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Feeling overweight vs. being overweight: Accuracy of weight perception among Minnesota youth

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Minnesota Department of **Human Services**
Performance Measurement and Quality Improvement Division

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By

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This is the second of a series of reports on issues related to overweight/obesity among Minnesota youth.

Copies of this report and the other reports, including the reports on adult obesity, can be printed from www.dhs.state.mn.us/healthcare/studies

Background

The prevalence of overweight/obesity among our youth has sharply increased since the mid-1970s in the United States, and childhood obesity has become a threatening health issue by reaching an epidemic level. Childhood obesity and overweight has important short- and long-term consequences for health, including the rising incidence of so-called "adult diseases," such as type 2 diabetes, hypertension, high cholesterol and painful joint conditions among youth.

Closely related to obesity and critical to the well-being of youth is perception of body weight, that is, how an individual perceives his or her body weight. Weight perception is related to attitude to weight management and assumed to be a risk factor for later eating disturbances.[1,2] It appears that both "being" overweight and "feeling" overweight should be examined for a better understanding of the obesity epidemic among youth and its impact on their overall well-being.

Now that larger proportions of youth are overweight, overweight youth might feel more "normal," and this might have shifted self perception of current weight among youth.[3] A study found that the increasing prevalence of overweight in adolescents over the period 1979-1999 in Finland has been associated with a decreasing prevalence of feeling too fat.[4] While the population has become heavier, cultural idealization of thinness has increased to a point of "thinspiration," particularly among young females. Children and teens who are consistently exposed to the ideal body images portrayed by mass media may feel dissatisfied about their bodies and perceive themselves as being too fat or too thin regardless of their actual size.

Weight perception and weight concern have been found to vary across gender and race/ethnicity. In general, female adolescents were found to be more concerned with body weight than male adolescents, and females tended to view themselves as fatter than they actually were.[5] Although boys generally display less overall body concern than girls, many boys report dissatisfaction with their bodies as well. Girls expressing the greatest body dissatisfaction were those who believed they were overweight, whereas the most dissatisfied boys were those who believed they were underweight.[6] Boys may appreciate being bigger and associate it with a positive image of being stronger and more masculine. In addition to gender, some investigators suggest race/ethnicity and cultural background

[1] Smolak L. Body image in children and adolescents: Where do we go from here? Body Image 2004; 1:15-28.

[2] Kagawa M, Kuroiwa C, Uenishi K, et al. A comparison of body perceptions in relation to measured body composition in young Japanese males and females. *Body Image*. 2007; 4(4):372-80.

[3] Jansen W, van de Looij_Jansen PM, de Wilde EJ, Brug J. Feeling fat rather than being fat may be associated with psychological well-being in young Dutch adolescents. J Adolesc Health. 2008; 42(2):128-36.

[4] Kaltiala-Heino R, Kautiainen S, Virtanen SM, et al. Has the adolescents' weight concern increased over 20 years? Eur J Public Health 2003; 13:4-10.

[5] Sisson BA, Franco SM, Carlin WM, Mitchell CK. Bodyfat Analysis and Perception of Body Image. Clinical Pediatrics 1997; 36(7): 415-418.

[6] Page RM, Allen O. Adolescent perceptions of body weight and weight satisfaction. Perceptual and Motor Skills. 1995; 81(1):81-82.

affect how adolescents perceive their body weight, and minority adolescents are not as overly preoccupied with thinness as whites.[7,8,9]

Minnesota youth

This report, the second of a series on body weight problems among Minnesota youth, examines how Minnesota students view their current body weight, how accurate their perceived weight is in relation to body mass index (BMI)-based body weight status, and what factors are associated with the discordance between body image and BMI-based body weight status.

Data are from the Minnesota Student Survey (MSS) conducted in spring 2007. MSS is administered statewide every three years to public school students in grades 6, 9, and 12. All public school districts are invited to participate and student participation is voluntary. In 2007, 309 of the 338 public school districts (91%) participated with an overall student participation of 72%.[10] In the 2007 survey, students in grades 9 and 12 were asked about their height and weight. This report is based on the data from 50,713 9th graders and 36,755 12th graders, excluding the 6th graders who were not asked about height and weight.

