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Successful weight loss initiation and maintenance among adolescents with overweight and obesity: Does age matter?

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Abstract

Background—Treatments for adolescents with overweight/obesity demonstrate mixed success, which may be due to a lack of consideration for developmental changes during this period. Potential developmental differences in weight loss motivations, weight maintenance behaviors, and the role of parents in these efforts were examined in a sample of successful adolescent weight losers.

Methods—Participants enrolled in the Adolescent Weight Control Registry ($n = 49$) self-reported demographic information and weight history, reasons for weight loss and weight control, weight loss approach and weight maintenance strategies, and perceived parental involvement with weight loss. Associations between age at weight loss initiation and the aforementioned factors were examined using linear and generalized regressions, controlling for highest z-BMI and sex.

Results—Adolescents who were older (≥ 16 years) at their weight loss initiation were more likely to report losing weight on their own (37.5% vs. 75%, $p = .01$) and reported greater responsibility for their weight loss and weight loss maintenance ($p < .001$) compared to younger adolescents. Younger age at weight loss initiation was associated with greater parental involvement ($p = .005$), whereas older age was associated with greater adolescent responsibility for the decision to lose weight ($p = .002$), the weight loss approach ($p = .007$), and food choices ($p < .001$).

Conclusions—Findings suggest the importance of considering developmental differences in responsibility for weight loss and maintenance among adolescents with overweight/obesity.

Keywords

adolescence; weight loss; motivation; parents; overweight; obesity

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Conflicts of Interest

No competing financial interests exist.

Introduction

The prevalence of obesity among adolescents in the United States remains alarmingly high. Data from the National Health and Nutrition Examination Survey (NHANES) indicate that approximately 20.5 percent of adolescents have a BMI ≥ 95th%, and four to six percent struggle with severe obesity.^{1,2} Efforts to develop effective weight control interventions specific to adolescents demonstrate mixed success, with considerable variability in outcomes.³ While interventions with school-age children support strong parental involvement^{4–6}, parents' ideal role in adolescent weight control interventions remains unclear.^{7,8} Further, few studies have documented long-term weight loss maintenance among adolescents^{3,7} resulting in the continuance of adolescent obesity into adulthood.

Adolescents who have successfully lost weight provide an important source of information regarding effective weight control strategies. Existing research supports behavioral strategies for weight loss including increased dietary and weight monitoring, increased physical activity, and decreased sedentary behavior, as well as increased consumption of fruits and vegetables and decreased consumption of fast food.^{9–12} Findings also suggest that adolescents with overweight/obesity may engage in unhealthy weight control behaviors, which may be associated with decreased weight loss success^{11,12} or weight gain over time.^{13,14} While informative, these studies do not document factors that may be associated with adolescents' decisions to initiate weight loss and maintain those efforts.

Weight control research typically treats adolescence as a homogenous age group, despite significant psychological, cognitive, and physical changes across this developmental period. This approach minimizes important developmental differences that may impact factors that prompt initial weight loss, as well as behavior changes that contribute to weight loss and maintenance. Indeed, developmental theory and literature demonstrate important age-related differences in cognitive¹⁵ and social functioning¹⁶, as well as the development of identity and autonomy¹⁷, all of which are salient to adolescents' health behavior decisions. Although age differences may be relevant to adolescents' weight loss initiation and maintenance, age rarely is considered in the context of adolescents' success.

Developmental changes also are relevant to parents' role in adolescents' weight loss efforts. The extent to which a teen is autonomous likely impacts parental perception of responsibility in the process, as well as the extent to which youth are willing to accept parental help. Inconsistent findings regarding parental involvement in adolescents' weight loss success may be due to ignoring developmental differences between younger (e.g., 13 year old) and older adolescents (e.g., 17 year old). Extrapolating from the broader developmental literature, younger adolescents may be more likely to report, and benefit from, greater parental involvement in their weight loss efforts than older adolescents.

Work from several qualitative studies provides preliminary evidence of the importance of age differences in adolescents' weight loss efforts.^{18–21} In two studies with successful adolescent and young adult weight losers, participants noted that weight loss primarily was self-initiated.^{18,21} Further, some noted that their weight-related concerns and/or desire to

lose weight increased as they aged, which they attributed to a general increase in maturity and acceptance of responsibility for their weight status.²¹ Two other studies suggest that as teens age and the teen-parent dynamic changes, the responsibility for the teen's weight status shifts, with teens reporting increased self-blame and parents accepting less responsibility.^{19,20} These studies provide important insights into developmental differences related to adolescents' weight loss and maintenance motivations, as well as the role of parents in these efforts.

