Adolescents' Subjective Appraisals: Relationships with Body Image and Dieting Attempts

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Abstract

Background: Current concerns around obesity, physical inactivity, eating disorders and their associated health consequences sustains the need for understanding body image and disordered eating in adolescence.

Objectives: The study explored how subjective appraisals of health, familial support, wellbeing and weight are associated with body image and dieting attempts in adolescents.

Methods: The study analysed data from a population-representative UK adolescent sample of 3,684 adolescents (aged between 11 and 16) from Understanding Society. Gender-stratified hierarchical and logistic regressions modelled the relationships between the adolescents' subjective appraisals of self (health, familial support, wellbeing and weight) and their body image and dieting attempts respectively.

Results: Subjective appraisal of being overweight was the strongest and most consistent predictor of poorer body image (Bs = 1.17 to 1.19, P < 0.01) and higher likelihood of dieting and weight loss attempts in both males (odds ratios = 9.36 to 9.76, P < 0.001) and females (odds ratio = 8.88 to 9.43, P < 0.001). Positive appraisals of health and wellbeing were associated with positive body image (Bs = 0.25 to 0.55, P < 0.001). However, positive appraisals of family support were associated with dieting attempts in males (B = 1.34, P < 0.05).

Conclusions: These highlight the importance of incorporating education components addressing wellbeing and family support into current adolescent public health programmes looking to mitigate risks of developing unhealthy weight control behaviours.

Keywords: Body Image, Dieting, Weight Loss, Adolescent, Subjective Appraisals, Wellbeing

1. Background

Growing public health concerns about obesity, physical inactivity, eating disorders and their associated health consequences continue to contribute to the interest in understanding body image and disordered eating in adolescence (1). Body image encompasses how we perceive, think, act and feel towards our body (2) and while it is largely accurate and positive, it could also be an unhealthy, inaccurate and largely negative perception (3). There is consistent evidence indicating that unhealthy body image plays an important role in eating disorder development (4), and is associated with physical inactivity and obesity in adolescents (5). Body image dissatisfaction is often cited as a reason behind adolescent dieting decisions (6). However, dieting, as a behaviour, is subjectively defined by patients and practitioners alike as it represents a spectrum of eating-related behaviour that ranges from healthy to unhealthy. Nonetheless, it suggests an intentional change in eating behaviours to achieve either weight loss or gain that is often temporary (7), with fasting, skipping meals and crash diets being most frequent (8, 9).

Psychologically, adolescence is also the time where one's identity and behaviours are shaped through the exploration of possible selves and developments in their ideological and interpersonal domains (10, 11). Because of the type and magnitude of age-related transitions (e.g., puberty) that also take place during these years, many influences also accompany this development process (12) and there is emerging evidence (12, 13) suggesting that this process may be important for the development of positive (or negative) body image and adaptive (or maladaptive) eating behaviours.

Jackson et al. (14) found that the perception of body weight in adolescents might be a cause for concern. While normal-weight adolescents largely estimated their body weight accurately, overestimation was still more common among girls than boys. However, almost half of the boys and a third of girls in the overweight or obese category underestimated their weight and perceived themselves as being about the right weight. Overall, though Jackson, Jackson et al. (14) found that girls had more accurate recognitions of weight status, supporting past suggestions that greater societal emphasis on thinness in women is also prevalent in adolescence (15, 16).

In addition, Kolodziejczyk et al. (17) found body im-

age and self-esteem mediating the relationship between BMI and quality of life. However, there is limited understanding of these relationships despite the growing focus on quality of life research in other fields within psychology, such as environmental ([18]) and transportation psychology ([19]). Quality of life research is also increasingly important for governments worldwide (Office of National Statistics, ([20])) thus there is need for more research exploring the use of subjective appraisals by youths in the area of body image and disordered eating.

The present study aims to investigate the relationship between subjective appraisals of adolescents and two precedents of eating disorders using understanding society, the UK household longitudinal study (UKHLS), a large representative dataset of the UK.

