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## Body dissatisfaction and disordered eating are prevalent problems among U.S. young people from diverse socioeconomic backgrounds: Findings from the EAT 2010–2018 study

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### Abstract

**Purpose:** Body dissatisfaction and disordered eating are linked to adverse health consequences. Research describing socioeconomic patterns in the prevalence of these problems is important for informing the design of health services and efforts to improve health equity.

**Methods:** Population-based cohort study (EAT 2010–2018: Eating and Activity over Time) of socioeconomically and ethnically/racially diverse U.S. young people who completed surveys as adolescents in 2009–2010 (mean age = 14.5 years) and as emerging adults in 2018 (mean age = 22.0 years). Participants were recruited from 20 schools in Minneapolis-St. Paul, Minnesota. Household socioeconomic status was determined using adolescent report of parental education,

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**Vivienne Hazzard:** Methodology, writing – review and editing.

**Dianne Neumark-Sztainer:** Supervision, methodology, writing – review and editing, funding acquisition,

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Declaration of competing interest

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employment, and public assistance benefits. Analyses were conducted using data from 1531 participants and regression models that accounted for repeated measures within individuals.

**Results:** Among females, high body dissatisfaction and unhealthy weight control behaviors (e.g., skipping meals) were more prevalent and regular use of lifestyle weight management behaviors (e.g., exercise) was less prevalent in the low SES group as compared to the middle and/or upper SES groups ( $p = .010$ ). Among males, thinness-oriented dieting, unhealthy weight control behaviors, and extreme weight control behaviors (e.g., taking diet pills) were all more prevalent in the low SES group as compared to the middle and/or upper SES groups ( $p = .010$ ). Few differences were observed across SES groups in models that adjusted for ethnic/racial identity and body mass index.

**Conclusions:** There is a need for greater attention to the reach and relevance of efforts to prevent disordered eating and improve body satisfaction to ensure efforts benefit young people across SES groups.

### Keywords

Disordered eating; Body satisfaction; Weight control behavior; Socioeconomic status; Adolescents; Emerging adults

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## 1. Introduction

Body dissatisfaction and disordered eating (including thinness-oriented dieting, unhealthy and extreme weight control behaviors, and binge eating) are highly prevalent among U.S. young people and are associated with several adverse consequences (Arcan et al., 2014; Chin et al., 2018; Hart et al., 2020; Kärkkäinen et al., 2018; Nagata et al., 2018a; Nagata et al., 2018b; Neumark-Sztainer, Wall, Larson, et al., 2012; Neumark-Sztainer et al., 2018; Patton et al., 1999). Experiencing body dissatisfaction is linked to greater risk for poor psychosocial health, inadequate physical activity, and engaging in disordered eating (Brechan & Lundin Kvaalem, 2015; Johnson et al., 2013; McLean & Paxton, 2019; Neumark-Sztainer et al., 2004; Neumark-Sztainer, Paxton, Hannan, et al., 2006; Stice & Shaw, 2002). Young people who engage in dieting and other forms of disordered eating are at increased risk for poor dietary intake, excess weight gain, alcohol and tobacco use, eating disorders, and serious medical problems (Field et al., 2007; Killen et al., 1996; Larson et al., 2009; Neumark-Sztainer, Wall, Gou, et al., 2006b; Piran & Robinson, 2011; Puccio et al., 2016). Disordered eating behaviors are of public health concern for both adolescent and emerging adult populations, and tend to track within individuals over time (Lewinsohn et al., 2000; Neumark-Sztainer et al., 2011). For example, population-based data from the Project EAT study indicate that more than 50% of adolescent girls and nearly 40% of adolescent boys use inherently unhealthy weight control behaviors (UWCBs such as taking diet pills, fasting) (Neumark-Sztainer et al., 2011; Neumark-Sztainer, Wall, Larson, et al., 2012). The prevalence of using UWCBs is constant in emerging adulthood (18–24 years) and young women and men have a higher relative risk of engaging in UWCBs during this life stage if they previously used these practices in early adolescence (Neumark-Sztainer et al., 2011).

As research addressing the treatment of body dissatisfaction and disordered eating has largely focused on populations of middle and upper socioeconomic status (SES), an important question is whether the prevalence of these problems is socioeconomically patterned (Mitchison et al., 2014; Mitchison & Hay, 2014; Sonnevile & Lipson, 2018). The extant literature includes few studies addressing SES patterns in these outcomes and additional research addressing this gap in the literature is imperative to inform efforts to ensure the equitable distribution of resources for prevention and design of health services (e.g., screening tools, referrals for treatment) (DeLeel et al., 2009; Lipson & Sonnevile, 2017; Marcus et al., 2007; Mitchison et al., 2014; Mitchison & Hay, 2014; Mulders-Jones et al., 2017; Nagata et al., 2018a; Pope et al., 1987; Rogers et al., 1997; Swanson et al., 2011). There is a need to comprehensively examine SES patterns in body dissatisfaction, disordered eating behaviors, and the use of other approaches to weight management because limited access to nutrient-dense foods and opportunities for engaging in physical activity may lead individuals to use UWCBs. Few studies have comprehensively investigated disordered eating and weight management behaviors among young people, and particularly few studies have accounted for the potential roles of body mass index (BMI) and ethnicity/race in observed patterns (DeLeel et al., 2009; Mulders-Jones et al., 2017; Sonnevile & Lipson, 2018). There is also a lack of studies with designs that allow for comparing prevalence patterns across the life stages of adolescence and emerging adulthood within the same population.

Adolescence and emerging adulthood are nutritionally vulnerable stages of development. Having poor dietary intake, engaging in thinness-oriented dieting or disordered eating, and engaging in inadequate or excessive physical activity as a result of body dissatisfaction during these vulnerable periods can have long-term consequences for multiple aspects of health (Kärkkäinen et al., 2018; VanKim et al., 2012; Neumark-Sztainer, Wall, Story, et al., 2012). It is therefore critical that the timely recognition of body dissatisfaction and disordered eating be improved, and disparities in prevention and treatment are eliminated. There is much evidence that socioeconomic disparities in mental health, dietary intake, and physical activity are major public health problems that are driven by multiple social and environmental factors (Aneshensel, 2009; Larson, 2020; Larson & Story, 2015; Meyer et al., 2014; Reiss, 2013). Building on this evidence to describe the socioeconomic patterning of body dissatisfaction, disordered eating, and lifestyle weight management behaviors (e.g., regularly eating more fruits and vegetables) could help to better inform research with regard to potential explanatory mechanisms (e.g., disparities in exposure to adverse experiences, access to health care, opportunities for physical activity, food insecurity, and access to nutrient-dense food and beverages) along with approaches to addressing the disparities across the spectrum of diet and health outcomes. If it is established that body dissatisfaction and disordered eating are prevalent concerns among populations of lower SES, then future research and service provision needs to better address the needs of young people with limited household resources. For example, health care professionals need to be informed regarding the importance of screening and providing referrals for body dissatisfaction and disordered eating in a manner that does not exacerbate disparities in access to appropriate treatment services, adequate nutrient intake, and engaging in physical activity that meets recommendations for preventing chronic disease (U.S. Department of Agriculture & U.S.

Department of Health and Human Services, 2020; U.S. Department of Health and Human Services, 2018).

