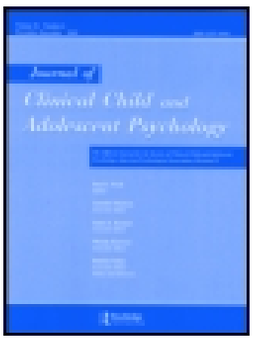

Routledge
Taylor & Francis Group

Journal of Clinical Child & Adolescent Psychology

ISSN: 1537-4416 (Print) 1537-4424 (Online) Journal homepage: http://www.tandfonline.com/loi/hcap20

Emotional Implications of Weight Stigma Across Middle School: The Role of Weight-Based Peer Discrimination

Jaana Juvonen, Leah M. Lessard, Hannah L. Schacter & Luisana Suchilt

To cite this article: Jaana Juvonen, Leah M. Lessard, Hannah L. Schacter & Luisana Suchilt (2016): Emotional Implications of Weight Stigma Across Middle School: The Role of Weight-Based Peer Discrimination, Journal of Clinical Child & Adolescent Psychology, DOI: 10.1080/15374416.2016.1188703

To link to this article: http://dx.doi.org/10.1080/15374416.2016.1188703

Journal of Clinical Child & Adolescent Psychology, 00(00), 1–9, 2016

ISSN: 1537-4416 print/1537-4424 online
DOI: 10.1080/15374416.2016.1188703

Routledge
Taylor & Francis Group

Emotional Implications of Weight Stigma Across Middle School: The Role of Weight-Based Peer Discrimination

Jaana Juvonen, Leah M. Lessard, Hannah L. Schacter, and Luisana Suchilt
Department of Psychology, University of California, Los Angeles

This study considered the emotional consequences of weight stigmatization in early adolescence by examining the effects of weight-based peer discrimination across middle school. Sampled across 26 urban middle schools, 5,128 youth (52% girls) with complete body mass index data at sixth or 7th grade were included: 30% Latino, 21% White, 14% East/Southeast Asian, 14% Multiethnic, 12% African American/Black, and 9% from other specific ethnic groups. About one third of the sample reported at least one weight-discrimination incident at 7th grade. Controlling for sixth-grade adjustment, perceptions of weight-based peer discrimination at 7th grade were stronger predictors of body dissatisfaction, social anxiety, and loneliness (and somatic symptoms for girls but not boys) at 8th-grade than 7th-grade body mass index. Moreover, heavier body stature during the 1st year in middle school was associated with increased body dissatisfaction by the end of middle school in part due to weight-related disrespectful, exclusionary, and demeaning treatment by peers. Weight-based peer discrimination helps us understand one of the stigmatizing mechanisms underlying the relation between heavy body stature and the progression of emotional problems in early adolescence.

Despite obesity rates tripling among youth since the mid-1990s (Gordon-Larsen, The, & Adair, 2010), there is no evidence that heavy weight has become less stigmatized. A comprehensive review of studies conducted across the past two decades indicated consistently that youth with heavier weight (overweight or obese) negatively stereotyped, are socially marginalized by their peers, and exhibit more negative self-views, as well as increased depression, compared to peers with normal weight (Puhl & Latner, 2007). Dissatisfied with their bodies, adolescents whose weight exceeds normal weight are also at elevated risk for eating problems (Neumark-Sztainer, Croll, et al., 2002). Given the persistence of obesity in adolescence into adulthood (Freedman et al., 2002) and that psychological problems tend to promote poor health habits (Tomiyama, 2014), it is critical to understand factors contributing to the psychological problems associated with heavy weight over time. We focus here on the emotional effects of perceived weight-based peer discrimination across 3 years of middle school.

Although children with obesity are less liked and more rejected by their peers than normal-weight classmates starting in elementary school (C. C. Strauss, Smith, Frame, & Forehand, 1985), heavy stature is a particularly salient and consequential social stigma in early adolescence for several reasons. Concerns of peer approval are heightened (LaFontana & Cillessen, 2010), and appearance norms become increasingly important for youth during the onset of puberty (Tremblay & Lariviere, 2009). Although worries about peer approval intensify as youth transition from elementary school to middle school because they need to reestablish their social networks (Juvonen, 2007), "fitting in" might be particularly challenging for youth with heavy weight, as social status is related to physical appearance in early adolescence (Adler & Adler, 1998; Harter, 1993).

A number of studies suggest that the mental health problems of youth with heavy weight are related to the ridicule, disrespect, and exclusion they often experience at the hands of their peers. Youth with obesity and overweight are at an elevated risk for being bullied (Janssen, Craig, Boyce, & Pickett, 2004; Lumeng et al., 2010) and

Correspondence should be addressed to Jaana Juvonen, University of California, Los Angeles, Psychology, 502 Portola Place, Los Angeles, CA 90095. E-mail: juvonen@psych.ucla.edu

social marginalization in school (R. S. Strauss & Pollack, 2003). Weight-based peer mistreatment, in turn, is concurrently associated with lower self-esteem and elevated depression, over and above actual weight (i.e., body mass index [BMI]; Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006; Eisenberg, Neumark-Sztainer, & Story, 2003). These findings are consistent with recent research on adults suggesting that higher BMI is indirectly related to concurrent psychological and physical health through perceived weight discrimination (Hunger & Major, 2015; Rosenthal et al., 2015). The latest evidence on adults also suggests that weight discrimination might be an even more potent predictor of health than other attributions for discrimination (Sutin, Stephan, & Terracciano, 2015).

