



Impact of weight and health-behavior information on evaluations of girls' health

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Received: 23 December 2023 / Accepted: 7 November 2024 / Published online: 4 December 2024
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Abstract

The dominant public health narrative equates excess weight with poor health, and previous research has demonstrated that people judge adults with higher body weights as being in poor health, even when they engage in healthy lifestyles. The present study investigated whether the same pattern of beliefs holds for perceptions of children's health. Participants ($n=445$) viewed the health profile of a female child that varied in terms of weight status (normal weight, obese), health behaviors (good, poor), and age (younger, older), and then rated the child's overall health and indicated their agreement with suggested behavior recommendations. For older children, targets with obesity were perceived as less healthy and were recommended to engage in more healthy and weight control behaviors than were the targets with normal weight. Health behaviors did influence perceptions of health and behavioral recommendations, but much less so for the target with obesity than for the target with normal weight. For younger children, participants placed a greater emphasis on health behaviors than on weight in their perceptions of the target's health and healthy behavior recommendations, but the target's weight did play a greater role in weight-control behavior recommendations. Overall, perceptions of older children reflect the mainstream weight-centric health beliefs that are perpetuated in public health messaging, whereas perceptions of younger children seem to be more aligned with the scientific evidence supporting the importance of health behaviors to overall health. Public health messaging, particularly messaging targeting parents, should be reframed to focus on the importance of engagement with health behaviors without reference to weight.

Keywords Weight status · Health behaviors · Children · Health · Weight-control behaviors

Public health messaging often emphasizes the associated health risks of excess weight and encourages people to lose weight as a means of improving their health (Jackson et al., 2013; Perrin et al., 2012; Shiffman et al., 2009). Although research indicates an association between obesity and health outcomes in both adults and children (Kumar & Kelly, 2017; Upadhyay et al., 2018), emerging research demonstrates that health behaviors can be at least as important in determining health outcomes in adults (Veronese et al., 2016) and health-related quality of life in children (Chen et al., 2014; Muros et al., 2017). Furthermore, research with adults has shown that improving diet and exercise results in health benefits, even among individuals who do not lose any

weight (Appel et al., 1997; Dugmore et al., 2020; Gaesser et al., 2011; King et al., 2009), and that deliberate weight loss can actually be harmful (Harrington et al., 2009).

Despite this scientific evidence, lay people hold strong beliefs that directly connect weight and health. For example, people typically associate obesity with poor health (Fraser et al., 2013; Smith et al., 2007), and recommend dieting behaviors and weight loss to individuals with obesity even if they are already engaging in a healthy lifestyle (Black et al., 2019, 2021). For example, one study provided participants with information about a woman's weight status and her engagement with various health behaviors (Black et al., 2019). Participants in that study perceived a woman with obesity as less healthy than a woman without obesity, and recommend that she engage in weight-control behaviors (e.g., counting calories) and even some extreme weight-loss behaviors (e.g., taking diet pills), regardless of whether or not she was described as eating a healthy diet and exercising regularly. These findings indicate that people tend to

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prioritize weight over health behaviors when making judgments about a person's health.

Most of the research examining people's beliefs about the connection between weight and health has focused on perceptions of adults, with relatively little known about people's beliefs about children and their health. Given the influence that adults have over children (Golan & Crow, 2004), it is important to understand what beliefs they have about children's weight and health, and how this might impact what they view as appropriate behaviors to encourage.

Research on beliefs about children's health has been limited to qualitative-survey and -interview studies, but there is some indication that people hold different beliefs about the determinants of health for older children and for younger children. Parents of older children tend to use their child's weight and physical appearance as indicators of their child's health (Eckstein et al., 2006; Thomas et al., 2014). This pattern of beliefs for older children mimics the pattern observed for adults (Black et al., 2019). In contrast, parents of younger children report using their child's food consumption, levels of physical activity, and emotional wellbeing, rather than their weight, as indicators of health (Jain et al., 2001; Syrad et al., 2015). Thus, parents' perceptions of their younger children's health appear to be more strongly influenced by the children's health behaviors than by their weight.

The present study

The primary aim of this study was to experimentally examine the impact of weight information and health-behavior information on evaluations of younger and older girls. A female target was used because previous research on perceptions of adults based on weight and health-behavior information has focused on female targets (Black et al., 2019, 2021, 2024), and because research suggests that parents show significantly more concern about their child's weight if the child is female rather than a male (Peyer et al., 2015; Thompkins et al., 2015; Wald et al., 2007).

