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EMPIRICAL RESEARCH

Preadolescents' and Parents' Dietary Coping Efficacy During Behavioral Family-Based Weight Control Treatment

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Abstract Developmentally relevant high-risk dietary situations (e.g., parties where tempting foods are available) may influence overweight youth's weight control, as they increase risk for overeating. Better self-efficacy for coping with these situations—which preadolescents may learn from their parents—could foster successful weight control. Overweight preadolescents ($N = 204$) ages 7–12 years (67% female), each with one parent, separately completed the Hypothetical High-Risk Situation Inventory (HHRSI) pre- and post-weight loss treatment. The HHRSI assesses temptation to overeat and confidence in refraining from overeating in response to four high-risk dietary scenarios. Participants generated coping strategies for each scenario. Coping strategies and confidence increased and temptation decreased from pre- to post-weight loss treatment. Parents' increase in confidence from pre- to post-treatment was associated with preadolescents' and parents' weight loss. Tailoring treatments to enhance parents' coping skills (e.g., building strategies, targeting high temptation/low confidence scenarios) may maximize preadolescents' weight control.

Keywords Self-efficacy · Coping · Weight loss treatment · Family-based treatment · Parents

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Introduction

The prevalence of obesity in youth has reached epidemic proportions (Ogden et al. 2008) and overweight children are at risk for a host of physical complications and psychological symptoms during adolescence that may impede healthy development (Faith et al. 2001; Wilfley et al. 2010). Specifically, overweight preadolescents are at risk for social marginalization (Strauss and Pollack 2003), poorer academic achievement (Taras and Potts-Datema 2005), and high vulnerability for tracking obesity into adolescence and adulthood (Dietz 1998). This developmental trajectory highlights the importance of understanding factors that hinder or promote successful weight loss among preadolescents. For example, one area of

interest is preadolescents' self-efficacy for coping with "high risk" (i.e., tempting) dietary situations—including how parents can help youth develop adequate coping skills. High-risk situations could pose a risk for overeating and thus make short- and long-term weight loss even more difficult—perhaps especially for individuals with poorer coping skills.

A socio-ecological framework for understanding the development and maintenance of obesity reveals that excess weight gain, and coping behaviors that may influence weight gain, are influenced by multiple relationships (e.g., parent–child) and contexts (Davison and Birch 2001). For example, youth's dietary intake is influenced not only by physiological hunger but also by the various situations encountered each day (e.g., parties with friends, watching television, interpersonal conflicts) that can prompt overeating due to powerfully ingrained habits (Bouton 2011). These tempting dietary situations are common among youth, and they include such situations as high-fat snacks present at a friend's home or advertised on television, or the temptation to eat in response to negative affect. As highlighted by the socio-ecological model, children's weight status and eating behaviors do not develop in a vacuum, but rather are constantly affected by contexts that may promote or protect against overeating.

Within this model, parents exert a powerful influence on their children's eating behaviors and weight, and this influence can be bidirectional. For example, parental over-control and excessive restriction of children's food intake actually can promote children's overeating and subsequent weight gain, which then may prompt even greater parental concern and restriction of intake (Birch and Fisher 1998). Further, it is well established that children's eating behaviors are indirectly influenced by parents' own eating attitudes and behaviors [e.g., (Birch and Fisher 1998; Savage et al. 2007)]. For example, maternal behaviors influence young girls' ideas about dieting and eating in the absence of hunger (Abramovitz and Birch 2000; Birch and Fisher 1998; Birch et al. 2003). Indeed, this prior research suggests that parents' modeling of certain eating and weight control behaviors (e.g., overeating vs. using strategies to prevent overeating) might even indirectly influence children's ideas about how to respond to high-risk dietary situations, although this specific question has yet to be examined within family-based treatment.

As discussed above, children's eating behaviors are impacted by a range of contextual and parental factors that might make overeating more or less likely. Further, successful coping (i.e., refraining from overeating) within tempting high-risk dietary situations is also thought to be influenced by multiple, interrelated factors. These factors include how tempting the situation is, how confident an individual is that he/she can handle the situation, and whether an individual has strategies to cope with the situation. For example, individuals' confidence for handling a high-risk situation would be lower for more tempting situations (e.g., those involving a favorite food or challenging emotional triggers for overeating) and higher for less tempting situations. Both temptation and confidence may be influenced by a third factor—the extent to which an individual has specific strategies to use to cope with the situation (i.e., to not overeat). For example, an individual with more coping strategies on hand may feel more confident that they will be able to manage the situation successfully, despite high temptation. The above factors may then influence an individual's weight loss success, considering that situations with tempting foods may lead to dietary lapses (i.e., overeating) if an individual is intensely tempted, low in confidence, and/or has insufficient strategies to use in the situation. There is considerable evidence examining the general self-efficacy and confidence that individuals report about making behavioral changes to lose weight (Linde et al. 2006; Strecher et al. 1986). For example, adults who are better able to generate strategies for coping with tempting dietary situations may achieve greater weight loss (Carels et al. 2004; Drapkin et al. 1995; Grilo et al. 1989). Despite this evidence in adults, similar data in youth are lacking. In the case of preadolescents, parents' own coping skills additionally could influence their children's coping, eating behaviors, and weight status. The present study builds upon prior findings with adults to determine whether the ability to cope with high-risk dietary situations influences weight loss among preadolescents and their parents—including the influence of parents' efficacy on preadolescents' weight loss.

