differences, parents in the treatment and control condition did not differ in terms of obtained scores on and parent reported measures of family functioning following treatment; PAC-O, $F(1,32) = 0.28$, $p = .602$, partial $\eta^2 = .01$; PAC-P, $F(1,32) = 0.03$, $p = .877$, partial $\eta^2 < .01$; FPSC-A, $F(1,32) = 0.23$, $p = .634$, partial $\eta^2 = .01$; FPSC-I, $F(1,32) = 0.21$, $p = .655$, partial $\eta^2 = .01$; PS-L, $F(1,30) = 0.20$, $p = .657$, partial $\eta^2 = .01$; PS-O, $F(1,30) = 0.18$, $p = .672$, partial $\eta^2 = .01$.

Treatment Acceptability

Consumer satisfaction questionnaires were returned by 71% of adolescent and 50% of parent intervention completers. All respondents indicated that they made some progress as a result of participating in the program. Adolescents reported an average overall progress rating of 4.06 (0.68) with 19% reporting some progress, 56% reporting considerable progress, and 25% reporting a great deal of progress. Parents reported an average overall progress rating of 3.75 (0.87) with 50% reporting some progress, 25% reporting considerable progress and 25% reporting a great deal of progress. No adolescents or parents reported that the problem did not change or that it got worse. Descriptive statistics for parent and adolescent responses on individual items are displayed in Table 4.

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Discussion

This study aimed to explore the impact of the CHOOSE HEALTH Program on psychosocial wellbeing in overweight and obese adolescents. Psychosocial outcomes were of interest for two reasons. The first was to ensure that treatment did not have a detrimental effect on adolescent or parent psychosocial wellbeing, and the second was to assess the impact of treatment on promoting improved psychosocial functioning in treatment seeking overweight and obese adolescents.

Treatment did not impact on adolescent depression, anxiety, or stress. This finding indicates that treating adolescent overweight and obesity in a supportive setting does not result in increased adolescent general psychopathology. While adolescent psychopathology was not significantly influenced by treatment participation, the measurement of these factors in adolescent weight loss interventions continues to be important. Six adolescents (10%) in the treatment sample were referred to specialist services for assistance in the management of anxiety, depression, disordered eating and/or family difficulties. This figure is considerably higher than the 3.6% of Australian adolescents identified as having clinical levels of psychopathology (Sawyer et al., 2000). This outcome highlights the importance of assessment and detection of psychopathology in adolescents participating in weight loss interventions as treatment outcomes may be improved if deficits can be identified and interventions can be modified or supplemented to address these barriers. Future research is needed to determine the optimum combination of interventions for adolescents requiring weight loss and psychological intervention. It may be that psychopathology needs to be addressed prior to weight loss intervention, or that the two can be addressed separately but concurrently, or that a combined weight loss and psychopathology intervention is most effective. Future research should also explore the usefulness of psychosocial wellbeing in predicting adolescent overweight and obesity treatment completion, adherence and outcomes.

Treatment resulted in increased weight control behaviour, which was sustained at maintenance. Weight control behaviour among normal weight adolescents is linked to increased risk of psychopathology (Pesa, 1999). However, non-extreme weight control behaviours is recommended for overweight and obese adolescents and is not associated with negative outcomes (Reilly & Wilson, 2006). This is supported by findings of the current study, indicating that disordered eating symptomatology did not increase as a result of treatment, despite increases in weight control behaviours.

Food-related disinhibition and poor impulse control are more prevalent among the overweight and obese (Gallant et al., 2010), and are associated with poorer treatment outcomes (Dalle Grave, Calugi, Corica, Di Domizio, & Marchesini, 2009). Thus, improvements in impulse regulation evident in the current study are promising. There were no other differences in eating disorder symptomatology, namely, drive for thinness, body dissatisfaction, bulimia, ineffectiveness, perfectionism, interpersonal distrust, interpersonal awareness, maturity fears, asceticism, or social insecurity. Given the high prevalence of disordered eating in the overweight and obese, and the associated negative psychosocial consequences, future research should explore disordered eating in overweight and obese adolescents, particularly in those seeking treatment.