Participants viewed information about a target child that varied in terms of the child's weight status (normal weight vs. obese), health behaviors (good health behaviors vs. poor health behaviors), and age (older child vs. younger child). Participants were asked to rate the child's overall health, and to make health-behavior recommendations for the child. It was predicted that, for older children, participants would rate the child with obesity as less healthy than they would the child with normal weight, and would also recommend more health behaviors (H1), regardless of the child's health behaviors. In contrast, it was hypothesized that, for younger children, participants would rate the child engaging in poor

health behaviors as less healthy and recommend that they engage in more health behaviors compared to the child engaging in good health behaviors (H2), regardless of their weight.

As a secondary aim, this study also examined the effect of weight and health-behavior information on participants' perceived accuracy of the target health profiles. Black et al. (2019) found that participants distrusted information suggesting that a target with obesity was engaging in high levels of healthy behaviors. Thus, it was tentatively hypothesized that participants would perceive the information in the health profile to be inaccurate when the target with obesity was described as engaging in healthy behaviors (H3).

Method

Participants

Data were collected in June 2021. A total of 445 adults who have at least one child were recruited for this study through Prolific Academic. Parents were chosen as the population of interest because they play a key role in their child's health choices (Golan & Crow, 2004), and it is therefore important to understand how they view the impact of weight and health-behavior information on children's health. The majority of the participants identified as female (57.3%) and as White/Caucasian (78.2%); they had a mean age of 40.27 ($SD=10.89$); their mean Body Mass Index (BMI; kg/m^2) was 25.92 ($SD=5.57$); and 62.7% had a bachelors degree or higher. The average number of children was 1.77 children ($SD=0.83$; range = 1–8). The study was approved by the university's ethics committee and consent was received from all participants.

Target health profiles

Eight health profiles were designed to present participants with information about the target's weight, health behaviors, and age (see Electronic Supplementary Materials for example profile).

Age

Participants were provided with information about the target's age (6 years vs. 14 years), as well as their grade in school (1st grade vs. 9th grade).

Weight

Participants were provided with information about the target's weight (in kg) and BMI percentile. For children, a

healthy weight is typically defined as a BMI between the 5th and 85th percentile, whereas obesity is defined as a BMI at or above the 95th percentile (Hales et al., 2018). In the present study, the values selected for the younger target were 20 kg and 47th percentile for the target with normal weight, and 27 kg and 95th percentile for the target with obesity. For the older target, the values selected were 50 kg and 49th percentile for the target with normal weight, and 70 kg and 95th percentile for the target with obesity. A figure-rating scale depicting the child's body size (Eckstein et al., 2006) was also used to visually represent the target's body size. The figure-rating scale had seven silhouettes depicting different body sizes ranging from obese to underweight (left to right). Different figure-rating scales were used for the younger and older targets. To depict the target with normal weight, the figure third from the right was selected; to depict the target with obesity, the figure furthest to the left was selected.

Diet and physical-activity information

The diet section included the target's daily average consumption of fruits and vegetables, whole grains and unhealthy snack foods along with their weekly average consumption of takeout food (see Table 1). Food consumption practices of targets engaging in good health behaviors were modeled on the health standards set out for children by Australian, British, and American health organizations (British Nutrition Foundation, 2019; National Health and Medical Research Council, 2013; US Department of Agriculture and US Department of Health and Human Services, 2020). The food consumption behaviors of targets in the poor health behaviors condition reflected minimal consumption of nutritious foods and high intake of unhealthy snacks foods and take-out meals.

In the physical-activity-information section, participants were provided with the following definition of physical activity: "Physical activity includes all movement that requires energy expenditure. Physical activity can include

light activity (e.g., eating, doing work at a computer, walking slowly),¹ moderate activity (e.g., walking quickly, dancing lightly) and vigorous activity (e.g., running, swimming, soccer)." The definition of physical activity was followed by information about the target's daily average engagement in moderate to vigorous physical activity and the target's weekly participation in organized sports (see Table 1). The physical activity of the target in the good-health-behavior conditions reflected the WHO's physical activity standards for children (World Health Organization, 2020). The physical activity of the target in the poor-health-behavior conditions reflected low engagement with physical activity.

Measures

Overall health

Participants were asked to rate the perceived health of the target on a scale from 0 to 100, with higher scores indicating better health.

Recommended health behaviors

Participants were asked to rate the extent to which they agreed the target should engage in 11 health behaviors (1 = *strongly disagree*; 7 = *strongly agree*). The health behaviors were adapted from previous research (Black et al., 2019; Roy & Gauvin, 2010), and were grouped into 6 items reflecting general health behaviors (e.g., "Improve diet quality" and "Incorporate more organized sport into the week"; $\alpha = 0.94$) and 5 items reflecting weight-control behaviors (e.g., "go on a diet" and "skip meals"; $\alpha = 0.81$).