Despite the contribution of this qualitative research, no age-related inferences can be made. Thus, the current work is a quantitative analysis of data collected in the context of a qualitative study with successful adolescent weight losers.¹⁸ Specifically, age was examined as a predictor of motivations for initial weight loss, behaviors contributing to weight maintenance, and the role of parents in weight loss and maintenance efforts. It was hypothesized that adolescents who were older (i.e., 16 years old) at their highest weight – i.e., the age at which they initiated successful weight loss – would report more health-focused weight loss triggers, motivations, and weight maintenance behaviors than younger adolescents (< 16 years old), and less parental involvement in their weight loss and maintenance.

Materials and Methods

Participants

The study sample included 49 adolescents enrolled in the Adolescent Weight Control Registry (AWCR), a national observational survey of long-term maintenance of weight loss among adolescents. Participants were recruited using social media, fliers posted in community locations, and through national and local media coverage of the AWCR. Inclusion criteria included (1) aged 14–20 years, (2) met criteria for overweight or obesity during adolescence, and (3) achieved and maintained a weight loss of 10 lbs for at least one year while they were adolescents (i.e. between the ages of 13 and 18 years). Adolescents were excluded if their (1) current BMI was < 5th percentile for their age and sex or (2) highest weight did not meet criteria for overweight/obesity (> 85th BMI percentile for ages 13–18 years).

Procedure

After initiating contact with study staff to determine eligibility, informed consent documents were mailed to participants. Parental consent and adolescent assent were obtained for participant's < 18 years; individuals 18 and older provided their own consent to participate. Participants who received consent and provided assent to participate completed questionnaires either in hard copy or via an online survey. Weight loss documentation through health provider confirmation, parental confirmation, or through photographs was required for participation. Participants received a \$20.00 check or gift card upon completion of the study. Institutional review boards at The Miriam Hospital and Brigham Young University approved all study procedures. Data from the qualitative portion of this study are published elsewhere.¹⁸

Measures

Participants answered a series of questions that were adapted from the National Weight Control Registry²² and provided standard demographic information.

Demographic information and weight history—Sociodemographic information and weight history (i.e., current weight and height, lifetime maximum weight and height at that time, duration of weight loss maintenance, age at highest weight) were self-reported. Adolescents' self-reported weight is supported as sufficiently reliable and valid.²³ Age- and sex-specific BMI z-scores were calculated using CDC growth charts.²⁴ Z-BMI scores were created for participants who aged out of the CDC growth charts following previous approaches used to bridge youth and adult BMI norms.²⁵ Adult z-BMI was calculated using data from NHANES I and II, which are the same data from which the CDC growth charts were created.²⁶ Youth z-BMI cut-offs for overweight, obesity, and healthy weight are based on corresponding adult BMI cut-offs, thus interpretation of adult and youth z-BMI scores are compatible.^{27–29}

Participants were categorized into those who were older at weight loss initiation (≥ 16 years old) versus younger at weight loss initiation (< 16 years old) based on self-reported age at highest weight.

Triggers for Successful Weight Loss Effort and Reasons for Weight Control—

Specific weight loss triggers were assessed using questions developed for the National Weight Control Registry.³⁰ Participants indicated whether there was a trigger to their weight loss efforts (yes/no). If participants responded “yes”, they selected which of seven specific events triggered their weight loss efforts, including seeing an image they did not like, reaching their highest weight, an anticipated change in life circumstance (i.e. moving to college), medical concerns, availability of a specific weight loss program, inspiration from others, and emotional concerns.

Twelve questions focused on more general reasons for weight loss. Reasons were divided into positive self-motivated (6 items; e.g., “Because I feel that I want to take responsibility for my own health.”), negative self-motivated (2 items; e.g., “Because I would feel guilty or ashamed of myself if I did not try to control my weight.”), and other-motivated (4 items; “Because I feel pressure from others to do so.”). Items were mean scored within each motivation category; positive self-motivated, negative self-motivated, and other-motivated reasons for weight control demonstrated acceptable internal consistency ($\alpha = .86, .82, .76$, respectively).

