

1 **Associations between weight loss attempts, weight-related stress and body image during**
2 **childhood and adolescence in children with parental obesity**

3 *Short title:* Weight loss attempts and body image in children

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34 dissatisfaction, weight misperception

35 **ABSTRACT (249/250 words)**

36 **Background.** Few longitudinal studies have investigated the role of weight loss attempts or
37 weight-related stress on body image during childhood. We examined whether weight loss attempts
38 and weight-related stress are associated with weight misperception and body dissatisfaction across
39 childhood and adolescence.

40 **Methods.** Data were drawn from the Quebec Adipose and Lifestyle InvestIgation in Youth
41 (QUALITY) cohort of Canadian children with parental obesity (8-10 years, n=630, 10-12 years:
42 n=564, 15-17 years: n=377). We assessed weight loss attempts and weight-related stress at baseline
43 and first follow-up, and perceived and desired silhouettes at first and second follow-up with
44 questionnaires. Weight misperception consisted of the difference in body mass index z-score
45 (zBMI) from the perceived silhouette and the measured zBMI. Body dissatisfaction consisted of
46 the discordance between perceived and desired silhouettes. We estimated multivariable mixed
47 effects regression models adjusting for age, sex, pubertal stage, parental BMI and education, and
48 sport-based teasing.

49 **Results.** Weight loss attempts were associated with a higher weight misperception score (ever
50 tried, beta [95% CI]: 0.13 [0.01; 0.24]) and with 2.13 times higher desire to be thinner (95% CI:
51 1.39; 3.26) at the subsequent follow-up. Similarly, children stressed by their weight had a higher
52 misperception score (beta [95% CI]: 0.15 [0.02; 0.27]) and greater desire to be thinner at the next
53 follow-up (OR [95% CI: 1.73 [0.999; 3.00]).

54 **Conclusions.** Weight-loss attempts and weight-related stress in children and adolescents are
55 associated with weight misperception and body dissatisfaction, supporting empowerment and
56 counselling focusing on healthy eating behaviors and a positive body image.

57 **IMPACT STATEMENT (50/50 words)**

58 First study examining weight loss attempts and body image over seven years in children with
59 parental obesity. Weight loss attempts and weight-related stress were prospectively associated
60 with weight misperception and body dissatisfaction. Findings highlight the importance of healthy
61 diet-free eating and the promotion of a healthy body image in childhood.

62 INTRODUCTION

63 People living with a larger shape consistently report greater negative cognitions,
64 perceptions, emotions, and behaviours related to their body shape and weight.¹ A negative body
65 image is associated with adverse mental health and well-being outcomes such as depression, poor
66 self-esteem, reduced self-confidence, and social marginalization in adolescents with overweight
67 or obesity², with weight-based teasing worsening these outcomes.³ In the current study, we focus
68 on two specific body image facets: weight misperception, defined as the incapacity to identify or
69 describe one's own weight and body shape accurately, and body dissatisfaction, defined as not
70 being satisfied with one's current weight or shape.⁴

71

72 Population-based studies report a high prevalence (49-61%) of body dissatisfaction in
73 adolescents, especially among girls and among adolescents with overweight or obesity.^{5, 6}
74 Engaging in weight loss attempts has been cross-sectionally associated with body dissatisfaction
75 in adolescents,^{7, 8} however not in a previous longitudinal study.⁹ Regarding weight misperception,
76 adolescents who perceive themselves as heavier tend to engage in weight loss attempts, especially
77 using extreme measures such as the use of laxatives or diuretics, fasting, or vomiting.¹⁰

78

79 Furthermore, childhood psychosocial stress, caused by familial and contextual factors (e.g.
80 exposure to violence) is associated with increased emotional eating, eating in the absence of
81 hunger¹¹ and weight gain.¹² The role of stress, particularly weight-related stress, on body image
82 remains uncertain. Indeed, interventions to reduce general stress as well as weight-focused stress

83 might be beneficial to restoring a healthy body image and preventing psychological distress in the
84 long term.

