Original Research Article



Parental Communication About Body Weight and Adolescent Health: The Role of Positive and Negative Weight-Related Comments

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Abstract

Objective: Research has consistently documented adverse effects of parent weight-related comments on adolescent health. However, little empirical attention has focused on isolating the impact of weight-related comments from mothers versus fathers, and the valence of their comments. The present study examined the extent to which positive and negative weight-related comments from mothers and fathers are related to adolescent health and wellbeing, and whether these associations differ according to adolescent sociodemographic characteristics.

Methods: Data were collected from a diverse sample of 2032 U.S.-based adolescents aged 10-17 years (59% female; 40% White, 25% Black or African American, 23% Latinx). Online questionnaires assessed perceived frequency of negative and positive weight-related comments from mothers and fathers, as well as four indicators of adolescent health and wellbeing: depression, unhealthy weight control behaviors, weight bias internalization (WBI), and body appreciation.

Results: More frequent negative weight-related comments from parents were associated with poorer adolescent health and wellbeing, while positive comments contributed to lower levels of WBI and body appreciation; these associations were documented regardless of whether mothers or fathers were the source of such comments, and considerable consistency was demonstrated across adolescent sociodemographic

Conclusion: Findings highlight differences in adolescent health based on how parents discuss their body weight (i.e., negatively or positively), and similarity in associations regardless of whether mothers or fathers are the source of weight communication. These findings reiterate the importance of efforts to educate parents on ways to engage in supportive communication about weight-related health with their children.

Keywords: adolescence; health and wellbeing; parental weight communication; weight stigma

Introduction

Adolescence is a developmental period characterized by considerable growth and development, including physical changes (Dahl et al., 2018). Normative physical development (e.g., body weight fluctuations; Alberga et al., 2012) and heightened attention to appearance norms (Gowers & Shore, 2001) during the adolescent years contribute to an increased salience of body weight among youth of this age. Adolescents receive social input about their body weight from a variety of sources (e.g., friends, social media, doctors, family members), with messages often reflecting the societal unacceptability of high weight (Puhl & Lessard, 2020), but also messages pertaining to body positivity (Bauer et al., 2021; Dahill et al., 2021; Maes & Vandenbosch, 2023). Parents, in particular, represent a main source of weight-related comments received by adolescents (Berge et al., 2015; Dahill et al., 2021). This can include both direct and indirect critique of adolescents' body weight, as well as statements minimalizing the

significance of body weight. Parent-adolescent communication about body weight is common, with prevalence estimates from diverse samples suggesting that a majority of parents engage in weight-related communication broadly with their children (Berge et al., 2015; Dahill et al., 2021). These high prevalence rates are concerning in light of the documented negative effects of parental weight-related communication on adolescent health and wellbeing. Meta-analytic evidence demonstrates negative associations between parental weight talk broadly and adolescent health, including elevated eating pathology, psychological distress, and body dissatisfaction (Gillison et al., 2016; Yourell et al., 2021). Such associations have been found even after accounting for sociodemographic characteristics (Bauer et al., 2013) and persist over time with long-lasting health implications into adulthood (Quick et al., 2013).

Several key gaps exist in the research literature, which limit our understanding of the health-related impacts of parent-

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adolescent weight communication. First, nuanced investigation of the content of parent-adolescent weight communication is lacking. That is, it is possible that parental comments with critical or stigmatizing messages elicit negative implications for adolescent health, whereas positive weight-related communication (e.g., messages of body acceptance) may promote healthy outcomes. While studies have consistently documented the adverse effects of parent weight-related comments on adolescent health (Bauer et al., 2013; Berge et al., 2013; Gillison et al., 2016; Yourell et al., 2021), less empirical attention has focused on isolating the impact of weight-related comments from mothers versus fathers, and the valence of their comments. Gross and Nelson (2000) found lower levels of eating disturbance among young adult women who perceived positive weight-related communication by their mothers (e.g., "Your health is what is important, not your weight"). Thus, it is critical to examine the independent implications of negative versus positive weight-related communication from parents on adolescent health and wellbeing. This is particularly warranted in light of recent evidence from a diverse adolescent sample documenting more frequent positive weight-related comments (e.g., "It's ok if you put on some weight, don't even worry about it") than negative weight-related comments (e.g., "If you eat that you'll get fat") from both mothers and fathers (Puhl et al., 2022). This limited evidence highlights the need to determine whether positive weight-related comments from parents affect adolescent health in the same ways that negative parental weight comments do and whether these associations are consistent regardless of the gender of the parent.