2. Methods

2.1. Study Design and Sample

Data from wave 4 of the UKHLS ([21]) was used. The UKHLS is a longitudinal panel survey of over 40,000 UK households that started in 2009, surveying all participants within the household annually via a computer-assisted personal interview. At wave 4, 3,684 youth participants between 10 to 16 years old within these households were surveyed on a range of variables used here. Further explanation of these variables follow. Further information about the UKHLS and its sampling methodology is reported elsewhere ([22]). For the purpose of this study, the sample was initially restricted to participants who had provided weight and height data for the calculation of body mass index (BMI; n = 1,634). As the study investigated two different outcome variables related to the development of eating disorders, two analytic samples were then derived. These two analytic samples were restricted to those with complete data for the relevant outcomes (body image or dieting and weight loss attempts) and covariates: (i) body image analysis sample (n = 1,342; 719 boys and 623 girls); (ii) dieting and weight loss attempt analysis sample (n = 1,336; 715 boys and 621 girls). Of these, 1,336 individuals appeared in both analytic samples, with a further 6 featuring in the body image sample only, making a total of 1,342 individuals featuring in one or both analytic samples. Ethical approval was not required for the analysis of secondary data presented here.

2.2. Data and Variables

The variables of interest related to the subjective appraisal of the health, weight, familial support and wellbeing of the respondents. The subjective appraisal of health was derived from responses on a five-point Likert scale ranging from 'poor' to 'excellent' to the question: "In general, would you say your health is?" The subjective appraisal of physiology was derived from a four-category response to the question: "Do you think that you are…" Responses options included 'about the right weight', 'underweight', 'slightly overweight' and 'very overweight'. The subjective appraisal of familial support was derived from responses on a seven-point Likert scale ranging from 'not at all happy' to 'completely happy' to the question: "How do you feel about your family?" Subjective wellbeing was measured by responses on a seven-point Likert scale ranging from 'not at all happy' to 'completely happy' to the question: "How do you feel about your life overall?"

The outcome variable of body image was measured by responses to the question: "How do you feel about your appearance?" Responses were rated on a seven-point Likert scale ranging from 'not at all happy' to 'completely happy'. The second outcome variable, dieting and lose weight attempts, was derived from responses to the question: "Do you ever diet or try to lose weight?" Responses were categorised to form a dichotomous variable consisting of 'no' (never), 'yes' (some of the time or all the time).

A range of factors hypothesised to confound the relationship between variables of interest and outcome variables were identified: age (continuous); BMI (continuous); diet quality (approximated using number of portions of fresh fruit and vegetables consumed in a typical day: none (reference category), 1 - 2 portions, 3 - 4 portions and 5 or more portions); level of engagement in physical activity (six category variable: never or hardly ever (reference category), less often than once a week, 1 - 2 days, 3 - 4 days, 5 - 6 days and everyday); mode of travel to school (three category variable conceptualised by increasing levels of physical exertion: by car (reference category), by public transport (bus, tube or train) and by active transport (walking or cycling)); familial proximity (approximated using the number of days per week that family has an evening meal together: none (reference category), 1 or 2 times, 3 - 5 times, 6 - 7 times).

2.3. Statistical Analysis

Descriptive analysis was undertaken to assess the levels of subjective appraisal of the health, weight, familial support and wellbeing in the study population, the levels of body image and attempts to diet and lose weight, and the patterning of the hypothesised confounding factors. Body image was operationalized as continuous variables; thus, multivariate linear regression was used to investigate its relationship with the variables of interest. Similarly, multivariate logistic regression was used to investigate the relationship between the variables of interest and dieting and weight loss attempt because of the dichotomous outcome

measure. As significant gender differences were present in two of four the variables of interest of subjective appraisal of weight (λ^2 test, P < 0.001) and health (t test, P < 0.05), and in the outcome variables of body image (λ^2 test, P < 0.001) and attempts of dieting and weight loss (t test, P < 0.001), the analyses were stratified by sex. In all instances, the analyses were carried out in two stages. The first model included the variables of interest and, age and BMI in the linear regressions and body image in the logistic regressions. The second model then added the remaining sociodemographic variables. Any remaining significant effect in the second model indicates independent effects from the variables of interest. All analyses were undertaken with Stata 13 software using the appropriate sample probability weights provided with the UKHLS data.