Perceived inaccuracy of the target profile

Participants were asked to rate on a 4-point scale (1 = *not at all*, 2 = *very little*, 3 = *somewhat*, 4 = *to a large extent*) to what extent they believed the information presented about the child was inaccurate. Participants who responded with "somewhat" or "to a large extent" were asked to explain in an open-ended format why they believed that the information was inaccurate.

Procedure

The entire study was conducted online. After providing informed consent, participants were randomly allocated to view one of the eight health profiles. They then rated the target's overall health, indicated their agreement that the target should be engaging in general health and weight-control

Table 1 Health behavior parameters presented in target health profiles in good and poor health behavior conditions

	Behaviors	Good	Poor
Diet	Fruits and vegetables	More than 5 serves/day	0–1 serves/day
	Whole grains	4–5 serves/day	0–1 serves/day
	Unhealthy snack foods	0–1 serves/day	4–5 serves/day
	Take-out meals	0–1 meals/week	4–5 meals/week
Physical activity	Moderate/vigorous physical activity	60 + min/day	15–30 min/day
	Organized sport	2–3 times/week	None/week

¹ Note that eating and light computer work are often considered sedentary behaviors rather than light physical activity.

behaviors, and rated the accuracy of the information in the profile. Participants then provided demographic information about themselves (gender, age, education, ethnicity, number of children, height, and weight).

Statistical analysis

The Hoaglin and Iglewicz's (1987) outlier labelling rule was used to assess for any outliers on the main dependent variables. There was only one outlier identified (overall health estimate variable) and excluding this outlier had no impact on the pattern of results. Therefore, all participants were included in the analyses. To test the study hypotheses (H1–H3), analyses were conducted separately for younger and older targets. A series of 2 (weight status: normal weight, obese) $\times$ 2 (health behavior: good, poor) ANOVAs were conducted on each dependent variable.

Results

Older children

Descriptive statistics for each outcome variable are reported in Table 2.

Ratings of overall health and behavior recommendations

Main effect of weight information Consistent with hypothesis H1, there was a significant main effect of weight information on ratings of overall health, $F(1,217)=70.22$, $p<.001$, $\eta^2_p=0.24$, on general health behavior recommendations, $F(1,217)=32.92$, $p<.001$, $\eta^2_p=0.13$, and on weight-control behavior recommendations, $F(1,217)=137.74$, $p<.001$, $\eta^2_p=0.39$. Compared to targets with normal weight, participants rated targets with obesity as significantly less healthy, more strongly believed that they should be engaging in gen-

eral health behaviors, and more strongly believed that they should be engaging in weight-control behaviors.

Main effect of health-behavior information There was a significant main effect of health-behavior information on ratings of overall health, $F(1,217)=68.87$, $p<.001$, $\eta^2_p=0.24$, on general health behavior recommendations, $F(1,217)=217.49$, $p<.001$, $\eta^2_p=0.50$, and on weight-control behavior recommendations, $F(1,217)=137.74$, $p<.001$, $\eta^2_p=0.39$. Compared to targets with normal weight, participants rated targets with obesity as significantly less healthy, more strongly believed that they should be engaging in general health behaviors, and more strongly believed that they should engage in weight-control behaviors.

Weight $\times$ health-behavior interaction The interaction effect between weight information and health-behavior information was significant for ratings of overall health, $F(1,217)=4.80$, $p=.029$, $\eta^2_p=0.021$, for general health behavior recommendations, $F(1,217)=12.99$, $p<.001$, $\eta^2_p=0.06$, and for weight-control behavior recommendations, $F(1,217)=14.70$, $p<.001$, $\eta^2_p=0.06$. Simple effects analyses showed that the targets with normal weight who displayed poor health behaviors (compared to those displaying good health behaviors) were rated as less healthy ($p<.001$, $\eta^2_p=0.21$), were recommended more general health behaviors ($p<.001$, $\eta^2_p=0.44$), and were recommended more weight-control behaviors ($p<.001$, $\eta^2_p=0.13$). In contrast, health-behavior information had less of an impact on evaluations of the target with obesity. The difference between the target with good vs. poor health behaviors was still significant, but the magnitude of the effect was smaller for ratings of overall health ($p<.001$, $\eta^2_p=0.08$) and for general health behavior recommendations ($p<.001$, $\eta^2_p=0.22$); health-behavior information had no impact on endorsement

Table 2 Group means and standard deviations for each dependent variable in the older-child condition

