Role of Childhood Maltreatment on Weight and Weight-Related Behaviors in Adulthood

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Abstract

Objective: This study investigated associations between child maltreatment and body mass, body weight perceptions, and weight control behaviors among men and women.

Method: Data were derived from The National Longitudinal Study of Adolescent to Adult Health (Add Health). Multinomial logistic regression was used to investigate links between dimensions of childhood maltreatment and adult (1) classifications of body mass index (BMI), (2) discrepancies in perceived weight and actual BMI categories, and (3) normative and risky weight control behaviors.

Results: Childhood maltreatment was highly predictive of BMI classification, weight perception discrepancies, and weight control behaviors for women. Women who reported physical abuse, sexual abuse, and neglect had increased risks for being slightly or very overweight, and among those who reported physical abuse and/or a combination of physical abuse and neglect, there is an increased likelihood of holding overweight perceptions. Finally, female victims of physical abuse, physical abuse and neglect, and of neglect only were more likely to adopt risky (e.g., diet pills or purging) versus normative (e.g., diet and exercise) weight control behaviors.

Conclusions: Results indicated that women who reported childhood maltreatment have increased risks for developing body and weight related issues, confirming research documenting female-specific effects of childhood maltreatment. For women, certain forms of maltreatment strongly predicted BMI groupings, discrepant weight perceptions, and risky weight behaviors. Taken together, findings suggest that child maltreatment is a predictor of health-related outcomes. Moreover, results highlight the importance of assessing gender-specific effects when examining outcomes related to body, weight, and dieting.

Keywords

childhood abuse; maltreatment; body weight perceptions; eating disorders; BMI

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Approximately 1.7 million children each year experience child maltreatment (CM) (A. J. Sedlak et al., 2010). CM, including physical abuse, sexual abuse, and neglect, is associated with lifelong inequities in physical and mental health outcomes (Chen et al., 2010; Norman et al., 2012). Because CM is concentrated among socially disadvantaged groups, it is an important factor in health disparities. While there is consistent evidence linking CM to an array of adult outcomes, evidence of links between CM to adult body and weight related issues is scarce and largely discordant. While many studies have assessed how CM is linked to body mass index (BMI) or obesity, work that focuses on body perceptions and eating disorder symptomology is limited (Norman et al., 2012). Moreover, the emphasis on body weight or BMI provides little insight into underlying behaviors and perceptions that may influence these outcomes. Moreover, because CM is more common among women, understanding the factors linking CM to body and weight related issues is crucial. In addition, women surrounded by thinness and beauty pressures and socialization processes that may increase their vulnerabilities to body and weight related issues. Taken together, we would expect that for women, links between CM and body/weight are more complex and exaggerated than they are for men.

The present study aims to address the gaps in the literature by examining three questions. Are experiences of physical abuse, sexual abuse, and neglect associated with: (1) being overweight or obese, (2) discordance between actual and perceived body weight (e.g., perceiving oneself as overweight when one is normal weight), and (3) weight control strategies? Using the National Longitudinal Study of Adolescent to Adult Health (Add Health), we employed multinomial logistic regression to investigate associations of CM with BMI classification, weight perception and BMI discordance, and weight control behaviors in adulthood.

Theoretical and Empirical Background

Child Maltreatment, BMI, Body Image, and Weight Behaviors

The majority of U.S. adults are overweight or obese (Flegal, Carroll, Kit, & Ogden, 2012; Ogden, Reynolds, & Smith, 2006) and risk of obesity is influenced by a range of biological and social factors. Evidence that CM influences body weight, however, remains inconclusive in existing research. Whereas the prevalence of obesity is higher among youth investigated for maltreatment (Helton & Liechty, 2014), studies have found both negative (Schneiderman, Mennen, Negriff, & Trickett, 2012) and positive (Shin & Miller, 2012) associations between maltreatment and risk of childhood or adolescent obesity. The body of research on CM and adult obesity has also produced mixed findings. Studies of adults have generally found no linkage between neglect and obesity (Bentley & Widom, 2009; Norman et al., 2012), but have indicated somewhat consistent associations of physical and sexual abuse with higher BMI or obesity (Alvarez, Pavao, Baumrind, & Kimerling, 2007; Greenfield & Marks, 2009; Mamun et al., 2007; Noll, Zeller, Trickett, & Putnam, 2007; Richardson, Dietz, & Gordon-Larsen, 2014).