Second, little is known about whether the adolescent health implications of positive and negative weight communication vary depending on whether fathers versus mothers are the source of these comments. Consistency across parent gender could be expected based on findings showing that the negative effects of parental weight teasing on adolescent appearance and weight esteem are similar regardless of whether mothers or fathers were the source of such negative comments (Valois et al., 2019). Third, additional research is needed to understand whether the health-related impact of negative and positive weight communication from mothers and fathers varies as a function of adolescent characteristics. While the negative implications of parental weight-focused conversations have been documented among diverse samples of youth (Gillison et al., 2016; Yourell et al., 2021), it is possible that links may be stronger for adolescents from certain demographic backgrounds (e.g., girls versus boys; Gillison et al., 2016). This is particularly important to investigate given sociodemographic and weight-related differences in adolescents' likelihood of experiencing parental weight comments, including heightened prevalence among older adolescents (Lessard et al., under review), and youth with higher body weight (Puhl et al., 2022).

To address these research gaps, the present exploratory study expands upon Puhl et al. (2022) to examine the extent to which positive and negative weight-related comments from mothers and fathers are related to adolescent health and wellbeing, and whether these associations differ according to adolescent sociodemographic characteristics. These questions were assessed among a large, diverse adolescent sample (see

Puhl et al., 2022) to allow for comparisons across sex, grade level, and weight status.

Methods

Participants

The present sample was comprised of 2032 U.S.-based adolescents between the ages of 10–17 years ($M_{\rm age}=14.64$, SD $_{\rm age}=2.46$; 59% female). Based on self-reported race/ethnicity, the sample was 40% White, non-Hispanic, non-Latinx, 25% Black or African American, 23% Latinx or Hispanic, and 12% Multiethnic or another race/ethnicity (e.g., American Indian or Alaska Native). Seventy-six percent of participants identified as heterosexual, and 35% indicated having a parent with a college degree. Based on the 2000 CDC Growth Charts for BMI percentile, 25% of adolescents had a BMI of \geq 95th percentile, 18% had a BMI of 85–94.9th percentile, 52% had a BMI of 5–84.9th percentile, and 5% had a BMI <5th percentile.

Procedure

The present study involved the completion of an online survey conducted from October 2021 to December 2021, and participants were recruited via Qualtrics Panel Services, a national survey panel company. Quotas were set to obtain approximately equal numbers of participants across race/ethnicity (Black or African American, Latinx or Hispanic, and White) and gender (male, female). Qualtrics recruited participants from multiple sources (e.g., social media advertisements, member referrals, targeted email lists, customer loyalty web portals). Those interested in participating in the study read a brief information sheet pertaining to the survey content, expected length, and completion incentives. Adolescents were reminded that participation was voluntary and that their survey responses would remain anonymous. After providing informed consent (obtained from parents for participants younger than 13 years), adolescents proceeded through the electronic questionnaire, which took approximately 20-25 min to complete. Respondents were compensated for survey completion with Qualtrics' incentive options including cash, gift cards, vouchers, or redeemable points. The final sample (N=2,032) excluded participants with implausible/ missing BMI data, mischievous responses (e.g., invalid or duplicate IP address, bot detection), and/or those outside the eligible 10- to 17-year-old age range (n = 298). The University of Connecticut's Institutional Review Board approved all study procedures, and additional information describing recruitment, data collection, and participant composition can be found elsewhere (Puhl et al., 2022).

Measures

Negative and Positive Weight-Related Comments from Mothers and Fathers

Adolescent-reported frequency of parental weight comments was assessed using the Parental Comments Questionnaire (Rodgers et al., 2009). This questionnaire includes four subscales which measure the frequency adolescents' mothers and fathers have directed seven negative (e.g., "You look like you've put on weight, you should watch what you eat") and four positive (e.g., "Your health is what is important not your weight"; "It's ok if you put on some weight, don't even worry about it") weight-related comments to them, on a scale of 1

(never) to 5 (always). Responses within each of the subscales were averaged into a mean composite score, and Cronbach's alphas ranged from 0.81 to 0.94 suggesting high internal reliability. Adolescents who indicated that they did not live with either their mother (n = 53) or father (n = 233) were not asked to complete the respective scales.