The table below shows the socio-demographic distribution of participating students. Gender is evenly divided in both grades. Overall, about one in five students are members of a minority population or of mixed racial/ethnic background. The proportion of minority students is higher in grade 9 than in grade 12. About 23.5% of 9th graders and 17.1% of 12th graders reported receiving a free or reduced-price lunch at school. This is used as a proxy measure for low-income status.

Socio-demographic characteristics of survey participants

		Grade 9	Grade 12	Total
Gender	Female	50.7%	50.4%	50.6%
Race/ethnicity	White	77.3%	83.8%	80.0%
	American Indian	1.4%	.8%	1.1%
	Black	5.2%	3.7%	4.6%
	Hispanic	3.8%	2.6%	3.3%
	Asian or Pacific Islander	5.3%	4.7%	5.0%
	Mixed	7.1%	4.4%	5.9%
Low-income status	Currently get a free or reduced-price lunch at school	23.5%	17.1%	20.8%

[7] Wadden TA, Stunkard AF, Dich L, et al. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. Pediatrics. 1990; 85:345-352.

[8] Desmond SM, Price JH, Hallinan C, Smith D. Black and white adolescents' perceptions of their weight. Journal of School Health. 1989; 59(8):353-8.

[9] Parker S, Nichter M, Nichter M, et al. Body image and weight concerns among African American and white adolescent females: Differences that make a difference. Human Organization 1995; 54(2):103-114.

[10] For a more detailed information about MSS, please check DHS web page for MSS at http://www.dhs.state.mn.us/id_007196

About two in three students in grades 9 and 12 think they have about the right weight, 23.9% think they are overweight, and 9.0% think they are underweight.
While there is a strong and positive relation between BMI-based weight status and perceived body weight, a substantial level of discordance exists, and it varies across gender, grade and race/ethnicity.

Using the self-reported height and weight information, a BMI score is computed for each student using the standard formula of weight/height^2 (kg/m^2). Based on age- and sex-specific Centers for Disease Control growth charts, [11] students with a BMI at or above the 95th percentile for children of the same age and sex are defined as "obese," and those with a BMI score at or above the 85th percentile but below the 95th percentile, are categorized as "overweight." [12] Students whose BMI scores are below the 5th percentile are categorized as "underweight."

About 9.1% of Minnesota students in grades 9 and 12 are obese, with an additional 13% being overweight.[13] About three quarters of them (75.5%) have a healthy weight and 2.4% are underweight. Male students have a higher mean BMI score than females (23.7 vs. 22.2), and have a higher proportion being overweight or obese than female students (26.9% vs. 17.5%).

Weight perception is measured by asking "At the present time, do you think you are underweight, about the right weight, or overweight?" Among the students in grades 9 and 12, just over two thirds (67.1%) think that they are about the right weight, 23.9% think they are overweight, and 9.0% think they are underweight. Male students are more than twice as likely as females to view themselves as underweight (12.7% vs. 5.3%), and females are more likely than males to view themselves as overweight (30.4% vs. 17.2%).

Distribution of weight perception among Minnesota youths

	9th grade		12th grade		Grade total		Gender total		Grand total
Weight perception	male	female	male	female	9th	12th	male	female	
underweight	12.6%	6.1%	13.0%	4.3%	9.3%	8.6%	12.7%	5.3%	9.0%
about the right weight	70.9%	64.8%	69.0%	63.5%	67.8%	66.2%	70.1%	64.3%	67.1%
overweight	16.5%	29.1%	18.0%	32.2%	22.9%	25.2%	17.2%	30.4%	23.9%

[11] Kuczmarski RJ, Ogden CL, Guo SS, Grummer-Strawn LM, Flegal KM, Mei Z, et al. 2000 CDC growth charts for the United States: methods and development. Vital Health Stat 11 2002; 246:1–190.

[12] In 2007, an Expert Committee, comprised of representatives from 15 professional organizations, including American Medical Association, recommended using "overweight" and "obesity", in place for the previous categories of "at risk of overweight" and "overweight" respectively (Barlow S & the Expert Committee. Expert Committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. Pediatrics. 2007; 120:s164-s192).

[13] Park, E. Overweight youth in Minnesota, their eating habits and the level of physical activity: Data from 2007 Minnesota Student Survey. Available at www.dhs.state.mn.us/healthcare/studies.