Because of the concentration of CM in socially disadvantaged populations (Lee, Coe, & Ryff, 2017) and the higher prevalence of becoming overweight or obese in low-income populations, it is possible that any association between CM and risk for obesity is spurious

in nature. For example, this relationship between CM and obesity could be explained by differential access and choice of healthy foods, consumption of fast food, or other lifestyle variants. If so, we would expect associations of maltreatment and BMI classification to be largely explicated by such socioeconomic factors. We would also not expect CM to be associated with categories reflecting low BMI, discordant perceptions of body weight, or risky weight control strategies.

Yet, there is some indication that CM may increase risk of disordered eating behaviors, body dysmorphia, and related conditions. Most risks for eating disorders are functions of genetic factors (Trace, Baker, Peñas-Lledó, & Bulik, 2013), but there remains a significant role for environmental characteristics, including exposure to CM. A number of studies have documented a high prevalence of CM among clinical samples with conditions such as body dysmorphia (Didie et al., 2006), bulimia nervosa (Groleau et al., 2012), binge-eating and food addiction (Imperatori et al., 2016), anorexia nervosa (Carter, Bewell, Blackmore, & Woodside, 2006), and other eating disorders (Cutajar et al., 2010; Smolak & Murnen, 2002; Wonderlich et al., 2000). Nevertheless, findings from larger-scale studies and meta-analytic reviews have found small or null associations between childhood sexual abuse and eating disorders. A meta-analysis found positive associations of neglect and physical abuse with eating disorders, but few studies were included (Norman et al., 2012). Although the literature on excess body weight, eating disorder symptomology, and body image distortions are largely separate, the mechanisms through which CM could affect these outcomes are quite similar. Research indicates that CM increases risks for depression (Norman et al., 2012) which can subsequently affect physical activity and sedentary behaviors (Kessler, 2012; F. Schuch et al., 2017). Since low levels of physical activity is linked to increased risk for obesity and poor diet (F. B. Schuch et al., 2018). CM may be associated with higher prevalence of abnormal body weight (either under or over) as opposed to average weight. Still, this would not explain potential associations between CM and distorted body perceptions or high-risk dieting behaviors. Importantly, disordered eating, body image distortions, and related risk factors likely commence in adolescence rather than adulthood. Psychologists generally focus on two pathways to these behaviors (Littleton & Ollendick, 2003). The first is an internalization of societal ideals related to being underweight, which leads individuals to attempt to alter their body in ways that align them with those ideals. The second pathway to disordered eating behavior involves interpersonal vulnerability, which largely refers to inadequate parenting environments (Littleton & Ollendick, 2003). Maltreatment is a potentially significant form of interpersonal vulnerability. Maltreated children are more likely to struggle with impulse control and emotional dysregulation (Kim & Cicchetti, 2010), both of which are linked to disordered eating behaviors (Littleton & Ollendick, 2003). In addition, experiences of abuse and neglect are associated with distorted self-image, reduced self-esteem (Schieman, Nguyen, & Elliott, 2006; Turner, Finkelhor, & Ormrod, 2010), and lack of self-acceptance (Tanaka, Wekerle, Schmuck, & Paglia-Boak, 2011), which may increase body dissatisfaction and compulsive eating (Dunkley, Masheb, & Grilo, 2010; Feinson & Hornik-Lurie, 2016). However, because image distortions and impulsivity may increase risks for unhealthy dieting in addition to, or in place of, compulsive eating, it is possible that CM can increase risks for image distortions and risky behaviors, while not necessarily affecting BMI.

