ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 02, pp.1442-1452, February, 2019

DOI: https://doi.org/10.24941/ijcr.34486.02.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE RELATIONSHIP BETWEEN ADOLESCENT BODY IMAGE AND ADULT SUCCESS OUTCOMES

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ARTICLE INFO

Article History:
Received 05th November, 2018
Received in revised form
09th December, 2018
Accepted 19th January, 2019
Published online 28th February, 2019

Key Words:
Obesity,
BMI,
Adolescents,
Body Image.

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ABSTRACT

Introduction: Body weight perception refers to the personal evaluation of one's weight irrespective of actual BMI. Body perception does not always reflect reality and can be influenced by external factors. ***Methods:*** This paper explores the association between adolescents' body perception, demographic characteristics and residential location using both binary and multinomial logistic regressions regression analysis to assess 1) perception accuracy, 2) the association between demographic characteristics and perception accuracy and 3) the relationship between perception and residence. ***Results:*** Results showed that half of adolescents misestimate (either under or over categorize) their body weight and that discordant perception is more prevalent among men, the overweight, blacks, younger adolescents and those enrolled in school. The type of misestimation varies by residential location. Rural residents are less likely to overestimate their weight while suburban residents are more like to underestimate their body weight compared to urban residents. ***Discussion and Conclusion:*** By examining both overestimation and underestimation of body weight, this study identified trends in adolescent weight perception by region. Rural residents are less likely to over- and suburban residents are more like to over-estimate their body weight compared to urban dwellers. Both are problematic. Underestimation can signify that actual overweight is being ignored. Overestimation may motivate overweight youth to eat healthier and be more active but could encourage unhealthy weight control behaviors. Therefore, intervention programs should be careful to promote healthy weight and weight perception.

Citation: ***Molly M. Jacobs.*** **2019.** "The relationship between adolescent body image and adult success outcomes", *International Journal of Current Research*, 11, (02), 1442-1452.

INTRODUCTION

Body weight perception refers to the personal evaluation of one's weight as "underweight", "normal weight" or "overweight" irrespective of actual body mass index (BMI) (Tremblay, 2009; Cheung *et al*., 2007). However, one's perception does not always reflect reality (Sijtsema, 2003) and can be influenced by external factors including family, media, and advertisements (Gregory, 2008; Kim, 2007). Geographic location likely has an impact on self-perception because of varying environmental, social and media influences (Johnson, 1995). Peers or classmates could also potentially influence perception due to social influences (Kobus, 2003; Akers, 1998; Bandura, 1977; Oetting, 1998; Leinhardt, 1977; Ennett, 1993; Wasserman, 1994; Raudsepp, 2000; Unger *et al*., 2002; Vries, 2003). Weight perception influences individuals' weight concerns, or lack thereof (Felts *et al*., 1996; Reel *et al*., 2015). It can be positive motivating for healthy weight maintenance, exercise and diet (Baranowski *et al*., 2003) or negative leading to unhealthy thoughts, feelings or behaviors (Felts *et al*., 1996; Reel *et al*., 2015). Evidence suggests that perceived body weight is strongly correlated with body actual weight and emotional satisfaction/depression.

Literature on adolescent weight-perception suggests that regional differences also play a role in weight perception and in weight-management goals and practices (Simons-Morton *et al*., 2001). In general, individuals living in large cities seem to engage in better health-promoting behaviors (Flay *et al*., 1998). Findings on rural–urban differences in perception have been inconsistent (Paxton *et al*., 2004), showing variation in weight-related behaviors rather than one's view of own weight (Felton *et al*., 2002). To date, no studies have identified systematic perception tendencies among urban, suburban and rural adolescent males and females (Felts *et al*., 1996; Yost *et al*., 2010; Edwards *et al*., 2010; Chung *et al*., 2013; Fan,2015; Welch *et al*., 2004) using a nationally representative sample. As individuals begin to establish their self-image during the adolescent years, it is important to understand the role these external factors (Cole, 1996; Steinberg, 1993) play in body perception or misperception to gain a better understanding of adolescent health awareness and how to promote health (Felts *et al*., 1996; Calzo *et al*., 2012; Kuchler, 2003). Controlling for various sociodemographic, physical, environmental, behavioral and household characteristics, this study analyzes the differences in body misperception by residence and weight.