Parents likely influence their preadolescents' coping by providing modeling of their own eating behaviors and reactions to tempting foods, particularly given that many common high-risk dietary situations are ones in which parents may serve as behavioral guides (e.g., family meals and celebrations). Children likely model their parents' eating attitudes (e.g., perception of how problematic—or tempting—a situation is, and their subsequent confidence that they can resist overeating) as well as how they respond to tempting dietary situations (e.g., strategies to cope with the situation). Parents' coping efficacy may directly or indirectly impact their preadolescent children's weight loss success; children often look to their parents' behaviors when they face novel or challenging situations, such as the high-risk scenarios examined in the present study.

Given the important role that parents have both in modeling effective coping and healthy eating behaviors as well as in controlling the home environment, children's

weight control behaviors can be influenced differently by parenting styles. Following on the theoretical and empirical role for parents as agents of change in pediatric obesity treatment, family-based weight loss treatment—which has a strong focus on changing parenting around eating and activity (Epstein et al. 1998; Wilfley et al. 2007, 2010)—is considered the gold standard for overweight youth. Among other skills, this family-based weight loss treatment teaches participants to increase their ability to generate dietary coping strategies, such as eliminating tempting foods from the home, using portion control, and distracting themselves with non-food activity (Wilfley et al. 2007). In addition, this treatment approach—in line with the socio-ecological framework described above—recognizes the potentially large influence that all family members' eating behaviors may have on one another, including the powerful positive role that parents can have in modeling healthy eating behaviors for their children (Kitzman-Ulrich et al. 2010). Indeed, previous research suggests that parenting styles impact children's risk for obesity and poor weight control (Golan 2006; Golan and Crow 2004). For example, parents with a permissive parenting style may have poorer control over the home environment (e.g., allowing greater availability of unhealthy foods in the home), which could make it more difficult for preadolescents to lose weight (Golan 2006). Parental behaviors also inadvertently may cause certain high-risk dietary situations to be more highly tempting through their (over) control of children's food intake (Birch and Fisher 1998; Birch et al. 2003). In contrast to permissive or authoritarian parenting, authoritative parenting—utilizing clear, firm, and assertive direction that is also warm and has reasonable give-and-take, rather than excessive restriction—may be associated with healthier eating and activity behaviors among youth (Gerards et al. 2011; Sleddens et al. 2011). Capitalizing on the high degree of control that parents have on their children's environments and experiences may maximize youth's weight loss (Anzman et al. 2010).

Despite the fact that youth typically are successful at losing weight during family-based treatment (Epstein et al. 2007; Wilfley et al. 2007), weight regain still commonly occurs following treatment (Jeffery et al. 2000). These typical outcomes underscore the importance of identifying factors that impede or enhance weight control to tailor future interventions to families' needs. Given the potentially large role that high-risk dietary situations and parental eating behaviors and coping skills may have on youth's eating behaviors, an examination of preadolescents' and parents' self-efficacy for coping with common high-risk dietary situations is warranted to determine their impact on weight loss and inform the personalization of weight loss treatment.

The Current Study

Previous research suggests that youth may struggle with weight control due to an array of contextual factors that promote overeating. Examining aspects of coping efficacy for these high-risk dietary situations (i.e., those that promote overeating) could enhance the understanding of their impact on weight loss among overweight youth and families. Specifically, preadolescents' perceived temptation and confidence when faced with high-risk dietary situations—along with strategies they have to prevent overeating—may influence their risk for overeating and excess weight gain. Further, the literature reviewed above suggests that an examination of preadolescents' coping skills and weight loss also requires the consideration of parental factors, as parents' behaviors exert a powerful influence over their children's eating behaviors (Anzman et al. 2010; Birch et al. 2003).

The current study examines whether coping with high-risk dietary situations and the changes therein (i.e., change from pre- to post-weight loss treatment) are related to preadolescents' and parents' weight outcomes (i.e., relative body weight loss from pre- to post-weight loss treatment). Several hypotheses were generated, informed by previous research described above and prior family-based weight loss treatment studies. First, considering the influence that parents have on their children's eating behaviors, it was hypothesized that preadolescents' and parents' coping efficacy would be associated positively. It also was expected that preadolescents and parents would increase their generated coping strategies from baseline to post-weight loss, as one of the treatment targets was improving family behavioral weight loss skills. Lastly, given previous research in adults highlighting the importance of developing coping strategies for high-risk dietary situations, it was hypothesized that pre-treatment coping and change in coping would be related to short- and long-term weight control outcomes among both preadolescents and parents. Within these aims, the potential influence of child sex and age on the results was also examined, as these factors could impact weight loss treatment success and/or coping efficacy (Epstein et al. 2007). Overall, findings may help clarify the relationship between parents' and preadolescents coping efficacy within high-risk dietary situations as they relate to weight loss success—including the potential relationship between parents' coping efficacy and preadolescents' weight loss.