Dependent variable	Behavior condition	Weight condition	
		Normal Weight	Obese
Overall health	Good	89.31 (8.81) ^a	59.43 (22.86) ^b
	Poor	59.66 (20.36) ^b	42.17 (27.54) ^c
General health behaviors	Good	3.24 (1.46) ^a	4.58 (0.70) ^b
	Poor	5.87 (0.67) ^c	6.18 (1.22) ^d
Weight-control behaviors	Good	2.28 (0.90) ^a	4.34 (1.10) ^b
	Poor	3.34 (0.94) ^c	4.39 (0.98) ^b

Note: For each dependent variable, means with different superscripts across the row or column indicate that the means are significantly different ($p<.05$). Overall health was rated on a scale from 0–100; general health behaviors and weight-control behaviors were ranged on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*)

of weight-control behaviors for targets with obesity ($p=.78$, $\eta^2_p < 0.001$).

Perceived accuracy of the profile

There was a significant main effect of weight on perceived accuracy ratings, $F(1,217)=5.34$, $p=.022$, $\eta^2_p=0.02$. Participants rated the information in the target with obesity's profile as significantly more inaccurate than they rated the profile of the target with normal weight. There was also a significant main effect of health behaviors, $F(1,217)=31.06$, $p<.001$, $\eta^2_p=0.13$. Participants rated the information in the profile of targets displaying good health behaviors as significantly less accurate than they rated the information in the profile of targets displaying poor health behaviors. These main effects were qualified by a significant interaction, $F(1,217)=23.31$, $p<.001$, $\eta^2_p=0.10$. In support of H3, simple effects analyses revealed that, for targets with obesity, the information in the profile of those displaying good health behaviors was rated as more inaccurate than was the information in the profile of those displaying poor health behaviors, $p<.001$, $\eta^2_p=0.20$. In contrast, there was no difference in the perceived accuracy for targets with normal weight as a function of their health behaviors, $p=.595$, $\eta^2_p=0.001$.

Follow-up post hoc paired-sample t -tests found that the information in the profile of the target with obesity displaying good health behaviors was rated as significantly more inaccurate than the information in any of the other conditions, $ts > 4.71$, $ps < 0.001$, $ds > 0.90$. In the open-ended responses, participants noted a disconnect between weight and health behavior information for targets with obesity displaying good health behaviors as the reason for their suspicion.

Younger children

Descriptive statistics for each outcome variable are reported in Table 3.

Table 3 Group means and standard deviations for each dependent variable in the younger-child condition

Dependent variable	Behavior condition	Weight condition	
		Normal Weight	Obese
Overall health	Good	89.34 (9.84) ^a	70.21 (21.12) ^b
	Poor	55.76 (21.65) ^c	41.55 (25.20) ^d
General health behavior	Good	3.12 (1.44) ^a	4.45 (1.27) ^b
	Poor	5.88 (0.85) ^c	6.17 (0.70) ^c
Weight-control behavior	Good	2.22 (1.06) ^a	3.78 (1.29) ^b
	Poor	3.40 (0.95) ^c	4.55 (1.14) ^d

Note: For each dependent variable, means with different superscripts across the row or column indicate that the means are significantly different ($p < .05$). Overall health was rated on a scale from 0–100; general health behaviors and weight-control behaviors were ranged on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*)

Ratings of overall health and behavior recommendations

Main effect of health-behaviors information Consistent with H2, there was a significant main effect of health-behavior information on overall health, $F(1,220)=132.02$, $p<.001$, $\eta^2_p=0.38$, on general health behavior recommendations, $F(1,220)=230.21$, $p<.001$, $\eta^2_p=0.51$, and on weight-control behavior recommendations, $F(1,220)=42.58$, $p<.001$, $\eta^2_p=0.16$. Compared to targets displaying good health behaviors, participants rated those displaying poor health behaviors as significantly less healthy, more strongly believed that they should engage in general health behaviors, and more strongly believed that they should engage in weight-control behaviors.

Main effect of weight information There was a significant main effect of weight information on ratings of overall health, $F(1,220)=37.91$, $p<.001$, $\eta^2_p=0.15$, on general health behavior recommendations, $F(1,220)=30.03$, $p<.001$, $\eta^2_p=0.12$, and on weight-control behaviors recommendations, $F(1,220)=82.01$, $p<.001$, $\eta^2_p=0.27$. Compared to targets with normal weight, participants rated targets with obesity as significantly less healthy, more strongly believed that they should be engaging in general health behaviors, and more strongly believed that they should engage in weight-control behaviors.