The current study will make use of data from a population-based cohort of young people that is more socioeconomically and ethnically/racially diverse than the study sample for earlier Project EAT studies (Neumark-Sztainer et al., 2011) and will extend the evidence base by examining whether body dissatisfaction, disordered eating, and lifestyle weight management behaviors (hereafter referred to as lifestyle behaviors) are socioeconomically patterned. SES patterning among this young cohort is examined with a focus on household-level markers of access to resources (i.e., parent educational attainment, parental employment, and receipt of public assistance). The first aim is to describe the distribution of body dissatisfaction, disordered eating, and lifestyle behaviors across SES groups. Secondly, the study aims to examine whether the SES patterning of these variables might be explained by differences in the distribution of ethnic/racial identities and BMI across SES. In addressing each aim, the study will examine potential differences between the stages of adolescence and emerging adulthood, and separately examine patterns by gender. It is hypothesized that body dissatisfaction, disordered eating, and the use of lifestyle behaviors will be similarly prevalent or more prevalent among low SES populations as compared to middle and upper SES population groups.

## 2. Methods

### 2.1. Study design and population

EAT 2010–2018 (Eating and Activity over Time) is a population-based cohort study of eating, activity, and weight-related behaviors and associated factors in young people. Participants enrolled in the EAT 2010 study as adolescents during the 2009–2010 academic year (mean age =  $14.4 \pm 2.0$  years) and completed a follow-up EAT 2018 survey as emerging adults in 2017–2018 (mean age =  $22.0 \pm 2.0$  years). For EAT 2010, middle and senior high school students at 20 urban public schools in Minneapolis-St. Paul, Minnesota completed surveys in school classrooms and anthropometric measures in a private area of their school (Larson et al., 2013). The follow-up assessment was designed to allow for examining changes as participants entered emerging adulthood.

Of the original 2793 adolescent participants, 410 (14.7%) were lost to follow-up, primarily due to missing contact information at EAT 2010 or no address found at follow-up. Invitations to the online EAT 2018 survey were mailed to the remaining 2383 young people. The initial invitation provided the web address and a unique password to access the online version of the survey; nonresponders were sent up to eight reminders through the U.S. Postal Service, including paper copies of the survey. Additional attempts to contact young people who had not yet completed a survey were made using email, phone calls, text messages, messaging through social media, and home visits. The diverse sample of young people who completed surveys at both time points represents 65.8% of the original participants for whom contact information was available at EAT 2018. To allow for making comparisons across life stages, the analyses described here include only the 898 females and 633 males who responded at both time points and had data on SES (Appendix A). Participants were compensated for their time with gift cards for a discount retail store; EAT

2010 participants received \$10 and EAT 2018 participants received \$50. The University of Minnesota Institutional Review Board Human Subjects Committee approved all protocols.

Inverse probability weighting (IPW) was used for all analyses to account for missing data (Seaman & White, 2011) as attrition did not occur completely at random. Nonresponders at follow-up were more likely than responders to be male (53.3% versus 41.7%); identify as Black, Indigenous, or a person of color (87.0% versus 76.7%); report being born outside the U.S. (20.0% versus 16.3%); and have parents with low educational attainment (41.4% versus 36.0%) in 2010. IPW minimizes potential response bias due to missing data and allows for extrapolation back to the original school-based sample. Weights for IPW were derived as the inverse of the estimated probability that an individual responded at the two time points based on several characteristics reported in 2010, including demographics, past year frequency of dieting, and weight status. After weighting, there were no significant differences between the analytic sample and the full EAT 2010 sample on demographic characteristics, dieting, or weight status ( $p > .900$ ). The weighted distribution across household-level SES categories based primarily on parent educational attainment was: 39.4% low, 22.2% low-middle, 17.9% middle, 13.1% upper-middle, and 7.5% high. In the weighted analytic sample, participants were 29.1% African American or Black, 19.9% Asian American, 18.8% White, 17.0% Hispanic, 3.7% Native American, and 11.5% mixed or other.

## 2.2. Survey development and measures

The EAT 2018 survey was based on the EAT 2010 survey and other surveys of weight-related behaviors (Larson et al., 2013). The test-retest reliability of EAT 2018 survey measures was examined using data from a subgroup of 112 participants who completed the survey twice within a period of three weeks. Similarly, the test-retest reliability of EAT 2010 survey items was determined over a one week period in a different sample of 129 middle and high school students. Details of the measures used to assess body dissatisfaction, thinness-oriented dieting, unhealthy and extreme weight control behaviors (UWCBs and EWCBs), lifestyle behaviors, binge eating, household-level SES, demographic characteristics, and BMI are described in Table 1 (Breiman et al., 1984; Johnson et al., 1999; Lampard et al., 2016; Larson et al., 2015; Nangle et al., 1994; Neumark-Sztainer et al., 2006c; Neumark-Sztainer et al., 2021; Paxton et al., 2006; Pingitore et al., 1997; Sherwood et al., 2009; van den Berg et al., 2007; Yanovski, 1993). Psychometric properties from the EAT 2018 survey are reported in Table 1 unless the measure was administered only as part of EAT 2010.

## 2.3. Statistical analysis

The two study aims were accomplished using gender-stratified models as prior research has established that body dissatisfaction and disordered eating behaviors are more prevalent among females than males (Gonsalves et al., 2014; Lee-Winn et al., 2016; Neumark-Sztainer, Wall, Larson, et al., 2012; Neumark-Sztainer et al., 2018). The first aim regarding the distribution of high body dissatisfaction, disordered eating, and lifestyle behaviors across parental SES was accomplished using binomial regression generalized estimating equations to account for repeated measures within individuals at EAT 2010 and EAT 2018. Models included main effect terms for SES and life stage and tested the interaction of SES with life

stage. The inverse linked scale option was used to estimate unadjusted prevalences for each SES group at adolescence and emerging adulthood.

The second aim was similarly accomplished using binomial regression generalized estimating equations and the inverse linked scale option to estimate adjusted prevalences of high body dissatisfaction, disordered eating, and lifestyle behaviors across SES groups. In addition to the terms for SES, life stage, and the interaction of SES and life stage, the models included terms to adjust for BMI and structurally racialized categories labeled by ethnicity/race (Cogburn, 2019; Neumark-Sztainer, Wall, Larson, et al., 2012; Transdisciplinary Resistance Collective for Research and Policy et al., 2020). Covariates were included in the models because BMI is associated with disordered eating risk and it is well-established there are differences in this marker that may account for higher prevalences of body dissatisfaction and disordered eating among socioeconomically disadvantaged populations and young people who identify as Black, Indigenous, or a person of color (Goldschmidt et al., 2008; Loth et al., 2015; Ogden et al., 2018).

Analyses were conducted using the Statistical Analysis System (version 9.4, 2015, SAS Institute Inc., Cary, NC) and, as described above, used IPW to account for missing data (Seaman & White, 2011). An alpha level of  $p < .050$  was set to determine statistical significance for main effects; the generalized estimating equation type 3 chi-square tests associated with SES had two degrees of freedom. For each case where the  $p$  value for an interaction test (SES by life stage, two degrees of freedom) was  $< .100$ , the result is described. Additional models were examined to investigate SES patterns in prevalence with adjustment only for BMI (Appendix B) and with adjustment only for ethnicity/race (Appendix C). Results of the additional models were very similar to the results of the fully adjusted models and thus were not described below.

### 3. Results

#### 3.1. Female adolescents and emerging adults

For females, unadjusted models of past year prevalence showed SES disparities in body dissatisfaction, UWCBs, and lifestyle behaviors ( $p = .010$ , Table 2). High body dissatisfaction and use of UWCBs were more prevalent and regular use of any lifestyle behaviors was less prevalent among the low SES group as compared to the middle and/or upper SES groups. Prevalence data showed a consistent pattern for multiple forms of lifestyle behaviors, including limited intake of high-fat foods, limited intake of sugar-sweetened soda, and exercise. For example, during adolescence, the prevalence of UWCBs was 53.5% among the low SES group, 48.9% among the middle SES group, and 37.2% among the upper SES group.