Female students in grade 12 are more likely to view themselves as overweight than females in grade 9 (32.2% vs. 29.1%), and females in grade 12 are less likely to view themselves as underweight than females in grade 9 (4.3% vs. 6.1%). There is not much difference across grades among male students.

The BMI-based weight status and perceived weight are strongly and positively correlated for both male and female students (Spearman's rho=.460; .513 for males and .468 for females). However, substantial discordance is still observed. Among males, for example, while 2.5% are categorized as underweight on the basis of their self-reported weight and height information, about five times of that proportion (12.7%) perceive themselves as underweight. On the other hand, among females, 30.4% view themselves as overweight while just 17.5% are actually overweight or obese according to their self-reported weight and height information.

To explore further the weight perception in relation to body weight status, the distribution of weight perception was examined for each sub-group of BMI-based body weight status, separately for each gender. While about three quarters of students with a healthy weight (79.7% of males and 74.7% of females) think they have about the right weight, healthy-weight females are almost four times as likely as their male counterparts to view themselves as overweight (20.0% vs. 5.1%). On the other hand, 15.2% of healthy-weight male students, compared to 5.2% of their female counterparts, consider themselves as underweight.

Distribution of weight perception within each group of BMI-based body weight status

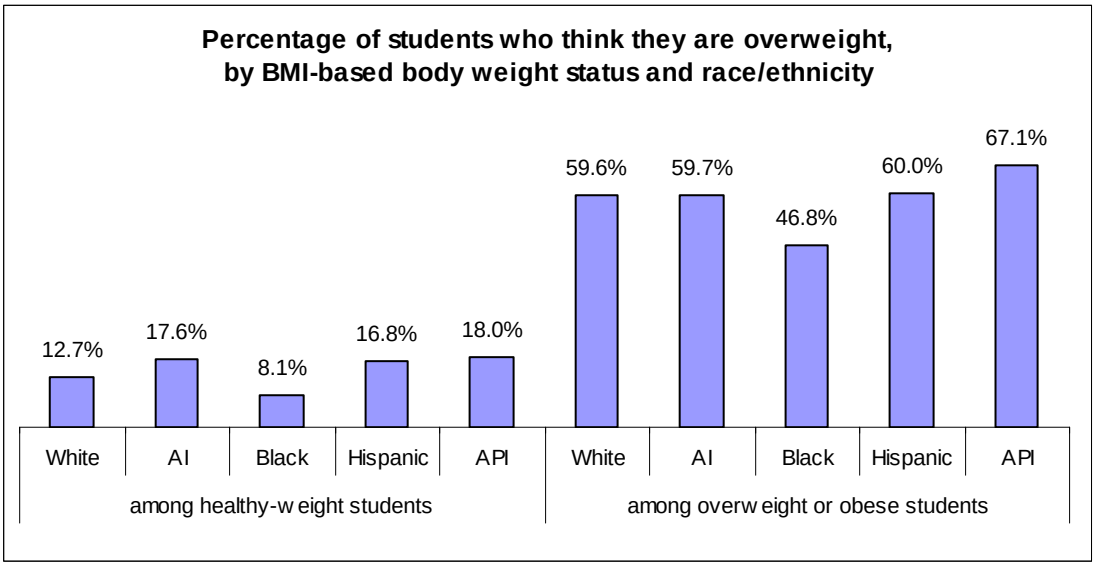
	BMI-based body weight status					
	Underweight		Healthy weight		Overweight/obese	
Weight perception	Male (n=963)	Female (n=892)	Male (n=27,188)	Female (n=32,095)	Male (n=10,311)	Female (n=6,971)
Underweight	50.9%	45.2%	15.2%	5.2%	1.9%	0.7%
About the right weight	44.8%	48.5%	79.7%	74.7%	49.6%	24.1%
Overweight	4.4%	6.3%	5.1%	20.0%	48.5%	75.3%

Another striking gender difference appears among overweight students. Overweight male students are about twice as likely as their female counterparts to consider themselves to have about the right weight (49.6% vs. 24.1%). On the other hand, about three quarters of female students who are overweight or obese (75.3%), compared to less than half of their male counterparts (48.5%), view themselves as overweight. Of those who are underweight, female students are more likely than males to think that they are about the right weight (48.5% vs. 44.8%).