Health-behavior $\times$ weight interaction The interaction effect was not significant for overall health, $F(1,220)=0.83$, $p=.364$, $\eta^2_p=0.004$, or for weight-control behavior recommendations, $F(1,220)=1.91$, $p=.168$, $\eta^2_p=0.01$. However, the interaction was significant for general health behavior recommendations, $F(1,220)=12.20$, $p=.001$, $\eta^2_p=0.05$. For targets with normal weight, those displaying poor health behaviors were more strongly recommended to engage in general health behaviors than were those displaying good health behaviors, $p<.001$, $\eta^2_p=0.44$. The same pattern emerged for targets with obesity, but the magnitude of the difference was smaller, $p<.001$, $\eta^2_p=0.24$, suggesting that

existing health behavior patterns were less relevant for targets with obesity.

Perceived accuracy of the profile

There was a significant main effect of health behaviors on perceived accuracy, $F(1,220)=17.62$, $p<.001$, $\eta^2_p=0.07$. Participants rated the information in the profile of targets displaying good health behaviors as significantly more inaccurate than they did the information in the profile of targets displaying poor health behaviors. There was no significant main effect of weight on perceived accuracy, $F(1,220)=1.44$, $p=.231$, $\eta^2_p=0.01$. There was, however, a significant interaction between weight and health behaviors, $F(1,220)=7.22$, $p=.008$, $\eta^2_p=0.03$. In support of H3, simple effects analyses revealed that, for targets with obesity, the information in the profile of those displaying good health behaviors were perceived as significantly more inaccurate than was the information in the profile of those displaying poor health behaviors, $p<.001$, $\eta^2_p=0.10$. In contrast, for targets with normal weight, there was no significant difference in perceived accuracy between targets displaying good health behaviors and those displaying poor health behaviors, $p=.284$, $\eta^2_p=0.01$.

Post hoc paired-sample t -tests found that the information in the profile of the target with obesity displaying good health behaviors was rated as significantly more inaccurate than the information in any of the other conditions, $ts>2.59$, $ps<0.001$, $ds>0.49$. As with older children, open-ended responses showed that participants noted a disconnect between weight and health behavior information as the reason for their suspicion.

Discussion

The purpose of this study was to empirically assess the impact of weight and health behavior information on perceptions of children's health. Although participants did tend to use both weight and health behavior information to make evaluations of a child's health and to make recommendations for the child's health behaviors, the pattern of results differed somewhat for evaluations of older and younger children.

For older children, consistent with our hypotheses, children with obesity were rated as significantly less healthy than were children with normal weight. This finding is consistent with other work suggesting that parents use the weight of older children as a marker of health (Eckstein et al., 2006; Thomas et al., 2014), and is also consistent with judgements of adults (Black et al., 2019), suggesting that

people view weight itself as an indicator of health. Although previous qualitative research suggests that parents primarily use weight as an indicator of the health of older children (Thomas et al., 2014), the current study found that participants did also take into consideration the target's health behaviors, but less so for targets with obesity than for targets with normal weight. In fact, the impact of the health behavior information on judgements of the targets with normal weight was more than twice that of the impact of health behavior information on judgements of targets with obesity. Furthermore, participants thought that the target with obesity should be engaging in general health behaviors and weight-control behaviors, even when the target was described as already engaging in adequate levels of health behaviors. These findings suggest that participants believed that the target with obesity needed to lose weight, even if the target was already engaging in a range of positive health behaviors. These beliefs conflict with research indicating that health behaviors themselves are important determinants of health outcomes (e.g., Veronese et al., 2016) and that engaging in health behaviors have benefits regardless of their impact on weight (e.g., Dugmore et al., 2020), and highlight the power of the dominant weight-focused discourse.

For judgments of younger children, in partial support of our hypotheses, health behavior information had a larger impact on ratings of overall health than did weight information ($\eta^2_p=0.38$ vs. $\eta^2_p=0.15$). This is consistent with previous research which finds that parents report using diet and exercise information, rather than weight, to make health assessments of younger children's health (Jain et al., 2001; Syrad et al., 2015), but is inconsistent with the finding that parents object to using weight as a measure of their younger child's health (Syrad et al., 2015). The discrepancy between our findings and previous research may reflect the difference between qualitative and experimental approaches to addressing this question, or may reflect the fact that participants in the previous qualitative studies were asked about their own children whereas in this study participants were asked about an unrelated child. As with older children, participants thought that younger children with obesity should engage in general health behaviors, regardless of their existing pattern of health behaviors. In contrast to older children, however, participants believed that only children with obesity displaying poor health behaviors should engage in weight-control behaviors.