Adolescent Health and Wellbeing Outcomes

Four variables were used to assess adolescent health and wellbeing: depression, unhealthy weight control behaviors, weight bias internalization (WBI), and body appreciation. Depression was measured with the Child Depression Inventory—Short Form (Ahlen & Ghaderi, 2017). For each of the 10 items, participants were asked to select which of three statements (e.g., "I like myself"; "I do not like myself"; "I hate myself") best describes how they have felt in the past 2 weeks. Response options were coded such that higher values, on a scale of 1-3, represent higher levels of depressive symptoms and were combined into a mean composite score $(\alpha = 0.82)$. Using items from Project EAT (a longitudinal study of eating and activity behaviors among a diverse sample of young people), unhealthy weight control behaviors were assessed by asking participants to rate the frequency with which they have engaged in nine specific behaviors (i.e., fasted, ate very little food, took diet pills, made oneself throw up, used laxatives, used diuretics, used food substitute, skipped meals, smoked cigarettes) to lose weight or keep from gaining weight during the past year (Neumark-Sztainer et al., 2002). Response options on a scale of 1 (never) to 4 (on a regular basis) were averaged and Cronbach's alpha was 0.90. WBI refers to self-devaluation because of one's body weight and was measured using the 10-item Modified Weight Bias Internalization Scale (Durso et al., 2016; Lee & Dedrick, 2016; Pearl & Puhl, 2014). Participants used a 7-point scale (1 = strongly disagree—7 = strongly agree) to indicate their extent of agreement with each statement (e.g., "I hate myself for my weight"). Items were coded such that higher values reflected greater WBI and combined into a mean composite score ($\alpha = 0.95$). Body appreciation reflects the degree to which people have acceptance and/or favorable opinions about their body; this construct was assessed using the Body Appreciation Scale-2C (Halliwell et al., 2017), in which participants rated their agreement with 10 specific statements (e.g., "I feel good about my body") on a scale of 1 (never) to 4 (always). Responses to each item were averaged, with higher values indicating greater body appreciation, and Cronbach's alpha was 0.96.

Covariates

Adolescent participants were asked to self-report their *sex* (male/female) and *race/ethnicity*, which was coded as White, Black or African American, Latinx/Hispanic, and Multiethnic or another race/ethnicity. Assessment of *parental level of education* distinguished adolescents with versus without a college-educated parent, and *sexual orientation* distinguished those identifying as straight (heterosexual) from those not identifying as such (e.g., bisexual, gay, or lesbian). In addition, adolescents reported on their *grade level*, which was recoded such that grades 4–5 = elementary school, grades 6–8 = middle school, and grades 9–12 = high school. Finally, *weight status* was assessed using adolescent-reported height, weight, sex, and age to calculate BMI percentile based on the CDC 2000 growth charts: BMI <5th percentile, BMI

5–84.9th percentile, BMI 85–94.9th percentile, and BMI ≥95th percentile.

Statistical Analyses

All analyses were conducted in SPSS. First, in a series of main effects models, each of the four outcome variables was regressed on the primary predictor variables (i.e., negative weight-related comments from mothers and from fathers and positive weight-related comments from mothers and from fathers) while controlling for the following covariates: sex (reference group = boys), race/ethnicity (reference group-= non-Hispanic White, due to highest racial/ethnic prevalence), parental education (reference group = parent not college-educated), sexual orientation (reference group = heterosexual), grade level (reference group = middle school), and weight status (reference group = BMI 5-84.9th percentile). Continuous modeled variables were examined for normality and within the acceptable range for skewness and kurtosis (West et al., 1995). All continuous predictor variables were grand-mean centered. Second, variation in the associations between each of the four parental weight-related comment variables and the outcome variables was assessed through the simultaneous addition of two-way interaction terms based on sex, grade level, and weight status; differences based on race/ ethnicity, parental education, and sexual orientation were also examined in initial models; however, these interactions were excluded from the final models for parsimony given consistent non-significant effects. To reduce the likelihood of type 1 error, statistical significance was set at p < .01, and listwise deletion was used for missing data handling. Data are available on reasonable request.

Results

Means, standard deviations, and intercorrelations among the main continuous variables are presented in Table I.