3. Results

The two analytic datasets were found to be representative of one another thus, for conciseness, only the descriptive of the body image sample is presented (see Table 1). In the body image analytic sample (719 boys, 623 girls), the mean age for boys was 12.76 (0.09) years and 12.75 (0.09) years for girls. Overall mean (SD) BMI was 19.59 (0.19) for boys and 19.69 (0.21) for girls. Boys reported higher levels of body image (M = 5.51, SD = 0.06) than girls (M = 5.07, SD = 0.10). Reports of dieting and weight loss attempts made some or all the time was reported by 43% of girls, compared to 32% of boys.

3.1. Body Image

Table 2 shows the results of sex-stratified multivariate linear regression modelling investigating the relationship between subjective appraisals of health, weight, familial support and wellbeing and body image in adolescents. Positive appraisals of health (P < 0.001) and wellbeing (P < 0.001) significantly predicted positive body image in the age and BMI adjusted and fully-adjusted models for both genders. Positive appraisal of familial support, however, predicted positive body image only for boys in all models (P < 0.01). The appraisal of being very overweight significantly predicted negative body image for both boys (P < 0.01) and girls (P < 0.001) in all models. In addition, for girls, the appraisal of being slightly overweight also predicted negative body image (P < 0.01).

The effect sizes for significant predictors were generally similar for both boys and girls. The greatest effect sizes were observed in the appraisal of weight, as would be expected. In the age and BMI adjusted models, boys and girls who appraised themselves as very overweight reported body image scores 1.04 (95% confidence interval 0.34 to

1.74) and 1.16 (0.56 to 1.75) points respectively lower than those who appraised themselves as having about the right weight. Adjusting for the full range of hypothesised confounding factors increased these differences to 1.17 (0.43, 1.92) and 1.19 (0.67, 1.71) points lower for boys and girls respectively. For girls who appraised themselves and slightly overweight, compared to being about the right weight, reported a similar picture, albeit with smaller effect sizes.

3.2. Dieting and Weight Loss Attempt

Tables 3 and 4 shows the results of sex stratified multivariate logistic regression modelling investigating the impact of subjective appraisals of health, weight, familial support and wellbeing on the likelihood of dieting and weight loss attempts in youth. Differences amongst the predictors were noticeable between the models for boys and girls.

In the body image adjusted model for boys, the appraisal of health [OR (95% CI) = 0.82 (0.68, 0.98), P < 0.05] and familial support [OR (95% CI) = 1.18 (1.03, 1.35), P < 0.05] were found to significantly predict dieting and weight loss attempts. In addition, boys who appraised themselves as being slightly overweight or very overweight were 9.72 (95% CI = 6.97, 13.55, P < 0.001) and 10.50 (95% CI = 5.02, 21.97, P < 0.001) times more likely to report dieting and weight loss attempts compared to boys who appraised themselves as being about the right weight. However, appraisals of wellbeing was not found to predict dieting and weight loss attempts, OR (95% CI) = 0.92 (0.78, 1.08), P > 0.05. Further adjustment for the full range of hypothesised confounding factors did not greatly affect the magnitude and significance of these results except for the appraisal of health, which was no longer significant, OR (95% CI) = 0.84 (0.61, 1.16), P > 0.05.