Using a nationally representative sample, data shows systematic patterns in under-, over- and accurate weight estimation among adolescents in urban, rural and suburban adolescents. This paper explores the association between adolescents' weight misperception, demographic characteristics and residential location. With the hypothesis that adolescents fail to correctly identify their we status, underestimating their weight and that misperceptions are larger among females, this study proceeds with a discussion of the current research on this topic in Section II. Section III describes the data and methodology, while Section IV outlines the empirical results. Finally, Section V outlines how these results could be used to shape policies and provides concluding remarks.

Background

Body perception research has typically been limited by 1) weight control behaviors focusing predominately to the effects of race/ethnicity and gender; 2) failure to control for objective weight status; and/or 3) a sample restricted to certain regions or group (Felts *et al*., 1996; Harris, 2013; Horm, 1993; Pritchard *et al*., 1977; Powell, 1995; Neff *et al*., 1997; Wilfley *et al*., 1996; Rucker, 1992; Dawson, 1988; Stevens**,** 1994). There is a great deal of literature concerning the relationship between adolescents' weight perception and their weight control strategies (Felts *et al*., 1996; Chung *et al*., 2013; Fan, 2015; Wong, 2009). Some studies indicate that adolescents who view themselves as being overweight are more likely to intend to lose weight but less likely to be physically active than those who perceive themselves as being normal weight (Yost *et al*., 2010; Fan, 2015). Others have found that perceiving oneself as overweight may be associated with more physical activity and greater tendency for extreme weight loss behavior than perceiving oneself as being normal weight (Wong, 2009). Studies are inconsistent in the behaviors and characteristics they find associated with overweight (Edwards *et al*., 2010), normal weight and underweight (Felts *et al*., 1996; Fan, 2015). Research suggests that body image and weight concerns are more important among females and they are more likely to try smoking, excessive exercise or diet restrictions to lose weight than males (Potter *et al*., 2004; French *et al*., 1995). Females also appear more susceptible than males to peer influences on health-related behaviors (Rand, 1990; Stephenson *et al*., 1987); however, males appear more likely to be influenced by risk-taking behaviors (French, 1995).

Previous studies note that self-perceived weight status is inadequately explained by actual body size (43-48). A sizable fraction of normal-weight individuals attempts or desire weight loss, while an equally notable fraction of overweight people are not (Rand, 1996; Stephenson *et al*., 1987; Forman *et al*., 1986; Strauss, 1999; Serdula, 1993; Jeffery *et al*., 1984; Williamson *et al*., 1992; Bennett, 1991; Levy, 1993). Self-evaluation of weight status, however, is not simply an autonomous, individual response; it is likely subject to social patterning and environmental influences. Attitudes toward body size and preferences for distinct levels of fatness are mediated by local social and cultural factors, and perceptions may vary in predictable ways among population subgroups (Fitzgibbon *et al*., 2000). This work improves on previous studies in several ways. First, this study adjusts for a broad range of sociodemographic factors including race/ethnicity, household income and age. Second, Add Health data consists of a nationally representative sample of adolescents and measures weight at various intervals throughout their development. Since BMI is interpreted as a percentile for individuals below 20 and as a raw value for those above 20, this study incorporates the appropriate BMI-age standard and utilizes the categorical measure in the estimation function. Additionally, various statistical tools from X^2 statistics to ANOVA to multinomial logistics regressions tested these relationships and all showed consistent findings. Finally, care was taken to normalize the BMI distribution, reducing any potential bias due to under- or over-reporting at BMI extremes (Nawaz *et al*., 2000; Kuskowska-Wolk *et al*., 1989). Given the inconsistent and sparse evidence on the relationship between weight perception and exogeneous influences, it is important to understand any misperception bias in relation to residential location.