Main Effects Models

Table II presents a summary of the main effects of linear regression models predicting adolescent health and wellbeing. Over and above covariate effects, receiving more frequent negative weight-related comments from parents was associated with higher levels of depression, unhealthy weight control behaviors, WBI, and reduced body appreciation. These associations were consistent regardless of whether mothers or fathers were the source of such negative comments. Comparison across standardized coefficients suggests that links between negative parental comments and compromised adolescent health and wellbeing were slightly stronger for comments from mothers versus fathers.

When accounting for covariates and the extent of negative parental weight-related comments, more frequent positive weight-related comments from both mothers and fathers were associated with reduced WBI and greater body appreciation in adolescents. Positive weight-related comments from mothers were unrelated to depression and unhealthy weight control behaviors in adolescents, but lower levels of depression and increased unhealthy weight control behaviors were documented among adolescents reporting more frequent positive weight-related comments from fathers.

Table I. Means, Standard Deviations, and Intercorrelations Among Main Continuous Variables

Variable	1	2	3	4	5	6	7	8
Negative comments—mother	_							
2. Negative comments—father	0.76**	_						
3. Positive comments—mother	0.04	0.17**	_					
4. Positive comments—father	0.22**	0.27**	0.61**	_				
5. Depression	0.35**	0.25**	-0.15**	-0.11**	_			
6. Unhealthy weight control behaviors	0.61**	0.58**	0.07*	0.20**	0.48**	_		
7. Weight bias internalization	0.53**	0.44**	-0.13**	-0.04	0.62**	0.52**	_	
8. Body appreciation	-0.22**	-0.12**	0.31**	0.26**	-0.66**	-0.24**	-0.60**	_
Mean	1.97	1.87	2.85	2.52	1.68	1.65	3.47	2.71
Standard deviation	1.10	1.10	1.11	1.24	0.44	0.70	1.71	0.89

^{**} *p* < .001.

Table II. Summary of Main Effect Linear Regression Models Predicting Adolescent Health and Wellbeing.

Variables	Depression		Unhealthy weight control behaviors			Weight bias internalization			Body appreciation			
	B (SE)	β	p	B (SE)	β	p	B (SE)	β	p	B (SE)	β	p
Covariates												
Sex (boy)												
Girl	0.15 (0.02)	0.17	<.001	0.06 (0.03)	0.04	.044	0.31 (0.07)	0.09	<.001	-0.18(0.04)	-0.10	<.001
Race/ethnicity (White)												
Black or African	-0.03(0.02)	-0.03	.219	0.01 (0.03)	0.01	.684	-0.22(0.08)	-0.06	.009	0.19 (0.05)	0.09	<.001
American												
Latinx	0.03 (0.02)	0.03	.214	-0.06(0.03)	-0.04	.077	0.17 (0.08)	0.04	.045	-0.08(0.05)	-0.04	.103
Multiethnic/other	-0.03(0.03)	-0.02	.353	-0.07(0.05)	-0.03	.107	-0.02(0.11)	0.00	.841	-0.09(0.06)	-0.03	.166
Parental education												
(not college educated)												
College educated	-0.04(0.02)	-0.05	.033	0.02 (0.03)	0.01	.453	0.03 (0.07)	0.01	.636	0.02 (0.04)	0.01	.677
Sexual orientation												
(heterosexual/straight)												
Sexual minority	0.22 (0.02)	0.21	<.001	0.12 (0.03)	0.07	<.001	0.50 (0.08)	0.12	<.001	-0.40(0.05)	-0.19	<.001
Grade level												
(middle school)												
Elementary school	-0.04(0.03)	-0.03	.212	-0.06(0.05)	-0.03	.170	-0.03(0.12)	-0.01	.794	001(0.07)	-0.01	.828
High school	0.14 (0.02)	0.16	<.001	0.13 (0.03)	0.09	<.001	0.30 (0.08)	0.09	<.001	-0.22(0.04)	-0.12	<.001
Weight category												
(BMI 5-84.9th %ile)												
BMI <5th %ile	0.08 (0.04)	0.04	.053			.380	0.33 (0.15)	0.04		-0.08(0.09)		.357
BMI 85-94.9th %ile	0.00 (0.03)	0.00		-0.02(0.04)		.567	0.30 (0.09)			-0.11(0.05)		.034
BMI ≥95th %ile	0.05 (0.02)	0.05	.022	-0.04(0.03)	-0.03	.200	0.65 (0.08)	0.17	<.001	-0.23(0.05)	-0.11	<.001
Primary predictors												
Negative comments:	0.10 (0.01)	0.26	<.001	0.23 (0.02)	0.36	<.001	0.58 (0.05)	0.38	<.001	-0.11(0.03)	-0.14	<.001
mother												
Negative comments:	0.05 (0.01)	0.13	<.001	0.20 (0.02)	0.31	<.001	0.26 (0.05)	0.17	<.001	-0.07(0.03)	-0.09	.006
father												
Positive comments:	-0.03(0.01)	-0.07	.012	-0.01(0.02)	-0.01	.573	-0.16(0.04)	-0.10	<.001	0.15 (0.02)	0.19	<.001
mother												
Positive comments: father	-0.03 (0.01)	-0.10	<.001	0.04 (0.01)	0.07	.004	-0.09 (0.03)	-0.07	.006	0.11 (0.02)	0.16	<.001

