Weight Status Misperception And The Health Behaviors Of Obese Adolescents

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Abstract

Background: Weight underestimation among U.S. adolescents is common, but the ramifications of this misperception are not yet well known.

Purpose: To determine the relationship between weight self-perception and participation in health behaviors among obese adolescents.

Methods: The sample consisted of 1,210 obese male and female 7th and 11th graders. Participants completed the Personal Wellness Profile – Teen Edition, a general self-report measure of adolescent health functioning, and had their BMI's measured. Data were analyzed using χ^2 tests and logistic regression models.

Results: Underestimated weight status was associated with higher reported rates of participation in health behaviors (physical activity, healthy diet, weight management, overall healthy lifestyle) as well as greater self-efficacy in one's ability to engage in these behaviors. Self-efficacy either partially or fully mediated the relationship between weight underestimation and the health behaviors.

Discussion: Both weight perception and self-efficacy should be considered when attempting to understand and predict which adolescents with obesity are likely to engage in health behaviors. For some adolescents it is possible that intervention efforts that emphasize fostering self-efficacy in regard to weight loss behaviors may be more effective than focusing on increasing self-awareness of obese status and the associated risks.

INTRODUCTION

The rate of pediatric obesity has risen significantly in the United States[1] to the point at which 17% of children ages 2-19 were obese and an additional 15% were overweight in 2007-2008[2]. This epidemic has become a major public health concern, as childhood obesity has been linked to many adverse health consequences, including juvenile hypertension, elevated cholesterol levels, orthopedic abnormalities, type II diabetes mellitus, gallstones, asthma, and sleep disorders, to name a few[3]. Prevention programs for children and adolescents have so far had limited success[4,5]. Thus, research is necessary to examine individual difference characteristics that contribute to the development of pediatric obesity and barriers to its treatment. This study intends to determine whether weight misperception may be an important factor in understanding the high prevalence of adolescent obesity.

Weight underestimation among a multiethnic sample of overweight U.S. adolescents (BMI at or above the 85 th percentile) was found to be common, with 61% of males and 40% of females underestimating their actual weight status[6]. This finding is indicative of an ongoing trend among many Americans with overweight who have inaccurate self-perceptions of their weights[7-10]. Furthermore, many parents have been found to underestimate the weight status of both their child and adolescent offspring[11-13], which thereby suggests a potential mechanism for transmitting an inaccurate gauge for healthy weight status to their children.

In adults, the tendency to misperceive one's weight varies

substantially across demographic factors, with men, those with lower socioeconomic status, Hispanics, and African-Americans more likely to underestimate their overweight status[10,14,15]. Similar to adults, there is some evidence that gender, race, and family factors play an important role in adolescent weight perception[16,17]. However, Yan et al[6] found only gender differences and no race or socioeconomic status associations with weight status misperception in their multiethnic sample of adolescents.

This study seeks to add to the current literature by determining associations between weight misperception and specific adolescent health behaviors, such as physical activity and nutrition, among individuals with obesity. Across healthy and unhealthy adolescent populations, weight loss efforts are strongly related to adolescents' perceptions of themselves as overweight[15,18]. Therefore, underestimation of overweight status might reduce the likelihood that adolescents with overweight would participate in healthy behaviors that could promote weight loss. This hypothesis suggests a direct perception-behavior relationship.

Alternatively, evidence that self-efficacy predicts adolescent participation in a range of health behaviors, including exercise, smoking, AIDS prevention, and diet[19-22], points to self-efficacy as a factor that may mediate the perception-behavior link. Thus, an opposing hypothesis exists such that accurate perception of obesity status could undermine self-efficacy to engage in health behaviors such as physical activity, thereby reducing the likelihood of participation in healthy activities. That is, they may view their overweight status as an impediment to their participation in health behaviors. In either case, an opportunity exists to gain a better understanding of relations between weight perception, self-efficacy, and health behaviors among obese adolescents.