Although adjustment problems, including body dissatisfaction, low self-esteem, and increased depression, are concurrently related to weight-based peer mistreatment, longitudinal evidence is limited. For example, we could not find a study in which BMI and weight-based peer discrimination are measured simultaneously to predict subsequent psychological adjustment when controlling for earlier levels of adjustment. By comparing the relative effects of concurrent BMI and weight-based mistreatment on changes in emotional adjustment, we can learn whether youth with higher BMI come to feel worse about themselves because of their weight, peer mistreatment, or both. We are particularly interested in extending past research on weight discrimination and adolescent well-being to study changes in social emotions, including social anxiety and loneliness. If youth are concerned about being rejected by their peers and feeling isolated, they may actively withdraw from social events and situations at the developmental phase when peer affiliations serve vital developmental functions (Blakemore & Mills, 2014). It is particularly important to study indicators of social anxiety and loneliness in light of evidence suggesting that social isolation from peers in early adolescence is related to greater physical health problems by early adulthood (Allen, Uchino, & Hafen, 2015). We presumed that weight-related peer mistreatment would help account for the association between earlier BMI and subsequent body dissatisfaction, loneliness, social anxiety, and somatic problems. Although some mediational models have been tested over time (Eisenberg et al., 2006; Rosenthal et al., 2015), they have been limited to two times points. A more rigorous statistical approach would establish temporal precedence of such processes by examining hypothesized predictors, mediators, and outcomes at three distinct time points (e.g., Chmura Kraemer, Kiernan, Essex, & Kupfer, 2008).

CURRENT STUDY

Two main goals guide the current study. First, we test the relative effects of simultaneously assessed BMI and weight-based peer discrimination (at seventh grade) on increased emotional problems between sixth and eighth grade. Such analyses are important before examining whether BMI during the first year in middle school (i.e., sixth grade) is indirectly related to emotional problems by the end of middle school through perceived weight-based peer discrimination at the seventh grade. Although the first set of analyses enables us to gauge whether weight-based peer discrimination predicts emotional problems over and above concurrent BMI the latter examine the processes by which earlier BMI is linked with subsequent discrimination and, in turn, changes in indicators of emotional distress. We hypothesized that higher BMI in the beginning of middle school increases the risk of weight-based peer discrimination by seventh grade, which in turn predicts increased emotional distress between the first and final year of middle school (i.e., eighth-grade distress when controlling for sixth-grade baseline).

This study extends prior research in several ways. First, by controlling for initial levels of emotional adjustment, our analyses provide a methodologically rigorous test of the indirect effects of BMI on changes in emotional adjustment between the first and last year of middle school. Second, in addition to assessing body dissatisfaction, we focus on less frequently examined emotional indicators (social anxiety, loneliness, somatic symptoms) that are highly relevant to understanding both short- and long-term effects on physical health (Allen et al., 2015). Third, we rely on a newly developed four-item measure of weight-based peer discrimination based on the Adolescent Discrimination Distress Index (Fisher, Wallace, & Fenton, 2000) rather than a general measure of peer victimization to gauge the degree to which youth attribute multiple forms of peer mistreatment specifically to their weight. Fourth, consistent with research demonstrating stronger associations between weight-based peer victimization and emotional adjustment among girls than boys (Puhl & Luedicke, 2012), we examine whether weight-based peer discrimination and social-emotional adjustment vary by sex. Finally, by relying on a large ethnically diverse public school sample, our goal is to obtain findings generalizable across a wide range of demographic groups.

METHOD

The current study relies on data from a larger, longitudinal study of youth recruited from 26 public middle schools in California that varied systematically in ethnic composition (N = 5,991). Our analytic sample consisted of 5,128 adolescents (52% girls) with complete BMI data at sixth or seventh grade (4,485 at sixth grade and 4,322 adolescents at seventh grade). The sixth-grade sample overlaps with a sample of girls (n = 2,636) used by Lanza, Echols, and Graham (2013) to

examine sample-based ethnic BMI norms. The ethnic distribution for our analytic sample was 30% Latino, 21% White, 14% East/Southeast Asian, 14% Multiethnic, 12% African American/Black, and 9% from other specific ethnic groups.

Procedure

The study was approved by the relevant Institutional Review Board and school districts. All eligible sixth-grade students and families received informed consent and informational letters. To increase the return rates of parental consent forms, two $50 gift cards were raffled in each school for those students who returned a consent form, regardless of parental permission to partake in the study. In addition, two iPods were raffled among study participants. Parental consent rates averaged 81% across the schools.

We rely here on data collected in the spring of sixth (demographics, BMI, and emotional health), seventh (BMI and weight-based peer discrimination), and eighth (emotional health) grades. Data collection was conducted in schools. Surveys were read aloud in each classroom by trained researchers, and students received $5 in the spring of sixth grade and $10 in seventh and eighth grades for completion of the surveys.