85

86 Despite their young age, children are vulnerable to weight loss attempts and weight-related
87 stress,¹³ weight misperception, and body dissatisfaction.^{14, 15} Yet few studies have reported
88 associations between weight loss attempts, weight-related stress and weight misperception in
89 children,^{16, 17} and none to our knowledge examined the link with body dissatisfaction. As weight-
90 based teasing is potentially a common cause of both weight loss attempts and body image, it is
91 necessary to account for it when examining these associations. The studies on the relationship
92 between weight loss attempts and weight misperception in children are of cross-sectional design,
93 and one of the two relied on self-reported anthropometric data and omitted potential confounders
94 (e.g., pubertal stage, parental adiposity),¹⁷ such that their findings are subject to bias.

95

96 Emerging evidence points to differences in sex and adiposity (e.g. body mass index [BMI])
97 in terms of weight loss attempts,¹⁸ weight misperception and body dissatisfaction.^{14, 15} In
98 adolescents, weight loss attempts are related to weight misperception, but differently across
99 sexes.¹⁹ Our study aims to examine how weight loss attempts and weight-related stress are
100 associated to weight perception and body dissatisfaction across childhood and adolescence. A
101 secondary objective is to investigate whether these associations differed by sex and by childhood
102 adiposity.

103

104 **MATERIALS AND METHODS**

105 *Design*

106 Data were drawn from the Quebec Adipose and Lifestyle Investigation in Youth
107 (QUALITY) cohort (Province of Québec, Canada) of children at risk of developing obesity due to
108 a parental history of obesity. The QUALITY study's overarching objective is to better understand
109 the natural history of obesity, its cardiometabolic consequences and the role of its determinants
110 across childhood. Complete methodology of the study has been published elsewhere.²⁰ We used
111 data collected at baseline, first, and second follow-ups for this study.

112

113 *Participants*

114 A total of 387 377 recruitment flyers were distributed among 2nd, 3rd, 4th, and 5th grade
115 students in 1040 elementary schools (89% of schools approached) within a 75-km radius of 3 urban
116 cities in the province of Québec. Eligible children were aged between 8 and 10 years, with at least
117 one biological parent with obesity (defined as self-reported BMI \geq 30 kg/m² or a waist
118 circumference > 102 cm in men and > 88 cm in women) and of White race/ethnicity. A total of
119 3350 families contacted the research staff to assess their eligibility. Among the 1320 eligible
120 families, 630 families (48%) agreed to participate and were evaluated between 2005 and 2008.
121 The first follow-up took place between 2008 and 2011 (10-12 years, n=564), and the second
122 follow-up between 2012 and 2015 (15-17 years, n=377).

123

124 The study was approved by the ethics research committees of Centre Hospitalier
125 Universitaire (CHU) Sainte-Justine and Institut Universitaire de Cardiologie et de Pneumologie de

126 Québec (IUCPQ). We obtained informed assent and consent from the child and parent,
127 respectively.

128

129 *Measurements*

130 Participants were invited to a full-day research visit at either CHU Sainte-Justine in
131 Montréal or at IUCPQ in Québec City at ages 8-10, 10-12, and 15-17 years. Trained research
132 nurses measured weight, height, and Tanner pubertal stage (0 = prepubertal, stage 1; 1 = pubertal,
133 stage 2 or above) at each visit following standardized protocols.²⁰ BMI was calculated by dividing
134 weight (kg) by squared height (m²). We computed age and sex adjusted BMI z-scores (zBMI) and
135 percentiles according to Center for Disease Control and Prevention.²¹ BMI categories were
136 attributed as follows: underweight if < 5th percentile; normal weight if between the ≥ 5th and <
137 85th; overweight if ≥ 85th and obese if ≥ 95th.²¹ Mothers' and fathers' BMI were calculated from
138 measured weight and height at baseline. To estimate socioeconomic status, we used the highest
139 parental educational attainment reported by parents at baseline, categorized as follows: high school
140 degree or less, college/vocational or trade school degree, and university degree. We measured
141 weight-based teasing but only in the context of physical activity with the child's questionnaire: "*I*
142 *often don't do physical activity because my friends tease me*" (1 = totally true, 2 = fairly true, 3 =
143 more or less true, 4 = false).