PURPOSE

The primary goal of this study was to test two hypotheses that examine associations between weight self-perception and participation in health behaviors among obese adolescents: 1) a direct weight perception-behavior relationship, with weight underestimation expected to decrease the likelihood of participation in health behaviors linked to weight management; and 2) a mediating effect of self-efficacy, such that accurate recognition of one's obese status is expected to correlate with lower self-efficacy in one's ability to participate in health behaviors, thereby reducing the likelihood of actual participation in these behaviors. To test these hypotheses, we measured self-reported readiness to participate in four areas of health behavior (i.e., physical activity, healthy diet, weight management, and overall healthy lifestyle) among adolescents who are obese. We also explored effects of hypothesized moderating (i.e., gender and grade level) variables in the relationship between weight perception and health behaviors.

METHODS

PARTICIPANTS

Data were gathered from a large sample of obese adolescents (defined as BMI's at or above the 95 th percentile[2]) who were enrolled in the 7 th and 11 th grades in two mostly rural Pennsylvania school districts from academic years 2001-2002 to 2005-2006.

Student data were eligible for inclusion if the participants were obese and had complete survey data (N = 1,328). The obese students comprised 25% of the total student sample with complete data (N = 5,392). There were no gender, grade, or BMI differences between the students with and without (N = 719) complete data.

Participants (N = 13) with BMI's that were four standard deviations (SD = 9.7) above the overall student sample mean BMI of 24.8 were removed from the analyses to control for the possibility of data entry errors. Participants whose reported ages were younger than 11 were also removed (N = 7). Additionally, to ensure independence in the total group of observations used for analysis, 7 th grade students observed in academic year 2001-2002 were removed from the analysis (N = 98). These data cleaning and outlier extraction procedures reduced the sample size of obese students to 1,210.

MEASURES

Personal Wellness Profile. Participants completed the "Personal Wellness Profile – Teen Edition" (PWP)[23], which is a 56-item self-report measure that provides a general assessment of the health functioning of adolescents. Items on the PWP fall under several categories: activity, dieting, eating habits, substance use, safety, stress and coping, family and friends, general health, and attitudes toward health behaviors. The PWP has adequate content validity (content validity index of 0.90)[24,25]. Cronbach's alpha coefficient was calculated to be .83 based on the sample and the four self-efficacy and four readiness to participate variables included in the study analyses. Selected PWP items were used to assess the following three areas of interest.

Weight perception. The PWP includes an item that asked participants to describe their weight. Response choices were underweight, about the right weight, slightly overweight (10 to 14 pounds), and overweight (15 or more pounds). The 1,210 participants with obesity were separated into two groups: those who accurately reported their weight status and those who underestimated their overweight status. Accurate report was defined as self-identification as either slightly overweight or overweight. Underestimation was defined as self-identifying as about the right weight or underweight.

Readiness to participate in health behaviors. The PWP asks participants to indicate their readiness to participate in a range of health behaviors. The following four behaviors were used in this study because of their relevance to healthy weight maintenance: being physically active most days, eating mostly healthy food, achieving or maintaining a healthy weight, and living an overall healthy lifestyle. Response choices ranged from 1 = not planning to do this, 2 = planning to start in next six mos., 3 = planning to start this month, 4 = recently started doing this, and 5 = already doing this, over 6 mos. For ease of interpretation in presentation, we collapsed the readiness variables into two categories: non-participation was defined as responses 1-3 and participation as a response of 4 or 5.

Self-efficacy. Participants also reported on the PWP their self-efficacy in regard to their confidence in their ability to engage in the four health behaviors listed above. There were three response choices for each behavior: 1 = I can do it, no problem, 2 = I think I can, and 3 = no way, I can't do it.

BMI

Participants' BMI was measured by certified school nurses. No information was provided in the dataset about methods for obtaining heights and weights (e.g., with shoes, with clothing, etc.). Obesity was defined as a BMI at or above the 95 th percentile according to the gender-specific growth charts from the Centers for Disease Control and Prevention[2,26]. Obese students were selected for inclusion, rather than overweight students (BMI's at or above the 85 th percentile to the 95 th percentile), to enable a greater degree of weight misperception among the sample that was more appropriate for the study hypotheses.

