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The longitudinal relationship between family and peer teasing in young adulthood and later unhealthy weight control behaviors: The mediating role of body image

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Abstract

Objective: Sociocultural theories hold that family and peer weight-related teasing increases the risk for unhealthy weight control behaviors (UWCBs) by negatively impacting body image. Although much cross-sectional support exists for these pathways, longitudinal data are lacking. This study tested the longitudinal relationships among peer and family teasing (occurrence and perceived impact) in early adolescence, body satisfaction in late adolescence, and UWCBs in young adulthood among a racially/ethnically and socioeconomically diverse population.

Method: Data were drawn from three waves of Project EAT over a 15-year period (Eating and Activity in Teens and Young Adults), and included responses from 1,902 young adults (57% female).

Results: Among female participants, a mediated indirect pathway emerged with family weight-related teasing predicting increased engagement in UWCBs in early adulthood via poorer body image in late adolescence. In contrast, peer teasing did not predict body image or UWCBs. Among

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CONFLICT OF INTEREST

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DATA AVAILABILITY STATEMENT

Research data are not shared. Research data are not shared.

boys, the mediated indirect pathways were not significant. However, poor body image in late adolescent males predicted higher likelihood of engaging in UCWBs in early adulthood.

Discussion: These findings support the long-term impact of family weight-related teasing on greater risk for UWCBs among girls and young women, and poor body image as a mechanism accounting for this relationship. Moreover, the results highlight the poor body image among adolescent boys as a factor for increased risk of engaging in UWCBs in early adulthood. Pending replication in current cohorts, health promotion and prevention involving family members of early adolescents that address family weight teasing and body image are needed.

Keywords

body dissatisfaction; EAT; family; longitudinal; peer; teasing; UWCB

1 | INTRODUCTION

Unhealthy weight control behaviors (UWCBs) are frequent among youth and track into young adulthood (Goldschmidt et al., 2018; Goldschmidt, Wall, Zhang, Loth, & Neumark-Sztainer, 2016; Lipsky et al., 2015). Sociocultural theories have emerged as useful explanatory frameworks for the development of these behaviors (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Such frameworks describe how pressures from the environment to attain unrealistic appearance ideals, including appearance-related teasing, may lead individuals to experience low body satisfaction, which in turn may result in individuals engaging in unhealthy weight control behaviors with the goal of moving their appearance closer to appearance ideals (Rodgers, Chabrol, & Paxton, 2011; Thompson et al., 1999). Research has utilized these frameworks to successfully ground previous work exploring UWCBs in youth (Girard, Chabrol, & Rodgers, 2018; Keery, Van den Berg, & Thompson, 2004; Rodgers et al., 2011). However, the majority of this research has been cross-sectional. The aim of the present study was to extend this work by testing the relationships among peer and family teasing in early adolescence, body satisfaction in late adolescence, and UWCBs in young adulthood.

UWCBs including purging, use of diet pills, skipping meals, and smoking to control weight have been shown to occur at high rates from early adolescence onwards, with estimates of lifetime engagement in the U.S. ranging from 4 to 18% of men and 10 to 49% of women (Linde, Wall, Haines, & Neumark-Sztainer, 2009; Rodgers et al., 2017). These behaviors are concerning and increase risk for negative outcomes including eating disorders and poorer dietary intake (Bakalar, Shank, Vannucci, Radin, & Tanofsky-Kraff, 2015; Kotler, Cohen, Davies, Pine, & Walsh, 2001; Neumark-Sztainer, Wall, et al., 2006). While UWCBs are shown to occur in both adolescent girls and boys, gender differences in the rates of these behaviors have also been highlighted, with girls tending to report higher rates compared to their male counterparts (Stephen, Rose, Kenney, Rosselli-Navarra, & Weissman, 2014). Such gender differences have been attributed to the gendered nature of appearance ideals, with female body ideals anchored around extreme thinness and girls experiencing greater pressure to pursue appearance ideals and to identify appearance as a central aspect of their self-worth (Rodgers, Faure, & Chabrol, 2009; Schaefer, Harriger, Heinberg, Soderberg, & Kevin Thompson, 2017; Thompson et al., 1999). In contrast, male body ideals have been

described as placing more emphasis on highly developed muscularity, with associated patterns of exercise and muscularity-oriented eating (Mitchison & Mond, 2015; Murray et al., 2019). In this way, gender differences in the types of disordered eating behaviors may also reflect differences in the gendered physiques pursued.