144

145 *Exposure variables*

146 We evaluated self-reported weight loss attempts and weight-related stress at baseline and
147 first follow-up with the children's questionnaire. The children completed the questionnaire in a

148 private room with the research assistant who ensured confidentiality of the responses and clarified
149 questions when necessary. Parents were in a separate room. Questions were retrieved from the
150 Quebec Child and Adolescent Health and Social Survey 1999 questionnaire.²² We assessed
151 lifetime and current weight loss attempts using these questions: “*Have you ever tried to lose*
152 *weight?*” (1 = yes, 0 = no) and “*Currently, what are you doing about your weight?*” (1 = trying to
153 lose weight, 2 = trying to gain weight, 3 = want to maintain my weight, 4 = not doing anything
154 about my weight). We evaluated weight-related stress with the question: “*During the past three*
155 *months, have you been worried or stressed by your weight?*” (1 = not at all, 2 = a little bit, 3 =
156 quite a bit, 4 = a whole lot) from the 2002 Health and Social Survey questionnaire.²³

157

158 *Outcome variables*

159 We assessed weight misperception with a scale of seven drawn sex-specific silhouettes
160 ranging from a child with a very thin body (silhouette 1) to a child with a very large body
161 (silhouette 7) in the child’s questionnaire at the first and second follow-ups with the question
162 “*Choose the illustration that best corresponds to your current appearance*”.²² Body silhouettes
163 have been shown to be reliable and highly correlated with specific BMI percentiles in children.²⁴
164 Using a previously published methodology,²⁵ we calculated a continuous weight misperception
165 score by calculating the difference between the zBMI of the perceived silhouette and the measured
166 zBMI. A negative score indicates underestimation whereas a positive score indicates
167 overestimation and a score of zero indicates accurate estimation of body size. Higher scores
168 represent greater misperception in either direction.

169

170 To assess body dissatisfaction, we asked the children to “*Choose the illustration that best*
171 *corresponds to what you would like to look like*” on the same scale of seven silhouettes and
172 calculated the difference between perceived and ideal silhouettes.⁵ Children were classified as
173 desiring to be thinner if the desired silhouette was thinner than the perceived silhouette, desiring
174 to be heavier if the desired silhouette was heavier than the perceived silhouette, and as satisfied
175 with their weight if the same two silhouettes were chosen.

176

177 *Statistical analyses*

178 We described children’s characteristics using means (standard deviations, SD), medians
179 (25th and 75th percentiles), and proportions for categorical variables. Characteristics were displayed
180 according to the children’s weight status based on zBMI cut points (underweight, normal weight
181 and overweight or obese) at the corresponding time point.

182

183 For our main objective, that is to examine the association between weight loss
184 attempts/weight-related stress and weight misperception and body dissatisfaction across childhood
185 and adolescence, we carried out distinct mixed effects multivariable regression models for each
186 exposure (ever tried to lose weight; currently trying to lose weight; stressed by weight) and
187 outcome combination (weight misperception; body dissatisfaction). Specifically, using the three
188 time points, we modelled beta coefficients and 95% confidence intervals (CI) on the relationship
189 between the exposure of interest at time t and the outcome at the subsequent follow-up (time t+1)
190 allowing for random intercepts. Thus, we provide a combined estimate of the relationship between
191 exposures at baseline (8-10 years) on outcomes at first follow-up (10-12 years), and between

192 exposure at first follow-up on outcomes at second follow-up (15-17 years). The variable ever tried
193 to lose weight was coded 1 = yes and 0 = no. The variable currently trying to lose weight was
194 coded 1 = trying to lose weight and 0 = not doing anything about my weight as the reference
195 category. The variable being worried or stressed by weight was coded 1 for those who responded
196 “a little bit”, “quite a bit” or “a whole lot” and 0 = “not at all”. We combined the three stress
197 categories because the numbers of children who reported “quite a bit” and “a whole lot” were too
198 small to allow inference as distinct categories. The number of observations remained low even
199 when combining “quite a bit” and “a whole lot” (n = 39).