Models adjusted for ethnicity/race and BMI indicated that high body dissatisfaction was more prevalent and regular use of any lifestyle behaviors was less prevalent among the low SES group as compared to the middle and/or upper SES groups ( $p$  for body dissatisfaction = .018,  $p$  for lifestyle behaviors = .005, Table 3). Prevalence data showed a consistent pattern for multiple lifestyle behaviors, including limited intake of high-fat foods, limited intake of sugar-sweetened soda, and watched portion sizes. For example, during emerging adulthood,



high body dissatisfaction was more prevalent among low SES (19.3%) and middle SES (17.2%) groups as compared to the upper SES group (7.0%). The association between SES and body dissatisfaction differed by life stage ( $p$  for interaction = .051) at the level of trend, such that the association was stronger in emerging adulthood than in adolescence.

### 3.2. Male adolescents and emerging adults

For males, unadjusted models of past year prevalence showed SES disparities in thinness-oriented dieting, UWCBs, and EWCBs ( $p$  .010, Table 4). Thinness-oriented dieting, use of UWCBs, and use of EWCBs were all more prevalent among the low SES group as compared to the middle and upper SES groups. For example, during adolescence, the prevalence of using any UWCBs was 45.5% among the low SES group, 37.7% among the middle SES group, and 20.5% among the upper SES group. The prevalence of using UWCBs was higher during emerging adulthood, but a similar pattern was observed across SES groups.

Models adjusted for ethnicity/race and BMI indicated that use of UWCBs was more prevalent among the low SES group as compared to the upper SES group ( $p$  = .009, Table 5). For example, the adjusted prevalence of using any UWCBs during adolescence was 39.3% among the low SES group, 37.1% among the middle SES group, and 23.4% among the upper SES group. No other statistically significant differences by SES were observed.

## 4. Discussion

This study extends the literature on socioeconomic patterns in the prevalence of body dissatisfaction, disordered eating, and regular use of lifestyle behaviors by reporting on a large, ethnically and racially diverse cohort. The results include unadjusted prevalences to inform the design of services and interventions, and adjusted models to build understanding of why there are prevalence differences across SES. Results of this study provide information on the critical life stages of adolescence and emerging adulthood; for both stages, it was demonstrated that high body dissatisfaction and disordered eating are prevalent problems across SES. Although there is a widely held belief that eating disorders predominantly affect females among high SES groups (Sonneville & Lipson, 2018) and much of the research informing the treatment and prevention of eating disorders has been conducted with middle and upper SES populations (Forrest et al., 2017; Mitchison et al., 2014; Regan et al., 2017; Sonneville & Lipson, 2018), the current study found that high body dissatisfaction and some disordered eating behaviors are more prevalent among low SES groups. SES-related disparities in disordered eating were particularly pronounced among males during adolescence; analyses accounting for both ethnicity/race and BMI showed that males of low SES were more likely than their higher SES peers to use UWCBs. Similar patterns in the prevalence of UWCBs across SES groups were observed for males at the stages of adolescence and emerging adulthood, but prevalence differences were of smaller magnitude during emerging adulthood. The results collectively suggest the need for additional research to build understanding of gender differences in prevalence and mechanisms that may explain the observed SES disparities, including the potential roles of food insecurity, stress associated with living in poverty, and neighborhood-level inequities in recreational facilities (Hazzard et al., 2020; Lydecker & Grilo, 2019; McKenzie et al.,

2013; Richardson et al., 2015; Spencer et al., 2020). The need for prevention and treatment services to serve young people from lower SES backgrounds is evident. Further, it will be essential that future efforts to evaluate the prevention and treatment of disordered eating address reach and provide content relevant to socioeconomically diverse populations.

The comprehensive investigation of SES disparities in body dissatisfaction, thinness-oriented dieting, UWCBs, EWCBs, lifestyle behaviors, and binge eating contributes in a unique manner to the extant literature (DeLeel et al., 2009; Lipson & Sonnevile, 2017; Mitchison et al., 2014; Mitchison & Hay, 2014; Mulders-Jones et al., 2017; Nagata et al., 2018a; Swanson et al., 2011). Most prior studies of SES disparities in eating behaviors have focused separately on eating disorders, a cluster of dieting and disordered eating behaviors, or engaging in selected lifestyle behaviors without a focus on weight control (DeLeel et al., 2009; Lipson & Sonnevile, 2017; Mitchison et al., 2014; Mitchison & Hay, 2014; Mulders-Jones et al., 2017; Nagata et al., 2018a; Swanson et al., 2011). Examining all of these variables together in a comprehensive manner allows for building an understanding of patterns that may influence response to health promotion interventions. For example, it is noteworthy that the unadjusted results showed that females of low SES were less likely to regularly use lifestyle behaviors but were more likely to use UWCBs. These findings along with the observation that males of low SES were also more likely to use UWCBs suggest that health promotion interventions should address a broad spectrum of problematic eating and weight-related behaviors. More specifically, the observed socioeconomic patterning suggests that young people of low SES could potentially benefit from more supports to improve body satisfaction, help them avoid UWCBs, and access healthy food and opportunities for physical activity. Young people who are concerned about their weight should be given supports for accessing nutrient-dense foods and safe spaces to engage in physical activity, and counseled to avoid excessive restriction of energy intake or extreme efforts to purge calories (e.g., exercising at a dangerous frequency or intensity) (Weinstein & Weinstein, 2014). There also needs to be improved recognition of UWCBs among low SES populations to ensure young people receive appropriate care from health professionals.

Strengths and weaknesses of the current study should be considered in drawing conclusions. Key strengths include the broad range of variables that were assessed to examine eating behavior and body weight/shape concerns, having data at two critical life stages for the same participants, the use of an established SES measure, and the sociodemographic diversity of participants. The diverse sample allowed the study to account for differences related to gender, ethnicity/race, and BMI in examining SES-related disparities; however, some caution should be used in interpreting the results as many other factors that may influence body dissatisfaction, disordered eating, and lifestyle behaviors were not included in models. Additionally, caution should be used in generalizing the results to populations outside the Midwest region of the U.S. as differences in socio-environmental context may produce different SES patterns. It is also notable that most measures were brief to limit participant burden and the binge eating measure addressed feelings of shame versus solely behavior. The SES measure was validated by parental report at study baseline and related studies have found this parental SES measure to correlate with other characteristics of adolescents and emerging adults in expected ways (Bruening et al., 2012; Larson et al., 2020), but it is important to acknowledge that SES may improve or decline in a manner that influences



health behaviors as young people transition to adulthood (Levesque et al., n.d.). Although parental education is a well-established measure of household-level SES measures, it is further noteworthy that other conceptions of SES may be differently related or unrelated to eating behavior and body weight or shape concerns (Cheng et al., 2015; Howe et al., 2013; Kachmar et al., 2019; Shavers, 2007; Suh et al., 2021).