For girls, only the appraisals of health [OR (95% CI) = 0.77 (0.65, 0.92), P < 0.01] and weight significantly predicted dieting and weight loss attempts in the body image adjusted model. Girls who appraised themselves as being 'slightly overweight' or 'very overweight' were 8.42 (95% CI = 5.87, 12.08, P < 0.001) and 7.96 (95% CI = 3.86, 16.43, P < 0.001) times more likely to report dieting and weight loss attempts compared to girls who appraised themselves as being 'about the right weight'. However, comparatively, girls who appraised themselves of being 'underweight' were less likely to engage in dieting and weight loss attempts, OR (95% CI) = 0.40 (0.19, 0.85), P < 0.05. Body image was also found to significantly predict dieting and weight loss attempts, OR (95% CI) = 0.82 (0.72, 0.92), P < 0.01. In the fully adjusted model, the observed effects persisted and increased in magnitude. In addition, age [OR (95% CI) = 1.25 (1.06, 1.47), P < 0.001] was a unique predictor of dieting and

weight loss attempts in girls in addition to BMI [OR (95% CI) = 1.13 (1.06, 1.21), P < 0.01] that was also observed in boys.

4. Discussion

This study investigated associations between the subjective appraisals of health, familial support, wellbeing and weight, and body image and dieting attempts in adolescent using a large nationally representative dataset. Subjective appraisals of being overweight was found to be the strongest and most consistent predictor of poorer body image and higher likelihood of dieting and weight loss attempts, and these were found among both male and female adolescents. As this observation persisted even after taking into account BMI, this finding suggests that appraising oneself as overweight influences body image and increases the likelihood of dieting and weight loss attempts above and beyond the adolescent's actual physiology. This highlights the importance of considering how one's perceptions of their own weight underlies or sustains poor body image or dieting and weight loss behaviours in both research and clinical practice (12, 23).

Positive appraisals of health and wellbeing were associated with positive body image for both male and female adolescents. However it has to be noted that given the nature of the analysis here, direction of causality cannot be established. While it is possible that having a positive body image contributes to positive appraisals of overall health and wellbeing, it is also plausible that adolescents who view their health and wellbeing positively would be more satisfied with their body image. Nonetheless, this observation implies that body image is related to an adolescent's overall subjective health and wellbeing. This expands past findings that adolescents with poorer body image also report poorer self-esteem and self-worth, and higher risk of depression (24-26).

An interesting finding was that appraisals of higher support from their family by male adolescents were associated with dieting and weight loss attempts. This seems to be counterintuitive, as it would be expected that having good support from their family would be a protective factor against the onset of dieting and weight loss attempts, especially when we also found that it was also associated with positive body image in boys. Yet, this finding would be made clearer if understood from the perspective that motivation behind dieting and weight loss differs in males and females adolescents in the same way that male body dissatisfaction would be masculinity- than thinness-related as compared to females (27). Thus, it is possible that dieting and weight loss by male adolescents may be oriented towards masculinity enhancement and facilitated by supportive family environments (28, 29).

Though covariates of physical activity levels, diet and time spent as a family were not associated with body image and dieting and weight loss attempts, it was still important to consider these as they are contribute to the adolescent's overall wellbeing. On the whole, these findings suggest that while there are similarities in the associations with body image and dieting and weight loss attempts in male and female adolescents, there are also gender specific associations. These imply that tailored approaches are needed when understanding and working with adolescents on body image and dieting and weight loss behaviours. Furthermore, potential cultural and societal differences should also be further explored as the concept of body image and normative eating behaviours show great variability between cultures and societies (29, 30).

Using the UKHLS provided a large representative sample of adolescents with the appropriate statistical power to explore these associations between our variables. The use of the four different subjective appraisals measures also allowed a multi-faceted exploration when exploring possible precursors in the development of body dissatisfaction and dieting behaviour. However, a key limitation of this study is the somewhat simplified measurements of these constructs using single-item measures instead of more established measures like the eating disorder inventory and body satisfaction scale. However, our findings, in line with the ongoing debate on the use of single-item measures (31), generally supported findings from past studies and suggests potential utility for these measures. Nonetheless, it would be useful to replicate this analysis with established measures. In addition, as this analysis was only conducted for data collected at one time point, the direction of causality cannot be interred from our findings. Longitudinal and quasi-experimental designs will be needed in future research to define and explore these causal mechanisms.