PROCEDURE

Nursing and research staff from Wayne Memorial Hospital in Wayne County, Pennsylvania collected questionnaire data, height, weight, and blood pressure as part of the hospital and school district's annual "Together for Health" program, which was designed to provide students with resources and practical assistance to make healthier lifestyle choices. Every student was invited to participate in the program and each participating student received a health profile detailing the results of their health assessments. Parental consent for the program was implicitly obtained through notification via a letter that was sent home with students and non-refusal. Parents were provided with the hospital's Notice of Privacy Practices, which informed them of their right to refuse permission for their medical information to be used for the purposes of research. Data collection was also approved by direct student assent. There were no data on rates of refusal. This data collection procedure was approved by the school district because data was collected anonymously, was not tracked at the student level over time, and was only reported in aggregate as it pertained to general patterns in health behaviors across the student population. All identifying information was removed from the dataset used for this study prior to data sharing. Temple University Health Sciences Institutional Review Board approval was obtained for analyses of the resulting anonymous, secondary dataset.

STATISTICAL ANALYSIS

BMI was compared by weight perception using a two-sample t-test. Chi-square tests of independence were used to evaluate the direct effects of weight perception (dichotomous: underestimators vs. accurate reporters) on gender, grade, and readiness to participate in the four dichotomous health behavior indicators, as well as on the four indicators of confidence in health behavior participation (three levels each). Effect sizes were quantified continuously using r^2 statistics (i.e., Pearson's coefficient of mean-square contingency).

The mediational effects of self-efficacy (four measures of self-efficacy in health related measures) on the relationship of weight perception as a predictor of health behavior were assessed using the four steps defined by Baron and Kenny[27]: (1) demonstration of a relationship between weight perception and health behaviors; (2) demonstration of a relationship between weight perception and the mediational variable of interest; (3) demonstration of a relationship between the potential mediator and health behaviors; and (4) demonstration of a null, or significantly reduced, effect of weight perception on health behaviors, in the presence of the potential mediation. The four steps outlined above were

evaluated using logistic regression models with adjustments for potential moderating covariates of gender and grade: (1) health behavior as the outcome of interest as a function of the independent variable weight perception; (2) self-efficacy in health behavior participation as a function of the independent variable weight perception; (3) health behavior as the outcome of interest as a function of the independent variable self-efficacy in the corresponding health behavior; and (4) comparative coefficients of determination for logistic regression models of health behavior with, and without, weight perception status and the mediator variable self-efficacy. A type I error rate of 0.0125 was used for significance in these analyses to control for multiplicity. This level is based on a Bonferroni adjustment of the 0.05 level for the four health behaviors under analysis.

RESULTS

Among the 1,210 obese students, ¬18% (N = 217) underestimated their weight status as normal or underweight. Males (23%; N = 166) were more likely than females (10%; N = 51) to underestimate their weight status, χ^2 (1) = 34.03, r^2 = .03. The 7 th graders (21%; N = 121) were more likely than 11 th graders (15%; N = 96) to underestimate their obese status, χ^2 (1) = 8.26, r^2 = .01. The underestimators (M = 29.5, SD = 3.1) had significantly lower BMI's than the accurate reporters (M = 33.1, SD = 4.9), t (1,208) = 10.35, Cohen's d = .78.

HEALTH BEHAVIORS

The distributions of self-reported rates of readiness to participate in health behavior are presented in Table 1.

Figure 1

Table 1: Associations between Self-reported Participation in Health Behaviors and Weight Perception

Weight perception	Health behavior		χ^2 (1)	r^2
	Participant	Non-participant		
Physical activity				
Underestimated	168 (77%)	49 (23%)	21.5*	.02
Accurate	603 (61%)	390 (39%)		
Healthy diet				
Underestimated	160 (74%)	57 (26%)	19.2*	.02
Accurate	573 (58%)	420 (42%)		
Achieve healthy weight				
Underestimated	182 (84%)	35 (16%)	81.4*	.07
Accurate	500 (50%)	493 (50%)		
Overall healthy lifestyle				
Underestimated	185 (85%)	32 (15%)	23.3*	.02
Accurate	685 (69%)	308 (31%)		

* $P < 0.001$.

The underestimators reported higher rates of physical activity, eating healthy food, healthy weight management, and an overall healthier lifestyle than those with accurate report.

SELF-EFFICACY

As predicted, the underestimators reported greater self-efficacy in their ability to engage in each of the four health behaviors than those with accurate self-report (see Table 2).