## 5. Conclusions

In summary, the results of this study indicate that young people of low SES experience an equal or excess burden of body dissatisfaction and disordered eating compared to young people of upper SES. Future studies are needed to examine explanatory mechanisms to build understanding of observed SES patterns in the prevalence of body dissatisfaction, disordered eating, and regular use of lifestyle behaviors. In particular, there is a need for research to identify reasons why SES patterns in the prevalence of these weight-related attitudes and behaviors may differ by gender. There is further a need for ongoing attention to the reach and relevance of efforts to prevent body dissatisfaction and disordered eating to ensure efforts benefit young people across SES groups. In particular, it is important that intervention curricula designed to promote healthy eating and activity behaviors include messages regarding the health consequences of disordered eating. An example of such a program is New Moves, which was implemented in secondary schools serving low SES and ethnically/racially diverse students. The program focused on preventing a broad spectrum of problems, including disordered eating, body dissatisfaction, and low levels of physical activity (Neumark-Sztainer et al., 2008; Neumark-Sztainer et al., 2010). Few studies have examined whether there are SES disparities in school curricula addressing the prevention of disordered eating or the relevance of content for students across SES (Larson et al., 2017). The targeting and tailoring of prevention efforts could benefit from more detailed evaluations of secondary school programs as well as interventions designed to promote healthy eating and activity behaviors among students enrolled in various forms of post-secondary studies. Additionally, there is a need for efforts to monitor SES disparities in access to treatment programs for eating disorders and develop policies that will provide more equitable supports for young people from lower SES groups. Existing research regarding disparities in eating disorder diagnoses and access to treatment is limited but suggests that economically disadvantaged young people may be less likely to receive treatment (Forrest et al., 2017; Regan et al., 2017; Sonnevile & Lipson, 2018). The observation of the current study that binge eating, thinness-oriented dieting, use of UWCBs, and lifestyle behaviors are prevalent across the SES spectrum further highlights the importance of involving diverse young people in efforts to implement and evaluate the relevance and effectiveness of treatment programs.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## References

- Aneshensel C. (2009). Toward explaining mental health disparities. *Journal of Health and Social Behavior*, 50(4), 377–394. [PubMed: 20099446]
- Arcan C, Larson N, Bauer K, et al. (2014). Dietary and weight-related behaviors and body mass index among Hispanic, Hmong, Somali, and White adolescents. *Journal of the Academy of Nutrition and Dietetics*, 114(3), 375–383. [PubMed: 24433949]
- van den Berg P, Paxton S, Keery H, et al. (2007). Body dissatisfaction and body comparison with media images in males and females. *Body Image*, 4(3), 257–268. [PubMed: 18089272]
- Brechan I, & Lundin Kvale I. (2015). Relationship between body dissatisfaction and disordered eating: Mediating role of self-esteem and depression. *Eating Behaviors*, 17, 49–58. [PubMed: 25574864]
- Breiman L, Friedman J, Olshen R, et al. (1984). *Classification and regression trees*. Belmont, CA: Wadsworth International Group.
- Bruening M, MacLehose R, Loth K, et al. (2012). Feeding a family in a recession: Food insecurity among Minnesota parents. *American Journal of Public Health*, 102(3), 520–526. [PubMed: 22390517]
- Cheng T, Goodman E, & Committee on Pediatric Research. (2015). Race, ethnicity, and socioeconomic status in research on child health. *Pediatrics*, 135(1), e225–e237. [PubMed: 25548336]
- Chin S, Lavery A, & Filippidis F. (2018). Trends and correlates of unhealthy dieting behaviours among adolescents in the United States, 1999–2013. *BMC Public Health*, 18(1), 439. [PubMed: 29661180]
- Cogburn C. (2019). Culture, race, and health: Implications for racial inequities and population health. *The Milbank Quarterly*, 97(3), 736–761. [PubMed: 31512293]
- DeLeel M, Hughes T, Miller J, et al. (2009). Prevalence of eating disturbance and body image dissatisfaction in young girls: An examination of the variance across racial and socioeconomic groups. *Psychology in the Schools*, 46(8), 767–775. [PubMed: 20336184]
- Field A, Aneja P, Austin S, et al. (2007). Race and gender differences in the association of dieting and gains in BMI among young adults. *Obesity*, 15(2), 456–464. [PubMed: 17299119]
- Forrest L, Smith A, & Swanson S. (2017). Characteristics of seeking treatment among U.S. adolescents with eating disorders. *The International Journal of Eating Disorders*, 50(7), 826–833. [PubMed: 28323350]
- Goldschmidt A, Passi Aspen V, Sinton M, et al. (2008). Disordered eating attitudes and behaviors in overweight youth. *Obesity*, 16(2), 257–264. [PubMed: 18239631]
- Gonsalves D, Hawk H, & Goodenow C. (2014). Unhealthy weight control behaviors and related risk factors in Massachusetts middle and high school students. *Maternal and Child Health Journal*, 18(8), 1803–1813. [PubMed: 24357083]
- Hart L, Gordon A, Sarda V, et al. (2020). The association of disordered eating with health-related quality of life in U.S. young adults and effect modification by gender. *Quality of Life Research*, 29(5), 1203–1215. [PubMed: 31970623]
- Hazzard V, Loth K, Hooper L, et al. (2020). Food insecurity and eating disorders: A review of emerging evidence. *Current Psychiatry Reports*, 22(12), Article 74.
- Howe L, Lawlor D, & Propper C. (2013). Trajectories of socioeconomic inequalities in health, behaviours and academic achievement across childhood and adolescence. *Journal of Epidemiology and Community Health*, 67(4), 358–364. [PubMed: 23322849]

- Johnson P, Fallon E, Harris B, et al. (2013). Body satisfaction is associated with Transtheoretical model constructs for physical activity behavior change. *Body Image*, 10(2), 163–174. [PubMed: 23339856]
- Johnson W, Grieve F, Adams C, et al. (1999). Measuring binge eating in adolescents: Adolescent and parent versions of the questionnaire of eating and weight patterns. *The International Journal of Eating Disorders*, 26(3), 301–314. [PubMed: 10441246]
- Kachmar A, Connolly C, Wolf S, et al. (2019). Socioeconomic status in pediatric health research: A scoping review. *The Journal of Pediatrics*, 213, 163–170. [PubMed: 31300308]
- Kärkkäinen U, Mustelin L, Raevuori A, et al. (2018). Do disordered eating behaviours have long-term health-related consequences? *European Eating Disorders Review*, 26 (1), 22–28. [PubMed: 29160017]
- Killen J, Taylor C, Hayward C, et al. (1996). Weight concerns influence the development of eating disorders: A 4-year prospective study. *Journal of Consulting and Clinical Psychology*, 64(5), 936–940. [PubMed: 8916622]
- Lampard A, Maclehoose R, Eisenberg M, et al. (2016). Adolescents who engage exclusively in healthy weight control behaviors: Who are they? *International Journal of Behavioral Nutrition and Physical Activity*, 13, Article 5.
- Larson N. (2020). Nutritional problems in childhood and adolescence: A narrative review of identified disparities. *Nutrition Research Reviews*, 1–31. Online ahead of print.
- Larson N, Davey C, Caspi C, et al. (2017). School-based obesity-prevention policies and practices and weight-control behaviors among adolescents. *Journal of the Academy of Nutrition and Dietetics*, 117(2), 204–213. [PubMed: 27889315]
- Larson N, Eisenberg M, Berge J, et al. (2015). Ethnic/racial disparities in adolescents' home food environments and linkages to dietary intake and weight status. *Eating Behaviors*, 16, 43–46. [PubMed: 25464066]
- Larson N, Laska M, & Neumark-Sztainer D. (2020). Food insecurity, diet quality, home food availability, and health risk behaviors among emerging adults: Findings from the EAT 2010–2018 study. *American Journal of Public Health*, 110(9), 1422–1428. [PubMed: 32673120]
- Larson N, Neumark-Sztainer D, & Story M. (2009). Weight control behaviors and dietary intake among adolescents and young adults: Longitudinal findings from project EAT. *Journal of the American Dietetic Association*, 109(11), 1869–1877. [PubMed: 19857628]
- Larson N, & Story M. (2015). Barriers to equity in nutritional health for U.S. children and adolescents: A review of the literature. *Current Nutrition Reports*, 4(1), 102–110.
- Larson N, Wall M, Story M, et al. (2013). Home/family, peer, school, and neighborhood correlates of obesity in adolescents. *Obesity*, 21(9), 1858–1869. [PubMed: 23512596]
- Lee-Winn A, Reinblatt S, Mojtabai R, et al. (2016). Gender and racial/ethnic differences in binge eating symptoms in a nationally representative sample of adolescents in the United States. *Eating Behaviors*, 22, 27–33. [PubMed: 27085166]
- Levesque A, MacDonald S, Berg S, et al., Assessing the impact of changes in household socioeconomic status on the health of children and adolescents: A systematic review. *Adolescent Research Review*; (Online ahead of print).
- Lewinsohn P, Striegel-Moore R, & Seeley J. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(10), 1284–1292. [PubMed: 11026183]
- Lipson S, & Sonnevile K. (2017). Eating disorder symptoms among undergraduate and graduate students at 12 U.S. colleges and universities. *Eating Behaviors*, 24, 81–88. [PubMed: 28040637]
- Loth K, Wall M, Larson N, et al. (2015). Disordered eating and psychological well-being in overweight and nonoverweight adolescents: Secular trends from 1999 to 2010. *The International Journal of Eating Disorders*, 48(3), 323–327. [PubMed: 25641764]
- Lydecker J, & Grilo C. (2019). Food insecurity and bulimia nervosa in the United States. *The International Journal of Eating Disorders*, 52(6), 735–739. [PubMed: 30920683]
- Marcus M, Bromberger J, Wei H-L, et al. (2007). Prevalence and selected correlates of eating disorder symptoms among a multiethnic community sample of midlife women. *Annals of Behavioral Medicine*, 33(3), 269–277. [PubMed: 17600454]