Method

Participants

Participants were 204 overweight (>85th percentile for body mass index) preadolescents ages 7–12 years

(mean = 9.8 ± 1.3 years; 67% female), each of whom had at least one overweight parent (body mass index ≥25 kg/m^2). Parents' mean body mass index was 35.2 ± 6.3 kg/m^2; they were mostly mothers (85% female) and were on average 41.9 ± 6.3 years of age. Preadolescents were 65.5% White, 19.8% Hispanic, 11.3% Black, and 3.4% Other race/ethnicity. Families were unpaid volunteers, and were recruited via media announcements and advertisements, as well as physician referrals. Families were excluded if either the child or parent was currently receiving psychological or weight loss treatment, was using medications affecting appetite or weight, or had a psychiatric condition that would interfere with participation. Preadolescents, each with a participating parent or guardian, enrolled in the weight control study, which consisted of a 20-week family-based behavioral weight loss treatment, followed by randomization to one of two 16-week weight maintenance interventions or a no-treatment control condition. A more detailed description of the intervention is provided elsewhere (Wilfley et al. 2007). The Institutional Review Boards of San Diego State University and Southern California Kaiser Permanente (a referral source) approved this study. Participating parents and preadolescents provided written informed consent and assent, respectively.

The present study examined data at baseline and at post-weight loss treatment, as well as 2-year follow-up weight outcomes. Preadolescents and parents separately completed the Hypothetical High-Risk Situation Inventory (see below) at baseline and post-weight loss, although not at 2-year follow-up. Families in which both the preadolescent and parent were missing Hypothetical High-Risk Situation Inventory data at baseline ($n = 27$) were excluded from analyses, and one additional preadolescent was excluded due to incomplete assessment administration, yielding a final sample of 177 families (including 175 preadolescents and 175 parents; see below for additional details of study flow). As some families were lost to follow-up, Hypothetical High-Risk Situation Inventory data was available from 147 families at post-weight loss (including 147 preadolescents and 132 parents), and 2-year follow-up weight outcomes were available from 123 families (including 123 preadolescents and 120 parents).

Measures and Procedures

Weight Outcomes

Preadolescents' and parents' weight and height were measured with shoes removed and in light clothing by trained research assistants using a calibrated balance beam scale and a stadiometer, respectively. For parents, body mass index (kg/m^2) was the primary weight outcome. For preadolescents, body mass index metrics adjusted for age and sex were calculated, including body mass index percentile, and percent overweight (i.e., preadolescents' percent above the median body mass index for their age and sex), which was computed based on Centers for Disease Control and Prevention normative data (Kuczmarski et al. 2000). As body mass index percentile is asymptotic at the upper limit in the case of pediatric obesity (e.g., above the 95th percentile), percent overweight—a more sensitive measure of relative body weight change in youth—was used as preadolescents' primary weight outcome.

Demographics

Parents reported on demographic variables (i.e., preadolescents' and parents' age, sex, and race/ethnicity. Race/ethnicity was categorized for the present analyses as Black, White, Hispanic, or Other; preadolescents categorized as Other (i.e., American Indian or Asian, $n = 6$) were excluded from all analyses that included race/ethnicity due to their low frequency.

Hypothetical High-Risk Situation Inventory (HHRSI) (Drapkin et al. 1995; Grilo et al. 1989)

Preadolescents' and parents' coping efficacy was assessed with the HHRSI, an interview designed to measure an individual's responses to hypothetical high-risk dietary situations. Three dimensions of coping efficacy are derived from the HHRSI: temptation (how tempting an individual perceives the situation to be), confidence (how confident an individual is that he/she can handle the situation), and coping strategies (how many distinct strategies an individual can generate to cope with the situation). The HHRSI presents four high-risk dietary scenarios that incorporate several identified triggers (Grilo et al. 1994) for overeating (e.g., a birthday party where favorite foods are available). The HHRSI has been used previously among adults (Drapkin et al. 1995; Grilo et al. 1989); for the present study, the HHRSI was adapted for preadolescents by simplifying some of the language and including a scenario involving a friend's house in place of the adult scenario involving a workplace (see Table 1). Each situation on the HHRSI was read aloud to each preadolescent or parent (interviewed separately) by trained assessors, after which participants were asked to report their temptation to overeat (1 = *not tempted at all* to 5 = *intensely tempted)* and their confidence in refraining from overeating (1 = *not confident at all* to 5 = *intensely confident*) in that situation. Participants were then asked to provide specific coping strategies (i.e., "Tell me as many things as you can that you would think or do to keep from eating or overeating") and were given three minutes to generate as many strategies as possible for each situation.