In addition, across all body weight categories, females are consistently more likely than males to view themselves as overweight (6.3% vs. 4.4% among underweight students; 20.0% vs. 5.1% among healthy weight students; 75.3% vs. 48.5% among overweight/obese students), while males are more likely than females to view themselves as underweight

(50.9% vs. 45.2% among underweight students; 15.2% vs. 5.2% among healthy weight students; 1.9% vs. 0.7% among overweight/obese students).

There is some racial/ethnic difference in weight perception. The chart below shows the percentage of students who think they are overweight, among those who have a healthy weight and among those who are overweight or obese, across racial/ethnic subgroups. About 12.7% of white students with a healthy weight think they are overweight. All the minority students, except blacks, have a higher proportion considering themselves as overweight even when they have a healthy weight (17.6% of American Indians, 16.8% of Hispanics and 18.0% of Asian/Pacific Islanders). Black students have the lowest proportion: 8.1% of black students who have a healthy weight think they are overweight.



On the other hand, among those who are overweight or obese, 59.6% of whites think they are overweight. While American Indians and Hispanics have comparable proportions to their white counterparts, with about 60.0% in each group considering themselves overweight, API students have the highest proportion with 67.1% of those who are overweight or obese think they are overweight. On the other hand, black students have the lowest proportion, with less than half of those who are overweight or obese (46.8%) considering themselves overweight.

Overall, more than a quarter of students (27.6%) have an inaccurate weight perception.
Males, minorities, those from low-income households and those with an unhealthy body weight are more likely than their counterparts to have an inaccurate weight perception.
Types of the inaccurate weight perception (underestimation or overestimation) vary by gender, grade, race/ethnicity, and household income.

To examine the pattern of discordance between perceived body weight and actual body weight in relation to various socio-demographic factors, a new variable — accuracy of weight perception — was created by comparing weight perception against BMI-based weight status. The three categories[14] of BMI-based body weight status (underweight, healthy, overweight/obese) and the three categories of weight perception (underweight, about the right weight, or overweight) are coded as 0, 1, and 2 respectively. If the two sets of numbers matched, the student was categorized as having an accurate weight perception. If the number for weight perception was lower than the number for BMI-based weight status, the student was categorized as having an "underestimated" weight perception. If the number for weight perception was higher than the number for BMI-based weight status, the student was categorized as having an "overestimated" weight perception.

Those with an underestimated weight perception view themselves as thinner than they actually are. This group includes those who are overweight or obese but view themselves as being about the right weight or as underweight and those who have a healthy weight but view themselves as underweight. On the other hand, those with an overestimated weight perception perceive themselves as fatter than they actually are. This group includes the students who have a healthy weight but view themselves as overweight, as well as those who are underweight but view themselves as being about the right weight or as overweight.

Accuracy of weight perception by body weight status

	BMI-based body weight status			Total
Accuracy of weight perception	Underweight	Healthy weight	Overweight/ obese	
underestimated	0%	9.8%	40.7%	16.4%
accurate	48.1%	77.0%	59.3%	72.4%
overestimated	51.9%	13.2%	0%	11.2%

Note. By definition, underweight students cannot have an underestimated perception and overweight/obese students cannot have an overestimated perception.

[14] The overweight category in BMI-based body weight status was combined with obese category for this comparison.

Overall, 72.4% of students perceive their weight accurately, and more than a quarter have either an overestimated or underestimated weight perception: 11.2% think they are fatter and 16.4% think they are thinner than they actually are. Of students with an underestimated weight perception, a majority (52.9%) are those who are overweight or obese but think they are about the right weight. Of students with an overestimated weight perception, a vast majority (89.0%) are those who have a healthy weight but think they are overweight.

Students with a healthy weight are more likely than their unhealthy-weight counterparts to have an accurate weight perception: 77.0% of healthy-weight students, compared to 48.1% of underweight students and 59.3% of overweight students, have an accurate weight perception. The adjusted odds ratios for having an inaccurate body image are 3.599 ($p<.001$) for underweight student and 2.208 ($p<.001$) for overweight/obese students, in comparison to those with a healthy weight (see Appendix for detailed results of regression analyses).

Findings from multivariate analyses

In the rest of the report, the accuracy of weight perception is examined in relation to various socio-demographic factors, such as gender, grade, race/ethnicity and household income. Only the differences that were found statistically significant in multivariate analyses are discussed, and the relevant adjusted odds ratios are reported whenever feasible. The full results of regression analyses are reported in the Appendix.

