Intergenerational Transmission of Parent Encouragement to Diet From Adolescence Into Adulthood

Jerica M. Berge, PhD, MPH, LMFT, CFLE,[a] Megan R. Winkler, PhD, RNC-NIC, CPNP-PC,[b] Nicole Larson, PhD, MPH, RDN,[b] Jonathan Miller, PhD,[a] Ann F. Haynos, PhD,[c] Dianne Neumark-Sztainer, PhD, MPH, RD[b]

abstract

BACKGROUND: Although previous cross-sectional research has revealed potential harmful outcomes associated with parent encouragement to diet, it is unclear whether these effects are long lasting and whether they are transmitted to the next generation. The main aim of the current study was to examine longitudinal associations between exposure to parent encouragement to diet in adolescence and weight-related and emotional health outcomes in adulthood and to examine whether intergenerational transmission of encouragement to diet occurs.

METHODS: This is a longitudinal, population-based study (ie, Project Eating and Activity in Teens and Young Adults) of socioeconomically and racially and/or ethnically diverse adolescents managed into adulthood and/or parenthood (n = 556; mean age = 31.4; 64.6% female). Surveys and anthropometrics were completed at school by adolescents in 1998–1999 and surveys were completed online in 2015–2016 by young adults.

RESULTS: Experiencing parent encouragement to diet as an adolescent was significantly associated with a higher risk of overweight or obesity, dieting, binge eating, engaging in unhealthy weight control behaviors, and lower body satisfaction 15 years later as a parent, after adjusting for sociodemographics and baseline measures of the outcomes ($P < .05$). Additionally, intergenerational transmission of encouragement to diet occurred and resulted in parents being more likely to report other weight-focused communication in the home environment.

CONCLUSIONS: Exposure to parent encouragement to diet as an adolescent had long-term harmful associations with weight-related and emotional health outcomes in parenthood and was transmitted to the next generation. It may be important for health care providers to educate parents about the potential harmful and long-lasting consequences of engaging in encouragement to diet with their children.

[a]*Department of Family Medicine and Community Health, University of Minnesota Medical School,* [b]*Division of Epidemiology and Community Health, School of Public Health, and* [c]*Department of Psychiatry, University of Minnesota, Minneapolis, Minnesota*

Dr Berge conceptualized the manuscript, assisted with data analysis and interpretation, and wrote all drafts of the manuscript; Dr Winkler conducted the data analysis and critically reviewed the manuscript; Dr Larson assisted with data acquisition and interpretation of the data and critically reviewed the manuscript; Dr Miller assisted with the conceptualization of the manuscript, assisted with data analysis, and critically reviewed the manuscript; Dr Haynos assisted with the data analysis of the manuscript and critically reviewed the manuscript; Dr Neumark-Sztainer is the principal investigator of the study, assisted in conceptualizing the manuscript, contributed to the design of the study, and critically reviewed the manuscript; and all

WHAT'S KNOWN ON THIS SUBJECT: Previous cross-sectional research reveals that parent encouragement to diet is associated with unhealthy weight, weight-related, and emotional health outcomes in adolescents. However, it is unknown if these outcomes carry forward into adulthood and whether they are passed on intergenerationally.

WHAT THIS STUDY ADDS: Parent encouragement to diet in adolescence was associated with harmful long-term weight, weight-related, and emotional health outcomes in adulthood and was transmitted to the next generation. Parent encouragement to diet may be a cyclical pattern that is important to break.

To cite: Berge JM, Winkler MR, Larson N, et al. Intergenerational Transmission of Parent Encouragement to Diet From Adolescence Into Adulthood. *Pediatrics.* 2018; 141(4):e20172955

Downloaded from www.aappublications.org/news by guest on May 15, 2021

Previous researchers have established that parental encouragement to diet (eg, telling your children that they should go on a diet to lose weight) is common. In a previous study conducted by the authors, almost 40% of parents reported regularly engaging in encouragement to diet with their daughters and sons.[1] In addition, results from qualitative research studies indicate that parents engage in encouragement to diet with their children for a number of reasons, including concerns about their children's health, worry about their children being teased, reactions to a visit with a health provider, cultural or societal norms, or unconscious action.[2–4] Several previous quantitative studies have further revealed that parent encouragement to diet is associated with unhealthy weight control behaviors, dieting, binge eating, lower self-esteem, and a less favorable body image in children and adolescents.[2,5–11] Although these previous studies have been useful in understanding the prevalence of parent encouragement to diet, the reasons why parents engage in encouragement to diet, and the potential harmful outcomes associated with parent encouragement to diet, it is unclear whether these effects last into parenthood and are transmitted to the next generation.