Sociocultural theories have highlighted the role of pressure from the environment to pursue unrealistic appearance ideals in increasing body image concerns and the risk for engaging in UWCBs as strategies to modify body weight and shape (Girard et al., 2018; Keery et al., 2004). While many of these pressures originate in messages from media and other societal institutions (Levine & Murnen, 2009), they may be relayed and amplified through interpersonal influences. In this way, weight-related teasing from friends and family members has emerged as an important factor related to body image concerns and UWCBs in youth (Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006; Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006; Menzel et al., 2010). Weight-related teasing during early adolescence has been reported by youth across the weight spectrum, although most frequently among higher and lower weight youth (Neumark-Sztainer, Falkner, et al., 2002). Furthermore, weight-related teasing has been shown to be associated both cross-sectionally (Chisuwa-Hayami & Haruki 2017; Lampard, MacLehose, Eisenberg, Neumark-Sztainer, & Davison, 2014; Leme & Philippi, 2013; Neumark-Sztainer, Falkner, et al., 2002) and longitudinally with body image concerns and UWCBs (Haines et al., 2006; Menzel et al., 2010; Puhl et al., 2017) among both girls and boys. However, mediating influences that explain this relationship over time have not yet been studied using longitudinal data.

Consistent with the gendered elements of the sociocultural context described above, adolescent girls have been shown to experience higher rates of weight-related teasing compared to their male counterparts, and to be more affected by teasing (Menzel et al., 2010; Neumark-Sztainer, Falkner, et al., 2002). Moreover, the relationships between weight-related teasing and UWCBs have evidenced gender differences. For example, in a prior analysis using data from Project EAT, the dataset to be used in the current study, weight-related teasing in middle and high school aged adolescents was found to be predictive of engagement in a range of later UWCBs among male youth including fasting, diet pill use, and self-induced vomiting, but only of frequent dieting among adolescent girls over 5 years (Haines et al., 2006). In a subsequent follow-up with the same sample, among female participants, weight-related teasing from both peers and family members during adolescence was related to poorer body image and higher likelihood of engaging in UWCBs 15 years later (Puhl et al., 2017). However, among male youth, weight-related teasing during adolescence from peers, but not family members, was related to poorer body image 15 years later, but not UWCBs (Puhl et al., 2017). Thus, patterns of relationships between teasing from different sources and outcomes have revealed gender differences.

These gendered findings should, however, be considered in light of gendered appearance ideals, with teasing related to weight perhaps being experienced as more hurtful by girls as compared to boys, who may place greater importance on other aspects of their appearance. Studies exploring the relationships among teasing and muscularity-oriented outcomes have often only included adolescent boys and young men, precluding explorations of gender differences (Cafri, Van Den Berg, & Thompson, 2006; Galioto, Karazsia, & Crowther, 2012;

Smolak & Stein, 2006). Nevertheless, the few studies that have assessed teasing as related to gender-appropriate outcomes (i.e., weight-related concerns among girls and muscularity-related concerns among boys) have reported more comparable findings in terms of the relationships between teasing and body image among girls and boys (Schaefer & Salafia, 2014). These findings highlight the existence of gendered pathways, as well as the importance of exploring the longitudinal relationships between adolescent weight-related teasing and later body image and eating outcomes among each gender separately. Furthermore, these findings also suggest that weight-related teasing from family and peers may impact outcomes through different pathways, and thus that their effects should also be examined separately.

While this work overall has supported the predictions of sociocultural theories regarding the capacity for appearance-related pressures to increase risk for later body image concerns and UWCBs, the framework would specifically predict a mediated pathway whereby sociocultural influences such as weight-related teasing would increase risk for later UWCB through the mechanism of poorer body image (Thompson et al., 1999). To date, however, this mediated serial pathway has yet to be tested in a long-term longitudinal study.

The aim of the current study was therefore to test the longitudinal relationships among peer and family teasing in early adolescence, body satisfaction in late adolescence, and UWCBs in young adulthood among female and male youth using data collected from the longitudinal Project EAT cohort. The present study builds on, and extends, previous work exploring teasing among these data in two critical ways. This study is the first to examine a mediated, indirect, relationship between adolescent teasing and later unhealthy weight control behaviors via body satisfaction at an intermediary timepoint. This potential pathway, as proposed by sociocultural theory, is supported by previous work in this cohort documenting the association between adolescent peer and family teasing and decreased body image 5 years later (Eisenberg et al., 2006), as well as increased risk of unhealthy weight control behaviors (Haines et al., 2006) 5 years later (EAT II). The present study also goes beyond this timeframe given the goal of assessing the mediated relationship across timepoints, and is thus also unique in utilizing three consecutive assessment points over 10 years to explore the indirect relationship. Indeed, it was anticipated that, consistent with sociocultural theories, experiences of weight-related teasing from peers and family members during early adolescence would be associated with lower body satisfaction in late adolescence, which would in turn be associated with higher likelihood of engaging in UWCBs in early adulthood. Given the evidence for the existence of gendered pathways, as described above (Menzel et al., 2010), these relationships were explored among male and female youth separately. Evidence supporting the existence of gendered pathways would provide important confirmation of the usefulness of sociocultural theories for grounding examinations of risk factors for UWCBs as well as confirming body image as a critical modifiable factor in health promotion and prevention intervention efforts.

2 | METHOD

2.1 | Study design and population

Data were collected during three study waves of Project EAT (Eating and Activity in Teens and Young Adults). Project EAT is a longitudinal study designed to examine dietary intake, physical activity, weight control behaviors, weight status, and factors associated with these outcomes among young people. The analytic sample includes 1,902 young adults who responded at all three time points.