The finding that weight plays somewhat of a more important role in evaluations of older children's than younger children's health indicates that beliefs about the impact of "excess weight" differs for younger and older children. Parents label excess weight in younger children as "puppy fat" and believe that their child will lose excess weight as

they undergo puberty (Jain et al., 2001; Syrad et al., 2015). This implies they do not consider this excess weight to be a health risk for younger children, and also that they believe that older children should not have excess weight and therefore should work to lose any excess weight. In line with this suggestion, participants believed that older children with obesity should engage in weight-control behaviors, regardless of their existing levels of health behaviors; for younger children with obesity, weight-control behaviors were only endorsed for those displaying poor health behaviors. Therefore, it may be that excess weight begins to be perceived as harmful (and thus an indicator of poor health) if it persists into older childhood.

Another noteworthy finding from the current study relates to participants' perceptions of the accuracy of the information in the children's health profiles. Black et al. (2019) found that participants distrusted the reports of targets with obesity who were described as engaging in healthy behaviors, citing the disconnect between the behavior and weight status as the reason for their distrust. Similar results were observed in the current study regarding participants' impressions of both older and younger children. Participants provided the highest ratings for how misleading the information was for targets with obesity who reportedly engaged in healthy behaviors, and open-ended responses indicated that they perceived a disconnect between the health information and the weight information. In other words, people seem to find it unlikely that an individual could become or remain obese if they were engaging in healthy behaviors.

The primary limitation of the current study is that participants were asked to evaluate the health of a (fictional) child who was unrelated to them. The use of unrelated children was necessary to conduct a controlled experiment in which we systematically varied information about weight and health behaviors, as well as to minimize any bias that parents might have in evaluating their own children. However, the implementation of these controls limits the ecological validity of the results. As noted above, some of our findings differ from previous research, and this could either be due to differences in method (i.e., qualitative research vs. a control experiment) or the difference between evaluations of one's own child versus an unrelated child. It would be worthwhile for future research to further examine the impact of weight and health behavior information on parents' perceptions of their own children's health. It would also be worthwhile exploring perceptions of unrelated children among others who may be likely to make health judgments and behavior recommendations (e.g., teachers, doctors) in order to determine whether there are biases in their perceptions that could lead to unnecessary or unhealthy behavioral recommendations and that should, therefore, be corrected with proper training. Finally, the study was also limited in its focus on

perceptions of female children, and it would be worthwhile for future research to explore perceptions of male children's health in order to determine whether the findings apply more broadly, or if there are differences in perceptions of boys and girls that need to be taken into consideration.

The important role that weight plays in judgments of children's (particularly older children's) health and in the behaviors that people believe are important for the child to engage in underscores the prominent narrative in the public health sphere connecting weight and health. Public health campaigns often emphasize the harmful effects of excess weight as well as the benefits of weight loss for improving health outcomes, even though there is evidence that engagement in health behaviors may be stronger predictors of health outcomes (Veronese et al., 2016) and that weight loss does not always confer health benefits (Harrington et al., 2009). The consequence of this messaging is that people may encourage unnecessary (and potentially even harmful) behaviors to young people who they deem to be "unhealthy" because they are of a higher weight. Indeed, the desire to be thinner and dieting behavior start to emerge by middle childhood (Sinton & Birch, 2005), and parental encouragement to diet influences the likelihood that children will diet (Balantekin et al., 2014). Thus, public health messaging should be reframed to focus on engagement with health behaviors without reference to weight, and regardless of the impact of those health behaviors on weight.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10865-024-00535-w>.

Author contributions Both authors contributed to the study conception and design. HN prepared the materials and conducted the study. Both authors analyzed the data. HN wrote the first draft of the manuscript. Both authors edited the manuscript and approved the final version.

Funding No funding was received for conducting this study.

Data availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability Not applicable.

Declarations

Ethical approval This study was approved by UNSW's Human Research Ethics Advisory Committee. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare that they have no conflicts of interest.