Weight Loss Maintenance Strategies—Participants were asked to identify which of 17 different strategies they employed to *maintain* their weight loss (yes/no). Behaviors were categorized into self-monitoring behaviors (counting calories, counting fat grams, weighing regularly), healthy weight control behaviors (exercise, eating fewer sweets, eating less fat, drinking less soda, eating smaller portions, increasing fruit/vegetable intake, choosing low calorie/low fat foods), and unhealthy weight control behaviors (skipping meals, fasting, smoking, using diet pills or laxatives, vomiting). Skipping meals and fasting were included in the unhealthy weight control category for two reasons. First, the expert committee

recommendations for weight loss strategies with pediatric populations include caloric restriction and regular meal consumption.³¹ Second, there is a robust literature documenting that meal skipping and fasting are associated with poorer diet quality,³² higher BMI,³³ greater body fat,³⁴ and disordered eating behaviors among adolescents.³⁵ The number of behaviors endorsed was summed within each behavior category. Due the high percentage of participants endorsing exercise (98%), exercise was excluded from the healthy behaviors composite in analyses.

Perceived Parental Involvement with Weight Control Effort—The original parent-report version of the Child Feeding Questionnaire (CFQ)³⁶ was modified to assess teens' perceptions of their parents' concerns, and feeding and exercise practices. Item wording was revised to capture adolescents' perceptions of their parents' concerns and behaviors, and six items were added to assess perception of parent support for teens' physical activity for a total of 22 items. Eighteen of these items focused on perception of parental behaviors (e.g., “How often does your parent decide what your portion sizes are?” “My parent offers to provide opportunities for me to exercise (e.g., giving rides, enrollment in team sports, gym memberships, etc.”)). These items were rated on one of two 5-point likert scales, depending on the phrasing of the question: *1 = never* to *5 = always* or *1 = disagree* to *5 = agree*, and averaged, with higher scores indicating perceptions of greater behavioral parental involvement ($\alpha = .73$).

Four additional items were used to assess adolescents' perceptions of responsibility for: (1) the decision to lose weight; (2) weight loss strategies; (3) types of food consumed; and (4) exercise at the time of adolescents' initial weight loss. Items were rated on a five point scale from *1 = mostly parent*, *3 = parent and teen shared equally*, and *5 = mostly teen*. These four items were averaged with higher scores indicating teens took primary responsibility for the weight loss behaviors ($\alpha = .76$).

Statistical Analyses

All statistical testing was done using SAS 9.4 (SAS Institute, Cary, NC) at an alpha level of .05. Independent samples *t*-tests and chi-squared tests were used to compare demographics and constructs of interest between participants who were younger (< 16 years) and older (≥ 16 years) at their age of highest weight. Controlling for highest z-BMI and gender, robust linear regression and generalized linear models were used to estimate the associations between age at highest weight (centered) and factors associated with initiation and maintenance of weight loss, and parents' role in teens' weight loss.

Results

Differences by Age at Highest Weight (Table 1)

Participants average age was approximately 18 years and the sample primarily comprised of Caucasian females. There was a small to medium effect of gender such that there were more females who were older at their highest weight (92.0%) compared to younger (70.8%; $d = .27$). Participants who were older at their highest weight reported highest lifetime z-BMIs

that were significantly lower than those of participants who were younger ($p = .007$, $d = .81$). There were no significant differences in participants' current z-BMI ($p = .74$, $d = .09$).

The majority of participants endorsed a specific weight loss trigger (~80%), with the most common trigger being appearance dissatisfaction (24–30%), followed by a major lifestyle change (e.g., starting college; 21–29%). The most common weight loss strategy was losing weight on their own, followed by engaging in a commercial weight loss program (12–21%). Engaging in one self-monitoring behavior was most common among adolescents who were younger at their highest weight (33%), whereas two self-monitoring behaviors was most common among those who were older (56%). All adolescents reported a minimum of two healthy weight control behaviors, with 95.8–96.0% reporting four or more healthy weight control behaviors. The vast majority of adolescents did not endorse any unhealthy weight control behaviors; 12.5% of those who were younger at their highest weight endorsed 1–2 behaviors and 24% of those who were older reported between 1–3 behaviors.

Participants who were older at their highest weight were more likely to report losing weight on their own ($p = .02$, $V = .33$) and taking primary responsibility for their weight loss ($p < .001$, $d = -1.18$). There was a small to medium effect of parental involvement with older adolescents reporting less parental involvement ($d = .28$) and a small effect of older adolescents reporting more healthy weight control behaviors ($d = .22$).