Figure 2

Table 2: Associations between Self-efficacy in Health Behavior Participation and Weight Perception

Weight Perception	Self efficacy			χ^2 (1)	r^2
	I can do it	*I think I can*	*No way*		
Physical activity					
Underestimated 217 (18%)	169 (78%)	42 (19%)	6 (3%)	61.5*	.05
Accurate 993 (82%)	483 (49%)	462 (46%)	48 (5%)		
Healthy diet					
Underestimated	149 (69%)	59 (27%)	9 (4%)	44.0*	.04
Accurate	437 (44%)	503 (51%)	53 (5%)		
Achieve healthy weight					
Underestimated	160 (74%)	53 (24%)	4 (2%)	133.4*	.11
Accurate	313 (32%)	619 (62%)	61 (6%)		
Overall healthy lifestyle					
Underestimated	167 (77%)	46 (21%)	4 (2%)	45.0*	.04
Accurate	517 (52%)	430 (43%)	46 (5%)		

* $P < 0.001$.

Consistent with the differences in their average BMI's, more than twice the proportion of underestimators compared to accurate self-reporters expressed strong self-efficacy ("I can do it, no problem") with healthy weight management. Self-efficacy was also found to be significantly associated with self-reported participation in each of the corresponding health behaviors. The results of this series of χ^2 tests are presented in Table 3.

Figure 3

Table 3: Associations between Self-reported Participation in Health Behaviors and Self-efficacy

	Physical activity			χ^2 (1)	r^2
	I can do it 652 (54%)	*I think I can* 504 (42%)	*No way* 54 (4%)		
Participant	544 (83%)	218 (43%)	9 (17%)	252.7*	.21
Non-participant	108 (17%)	286 (57%)	45 (83%)		
	Healthy diet				
	I can do it 586 (48%)	*I think I can* 562 (46%)	*No way* 62 (5%)		
Participant	468 (80%)	254 (45%)	11 (18%)	194.6*	.16
Non-participant	118 (20%)	286 (57%)	51 (82%)		
	Achieve healthy weight				
	I can do it 473 (39%)	*I think I can* 672 (56%)	*No way* 65 (5%)		
Participant	357 (75%)	305 (45%)	20 (31%)	120.5*	.10
Non-participant	116 (25%)	367 (55%)	45 (69%)		
	Overall healthy lifestyle				
	I can do it 684 (57%)	*I think I can* 476 (39%)	*No way* 50 (4%)		
Participant	594 (87%)	266 (56%)	10 (20%)	202.7*	.17
Non-participant	90 (13%)	210 (44%)	40 (80%)		

* $P < 0.001$.

LOGISTIC REGRESSION MODELS

In the fourth and final step of the mediational analysis, a series of four logistic regression analyses were run to determine the influence of self-efficacy on the associations between weight perception and self-reported health behavior participation. A null effect for weight perception on physical activity and healthy diet, respectively, was found when self-efficacy was entered into these logistic regression equations, indicating that self-efficacy mediates the relationship between weight perception and these two outcomes (see Figure 1).

Figure 1. Observed Models in which Self-efficacy Significantly Mediated the Relationship Between Weight Perception and Health Behaviors.

Figure 4

Figure 1a. Physical Activity

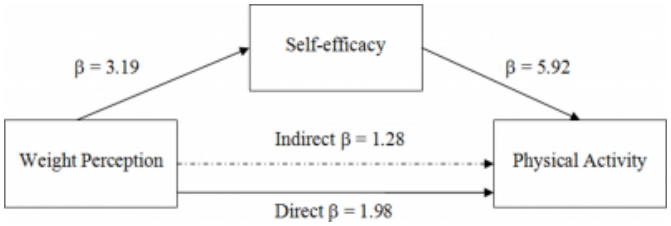
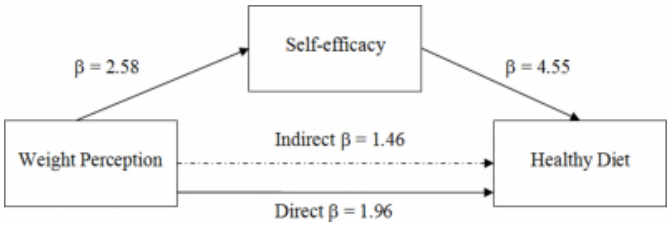


Figure 5

Figure 1b. Healthy Diet



In contrast, although a null effect was not found for weight management and overall healthy lifestyle when self-efficacy was entered into those two equations, the shift in parameter estimates of exp() towards unity indicates partial mediational effects[27]. The odds are presented in Table 4.