Measures

Body Mass Index

BMI was calculated as a function of participants' age, gender, and self-reported height and weight in the spring of sixth and seventh grade. As typical of self-reported height and weight data (Himes, 2009), 22% of the sixth-grade sample and 26% of the seventh-grade sample was missing height, weight, or age. BMI *z* scores were calculated based on Centers for Disease Control and Prevention (CDC, 2000) growth charts for age and gender. Records with height-for-age, weight-for-age, or BMI-for-age values that were identified as implausible based on the World Health Organization's (1995) recommended exclusion ranges were excluded from the analyses (CDC, 2015). These exclusion criteria resulted in the loss of 237 sixth graders and 116 seventh graders.

Weight-Based Peer Discrimination

Adolescents' perceptions of weight-based peer discrimination were assessed using four items adapted from the Adolescent Discrimination Distress Index (Fisher et al., 2000) at seventh grade. Items asked participants whether they had experienced exclusion, disrespectful treatment, threats, or name calling by their peers because of their weight (e.g., "How often did kids exclude you from their activities because of your weight?"). Means of the 5-point rating scales from 1 (*never*) to 5 (*a whole lot*) were computed, with higher scores indicating higher levels of discrimination ($\alpha_{7th\ grade} = .86$). This measure was correlated with a seven-item self-report measure of general peer victimization ($r = .42$), adapted from Neary and Joseph (1994).

Emotional Adjustment

Four indicators were used to assess adjustment at sixth and eighth grade: body dissatisfaction, social anxiety, loneliness, and somatic symptoms.

Body dissatisfaction. Body dissatisfaction was assessed by relying on four items adapted from the Appearance subscale of the Body Esteem Scale for Adolescents and Adults (Mendelson, Mendelson, & White, 2001; e.g., "I like what I see when I look in the mirror"). Ratings of the 6-point scale were reverse coded and averaged such that higher values indicated greater body dissatisfaction, from 1 (*always*) to 6 (*never*), $\alpha_{6th\ grade} = .87$, $\alpha_{8th\ grade} = .89$.

Social anxiety. Social anxiety was measured using the Social Anxiety Scale for Adolescents (La Greca & Lopez, 1998). The six items were aggregated from two subscales: Fear of Negative Evaluation (e.g., "I worry about what others say about me") and Social Avoidance and Distress–General (e.g., "It's hard for me to ask others to do things with me"). Responses were rated on a 5-point scale from 1 (*not at all*) to 5 (*all the time*), summed, and averaged ($\alpha_{6th\ grade} = .82$, $\alpha_{8th\ grade} = .81$).

Loneliness. A five-item version of Asher and Wheeler's (1985) Loneliness Scale was used to measure feelings of loneliness at school (e.g., "I feel alone"). Students rated the items on a 5-point scale from 1 (*not at all*) to 5 (*all of the time*). Means were computed such that higher scores indicated more loneliness ($\alpha_{6th\ grade} = .91$, $\alpha_{8th\ grade} = .92$).

Somatic symptoms. Participants rated how many times in the past 2 weeks they had experienced five somatic symptoms (e.g., headaches, fatigue, stomachaches, nausea, poor appetite). Each symptom was rated on a 4-point scale from 1 (*not at all*) to 4 (*almost every day*). The symptoms included here were adapted from the longer list used in the National Longitudinal Study of Adolescent Health (Udry & Bearman, 1998). Ratings were summed and averaged ($\alpha_{6th\ grade} = .75$, $\alpha_{8th\ grade} = .76$), with higher values indicating poorer health.

Control Variables

Several control variables were used in the analyses. Students reported their sex and ethnicity in the sixth grade. We relied on parental education (using a 6-point scale) as an indicator of socioeconomic status. Finally,

participants rated their physical development compared to their same-sex and same-age peers (Dubas, Graber, & Petersen, 1991), on a 5-point scale, with higher values indicating faster maturation (M = 2.90, SD = .91).

Missing Data

To maximize power while allowing for measurement efficiency that reduces the time needed to complete all self-report measures, data for social anxiety, loneliness, and somatic symptoms at eighth grade were each completed by two thirds of randomly selected respondents (see Graham, Taylor, Olchowski, & Cumsille, 2006; Little, Jorgensen, Lang, & Moore, 2014). Full information maximum likelihood estimation methods are used for missing data. Full information maximum likelihood allows for the inclusion of all available data in the analyses by fitting the covariance structure model directly to the observed raw data for each participant (Enders, 2010). Only participants with missing or implausible BMI data were excluded from the analyses.

RESULTS

Analysis Plan

We first present descriptive statistics indicating weight categories and level of weight discrimination by ethnic groups. Next, we review regression models examining the effects of the simultaneously assessed BMI and weight-based peer discrimination at seventh grade on the eighth-grade adjustment outcomes. Finally, we turn to mediation models that examine the indirect effect of sixth-grade BMI on eighth-grade emotional adjustment through seventh-grade weight discrimination. In all analyses we control for sixth-grade baseline adjustment.

Descriptive Statistics

The mean sixth- and seventh-grade BMI percentiles among boys were 59.91 (SD = 29.00) and 58.16 (SD = 29.75) and among girls were 54.36 (SD = 29.60) and 56.98 (SD = 28.10). At each grade level, 23% of youth were classified with overweight or obesity (BMI $\geq$ 85th percentile according to CDC growth charts), with an overrepresentation of African American and Latino youth (see Table 1). Adolescents with overweight or obesity reported significantly more weight discrimination by their peers than those with average and underweight, $t(4208) = -2.44$, $p = .015$, at seventh grade. About one third (32%) of the sample reported at least one weight discriminatory experience by peers at seventh grade; no ethnic or gender differences were observed.