There is limited research including examinations of the longitudinal influence of parent encouragement to diet experienced in adolescence and weight-related and emotional health outcomes in parenthood. The authors of the few longitudinal studies conducted have focused primarily on weight teasing and have found that parent or family weight teasing was associated with lower health-related quality of life[12] and overweight status in adulthood.[13] One retrospective study revealed significant associations between recalling parent weight-related comments experienced in youth and lower body dissatisfaction in adult women.[14]

Additionally, we are not aware of any research that has examined whether parent encouragement to diet is transmitted to the next generation. For example, if parent encouragement to diet occurs in adolescence, will those exposed to these conversations be more likely to engage in encouragement to diet with their own children when they are parents? Furthermore, will parents exposed to encouragement to diet in adolescence be more likely to have home environments where other family-level, weight-related communication (such as weight-teasing or family members talking about their own and other family members' weight) occurs?

According to Family Systems Theory (FST),[15,16] the family home environment is the most proximal level of influence on child weight and weight-related behaviors. Additionally, FST posits that behaviors learned in the family context in which a person is raised are passed on intergenerationally.[17,18] These patterns and behaviors can either be healthful (eg, modeling fruit and vegetable consumption) or unhealthful (eg, parent encouragement to diet) and are passed on intergenerationally both through direct communication (ie, verbal communication) and modeling (ie, nonverbal communication). For example, an adolescent told by his or her parent to lose weight or diet may subsequently use a direct communication approach of engaging in similar encouragement to diet with his or her own children. In addition, young adult parents previously exposed to encouragement to diet in adolescence may engage in unhealthy weight-related behaviors they saw their own parents use, such as dieting, binge eating, taking diet pills, or skipping meals. They may also model these unhealthy weight-related behaviors in their own households with their own children, and when observed by their children, it can facilitate intergenerational transmission of weight and thinness values, as well as unhealthy weight-related behaviors. Furthermore, engaging in encouragement to diet within the home environment may also promote other weight-focused communication from other family members.

Given the harmful potential of parent encouragement to diet for current and future generations, it is important to examine whether unhealthy outcomes associated with encouragement to diet in adolescence carry forward into adulthood and whether encouragement to diet is transmitted to the next generation. In the current study, we hypothesize that adolescents who experience parent encouragement to diet (before the age of 19 years)[19] will be at higher risk for engaging in unhealthy weight-related behaviors, will have a higher weight status, and will have poorer emotional health as parents. In addition, we hypothesize that adolescents who experience parent encouragement to diet will be more likely to carry forward this practice as parents with their own children. Furthermore, we hypothesize that parents who experienced encouragement to diet as adolescents will allow other weight-focused communication in their home environments (eg, talk about their own and other family members' weight; engaging in weight teasing).

METHODS

Study Design and Population

Adolescent data for the current analysis were drawn from Wave 1 (1998–1999) and Wave 2 (2003–2004; if the participant was <19 years old at Wave 2)[19] of Project Eating and Activity in Teens and Young Adults

Downloaded from www.aappublications.org/news by guest on May 15, 2021

(EAT), a longitudinal study designed to examine dietary intake, physical activity, weight control behaviors, weight status, and factors associated with these outcomes during the transition from adolescence to young adulthood and parenthood.[20,21] Adolescence was defined by the World Health Organization (WHO) definition of adolescence,[19] which is up to 19 years of age. Data from parenthood was drawn from Wave 4 (2015–2016). The analytic sample includes 556 participants who responded at Waves 1 and 4 of Project EAT and who were parents of 1 or more children aged ≥2 years who lived with them at least 50% of the time at Wave 4. Children ≥2 were included in analyses because previous studies have revealed that parents engage in diet and weight-related conversations with children this young.[22] In adolescence, participants were recruited from 31 public schools in the Minneapolis–St Paul metropolitan area of Minnesota, United States, and completed Wave 1 surveys and anthropometric measures as part of a health, science, or physical education class.[20,21] The Wave 2 survey was conducted by mail. Participants in the Wave 1 survey were invited to participate in Wave 2 if they could be contacted at follow-up and again were invited to participate in the Wave 4 survey if they had participated in either of the Wave 2 or Wave 3 (2008–2009) surveys. Mailed or online surveys were completed by 66.1% of those who could be contacted at Wave 4. The University of Minnesota's Institutional Review Board Human Subjects Committee approved all protocols used in Project EAT at each wave.

Participants in the analytic sample had a mean age of 15.3 ± 1.4 years at Wave 1 and a mean age of 31.4 ± 1.5 years at Wave 4. These participants also reported on their children at Wave 4; 52.7% of children were aged 2 to 5 years, 23.9% were 6 to 9 years, and 23.4% were 10 years or older.