References

- Appel, L. J., Moore, T. J., Obarzanek, E., et al. (1997). A clinical trial of the effects of dietary patterns on blood pressure. *New England Journal of Medicine*, 336(16), 1117–1124. <https://doi.org/10.1056/NEJM199704173361601>
- Balantekin, K. N., Savage, J. S., Marini, M. E., & Birch, L. L. (2014). Parental encouragement of dieting promotes daughters' early dieting. *Appetite*, 80, 190–196. <https://doi.org/10.1016/j.appet.2014.05.016>
- Black, C., Vartanian, L. R., & Faasse, K. (2019). An experimental test of the effects of a target person's body weight and engagement with health behaviours on perceptions of overall health. *Applied Psychology: Health and Well Being*, 11(2), 240–261. <https://doi.org/10.1111/aphw.12151>
- Black, C. K., Vartanian, L. R., & Faasse, K. (2021). Investigating lay beliefs regarding the effect of weight loss on health. *Psychology & Health*, 36(8), 934–951. <https://doi.org/10.1080/08870446.2020.1792904>
- Black, C. K., Vartanian, L. R., & Faasse, K. (2024). Lay beliefs about the perceived harmfulness of excess weight: Influence of weight status and the cause of weight. *Applied Psychology: Health and Well-Being*, 16, 653–671. <https://doi.org/10.1111/aphw.12509>
- British Nutrition Foundation (2019). *Find your balance*. <https://www.nutrition.org.uk/media/csapwcse/457881-2.pdf>
- Chen, G., Ratcliffe, J., Olds, T., Magarey, A., Jones, M., & Leslie, E. (2014). BMI, health behaviors, and quality of life in children and adolescents: A school-based study. *Pediatrics*, 133(4), e868–e874. <https://doi.org/10.1542/peds.2013-0622>
- Dugmore, J. A., Winten, C. G., Niven, H. E., & Bauer, J. (2020). Effects of weight-neutral approaches compared with traditional weight-loss approaches on behavioral, physical, and psychological health outcomes: A systematic review and meta-analysis. *Nutrition Reviews*, 78(1), 39–55. <https://doi.org/10.1093/nutrit/nuz020>
- Eckstein, K. C., Mikhail, L. M., Ariza, A. J., et al. (2006). Parents' perceptions of their child's weight and health. *Pediatrics*, 117(3), 681–690. <https://doi.org/10.1542/peds.2005-0910>
- Fraser, S., Leveritt, M., & Ball, L. (2013). Patients' perceptions of their general practitioner's health and weight influences their perceptions of nutrition and exercise advice received. *Journal of Primary Health Care*, 5(4), 301–307. <https://doi.org/10.1071/HC13301>
- Gaesser, G. A., Angadi, S. S., & Sawyer, B. J. (2011). Exercise and diet, independent of weight loss, improve cardiometabolic risk profile in overweight and obese individuals. *The Physician and Sportsmedicine*, 39(2), 87–97. <https://doi.org/10.3810/psm.1999.10.1.1032>
- Golan, M., & Crow, S. (2004). Parents are key players in the prevention and treatment of weight-related problems. *Nutrition Reviews*, 62(1), 39–50. <https://doi.org/10.1111/j.1753-4887.2004.tb00005.x>
- Hales, C. M., Fryar, C. D., Carroll, M. D., Freedman, D. S., & Ogden, C. L. (2018). Trends in obesity and severe obesity prevalence in US youth and adults by sex and age, 2007–2008 to 2015–2016. *Journal of the American Medical Association*, 319(16), 1723–1725. <https://doi.org/10.1001/jama.2018.3060>
- Harrington, M., Gibson, S., & Cottrell, R. C. (2009). A review and meta-analysis of the effect of weight loss on all-cause mortality risk. *Nutrition Research Reviews*, 22(1), 93–108. <https://doi.org/10.1017/S0954422409990035>
- Hoaglin, D. C., & Iglewicz, B. (1987). Fine-tuning some resistant rules for outlier labeling. *Journal of the American Statistical Association*, 82(400), 1147–1149. <https://doi.org/10.2307/2289392>
- Jackson, S. E., Wardle, J., Johnson, F., Finer, N., & Beeken, R. J. (2013). The impact of a health professional recommendation on weight loss attempts in overweight and obese British adults: A cross-sectional analysis. *British Medical Journal Open*, 3, e003693. <https://doi.org/10.1136/bmjopen-2013-003693>
- Jain, A., Sherman, S. N., Chamberlin, L. A., Carter, Y., Powers, S. W., & Whitaker, R. C. (2001). Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics*, 107(5), 1138–1146. <https://doi.org/10.1542/peds.107.5.1138>
- King, N. A., Hopkins, M., Caudwell, P., Stubbs, R. J., & Blundell, J. E. (2009). Beneficial effects of exercise: Shifting the focus from body weight to other markers of health. *British Journal of Sports Medicine*, 43(12), 924–927. <https://doi.org/10.1136/bjsm.2009.065557>
- Kumar, S., & Kelly, A. S. (2017). Review of childhood obesity: From epidemiology, etiology, and comorbidities to clinical assessment and treatment. *Mayo Clinic Proceedings*, 92(2), 251–265. <https://doi.org/10.1016/j.mayocp.2016.09.017>
- Muros, J. J., Pérez, F. S., Ortega, F. Z., Sánchez, V. M., & Knox, E. (2017). The association between healthy lifestyle behaviors and health-related quality of life among adolescents. *Journal of Pediatrics*, 93(4), 406–412. <https://doi.org/10.1016/j.jpeds.2016.10.005>
- NHMR Publication N55. (2013). *Australian Dietary guidelines*. National Health and Medical Research Council. https://www.eatforhealth.gov.au/sites/default/files/content/n55_austrian_dietary_guidelines.pdf
- Perrin, E. M., Skinner, A. C., & Steiner, M. J. (2012). Parental recall of doctor communication of weight status: National trends from 1999 through 2008. *Archives of Pediatrics & Adolescent Medicine*, 166(4), 317–322. <https://doi.org/10.1001/archpediatrics.2011.1135>
- Peyer, K. L., Welk, G., Bailey-Davis, L., Yang, S., & Kim, J. K. (2015). Factors associated with parent concern for child weight and parenting behaviors. *Childhood Obesity*, 11(3), 269–274. <https://doi.org/10.1089/chi.2014.0111>
- Roy, M., & Gauvin, L. (2010). Having a personal weight goal that mismatches healthy weight recommendations increases the likelihood of using unhealthy behaviors among a representative population-based sample of adolescents. *Eating Behaviors*, 11(4), 281–287. <https://doi.org/10.1016/j.eatbeh.2010.08.002>
- Shiffman, S., Sweeney, C. T., Pillitteri, J. L., Sembower, M. A., Harkins, A. M., & Wadden, T. A. (2009). Weight management advice: What do doctors recommend to their patients? *Preventive Medicine*, 49(6), 482–486. <https://doi.org/10.1016/j.ypmed.2009.09.015>
- Sinton, M. M., & Birch, L. L. (2005). Weight status and psychosocial factors predict the emergence of dieting in preadolescent girls. *International Journal of Eating Disorders*, 38(4), 346–354. <https://doi.org/10.1002/eat.20176>
- Smith, C. A., Schmoll, K., Konik, J., & Oberlander, S. (2007). Carrying weight for the world: Influence of weight descriptors on judgments of large-sized women. *Journal of Applied Social Psychology*, 37(5), 989–1006. <https://doi.org/10.1111/j.1559-1816.2007.00196.x>
- Syrad, H., Falconer, C., & Cooke, L. (2015). 'Health and happiness is more important than weight': A qualitative investigation of the views of parents receiving written feedback on their child's weight as part of the National Child Measurement Programme. *Journal of Human Nutrition and Dietetics*, 28(1), 47–55. <https://doi.org/10.1111/jhn.12217>
- Thomas, S. L., Olds, T., Pettigrew, S., Randle, M., & Lewis, S. (2014). Don't eat that, you'll get fat! Exploring how parents and children conceptualise and frame messages about the causes and