Association Between Age at Highest Weight and Initiation & Maintenance Factors (Table 2)

Weight Loss Triggers & Strategy—A generalized logistic regression suggested that age at highest weight was not associated with endorsing a trigger for weight loss initiation (OR = .91, 95% CI [.61, 1.34], $p = .63$). Generalized multinomial regressions suggested that age at highest weight was not associated with the type of weight loss trigger identified (OR = .89, 95% CI [.64, 1.24], $p = .49$) or the primary weight loss strategy employed by participants (OR = .77, 95% CI [.56, 1.06], $p = .11$).

Reasons for Weight Control—Robust regressions suggested that age at highest weight was not significantly associated with adolescents' positive self-related weight-loss reasons ($b = .08$, $p = .33$), negative self-related reasons for weight loss ($b = -.11$, $p = .39$), or other-related reasons for weight loss ($b = -.02$, $p = .85$).

Weight Maintenance Strategies—Generalized Poisson regressions suggested that age at highest weight was not significantly associated with use of self-monitoring behaviors (OR = 1.04, 95% CI [.92, 1.18], $p = .49$), with healthy weight control behaviors (OR = 1.02, 95% CI [.95, 1.09], $p = .64$), or with unhealthy weight control behaviors (OR = 1.16, 95% CI [.84, 1.48], $p = .44$).

Parental Involvement—Robust regressions suggested that age at highest weight was significantly associated with parental involvement in participants' weight loss efforts ($b = -.10$, $p = .005$). Specifically, for each additional year of age, adolescents perceived less parental involvement in their weight loss.

Responsibility for Weight Control—A robust regression suggested that age at highest weight was significantly associated with perceived responsibility for weight control. For each additional year of age, adolescents perceived greater responsibility for their weight control effects ($b = .22, p < .001$).

Individual generalized ordinal regression models were estimated to examine perceived responsibility for the four specific behaviors included in this variable. Age at highest weight was associated with three behaviors. For each additional year of age, adolescents had 2.38 times the odds, 95% CI [1.40, 4.08], of reporting greater teen responsibility for weight loss ($p = .002$), 1.73 times the odds, 95% CI [1.16, 2.57], of reporting greater teen responsibility for deciding on weight control strategies ($p = .007$), and 2.23 times the odds, 95% CI [1.46, 3.41], of reporting greater teen responsibility for food choices ($p < .001$).

Discussion

This study examined the effect of age at successful weight loss initiation on weight loss motivations and perceived responsibility (teen vs. parent) for weight loss initiation and maintenance among successful adolescent weight losers. While no age differences emerged for weight loss antecedents or weight maintenance behaviors, as hypothesized, and consistent with developmental theory and literature, age at weight loss initiation was associated with perceived parental involvement. Specifically, adolescents who were older when they initiated successful weight loss perceived less parental involvement and were more likely to endorse taking responsibility for the decision to lose weight and selection of weight loss strategies.

Contrary to expectations, there were no observed age differences in weight loss triggers or motivations. Within adult populations, medical triggers for weight loss are reported most commonly and are associated with greater initial weight loss and weight maintenance efforts³⁰, whereas body dissatisfaction and social comparison are common weight loss triggers for adolescent females.³⁷ Indeed, approximately 25% of the current sample endorsed appearance dissatisfaction as their weight loss trigger, whereas almost no participants cited medical concerns. Medical concerns that commonly prompt adult weight loss may not be present or as acute among adolescents, even older adolescents. Alternatively, adolescents may be less attuned to the potential for negative health outcomes.³⁸

Importantly, in the current sample of successful adolescent weight losers, the vast majority denied engaging in any unhealthy weight control behaviors. Further, approximately half the sample endorsed engaging in all six healthy weight control behaviors measured, as well as some level of self-monitoring. These findings are consistent with prior research^{9–11} and suggest that continuing to engage in these behaviors also may be important to successful weight maintenance during adolescence and young adulthood.