Survey Development

To allow for longitudinal comparisons and examination of secular trends, key items from earlier study waves were retained on the Wave 4 survey. 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. Additions to the survey were also made to reflect the study's life course perspective and focus on learning about significant other and intergenerational influences on weight-related outcomes.[23] Scale psychometric properties were examined for the EAT surveys at each of the 4 waves of data collection. Item test-retest reliability (reported in Supplemental Table 4) were determined in a subgroup of participants (100 participants on average) at Wave 4 who completed the survey twice within a period of 1 to 4 weeks. The reliability of items included on the Wave 1 survey are also reported but were based on the reports of a separate sample of seventh- and 10th-grade students who completed the survey twice within a 2-week period.[21]

Measures

Because we were interested in capturing the experience of parent encouragement to diet across the entire adolescent developmental period, we created an exposure variable reflecting any parent encouragement to diet from either parent at Wave 1 or Wave 2 (if the participant was <19 years old at Wave 2).[19] The survey measures used to assess parent encouragement to diet, outcome variables (ie, dieting, binge eating, weight status, unhealthy weight control behaviors, body satisfaction, depressive symptoms, self-esteem, encouraging their own children to diet, talking about their own weight as parents, having family members who talk about their own and each other's weight, and family weight teasing), covariates (ie, sex, age, race and/or ethnicity, family socioeconomic status [SES]), and baseline measures of outcome variables are described in Supplemental Table 4.[21]

Statistical Analysis

Analyses were conducted by using SAS (version 9.3; SAS Institute, Inc, Cary, NC), and statistical significance was set at $P < .05$. We first examined distributions of participant sociodemographic characteristics, weight status, weight-related behaviors, and emotional well-being in adolescence at the earliest wave in which parent encouragement to diet was experienced, comparing participants who experienced encouragement to diet with those who did not. We examined differences using the χ^2 test or F tests to test the equality of means.

Linear regression models were then used to estimate both the unadjusted and adjusted longitudinal associations of experiencing parent encouragement to diet in adolescence with unhealthy weight control behaviors and emotional health outcomes (body satisfaction, self-esteem, depression) in adulthood as a parent (Wave 4). Adjusted models controlled for participant sex, race and/or ethnicity, age, SES, and measures of the outcome variable (eg, depressive symptoms, body satisfaction) in adolescence, when parent encouragement to diet was experienced.

Logistic regression models were used to estimate the adjusted longitudinal associations of experiencing parent encouragement to diet in adolescence with participant weight status, binge eating, dieting behavior,

Downloaded from www.aappublications.org/news by guest on May 15, 2021

parent-child communication outcomes (encouraging one's own child to diet and talking to the child about his or her weight), and the other parent and family weight-related communication outcomes (complaining about weight in front of family and family members talking about their own weight, each other's weight, and teasing each other about weight) in parenthood (Wave 4). To provide more interpretable estimates of association for categorical outcomes, we used the counterfactual method[24,25] to calculate adjusted prevalence ratios (PRs) from the prediction equation estimated in the logistic regressions. SEs for PRs were estimated by using the δ method and method of variances estimates recovery,[25] allowing estimation of 95% confidence intervals (CIs). Models used to estimate the prevalence of overweight, obesity, binge eating, and dieting behavior in adulthood were adjusted for participants' sex, race and/or ethnicity, age, SES, and measures of the outcome variable (eg, weight status, dieting, binge eating) in adolescence, when parent encouragement to diet was experienced. Models estimating the prevalence of parent-child and family weight-related communication outcomes were adjusted for participants' sex, race/ethnicity, age, family SES, and weight status in adolescence, when parent encouragement to diet was experienced. Unadjusted PRs were calculated by using contingency tables.

Exploratory analyses were also performed to examine whether the associations between experiencing parent encouragement to diet and the weight-related and emotional health outcomes varied by participant sex and whether the associations with communication outcomes varied by the age of the participant's child or combinations of participant and child sex. No statistically significant evidence for potential moderators was identified.