BMI and Peer Discrimination Predicting Adjustment

In our regression models predicting eighth-grade adjustment, we capture the progression of adjustment difficulties across the middle school grades by controlling for sixth-grade levels of each outcome (cf. Eisenberg et al., 2006). Regression models include all control variables (ethnicity dummy coded with Latinos as the largest group for the reference) and consider the effects of both BMI and weight discrimination at seventh grade, as well as their interactions with sex. When interactions of BMI and discrimination

TABLE 1
Ethnic and Gender Breakdown of Sixth-Grade Sample Weight Category Characteristics

	Ethnicity					
	African American[a]	*E/SE Asian*[b]	*Latino/a*[c]	*White*[d]	*Multiethnic*[e]	*Other*[f]
Weight Status	*Boys/Girls*	*Boys/Girls*	*Boys/Girls*	*Boys/Girls*	*Boys/Girls*	*Boys/Girls*
Underweight (BMI < 5th %ile)	5 / 3%	6 / 10%	3 / 2%	6 / 9%	3 / 7%	4 / 2%
Normal (BMI 5 –84.9th %ile)	69 / 64%	73 / 77%	60 / 71%	79 / 80%	74 / 73%	70 / 86%
Overweight (BMI 85 –94.9th %ile)	17 / 18%	13 / 10%	22 / 17%	10 / 8%	14 / 12%	16 / 6%
Obese (BMI ≥ 95th %ile)	9 / 15%	8 / 3%	15 / 10%	5 / 3%	9 / 8%	10 / 6%

Note. BMI = body mass index; %ile = percentile.
[a] n = 519.
[b] n = 635.
[c] n = 1,327.
[d] n = 952.
[e] n = 656.
[f] n = 393.

were explored with ethnicity, only one significant difference across the pan-ethnic groups was obtained showing that weight discrimination was not related to body dissatisfaction among African American youth. For the sake of parsimony, the five Ethnicity × Weight Discrimination terms for each emotional indicator are not included in Table 2.

Examining the results simultaneously across all four adjustment measures based on Table 2, a sex difference was documented only for body dissatisfaction and somatic symptoms, with girls reporting higher levels than boys for both outcomes. The differences across the pan-ethnic groups showed that, compared to Latino youth, African American youth reported lower body dissatisfaction, whereas Asian and White students displayed higher social anxiety and loneliness in addition to greater body dissatisfaction at eighth grade. Over and above these differences and baseline effects for each outcome, there were no significant effects of seventh-grade BMI on eighth-grade outcomes. Instead, seventh-grade weight-based peer discrimination was a consistent predictor of each emotional problem at eighth grade. Significant Discrimination × Sex interactions revealed that the association between discrimination and loneliness was stronger for girls than boys and that discrimination was related to somatic symptoms for girls but not for boys at eighth grade. Taken together, these findings suggest that when controlling for BMI, youth are more dissatisfied with their bodies, as well as feel more anxious, lonely, and sick because of the way they perceive to get treated by their peers due to their weight.

TABLE 2
Effects of Sixth-Grade Controls, Seventh-Grade Weight, and Seventh-Grade Weight Discrimination on Psychosocial Outcomes

	Eighth-Grade Outcomes (Standardized Coefficients and SEs)			
	Body Dissatisfaction	*Social Anxiety*	*Loneliness*	*Somatic Symptoms*
Sex	.217 (.03)***	.041 (.05)	.045 (.05)	.137 (.05)**
African American	−.107 (.02)***	−.032 (.02)	−.005 (.02)	.021 (.02)
Asian	.062 (.02)***	.130 (.02)***	.138 (.02)***	.005 (.02)
White	.042 (.02)**	.087 (.03)***	.073 (.03)**	−.003 (.03)
Multiethnic	−.034 (.02)*	.020 (.02)	.083 (.02)***	−.011 (.02)
Other	.000 (.02)	.052 (.02)*	.032 (.02)	−.023 (.02)
Parental Education (SES)	.039 (.02)	.023 (.02)	.024 (.02)	−.012 (.02)
6th-Grade Pubertal Development	−.016 (.01)	−.014 (.02)	.010 (.02)	.023 (.02)
6th-Grade Outcome	.376 (.01)***	.424 (.02)***	.326 (.02)***	.364 (.02)***
7th-Grade BMI	.025 (.02)	.015 (.03)	−.016 (.03)	.005 (.03)
7th-Grade Peer Weight Discrimination	.103 (.02)***	.080 (.03)**	.055 (.03)*	.025 (.03)
Discrimination × Sex	.067 (.04)†	.087 (.05)	.136 (.05)**	.115 (.05)*
BMI × Sex	.017 (.02)	.007 (.03)	.036 (.03)	.010 (.03)

Note. Ethnicity reference group = Latino. Sex reference group = boys. SES = socioeconomic status; BMI = body mass index.
†$p < .07$. *$p < .05$. **$p < .01$. ***$p < .001$.