- McKenzie T, Moody J, Carlson J, et al. (2013). Neighborhood income matters: Disparities in community recreation facilities, amenities, and programs. *Journal of Park and Recreation Administration*, 31(4), 12–22. [PubMed: 25006598]
- McLean S, & Paxton S. (2019). Body image in the context of eating disorders. *The Psychiatric Clinics of North America*, 42(1), 145–156. [PubMed: 30704635]
- Meyer O, Castro-Schilo L, & Aguilar-Gaxiola S. (2014). Determinants of mental health and self-rated health: A model of socioeconomic status, neighborhood safety, and physical activity. *American Journal of Public Health*, 104(9), 1734–1741. [PubMed: 25033151]
- Mitchison D, & Hay P. (2014). The epidemiology of eating disorders: Genetic, environmental, and societal factors. *Clinical Epidemiology*, 6, 89–97. [PubMed: 24728136]
- Mitchison D, Hay P, Slewa-Younan S, et al. (2014). The changing demographic profile of eating disorder behaviors in the community. *BMC Public Health*, 14, Article 943.
- Mulders-Jones B, Mitchison D, Girosi F, et al. (2017). Socioeconomic correlates of eating disorder symptoms in an Australian population-based sample. *PLoS One*, 12 (1), Article e0170603.
- Nagata J, Garber A, Tabler J, et al. (2018a). Prevalence and correlates of disordered eating behaviors among young adults with overweight or obesity. *Journal of General Internal Medicine*, 33(8), 1337–1343. [PubMed: 29948810]
- Nagata J, Garber A, Tabler J, et al. (2018b). Disordered eating behaviors and cardiometabolic risk among young adults with overweight or obesity. *The International Journal of Eating Disorders*, 51(8), 931–941. [PubMed: 30030944]
- Nangle D, Johnson W, Carr-Nangle R, et al. (1994). Binge eating disorder and the proposed DSM-IV criteria: Psychometric analysis of the Questionnaire of Eating and Weight Patterns. *The International Journal of Eating Disorders*, 16(2), 147–157. [PubMed: 7987349]
- Neumark-Sztainer D, Flattum C, Story M, et al. (2008). Dietary approaches to healthy weight management for adolescents: The New Moves model. *Adolescent Medicine: State of the Art Reviews*, 19(3), 421–430. [PubMed: 19227384]
- Neumark-Sztainer D, Friend S, Flattum C, et al. (2010). New Moves-Preventing weight-related problems in adolescent girls: A group-randomized study. *American Journal of Preventive Medicine*, 39, 421–432. [PubMed: 20965379]
- Neumark-Sztainer D, Goeden C, Story M, et al. (2004). Associations between body satisfaction and physical activity in adolescents: Implications for programs aimed at preventing a broad spectrum of weight-related disorders. *Eating Disorders*, 12, 125–137. [PubMed: 16864312]
- Neumark-Sztainer D, Paxton S, Hannan P, et al. (2006a). Does body satisfaction matter? Five-year longitudinal associations between body satisfaction and health behaviors in adolescent females and males. *The Journal of Adolescent Health*, 39(2), 244–251. [PubMed: 16857537]
- Neumark-Sztainer D, Wall M, Chen C, et al. (2018). Eating, activity, and weight-related problems from adolescence to adulthood. *American Journal of Preventive Medicine*, 55(2), 133–141. [PubMed: 29937114]
- Neumark-Sztainer D, Wall M, Guo J, et al. (2006b). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *Journal of the American Dietetic Association*, 106(4), 559–568. [PubMed: 16567152]
- Neumark-Sztainer D, Wall M, Guo J, et al. (2006c). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare five years later? *Journal of the American Dietetic Association*, 106, 559–568. [PubMed: 16567152]
- Neumark-Sztainer D, Wall M, Larson N, et al. (2011). Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Journal of the American Dietetic Association*, 111(7), 1004–1011. [PubMed: 21703378]
- Neumark-Sztainer D, Wall M, Larson N, et al. (2012a). Secular trends in weight status and weight-related attitudes and behaviors in adolescents from 1999 to 2010. *Preventive Medicine*, 54(1), 77–81. [PubMed: 22024221]
- Neumark-Sztainer D, Wall M, Levine A, et al. (2021). Yoga practice among ethnically/racially diverse emerging adults: Associations with body image, mindful and disordered eating, and muscle-enhancing behaviors. *The International Journal of Eating Disorders*, 54(3), 376–387. [PubMed: 33277727]