- consequences of obesity. *Social Science & Medicine*, 119, 114–122. <https://doi.org/10.1016/j.socscimed.2014.08.024>
- Tompkins, C. L., Seabloom, M., & Brock, D. W. (2015). Parental perception of child's body weight: A systematic review. *Journal of Child and Family Studies*, 24(5), 1384–1391. <https://doi.org/10.1007/s10826-014-9945-0>
- Upadhyay, J., Farr, O., Perakakis, N., Ghaly, W., & Mantzoros, C. (2018). Obesity as a disease. *Medical Clinics of North America*, 102(1), 13–33. <https://doi.org/10.1016/j.mcna.2017.08.004>
- US Department of Agriculture and US Department of Health and Human Services (2020). Dietary Guidelines for Americans, 2020–2025 (9th Edition). US Department of Agriculture and US Department of Health and Human Services. https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf
- Veronese, N., Li, Y., Manson, J. E., Willett, W. C., Fontana, L., & Hu, F. B. (2016). Combined associations of body weight and lifestyle factors with all cause and cause specific mortality in men and women: Prospective cohort study. *Bmj*, 355, i5855. <https://doi.org/10.1136/bmj.i5855>
- Wald, E. R., Ewing, L. J., Cluss, P., Goldstrohm, S., Cipriani, L., Colborn, D. K., & Weissfeld, L. (2007). Parental perception of children's weight in a paediatric primary care setting. *Child: Care Health and Development*, 33(6), 738–743. <https://doi.org/10.1111/j.1365-2214.2007.00753.x>
- World Health Organization (2020). *Physical activity*. <https://www.who.int/news-room/fact-sheets/detail/physical-activity>

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