200

201 Models were adjusted for potential confounders measured concurrently with the exposure
202 and included child’s age, sex, pubertal stage, zBMI, parental BMI and education level, and sport-
203 based teasing. This variable was coded 1 if responded “totally true”, “fairly true”, or “more or less
204 true”, and coded 0 if responded “false” to sport-based teasing. Because of the nonlinear
205 relationship between zBMI and the weight misperception score (**Figure S1, Supplemental**
206 **Material**), we used generalized additive models with penalized regression splines for zBMI in
207 weight misperception models. For the body dissatisfaction models, we estimated generalized
208 mixed effect models (logit link) comparing the likelihood of desiring to be thinner to being
209 satisfied with one’s silhouette as the reference category. We also verified the association between
210 weight-related stress and the desire to be heavier compared to being satisfied with one’s silhouette
211 as the reference category.

212

213 For our secondary objective, we investigated effect modification by sex by testing
214 interaction terms between sex and the exposure variable in each model described previously.
215 Similarly, we tested effect modification by the child's adiposity by including an interaction term
216 between zBMI and the exposure variable in each model. We conducted our analyses with R 4.2.1
217 (The R Foundation for Statistical Computing, Vienna, Austria). Statistical significance was two-
218 sided at alpha 5% level.

219

220 **RESULTS**

221 *Participants characteristics*

222 Characteristics of participants by weight status are reported in **Table 1**. Overall, 80% of
223 children with overweight or obesity and 30% of normal weight children had ever tried to lose
224 weight at 8-10 years of age. Forty-two percent of children with overweight or obesity reported
225 weight-related stress. On average, children underestimated their weight at 10-12 years, and to a
226 lesser extent at 15-17 years. Eighty-six percent of children with overweight or obesity and 29% of
227 normal weight children desired to be thinner at 10-12 years. At 15-17 years, proportion increased
228 to 92% in children with overweight or obesity and 37% in normal weight children.

229

230 The **Supplemental Material** presents data on weight loss attempts, weight-related stress,
231 weight misperception and body dissatisfaction in girls and boys separately. Of the 630 children at
232 baseline, 90% returned to the first follow-up and 60% to the second follow-up. Average duration
233 was 24 months (SD = 2) between baseline and first follow-up and 62 months (SD = 4) between

234 first and second follow-up. Children who did not come back for follow-up were younger, had a
235 higher zBMI and were more likely to have tried to lose weight, as previously reported.¹³

236

237 *Associations between self-reported weight loss attempts, weight-related stress, and weight*
238 *misperception*

239 As shown in **Table 2**, children who reported trying to lose weight were more likely to
240 overestimate their weight compared to their measured weight at the subsequent follow-up (ever
241 tried, beta [95% CI] = 0.13 [0.01; 0.24], currently trying = 0.13 [0.003; 0.25]). Moreover, children
242 who were stressed by their weight were more likely to overestimate their weight by 0.15 SD of
243 BMI at the next follow-up (95% CI = 0.02; 0.27), compared to children who did not experience
244 weight-related stress. We did not observe statistically significant interactions by zBMI or by sex.