- Neumark-Sztainer D, Wall M, Story M, et al. (2012b). Dieting and unhealthy weight control behaviors during adolescence: Associations with 10-year changes in body mass index. *The Journal of Adolescent Health*, 50(1), 80–86. [PubMed: 22188838]
- Ogden C, Fryar C, Hales C, et al. (2018). Differences in obesity prevalence by demographics and urbanization in US children and adolescents, 2013–2016. *JAMA*, 319(23), 2410–2418. [PubMed: 29922826]
- Patton G, Selzer R, Coffey C, et al. (1999). Onset of adolescent eating disorders: Population based cohort study over 3 years. *BMJ*, 318(7186), 765–768. [PubMed: 10082698]
- Paxton S, Neumark-Sztainer D, Hannan P, et al. (2006). Body dissatisfaction prospectively predicts depressive mood and low self-esteem in adolescent girls and boys. *Journal of Clinical Child and Adolescent Psychology*, 35(4), 539–549. [PubMed: 17007599]
- Pingitore R, Spring B, & Garfield D. (1997). Gender differences in body satisfaction. *Obesity Research*, 5(5), 402–409. [PubMed: 9385613]
- Piran N, & Robinson S. (2011). Patterns of associations between eating disordered behaviors and substance use in two non-clinical samples: A university and community based sample. *Journal of Health Psychology*, 16(7), 1027–1037. [PubMed: 21444727]
- Pope H, Champoux R, & Hudson J. (1987). Eating disorder and socioeconomic class. Anorexia nervosa and bulimia in nine communities. *The Journal of Nervous and Mental Disease*, 175(10), 620–623. [PubMed: 3655770]
- Puccio F, Fuller-Tyszkiewicz M, Ong D, et al. (2016). A systematic review and meta-analysis on the longitudinal relationship between eating pathology and depression. *Journal of Affective Disorders*, 199, 439–454.
- Regan P, Cachelin F, & Minnick A. (2017). Initial treatment seeking from professional health care providers for eating disorders: A review and synthesis of potential barriers to and facilitators of “first contact”. *The International Journal of Eating Disorders*, 50(3), 190–209. [PubMed: 28134980]
- Reiss F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, 90, 24–31. [PubMed: 23746605]
- Richardson A, Arsenault J, Cates S, et al. (2015). Perceived stress, unhealthy eating behaviors, and severe obesity in low-income women. *Nutrition Journal*, 14, Article 122.
- Rogers L, Resnick M, Mitchell J, et al. (1997). The relationship between socioeconomic status and eating-disordered behaviors in a community sample of adolescent girls. *The International Journal of Eating Disorders*, 22, 15–23. [PubMed: 9140731]
- Seaman S, & White I. (2011). Review of inverse probability weighting for dealing with missing data. *Statistical Methods in Medical Research*, 22(3), 278–295. [PubMed: 21220355]
- Shavers V. (2007). Measurement of socioeconomic status in health disparities research. *Journal of the National Medical Association*, 99(9), 1013–1023. [PubMed: 17913111]
- Sherwood NE, Wall M, Neumark-Sztainer D, et al. (2009). Effect of socioeconomic status on weight change patterns in adolescents. *Preventing Chronic Disease*, 6, A19. [PubMed: 19080025]
- Sonneville K, & Lipson S. (2018). Disparities in eating disorder diagnosis and treatment according to weight status, race/ethnicity, socioeconomic background, and sex among college students. *The International Journal of Eating Disorders*, 51(6), 518–526. [PubMed: 29500865]
- Spencer L, Lynch M, Lawrence C, et al. (2020). A scoping review of how income affects accessing local green space to engage in outdoor physical activity to improve well-being: Implications for post-COVID-19. *International Journal of Environmental Research and Public Health*, 17(24), 9313.
- Stice E, & Shaw H. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, 53, 985–993. [PubMed: 12445588]
- Suh S, Song S, Choi H, et al. (2021). Parental educational status independently predicts the risk of prevalent hypertension in young adults. *Scientific Reports*, 11, 3698. [PubMed: 33580117]
- Swanson S, Crow S, Le Grange D, et al. (2011). Prevalence and correlates of eating disorders in adolescents: Results from the National Comorbidity Survey Replication Adolescent Supplement. *Archives of General Psychiatry*, 68(7), 714–723. [PubMed: 21383252]

- Transdisciplinary Resistance Collective for Research and Policy, Neely A., Ivey A, et al. (2020). Building the transdisciplinary resistance collective for research and policy: Implications for dismantling structural racism as a determinant of health inequity. *Ethnicity & Disease*, 30(3), 381–388. [PubMed: 32742140]
- U.S. Department of Agriculture, & U.S. Department of Health and Human Services. (2020). *Dietary guidelines for Americans, 2020–2025 (9th ed.)*. Washington, DC: U.S. Department of Agriculture and U.S. Department of Health and Human Services.
- U.S. Department of Health and Human Services. (2018). *Physical activity guidelines for Americans (2nd ed.)*. Washington, DC: U.S. Department of Health and Human Services.
- VanKim NA, Larson N, & Laska MN (2012). Emerging adulthood: A critical age for preventing excess weight gain? *Adolescent Medicine: State of the Art Reviews*, 23(3), 571–588. [PubMed: 23437688]
- Weinstein A, & Weinstein Y. (2014). Exercise addiction-diagnosis, bio-psychological mechanisms and treatment issues. *Current Pharmaceutical Design*, 20(25), 4062–4069. [PubMed: 24001300]
- Yanovski S. (1993). Questionnaire on Eating and Weight Patterns—Revised (QEWP-R). *Obesity Research*, 1, 319–324.



Table 1

## Description of survey measures.

Measure	Survey items or description
Body dissatisfaction	A modified version of the Body Shape Satisfaction Scale was included on the EAT surveys at each time point (Pingitore et al., 1997). Participants were asked “How satisfied are you with your weight” and were similarly asked to report satisfaction with other aspects of their body (i.e., height, body shape, waist, hips, thighs, stomach, face, body build, shoulders, muscles, chest, overall body fat) using five Likert response categories ranging from very dissatisfied to very satisfied. Item responses were summed with higher scores indicative of greater body satisfaction (score range: 13–65; Cronbach’s $\alpha = 0.94$ ). A previously published principal component analysis has established that a single factor score is a good fit for data provided by female and male participants (Paxton et al., 2006; van den Berg et al., 2007). High body dissatisfaction was defined by a score of $<30$ (test-retest agreement = 88%).
Thinness-oriented dieting	Participants were asked “How often have you gone on a diet during the last year? By ‘diet’ we mean changing the way you eat so you can lose weight.” Responses included “never”, “one to four times”, “five to ten times”, “more than ten times”, and “I am always dieting”. These responses were dichotomized into nondieters (responded never) and those who were dieters at one or more time in the past year (test-retest agreement = 80%) (Neumark-Sztainer, Wall, Gou, et al., 2006c).
Unhealthy and extreme weight control behaviors (UWCBs and EWCBs)	Participants were asked the question: “Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?” (yes/no for each method). Methods were categorized to distinguish extreme behaviors that may have immediate and critical health consequences from inherently unhealthy but less extreme behaviors. The methods categorized as UWCBs included 1) fasted, 2) ate very little food, 3) used a food substitute (powder or a special drink), 4) skipped meals, and 5) smoked more cigarettes. The methods categorized as EWCBs included 1) took diet pills, 2) made myself vomit, 3) used laxatives, and 4) used diuretics. For analysis, those who responded “yes” for one or more methods were coded as users of unhealthy (test-retest agreement = 76%) and extreme (test-retest agreement = 93%) weight control behaviors.
Lifestyle weight management behaviors	Participants were separately asked to report on lifestyle behaviors in response to the question: “How often have you done each of the following things in order to lose weight or keep from gaining weight during the past year?” The specific behaviors assessed were 1) exercise, 2) ate more fruits and vegetables, 3) ate less high-fat foods, 4) ate less sweets, 5) drank less soda pop (not including diet pop), and 6) watched my portion sizes (serving sizes). In alignment with prior research and the categorization of lifestyle behaviors (Lampard et al., 2016), responses were dichotomized such that those reporting the use of a behavior “on a regular basis” were coded as regular users of the behavior and those indicating “never”, “rarely”, or “sometimes” for each behavior were coded as not regular users (test-retest agreement = 80–88%). Responses were also combined for analysis such that those reporting the regular use of one or more specific behavior were coded as regular users of lifestyle behaviors (test-retest agreement = 84%).
Binge eating	The measure of binge eating was adapted from the adult version of the Questionnaire on Eating and Weight Patterns-Revised, which has good psychometric properties in adolescents and adults (Johnson et al., 1999; Nangle et al., 1994; Yanovski, 1993). Participants were asked the question: “In the past year, have you ever eaten so much food in a short period of time that you would be embarrassed if others saw you (binge eating)?” (yes/no). If participants responded yes, they were asked, “During the times when you ate this way, did you feel you couldn’t stop eating or control what or how much you were eating?” (yes/no). Participants who responded yes to both items were categorized as engaging in binge eating (test-retest agreement = 89%).
Household-level socioeconomic status (SES)	Given the young age of participants, SES was determined with a focus on household-level markers of access to resources. Participants self-reported the educational attainment of their parent(s), family eligibility for public assistance, eligibility for free or reduced-cost school meals, and parental employment status at baseline. The primary determinant of SES was parental educational level, defined by the higher level of either parent (i.e., 1 = less than high school degree, 2 = high school degree, 3 = some college, 4 = college degree, 5 = advanced degree). The additional measures of income and employment were used as part of an algorithm to reduce the impact of missing data and to prevent misclassification in ranking SES (range: 1–5, test-retest $r = 0.90$ ) (Breiman et al., 1984). Use of the algorithm reduced missingness from 5% to 4%. Algorithmic classification scores were reduced by two levels if an adolescent’s family was receiving public assistance, and by one level if an adolescent was eligible for free or reduced-cost school meals or had two unemployed parents (Sherwood et al., 2009). SES rankings were validated in the 2010 sample by comparing classifications based on adolescent report to parental report of educational attainment; complete parent survey data were collected from both a mother and father as part of a related study ( $n = 1034$ adolescents). The Spearman correlation for the association between SES classification and parental report of highest educational level was 0.73. Parental report of household income also corresponded to SES classification with those in the lowest category having a mean household income of less than \$30,000 and those in the highest category having a mean income above \$75,000. For the stratified analyses conducted as part of the current study, it was necessary to collapse the five-level SES variable to create three groups of adequate sample size for examining uncommon behaviors. The SES groups created for analysis represent households of low (SES rank 1), middle (SES ranks 2–3), and upper (SES ranks 4–5) classes.
Demographic characteristics and BMI	Participants self-reported their gender identity, height, and weight at baseline. Measured height and weight were used to calculate BMI ( $\text{kg}/\text{m}^2$ ) values for inclusion in models as a covariate; self-reported measures were used when measured BMI was missing. The correlation of measured and self-reported BMI was $r = 0.88$ for both female and male adolescents. Ethnicity/race was based on self-report on the original school-based survey (test-retest agreement = 98–100%). Participants were asked “Do you think of yourself as...?” (1) White, (2) Black or African American, (3) Hispanic or Latino, (4) Asian American, (5) Native Hawaiian or Pacific Islander, (6) American Indian or Native American, or (7) Other”. Since very few participants identified as “Hawaiian or Pacific Islander” or did not identify their ethnicity/race, they were coded as “mixed/other” along with those who indicated two or more identities (Larson et al., 2015; Neumark-Sztainer et al., 2021).