Note. Bold signifies statistical significance at p < .01. N = 2032.

Interaction Models

A summary of the interaction effect models predicting adolescent health and wellbeing is presented in Supplementary Table 1.

Depression

Links between parental weight-related comments and depression were consistent across grade level and weight status. One interaction emerged based on adolescent sex, such that the

positive association between depression and negative weightrelated comments from mothers was stronger for girls relative to boys ($\beta = 0.15$, p = .009).

Unhealthy Weight Control Behaviors

Links between parental weight-related comments and unhealthy weight control behaviors were consistent across sex and grade level.

One interactive effect based on weight status was revealed such that the positive association between unhealthy weight

^{*} p < .01.

control behaviors and negative weight-related comments from fathers was weaker for adolescents with a of BMI 85–94.9th percentile relative to those with a BMI 5–84.9th percentile ($\beta = -0.12$, p < .001).

Weight Bias Internalization

Links between parental weight-related comments and WBI were consistent across grade level and weight status. Two interactive effects emerged based on sex; specifically, the negative association between WBI and positive weight-related comments from mothers was weaker for girls relative to boys ($\beta = 0.12$, p = .004), whereas the negative association between WBI and positive weight-related comments from fathers was stronger for girls compared to boys ($\beta = -0.12$, p = .005).

Body Appreciation

Links between parental weight-related comments and body appreciation were consistent across grade level and weight status. One interaction based on sex emerged; specifically, the negative association between body appreciation and negative weight-related comments from mothers was stronger for girls compared to boys ($\beta = -0.16$, p = .005).

Discussion

Research highlights negative effects of parental weight communication on adolescent health (Gillison et al., 2016; Yourell et al., 2021); however, nuanced examination of the independent impacts of negative and positive weight-related comments from mothers and fathers has been limited. The present study, which was exploratory in nature, begins to address this research gap and utilizes a large racially/ethnically and socioeconomically diverse adolescent sample to consider variation in the links between parental weight communication and adolescent health across sociodemographic groups and weight status. The study results revealed that more frequent negative weight-related comments from parents were associated with higher levels of depression, WBI, more unhealthy weight control behaviors, and reduced body appreciation; these associations were documented regardless of whether mothers or fathers were the source of such negative comments, and over and above covariate effects. Positive weight-related comments from parents, on the other hand, in general (see exception below), were associated with positive adolescent health outcomes, including reduced WBI, as well as increased body appreciation; these associations were again consistent across mothers and fathers. Given that adolescents view parents as one of their most preferred sources of weight communication (Lessard et al., under review), our findings provide critical insights into how the valence of mothers' and fathers' weight-related comments may differentially contribute to their adolescents' health.

Fathers are underrepresented in research pertaining to parent–adolescent weight communication (Yourell et al., 2021); however, our results suggest that fathers' comments about weight to their adolescent carry unique implications for their child's health and wellbeing, independent of mothers' comments. Given that fathers report more frequently engaging in weight talk with their adolescents across communication modes (e.g., in-person, electronically) and contexts (e.g., at the dinner table, when watching tv) than do mothers (Puhl et al., 2022), it is important that fathers are aware of the

potential negative implications of weight-stigmatizing comments. Instead, placing emphasis on health rather than weight, as well as body acceptance, may be more beneficial for adolescents. An exception to the inverse association between positive weight-related comments from fathers and adolescent health in our study was with unhealthy weight control behaviors. While additional research is needed to understand this association and why it emerged only in the context of father's (not mother's) comments, it is possible that an adolescent's engagement in unhealthy weight control behaviors (e.g., fasting, vomiting) prompts fathers to more frequently make statements about the acceptability of weight gain. Future studies using longitudinal methods are warranted to shed light on the directionality of this association.