Figure 6

Table 4: Logistic Regression Modeling Results for Health Behavior Participation

Health behavior	Model	Cox & Snell r^2	Exp(β)	95% CI for Exp(β)
Physically active	Model (1)†‡	.03	1.98*†	1.40 – 2.81
	Model (2)	.20	5.92*	4.62 – 7.58
	Model (3)	.20	1.28	0.87 – 1.89
Healthy diet	Model (1)†	.03	1.96*	1.40 – 2.73
	Model (2)†	.17	4.55*	3.60 – 5.73
	Model (3)†	.17	1.46	1.01 – 2.09
Achieve healthy weight	Model (1)	.08	4.81*	3.27 – 7.08
	Model (2)†	.10	3.14*	2.51 – 3.93
	Model (3)	.13	3.38*	2.26 – 5.04
Overall healthy lifestyle	Model (1)†	.03	2.36*	1.57 – 3.53
	Model (2)†	.16	5.08*	3.96 – 6.52
	Model (3)	.17	1.63*	1.05 – 2.51

Note: Model (1) includes Weight Perception, Gender, and Grade; estimates in table are associated with Weight Perception. Model (2) includes Self-efficacy, Gender, and Grade; estimates in table are associated with Self-efficacy. Model (3) includes Weight Perception, Self-efficacy, Gender, and Grade; estimates in table are associated with Weight Perception
* $P < 0.001$.
† Grade significantly predictive of behavior, $P < 0.01$.
‡ Gender significantly predictive of behavior, $P < 0.01$.

GENDER AND GRADE LEVEL

Gender and grade level were included as covariates in the logistic regression analyses generated in step 4. Gender did not emerge an independent predictor in the final step for any of the dependent health behavior variables. Grade remained an independent predictor of only one of the four outcome measures, healthy diet, in step 4 of the comprehensive analysis. Among 11 th graders, a null effect for weight perception on healthy diet was found when self-efficacy was entered into the logistic regression model, indicating that self-efficacy mediates the relationship between weight perception and outcome. The parameter estimates of exp() for weight perception were 1.70 (95% CI 1.07 to 2.70) and 1.16 (95% CI 0.70 to 1.94) in models 1 and 3, respectively. In contrast, although a null effect was not found among the 7 th graders for healthy diet when self-efficacy was entered into the model, the shift in parameter estimates associated with

the odds ratio towards unity (i.e., an attenuation of effect), indicates partial mediational effects[27]. The parameter estimates of exp() for weight perception were 2.24 (95% CI 1.37 to 3.66) and 1.82 (95% CI 1.07 to 3.08) in models 1 and 3, respectively.

DISCUSSION

This study intended to determine the association between weight perception and health behavior participation among obese adolescents. Two competing hypotheses were tested: (1) underestimation is associated with decreased participation through a direct perception-behavior link and (2) accurate perception is associated with decreased participation through the mediating effect of self-efficacy. Weight underestimation was observed in 18% of participants, which was a substantial reduction in prevalence from the 2009 Yan et al.[6] study that included a multiethnic sample of both overweight and obese adolescents. The decision to include only obese students in this sample may have reduced the rate of misperception as intended. The data refuted the first hypothesis, but generally supported the second hypothesis. Underestimators reported rates of participation in four health behaviors (physical activity, healthy diet, weight management, overall healthy lifestyle) that were 16-33% higher than the accurate reporters.

Consistent with the second hypothesis, self-efficacy was shown to be positively associated with both weight underestimation (r^2 range of .04 to .11) and self-reported health behavior participation (r^2 range of .10 to .21), respectively. Self-efficacy fully mediated the relationships between weight perception and physical activity and healthy diet, respectively, and was a partial mediator of the relationships with weight management and overall healthy lifestyle.