MATERIALS AND METHODS

This study compares weight misperception of urban, rural and suburban adolescents using four waves from the National Longitudinal Study of Adolescent to Adult Health (Add Health)—a nationally representative sample of adolescents age 10 to 19 years old. These four waves were collect in 1994-1995, 1996, 2001-2002 and 2008. Respondents were surveyed in their homes to collect data on respondents' social, economic, psychological and physical well-being with contextual data on the family, neighborhood, community, school, and relationships, providing a unique opportunity to assesshow urban, rural and suburban respondents systematically underestimate, accurately estimate of overestimate their weight status. All waves include in-home interviews as well as contextual variables on income and poverty, unemployment, availability and utilization of health services, crime, church membership, and social programs and policies. Add Health was created to help research the causes of adolescent health and health behavior with a special emphasis on the effects of multiple contexts of adolescent life (Harris, 2013). Basic demographic characteristics—gender, age, race, ethnicity, height and weight—were obtained in all waves. Age is listed as the age in years at the time the survey was conducted. Respondents self-classify their race and ethnicity. For this analysis two dummy variables—black and Hispanic—capture between 18 and 13 percent, respectively, of the sample. Household income measures total income, pre-tax income in 1995 including income, income of everyone else in the household, and income from welfare benefits, dividends, and all other sources. This was obtained from the parental questionnaire and translated into a dummy variable equaling 1 if income is greater than $700 and zero if otherwise. Respondents report whether they are currently enrolled in school or, if the interview is conducted during the summer, whether they were enrolled in school in the past school year. They are also asked to classify their weight as very underweight, slightly underweight, normal weight, slightly overweight or very overweight. This item is used as the measure of weight perception. For this analysis, the two underweight categories—very underweight and slightly underweight—are combined into one group. Interviewers characterized the immediate area or street where respondent lives as rural, suburban, urban- mostly residential, urban- 3 or more commercial properties, mostly retail or urban- 3 or more commercial properties, mostly wholesale or industrial. All the urban classifications are combined into onegroup. Self-reported height and weight were used to calculate BMI. BMI was used to place all respondents into BMI categories—underweight, normal weight, overweight and obese.

For respondents age 19 and below, BMI percentiles were used to place individuals into weight categories. BMI percentiles, developed by the Centers for Disease Control and Prevention, assign each respondent a percentile ranking based on their stature compared to others on of the same age using gender-specific BMI-for-age growth charts. Respondents are categorized based on their BMI score. The corresponding categories are listed in Table I. Categories, rather than BMI values, were used to classify individuals. Table II list the mean and frequency distributions for BMI category, weight perception and demographic variables for men and women, which are listed separately. Forty to 50 percent, of men and women perceive their weight as normal and a slightly smaller proportion, 30 to 40 percent, perceive overweight. There are relatively few who see themselves are underweight orobese. Interestingly, more females than males perceive themselves and overweight and nearly 10 percent of females perceive themselves as obese.

These percentages differ largely from the actual BMI categories which show that about twenty percent of the sample is obese and 20 to 25 percent are overweight. Both gender drastically underestimate their true weight particularly males. About one-third are self-designated as black or Hispanic and less than 15 percent are from high income households. Most respondents, 60 percent, are enrolled in school. Less than half of males and females live in urban areas, while 25 percent reside in rural towns and about a quarter in the suburbs. Age is represented as the age in the first sample, Wave I, and range from 10 to 19. Table III provides correlation coefficients between misperception and all demographic and lifestyle covariates. Misperception is highly, positively correlated with BMI, age, residence and being black or Hispanic. Positive correlation would denote a higher likelihood of either over or underestimating one's weight. It is negatively correlated with school enrollment, indicating that those enrolled in school are more likely to accurately classify their body weight. Table IV list the percentage of residential groups that under, over and accurately estimate their body size. Fifty to sixty percent of males and females respectively perceive their body size. The remaining fifty percent either over or underestimates their body size. Females tend to underestimate body size and males overestimate.