Extending beyond the unidimensional assessment of parental weight communication, the present investigation is among the first to examine differential health implications of both negative and positive weight-related comments from parents. Simultaneous modeling of negative and positive comments is important given that these are unlikely to be mutually exclusive. For example, Berge et al. (2020) found that parents may engage in both weight- and health-focused conversations with their children, and within our data, there was a positive correlation between the frequency of negative and positive weightrelated comments from fathers. Our results therefore uniquely isolate the independent associations between positive weightrelated communication and adolescent health after accounting for parental negative comments. This is important given that positive parental weight-related comments were reported to be more prevalent overall compared to negative weightrelated comments, consistent with previous adolescent samples (Dahill et al., 2021). The documented inverse associations between positive weight-related comments and health risk reinforce the complexity of parent-adolescent weight communication (Puhl et al., 2022). In other words, talking about weight may not be wholly problematic, but rather the way in which body weight is discussed (e.g., sending stigmatizing messages or de-emphasizing the importance of weight relative to health) appears to contribute to divergent health and wellbeing correlates.

The diversity of our adolescent sample uniquely allowed us to test whether associations between each of the parental weight communication variables and the health outcomes varied as a function of adolescent sociodemographic and weight status categories. Considerable consistency was documented across these interaction models (e.g., no differences as a function of grade level emerged); nevertheless, the pattern of significant interactive effects was inconsistent across outcomes; for example, while the association between mothers' negative weight-related comments and adolescent health emerged as stronger among girls for depression and body appreciation, no sex differences were found in the context of unhealthy weight control behaviors and WBI. As such, it is important that follow-up studies are conducted to replicate and unpack sociodemographic and weight-related differences.

Limitations

Several study limitations should be noted. First, the present exploratory investigation was cross-sectional, with the parental weight communication and adolescent health variables assessed at a single timepoint. While parental weight communication may be presumed to affect adolescent health, based on previous longitudinal evidence (Berge et al., 2019; Lessard

et al., 2021), it is also possible that the frequency with which parents talk about weight (either negatively or positively) is driven by adolescents' engagement in (un)healthy behaviors. Second, this study relies on single-informant responses, elevating shared method variance. Future studies should consider dyadic approaches to allow for the inclusion of both adolescent and parent perspectives, or observational approaches for more objective assessment. Finally, additional research is needed to understand the mechanisms driving the documented associations. Given that WBI has been shown to mediate the association between weight stigma and health (Pearl & Puhl, 2018), it may be more proximally linked to parental weight communication, which in turn contributes to adolescent health outcomes.

Conclusion and Implications

The current study contributes to a growing body of research implicating the health harms of parent-adolescent weightfocused communication. Our exploratory findings offer novel insights that highlight differences in adolescent health based on how parents discuss their body weight (i.e., negatively or positively), and similarity in associations regardless of whether mothers or fathers are the source of weight communication. These findings reiterate the importance of efforts, for example, in the pediatric provider context, to educate parents on ways to engage in supportive communication about weight-related health with their children. Helping parents identify critical or stigmatizing weight comments, and replacing these with positive messages emphasizing acceptance and the importance of health rather than weight, may foster more supportive dialogue and improved adolescent wellbeing. Gaining an understanding of how parents are talking about weight can ensure that youth are supported in ways that facilitate healthy outcomes.

Supplementary Data

Supplementary data can be found at: https://academic.oup.com/jpepsy.

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Author Contributions

Leah M. Lessard (Data curation [equal], Formal analysis [equal], Methodology [equal], Writing—original draft [equal]), Rebecca Puhl (Conceptualization [equal], Funding acquisition [equal], Methodology [equal], Supervision [equal], Writing—review & editing [equal]), Gary Foster (Resources [equal], Supervision [equal], Writing—review & editing [equal]), and Michelle Cardel (Resources [equal], Supervision [equal], Writing—review & editing [equal])

Conflicts of interest

L. M. Lessard declares no conflicts of interest. R. M. Puhl has received funding on grants from WW and Eli Lilly &

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