Consistent with hypotheses and developmental theory, adolescents who were older when they initiated their successful weight loss reported less parental involvement and increased personal responsibility for initiating and maintaining weight loss. Some work within the weight loss intervention literature suggests that less parental involvement leads to better

weight loss outcomes in adolescents.^{7,39} For example, by simply separating parents and adolescents in a weight loss intervention, adolescents achieved greater initial and sustained weight loss than when the adolescent and parent attended sessions together.⁴⁰ Further, parental over-involvement (e.g., pressure to eat, concern regarding child's weight status) is predictive of less adolescent weight loss.⁴¹ While adolescents may view parental support in their weight loss efforts as helpful,⁴² current results suggests that the effectiveness of parental involvement may depend on the teen's age. Indeed, results corroborate qualitative findings by Sweeting and colleagues²¹, in which adolescents reported their desire to lose weight increased as they aged, as well as work suggesting that adolescents become more autonomous in decision making as they age.⁴³ Taken together, adolescents who are younger when they initiate weight loss may benefit from increased parental involvement in their weight loss and maintenance efforts, whereas adolescents who are older when they initiate weight loss may benefit from an emphasis on their ability to be independent and self-efficacious in their weight loss and maintenance efforts.

Several limitations should be considered when interpreting results from this study. Most salient is the obtained convenience sample is comprised of individuals who were motivated to share their weight loss experience. These individuals likely have unique characteristics compared to the broader population of adolescents with overweight/obesity who have successfully lost weight. Furthermore, the sample was largely Caucasian, female, and from middle to high socioeconomic backgrounds, limiting generalizability. Additionally, the data are retrospective in nature; adolescents self-reported their height and weight, as well as their health behaviors, with many of the questions referring to time periods several years in the past. Empirical work examining the concordance between adolescents' and young adults' retrospective reports of health behaviors suggests acceptable accuracy, particularly among older adolescents and young adults, for a range of behaviors.⁴⁴⁻⁴⁶ Data also suggest that adolescents and young adults generally are accurate reporters of their height and weight.⁴⁷ Nevertheless, retrospective reports tend to underestimate behaviors,⁴⁴⁻⁴⁶ especially related to dietary intake,⁴⁸ potentially limiting the accuracy of health behaviors reported in this study. Findings should be replicated with prospective longitudinal data. Last, given the predominantly female sample, sex differences could not be examined. There is evidence that adolescent males' and females' experiences of weight-related concerns and behaviors may differ,^{49,50} which may impact not only triggers and approaches to initial weight loss and weight loss maintenance, but also the role of parents in these efforts.

Despite these limitations, this study is one of the first to examine specific weight loss triggers, motives, and weight maintenance strategies among a group of highly successful weight losing adolescents. Adolescents largely were intrinsically motivated to lose weight, engaged in healthy weight maintenance behaviors, and generally avoided unhealthy weight loss behaviors. More relevant to weight loss intervention efforts, the current findings underscore the importance of considering age and developmental status in the context of weight control with adolescents with overweight/obesity and the potential utility of teaching parents how to provide support for teens' development of autonomy that is consistent their age and developmental stage.

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EJ and RW conceived of the study design. EJ, CJ, KD, DR, and EE recruited participants and collected data. DR and EE conducted the analyses. All authors were involved in data interpretation and writing the paper, and had final approval of the submitted version.

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What is already known about this subject

- Weight loss interventions for adolescents with overweight/obesity have variable success and the feasibility of teens' successful weight loss by behavior change is not well-documented.
- Adolescence is a heterogeneous developmental period with physical, psychological, and social changes that are relevant to weight loss initiation and maintenance.
- Little is known about associations between age-related developmental changes and adolescents' weight loss initiation and success.

What this study adds

- Adolescents who were older (≥ 16 years) at weight loss initiation reported greater responsibility for weight loss and maintenance compared to younger adolescents.
- Adolescent weight loss programs could benefit from increased developmentally-based tailoring.

Table 1

Demographics and constructs of interest by age at weight loss initiation.