Accuracy of weight perception by gender and grade

	Gender		Grade	
Accuracy of weight perception	Males	Females	9	12
underestimated	24.5%	8.5%	17.6%	14.8%
accurate	70.7%	74.1%	72.0%	73.0%
overestimated	4.8%	17.3%	10.4%	12.2%

When the accuracy of weight perception is examined across genders, a clear difference appears. Overall, females are more likely to have an accurate weight perception than males (74.1% vs. 70.7%). In addition, female students are more likely than male students to view themselves as fatter than they actually are: 17.3% of females vs. 4.8% of males have an overestimated weight perception (adjusted odds ratio=3.839, $p<.001$). On the other hand, male students are more likely than female students to view themselves as thinner than they actually are: 24.5% of males vs. 8.5% of females have an underestimated weight perception (adjusted odds ratio for female=.335, $p<.001$).

Compared to 9th graders, students in grade 12 are less likely to have an underestimated body image (14.8% vs. 17.6%; adjusted odds ratio=.827, $p<.001$) and more likely to have an overestimated weight perception (12.2% vs. 10.4%; adjusted odds ratio=1.194, $p<.001$). Similar patterns appeared when the analyses were conducted for each gender separately (see Appendix for detailed results of regression analyses).

The next table examines the accuracy of weight perception by race/ethnicity. Overall, minority students are more likely than whites to have an inaccurate (either underestimated or overestimated) weight perception: Adjusted odds ratios are 1.233 (p=.007) for American Indians, 1.154 (p=.001) for blacks, 1.132 (p= .010) for Hispanics, and 1.198 (p<.001) for Asian/Pacific Islanders.

Accuracy of weight perception by race/ethnicity and gender

		Race/ethnicity				
	Accuracy of weight perception	White	American Indian	Black	Hispanic	API
Male	Underestimated	23.8%	32.3%	30.5%	28.0%	24.5%
	Accurate	71.5%	61.6%	65.2%	66.5%	69.2%
	Overestimated	4.7%	6.1%	4.4%	5.5%	6.4%
	Total N	30,518	427	1,539	1,154	1,783
Female	Underestimated	7.5%	9.6%	18.7%	12.4%	9.9%
	Accurate	75.4%	71.5%	71.5%	69.2%	68.2%
	Overestimated	17.1%	18.9%	9.7%	18.4%	21.8%
	Total N	31,975	386	1,462	1,112	1,982

Among male students, American Indians (32.3%) and blacks (30.5%) are more likely than whites (23.8%) to have an underestimated weight perception (adjusted odds ratios are 1.345, p=.011 for AI; 1.397, p<.001 for black). A majority of those with an underestimated weight perception are overweight or obese students who think they are about the right weight. Among American Indian males with an underestimated weight perception, about 61% are overweight or obese but think they are about the right weight; 33% have a healthy weight but think they are underweight. Among black males with an underestimated weight perception, 56% of them are overweight or obese but think they are about the right weight; 41% have a healthy weight but think they are underweight.

While female students, in general, tend to have an overestimated than underestimated weight perception, a substantial proportion of female students view themselves as thinner than they actually are (the proportions range from 7.5% for white to 18.7% for black). Some minority females, such as black and Asian/Pacific Islander females, are more likely than their white counterparts to have an underestimated weight perception (adjusted odds ratios are 1.863, p<.001 for black; 1.262, p=.008 for API). Among black females with an underestimated weight perception, 64% are overweight or obese but think they are about the right weight, and 33% have a healthy weight but think they are underweight. Among API females with an underestimated weight perception, 28% are overweight or obese but think they are about the right weight, while 71% have a healthy weight but think they are underweight.

All of the minority students, with an exception of blacks, are more likely than whites to have an overestimated weight perception (adjusted odds ratios are 1.526, p<.001 for AI; 1.418, p<.001 for Hispanic; 1.424, p<.001 for API). Similar patterns appeared when the analyses were conducted for each gender separately. Almost three quarters (74%) of male

students with an overestimated weight perception are those who have a healthy weight but think they are overweight, and 23% are underweight but think they are about the right weight. A vast majority (93%) of female students with an overestimated weight perception have a healthy weight but think they are overweight. On the other hand, black females are less likely than white females to have an overestimated weight perception (9.7% vs. 17.1%; adjusted odds ratio=.601, p<.001).