These findings indicate that participation in a weight loss intervention did not increase disordered eating in overweight and obese adolescents. These results are consistent with adult research, indicating that comprehensive multifaceted weight loss interventions do not lead to increases in disordered eating, and may in fact reduce

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eating psychopathology (Wadden, Womble, Stunkard, & Anderson, 2002; Yanovski, 2002). This finding has important implications for health promotion as many parents in the current program reported that fears of causing disordered eating had prevented or delayed them seeking weight loss intervention for their adolescent.

Adolescents in the treatment and control conditions did not differ in terms of self-esteem. Similarly, treatment did not result in changes in adolescent reported family and friend support for healthy eating and physical activity or parent reported family support for healthy eating and physical activity. Improvements were not evident in parent or adolescent reported social skills or social competence. However, adolescents participating in the intervention reported significant improvements in the social support they received from their family. These findings suggest that providing parents with specific strategies to support adolescent behaviour change improves their ability to provide more general social support to their adolescent. Perceived family support has been identified as a protective factor for adolescents (Department of Health and Ageing, 2004b; Sawyer et al., 2000) and is associated with adolescent coping and wellbeing (Jackson et al., 1998), and is therefore likely to be associated with improved treatment outcomes and psychosocial wellbeing.

Treatment resulted in statistically significant improvements in adolescent reported problem communication. This finding suggests that joint parent and adolescent participation in an adolescent weight loss intervention may result in improved parent adolescent communication and problem solving from the adolescent's perspective. This is consistent with the previously discussed finding that adolescents receiving treatment perceived improvements in social support from their family. Improved communication and problem solving may be expected as parents and adolescents negotiate the individual and family changes required to improve eating and physical activity habits with the support of the clinician. Given the importance of parents in supporting adolescent behaviour change (Dishion & McMahon, 1998; Sanders, 1999), adolescent weight loss treatments may be improved by the inclusion of strategies to improve parent–adolescent communication.

All respondents returning consumer satisfaction questionnaires indicated that they made some progress, and the majority made considerable progress or a great deal of progress as a result of participating in the program. Individual ratings of aspects of the treatment program and the treating clinician were also high. These results indicate that both adolescents and parents who completed the CHOOSE HEALTH Program found it highly acceptable. A number of adolescents and parents did not return consumer satisfaction questionnaires. It may be that these participants were less satisfied with the intervention, therefore future research should attempt to improve response rates to consumer satisfaction questionnaires.

While the current study addresses many limitations of previous research, several additional methodological issues are acknowledged. The requirement that participants allocated to the wait-list condition be offered treatment immediately following the treatment period prevented long-term comparisons between the treatment and control conditions. Measurement of long-term outcomes of overweight and obesity treatment programs is essential as maintenance of treatment effects is generally poor (Oude Luttikhuis et al., 2008). Future research must consider alternative techniques to allow for evaluation of the long-term effects of adolescent weight loss interventions.

As the sample was recruited from the community, results may not generalise to adolescents seeking treatment in medical or community health settings. Research suggests that adolescent and parents recruited for research have fewer comorbidities

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than those clinically referred for treatment (Kazdin, 2003). It is possible that the noncompleters differed from the completers in important ways, and consequently results are not representative of those obtained had the entire sample completed all assessments. Results from completer analysis were, however, consistent with intention-to-treat results, providing support for the validity of completer analyses.

Limited data were available to inform an a priori power analysis for the current study. While the study was sufficiently powered to detect treatment effects on primary outcome variable body composition (Brennan et al., 2008) it was likely insufficiently powered to detect treatment impact on psychosocial factors as evidenced by a number of nonsignificant positive trends. The drop-out rate, combined with the incomplete questionnaire data, further reduced the sample size and statistical power of the current study. Future studies should explore psychosocial factors in larger samples. Future research should also include more comprehensive measurement of weight specific psychopathology and consider the impact of intervention on these weight specific difficulties. Methods to improve retention and promote more complete data completion are also required.