Although self-efficacy appears to be a key mediating factor between weight underestimation and self-reported health behavior participation, other mediators not accounted for in this dataset could be involved. One speculative hypothesis comes from the finding that intrinsic motivation (e.g., fitness, recreation, etc.) predicts exercise and general quality of life, whereas extrinsic motivation (e.g., weight loss, attractiveness) is negatively associated with these outcomes[17]. Without an accurate recognition of their obese status, it would seem that underestimators would be more likely to participate in health behaviors for intrinsic reasons other than weight loss. On the other hand, those who recognize that they are obese may tend to be interested in health behaviors for the specific purpose of trying to lose weight, which is an extrinsic source of motivation that negatively predicts actual exercise participation.

Body dissatisfaction could be another mediating factor in the relationship between weight underestimation and health behavior participation. Presumably, those who identified themselves as overweight would be more at-risk for lower body satisfaction. Although body dissatisfaction has been shown to be associated with unhealthy weight loss efforts, such as binge eating and smoking, it predicts lower levels of healthy weight loss behaviors, such as fruit and vegetable intake and physical activity[28].

Consistent with previous adolescent research[6], the males who were obese were more likely to underestimate their weight status than the females. Also, the 7 th graders were more prone to underestimate their obese status than the 11 th graders, perhaps suggesting that weight self-awareness is more accurate among older than younger adolescents. Yet in our multivariate analyses, grade level appeared to be a more influential moderator of health behavior than gender (see Table 4).

LIMITATIONS

The most significant limitation of this study was the lack of available psychometric data for the self-report measure. Although the PWP items that are intended to measure health behavior participation, self-efficacy, and interest have strong content validity, they are not standardized measurements of these constructs. The authors emphasize that the use of this self-report measure enabled an initial investigation into variables of interest that have potential to inform and improve future obesity research and prevention efforts.

The use of self-report in itself is another limitation of the study. Although self-report is commonly used to determine levels of health behavior participation, it is susceptible to the influence of a number of cognitive and situational factors that could reduce reliability and validity of this key variable[29]. In this study, there is a possibility of a spurious, bidirectional relationship with self-reported weight. That is, self-reported weight status may have been influenced by reporting biases other than actual weight perception, such as an optimistic view of reality or concern with impression management (i.e., the desire to look “good’). From the perspective of cognitive dissonance theory[30], for example, participants may have strived to maintain cognitive consistency by reporting health behavior levels that were correspondent to their self-images. Also, those who

underestimated their weight status may just have been less accurate overall in their self-report, which could have also led to skewed self-reported participation rates.

The use of nurse-obtained BMI was a strength of this study because adolescents, particularly those who are obese or overweight, tend to under-report their body weight, which can lead to an underestimation of the prevalence of overweight and obesity[31,32]. On the other hand, although BMI is considered a valid indicator of adiposity in adolescents[33,34], a flaw of the measure is that it does not take into account body frame and muscularity. Therefore, the use of BMI to assess adiposity could result in the erroneous categorization of some muscular and broad-shouldered athletic students as obese.

Both the underestimators and accurate reporters had average BMI's within the obese range. However, consistent with the underestimators' assertion of healthier weight status, they had lower BMI's than the accurate reporters. It makes intuitive sense that the students with lower levels of obesity who are somewhat closer to the cut-off for normal weight status would be more prone to weight underestimation those with a greater degree of obesity. It is also possible that a portion of the heightened participation in health behaviors among underestimators may have been due to the limitations of BMI as a measure of obesity in adolescents, rather than a direct perception-behavior relationship. In addition to improved assessment of health behavior participation, future study in this area will benefit from including multiple fitness indicators.

Other limitations included the correlational nature of the analyses, thereby precluding any conclusions about the causal relationships among variables. The sample was obtained from a predominantly rural school district and therefore cannot be assumed to be representative of the U.S. adolescent population. Furthermore, due to the school districts' concerns with privacy issues, there were no racial or socioeconomic data available to further determine generalizability and the potential influence of these important variables. Interpretation of these findings is also limited to 7 th and 11 th graders and the results cannot be assumed to be representative of the entire adolescent developmental spectrum.