These limitations notwithstanding and in the context of today's public health focus on reducing obesity, it is important for programmes that target adolescents consider incorporating educational components that address and promote the wellbeing of the adolescent while actively involving adolescent's family to build a supportive immediate social support network to mitigate the risks of developing unhealthy weight control behaviours.

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Table 1. Distribution of Outcome Variables (Bod Image and Dieting and Weight Loss Attempts), Variables of Interest (Subjective Appraisal of the Health, Weight, Familial Support and Wellbeing), and Hypothesized Confounding Covariates in the Body Image Analytic Sample[a]

	Boys (n = 719)	Girls (n = 623)	P Value
Body image (1 (not at all happy) to 7 (completely happy)	5.51 (0.06)	5.07 (0.10)	< 0.001[b]
Age, y	12.75 (0.09)	12.76 (0.09)	0.94[b]
Body mass index	19.59 (0.19)	19.69 (0.21)	0.74[b]
Subjective appraisal of the health (1 (poor) to 5 (excellent)	3.59 (0.04)	3.81 (0.06)	0.06[b]
Subjective appraisal of the familial support (1 (not at all happy) to 7 (completely happy)	6.33 (0.06)	6.34 (0.06)	0.89[b]
Subjective appraisal of the wellbeing (1 (not at all happy) to 7 (completely happy)	5.98 (0.07)	5.88 (0.06)	0.21[b]
Dieting and weight loss attempt			0.01[c]
No (never)	484 (67.72)	354 (57.00)	
Yes (some/all the time)	231 (32.28)	267 (43.00)	
Subjective appraisal of the weight			0.08[c]
About the right weight	485 (67.45)	382 (61.385)	
Underweight	61 (8.42)	38 (6.05)	
Slightly overweight	151 (20.96)	175 (28.14)	
Very overweight	23 (3.17)	38 (4.43)	
Travel mode to school			0.59[c]
Car	180 (25.01)	174 (27.92)	
Public transport (bus, tube or train)	182 (25.28)	160 (25.63)	
Active transport (walk or cycle)	357 (49.70)	289 (46.45)	
Level of engagement in physical activity weekly			0.001[c]
Never or hardly ever	15 (2.05)	20 (3.28)	
Less often than once a week	27 (3.73)	34 (5.38)	
1 - 2 days	119 (16.25)	166 (26.62)	
3 - 4 days	252 (35.09)	242 (38.80)	
5 - 6 days	180 (24.97)	92 (14.80)	
Everyday	127 (17.64)	69 (11.12)	
Portion of fruits and vegetable consumed per day			0.51[c]
None	29 (4.01)	18 (2.82)	
1 - 2	273 (38.01)	216 (34.75)	
3 - 4	339 (47.17)	301 (48.30)	
5 or more		88 (14.13)	
Evening meals together with family per week			0.44[c]
None	45 (6.20)	35 (6.65)	
1 - 2 times	109 (15.18)	115 (18.46)	

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Table 2. Results of Sex Stratified Series of Linear Regressions Models Investigating the Association Between Subjective Appraisal of Health, Weight, Familial Support and Wellbeing and Body Image[a]