It is difficult to discern distinct differences in perception among rural, urban and suburban youth. Suburban residents appear to have the highest frequency of underestimation and urban residents the highest rate of overestimation. These frequencies suggestion systematic differences in perception accuracy among residential locations. This study uses regression analysis toassess 1) adolescent perception accuracy, 2) the association between demographic characteristics and perception accuracy and 3) the relationship between misperception and residence. The first estimation model, a binary logistic regression, explores whether adolescents accurately assess their body weight and the contributors. The second model, a multinomial logistic regression,evaluates the difference between over-, under- and accurate weight estimation and what leads to these to these types of weight discordance. To test for different behavior along the BMI distribution, both models were run on the full sample then separately on overweight/obese respondents and normal/underweight respondents. SAS 9.4 (SAS Institute Inc, Cary, North Carolina) was used to carry out the statistical analyses.

RESULTS

Table V lists results from binary logistic regression. The dependent variable measures whether perception aligns with BMI category, assuming a value of one if they are discordant and zero if they are concordant. Age, being overweight, school enrollment, gender and residence are significant. By taking the exponential of the coefficient, the estimate can then be interpreted as the impact of the independent variable on the log-odds. Using this simple conversion, results show that males have a higher probably of discordant perception as do those who are overweight and enrolled in school. Older respondents are less likely to be discordant suggesting that ability to assess one's weight increases with age. Estimates also test whether urban, rural and suburban residence impacts weight discordance. Compared to the urban reference category, suburban residents appear more like to view their weight inaccurately. These results provide some insight into adolescent body perception, but do not provide information into the type of weight discordance. Therefore, the second set of results, listed in Table VI, include a multinomial logistic model. The dependent variable assumes a value of one for overestimation, zero for accurate estimation and negative one for underestimation. Accurate weight estimation serves as the reference category. Results are relatively consistent with those presented above. Age, overweight, school enrollment, gender and residence continue to be deterministic, but black and Hispanic also emerge as significant. Coefficients model the probability of over and underestimating body weight relative to accurately estimating—the reference category.The exponential of the estimate represents the impact of the independent variable on the log-odds of under or over estimating their body weight.

Overweight respondents are less likely to underestimate and more likely to overestimate their body size. Bivariate logit results showed that older respondents were less likely to experience perception discordance. These multinomial estimates showed that younger respondents are twice as likely to perceive themselves overweight as older ones. Those enrolled in school are less likely to underestimate and males are three times more likely to overestimate their weight than females. Blacks are twice as likely to overestimate their body size, while Hispanics underestimate, compared to other groups. In the earlier specification, suburban residents were distinctly different, but rural residents were not. When the type of discordance is disaggregated, both residential categories show distinctively different behavior. Rural residents are less likely than urban residents to overestimate their weight while suburban residents are more likely to underestimate their body weight. These results are supported by mean analysis presented earlier showing that a substantial proportion of urban residents who overestimate, rural residents accurately estimate, and suburban residents underestimate their body weight. Research shows that the sociodemographic factors working in urban and rural areas manifest distinctly differently and could contribute to varying self-views (Weber *et al*., 2018). Not only do adolescents in different residential locations have varying lifestyles, but they also hold different body size ideals (Okop *et al*., 2016). While distinct regional differences in perception accuracy exist among the full sample, it is important to test whether these results vary along the BMI distribution. To check for discontinuity, the sample was divided into two groups—overweight and normal weight. Regression analysis was repeated on the two groups.

Table 1. BMI Categorical Classification

Weight Status Category	Percentile	BMI
Age	>=2,<=19	>=20
Underweight	<5th	<18.5
Normal or Healthy Weight	>=5th, <85th	>=18.5, <25
Overweight	>=85th, <95th	>=25, <30
Obese	>=95th	>=30