Table 2

Females: unadjusted prevalences from binomial regression generalized estimating equations for high body dissatisfaction, disordered eating, and lifestyle behaviors by socioeconomic status (SES) and life stage.

	Adolescence			Emerging adulthood			<i>p</i> for SES	<i>p</i> for SES * stage
	Low SES	Middle SES	Upper SES	Low SES	Middle SES	Upper SES		
Body dissatisfaction (% high)	16.5 <sup>a</sup>	15.3 <sup>a</sup>	12.2 <sup>a</sup>	22.7 <sup>a</sup>	19.0 <sup>a</sup>	8.1 <sup>b</sup>	<b>.003</b>	.066
Dieting (% ever past year)	46.2	45.4	37.6	57.2	61.4	52.6	.063	.524
Weight control behaviors								
Unhealthy (% any)	53.5 <sup>a</sup>	48.9 <sup>a</sup>	37.2 <sup>b</sup>	58.6 <sup>a</sup>	54.7 <sup>a</sup>	51.2 <sup>a</sup>	<b>.005</b>	.223
Extreme (% any)	5.4	4.9	6.8	21.9	17.1	11.7	.494	.172
Lifestyle behaviors (% any)	53.1 <sup>a</sup>	61.3 <sup>b</sup>	61.0 <sup>ab</sup>	63.6 <sup>a</sup>	71.1 <sup>b</sup>	70.5 <sup>ab</sup>	<b>.011</b>	.998
Limited high-fat foods	14.2 <sup>a</sup>	22.7 <sup>b</sup>	20.4 <sup>ab</sup>	17.5 <sup>a</sup>	20.0 <sup>a</sup>	18.3 <sup>a</sup>	<b>.046</b>	.249
Limited sweets	16.3	18.6	21.3	23.0	24.2	23.8	.492	.619
Limited sugar-sweetened soda	22.5 <sup>a</sup>	29.2 <sup>b</sup>	30.7 <sup>b</sup>	39.4 <sup>a</sup>	49.9 <sup>b</sup>	53.5 <sup>b</sup>	<b>&lt;.001</b>	.837
Ate more fruit and vegetables	27.5	33.7	34.1	35.7	35.8	40.2	.199	.418
Exercised	24.7 <sup>a</sup>	28.2 <sup>ab</sup>	35.2 <sup>b</sup>	20.2 <sup>a</sup>	28.3 <sup>b</sup>	29.7 <sup>b</sup>	<b>.003</b>	.442
Watched portion sizes	13.4	14.5	16.7	19.9	27.3	27.8	.095	.517
Binge eating (%)	9.8	9.7	8.9	16.8	15.2	14.2	.776	.942

*Note.* Percentages are weighted to reflect the probability of responding to the follow-up EAT 2018 survey. The percentages for lifestyle behaviors represent regular use of the behavior. The primary determinant of SES was parental educational level, defined by the higher level of either parent. Additional measures of income and employment were used as part of an algorithm to reduce the impact of missing data and to prevent misclassification in ranking SES (range: 1–5). Low SES was defined as rank 1, middle SES as rank 2–3, and upper SES as rank 4–5. Bold font represents statistically significant differences across SES groups. In each row of prevalences for a life stage, cells that share a superscript letter do not differ ( $p > .05$ ).

Table 3

Females: adjusted prevalences from binomial regression generalized estimating equations for high body dissatisfaction, disordered eating, and lifestyle behaviors by socioeconomic status (SES) and life stage.

	Adolescence			Emerging adulthood			<i>p</i> for SES	<i>p</i> for BMI	<i>p</i> for race	<i>p</i> for SES * stage
	Low SES	Middle SES	Upper SES	Low SES	Middle SES	Upper SES				
Body dissatisfaction (% high)	13.1 <sup>a</sup>	12.8 <sup>a</sup>	11.1 <sup>a</sup>	19.3 <sup>a</sup>	17.2 <sup>a</sup>	7.0 <sup>b</sup>	<b>.018</b>	<.001	<.001	.051
Dieting (% ever past year)	42.7	45.1	43.7	56.2	63.2	62.2	.303	<.001	<.001	.604
Weight control behaviors										
Unhealthy (% any)	51.3	49.0	42.6	57.6	55.1	57.8	.542	<.001	<.001	.279
Extreme (% any)	4.8	4.7	7.3	20.6	15.9	11.9	.722	<.001	.465	.134
Lifestyle behaviors (% any)	52.7 <sup>a</sup>	62.3 <sup>b</sup>	62.2 <sup>ab</sup>	64.1 <sup>a</sup>	72.0 <sup>b</sup>	71.4 <sup>ab</sup>	<b>.005</b>	<.001	.003	.975
Limited high-fat foods	13.5 <sup>a</sup>	22.8 <sup>b</sup>	20.9 <sup>b</sup>	16.7 <sup>a</sup>	19.7 <sup>a</sup>	18.7 <sup>a</sup>	<b>.018</b>	.018	.027	.223
Limited sweets	15.7	18.5	20.6	22.5	23.5	23.2	.545	.012	.002	.607
Limited sugar-sweetened soda	21.2 <sup>a</sup>	29.2 <sup>b</sup>	31.3 <sup>b</sup>	38.5 <sup>a</sup>	50.2 <sup>b</sup>	54.6 <sup>b</sup>	<b>&lt;.001</b>	<.001	.115	.884
Ate more fruit and vegetables	27.3	34.1	32.9	35.7	35.7	38.6	.325	.002	.094	.354
Exercised	25.0	28.0	32.3	20.6	28.1	27.0	.053	.070	.018	.479
Watched portion sizes	12.5 <sup>a</sup>	14.3 <sup>a</sup>	17.4 <sup>a</sup>	18.8 <sup>a</sup>	26.2 <sup>ab</sup>	28.9 <sup>b</sup>	<b>.028</b>	<.001	.147	.621
Binge eating (%)	8.9	9.3	8.9	15.6	14.4	14.4	.983	<.001	.247	.895