At the baseline measurement (Project EAT-I), high school students (ages 11–18) at 31 public schools in the Minneapolis/St. Paul metropolitan area of Minnesota completed surveys and anthropometric measures during the 1998–1999 academic year (Neumark-Sztainer, Croll, et al., 2002). Five years later, for Project EAT-II, original participants (ages 17–23) were mailed follow-up surveys to examine changes in their eating patterns, weight control behaviors, and weight status as they progressed through adolescence (Neumark-Sztainer, Levine, et al., 2006; Neumark-Sztainer, Wall, et al., 2006). Project EAT-III was designed to follow up on participants again (ages 21–27) in 2008–2009 as they progressed from adolescence to young adulthood.

Of the original 4,746 participants, 1,304 (27.5%) were lost to follow-up for various reasons, which primarily consisted of missing contact information at EAT-I ($n = 411$) and no address found at follow-up ($n = 712$). For Project EAT-III, survey invitation letters, providing the web address and a unique password for completing the online version of the Project EAT-III survey were mailed to the remaining 3,442 participants (Larson, Neumark-Sztainer, Harwood, et al., 2011). To enhance participant response, nonresponders were sent three reminder letters. The University of Minnesota's Institutional Review Board Human Subjects Committee approved all protocols used in Project EAT at each of the three time points.

A total of 2,287 young adults completed Project EAT-III surveys, representing 66.4% of participants who could be contacted (48.2% of the original school-based sample). The majority (86.5%) of respondents completed the survey online, rather than by mail. Participants included 819 boys (43.0%) and 1,083 girls (57.0%). Attrition from the original sample did not occur at random, with nonresponders at wave 3 more likely to be male, non-White, and of higher weight. Full information maximum likelihood (FIML) was used to handle missing data, which allows us to use all available information to estimate the model, including data from participants who did not participate in every measurement occasion. The sample was 48.3% white, 18.5% African American, 19.7% Asian, 5.5% Hispanic, 3.5% Native American, and 4.5% mixed or other race/ethnicity. The sample was well-distributed across the five categories of socioeconomic status: 17.5% low, 19.2% low-middle, 26.3% middle, 23.4% upper-middle, and 13.6% high.

2.2 | Survey development

To allow for longitudinal comparisons and examination of secular trends, key items from the baseline survey were retained on later surveys. Decisions to retain or drop items were based on their relevance to the current study aims, their use in earlier analyses, and the performance of represented constructs in the peer-reviewed literature. In addition, changes

were made to ensure relevance to the study population as they were transitioning to more independent lifestyles and establishing new careers, households, and families. Additional details of the survey development process are described elsewhere (Larson, Neumark-Sztainer, Story, van den Berg, & Hannan, 2011; Neumark-Sztainer, Croll, et al., 2002; Neumark-Sztainer, Falkner, et al., 2002; Neumark-Sztainer, Story, Perry, & Casey, 1999).

2.3 | Measures

Peer weight teasing during adolescence was measured with the question: “Have you ever been teased or made fun of by other kids because of your weight? Response options included: (1) No and (2) Yes. Participants were then asked: “If yes, how much did this bother you?” (test–retest Kappa = 0.59). Response options included: (1) I have not been teased because of my weight by other kids, (2) Not at all, (3) A little bit, (4) Somewhat, or (5) Very much. Peer weight teasing scores range from 1–5, with higher scores indicating greater distress in response to peer weight teasing.

Family weight teasing during adolescence was measured with the question: “Have you ever been teased or made fun of by family members because of your weight? Response options included: (1) No and (2) Yes. Participants were then asked: “If yes, how much did this bother you?” (test–retest Kappa = 0.78). Response options included: (1) I have not been teased because of my weight by family members, (2) Not at all, (3) A little bit, (4) Somewhat, or (5) Very much. Family weight teasing scores range from 1–5, with higher scores indicating greater distress in response to family weight teasing.

For each of these variables, the score therefore represents a combination of the occurrence of teasing as well as its perceived impact, wherein a score of 1 reflects the absence of teasing. The term “teasing” was used throughout to refer to the combined variables, both to avoid lengthy variable names and improve the manuscript flow, as well as to be consistent with our framing of teasing as a sociocultural influence, rather than placing the emphasis on the individual’s response.

Body satisfaction was measured in EAT II by asking about satisfaction with each of the following: height, weight, body shape, waist, hips, thighs, stomach, face, body build, and shoulders, with responses ranging on a 5-point scale from very dissatisfied to very satisfied (test–retest reliability = 0.82). All items were summed for an overall score with higher scores indicating higher body satisfaction (range: 10–50).