Table 2. Sociodemographic Characteristics Means and Frequencies

Sociodemographic Characteristics Means and Frequencies				
	N	Percent	N	Percent
	Male		Female	
Perception				
Underweight	780	18.3896	462	8.0903
Normal Weight	2116	49.2663	2385	43.2121
Overweight	1209	28.7461	2111	39.3268
Obese	154	3.598	516	9.3708
BMI Category				
Underweight	70	1.7706	493	9.25
Normal Weight	2331	52.2787	2967	54.1562
Overweight	1054	24.824	1054	19.2456
Obese	904	21.1267	955	17.3483
Race/Ethnicity				
Black	861	13.3829	1432	16.9116
Hispanic	517	13.9563	608	13.8332
High Income	571	13.9593	673	13.9945
In School	2667	62.6825	3549	63.9675
Exercise				
Never	963	27.8697	792	17.2721
1 or 2 times	977	27.7174	1624	34.7213
3 or 4 times	671	19.0609	1115	23.8687
5 or more times	891	25.352	1173	24.1378
Residence				
Rural	704	23.0201	936	23.9239
Suburban	984	32.5283	1140	29.0782
Urban	3037	44.4516	1848	46.9979

Descriptive Statistics of Demographic Variables			
Variable	Mean	Min	Max
Male			
Age Wave I	14.8689327	10	19
TV	15.5872681	0	998
Female			
Age Wave I	14.6791339	11	19
TV	14.5111084	0	998

Table 3. Male and Female Correlation Coefficients

Male and Female Correlation Coefficients									
Prob > |r| under H0: Rho=0									
Number of Observations									
	BMI	Age	In School	Residence	Exercise	Black	Hispanic	TV	High Income
Misperception	Male								
	0.35786	0.29549	-0.22289	0.08998	-0.07686	0.06808	-0.04021	-0.02565	-0.00112
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0138	0.095	0.9469
	4258	4258	4255	3036	3501	4258	3748	4240	3513
	Female								
	0.39659	0.22481	-0.19357	0.12019	-0.02731	0.15183	0.03297	0.05128	-0.04508
	<.0001	<.0001	<.0001	<.0001	0.0612	<.0001	0.023	0.0002	0.003
	5469	5469	5468	3921	4699	5469	4752	5452	4320

Table 4. Residence and Misperception Distributions

Residence and Misperception Distributions			
Row Pct	**Misperception**		
Col Pct	**Underestimate**	**Accurately Estimate**	**Overestimate**
Male			
Rural	10.16	58.28	31.56
	25.51	24.37	20.73
Suburban	11.21	58.21	30.58
	38.48	33.29	27.46
Urban	7.38	52.07	40.56
	36.01	42.34	51.8
Female			
Rural	29.02	58.32	12.66
	27.22	22.83	18.96
Suburban	29.15	58.23	12.62
	34.96	29.15	24.16
Urban	20.06	61.04	18.91
	37.81	48.02	56.88

Table 5. Logit of Misperception on Residence and Demographic Characteristics

Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: ALL BMI GROUPS			
Misperception		**N**	
Accurately Estimate		2853	
Discordant		2071	
Test		F Value	
Wald Test of Homogeneity		7.04***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	35979455	35440665	
SC	35979470	35440816	
-2 Log L	35979453	35440645	
Likelihood Ratio	51411.2		
Analysis of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	4.94**	1	122
Overweight	15.88***	1	122
In School	9.28**	1	122
High Income	1.21	1	122
Male	7.03**	1	122
Black	0.72	1	122
Hispanic	0.61	1	122
Residence	4.02**	2	121
Analysis of Maximum Likelihood Estimates			
Parameter		Estimate	Std Err
Intercept		-1.2885***	0.3724
Overweight		0.0579**	0.0261
In School		0.3611***	0.0906
Age		-0.2758***	0.0905
High Income		-0.1132	0.1028
Male		0.1969***	0.0742
Black		0.0791	0.0934
Hispanic		0.0792	0.1017
Rural Residence		0.107	0.089
Suburban Residence		0.2271***	0.0798
Dependent Variable: 1→ Perception≠BMI Category, 0→Perception=BMI Category Significance: ***=99%, **=95%, *=90%			

Table 6. Multinomial Logit of Misperception on Residence and Demographic Characteristics