	Boys (n = 719)		Girls (n = 623)	
	Age and BMI Adjusted Difference	Fully Adjusted Difference	Age and BMI Adjusted Difference	Fully Adjusted Difference
Subjective appraisal of health	0.32	0.32	0.25	0.25
	(0.17, 0.47)[b]	(0.18, 0.47)[b]	(0.13, 0.37)[b]	(0.11, 0.40)[b]
Subjective appraisal of familial support	0.16	0.19	0.05	0.08
	(0.02, 0.31)[c]	(0.06, 0.32)[d]	(-0.11, 0.20)	(-0.06, 0.22)
Subjective appraisal of wellbeing	0.44	0.39	0.57	0.55
	(0.25, 0.62)[b]	(0.21, 0.57)[b]	(0.48, 0.66)[b]	(0.44, 0.66)b
Subjective appraisal of weight				
About the right weight	0	0	0	0
Underweight	-0.32 (-0.72, 0.07)	-0.20 (-0.56, 0.15)	-0.22 (-0.65, 0.21)	-0.33 (-0.65, -0.01)c
Slightly overweight	-0.19 (-0.42, 0.04)	-0.17 (-0.42, 0.08)	-0.42 (-0.67, -0.16)[d]	-0.35 (-0.62, -0.09)d
Very overweight	-1.04 (-1.74, -0.34)[d]	-1.17 (-1.92, -0.43)[d]	-1.16 (-1.75, -0.56)[b]	-1.19 (-1.71, -0.67)b
Age, y	-0.02 (-0.08, 0.04)	-0.02 (-0.08, 0.04)	-0.10 (-0.15, -0.04)[b]	-0.11 (-0.17, -0.04)d
Body mass index	-0.00 (-0.03, 0.03)	0.01 (-0.02, 0.04)	-0.01 (-0.04, 0.02)	-0.00 (-0.03, 0.03)
Travel mode to school				
Car		0		0
Public transport (bus, tube or train)		-0.16 (-0.40, 0.08)		-0.13 (-0.39, 0.12)
Active transport (walk or cycle)		-0.12 (-0.32, 0.07)		-0.18 (-0.40, 0.04)
Level of engagement in physical activity weekly				
Never or hardly ever		0		0
Less often than once a week		-0.45 (-1.88, 0.98)		0.61 (-0.32, 1.55)
1 - 2 days		-0.25 (-1.58, 1.09)		0.33 (-0.43, 1.08)
3 - 4 days		-0.18 (-1.52, 1.16)		0.30 (-0.41, 1.04)
5 - 6 days		-0.22 (-1.59, 1.15)		0.25 (-0.41, 0.91)
Everyday		0.00 (-1.36, 1.36)		0.16 (-0.60, 0.92)
Portion of fruits and vegetable consumed per day				
None		0		0
1 - 2		0.42 (-0.62, 1.05)		0.04 (-0.50, 0.58)
3 - 4		0.43 (-0.22, 1.08)		-0.01 (-0.52, 0.51)
5 or more		0.57 (-0.08, 1.22)		0.05 (-0.50, 0.59)
Evening meals together with family per week				
None		0		0
1 - 2 times		-0.07 (-0.62, 0.49)		0.15 (-0.41, 0.70)
3 - 5 times		0.07 (-0.45, 0.59)		0.15 (-0.38, 0.68)
6 - 7 times		0.41 (-0.47, 0.55)		0.01 (-0.51, 0.53)

Abbreviation: BMI, body mass index.
[a] Values are difference (95% confidence interval) in body image score.
[b] P < 0.001.
[c] P < 0.05.
[d] P < 0.01.

Table 3. Results of Logistic Regressions Models Investigating the Association Between Subjective Appraisal of Health, Weight, Familial Support and Wellbeing and Dieting and Weight Loss Attempts in Boys (n = 715)