245

246 *Associations between self-reported weight loss attempts, weight-related stress, and body*
247 *dissatisfaction*

248 Children who ever tried or were currently trying to lose weight were 2.13 (95% CI: 1.39,
249 3.26) and 2.21 times (95% CI: 1.38; 3.54) more likely to desire to be thinner at the subsequent
250 follow-up, compared to those who reported doing nothing about their weight (**Table 3**). Similarly,
251 children worried or stressed by their weight were more likely to desire to be thinner at the next
252 follow-up (OR [95% CI]: 1.73 [0.999; 3.00]). We did not observe statistically significant
253 interactions for sex or zBMI. Moreover, weight-related stress was not associated with a greater
254 likelihood of desiring to be heavier (data not shown).

255

256 **DISCUSSION**

257 This study examined the relationship between weight loss attempts and weight-related
258 stress with weight misperception and body dissatisfaction during pubertal years in children with
259 parental obesity. At 10-12 years of age, 86% of children with overweight or obesity desired to be
260 thinner compared to 29% of children with normal weight. Furthermore, self-reported weight loss
261 attempts and weight-related stress were found to be risk factors of weight misperception and body
262 dissatisfaction. Children in our sample were more prone to underestimate their weight although
263 the amplitude attenuated in adolescence. Weight underestimation was also reported in Canadian
264 children and adolescents²⁵ and children in Norway²⁶ and the Netherlands.²⁷ Weight
265 underestimation among children is greater when parents have a higher BMI,²⁵ which could explain
266 this finding in our study of children with parental obesity. Our findings support the visual
267 normalization theory, which proposes that weight status perception is influenced by visual norms
268 of body size and because of the higher prevalence of individuals with overweight or obesity today,
269 the definition of a “normal” weight has been recalibrated.²⁸ We thus hypothesize that because the
270 children in our sample live with parents with larger bodies, they may be more likely to
271 underestimate their weight and consider it as “normal”.

272

273 Although most children in the cohort underestimated their weight, those who reported past
274 or current weight loss attempts and were worried by their weight were more likely to overestimate
275 their weight at the subsequent follow-up. Similar findings have been noted in previous cross-
276 sectional studies in children.^{16, 17} Weight loss attempts and weight-related stress in childhood could

277 be involved in the development of a distorted perception of the body, which in turn can cause
278 shame and stress and predispose to disordered eating as a coping strategy.^{4, 10}

279

280 Most children with overweight or obesity desired to be thinner at 10-12 and 15-17 years,
281 which is very concerning for their mental health: body dissatisfaction in adolescence has been
282 associated with poorer self-esteem and higher risk of depression.² We found that past self-reported
283 weight loss attempts and weight-related stress were associated with the desire to be thinner at the
284 next visit. One case-control study observed that adolescents who engaged in weight loss attempts
285 reported past body dissatisfaction.²⁹ Our findings are consistent with the current literature in
286 adolescents on the exacerbating effect of weight loss attempts on body dissatisfaction.^{5, 8} In
287 Norwegian preteens and in French Canadian adolescents, weight loss attempts were cross-
288 sectionally associated with a greater body dissatisfaction, with the relationship being stronger in
289 girls compared to boys in both studies.^{5, 8} In contrast, we did not find effect modification by sex in
290 our study. Absence of effect modification could be because our sample is composed of children
291 with overweight or obesity (or at risk, given the parental history), such that boys, as much as girls,
292 report stress toward their weight and weight loss attempts, and that the relationship with body
293 image is similar across sexes.

294

295 Unlike most existing studies, our study focused on children with data collected
296 prospectively over seven years. This cohort design informs on the temporal causal sequence
297 between weight loss attempts, weight misperception and body dissatisfaction. We also used
298 innovative methods to define weight perception and body dissatisfaction using sex-specific child
299 silhouettes and measured zBMI. Another limitation is that self-reported weight loss attempts and

300 weight-related stress constructs were measured using single items. Importantly, we were not able
301 to distinguish between healthy and extreme methods of weight loss nor assess the motivations and
302 attitudes towards weight control. The associations of interest in the present study should be
303 examined in future studies with more detailed questionnaires or qualitative designs. There also
304 may be unaccounted confounders that biased our findings. For instance, we did not measure
305 experiences of weight-based teasing in other settings than a physical-activity-related context,
306 parental weight-related stress, or parental practices around weight loss and body image perception.
307 Finally, our study comprises only White children between years 2005 and 2015, which limits the
308 transposability of our findings to other ethnicities and to today's context.