Table 1 HHRSI scenarios and average number of strategies generated by scenario

Scenario	Scenario description	Number of strategies reported[a] (*M*, range)		Inter-rater reliability
		Baseline	Post-FBT	
Party				
Preadolescent	"You are at a birthday party for one of your good friends. You like the company and the games. All of your favorite foods are at this party—from dinner to dessert"	2.8 (0.0–10.5)	5.1 (0.0–18.0)	.81–.99
Parent	"You are having a family celebration. You are enjoying the company and the festive atmosphere. Everyone has prepared their specialty dishes, from the appetizers through the desserts, and you really like these foods"	4.0 (1.0–9.0)	5.5 (1.0–14.0)	.83–1.00
Argument				
Preadolescent	"You are sitting down for a relaxing evening after school. A family member starts to pick a fight with you. They get really angry and they stomp out of the house, slamming the door behind them. You escape to the kitchen and find yourself looking for something to eat"	3.2 (0.0–10.5)	5.5 (0.0–18.5)	.94–.99
Parent	"You are sitting down for an evening at home. A family member picks this time to continue an unresolved argument. Tempers flare and he or she stomps out of the house, slamming the door. You escape to the kitchen and find yourself looking for something to eat"	3.6 (1.0–10.0)	4.7 (1.0–13.0)	.83–1.00
TV				
Preadolescent	"You are at home and nobody is around. You are watching TV and a commercial comes on and you find yourself wandering into the kitchen to see what there is good to eat. You see your favorite food lying on the kitchen counter. It looks pretty good"	3.0 (0.0–11.0)	5.6 (0.0–20.0)	.79–.99
Parent	"You are at home watching TV. A commercial comes on and you wander into the kitchen. You see your favorite food on the kitchen counter"	3.4 (1.0–9.0)	4.7 (0.0–12.5)	.77–.99
Friend's house (preadolescent) or Work (parent)				
Preadolescent	"You go over to a friend's house. The friend offers you foods that you are trying to eat not so much of"	2.9 (0.0–10.5)	5.1 (0.0–21.0)	.94–.99
Parent	"You are behind on a project at work or at home. You feel pressured and very tense. You go to get yourself a cup of coffee and eye the delicious snacks in the kitchen or break room"	3.0 (1.0–8.0)	4.4 (1.0–12.0)	.86–.99

HHRSI data were available for 175 preadolescents and 175 parents at baseline and for 142 preadolescents and 137 parents at post-FBT

[a] Although the square-root transformation of strategies was used for analyses, raw data is presented for ease of understanding. Due to averages between independent raters, coping strategies may not be whole numbers

Responses were coded by two trained independent raters, following guidelines from previous use of the HHRSI, which elicits behavioral (overt activity) and cognitive (unobservable mental activity) strategies (Drapkin et al. 1995; Grilo et al. 1989). Responses that did not fit either the behavioral or cognitive definitions were not coded (e.g., unrelated information, or responses that were not specific or actionable enough, such as "just don't eat"). Rater training also included detailed instructions in separating dissimilar items into distinct strategies where appropriate and combining similar strategies into a single strategy. For example, the strategy "go outside and ride my bike" was combined with "go outside and ride my scooter," whereas "play a game with a friend" and "play with the dog" were entered as distinct strategies because they entail conceptually different activities. In cases of disagreement between independent raters in the number of strategies generated, ratings were averaged across raters. Inter-rater reliability was excellent; overall, intraclass correlations across the four scenarios were .90–1.00 for total strategies generated (see Table 2).

Results

The final sample included 177 families, including four families with partially missing data due to incomplete administration (two preadolescents and two parents were missing baseline HHRSI data), yielding 175 preadolescents and 175 parents. Families excluded from analyses due to missing HHRSI data ($n = 27$) did not differ from the final sample on preadolescent or parent age, race/ethnicity, baseline relative body weight or relative body weight loss during treatment, or parent sex. However, disproportionately more boys were excluded due to missing HHRSI data, $\chi^2\,(1, N = 204) = 5.29, p = 0.03$. Thus, preadolescent sex was included as a covariate in all analyses.

Table 2 Average HHRSI behavioral, cognitive, and total strategies reported across the four scenarios (with example strategies)

	Examples of strategies reported	Number of strategies reported[a] (*M*, range)		Inter-rater reliability
		Baseline	Post-FBT	
Total strategies				
Preadolescent	"Go outside and play a game," "Say 'no thank you,'" "Tell myself 'I'm not supposed to be eating too much,'" "Think about how the food is unhealthy"	3.0 (0.0–9.6)	5.3 (0.1–17.6)	.93–.99
Parent	"Drink a glass of water instead," "Take a walk outside," "Remind myself of my goals," "Focus on something else to distract my mind from food"	3.5 (1.0–8.1)	4.8 (1.3–12.3)	.90–1.00

HHRSI data were available for 175 preadolescents and 175 parents at baseline and for 142 preadolescents and 137 parents at post-FBT

[a] Although the square-root transformation of strategies was used for analyses, raw data is presented for ease of understanding. Due to averages between independent raters, and then averages between up to 4 scenarios, coping strategies may not be whole numbers

Kolmogorov–Smirnov tests examined the normality of HHRSI variables; the number of coping strategies were positively skewed, $p < 0.05$, and was square-root transformed.