Multinomial Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: ALL BMI GROUPS			
Misperception		N	
Underestimate		903	
Accurately Estimate		2853	
Overestimate		1168	
Test		F Value	
Wald Test of Homogeneity		42.17***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	51186850	42384256	
SC	51186881	42384558	
-2 Log L	51186846	42384216	
Likelihood Ratio	415164		
Analysi of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	17.3***	2	121
Overweight	176.97***	2	121
In School	12.11***	2	121
High Income	1.46	2	121
Sex	129.47***	2	121
Black	22.96***	2	121
Hispanic	2.71*	2	121
Residence	2.53**	4	119
Analysis of Maximum Likelihood Estimates			
Parameter	Misperception	Estimate	Std Err
Intercept	Underestimate	0.3684	0.4985
Intercept	Overestimate	-4.4901***	0.4591
Overweight	Underestimate	-0.0714**	0.0354
Overweight	Overestimate	0.1563***	0.031
In School	Underestimate	-2.226***	0.2091
In School	Overestimate	1.5781***	0.1128
Age	Underestimate	0.0866	0.1687
Age	Overestimate	-0.5033***	0.1046
High Income	Underestimate	-0.2377**	0.1387
High Income	Overestimate	-0.014	0.1461
Sex	Underestimate	-0.9336***	0.1137
Sex	Overestimate	1.2433***	0.0888
Black	Underestimate	-0.4776***	0.1389
Black	Overestimate	0.5591***	0.1113
Hispanic	Underestimate	0.3404**	0.1534
Hispanic	Overestimate	-0.0951	0.1336
Rural Residence	Underestimate	0.1943	0.1377
RuralResidence	Overestimate	-0.0116*	0.1098
Suburban Residence	Underestimate	0.2994***	0.1029
Suburban Residence	Overestimate	0.1568	0.1147
Significance: ***=99%, **=95%, *=90% Dependent Variable: -1=Underestimation, 0=Accurate Estimation, 1=Overestimation			

Results from the bivariate logit can be found in Appendix I and results from the multinomial logit are listed in Appendix II. In the binary logit of discordance, coefficient for age, sex, race, ethnicity and school enrollment remain significant and consistent among the normal and overweight groups. Normal weight suburban adolescents and overweight rural adolescents are more likely to be discordant. While rural was not significant in the previous specification, these results are consistent with the multinomial estimates that shows both rural and suburban differentials. In the multinomial logit of estimation accuracy, gender, age, overweight, school enrollment, race and ethnicity continue to be deterministic and the impacts remain similar. Both rural and suburban residents continue to misestimate weight on both the normal and overweight sample compared to urban residents. Magnitudes of the differences vary slightly in the subdivided samples, but the absence of any notable differences between the two groups suggests that the systematic differencesin body perception among rural and suburban residents, are robust to BMI level. Therefore, results persist throughout the BMI distribution.

While insightful, the findings in this study are subject to some limitations. All height and weight data are self-reported. Evidence shows that women tend to underreport their weight more than males (Sherry *et al*., 2007). Additionally, the weight perception reported by females may also suffer from a tendency to underreport. Similar gender differences were found in the US National Health and Nutrition Examination Survey when comparing reported to measured weight and height information (Strauss, 1999). Not only is height and weight data subject to reporting, but BMI is also a subpar indicator of body fat composition since different subpopulations may have different tissue densities. A high BMI could be mistakenly classified as overweight if it belongs to an active, muscular individual with a high, lean body mass (Daniels *et al*., 1997; Viner *et al*., 2006). While the findings of this study shed light on adolescent body perception accuracy, more research utilizing measured height and body weight comparisons are needed to fully understand adolescents' weight perception. Another limitation of this study is the fact that interviews were conducted verbally. When asked about body weight in a verbal interview, respondents could experience a tendency to report answers that sound more pleasing or favorable.