Across all racial/ethnic groups, males are more likely to have an underestimated rather than overestimated weight perception while females are more likely to have an overestimated rather than underestimated weight perception. Blacks are the only exception to this general pattern. They are more likely to have an underestimated rather than overestimated weight perception regardless of gender (30.5% vs. 4.4% among males; 18.7% vs. 9.7% among females).

Finally, the accuracy of weight perception was examined in relation to household income. Overall, students from low-income households are more likely to have an inaccurate weight perception than their more affluent counterparts (adjusted odds ratio=1.105; p<.001). More specifically, students from low-income households are more likely than their more affluent counterparts to have an underestimated weight perception (27.5% vs. 23.8% among males; 12.4% vs. 7.5% among females). But the difference was only significant among females when other factors were controlled in multivariate analyses (adjusted odds ratios are 1.198, p<.001 for females; 1.013, p=.725 for males). Although there was only a small difference in the prevalence of an overestimated weight perception across low-income status (5.0% vs. 4.7% among males; 17.8% vs. 17.2% among females), when the other factors were controlled, the difference among female students turned out to be significant. That is, female students from low-income households are more likely to have an overestimated weight perception than the others (adjusted odds ratios are 1.289, p<.001 for females; 1.136, p=.076 for males).

Accuracy of weight perception by household income and gender

		Get a free/reduced-price lunch at school	
	Accuracy of weight perception	Yes	No
Male	underestimated	27.5%	23.8%
	accurate	67.5%	71.4%
	overestimated	5.0%	4.7%
Female	underestimated	12.4%	7.5%
	accurate	69.8%	75.3%
	overestimated	17.8%	17.2%

In summary, while the majority of Minnesota youth accurately perceive their weight a substantial proportion have an inaccurate weight perception, and some troubling patterns of overestimation and underestimation of current body weight were observed:

- Overall, males, minorities, those from low-income households, and those who are either underweight or overweight are more likely than their counterparts to have an inaccurate weight perception.
- Overestimation is more prevalent among females while underestimation is more prevalent among males.
- Compared to 9th graders, students in grade 12 are more likely to overestimate and less likely to underestimate their body weight.
- Black students (both genders), American Indian males, and Asian/Pacific Islander females are more likely than their white counterparts to have an underestimated weight perception.
- Minority students, with an exception of blacks, are more likely than their white counterparts to have an overestimated weight perception. Black females are less likely to have an overestimated weight perception than white females.
- Female students from low-income households are more likely than their more affluent counterparts to underestimate as well as overestimate their body weight.

Underestimating is problematic since, in many cases, it signifies that actual overweight is being ignored. The fact that underestimating is more prevalent among some of the minority students and those from low-income households is particularly of concern since there is a higher prevalence of obesity in those same groups. If minority youth or those from low-income households are more likely to underestimate their body weight, the already high prevalence of obesity among these groups is unlikely to decrease. An accurate perception of body weight is probably the first step toward a healthier lifestyle for an overweight youth.

While modest levels of body dissatisfaction may serve a functional role in motivating overweight youth to undertake healthier eating and physical activities, overestimating can also be a risk factor for unhealthy weight-control behaviors, such as fasting, smoking, purging, and using drugs. With a proliferation of web sites that provide blunt tips on crash dieting, bingeing, vomiting and hiding weight loss from concerned parents, the temptation for excessive and unhealthy dieting may be high especially for adolescents who are not happy with their current body weight. The heightened nationwide concern about childhood obesity may add more pressure on overweight adolescents and unwittingly increase their risk factor for unhealthy weight-control behaviors.

Weight perception is an important aspect of self-representation during adolescence.[15] For the overall well-being of our youth, it becomes even more critical, now than ever, to develop and nurture a "healthy" weight perception at younger ages by providing them with

[15] Middleman AB, Vazquez I, Durant R. Eating patterns, physical activity and attempts to change weight among adolescents. *J Adolesc Health* 1998; 22:37-42.

environments that promote acceptance of all body shapes. At the same time, parents, teachers, and health care providers should work together to help children and teens to have an accurate perception of their weight, as well as to have a more active lifestyle and healthier eating habits.