Unhealthy weight control behaviors (UWCBs) were measured with a modified version of the Pound of Prevention Survey (Haines et al., 2006; Jeffrey & French, 1999; Linde et al., 2009; Neumark-Sztainer, Wall, Story, & Perry, 2003). Participants were asked if they had done any of the following behaviors in order to lose weight or keep from gaining weight in the past year: (1) took diet pills; (2) made myself vomit; (3) used laxatives; (4) used diuretics; (5) fasted; (6) ate very little food; (7) used a food substitute (powder or a special drink); (8) skipped meals; and (9) smoked more cigarettes to control or lose weight (test–retest agreement = 86%). All items were summed, with higher scores indicating engagement in a higher number of UWCBs. An additional item was available regarding anabolic steroid use. Due to the low and gendered prevalence of anabolic steroid use (Irving, Wall, Neumark-

Sztainer, & Story, 2002), this item was used in sensitivity analyses only, to ensure that not including it as an index of UWCBs in the main analyses was not leading to important information being missed.

Body Mass Index (BMI) was calculated with self-report height and weight (kg/m^2), which has been described as an appropriate means of obtaining BMI information among this age group, with correlations between reported and measured body mass index (BMI; kg/m^2) of $r = 0.85$ and $r = 0.89$ for female and male adolescents respectively (Himes, Hannan, Wall, & Neumark-Sztainer, 2005). Additionally, very high correlations between self-reported BMI and measured BMI in males ($r = 0.95$) and females ($r = 0.98$) were found in the cohort at 10-year follow-up among a subsample (Quick, Eisenberg, Bucchianeri, & Neumark-Sztainer, 2013; Sirard et al., 2013). Sex- and age-specific cutoff points used to classify respondents as overweight (Himes & Dietz, 1994). At the first timepoint, 5.6% of the sample would classify as underweight, and 22.4% at risk of overweight. At the second and third timepoint, this proportions were 6.7% and 5.8%, and 23.6% and 31.5%, respectively.

2.4 | Statistical analysis plan

All assumptions were checked using IBM SPSS computer software for Macintosh, and all hypotheses were tested using Mplus 7 computer software (Muthén & Muthén, 2011). Path analysis was conducted to examine the extent to which peer weight teasing and family weight teasing during adolescence (EAT I) predicted unhealthy weight control behaviors in young adulthood (EAT III) and was mediated by the level of body satisfaction during emerging adulthood (EAT II). Mediation effects can be determined by comparing the product of 2 or more coefficients (e.g., the effect of X on M (here body satisfaction [a]) and the effect of M on Y (here UCWBs[b]) with its standard error; the test assumes that this product is normally distributed. Yet, the product of two normally distributed coefficients (ab) often violates this assumption and contributes bias to the interpretation of the findings. To address this concern, bias-corrected bootstrap resampling was used for tests of mediation (MacKinnon, Lockwood, & Williams, 2004). Analyses were stratified by gender. Additionally, analyses controlled for body satisfaction at baseline, as well as unhealthy weight control behaviors at baseline. Two sets of sensitivity analyses were conducted, wherein: (a) anabolic steroid use was included in the measure of unhealthy weight control behaviors at EAT III; and (b) BMI was modeled as a covariate.

3 | RESULTS

In general, a higher proportion of girls reported engaging in any UWCBs (e.g., diet pills, fasting, vomiting, etc.) at EAT-I (53.6%), EAT-II (62.7%), and EAT-III (51.9%) relative to boys (24.1%, 29.5%, and 29.2%). Moreover, pertaining to the specific number of UWCBs endorsed, girls (Mean: 1.36–1.74, range: 0–9) tended to endorse a greater number of UWCBs relative to boys (Mean: 0.47–0.65; range: 0–9). More than a quarter of adolescent girls reported teasing from peers (30.2%) and/or family members (27.8%). Over a quarter of adolescent boys reported teasing from peers (30.4%), whereas fewer boys reported teasing from family members (18.3%). Using the combined measure of teasing reflecting both occurrence and impact, among adolescents who experienced peer teasing, girls reported

greater impact of peer (Mean = 3.79, SD = 1.12) teasing than boys (Mean = 3.05, SD = 0.95). Moreover, among adolescents who experienced teasing from family members, girls reported greater impact of family teasing (Mean = 3.56, SD = 1.11) than did boys (Mean = 2.77, SD = 0.96). To this end, among the subgroup of those who reported weight teasing, adolescent girls were, on average, “a little bit” to “somewhat” bothered by weight teasing, whereas, on average, boys were “a little bit” bothered. The means and standard deviations for the full sample are presented in Table 1. At the first timepoint, 5.6% of the sample would classify as underweight, and 22.4% at risk of overweight. At the second and third timepoint, these proportions were 6.7% and 5.8%, and 23.6% and 31.5%, respectively.

3.1 | Path analysis results among women

The path analysis determined that the data fit the model well, according to multiple indices of fit (χ^2 [3] = 13.12, p = .004; CFI = 0.986; TLI = 0.932; SRMR = 0.020). The path analysis (see Figure 1) did not support the hypothesized negative relationship between peer weight teasing during EAT I and body satisfaction during EAT II (a_1 path) in women. However, the results from the path analysis did provide support for the hypothesized negative relationship between family weight teasing during EAT I and body satisfaction during EAT II (a_2 path). Similarly, the path analysis revealed a negative relationship between body satisfaction during EAT II and UWCBs during EAT III (b path). The direct effects of peer weight teasing and family weight teasing during EAT I on UWCBs at EAT III were not statistically significant. Given the gender differences that may exist in these pathways, and the potential impact of the inclusion of muscularity-oriented measures, sensitivity analyses were conducted wherein anabolic steroid use was included in the measure of UWCB at EAT III. Findings from these additional analyses revealed little substantive differences and maintained adequate model fit (χ^2 [3] = 14.08, p = .003; CFI = 0.985; TLI = 0.925; SRMR = 0.020).