This study aimed to explore the impact of the CHOOSE HEALTH Program on psychosocial wellbeing in overweight and obese adolescents. Treatment did not have detrimental effects on psychopathology, psychosocial functioning, or family functioning. Parents and professionals can be assured that a comprehensive, multifaceted parent-supported intervention for overweight and obese adolescents does not cause psychological harm. Further, treatment resulted in significant improvements in impulse regulation, a factor implicated in the development of eating disorders. Adolescents receiving treatment reported improvements in social support from their family, and there was some evidence of improved parent-adolescent communication and problem solving.

Disclosures

LB developed and delivered the CHOOSE HEALTH program and was responsible for design and conceptualisation of the study, data analysis and interpretation and manuscript preparation.

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This study was conducted as part of LB's PhD program. LB developed and delivered the intervention; she was responsible for design and conceptualisation of the study, data analysis and interpretation and manuscript preparation. RW and JW were LB's research supervisors and provided feedback on the manuscript. LB was funded by a RMIT Postgraduate Award and a VicHealth Postgraduate Scholarship. Thank you to Kylie Murphy for reviewing and editing the final version of the manuscript.

References

Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.W., & Swinson, R.P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales (DASS) in clinical groups and a community sample. *Psychological Assessment*, *10*, 176–181.

Arnold, D.S., O'Leary, S.G., Wolf, L.S., & Acker, M.M. (1993). The Parenting Scale: A measure of dysfunctional parenting in discipline situations. *Psychological Assessment*, *5*(2), 137–144.

Barnes, H., & Olsen, D. H. (1982). Parent-adolescent communication. In D.H. Olson, H.I. McCubbin, H.L. Barnes, A.S. Larsen, M.J. Muxen & M.C. Wilson (Eds.), *Family inventories: Inventories*

https://doi.org/10.1017/bec.2012.5 Published online by Cambridge University Press

used in a national survey of families across the family lifespan (pp. 33–48). St Paul, MI: Family Social Sciences, University of Minnesota.

Barnes, H.L., & Olson, D.H. (1985). Parent-adolescent communication and the Circumplex model. *Child Development*, *46*, 438–447.

Brennan, L. (2006). *Cognitive behavioural evaluation and treatment of adolescent overweight and obesity*. Melbourne, Australia: RMIT University.

Brennan, L., Walkley, J., Fraser, S., F, Greenway, K., & Wilks, R. (2008). Motivational interviewing and cognitive behaviour therapy in the treatment of adolescent overweight and obesity: Study design and methodology. *Contemporary Clinical Trials*, *29*, 359–375.

Brennan, L., Walkley, J., Lukeis, S., Risteska, A., Archer, L., Digre, E., & Greenway, K. (2009). A cognitive behavioural intervention for overweight and obese adolescents illustrated by four case studies. *Behaviour Change*, *26*(3), 190–213.

Brennan, L., Walkley, J., Wilks, R., Fraser, S.F., & Greenway, K. (in press). Physiological and behavioural outcomes of a randomised controlled trial of a cognitive behavioural lifestyle intervention for overweight and obese adolescents. *Obesity Research and Clinical Practice*. http://dx.doi.org/10.1016/j.orcp.2012.02.010

Brown, T.A., Chorpita, B.F., Korotitsch, W., & Barlow, D.H. (1997). Psychometric properties of the Depression Anxiety Stress Scales (DASS) in clinical samples. *Behaviour Research and Therapy*, *35*, 79–89.

Chandarana, P., Holliday, R., Conlon, P., & Deslippe, T. (1988). Psychosocial considerations in gastric stapling surgery. *Journal of Psychosomatic Research*, *32*(1), 85–92.

Cole, T.J., Bellizzi, M.C., Flegal, K.M., & Dietz, W.H. (2000). Establishing a standard definition for child overweight and obesity worldwide: International survey. *BMJ*, *320*, 1240–1243.

Dalle Grave, R., Calugi, S., Corica, F., Di Domizio, S., & Marchesini, G. (2009). Psychological Variables Associated with Weight Loss in Obese Patients Seeking Treatment at Medical Centers. *Journal of the American Dietetic Association*, *109*(12), 2010–2016.