Indirect Effects of BMI

To test how weight might indirectly predict the development of emotional problems, we examined the effects of an earlier (i.e., sixth grade) BMI on emotional problems at eighth-grade through seventh-grade weight-based peer discrimination. Following recommended procedures, we used bias-corrected bootstrapping procedures (10,000 bootstraps) in Mplus version 7.31 to estimate these indirect effects and corresponding 95% confidence intervals (CI; Muthén & Muthén, 1998–2012; Preacher & Hayes, 2008). CIs that do not include zero are considered statistically significant. Given the sex differences mentioned in an earlier section, the models were tested separately for girls (n = 2,308) and boys (n = 2,177), controlling for ethnicity, socioeconomic status, and pubertal development.

Body Dissatisfaction

Students with higher BMI at sixth grade were more likely to experience weight-based peer discrimination at seventh grade, which in turn predicted higher levels of body dissatisfaction (see Figure 1a). There was evidence of partial mediation for girls and boys (indirect effect = .020, CI: .012–.032) for girls, (indirect effect = .018, CI: .008–.029) for boys. That is, although higher sixth-grade BMI predicted greater body dissatisfaction at eighth

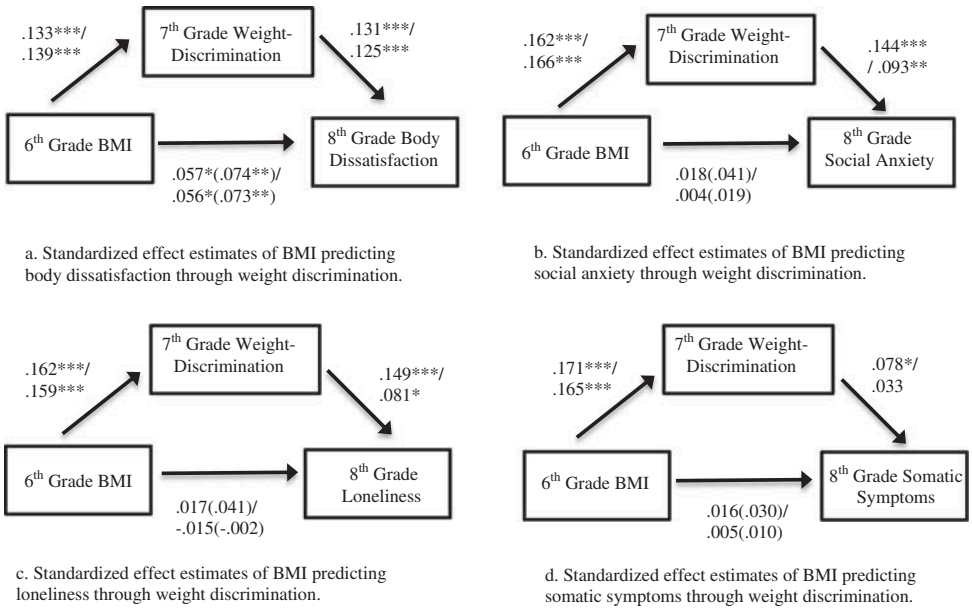

FIGURE 1 Standardized effect estimates of body mass index (BMI) predicting adjustment outcomes through weight-discrimination. *Note*. Coefficients for girls, followed by boys, are separated by a slash. *$p < .05$. **$p < .01$. ***$p < .001$.

grade, this association was partially accounted for by seventh-grade weight discrimination.

Social Anxiety

As shown in Figure 1b, there was also a significant indirect path from BMI to social anxiety for both girls (indirect effect = .016, CI: .009–.026) and boys (indirect effect = .010, CI: .003–.020). Although the relation between sixth-grade BMI and eighth-grade social anxiety was not statistically significant, the indirect effects can be interpreted in light of our theoretical predictions (Rucker, Preacher, Tormala, & Petty, 2011). That is, higher sixth-grade BMI predicted higher levels of weight-based peer discrimination at seventh grade, which in turn predicted increased social anxiety in eighth grade.

Loneliness

As shown in Figure 1c, a similar pattern emerged for loneliness. Higher BMI at sixth grade increased the risk for weight-based peer discrimination at seventh grade, in turn predicting higher levels of eighth-grade loneliness. Although the relation between sixth-grade BMI and eighth-grade loneliness was not statistically significant, an indirect path from BMI to loneliness through weight discrimination was significant for girls (indirect effect = .019, CI: .011–.032) and boys (indirect effect = .009, CI: .002–.019).

Somatic Symptoms

Although there was a significant indirect effect from BMI to somatic symptoms for girls (indirect effect = .008, CI: .002–.016), weight discrimination did not predict somatic symptoms for boys (Figure 1d). These findings imply that seventh-grade weight-based peer discrimination accounts only for the eighth-grade physical health problems of girls with heavier weight in sixth grade.

In sum, the results suggest that heavier weight during the 1st year in middle school increases the risk that youth feel discriminated against by their peers at seventh grade, and such perceptions predict increased emotional problems by the end of middle school. The effects were consistent across all our emotional indices, with the exception of somatic symptoms among boys.