IMPLICATIONS

Despite this study's limitations, results supported a hypothesis about the role of weight perception in a sample of obese adolescents. The associations between accurate self-perception and lower rates of health behaviors and lower self-efficacy in one's ability to participate in these behaviors suggest a potential mechanism that may create barriers to weight loss efforts among some obese adolescents. The proposed mechanism may be similar to the stereotype threat that has been found to lead to the underperformance of minority students on academic skills tests when their minority status is made salient. Similar observations have been observed among female students who have demonstrated underperformance on math tests when their self-awareness of their gender status is raised[35]. The strong associations between self-efficacy and participation in healthy weight loss behaviors suggest that this factor may deserve special focus in prevention and intervention efforts. As further indication of the importance of this variable, self-efficacy was found to at least partially mediate the relationship between weight perception and the health behaviors.

We speculate that interventions that foster self-efficacy in regard to weight loss behaviors may be a relatively more effective strategy than focusing on increasing self-awareness of obesity and the associated risks. Programs that provide opportunities for supervised instruction and coaching while supporting and encouraging student participation may be particularly beneficial for adolescents who are self-aware of their obese status. Research on stereotype threat offers encouraging support for the notion that relatively straightforward steps can be taken to overcome negative self-perceptions[36,37], which suggests that it would be possible to reduce the potential deleterious influence of self-perception on health behavior participation. Also, given that self-recognition of one's obesity status does not render adolescents more likely to participate in health behaviors, interventions should seek to tap into and to further develop the intrinsic motivations, such as enjoyment, competition, and opportunity for socialization, that may be more important in facilitating participation. Nonetheless, the direct effects of both weight perception and self-efficacy should be considered when attempting to understand and predict which obese adolescents are likely to engage in health behaviors.

This study has provided preliminary insights into the relationship between obesity and weight perception among adolescents, but the implications of the findings should remain tentative at this point due to the limitations of this study design. It is uncertain whether weight perception has played a meaningful role in contributing to the current adolescent obesity epidemic. Future studies are necessary to

further determine and the most effective ways for intervention efforts to address the issue of misperception.

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References

1. Ogden CL, Carrol MD, Flegal KM: High body mass index for age among US children and

adolescents, 2003-2006. JAMA; 2008; 299(20): 2401-2405.
2. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM: Prevalence of high body mass

index in US children and adolescents, 2007-2008. JAMA; 2010; 303(3): 242-249.
3. Daniels SR: The consequences of childhood overweight and obesity. Future Child;

2006; 16(1): 47-67.
4. Floodmark CE, Marcus C, Britton M: Interventions to prevent obesity in children and