The mediation analysis revealed a significant mediated pathway for the relationship between parental weight teasing during EAT I and unhealthy weight control behaviors during EAT III in the hypothesized direction. Specifically, the mediation model revealed that body satisfaction during EAT II mediated the relationship between family weight teasing during EAT I and UWCBs during EAT III, while controlling for earlier measurement of unhealthy weight control behaviors and body satisfaction (see Figure 1). The analysis yielded narrow bias-corrected bootstrap confidence intervals (CIs) that did not include zero (95% CIs: 0.01–0.05), which can be interpreted as the effect being significant. Together, results find support for mediating effects beyond what is expected by chance. The standardized total effect of the mediated path was 0.07, the total direct effect was 0.05, and the total indirect effect was 0.02. The mediated pathway shows that the proportion of the total effect that is mediated by body satisfaction (0.02/0.07) is 0.29, and thus, the mediating effect of body satisfaction during EAT II explains 29% of the total effect of family weight teasing during EAT I on UWCBs during EAT III.

3.2 | Path analysis results among men

The path analysis determined that the data fit the model well, according to multiple indices of fit (χ^2 [3] = 24.01, p = .001; CFI = 0.925; TLI = 0.623; SRMR = 0.036). Further, the path

analysis (see Figure 2) did not support the hypothesized negative relationship between peer weight teasing or family weight teasing during EAT I and body satisfaction during EAT II among men. However, the path analysis did reveal a negative relationship between body satisfaction during EAT II and UWCBs during EAT III (b path, $p < .01$). The direct effects of peer weight teasing and family weight teasing during EAT I on UWCBs at EAT III was not significant ($p < .05$). The mediation analysis did not support a mediating effect of body satisfaction during EAT on the relationship between peer weight teasing or family weight teasing during EAT I and UWCBs during EAT III among males. Findings from the anabolic steroid use sensitivity analyses revealed little substantive differences and maintained adequate model fit ($\chi^2 [3] = 14.08, p = .003$; CFI = 0.985; TLI = 0.925; SRMR = 0.020). In contrast the incorporation of BMI as a covariate in the model significantly reduced all indices of model fit for both men and women, which diminished the ability to interpret parameter estimates.

4 | DISCUSSION

The aim of the current study was to test the longitudinal relationships among peer and family teasing in early adolescence, body satisfaction in late adolescence, and UWCBs in young adulthood among female and male youth. Among women, our findings provide some support for the longitudinal pathways proposed by sociocultural theories (Rodgers et al., 2011), specifically the effects over time of weight-related teasing on UWCBs via the mechanism of poorer body image. Notably, family weight-related teasing reported by early adolescent girls predicted increased engagement in UWCBs in early adulthood indirectly via poorer body image in late adolescence.

First and foremost, the results highlight the evidence for continued longitudinal negative outcomes family weight-related teasing among girls over time, and its negative impact on body image and engagement in UWCBs over the next 10 years. Family weight-related teasing has been identified as an important contributor to negative body image and eating outcomes, particularly among girls (Menzel et al., 2010; Neumark-Sztainer et al., 2010; Puhl et al., 2017; Quick et al., 2013). The current findings provide additional support for this relationship and emphasize the importance of targeting family weight-related communication in prevention interventions (Hart, Cornell, Damiano, & Paxton, 2015). Indeed, family influences have been identified as a likely modifiable element in children and adolescents' sociocultural environment (Hart, Damiano, Sutherland, & Paxton, 2014; Rodgers & Chabrol, 2009). Further efforts should be made to develop and disseminate health promotion and prevention strategies that target weight-related teasing as well as to dissuade more overt pressures to engage in UWCBs in the family environment. Increasing awareness among parents that weight-related teasing can, even unintentionally, be very hurtful and helping them to be aware of how to identify and modify teasing would likely be an effective prevention strategy. To date, little is known regarding parental understandings of the impact of weight-related teasing or other weight-related commentary, which constitutes a barrier to the development and implementation of health-promotion programs for parents. Understanding parental beliefs around the potential negative impacts of weight related teasing on children is an important next step for public health research in this area (Bullivant, Rhydderch, Griffiths, Mitchison, & Mond, 2020; Mond, 2014, 2016). It is

noteworthy that most parents do not tease with the goal of being hurtful, and indeed this may be recognized by their children. Yet weight-teasing may have negative effects even when unintentional (Neumark-Sztainer, Story, & Faibisch, 1998).