309

310 **CONCLUSIONS**

311 In conclusion, our study suggests that children engaging in weight loss attempts or stressed
312 by their weight have an altered perception of their silhouette and suffer from body dissatisfaction.
313 This study lends further support towards empowerment and counselling that focus on healthy
314 eating behaviors and a positive body image, particularly among children with overweight or
315 obesity. Findings also call for health promotion campaigns that favor body acceptance starting at
316 an early age. Finally, more knowledge is needed on the role of weight loss attempts and weight-
317 related stress and body image in childhood, using more comprehensive measures and a longer
318 follow-up.

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327

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329 Soren Harnois-Leblanc: conceptualization, methodology, formal analysis, writing – original draft,
330 writing - review and editing. Andraea Van Hulst: conceptualization, methodology, writing - review
331 and editing. Kristen M. Lucibello: writing - review and editing. Marie-Josée Harbec: writing -
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337

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456 **SUPPLEMENTAL MATERIAL**

- 457 • Figure S1: Non-linear relationship between body mass index z-score and the weight
458 misperception score at next follow-up.
- 459 • Table S1. Weight loss attempts in the children at baseline and first follow-up, by sex.
- 460 • Table S2. Profile of weight perception and body dissatisfaction in the children at first and
461 second follow-up, by sex.

Table 1. Characteristics of the children from the QUALITY cohort at baseline, first follow-up, and second follow-up stratified by weight status at the corresponding time

<i>Baseline (8-10 years, n = 630)</i>			
	Underweight (n = 12)	Normal weight (n = 354)	Overweight or obesity (n = 264)
Age, mean (SD)	9.9 (1.0)	9.5 (0.9)	9.7 (0.9)
Girls, n (%)	7 (58.3)	160 (45.2)	120 (45.4)
Pubertal, n (%)	4 (33.3)	56 (15.8)	76 (28.9)
zBMI, mean (SD)	-1.91 (0.41)	0.03 (0.64)	1.75 (0.42)
Ever tried to lose weight, n (%)	1 (8.3)	99 (30.0)	212 (80.3)
Currently trying to lose weight, n (%)	0 (0)	68 (28.1)	169 (77.5)
Worried or stressed by weight, n (%)	0 (0)	25 (7.1)	109 (41.8)
Teased in sports, n (%)	1 (8.3)	54 (15.3)	44 (16.7)
Parental education, n (%)			
≥ 1 parent with high school degree or less	1 (8.3)	25 (7.1)	27 (10.2)
≥ 1 parent with college/vocational/trade school degree	8 (66.7)	115 (32.5)	113 (42.8)
≥ 1 parent with university degree	3 (25.0)	214 (60.5)	124 (47.0)
Mothers' BMI (kg/m ²), mean (SD)	26.9 (3.1)	28.3 (6.3)	31.0 (6.9)
Fathers' BMI (kg/m ²), mean (SD)	27.3 (4.0)	29.7 (4.9)	32.2 (5.8)
<i>First follow-up (10-12 years, n = 564)</i>			
	Underweight (n = 13)	Normal weight (n = 327)	Overweight or obesity (n = 224)
Ever tried to lose weight, n (%)	0 (0)	77 (23.5)	163 (72.8)
Currently trying to lose weight, n (%)	0 (0)	54 (24.3)	139 (80.8)
Worried or stressed by weight, n (%)	1 (7.7)	38 (11.7)	102 (45.6)
Teased in sports, n (%)	0 (0)	21 (6.4)	25 (11.1)
Weight misperception score, mean (SD) ^a	0.08 (0.84)	-0.93 (0.81)	-1.23 (0.70)