Overview of Preadolescents' and Parents' HHRSI Responses

Pearson bivariate correlations and ANOVA were used to examine associations between HHRSI variables and preadolescents' and parents' age, sex, and weight status (i.e., preadolescent percent overweight and parent body mass index), as well as the association between and among preadolescents' and parents' HHRSI coping variables.

HHRSI temptation and coping confidence ratings were inversely related at baseline (partial $r = -.45$ for preadolescents and partial $r = -.60$ for parents, $ps < 0.001$) and post-weight loss (partial $r = -.56$ for preadolescents and partial $r = -.34$ for parents, $ps < 0.001$). For coping strategies, only parents' higher baseline temptation was associated with a higher baseline number of coping strategies, $r = .16$, $p < 0.05$; no other significant associations emerged between coping strategies and preadolescents' or parents' temptation and confidence.

At baseline, total strategies was positively associated with preadolescent age, $r = .16$, $p < 0.05$, indicating that older children generated more strategies than younger children. Preadolescents' baseline percent overweight was positively correlated with reported temptation, $r = .17$, $p < 0.05$. No associations were found between preadolescents' sex and their coping efficacy (i.e., boys and girls did not differ on HHRSI temptation, confidence, or coping strategies). At baseline, mothers ($n = 148$) generated more strategies than fathers (mean = 3.6 vs. 2.5 strategies), $t(172) = 3.83$, $p < 0.001$. Further, at post-weight loss, associations between HHRSI variables and demographics or relative body weight were no longer present.

Hypothesis 1: Association Between Preadolescents' and Parents' Coping Efficacy

It was hypothesized that preadolescents' and their parents' coping confidence, temptation, and coping strategies would be significantly correlated (i.e., partial correlations controlling for preadolescents' sex). Preadolescents' and parents' temptation (partial $r = .04$, $p = 0.67$) and confidence (partial $r = .03$, $p = 0.66$) were not significantly correlated at baseline, but at post-weight loss, a small correlation emerged between preadolescents' and parents' confidence (partial $r = .17$, $p = 0.05$) but not temptation (partial $r < .01$, $p = 0.92$). As expected, preadolescents' and parents' total number of strategies generated were significantly correlated with one another at baseline (partial $r = .49$, $p < 0.001$) and post-weight loss (partial $r = .50$, $p < 0.001$).

Hypothesis 2: Change in Coping Efficacy During Weight Loss Treatment

The hypothesis that preadolescents and parents would improve in coping efficacy from baseline to post-weight loss treatment was examined by repeated measures general linear models (with preadolescent sex as a covariate).

Parents reported significantly lower temptation, $F(1, 134) = 23.10$, $p < 0.001$, at post-weight loss than at baseline (2.8 vs. 3.2), whereas preadolescents did not significantly change over time on temptation or confidence ($ps > 0.26$). In addition, preadolescents, $F(1, 138) = 28.28$, $p < 0.001$, and parents, $F(1, 134) = 30.21$, $p < 0.001$, generated more total coping strategies at post-weight loss compared to baseline (see Table 2).

Hypothesis 3: Coping Efficacy and Weight Outcomes

It was hypothesized that coping efficacy would significantly predict preadolescents' and parents' weight

outcomes (i.e., change in percent overweight or body mass index, respectively, from baseline to post-weight loss and from baseline to 2-year follow-up). Hierarchical regression predicting preadolescents' and parents' weight outcomes included variables in the order most likely to explain variance in weight outcome (see Tables 3, 4). Maintenance condition randomization was also included in the model predicting long-term (2 years post-weight loss treatment) weight outcomes.

The regression model examining change in preadolescent percent overweight during weight loss treatment, summarized in Table 3, accounted for 24.0% of the variance in preadolescent percent overweight change from baseline to post-weight loss, $p = 0.01$. Only the last step, parents' change in HHRSI variables during treatment, $p = 0.03$, significantly added to the variance beyond baseline preadolescent percent overweight; an increase in parent confidence to handle high-risk situations was associated with a greater decrease in preadolescent percent overweight, $p < .01$.

The model examining preadolescents' weight outcomes at 2-year follow-up was not significant, $p = 0.49$.

Table 4 summarizes the regression model predicting parents' body mass index change during weight loss treatment. The full regression model accounted for 27.9% of the variance in parents' body mass index change, $p < 0.001$. Parents' change in HHRSI variables, entered in the last step, significantly added to the variance explained, $p = 0.001$, in that an increase in parents' coping confidence, $p = 0.10$, and a decrease in temptation, $p = 0.09$, for high-risk dietary situations during weight loss treatment was associated with greater decreases in parents' body mass index.