Department of Health and Ageing. (2004a). *Australia's physical activity recommendations for 12–18 year olds*. Canberra, Australia: Commonwealth of Australia.

Department of Health and Ageing. (2004b). *Responding to the mental health needs of young people in Australia. Discussion paper: principles and strategies*. Canberra, Australia: Commonwealth of Australia.

Dishion, T.J., & McMahon, R.J. (1998). Parental monitoring and the prevention of child and adolescent problem behavior: A conceptual and empirical formulation. *Clinical Child and Family Psychology Review*, *1*(1), 61–75.

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G * Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behaviour Research and Therapy*, *39*(2), 175–191.

Gallant, A.R., Tremblay, A., Pérusse, L., Bouchard, C., Després, J.-P., & Drapeau, V. (2010). The Three-Factor Eating Questionnaire and BMI in adolescents: Results from the Québec Family Study. *British Journal of Nutrition*, doi:10.1017/S0007114510001662

Garner, D.M. (1990). *Eating Disorder Inventory — 2. Professional manual*. Odessa, FL: Psychological Assessment Resources.

Garner, D.M., Olmstead, M.P., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*(2), 15–34.

Gavazzi, S.M. (1994). Perceived social support from family and friends in a clinical sample of adolescents. *Journal of Personality Assessment*, *62*(3), 465–471.

Hollon, S.D., & Kendall, P.C. (1980). Cognitive self-statements in depression: Development of an Automatic Thoughts Questionnaire. *Cognitive Therapy and Research*, *4*(4), 383–395.

Irvine, A.B., Biglan, A., Smolkowski, K., & Ary, D.V. (1999). The value of the Parenting Scale for measuring the discipline practices of parents of middle school children. *Behaviour Research and Therapy*, *37*, 127–142.

Jackson, S., Bijstra, J., Oostra, L., & Bosma, H. (1998a). Adolescents' perceptions of communication with parents relative to specific aspects of relationships with parents and personal development. *Journal of Adolescence*, *21*, 305–322.

Kazdin, A.E. (2003). Psychotherapy for children and adolescents. *Annual Review of Psychology*, *54*, 253–276.

Leske, J.S., & Jiricka, M.K. (1998). Impact of family demands and family strengths and capabilities on family well-being and adaptation after critical injury. *American Journal of Critical Care*, *7*(5), 383–392.

Lobstein, T., Baur, L., & Uauy, R. (2004). Obesity in children and young people: A crisis in public health. *Obesity Reviews*, *5*(Suppl. 1), 4–104.

Lovibond, S.H., & Lovibond, P.F. (1995). *Manual for the Depression Anxiety Stress Scale* (2nd ed.). Sydney, Australia: Psychology Foundation.

Lyons, J.S., Perrotta, P., & Hancher-Kvam, S. (1988). Perceived social support from family and friends: Measurement across disparate samples. *Journal of Personality Assessment*, *52*(1), 42–47.

McCarthy, J.D., & Hoge, D.R. (1982). Analysis of age effects in longitudinal studies of adolescent self-esteem. *Developmental Psychology*, *18*, 372–379.

McCubbin, M.A., McCubbin, H.I., & Thompson, A.I. (1988). Family problem solving communication (FPSC). In H.I. McCubbin, A.I. Thompson, & M.A. McCubbin (Eds.), *Family assessment: Resiliency, coping, and adaptation — Inventories for research and practice* (pp. 639–686). Madison, WI: University of Wisconsin System.

National Health and Medical Research Council. (2003). *Clinical practice guidelines for the management of overweight and obesity in children and adolescents*. Canberra, Australia: National Health and Medical Research Council.

Oude Luttikhuis, H., Baur, L., Jansen, H., Shrewsbury, V., O'Malley, C., Stolk, R., & Summerbell, C.D. (2008). Interventions for treating obesity in children. *Cochrane Database of Systemic Reviews*, (3), CD001872. doi: 10.1002/14651858.CD001872.