TABLE 1 Parent Encouragement to Diet by Participant Sociodemographics and Weight-Related Behaviors and Emotional Health During Adolescence

	Total Sample, *N* = 556	Did Not Experience Diet Talk in Adolescence, *N* = 344	Experienced Diet Talk in Adolescence, *N* = 206	*P*
Baseline (Wave 1) sociodemographic characteristics				
Sex, % (*N*)				
Male	35.4 (197)	71.3 (139)	28.7 (56)	.002[a]
Female	64.6 (359)	57.8 (205)	42.3 (150)	
Age (y at baseline), mean (SE)	15.3 (1.4)	15.4 (0.08)	15.1 (0.10)	.003[a]
Family SES, % (*N*)				
Low	34.4 (189)	54.8 (103)	45.2 (85)	.012[a]
Middle	23.1 (127)	63.2 (79)	36.8 (46)	
High	42.6 (234)	68.8 (161)	31.2 (73)	
Race and/or ethnicity[b], % (*N*)				
White or non-Hispanic	65.9 (363)	66.6 (241)	33.4 (121)	.005[a]
Hispanic or nonwhite	34.1 (188)	54.4 (100)	45.7 (84)	
Adolescent[c] wt-related and emotional health characteristics				
Wt status[d], % (*N*)				
Normal wt	68.9 (370)	71.4 (264)	28.7 (106)	<.001[a]
Overweight	18.4 (99)	49.5 (49)	50.5 (50)	
Obese	12.7 (68)	33.8 (23)	66.2 (45)	
Dieted ≥1 time in previous y, % (*N*)				
Yes	44.0 (242)	46.7 (113)	53.3 (129)	<.001[a]
No	56.0 (308)	75.0 (231)	25.0 (77)	
Binge eating with loss of control, % (*N*)				
Present	7.9 (42)	45.2 (19)	54.8 (23)	.014[a]
Absent	92.2 (493)	64.3 (317)	35.7 (176)	
Unhealthy wt control behaviors, mean (SE)	1.2 (1.6)	0.85 (0.08)	1.75 (0.11)	<.001[e]
Body satisfaction	33.5 (9.5)	35.4 (0.50)	30.2 (0.65)	<.001[e]
Depression symptoms	10.7 (2.8)	10.3 (0.15)	11.2 (0.20)	<.001[e]
Self-esteem	17.9 (3.6)	18.5 (0.19)	17.0 (0.25)	<.001[e]

[a] Significant differences ($P < .05$) were assessed by using χ^2 tests.
[b] White or non-Hispanic parents ($n = 363$) and Hispanic or nonwhite parents (total n = 188; $n = 48$ Non-Hispanic African American parents, $n = 34$ Hispanic parents, $n = 77$ Non-Hispanic Asian American parents, $n = 1$ Non-Hispanic Pacific Islander parent, $n = 5$ Non-Hispanic American Indian parents, and $n = 23$ Non-Hispanic multiracial parents).
[c] Adolescent = the value of wt-related and emotional health characteristics at the time diet talk was experienced; if the participant did not experience diet talk, the value is from baseline (Wave 1).
[d] Wt status was categorized on the basis of age- and sex-specific Centers for Disease Control and Prevention BMI growth curves, including normal wt (BMI <85th percentile), overweight (BMI ≥85th–95th percentile), and obesity (BMI ≥95th percentile).
[e] Significant differences ($P < .05$) were assessed by using analysis of variance.

RESULTS

Descriptive Results

During adolescence, participants who were exposed to parent encouragement to diet were more likely to be female, younger in age, from lower SES households, and overweight or obese and were more likely to represent an ethnic and/or racial background other than non-Hispanic white. Additionally, participants who experienced parent encouragement to diet in adolescence were more likely to engage in unhealthy weight-related behaviors, dieting, and binge eating and were more likely to report more negative emotional health and lower body satisfaction during adolescence than participants who did not experience parent encouragement to diet (Table 1).

Downloaded from www.aappublications.org/news by guest on May 15, 2021

TABLE 2 Prevalence of Weight, Weight-Related, and Emotional Health Outcomes as a Parent by Exposure to Parent Encouragement to Diet in Adolescence (N = 556)

	Unadjusted Model	Adjusted Model[a]
	PR (95% CI)	PR (95% CI)
Overweight (BMI ≥ 25)		
Did not experience diet talk in adolescence[b]	1 (reference)	1 (reference)
Experienced diet talk in adolescence	1.40 (1.25–1.58)[c]	1.25 (1.10–1.41)[c]
Obesity (BMI ≥ 30)		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	2.02 (1.57–2.60)[c]	1.37 (1.06–1.76)[c]
Dieting		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.41 (1.23–1.62)[c]	1.20 (1.04–1.37)[c]
Binge eating (with loss of control)		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	2.21 (1.39–3.49)[c]	1.72 (1.08–2.75)[c]
	Mean (95% CI)	Mean (95% CI)
Unhealthy wt control behaviors (range: 0–9)		
Did not experience diet talk in adolescence	0.89 (0.73–1.05)	1.49 (1.18–1.81)
Experienced diet talk in adolescence	1.54 (1.33–1.75)[c]	1.79 (1.49–2.10)[c]
Body satisfaction (range: 10–50)		
Did not experience diet talk in adolescence	32.7 (31.8–33.6)	32.0 (31.1–32.9)
Experienced diet talk in adolescence	28.1 (26.9–29.3)[c]	29.8 (28.7–31.0)[c]
Depression symptoms (range: 6–18)		
Did not experience diet talk in adolescence	10.0 (9.7–10.4)	10.1 (9.8–10.5)
Experienced diet talk in adolescence	10.7 (10.3–11.1)[c]	10.3 (9.9–10.7)
Self-esteem (range: 6–24)		
Did not experience diet talk in adolescence	19.5 (19.1–19.8)	19.4 (19.0–19.7)
Experienced diet talk in adolescence	18.6 (18.1–19.0)[c]	19.1 (18.6–19.5)