This report found that female students were more likely than male students to overestimate their body weight and consider themselves overweight regardless of their actual body weight status. It is possible that the gender difference is at least partially caused by the tendency of female students underreporting their weight. Since the BMI score used in this report is based on self-reported height and weight information, there is no way to examine this possibility. A similar gender difference in weight perception, however, was reported in a study of adolescents using directly measured weight and height information.[16] More studies with direct measures of BMI are needed to further illuminate the accuracy of weight perception that adolescents have about themselves.

[16] Strauss RS. Self-reported weight status and dieting in a cross-sectional sample of young adolescents: national Health and Nutrition Examination Survey III. *Arch Pediatr Adolesc Med* 1999; 153:741-747.

Appendix

Odds ratios from multivariate logistic regression for inaccurate weight perception

Dependent variable: Inaccurate weight perception[a]	
Independent variables (reference category)	N=75,964
Gender (male)	
Female	.910***
Grade (9th)	
12th grader	.967*
Race/ethnicity (white)	
American Indian	1.233**
Black	1.154**
Hispanic	1.132*
Asian/Pacific Islander	1.198***
Mixed	1.179***
Household income (high)	
Currently get free/reduced price lunch at school	1.105***
Residency (non-metro)	
Metro [b]	.992
BMI categories (healthy weight)	
Underweight	3.599***
Overweight	2.208***

* p<.05 ** p<.01 *** p<.001

[a] Dependent variable is coded as 1 for having an inaccurate weigh perception (either underestimated or overestimated) and 0 for having an accurate weigh perception.

[b] Metro area is defined as the seven metro counties (Hennepin, Ramsey, Anoka, Carver, Scott, Dakota, Washington), as well as Stearns and St. Louis counties.

Odds ratios from multivariate logistic regressions for overestimated weight perception

Dependent variable: Overestimated weight perception [a]			
Independent variables (reference category)	Total (n=53,691)	Males (n=23,133)	Females (n=30,558)
Gender (male)			
Female	3.839***		
Grade (9th)			
12th grader	1.194***	1.201**	1.191***
Race/ethnicity (white)			
American Indian	1.526***	1.681*	1.455**
Black	.680***	.926	.601***
Hispanic	1.418***	1.349*	1.425***
Asian/Pacific Islander	1.424***	1.534***	1.397***
Mixed	1.396***	1.013	1.503***
Household income (high)			
Currently get free/reduced price lunch at school	1.259***	1.136	1.289***
Residency (non-metro)			
Metro [b]	.916*	.902	.919**
BMI categories [c] (healthy weight)			
Underweight	8.268***	15.091***	4.567***

* p<.05 ** p<.01 *** p<.001

[a] Dependent variable is coded as 1 for having an overestimated weigh perception and 0 for having an accurate weigh perception.

[b] Metro area is defined as the seven metro counties (Hennepin, Ramsey, Anoka, Carver, Scott, Dakota, Washington), as well as Stearns and St. Louis counties.

[c] Those who are overweight or obese are excluded from the regression since they cannot have an overestimated weigh perception by definition.

Odds ratios from multivariate logistic regressions for underestimated weight perception

Dependent variable: Underestimated weight perception [a]			
Independent variables (reference category)	Total (n=66,611)	Males (n=34,782)	Females (n=31,829)
Gender (male)			
Female	.335***		
Grade (9th)			
12th grader	.827***	.939*	.624***
Race/ethnicity (white)			
American Indian	1.151	1.345*	.838
Black	1.550***	1.397***	1.863***
Hispanic	1.027	.982	1.140
Asian/Pacific Islander	1.048	.954	1.262**
Mixed	1.085	.999	1.240**
Household income (high)			
Currently get free/reduced price lunch at school	1.075*	1.013	1.198***
Residency (non-metro)			
Metro [b]	1.043	1.038	1.045
BMI categories [c] (healthy weight)			
Overweight	5.211***	5.572***	4.473***

* p<.05 ** p<.01 *** p<.001

[a] Dependent variable is coded as 1 for having an underestimated weigh perception and 0 for having an accurate weigh perception.

[b] Metro area is defined as the seven metro counties (Hennepin, Ramsey, Anoka, Carver, Scott, Dakota, Washington), as well as Stearns and St. Louis counties.

[c] Those who are underweight are excluded from the regression since they cannot have an underestimated weigh perception by definition.