DISCUSSION AND CONCLUSION

This study utilizes a measure of body perception that focuses accuracy relative to actual BMI. Over or under estimation was identified by comparing calculated BMI categories to reported body size. By examining both overestimation and underestimation of body weight, this study identified trends in adolescent weight perception more precisely than previous analyses. Results showed that the misestimation of body size was common among all ages, weights, races, ethnicities and socio-demographic levels. Nearly half of adolescents misestimate their body weight and that discordant perception is more prevalent among men, blacks, younger adolescents, those enrolled in school and overweight individuals. The type of discordance or misestimation varies by residential locations. The findings show that rural residents are less likely than urban residents to overestimate their weight while suburban residents are more like to underestimate their body weight (Bergström *et al*., 2000). Males were three times more likely to overestimate their weight status than females. Blacks overestimated their weight, but Hispanics showed a tendency to underestimate. Underestimation is problematic because it can signify that actual overweight is being ignored. The fact that underestimation is more prevalent with suburban residents and some minorities are of special concern as there is a higher prevalence of obesity in those same groups (Lutfiyya *et al*., 2007). If underestimation negatively affects the efficacy of obesity intervention efforts, such patterns of underestimation across subgroups may increase the current disparities in the prevalence of obesity among subgroups. On the other hand, blacks, rural residents and overweight residents, were more likely to overestimate their body weight. While body dissatisfaction may motivate overweight youth to eat healthier,if body composition does not change rapidly, they may turn to steroid use, over exercising, fasting, smoking, purging and fad diets to achieve results more quickly (Striegel-Moore *et al*., 2001; Martz *et al*., 1995). The public health concern about obesity may increase the proclivity for risky weight-related behaviors. Perception integrates both a body image ideal and a situation norm capturing how one feels in relation to both the ideal and the norm. While the population is coming increasingly more overweight, the images displayed in the media are increasingly unattainable. At a time when adolescents are still growing both physically and mentally, it is becoming increasingly more difficult to reconcile what is both biologically healthy and visually pleasing. As self-image continues to develop, it is important that weight perception form an accurate estimation of weight and size. Both over and underestimation of body weight, can lead to unhealthy behaviors, situations and ideas.

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Appendix I

Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: NORMAL WEIGHT			
Misperception		N	
Accurately Estimate		1982	
Discordant		1218	
Test		F Value	
Wald Test of Homogeneity		2.55***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	22842457	22665165	
SC	22842471	22665297	
-2 Log L	22842455	22665147	
Likelihood Ratio	18396.8		
Analysis of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	2.46	1	122
In School	1.04	1	122
High Income	3.33*	1	122
Male	4.43**	1	122
Black	3.66**	1	122
Hispanic	1.39	1	122
Residence	4.73**	2	121
Analysis of Maximum Likelihood Estimates			
Parameter		Estimate	Std Err
Intercept		-1.0194**	0.4711
In School		0.0505	0.0322
Age		-0.1476	0.1448
High Income		-0.2366*	0.1298
Male		-0.2058**	0.0977
Black		-0.2264**	0.1183
Hispanic		0.1849	0.1569
RuralResidence		-0.0129	0.1122
Suburban Residence		0.2376**	0.0877
Dependent Variable: 1→ Perception≠BMI Category, 0→Perception=BMI Category **Significance: ***=99%, **=95%, *=90%**			

Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: OVERWEIGHT			
Misperception		N	
Accurately Estimate		871	
Discordant		853	
Test		F Value	
Wald Test of Homogeneity		12.9***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	12823836	12115383	
SC	12823850	12115510	
-2 Log L	12823834	12115365	
Likelihood Ratio	83036.1		
Analysis of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	2.35	1	119
In School	15.46***	1	119
High Income	0.48	1	119
Male	80***	1	119
Black	19.19***	1	119
Hispanic	0.1	1	119
Residence	2.98**	2	118
Analysis of Maximum Likelihood Estimates			
Parameter		Estimate	Std Err
Intercept		-1.4444**	0.5749
In School		0.0607	0.0396
Age		-0.4449***	0.1132
High Income		0.1285	0.1847
Male		0.9852***	0.1102
Black		0.7284***	0.1663
Hispanic		-0.0564	0.1787
Rural Residence		0.3408**	0.1395
Suburban Residence		0.153	0.1541
Dependent Variable: 1→ Perception≠BMI Category, 0→Perception=BMI Category Significance: ***=99%, **=95%, *=90%			