[a] Controlling for sex, race and/or ethnicity (white or non-Hispanic parents vs Hispanic or nonwhite parents), age, family SES, and measure of outcome variable in adolescence.

[b] Adolescence = experienced diet talk at either EAT Wave 1 (all <19 y) and/or at EAT Wave 2 before 20 y of age (WHO defines adolescent as 10–19 y).[23]

[c] Values are significantly different from reference values.

Associations Between Experiencing Parent Encouragement to Diet in Adolescence and Weight, Weight-Related, and Emotional Health Outcomes in Parenthood

Regarding weight and weight-related outcomes, results consistently revealed that participants who experienced parent encouragement to diet in adolescence had a higher risk of dieting, binge eating, and being overweight or obese 15 years later as parents than participants who did not experience parent encouragement to diet in adolescence, after adjusting for sex, age, race and/or ethnicity, SES, and the previous measure of the outcome variable in adolescence (Table 2). Additionally, participants who experienced parent encouragement to diet in adolescence engaged in more unhealthy weight control behaviors ~15 years later as parents, compared with adolescents who did not experience encouragement to diet (Table 2).

Regarding emotional health outcomes, results revealed that participants who experienced parent encouragement to diet in adolescence had lower body satisfaction 15 years later as parents, compared with participants who did not experience parent encouragement to diet in adolescence (Table 2). Associations between experiencing parent encouragement to diet in adolescence and depressive symptoms and self-esteem in parenthood were only significant in unadjusted models (Table 2).

Intergenerational Transmission of Parent Encouragement to Diet and Family Weight-Related Communication in Parenthood

Results revealed that participants who experienced parent encouragement to diet in adolescence had a higher risk of both engaging in encouragement to diet with their own children and talking with their own children about their children's weight 15 years later as parents, compared with participants who did not experience parent encouragement to diet in adolescence (Table 3). Additionally, participants who experienced parent encouragement to diet in adolescence were more likely to complain about their own weight in the presence of family members and to report other family members talking about their own weight. There were no significant associations found between parent encouragement to diet and family members engaging in weight-related teasing in parenthood (Table 3).

DISCUSSION

Results revealed that participants who experienced parent encouragement to diet in adolescence were more likely to be overweight or obese; engage in dieting, binge eating, and unhealthy weight control behaviors; and have lower body satisfaction 15 years later in adulthood as parents. Additionally, the intergenerational transmission of parent encouragement to diet occurred from adolescence to parenthood and resulted in home environments with more weight-focused communication. With the results of the current study, we support previous research revealing that parent encouragement to diet is associated with negative weight-related and emotional health outcomes, and we extend previous findings by showing that these harmful outcomes track into parenthood.[2,5–11] With our study findings, we also extend previous research by showing that encouragement to diet is passed on to the next generation[2,5–11] and thus may be cyclical. For example,

Downloaded from www.aappublications.org/news by guest on May 15, 2021

TABLE 3 Prevalence of Intergenerational Transmission of Parent Diet Talk and Family-Level Weight-Related Communication in Parenthood by Exposure to Parent Encouragement to Diet in Adolescence ($N = 556$)

	Unadjusted Model	Adjusted Model[a]
	PR (95% CI)	PR (95% CI)
Parent-child diet talk and wt-related communication		
Encourages own child to diet		
Did not experience diet talk in adolescence[b]	1 (reference)	1 (reference)
Experienced diet talk in adolescence	1.55 (1.25–1.92)[c]	1.52 (1.12–2.05)[c]
Talks to own child about his or her wt		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.51 (1.22–1.87)[c]	1.49 (1.15–1.93)[c]
Other parent and family-level wt-related communication		
Parent complains about wt when other family members are around		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.56 (1.26–1.92)[c]	1.46 (1.11–1.92)[c]
Family members talk about their own wt		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.34 (1.08–1.67)[c]	1.37 (1.13–1.65)[c]
Family members talk about each other's wt		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.29 (1.03–1.61)[c]	1.31 (0.98–1.74)
Family members tease one another about their wt		
Did not experience diet talk in adolescence	1	1
Experienced diet talk in adolescence	1.30 (1.00–1.70)	1.40 (0.92–2.12)

[a] Adjusted model controls for sex, race and/or ethnicity (white or non-Hispanic parents vs Hispanic or nonwhite parents), age, family SES, and wt status in adolescence.