Patton, G., Selzer, R., Coffey, C., Carlin, J.B., & Wolfe, R. (1999). Onset of adolescent eating disorders: Population based cohort study over 3 years. *British Medical Journal*, *318*(7186), 765–768.

Patton, G.C., Carlin, J.B., Shao, Q., Hibbert, M.E., Rosier, M., Selzer, R., & Bowes, G. (1997). Adolescent dieting: Healthy weight control or borderline eating disorder? *Journal of Child Psychology and Psychiatry*, *38*(3), 299–306.

Pesa, J. (1999). Psychosocial factors associated with dieting behaviors among female adolescents. *Journal of School Health*, *69*(5), 196–201.

Procidano, M.E., & Heller, K. (1983). Measures of perceived social support from friends and from family: Three validation studies. *American Journal of Community Psychology*, *11*(1), 1–24.

Redding, C.A., Rossi, J.S., Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., ... Rossi, S.F. (1999). Measures of family influence on healthy behavior changes in parents of adolescents [Abstract]. *Annals of Behavioral Medicine*, *21*, S174.

Reilly, J.J., & Wilson, D. (2006). Childhood obesity. *BMJ*, *333*(7580), 1207–1210. doi: 10.1136/bmj.39048.503750.BE

Rosen, K.C., Silberg, N.T., & Gross, J. (1988). Eating Attitudes Test and Eating Disorder Inventory: Norms for adolescent girls and boys. *Journal of Consulting and Clinical Psychology*, *56*, 305–308.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Sanders, M.R. (1999). The Triple P-Positive Parenting Program: Towards an empirically validated multi-level parenting and family support strategy for the prevention and treatment of child behavior and emotional problems. *Clinical Child and Family Psychology Review*, *2*, 71–90.

Sawyer, M.G., Arney, F.M., Baghurst, P.A., Clark, J.J., Graetz, B.W., Kosky, R.J., ... Zubrick, S.R. (2000). *Mental Health of Young People in Australia. Child and adolescent component of the National Survey of Mental Health and Well-being: Mental Health and Special Programs Branch*. Canberra, Australia: Commonwealth Department of Health and Aged Care.

https://doi.org/10.1017/bec.2012.5 Published online by Cambridge University Press

Shore, R.A., & Porter, J.E. (1990). Normative and reliability data for 11 to 18 year olds on the Eating Disorder Inventory. *International Journal of Eating Disorders*, 9(2), 201–207.

Smith, A., Kellett, E., & Schmerlaib, Y. (1998). *The Australian guide to healthy eating*. Canberra, Australia: Commonwealth of Australia.

Spence, S.H. (1995). Social skills training with children and adolescents. Berkshire, UK: Nfer-Nelson.

Stice, E., Cameron, R.P., Killen, J.D., Howard, C., & Taylor, C.B. (1999). Naturalistic weight reduction efforts prospectively predict growth in relative weight and onset of obesity among adolescent females. *Journal of Consulting and Clinical Psychology*, *67*, 967–974.

Summerbell, C.D., Achton, V., Campbell, K.J., Edmunds, L., Kelly, S., & Waters, E. (2003). Interventions for treating obesity in children. *Cochrane Database of Systematic Reviews* (3), CD001872. doi: 10.1002/14651858.CD001872.

Wadden, T.A., Womble, L.G., Stunkard, A.J., & Anderson, D.A. (2002). Psychosocial consequences of obesity and weight loss. In T.A. Wadden & A.J. Stunkard (Eds.), *Handbook of Obesity Treatment* (pp. 144–169). New York: Guilford Press.

Yanovski, S.Z. (2002). Binge eating in obese persons. In C.G. Fairburn & K.D. Brownell (Eds.), *Eating disorders and obesity. A comprehensive handbook*. (2nd ed., pp. 403–407). New York: Guilford Press.

Zeller, M., Kirk, S., Claytor, R., Khoury, P., Grieme, J., Santangelo, M., & Daniels, S. (2004). Predictors of attrition from a pediatric weight management program. *Journal of Pediatrics*, *144*, 466–470.

https://doi.org/10.1017/bec.2012.5 Published online by Cambridge University Press