	Younger (< 16 years) <i>n</i> = 24	Older (≥ 16 years) <i>n</i> = 25	Statistic	<i>p</i>	Effect Size
Gender (% Female)	70.8%	92.0%	$\chi^2(1) = 3.66$	.06	$V = .27$
Race/ethnicity (% Caucasian)	87.5%	72.0%	$\chi^2(1) = 1.81$	.18	$V = -.19$
Current zBMI	.46 (.87)	.39 (.74)	$t(47) = .33$	.74	$d = .09$
Highest zBMI	1.99 (.53)	1.58 (.50)	$t(47) = 2.82$	.007	$d = .81$
Weight Loss Trigger (% yes)	79.2%	80.0%	$\chi^2(1) = .005$	.94	$V = -.01$
Specific Weight Loss Trigger (% appearance) ^a	36.8%	28.6%	$\chi^2(1) = .31$	.58	$V = -.09$
Weight Loss Strategy (% on own)^b	37.5%	75.0%	$\chi^2(1) = 6.86$	.01	$V = .38$
Reasons for Weight Control – Positive Self	5.84 (1.02)	5.77 (1.17)	$t(47) = .21$	.83	$d = .06$
Reasons for Weight Control – Negative Self	5.65 (1.35)	5.44 (1.72)	$t(47) = .46$	.64	$d = .13$
Reasons for Weight Control – Other-Related	3.77 (1.54)	3.63 (1.43)	$t(47) = .33$	.74	$d = .09$
Self-Monitoring Behaviors (% > 1) ^c	50.0%	68.0%	$\chi^2(1) = 1.64$	.20	$V = .18$
Healthy Weight Control Behaviors (% = 6) ^d	45.8%	68.0%	$\chi^2(1) = 2.46$	.12	$V = .22$
Unhealthy Weight Control Behaviors (% = 0) ^e	87.5%	76.0%	$\chi^2(1) = 1.08$	.30	$V = .15$
Parental Involvement	2.21 (.49)	2.07 (.48)	$t(45) = .96$	.34	$d = .28$
Perceived Responsibility^{*†}	4.02 (.78)	4.79 (.46)	$t(35.3) = -4.01$	< .001	$d = -1.18$

Note. zBMI = standardized body mass index based on age and sex.

^aCategories collapsed into binary variable of “Did not like the way I looked” versus other trigger.^bCategories collapsed into binary variable of “Lost weight on own” versus other strategy.^cCategories collapsed into binary variable of endorsing 1 self-monitoring behavior or > 1 self-monitoring behaviors.^dCategories collapsed into binary variable of endorsing < 6 healthy weight control behaviors or all 6 possible healthy weight control behaviors.^eCategories collapsed into binary variable of endorsing 0 unhealthy weight control behaviors or 1 unhealthy weight control behavior.^{*} = unequal variances.[†] Higher scores indicate greater teen responsibility for weight control.

Regression Estimates of Associations between Age at Weight Loss Initiation and Weight Loss Triggers and Weight Maintenance Strategies Controlling for Gender and Highest zBMI.

Table 2

Outcome	Unstandardized Estimate	Odds Ratio	95% CI	p
Endorsement of Weight Loss Trigger ^{a,b}	-.10 (.20)	.91	.61 1.34	.63
Specific Weight Loss Trigger ^{c,d}	-.12 (.17)	.89	.64 1.24	.49
Weight Loss Strategy ^{c,e}	-.26 (.16)	.77	.56 1.06	.11
Reasons for Weight Control – Positive Self ^f	.08 (.08)		-.08 .24	.33
Reasons for Weight Control – Negative Self ^f	-.11 (.12)		-.35 .14	.39
Reasons for Weight Control – Other-Related ^f	-.02 (.13)		-.27 .22	.85
Self-Monitoring Behaviors ^g	.04 (.06)	1.04	.92 1.18	.49
Healthy Weight Control Behaviors ^g	.02 (.03)	1.02	.95 1.09	.64
Unhealthy Weight Control Behaviors ^g	.11 (.14)	1.16	.84 1.48	.44
Parental Involvement ^{f,h}	-.10 (.03)	-.16	-.03 .005	
Perceived Responsibility for Weight Control ^{f,h}	.22 (.05)	.13	.32 < .001	
Responsibility for Decision to Lose Weight ^{h,i}	.87 (.27)	2.38	1.40 4.08	.002
Responsibility for Weight Loss Approach ^{h,i}	.55 (.20)	1.73	1.16 2.57	.007
Responsibility for Food Choices ^{h,i}	.80 (.22)	2.23	1.46 3.41	< .001
Responsibility for Exercise Type & Frequency ^{h,i}	.37 (.19)	1.45	.99 2.11	.05

Note. zBMI = standardized body mass index based on age and sex.

^a Generalized logistic regression.

^b Reference endorsing a weight loss trigger.

^c Generalized multinomial regression.

^d Reference endorsing disliking appearance.

^e Reference losing weight on own.

^f Robust regression.

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Generalized Poisson regression.
 η Higher scores indicate greater teen responsibility.
 δ Generalized ordinal regressions.
 j

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