[b] Adolescence = experienced diet talk at either EAT 1 (all <19 y) and/or EAT 2 before 20 y of age (WHO defines adolescence as 10–19 y).[23]

[c] Values are significantly different from reference values.

experiencing parent encouragement to diet in adolescence predicted the use of encouragement to diet with the next generation of children and increased the likelihood that other weight-focused communication was reported in the home environment in parenthood.

Findings from the current study support FST, in that the intergenerational transmission of parent encouragement to diet occurred and appeared to be transmitted via both direct communication and parental modeling. For example, adolescents who grew up experiencing encouragement to diet from their parents had a higher risk of engaging in unhealthy weight control behaviors, had poorer emotional health outcomes, and were more likely to engage in encouragement to diet with their own children. Thus, these findings suggest that parent encouragement to diet not only physically and emotionally affects the person experiencing encouragement to diet but also potentially shapes their values, beliefs, and weight-related practices, which they engage in and/or pass on to their own families through direct communication and parental modeling. Furthermore, the negative effects of parent encouragement to diet can compound over time, not only impacting the person directly receiving the messages, but also potentially hurting generations to come.

These study findings may be useful for future research and intervention studies. For example, knowing that parent encouragement to diet is transmitted to the next generation and creates home environments ripe for more encouragement to diet and negative weight-related and emotional health outcomes, interventionists might want to prioritize intervening on parent encouragement to diet to break the chain of transmission. For example, it would be important to target the direct communication and modeling pathways identified by FST that may promote the transmission of parental encouragement to diet and unhealthy weight-related behaviors from one generation to the next. Additionally, targeting parent encouragement to diet in adolescence may help reduce overweight and/or obesity, binge eating, unhealthy weight control behaviors, and body dissatisfaction as adolescents transition into adulthood and become parents.

There were both strengths and limitations to the current study. One strength of the study is the longitudinal study design, allowing for the examination of parent encouragement to diet used in the home during adolescence and in parenthood. With this strength, we greatly advance the field, given that previous researchers have only measured parent encouragement to diet retrospectively.[14] Another strength is the ability to adjust for important demographic variables and previous measures of the outcome variables during adolescence. One limitation of the study includes self-reported BMI. However, in the current sample, high correlations were found between self-reported and measured BMI in male ($r = 0.88$) and female ($r = 0.85$) adolescents at baseline.[26] Additionally, at Wave 3, high correlations between self-reported and measured BMI were found in a validation subsample of 63 male and 62 female study participants ($r = 0.95$ for males and $r = 0.98$ for females).[27] Another limitation of the study is that findings may not be generalizable to other more diverse populations because of participants being recruited only from the Minneapolis and St Paul, Minnesota, school districts. It may also be the case that the current sample of young parents is not generalizable to older-aged parents or nonparents. In addition, because of the small sample size of fathers,

Downloaded from www.aappublications.org/news by guest on May 15, 2021

it was not possible to examine differences between participants who experienced encouragement to diet from mothers only compared with those who experienced encouragement to diet from fathers only or from both parents in adolescence. Future researchers should examine differences in weight-related and emotional health outcomes for adolescents who experience mother-only, father-only, or mother and father engagement in encouragement to diet. Furthermore, social desirability bias may have occurred, given the self-report nature of survey research, and the 1-item measure of parental encouragement to diet may not be as robust as using multiple items.

CONCLUSIONS

Results from the current study may be helpful for health care providers who work with parents of young children. For example, health care providers should consider educating parents about the harmful outcomes associated with engaging in encouragement to diet with their children. In addition, it may be important for parents to know that it is common for parents who experience encouragement to diet in adolescence to carry this behavior forward with their own children. For example, if parents grow up hearing encouragement to diet from their own parents, they may have a sense that encouragement to diet is normative and that they should engage in these same conversations with their own children.[28] Health care providers may be able to help parents break this potential negative intergenerational pattern by bringing it to their attention and helping them to engage in other health-promoting parenting practices.

Additionally, the results of the current study may be useful for future prevention studies. Future public health interventionists may want to focus on teaching parents how to avoid engaging in encouragement to diet with their children, given the long-term harmful weight-related and emotional health outcomes associated with parent encouragement to diet and the potential for the intergenerational transmission of these patterns to occur. Furthermore, it may be important to examine at a societal level what messages were or are being sent to parents that influence them to engage in encouragement to diet with their children. For example, advertisements, dieting products, and other messages at a societal level may need to be targeted to reduce parent encouragement to diet and the cycle of transmitting weight values to the next generation.