*Note.* Percentages are weighted to reflect the probability of responding to the follow-up EAT 2018 survey. The percentages for lifestyle behaviors represent regular use of the behavior. The primary determinant of SES was parental educational level, defined by the higher level of either parent. Additional measures of income and employment were used as part of an algorithm to reduce the impact of missing data and to prevent misclassification in ranking SES (range: 1–5). Low SES was defined as rank 1, middle SES as rank 2–3, and upper SES as rank 4–5. Generalized estimating equation models included ethnicity/race and body mass index, and were used to separately examine statistical associations of each weight-related variable with SES. Bold font represents statistically significant differences across SES groups. In each row of prevalences for a life stage, cells that share a superscript letter do not differ ( $p > .05$ ).

Table 4

Males: unadjusted prevalences from binomial regression generalized estimating equations for high body dissatisfaction, disordered eating, and lifestyle behaviors by socioeconomic status (SES) and life stage.

	Adolescence				Emerging adulthood			<i>p</i> for SES	<i>p</i> for SES * stage
	Low SES	Middle SES	Upper SES	Upper SES	Low SES	Middle SES	Upper SES		
Body dissatisfaction (% high)	15.6	12.3	7.5	11.3	13.9	9.2	11.3	.115	.210
Dieting (% ever past year)	41.8 <sup>a</sup>	31.5 <sup>b</sup>	24.9 <sup>b</sup>	40.8 <sup>b</sup>	53.9 <sup>a</sup>	47.3 <sup>ab</sup>	40.8 <sup>b</sup>	<b>.001</b>	.609
Weight control behaviors									
Unhealthy (% any)	45.5 <sup>a</sup>	37.7 <sup>a</sup>	20.5 <sup>b</sup>	37.9 <sup>b</sup>	57.6 <sup>a</sup>	44.7 <sup>b</sup>	37.9 <sup>b</sup>	<b>&lt;.001</b>	.135
Extreme (% any)	4.8 <sup>a</sup>	2.5 <sup>a</sup>	1.2 <sup>a</sup>	3.5 <sup>b</sup>	8.8 <sup>a</sup>	7.5 <sup>ab</sup>	3.5 <sup>b</sup>	<b>.012</b>	.721
Lifestyle behaviors (% any)	57.0	57.2	54.0	62.2	58.0	57.2	62.2	.969	.400
Limited high-fat foods	16.8	15.5	11.2	17.0	20.6	16.1	17.0	.274	.567
Limited sweets	20.6	20.6	16.9	26.8	22.7	19.6	26.8	.843	.151
Limited sugar-sweetened soda	24.9	24.4	20.7	38.4	37.2	30.3	38.4	.604	.157
Ate more fruit and vegetables	18.4	21.4	21.9	25.1	23.6	27.1	25.1	.545	.902
Exercised	38.3	39.5	40.8	34.6	30.7	29.8	34.6	.629	.826
Watched portion sizes	12.2	16.3	14.5	19.5	15.0	8.4	19.5	.811	.051
Binge eating (%)	6.5	5.0	4.9	6.6	8.0	7.9	6.6	.724	.877

*Note.* Percentages are weighted to reflect the probability of responding to the follow-up EAT 2018 survey. The percentages for lifestyle behaviors represent regular use of the behavior. The primary determinant of SES was parental educational level, defined by the higher level of either parent. Additional measures of income and employment were used as part of an algorithm to reduce the impact of missing data and to prevent misclassification in ranking SES (range: 1–5). Low SES was defined as rank 1, middle SES as rank 2–3, and upper SES as rank 4–5. Bold font represents statistically significant differences across SES groups. In each row of prevalences for a life stage, cells that share a superscript letter do not differ ( $p > .05$ ).

**Table 5**

Males: adjusted prevalences from binomial regression generalized estimating equations for high body dissatisfaction, disordered eating, and lifestyle behaviors by socioeconomic status (SES) and life stage

	Adolescence			Emerging adulthood			<i>p</i> for SES	<i>p</i> for BMI	<i>p</i> for race	<i>p</i> for SES * stage
	Low SES	Middle SES	Upper SES	Low SES	Middle SES	Upper SES				
Body dissatisfaction (% high)	11.0	9.1	8.4	9.7	7.0	12.9	.398	<.001	.109	.258
Dieting (% ever past year)	32.6	30.6	29.2	46.7	48.7	50.3	.999	<.001	<.001	.628
Weight control behaviors										
Unhealthy (% any)	39.3 <sup>a</sup>	37.1 <sup>a</sup>	23.4 <sup>b</sup>	53.5 <sup>a</sup>	44.3 <sup>a</sup>	43.9 <sup>a</sup>	<b>.009</b>	<.001	.007	.122
Extreme (% any)	3.9	2.5	1.3	7.4	7.0	4.0	.134	.048	.870	.774
Lifestyle behaviors (% any)	55.1	57.4	56.2	55.3	57.7	64.7	.493	<.001	.890	.386
Limited high-fat foods	15.2	15.8	12.0	18.1	16.0	17.6	.813	<.001	.662	.575
Limited sweets	17.2	20.2	17.7	18.4	18.7	29.0	.352	<.001	.873	.111
Limited sugar-sweetened soda	23.0	24.5	19.4	34.4	30.1	37.8	.948	<.001	.040	.124
Ate more fruit and vegetables	17.0	22.3	22.3	22.0	27.1	25.2	.224	.003	.828	.901
Exercised	36.5	38.4	42.7	28.2	30.5	36.3	.248	.008	.551	.925
Watched portion sizes	10.2	14.7	8.9	13.4	14.6	20.8	.509	<.001	.614	.038
Binge eating (%)	5.2	4.3	5.3	5.8	6.4	7.2	.890	.004	.209	.855

*Note.* Percentages are weighted to reflect the probability of responding to the follow-up EAT 2018 survey. The percentages for lifestyle behaviors represent regular use of the behavior. The primary determinant of SES was parental educational level, defined by the higher level of either parent. Additional measures of income and employment were used as part of an algorithm to reduce the impact of missing data and to prevent misclassification in ranking SES (range: 1–5). Low SES was defined as rank 1, middle SES as rank 2–3, and upper SES as rank 4–5. Generalized estimating equation models included ethnicity/race and body mass index, and were used to separately examine statistical associations of each weight-related variable with SES. Bold font represents statistically significant differences across SES groups. In each row of prevalences for a life stage, cells that share a superscript letter do not differ ( $p > .05$ )