Concordance between perceived silhouette and desired silhouette, n (%)			
Same/Satisfied	6 (46.2)	184 (56.3)	31 (13.8)
Desire to be thinner	0 (0.0)	94 (28.7)	193 (86.2)
Desire to be heavier	7 (53.8)	49 (15.0)	0 (0.0)
<i>Second follow-up (15-17 years, n = 377)</i>			
	Underweight (n = 7)	Normal weight (n = 236)	Overweight or obesity (n = 134)
Weight misperception score, mean (SD) ^a	0.56 (0.58)	-0.60 (0.69)	-0.65 (0.60)
Concordance between perceived silhouette and desired silhouette, n (%)			
Same/Satisfied	2 (28.6)	97 (41.3)	11 (8.2)
Desire to be thinner	0 (0)	88 (37.4)	123 (91.8)
Desire to be heavier	5 (71.4)	50 (21.3)	0 (0)

Legend: BMI: body mass index, SD: standard deviation, zBMI: body mass index z-score.

^aThe misperception score is calculated with the following equation: perceived zBMI - measured zBMI. A negative score indicates weight underestimation, and a positive score, weight overestimation.

Table 2. Separate multivariable mixed effects linear regression models of the association between weight loss attempts and weight-related stress and the weight misperception score^a at the subsequent follow-up between baseline (8-10 years) and second follow-up (15-17 years)^b

	Weight misperception score $\hat{\beta}$ [95% CI]	<i>p</i> value
Ever tried to lose weight (vs. never)	0.13 [0.01; 0.24]	0.029
Currently trying to lose weight (vs. doing nothing)	0.13 [0.003; 0.27]	0.046
Worried or stressed by weight (vs. not)	0.15 [0.02; 0.27]	0.024

Legend: $\hat{\beta}$: estimated beta coefficient, CI: confidence intervals. Results in bold indicate statistical significance at the 5% level.

^aThe misperception score is calculated by the following equation: perceived zBMI - measured zBMI. A negative score indicates weight underestimation, and a positive score, weight overestimation.

^bAll models were distinct and were adjusted for age, sex, pubertal stage, zBMI, parental BMI, parental education, and sport-based teasing, as well as the subject ID variable as random intercept. We used penalized regression splines for the zBMI variable because the relationship between zBMI and the weight misperception score is nonlinear. See the Figure in the Supplemental Material.

Table 3. Separate multivariable mixed effects generalized linear models of the association between weight loss attempts and weight-related stress and the desire to be thinner at the subsequent follow-up between baseline (8-10 years) and second follow-up (15-17 years)^a

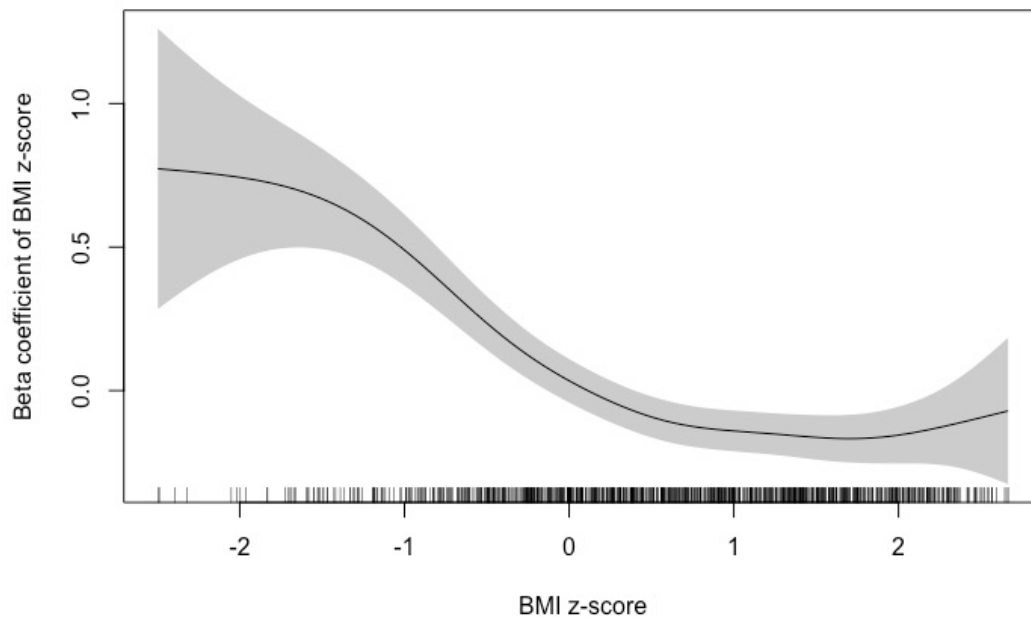
	Desire to be thinner \widehat{OR} [95% CI]	<i>p</i> value
Ever tried to lose weight (vs. never)	2.13 [1.39 ; 3.26]	<0.001
Currently trying to lose weight (vs. doing nothing)	2.21 [1.38 ; 3.54]	0.001
Worried or stressed by weight (vs. not)	1.73 [0.999 ; 3.00]	0.050