	Body Image Adjusted		Fully Adjusted	
	OR (95%CI)	Wald	ORa (95%CI)	Wald
Subjective appraisal of health	0.82 (0.68, 0.98)[a]		0.84 (0.61, 1.16)	
Subjective appraisal of familial support	1.18 (1.03, 1.35)[a]		1.34 (1.04, 1.73)[a]	
Subjective appraisal of wellbeing	0.92 (0.78, 1.08)		0.79 (0.60, 1.06)	
Subjective appraisal of weight		70.63[b]		28.17[b]
About the right weight	1		1	
Underweight	0.57 (0.30, 1.07)		0.72 (0.42, 1.23)	
Slightly overweight	9.72 (6.97, 13.55)[b]		9.96 (5.80, 17.12)[b]	
Very overweight	10.50 (5.02, 21.97)[b]		17.12 (5.14, 57.01)[b]	
Body image	1.08 (0.94, 1.24)		1.04 (0.82, 1.31)	
Age, y			1.00 (0.87, 1.16)	
Body mass index			1.11 (1.04, 1.18)[c]	
Travel mode to school				1.24
Car			1	
Public transport (bus, tube or train)			0.65 (0.35, 1.24)	
Active transport (walk or cycle)			0.97 (0.57, 1.63)	
Level of engagement in physical activity weekly				2.16
Never or hardly ever			1	
Less often than once a week			1.39 (0.04, 45.31)	
1 - 2 days			2.80 (0.10, 80.80)	
3 - 4 days			3.91 (0.13, 115.72)	
5 - 6 days			5.96 (0.20, 177.75)	
Everyday			6.35 (0.21, 189.73)	
Portion of fruits and vegetable consumed per day				0.87
None			1	
1 - 2			3.25 (0.55, 19.26)	
3 - 4			3.77 (0.61, 23.42)	
5 or more			2.92 (0.44, 19.48)	
Evening meals together with family per week				1.90
None			1	
1 - 2 times			1.78 (0.54, 5.88)	
3 - 5 times			2.48 (0.84, 7.30)	
6 - 7 times			1.53 (0.52, 4.84)	

Abbreviation: OR, odds ratio.

[a] $P < 0.05$.

[b] $P < 0.001$.

[c] $P < 0.01$.

Table 4. Results of Logistic Regressions Models Investigating the Association Between Subjective Appraisal of Health, Weight, Familial Support and Wellbeing and Dieting and Weight Loss Attempts in Girls (n = 621)

	Body Image Adjusted		Fully Adjusted	
	ORa (95%CI)	Wald	ORa (95%CI)	Wald
Subjective appraisal of health	0.77 (0.65, 0.92)[a]		0.62 (0.45, 0.85)[a]	
Subjective appraisal of familial support	0.93 (0.75, 1.14)		0.89 (0.64, 1.22)	
Subjective appraisal of wellbeing	0.97 (0.82, 1.16)		1.03 (0.82, 1.29)	
Subjective appraisal of weight		57.05[b]		18.65[b]
About the right weight	1		1	
Underweight	0.40 (0.19, 0.85)[c]		0.36 (0.18, 0.71)[a]	
Slightly overweight	8.42 (5.87, 12.08)[b]		7.55 (4.16, 13.68)[b]	
Very overweight	7.96 (3.86, 16.43)[b]		4.13 (1.77, 9.63)[a]	
Body image	0.82 (0.72, 0.92)[a]		0.79 (0.66, 0.96)[c]	
Age, y			1.25 (1.06, 1.47)[a]	
Body mass index			1.13 (1.06, 1.21)[b]	
Travel mode to school				0.65
Car			1	
Public transport (bus, tube or train)			0.71 (0.39 1.30)	
Active transport (walk or cycle)			0.79 (0.46, 1.36)	
Level of engagement in physical activity weekly				0.49
Never or hardly ever			1	
Less often than once a week			1.25 (0.26, 5.95)	
1 - 2 days			0.75 (0.22, 2.56)	
3 - 4 days			1.11 (0.33, 3.71)	
5 - 6 days			1.13 (0.33, 3.84)	
Everyday			0.93 (0.31, 2.80)	
Portion of fruits and vegetable consumed per day				1.54
None			1	
1 - 2			2.87 (0.73, 11.38)	
3 - 4			3.29 (0.81, 13.31)	
5 or more			1.89 (0.39, 9.19)	
Evening meals together with family per week				1.14
None			1	
1 - 2 times			0.57 (0.18, 1.79)	
3 - 5 times			0.63 (0.23, 1.73)	
6 - 7 times			0.46 (0.17, 1.23)	

Abbreviation: OR, odds ratio.
[a] $P < 0.01$.
[b] $P < 0.001$.
[c] $P < 0.05$.