DISCUSSION

Underscoring the social-emotional consequences of heavy weight, our analyses provide further insights about weight-based stigmatization in early adolescence. By relying on prospective longitudinal data at a time when appearance norms are salient, we show how perceptions of weight-based peer discrimination are associated not only with body dissatisfaction but also with social anxiety and loneliness by the end of middle school. Thus, in addition to having fewer friends (R. S. Strauss & Pollack, 2003), youth appear to feel the social burden of weight. When attributing negative peer treatment to their weight, they may come to view peer approval as contingent on their body stature (cf. Pierce & Wardle, 1997) and hence be particularly vulnerable to emotional and physical health problems over time.

Consistent with recent findings on adults (Hunger & Major, 2015), the current findings indicate that the connection between heavy weight and emotional adjustment is largely due to perceived weight discrimination. At seventh grade, it was weight-based peer discrimination rather than concurrently assessed BMI that predicted body dissatisfaction, social anxiety, and loneliness by eighth grade. When examining the effects of earlier BMI, our findings suggest that heavier weight during the 1st year in middle school puts youth at risk for weight-related disrespectful, exclusionary, and demeaning treatment by peers, in turn, increasing their body dissatisfaction, social anxiety, and loneliness by the end of middle school. In addition, girls reporting peer mistreatment because of their weight experienced higher rates of somatic symptoms by eighth grade. Thus, weight-based peer discrimination helps us understand one of the stigmatizing mechanisms underlying the relation between sixth-grade BMI and increased emotional problems by eighth grade.

Similar to findings by Neumark-Sztainer, Falkner, et al. (2002), about one third of all middle school students reported at least one weight-based peer discrimination experience, and youth with overweight and obesity reported higher rates of such mistreatment. Although African American and Latino youth were overrepresented in the categories with overweight and obesity, they did not report greater rates of weight-based discrimination. This finding might reflect different weight norms across ethnic groups (Lanza et al., 2013). That is, when a greater number of youth of a particular ethnic group have high BMI, heavy stature may be less stigmatizing. Indeed, it is important to recognize that weight norms are relative: Previous analyses show that weight-based peer mistreatment is associated with worse psychological well-being across all weight categories (Eisenberg et al., 2003). This means that even a teen with average weight may feel socially anxious when excluded by peers who are skinnier than her. Thus, it should be recognized that in addition to weight, peer group norms about weight may also contribute to perceptions of weight-based peer discrimination.

We presume one factor accounting for the robustness of our results pertains to the new measure used to capture weight-based peer mistreatment. Rather than relying on a single-item weight-teasing measure or a general measure of peer victimization frequently used to compare the plight of youth with obesity to those with average weight, each of our four peer discrimination items referred to mistreatment specifically due to weight. Although this measure was moderately correlated with a measure of general peer victimization, the weight-based peer discrimination measure did not leave the attribution for the name calling, exclusion, and so on, ambiguous. The associations with this measure were relatively robust across gender and ethnic groups, although weight-based peer victimization seems particularly impactful among girls (Puhl & Luedicke, 2012). Weight-based peer discrimination in seventh grade was related to increased loneliness more strongly for girls than boys, and more frequent somatic symptoms at eighth grade only among girls. The finding regarding somatic complaints is consistent with research by Rosenthal et al. (2015), suggesting that girls manifest weight-discrimination-related distress by feeling sick. The only ethnic difference pertained to body dissatisfaction, such that weight discrimination was associated with body dissatisfaction for all but African American youth. This finding, in turn, is consistent with research suggesting that weight-based stigma has fewer mental health consequences for African American girls (Mustillo, Budd, & Hendrix, 2013).

Although the current study has several methodological strengths, there are also limitations. The most notable one pertains to our reliance on self-reported weight and height. Objective weight and height assessments would be ideal and possibly limit missing data. We also relied on self-reports of weight-based peer discrimination that are subjective. It would be important to examine whether the current findings replicate when relying on peer-reported discrimination measures (Rancourt & Prinstein, 2009). Also, a particular sequence (BMI → discrimination → adjustment) was presumed with the weight-discrimination data available only starting at seventh grade. Directionality of the associations could be further tested with cross-lagged panel data. In addition, future studies need to examine whether the duration of weight-based peer discrimination might help account for an accumulation of adjustment problems over time, especially in light of the latest findings suggesting that weight discrimination shortens life (Sutin et al., 2015). Particularly concerning are the potential negative health effects of earlier weight-based peer discrimination among girls.

Taken together, our main findings underscore that weight-related peer mistreatment needs to be addressed when trying to improve the well-being of youth with overweight. Many school-based health programs focus on fitness and may therefore narrow acceptable body size norms. Moreover, when health promotion programs underscore the importance of personal responsibility by promoting healthy eating habits and exercise (see Stice, Shaw, & Marti, 2006), they can further contribute to weight stigma—those who remain overweight may actually be blamed for their weight (e.g., Russell-Mayhew, 2006). Thus, programs that empower youth to take control of their health should also manage social implications of these messages (i.e., to prevent negative evaluations and the mistreatment of youth with heavy weight). Although general antibullying programs might help reduce at least overt forms of weight-based peer mistreatment (Juvonen & Graham, 2014), promoting weight acceptance and body shape diversity is also needed. Such programs have been shown to be effective in improving peer acceptance and reducing teasing of overweight children in elementary school

(e.g., Irving, 2000), but developmentally sensitive methods need to be created to improve the emotional health of young adolescents experiencing weight-related peer mistreatment in middle school.