In addition, the present findings among adolescent girls and young women confirm the existence of an indirect pathway whereby the negative impact of sociocultural appearance-related influences in early adolescence, and particularly family influence, can be seen on body image in late adolescence, which in turn increases the likelihood of engaging in UWCBs in early adulthood. Although the present data are observational, experimental data have also provided support for these pathways, with experimental exposure to weight-related teasing or appearance-related commentary shown to be associated with higher negative affect well as disordered eating (Aubie & Jarry, 2009; Carlson Jones, Newman, & Bautista, 2005; Furman & Thompson, 2002). The results of these previous experimental studies, along with the indirect pathway evidenced here, provide additional support for sociocultural theories of the development of body image and eating concerns and emphasize the importance of supporting positive body image among adolescent girls as a means of preventing harmful eating behaviors (Neumark-Sztainer, Levine, et al., 2006). Further work examining successful strategies to assist families and adolescents with ways to sustain positive body image will be useful.

Our findings did not, however, find evidence of a similar mediated indirect pathway from weight-related teasing from peers to UWCBs, suggesting that peer teasing in early adolescence may have fewer long-term effects on body image and eating concerns as compared to family teasing. To be clear, this does not negate the detrimental impact of peer weight-related teasing in early adolescence. However, it suggests that in this age group, family influences may have a comparatively greater capacity to determine later body image and eating concerns. It has been proposed that during the course of adolescence the relative importance of family and peer influences on body image and eating outcomes may change, with peer influence becoming progressively more important and family influences less so with age (Paxton, Eisenberg, & Neumark-Sztainer, 2006). Our findings are consistent with this interpretation and the predominant importance of family influences related to weight and appearance among early adolescent girls. It may also be that peer groups change over the course of adolescence and young adulthood and that therefore the presence of peer teasing is less enduring as compared to family teasing. It may also be that with age, peers become more aware of the negative impact of weight-related teasing and engage in it less. In contrast, family dynamics may be more resistant to change, and youth may feel less comfortable challenging such communications from their parents. Thus, several factors may contribute to these findings, and unpacking these differential pathways will be an important direction for future research.

In contrast to the pattern of finding among girls, among adolescent boys and young men, the indirect pathway posited by sociocultural theories was not supported. Specifically, no relationship emerged between family or peer weight-related teasing in early adolescence and poorer body image in late adolescent boys. However, a relationship did emerge between poor body image and the increased likelihood of engaging in UWCBs in early adulthood, suggesting that among adolescent boys, poor body image is also a driver of UWCBs and

predicts increases in these outcomes over time. The lack of support for the relationship between weight-related teasing and poorer body image among boys is somewhat consistent with other reports of the lesser impact of teasing on body image and eating outcomes among boys as compared to girls (Haines et al., 2006; Menzel et al., 2010). Further work aiming to identify the factors contributing to poor body image among late adolescent boys is needed. Gaining a better understanding of why adolescent boys seem less impacted by weight-related teasing with regard to body image compared to their female counterparts is important, and it may be helpful to ascertain whether these differences remain when using assessments of teasing and body image and body change outcomes that better capture muscularity and body shape dimensions. As described, work using gender-specific measures has produced more consistent evidence of relationships between teasing and body image among boys (Schaefer & Salafia, 2014). Thus, it may be that teasing related to aspects of appearance that are more central to male youth's body image (such as muscularity) is more impactful than teasing related to aspects that male youth are less invested in. Studies capable of capturing the comments with the potential to be most hurtful may therefore be those that evidence the strongest relationships.

Despite the lack of the hypothesized mediated pathway, our findings revealed that among late adolescent boys, poor body image predicted increases in the likelihood of engaging in UWCBs in early adulthood. This is in itself an important finding and highlights the central role of body image as a determinant of later health behaviors among boys and young men among whom data are more scarce compared to girls (Girard et al., 2018). Our findings support the dissemination of interventions capable of promoting body satisfaction among adolescent boys as a means of preventing later UWCBs. In addition, the gendered pathways emerging here suggest the usefulness of considering how health promotion interventions and approaches might be tailored according to male and female adolescents to be most effective.

Our study includes a number of limitations. One, our measure of UWCBs is a count variable, and represented engagement with a range of different types of behaviors, and thus the frequency of engagement of each behavior was not assessed. Two, our measures of teasing focused only on weight-related teasing, as opposed to weight- and shape-related teasing. Given that other work among male youth has identified relationships between muscularity-oriented teasing and body image outcomes (e.g., Galioto et al., 2012), utilizing measures of teasing that can capture both of these aspects would be useful in future research. In addition, although the measures of body satisfaction included items assessing body areas that are of concern for males (such as shoulders), future research would benefit from utilizing measures that explicitly assess dissatisfaction related to muscularity as these are increasing concerns in youth across genders (Cunningham et al., 2019; Rodgers et al., 2018). Similarly, outcome measures that include muscularity-targeted eating and exercise behaviors would also contribute to better capturing these relationships among male youth (Bentley, Gratwick-Sarll, Harrison, & Mond, 2015; Murray et al., 2019; Trompeter et al., 2020). Three, while weight-related teasing is a critical element of the appearance pressures exerted by family members and peers, other types of interactions such as negative appearance-related comments and feedback (Rodgers & Chabrol, 2009), pressures to diet or modify body weight and shape through eating and exercise behaviors (Field et al., 2001), or appearance-focused conversations (Neumark-Sztainer et al., 2010), have also been identified