adolescents: a systematic literature review. Int J Obes; 2006; 30(4): 579-589.
5. Thomas H: Obesity prevention programs for children and youth: why are their results so modest? Health Educ Res; 2006; 21(6): 783-795.
6. Yan AF, Zhang G, Wang MQ, Stoesen CA, Harris BM: Weight perception and weight control practice in a multiethnic sample of US adolescents. South Med J; 2009; 102(4): 354-360.
7. Chang VW, Christakis NA: Self-perception of weight appropriateness in the United States. Am J Prev Med; 2003; 24(4): 332-339.
8. Kuchler F, Variyam JN: Mistakes were made: misperception as a barrier to reducing overweight. Int J Obes; 2003; 27(7): 856-861.
9. Powell L, Amsbary JH: Self-reported obesity and obesity-related behaviors. Individ Differ Res; 2004; 2(2): 118-124.
10. Rand CSW, Kuldau JM: The epidemiology of obesity and self-defined weight problem in the general population: gender, race, age, and social class. Int J Eat Disord; 1990; 9(3): 329-343.
11. Boutelle K, Fulkerson JA, Neumark-Sztainer D, Story M: Mothers' perceptions of their adolescents' weight status: are they accurate? Obesity; 2004; 12(11): 1754-1757.
12. Carnell S, Edwards C, Croker H, Boniface D, Wardle J: Parental perceptions of overweight in 3-5 y olds. Int J Obes; 2005; 29(4): 353-355.
13. Skelton JA, Busey SL, Havens PL: Weight and health status of inner city African American children: perceptions of children and their parents. Body Image; 2006; 3(3): 289-293.
14. Crawford D, Campbell K: Lay definitions of ideal weight and overweight. Int J Obes; 1999; 23(7): 738-745.
15. Serdula MK, Collins ME, Williamson DF, Anda RF, Pamuk E, Byers TE: Weight control practices of U.S. adolescents and adults. Ann Int Med; 1993; 119(7 Pt 2): 667-671.
16. Strauss R: Self-reported weight status and dieting in a cross-sectional sample of young adolescents: National Health and Nutrition Examination Survey III. Arch Pediatr Adolecs Med; 1999; 153(7): 741-747.
17. Gillison FB, Standage M, Skevington SM: Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behaviour: a self-determination theory approach. Health Educ Res; 2006; 21(6): 836-847.
18. Wichstrom L: Social, psychological and physical correlates of eating problems. A study of the general adolescent population in Norway. Psychol Med; 1995; 25(3): 567-580.
19. Allison K, Dwyer J, Makin S: Self-efficacy and participation in vigorous physical activity by high school students. Health Educ Behav; 1999; 26(1): 10-22.
20. Goh DS, Primavera C, Bartalini D: Risk behaviors, self-efficacy, and AIDS prevention among adolescents. J Psychol; 1996; 130(5): 537-546.
21. Granner ML, Sargent RG, Calderon KS, Hussey JR, Evans AE, Watkins KW: Factors of fruit and vegetable intake by race, gender, and age among young adolescents. J Nutr Educ Behav; 2004; 36(4): 173-180.
22. Ham OK: Stages and processes of smoking cessation among adolescents. West J Nurs Res; 2007; 29(3): 301-315.
23. Wellsource, Inc: Personal Wellness Profile – Teen Edition. Clackamas, OR: Author; 1999.
24. Polit DF, Beck CT: The content validity index: are you sure you know what's being reported? critique and recommendations. Res Nurs Health; 2006; 29(5): 489-497.
25. Wellsource: The Personal Wellness Profile: a health and lifestyle assessment instrument.
Available at:
http://www.wellness-training.org/profile-wellsource.htm. Accessed June 18, 2007.
26. Centers for Disease Control and Prevention: 2000 CDC growth charts: United States. Available at:
http://www.cdc.gov/growthcharts. Accessed June 18, 2007.
27. Baron RM, Kenny DA: The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. J Pers Soc Psychol; 1986; 51(6): 1173-1182.
28. Neumark-Sztainer D, Paxton SJ, Hannan PJ, Haines J, Story M: Does body satisfaction
matter? five-year longitudinal associations between body satisfaction and health behaviors in
adolescent females and males. J Adolesc Health; 2006; 39(2): 244-251.
29. Benner ND, Billy JOG, Grady WR: Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. J Adolesc Health; 2003; 33(6): 436-457.
30. Festinger L: A Theory of Cognitive Dissonance. Stanford, CA: Stanford University Press; 1957.
31. Elgar FJ, Roberts C, Tudor-Smith C, Moore L: Validity of self-reported height and weight and predictors of bias in adolescents. J Adolesc Health; 2005; 37(5): 371-375.
32. Lee K, Valeria B, Kochman RN, Lenders CM: Self-assessment of height, weight, and sexual maturation: validity in overweight children and adolescents. J Adolesc Health; 2006; 39(3): 346-352.
33. Steinberger J, Jacobs DR Jr, Raatz S, Moran A, Hong CP, Sinaiko AR: Comparison of body fatness measurements by BMI and skinfolds vs dual energy X-ray absorptiometry and their relation to cardiovascular risk factors in adolescents. Int J Obes; 2005; 29(11): 1346-1352.
34. Troiano RP, Flegal KM, Kuczmarski RJ, Campbell SM,

Johnson CL: Overweight prevalence and trends for children and adolescents: the National Health and Nutrition Surveys, 1963 to 1991. Arch Pediatr Adolesc Med; 1996; 149(10): 1086-1091.
35. Steele CM, Spencer S, Aronson J: Contending with group image: the psychology of stereotype and social identity threat. In: Zanna, MP, ed. Advances in Experimental Social Psychology. San Diego, CA: Academic Press; 2002; 34: 379-440.
36. Hess TN, Hinson JT, Hodges EA: Moderators of and mechanisms underlying stereotype threat effects on older adults' memory performance. Exp Aging Res; 2009; 35(2): 153-177.
37. Rydell RJ, McConnell AR, Beilock SL: Multiple social identities and stereotype threat: imbalance, accessibility, and working memory. J Pers Soc Psychol; 2009; 96(5): 949-966.

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