The model examining change in parent body mass index from baseline to 2-year follow-up accounted for 21.0% of the variance in parent body mass index change, $p = 0.01$. Parent change in HHRSI variables, entered in the last step, remained significant, $p = 0.01$, in that an increase in parent confidence, $p = 0.01$, and a decrease in number of strategies generated, $p < 0.05$, during treatment was associated with greater decrease in parent body mass index.

Discussion

This study explored overweight preadolescents' and their parents' self-efficacy for coping with high-risk dietary situations, and how coping efficacy predicts preadolescents' and

Table 3 Hierarchical regression model predicting preadolescent relative body weight loss

Variable	B	SEB	β	p	R^2	ΔR^2	$p\Delta R^2$
Step 1: preadolescent baseline percent overweight	−.08	.04	−.19	.03	.036		.03
Step 2: demographics					.080	.044	.13
Preadolescent sex	3.30	1.58	.19	.04			
Parent sex	−.84	1.96	−.04	.67			
Preadolescent age	.88	.58	.14	.13			
Step 3: preadolescent baseline HHRSI					.130	.051	.08
HHRSI preadolescent confidence	−1.36	.82	−.16	.10			
HHRSI preadolescent temptation	−2.51	1.00	−.24	.01			
HHRSI preadolescent total responses	.12	1.27	.01	.93			
Step 4: preadolescent change in HHRSI					.144	.014	.60
Δ HHRSI preadolescent confidence	−.96	1.13	−.12	.40			
Δ HHRSI preadolescent temptation	.33	1.20	.04	.78			
Δ HHRSI preadolescent total responses	.57	1.08	.05	.60			
Step 5: parent baseline HHRSI					.173	.029	.28
HHRSI parent confidence	1.70	1.46	.13	.25			
HHRSI parent temptation	1.55	1.16	.16	.18			
HHRSI parent total responses	2.58	2.17	.13	.24			
Step 6: parent change in HHRSI					.240	.067	.03
Δ HHRSI parent confidence	−4.29	1.57	−.36	<.01			
Δ HHRSI parent temptation	−1.29	1.37	−.12	.35			
Δ HHRSI parent total responses	−1.27	1.85	−.07	.50			

Change represents baseline to post-weight loss change; *B* and *SEB* are the *Beta* coefficients and β is the standardized β coefficient. Negative *B* values indicate that a higher value or an increasing value (for change scores) was associated with greater decrease in preadolescent percent overweight from baseline to post-weight loss treatment

Table 4 Hierarchical regression model predicting parent relative body weight loss

Variable	*B*	SEB	*β*	*p*	R^2	ΔR^2	$p\Delta R^2$
Step 1: parent baseline BMI	−.08	.02	−.31	<.001	.094		<.001
Step 2: parent sex	.90	.39	.19	.02	.135	.041	.05
Preadolescent sex	.19	.32	.05	.55			
Step 3: parent baseline HHRSI					.175	.040	.12
HHRSI parent confidence	−.25	.29	−.09	.40			
HHRSI parent temptation	−.18	.23	−.08	.45			
HHRSI parent total responses	.86	.37	.20	.02			
Step 4: parent change in HHRSI					.279	.105	.001
Δ HHRSI parent confidence	−.51	.31	−.20	.10			
Δ HHRSI parent temptation	.46	.27	.20	.09			
Δ HHRSI parent total responses	−.21	.33	−.05	.52			

Change represents baseline to post-weight loss change; *B* and *SEB* are the Beta coefficients and *β* is the standardized *β* coefficient. Negative *B* values indicate that a higher value or an increasing value (for change scores) was associated with greater decrease in parent BMI from baseline to post-weight loss treatment

parents' weight outcomes within family-based treatment. Given that weight control remains a challenge for most overweight youth, understanding coping efficacy for high-risk situations (i.e., perceived confidence, temptation, and strategies to respond to the situations) and weight loss among preadolescents is crucial in order to enhance treatment efficacy. Developmental models for the study of overweight in youth suggest the importance of addressing parental and contextual factors, as parents' eating attitudes and behaviors influence their children's eating behaviors (Birch and Fisher 1998; Savage et al. 2007). Within this framework, the present study is the first to utilize the HHRSI to explore the role of preadolescents' and parents' feelings of temptation and confidence and ability to generate specific coping strategies for high-risk dietary situations. Findings indicated that parents' coping efficacy as measured by the HHRSI (i.e., an increase in parents' confidence that they can handle high-risk dietary situations) has some predictive value for their preadolescents' weight loss. These findings add to previous literature on the use of the HHRSI in adults (Drapkin et al. 1995; Grilo et al. 1989) and suggest a role for predictors of parents' weight loss in promoting healthy weight management in preadolescents. Findings continue to highlight the relevance of examining preadolescents' self-efficacy for healthy eating from a developmental socio-ecological framework, in that parents' coping responses appeared most important in the present study.