Legend: CI: confidence intervals, \widehat{OR} : estimated odds ratio. Results in bold indicate statistical significance at the 5% level.

^aAll models were distinct and were adjusted for age, sex, pubertal stage, body mass index z-score (zBMI), parental BMI, parental education, and sport-based teasing.

SUPPLEMENTAL MATERIAL

Figure S1. Non-linear relationship between body mass index z-score and the weight misperception score at next follow-up



Legend: The generalized additive mixed model used penalized regression splines to estimate with flexibility the relationship between body mass index z-score (zBMI) on the x-axis and weight misperception score. The y-axis represents the beta coefficient of the effect of zBMI on the weight misperception score across the spectrum of zBMI. The effect of zBMI on the weight misperception score plateaus at a zBMI of -2 to -1, decreases and becomes slightly negative starting at a zBMI of +1, and increases again at a zBMI of +2. The curve should be interpreted with caution in the extremes given the small number of observations.

Table S1. Weight loss attempts in the children at baseline and first follow-up 8-10 and 10-12 years of age, by sex

Baseline (8-10 years)		
	Girls (n = 287)	Boys (n = 343)
Ever tried to lose weight, n (%)	143 (49.8)	169 (49.3)
Currently trying to lose weight, n (%)	113 (51.8)	124 (49.6)
Worried or stressed by weight, n (%)	68 (23.8)	66 (19.5)
First follow-up (10-12 years)		
	Girls (n = 251)	Boys (n = 313)
Ever tried to lose weight, n (%)	103 (41.0)	137 (43.8)
Currently trying to lose weight, n (%)	86 (47.5)	107 (48.9)
Worried or stressed by weight, n (%)	75 (29.9)	66 (21.3)

Table S2. Profile of weight perception and body dissatisfaction in the children at first and second follow-up 10-12 and 15-17 years of age, by sex

First follow-up (10-12 years)		
	Girls (n = 251)	Boys (n = 313)
Weight misperception score, mean (SD)	-1.03 (0.78)	-1.02 (0.81)
Concordance between perceived silhouette and desired silhouette, n (%)		
Same/Satisfied	97 (38.6)	124 (39.6)
Desire to be thinner	138 (55.0)	149 (47.6)
Desire to be heavier	16 (6.4)	40 (12.8)
Second follow-up (15-17 years)		
	Girls (n = 173)	Boys (n = 204)

Weight misperception score, mean (SD)	-0.53 (0.70)	-0.65 (0.65)
Concordance between perceived silhouette and desired silhouette, n (%)		
Same/Satisfied	44 (25.6)	66 (32.4)
Desire to be thinner	121 (70.3)	90 (44.1)
Desire to be heavier	7 (4.1)	48 (23.5)