ABBREVIATIONS

CI: confidence interval
EAT: Eating and Activity in Teens and Young Adults
FST: Family Systems Theory
PR: prevalence ratio
SES: socioeconomic status
WHO: World Health Organization

authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work regarding the accuracy and integrity of any part of the work.

DOI: https://doi.org/10.1542/peds.2017-2955

Accepted for publication Jan 8, 2018

Address correspondence to Jerica M. Berge, PhD, MPH, LMFT, CFLE, Department of Family Medicine and Community Health, University of Minnesota Medical School, 717 Delaware St SE, Room 425, Minneapolis, MN 55414. E-mail: jberge@umn.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2018 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: Supported by grant R01HL116892 (principal investigator [PI]: Dr Neumark-Sztainer) from the National Heart, Lung, and Blood Institute. Dr Winkler is supported by grant T32DK083250 from the National Institute of Diabetes and Digestive and Kidney Diseases (PI: Dr Jeffery). Dr Miller is supported by grant T32CA163184 from the National Cancer Institute (PI: Dr Allen). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung and Blood Institute, National Cancer Institute, or the National Institutes of Health. Funded by the National Institutes of Health (NIH).

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

1. Berge JM, Maclehose R, Loth KA, Eisenberg M, Bucchianeri MM, Neumark-Sztainer D. Parent conversations about healthful eating and weight: associations with adolescent disordered eating behaviors. *JAMA Pediatr*. 2013;167(8):746–753
2. Berge JM, Trofholz A, Fong S, Blue L, Neumark-Sztainer D. A qualitative analysis of parents' perceptions of weight talk and weight teasing in the home environments of diverse low-income children. *Body Image*. 2015;15:8–15
3. Berge JM, Hanson-Bradley C, Tate A, Neumark-Sztainer D. Do parents or siblings engage in more negative

Downloaded from www.aappublications.org/news by guest on May 15, 2021

weight-based talk with children and what does it sound like? A mixed-methods study. *Body Image*. 2016;18:27–33