At the preadolescent stage of development, it is important to understand parents' influence on their children prior to the heightened influence of peers, for example, on adolescents' eating and weight control behaviors (Salvy et al. 2011). In the area of weight control, greater insight into preadolescents' coping skills at this critical stage could aid in tailoring treatments to teach these skills to youth and families. The present study's findings indicate that targeting parents' coping efficacy for high-risk dietary situations may be one mechanism to enhance preadolescents' weight control. Intervening early to teach children effective coping skills and healthy eating behaviors may help enable them to effectively manage high-risk dietary situations they increasingly will face as adolescents. Within family-based weight loss treatment, parents support their children in making healthy eating choices while modeling a healthy level of dietary restraint (e.g., reduced intake of high-fat foods, but within flexible guidelines that accommodate special occasions and allow smaller portions of favorite foods). For example, preadolescents could develop effective coping and healthy eating behaviors when eating away from home (e.g., fast food restaurants) or when offered high-fat food at friends' homes, so that they have ample time to practice skills in multiple contexts and develop healthy habits prior to the increased independence that accompanies the transition into adolescence. Indeed, tracking obesity from preadolescence into adolescence can have serious health and psychosocial implications; adolescence has been identified as a crucial period when obesity-related health complications become most entrenched into adulthood (Dietz 1994, 1998). Especially considering studies that suggest that obesity in preadolescence confers risk for decreased self-esteem and even substance use in adolescence (Strauss 2000), ameliorating the severity of obesity is particularly important early in children's development.

As expected, preadolescents and parents improved their ability to generate coping strategies from baseline to post-weight loss treatment. Although boys and girls did not differ in their coping skills, age emerged as a significant correlate of coping strategies. Older youth generated more

strategies at baseline, supporting the likelihood that preadolescents improve in their ability to generate coping strategies as they cognitively and socially mature. As older children develop more cognitive flexibility and experience with testing different behavioral strategies, they may be more able to identify coping strategies when prompted with high-risk situations. However, this baseline age difference was no longer present at post-treatment. That is, although younger children entered treatment with poorer existing coping skills, the weight loss treatment may have mitigated this disparity.

An increase in parents' confidence during treatment appeared to have the biggest positive influence on preadolescents' weight loss. This is perhaps not surprising given the intense focus on parenting strategies during the weight loss treatment. Parents acquiring skills during treatment may have subsequently increased their skills usage, with corresponding increases in confidence in ways that trickled down to their preadolescents' making better eating and activity choices. These findings are concordant with previous data suggesting that parental involvement is crucial for preadolescents' treatment success (Wrotniak et al. 2005) and highlight the crucial role that parents play as agents of change within family-based weight loss treatment (Anzman et al. 2010). Preadolescents' and parents' number of strategies were positively associated, which is particularly remarkable considering that parents' and preadolescents' HHRSIs were administered independently. Preadolescents may look to their parents' reactions and behaviors when deciphering how to respond to tempting situations and regulate their eating. Additionally, in the case of high-risk dietary situations, parents can help their preadolescents to be successful even if preadolescents have not yet developed effective coping skills of their own, both by modeling coping strategies and by controlling their young preadolescents' environments (e.g., which high-risk situations they allow their preadolescents to experience, keeping tempting foods out of the home environment). Treatment that emphasizes enhancing parenting around eating and activity patterns within the family as a unit can capitalize on parents' crucial role in the development of children's eating behaviors (Anzman et al. 2010; Gerards et al. 2011; Kitzman-Ulrich et al. 2010; Lindsay et al. 2006). For example, parents can foster their children's healthy eating by making healthy foods available in the home (and limiting the presence of tempting high-fat snacks and sugar-sweetened beverages) and modeling healthy eating during family mealtimes (Lindsay et al. 2006). Family-based weight loss treatment assists parents in learning and enhancing effective parenting practices (e.g., providing immediate praise, rewarding behavior change) and identifying and problem-solving around high-risk dietary situations relevant to each family (e.g., celebrations, restaurants). The present study's finding that an increase in parents' confidence was related to preadolescents' weight loss during treatment further supports this family-based approach.

Parents' increasing confidence and decreasing temptation significantly predicted their own weight outcomes as well. This increase in parents' confidence was an expected and useful target of intervention within weight loss treatment. Parents reporting higher temptation also reported a greater number of coping strategies, although it remains unclear whether those strategies proved useful. Prior to treatment, parents who experienced high-risk scenarios as more tempting may have been more motivated to brainstorm potential coping strategies; these same parents perhaps had greater difficulty using these strategies and losing weight. Although the association between parents' change in coping strategies and weight change was surprising (i.e., parents who decreased in the number of coping strategies generated on the HHRSI, or who increased less, lost more weight by 2-year follow-up), this finding, in combination with parents' increase in confidence, may reflect parents' becoming more discriminating in using only the most effective coping strategies. Given the association typically found between parents' weight loss and children's weight loss in family-based programs (Wrotniak et al. 2004), identifying potential mediators of parents' treatment response consequently could inform treatment response among their children.