as important sociocultural influences on body image and eating concerns. Future work should aim to extend the current findings to include a broader focus on peer and family influences in early adolescence, or even younger, given evidence of weight- and shape-related teasing among children (McCormack et al., 2011). Four, while this study makes use of a large longitudinal dataset to track these relationships over time, it should be acknowledged that the data were collected in a specific area of the U.S. over 10 years ago, and therefore it is unclear how this might affect the generalizability of the findings to more recent cohorts and individuals in other parts of the world. Finally, while longitudinal observational research may contribute to the evidence building toward supporting the directionality of pathways predicted by theory, these data are still limited in terms of the inferences that can be made with respect to causality.

The present study also includes a number of notable strengths, including the 10-year longitudinal design and the inclusion of males, who are frequently underrepresented in research related to body image and eating concerns, as well as including a racially/ethnically and socioeconomically diverse population. In addition, the assessment of teasing from peers and parents separately constitute additional strengths and allow for their respective and distinct roles to be examined. Thus, the present study makes an important contribution to extant literature by providing strong evidence for poor body image as a mechanism accounting for the long-term negative impact of family weight-related teasing on the risk for UWCBs among adolescent girls and young women. In addition, our findings highlight the importance of poor body image among adolescent boys as a factor for increased risk of engaging in UWCBs in early adulthood. Taken together these results support the usefulness of grounding research and intervention efforts aiming to prevent UWCBs within sociocultural models and call for the development of programs that involve the family members of early adolescents. Given the unintended consequences of teasing, interventions designed to decrease family weight-related teasing and to promote strategies for at-risk girls to address such teasing would be useful additions to prevention interventions.

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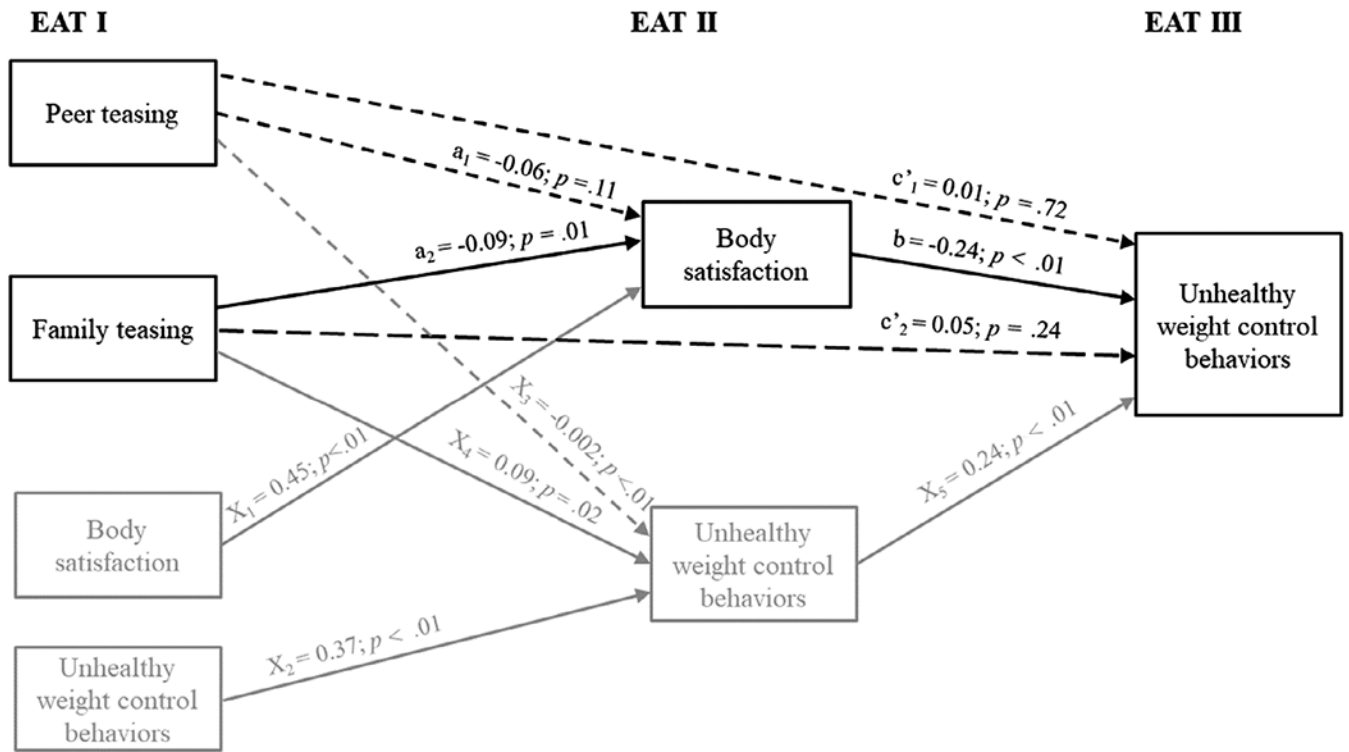