REFERENCES

Adler, P. A., & Adler, P. (1998). *Peer power: Preadolescent culture and identity*. New Brunswick, NJ: Rutgers University Press.

Allen, J. P., Uchino, B. N., & Hafen, C. A. (2015). Running with the pack: Teen peer-relationship qualities as predictors of adult physical health. *Psychological Science*, *26*, 1574–1583. doi:10.1177/0956797615594118

Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, *53*(4), 500–505. doi:10.1037/0022-006X.53.4.500

Blakemore, S. J., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing? *Annual Review of Psychology*, *65*, 187–207. doi:10.1146/annurev-psych-010213-115202

Centers For Disease Control and Prevention. (2000). CDC Growth Charts: United States. Retrieved from http://www.cdc.gov/growthcharts/charts/htm.

Centers for Disease Control and Prevention. (2015). *A SAS program for the 2000 CDC growth charts (ages 0 to <20)*. Retrieved from http://www.cdc.gov/nccdphp/dnpao/growthcharts/resources/sas.htm.

Chmura Kraemer, H., Kiernan, M., Essex, M., & Kupfer, D. J. (2008). How and why criteria defining moderators and mediators differ between the Baron & Kenny and MacArthur approaches. *Health Psychology*, *27*(2, Suppl.), S101–S108. doi:10.1037/0278-6133.27.2(suppl.).s101

Dubas, J. S., Graber, J. A., & Petersen, A. C. (1991). A longitudinal investigation of adolescents' changing perceptions of pubertal timing. *Developmental Psychology*, *27*(4), 580–586. doi:10.1037/0012-1649.27.4.580

Eisenberg, M. E., Neumark-Sztainer, D., Haines, J., & Wall, M. (2006). Weight-teasing and emotional well-being in adolescents: Longitudinal findings from Project EAT. *Journal of Adolescent Health*, *38*(6), 675–683. doi:10.1016/j.jadohealth.2005.07.002

Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Archives of Pediatrics & Adolescent Medicine*, *157*, 733–738. doi:10.1001/archpedi.157.8.733

Enders, C. K. (2010). *Applied missing data analysis*. New York, NY: Guilford Press.

Fisher, C. B., Wallace, S. A., & Fenton, R. E. (2000). Discrimination distress during adolescence. *Journal of Youth and Adolescence*, *29*(6), 679–695. doi:10.1023/a:1026455906512

Freedman, D. S., Khan, L. K., Mei, Z., Dietz, W. H., Srinivasan, S. R., & Berenson, G. S. (2002). Relation of childhood height to obesity among adults: The Bogalusa heart study. *Pediatrics*, *115*, 22–27. doi:10.1542/peds.2004-0220

Gordon-Larsen, P., The, N., & Adair, L. (2010). Longitudinal trends in obesity in the United States from adolescence to the third decade of life. *Obesity*, *18*(9), 1801–1804. doi:10.1038/oby.2009.451

Graham, J. W., Taylor, B. J., Olchowski, A. E., & Cumsille, P. E. (2006). Planned missing data designs in psychological research. *Psychological Methods*, *11*(4), 323–343. doi:10.1037/1082-989x.11.4.323

Harter, S. (1993). Self and identity development. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 352–387). Cambridge, MA: Harvard University Press.

Himes, J. H. (2009). Challenges of accurately measuring and using BMI and other indicators of obesity in children. *Pediatrics*, *124*, S3–S22. doi:10.1542/peds.2008-3586D

Hunger, J. M., & Major, B. (2015). Weight stigma mediates the association between BMI and self-reported health. *Health Psychology*, *34*(2), 172–175. doi:10.1037/hea0000106

Irving, L. M. (2000). Promoting size acceptance in elementary school children: The EDAP puppet program. *Eating Disorders*, *8*(3), 221–232. doi:10.1080/10640260008251229

Janssen, I., Craig, W. M., Boyce, W. F., & Pickett, W. (2004). Associations between overweight and obesity with bullying behaviors in school-aged children. *Pediatrics*, *113*(5), 1187–1194. doi:10.1542/peds.113.5.1187

Juvonen, J. (2007). Reforming middle schools: Focus on continuity, social connectedness, and engagement. *Educational Psychologist*, *42*(4), 197–208. doi:10.1080/00461520701621046

Juvonen, J., & Graham, S. (2014). Bullying in schools: The power of bullies and the plight of victims. *Annual Review of Psychology*, *65*, 159–185. doi:10.1146/annurev-psych-010213-115030

LaFontana, K. M., & Cillessen, A. H. (2010). Developmental changes in the priority of perceived status in childhood and adolescence. *Social Development*, *19*(1), 130–147. doi:10.1111/j.1467-9507.2008.00522.x

La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, *26*(2), 83–94. doi:10.1023/A:1022684520514

Lanza, H. I., Echols, L., & Graham, S. (2013). Deviating from the norm: Body mass index (BMI) differences and psychosocial adjustment among early adolescent girls. *Journal of Pediatric Psychology*, *38*(4), 376–386. doi:10.1093/jpepsy/jss130