HHRSI responses were not predictive of preadolescents' 2-year follow-up weight outcomes, which might have been due to changes in preadolescents' or parents' dietary coping in the time between the end of the weight control treatment and long-term follow-up. Future studies should examine long-term changes in preadolescent coping with high-risk situations; pediatric weight loss interventions may need to be of increased contact or duration in order to provide for sufficient learning and practice of effective coping skills (Wilfley et al. 2010). Although HHRSI responses did not predict long-term outcomes, youth who lose more weight in the short-term are more likely to be successful in the long-term (Goldschmidt et al. 2011), emphasizing the importance of identifying predictors of early weight loss. Coping strategy generation was not related to their short-term weight outcomes, suggesting perhaps that the quality of strategies (e.g., likelihood of being used, helpfulness, appropriateness to the situation) may more strongly impact weight control success than the ability to generate more strategies.

However, the HHRSI interview was not without merit in the context of family-based weight loss treatment, given the findings pertaining to parental data as discussed above. Administering the HHRSI with parents participating in family-based treatment could be useful in informing intervention techniques for the family (e.g., providing skills

training for particular situations that families find most challenging). To help the HHRSI serve this purpose, it could be modified to include assessment of strategies' quality and use, including using the HHRSI as a clinical tool to inform treatment enhancement and personalization (e.g., by focusing on situations that participants identify as most difficult for them). Even in its current form, findings suggest that preadolescents' ability to generate coping strategies is highly associated with their parents' strategy generation, possibly reflecting parents' influence within family-based treatment. For example, parents may directly teach or indirectly model coping strategy usage for their children when faced with high-risk situations (e.g., family parties, watching TV at home). Lastly, the HHRSI demonstrated usefulness in its ability to detect improvements in coping among preadolescents and their parents within a treatment that was partially geared towards augmenting coping skills and self-efficacy.

The present study had several strengths, including the large sample size of preadolescents and adults, and long-term weight outcome data. Findings represent the first time the HHRSI has been administered with youth and within a family-based setting incorporating data from both parents and preadolescents. As such, results augment the generalizability of previous HHRSI data and inform this measure's use within family-based treatment with youth.

Despite these strengths, there were some limitations within the present study. The HHRSI describes only hypothetical situations rather than measuring actual lapses or tempting scenarios experienced. However, the HHRSI is less time-intensive than ecological momentary assessments of "real-time" behaviors (Carels et al. 2004), and individuals' qualitative reports of past dietary lapses are subject to retrospective recall bias (Grilo et al. 1994). Furthermore, most participants did report temptation to overeat when asked to imagine these situations, suggesting at least face validity to these high-risk situations. Also, as the proportion of variance in preadolescent weight outcome explained by HHRSI coping was relatively low, it is worth noting that efficacy for coping with high-risk dietary situations is one of multiple varied factors influencing families' success in weight loss treatment. Finally, families in the present study were weight loss treatment seeking; more data are needed to replicate findings with non-treatment seeking families. Despite these limitations, the present study represents an important next step in exploring the role of parents' coping efficacy (e.g., confidence for coping with high-risk situations) in augmenting youth's weight loss.

In sum, findings indicate that parents' confidence for making dietary changes appears to be an important variable to target within family-based pediatric weight loss treatments. That is, bolstering parents' confidence for managing tempting situations may have a positive impact on their weight loss as well as on their preadolescents' weight loss, highlighting the relevance of applying a socio-ecological approach to examining predictors of overweight youth's treatment response. Indeed, young children may not have developed sufficient coping skills of their own, and at this age, they likely look to their parents for guidance regarding how to respond to high-risk dietary situations. To this end, the HHRSI provides a brief estimate of parents' skills for coping with high-risk dietary situations, and is one tool for exploring preadolescents' self-efficacy for adhering to healthy eating behaviors in a range of relevant high-risk contexts. Both preadolescents and parents improved in their ability to respond to hypothetical high-risk dietary situations (i.e., specific coping strategies), indicating a benefit in the specific area of coping efficacy among both the parents and preadolescents who participated. However, given that effective coping skills may be difficult to acquire within a relatively brief weight loss program, especially for preadolescents, extended treatments should examine long-term coping efficacy to determine if families are routinely able to engage in useful coping strategies in order to promote sustained weight control. Overall, focusing on parents' coping efficacy within family-based interventions may help augment both their own and their preadolescents' weight loss success. Maximizing weight loss during childhood thereby helps to hamper the progression of pediatric obesity into adolescence. Reducing obesity-related physical and psychosocial sequelae is critical to fostering healthy adolescent development.

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Conflict of interest The authors declare that they have no conflict of interest.

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