Appendix II

Multinomial Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: Normal Weight			
Misperception		N	
Underestimate		855	
Accurately Estimate		1982	
Overestimate		363	
Test		F Value	
Wald Test of Homogeneity		13.37***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	30835753	28477582	
SC	30835782	28477846	
-2 Log L	30835749	28477546	
Likelihood Ratio	121604		
Analysis of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	25.35***	2	121
In School	4.41**	2	121
High Income	1.91	2	121
Male	73.49***	2	121
Black	7.13***	2	121
Hispanic	3.46**	2	121
Residence	4.12***	4	119
Analysis of Maximum Likelihood Estimates			
Parameter	Misperception	Estimate	Std Err
Intercept	Underestimate	0.477	0.5292
Intercept	Overestimate	-6.9598***	0.8222
Age	Underestimate	-0.0775**	0.0376
Age	Overestimate	0.3277***	0.0522
In School	Underestimate	0.0533	0.1851
In School	Overestimate	-0.5042**	0.1832
High Income	Underestimate	-0.2691*	0.1464
High Income	Overestimate	-0.2241	0.21
Male	Underestimate	-0.8852***	0.1159
Male	Overestimate	1.506***	0.1722
Black	Underestimate	-0.4997***	0.1433
Black	Overestimate	0.1771	0.1938
Hispanic	Underestimate	0.3606**	0.1721
Hispanic	Overestimate	-0.2784	0.2637
Rural Residence	Underestimate	0.1265	0.1406
RuralResidence	Overestimate	-0.4294***	0.1984
Suburban Residence	Underestimate	0.3162***	0.1068
Suburban Residence	Overestimate	0.071	0.1668
Significance: ***=99%, **=95%, *=90% Dependent Variable: -1=Underestimation, 0=Accurate Estimation, 1=Overestimation			

Multinomial Logit of Misperception on Residence and Demographic Characteristics			
Response Profile: Overweight			
Misperception		N	
Underestimate		48	
Accurately Estimate		871	
Overestimate		805	
Test		F Value	
Wald Test of Homogeneity		9.51***	
Model Fit Statistics			
Criterion	Intercept Only	Intercept and Covariates	
AIC	14629133	13497022	
SC	14629161	13497275	
-2 Log L	14629129	13496986	
Likelihood Ratio	63639.1		
Analysis of Covariate Model Fit			
Effect	F Value	Num DF	Den DF
Age	2.86*	2	118
In School	9.54***	2	118
High Income	0.23	2	118
Male	63.8***	2	118
Black	12.49***	2	118
Hispanic	0.05	2	118
Residence	2.26*	4	116

Continue ……..

Analysis of Maximum Likelihood Estimates			
Parameter	Misperception	Estimate	Std Err
Intercept	Underestimate	-6.7449***	1.8868
Intercept	Overestimate	-1.3819**	0.5832
Age	Underestimate	0.2676**	0.1181
Age	Overestimate	0.0466	0.0407
In School	Underestimate	0.3226	0.3915
In School	Overestimate	-0.493***	0.116
High Income	Underestimate	0.162	0.5504
High Income	Overestimate	0.1255	0.1872
Male	Underestimate	-1.8012***	0.5274
Male	Overestimate	1.1376***	0.1111
Black	Underestimate	-0.8538	0.6949
Black	Overestimate	0.8237***	0.1725
Hispanic	Underestimate	-0.0609	0.4908
Hispanic	Overestimate	-0.0546	0.1833
Rural Residence	Underestimate	0.7279**	0.3549
RuralResidence	Overestimate	0.296**	0.1415
Suburban Residence	Underestimate	-0.1574	0.441
Suburban Residence	Overestimate	0.1728	0.1592
Significance: ***=99%, **=95%, *=90% Dependent Variable: -1=Underestimation, 0=Accurate Estimation, 1=Overestimation			

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