FIGURE 1. Path analysis results for women, with data from EAT I-III. Control variables, paths, and coefficients from earlier measurement occasions are presented in grey font

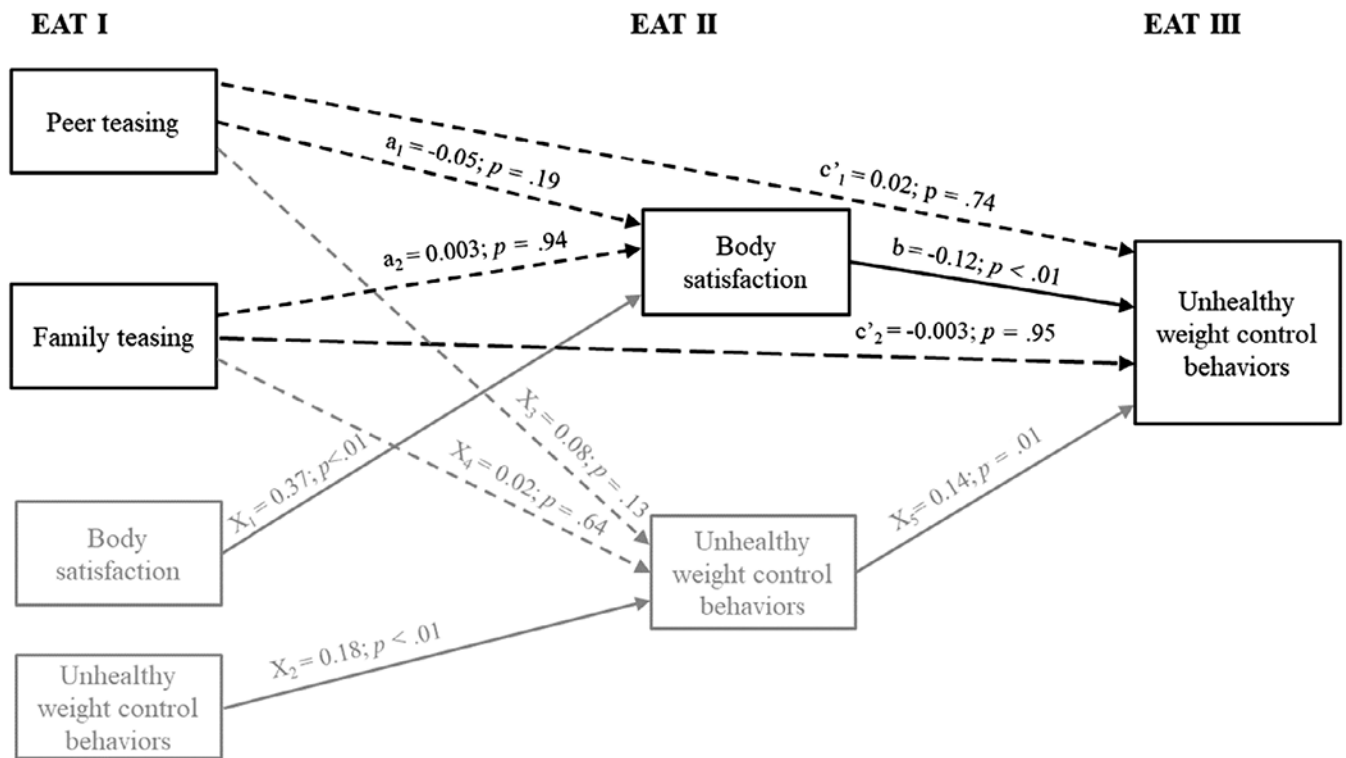


FIGURE 2. Path analysis results for men, with data from EAT I-III. Control variables, paths, and coefficients from earlier measurement occasions are presented in grey font

TABLE 1

Characteristics of the sample ($N = 1,902$ young adults, 57% female)

Variables	Range	EAT I		EAT II		EAT III	
		M	SD	M	SD	M	SD
Women							
UWCBs	0–9	1.37	1.60	1.74	1.79	1.36	1.69
Body satisfaction	10–50	31.88	9.14	31.41	8.88	30.03	8.77
Body mass index	13–57	21.82	3.88	23.63	4.66	25.60	5.93
Peer weight teasing	1–5	2.13	1.84				
Family weight teasing	1–5	1.98	1.70				
Men							
UWCBs	0–9	0.47	1.01	0.63	1.21	0.65	1.28
Body satisfaction	10–50	37.26	8.56	36.46	8.59	35.32	8.14
Body mass index	14–62	22.19	4.11	24.30	4.21	26.14	4.73
Peer weight teasing	1–5	1.62	1.08				
Family weight teasing	1–5	1.32	0.80				

Abbreviations: M, mean; SD, standard deviation.