Little, T. D., Jorgensen, T. D., Lang, K. M., & Moore, E. W. G. (2014). On the joys of missing data. *Journal of Pediatric Psychology*, *39*(2), 151–162. doi:10.1093/jpepsy/jst048

Lumeng, J. C., Forrest, P., Appugliese, D. P., Kaciroti, N., Corwyn, R. F., & Bradley, R. H. (2010). Weight status as a predictor of being bullied in third through sixth grades. *Pediatrics*, *125*(6), e1301–e1307. doi:10.1542/peds.2009-0774

Mendelson, B. K., Mendelson, M. J., & White, D. R. (2001). Body-esteem scale for adolescents and adults. *Journal of Personality Assessment*, *76*(1), 90–106. doi:10.1207/S15327752JPA7601_6

Mustillo, S. A., Budd, K., & Hendrix, K. (2013). Obesity, labeling, and psychological distress in late-childhood and adolescent black and white girls: The distal effects of stigma. *Social Psychology Quarterly*, *76*(3), 268–289. doi:10.1177/0190272513495883

Muthén, L. K., & Muthén, B. O. (1998-2012). *Mplus user's guide* (7th ed., pp. 1–805). Los Angeles, CA: Muthén & Muthén.

Neary, A., & Joseph, S. (1994). Peer victimization and its relationship to self-concept and depression among schoolgirls. *Personality and Individual Differences*, *16*(1), 183–186. doi:10.1016/0191-8869(94)90122-8

Neumark-Sztainer, D., Croll, J., Story, M., Hannan, P. J., French, S. A., & Perry, C. (2002). Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: Findings from project EAT. *Journal of Psychosomatic Research*, *53*(5), 963–974. doi:10.1016/s0022-3999(02)00486-5

Neumark-Sztainer, D., Falkner, N., Story, M., Perry, C., Hannan, P. J., & Mulert, S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *International Journal of Obesity*, *26,* 123–131. doi:10.1038/sj/ijo/0801853

Pierce, J. W., & Wardle, J. (1997). Cause and effect beliefs and self-esteem of overweight children. *Journal of Child Psychology and Psychiatry*, *38*(6), 645–650. doi:10.1111/j.1469-7610.1997.tb01691.x

Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. doi:10.3758/brm.40.3.879

Puhl, R. M., & Latner, J. D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, *133*(4), 557–580. doi:10.1037/0033-2909.133.4.557

Puhl, R. M., & Luedicke, J. (2012). Weight-based victimization among adolescents in the school setting: Emotional reactions and coping behaviors. *Journal of Youth and Adolescence*, *41*, 27–40. doi:10.1007/s10964-011-9713-z

Rancourt, D., & Prinstein, M. (2009). Peer status and victimization as possible reinforcements of adolescent girls' and boys' weight-related

behaviors and cognitions. *Journal of Pediatric Psychology*, *35,* 354–367. doi:10.1093/jpepsy/jsp067

Rosenthal, L., Earnshaw, V. A., Carroll-Scott, A., Henderson, K. E., Peters, S. M., McCaslin, C., & Ickovics, J. R. (2015). Weight- and race-based bullying: Health associations among urban adolescents. *Journal of Health Psychology*, *20*(4), 401–412. doi:10.1177/1359105313502567

Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, *5*(6), 359–371. doi:10.1111/j.1751-9004.2011.00355.x

Russell-Mayhew, S. (2006). Key concepts from health promotion evaluations: What psychology needs to know. *International Journal for the Advancement of Counselling*, *28*(2), 167–182. doi:10.1007/s10447-005-9011-0

Stice, E., Shaw, H., & Marti, C. N. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin*, *132*(5), 667–691. doi:10.1037/0033-2909.132.5.667

Strauss, C. C., Smith, K., Frame, C., & Forehand, R. E. X. (1985). Personal and interpersonal characteristics associated with childhood obesity. *Journal of Pediatric Psychology*, *10*(3), 337–343. doi:10.1093/jpepsy/10.3.337

Strauss, R. S., & Pollack, H. A. (2003). Social marginalization of overweight children. *Archives of Pediatrics & Adolescent Medicine*, *157*, 746–752. doi:10.1001/archpedi.157.8.746

Sutin, A. R., Stephan, Y., & Terracciano, A. (2015). Weight discrimination and risk of mortality. *Psychological Science*. Advance online publication. doi:10.1177/095679615601103

Tomiyama, A. (2014). Weight stigma is stressful. A review of evidence for the cyclic obesity/Weight-Based Stigma model. *Appetite*, *82*, 8–15. doi:10.1016/j.appet.2014.06.108

Tremblay, L., & Lariviere, M. (2009). The influence of puberty onset, body mass index, and pressure to be thin on disordered eating behaviors in children and adolescents. *Eating Behaviors*, *10*(2), 75–83. doi:10.1016/j.eatbeh.2008.12.001

Udry, R., & Bearman, P. (1998). New methods for new research on adolescent sexual behavior. In R. Jessor (Ed.), *New perspectives on adolescent risk behavior* (pp. 241–269). New York, NY: Cambridge University Press.

World Health Organization. (1995). *Physical status: The use and interpretation of anthropometry* (WHO Tech. Rep. Series: 854). Geneva, Switzerland: Author. Retrieved from http://apps.who.int/iris/bitstream/10665/37003/1/WHO_TRS_854.pdf