4. Trofholz A, Tate A, Berge JM. An exploration of the frequency, location, and content of parents' weight conversations with their children and associations with child weight status. *Fam Syst Health*. 2018, In press.
5. Bauer KW, Bucchianeri MM, Neumark-Sztainer D. Mother-reported parental weight talk and adolescent girls' emotional health, weight control attempts, and disordered eating behaviors. *J Eat Disord*. 2013;1:45
6. Dixon RS, Gill JM, Adair VA. Exploring paternal influences on the dieting behaviors of adolescent girls. *Eat Disord*. 2003;11(1):39–50
7. Francis LA, Birch LL. Maternal influences on daughters' restrained eating behavior. *Health Psychol*. 2005;24(6):548–554
8. Neumark-Sztainer D, Bauer KW, Friend S, Hannan PJ, Story M, Berge JM. Family weight talk and dieting: how much do they matter for body dissatisfaction and disordered eating behaviors in adolescent girls? *J Adolesc Health*. 2010;47(3): 270–276
9. Balantekin KN, Savage JS, Marini ME, Birch LL. Parental encouragement of dieting promotes daughters' early dieting. *Appetite*. 2014;80: 190–196
10. Neumark-Sztainer D, Wall M, Story M, Sherwood NE. Five-year longitudinal predictive factors for disordered eating in a population-based sample of overweight adolescents: implications for prevention and treatment. *Int J Eat Disord*. 2009;42(7):664–672
11. Neumark-Sztainer D, Wall M, Story M, van den Berg P. Accurate parental classification of overweight adolescents' weight status: does it matter? *Pediatrics*. 2008;121(6). Available at: www.pediatrics.org/cgi/content/full/121/6/e1495
12. Jensen CD, Steele RG. Longitudinal associations between teasing and health-related quality of life among treatment-seeking overweight and obese youth. *J Pediatr Psychol*. 2012;37(4):438–447
13. Rancourt D, Barker DH, Sato AF, Lloyd-Richardson EE, Hart CN, Jelalian E. Longitudinal associations among change in overweight status, fear of negative evaluation, and weight-related teasing among obese adolescents. *J Pediatr Psychol*. 2014;39(7):697–707
14. Wansink B, Latimer LA, Pope L. "Don't eat so much:" how parent comments relate to female weight satisfaction. *Eat Weight Disord*. 2017;22(3): 475–481
15. Whitchurch GG, Constantine LL. In: Boss PG, Doherty WJ, LaRossa R, Schumm WR, Steinmetz SK, eds. *Sourcebook on Family Theories and Methods: A Contextual Approach*. New York, NY: Plenum Press; 1993:325–352
16. Bertalanffy LV. Theoretical models in biology and psychology. In: Krech D, Klein GS, eds. *Theoretical Models and Personality*. Durham, NC: Duke University Press; 1952:24–38
17. Berge JM, Meyer C, MacLehose RF, Crichlow R, Neumark-Sztainer D. All in the family: correlations between parents' and adolescent siblings' weight and weight-related behaviors. *Obesity (Silver Spring)*. 2015;23(4):833–839
18. Pachucki MC, Lovenheim MF, Harding M. Within-family obesity associations: evaluation of parent, child, and sibling relationships. *Am J Prev Med*. 2014;47(4):382–391
19. World Health Organization. Health for the world's adolescents. 2014. Available at: http://apps.who.int/adolescent/second-decade/section2/page1/recognizing-adolescence.html. Accessed August 3, 2017
20. Neumark-Sztainer D, Story M, Hannan PJ, Croll J. Overweight status and eating patterns among adolescents: where do youths stand in comparison with the healthy people 2010 objectives? *Am J Public Health*. 2002;92(5):844–851
21. Neumark-Sztainer D, Croll J, Story M, Hannan PJ, French SA, Perry C. Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: findings from Project EAT. *J Psychosom Res*. 2002;53(5):963–974
22. Winkler M, Berge J, Larson N, Loth K, Wall M, Neumark-Sztainer D. Parent-child health- and weight-focused conversations: who is saying what and to who?. *Appetite*. 2018, In press.
23. Fine A, Kotelchuck M; US Department of Health and Human Services, Heath Resources and Services Administration; Maternal and Child Health Bureau. *Rethinking MCH: The Life Course Model as an Organizing Framework, Version 1.1*. Washington, DC: US Department of Health and Human Services; 2010
24. Muller CJ, MacLehose RF. Estimating predicted probabilities from logistic regression: different methods correspond to different target populations. *Int J Epidemiol*. 2014;43(3):962–970
25. Zou GY. Assessment of risks by predicting counterfactuals. *Stat Med*. 2009;28(30):3761–3781
26. Himes JH, Hannan P, Wall M, Neumark-Sztainer D. Factors associated with errors in self-reports of stature, weight, and body mass index in Minnesota adolescents. *Ann Epidemiol*. 2005;15(4):272–278
27. Quick V, Wall M, Larson N, Haines J, Neumark-Sztainer D. Personal, behavioral and socio-environmental predictors of overweight incidence in young adults: 10-yr longitudinal findings. *Int J Behav Nutr Phys Act*. 2013;10:37
28. Neumark-Sztainer D. *I'm, Like, SO Fat!: Helping Your Teen Make Healthy Choices About Eating and Exercise in a Weight-Obsessed World*. New York, NY: The Guilford Press; 2005

Downloaded from www.aappublications.org/news by guest on May 15, 2021

Intergenerational Transmission of Parent Encouragement to Diet From Adolescence Into Adulthood
Jerica M. Berge, Megan R. Winkler, Nicole Larson, Jonathan Miller, Ann F. Haynos and Dianne Neumark-Sztainer
Pediatrics 2018;141;
DOI: 10.1542/peds.2017-2955 originally published online March 6, 2018;

Updated Information & Services	including high resolution figures, can be found at: http://pediatrics.aappublications.org/content/141/4/e20172955
References	This article cites 20 articles, 0 of which you can access for free at: http://pediatrics.aappublications.org/content/141/4/e20172955#BIBL
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): **Adolescent Health/Medicine** http://www.aappublications.org/cgi/collection/adolescent_health:medicine_sub **Public Health** http://www.aappublications.org/cgi/collection/public_health_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.aappublications.org/site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: http://www.aappublications.org/site/misc/reprints.xhtml

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

Downloaded from www.aappublications.org/news by guest on May 15, 2021

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Intergenerational Transmission of Parent Encouragement to Diet From Adolescence Into Adulthood

Jerica M. Berge, Megan R. Winkler, Nicole Larson, Jonathan Miller, Ann F. Haynos and Dianne Neumark-Sztainer

Pediatrics 2018;141;
DOI: 10.1542/peds.2017-2955 originally published online March 6, 2018;

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/141/4/e20172955

Data Supplement at:
http://pediatrics.aappublications.org/content/suppl/2018/03/02/peds.2017-2955.DCSupplemental

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 2018 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®

Downloaded from www.aappublications.org/news by guest on May 15, 2021