Gender Differences in BMI, Body Image, and Weight Behaviors

The effects of CM on eating disorder symptomology, including distorted perception of weight or high-risk weight control strategies, may be gender specific. Women are more likely than men to chronically diet, use risky dieting strategies, critically examine their bodies, and have distorted body images (Cachelin & Regan, 2006; Striegel-Moore et al., 2010). Ideals of thinness are especially powerful for women given that the media regularly and disproportionately targets messages related to weight loss to this audience. Although both genders experience body dissatisfaction, it has a pronounced effect on female well-being (Yuan, 2010), which may lead to greater behavior modification by women as compared with men.

In addition, girls are subjected to higher rates of maltreatment when compared to boys (A. Sedlak, Mettenburg, & Basena, 2010), particularly sexual abuse (Pereda, Guilera, Forns, & Gómez-Benito, 2009). Even so, research has found few differences in the effects of CM by gender (Sternberg, Baradaran, Abbott, Lamb, & Guterman, 2006), with no known studies examining gender-specific associations of CM and BMI, weight distortions, or high-risk behaviors. Research has shown strong associations between self-esteem and satisfaction with appearance among women (but not men) (Furnham, Badmin, & Sneade, 2002). Studies also find that women invest more energy in managing their looks when compared to men (Muth & Cash, 1997). Taken together, women may evaluate their weight more critically and internalize criticism more heavily—making them more vulnerable to risky weight control behaviors.

In sum, the links between CM and weight or eating-related issues are highly inconsistent. Most studies have focused on a single form of maltreatment or on eating disorders and obesity rather than on a range of related conditions or experiences. Moreover, research that has examined gender differences in these associations is scant, with most relying heavily on clinical samples. This study addresses these limitations and estimates a range of outcomes using a nationally representative sample along with measures gauging multiple forms and combinations of CM.

Methods

Data and Sample

Data come from the National Longitudinal Study of Adolescent Health (Add Health), a study of adolescents (grades seven through twelve), which used a multistage, stratified, school-based, cluster sampling. Baseline data (Wave I) were collected in 1995 by interviewing 20,745 adolescents between the ages of ten and seventeen, and 17,500 parents. Approximately 88% of these adolescents participated in the Wave II data collection, which took place in 1996. Of these individuals, 73% took part in the 2002 for Wave III (N = 15,170).

The present study relies on data from Wave III for dependent and key independent variables. We also include childhood controls using data from the Wave I parent questionnaire. The final analytical sample includes respondents who participated in Waves I and III, yielding an effective sample size of 15,170. Missing data, which were missing at random (MAR),

were handled via multiple imputation with chained equations, generating 75 imputed datasets. Sensitivity analyses compared results with and without imputation, indicating that findings were substantively consistent. This study was approved by The Pennsylvania State University Institutional Review Board. Add Health participants provided informed consent prior to their participation in Add Health components[1], which is in accordance with the Code of Federal Regulations on the Protection of Human Subjects 45CFR46 (Harris et al., 2009).

Study Measures

Dependent Variables.—Three dependent variables were assessed in analytical models. The first is a calculated measure for BMI using data collected during interviews. This is a common method given its relative ease. This lends to the importance of research that examines the scope of error that exists in BMI measures—especially those derived from self-reports of height and weight as opposed to physical measurements. The second variable —commonly assessed alongside BMI— gauges subjective body weight. Evidence suggests that self-reports of body weight are related to BMI, with heavier individuals commonly underestimating their weight and vice versa (McCabe, McFarlane, Polivy, & Olmsted, 2001). Scholars are still unsure whether creating cutoffs from a continuous measure of BMI can misclassify categories of body weight perceptions. Most evidence indicates a mix between substantial misclassifications and reported error, and also consistencies between objective physical measures and subjective ones (Stommel & Schoenborn, 2009). In keeping with this information, our third variable is a calculation of discordance, which subtracts weight perceptions from BMI groups. This allows us to assess misclassification of body weight perceptions with respect to BMI classifications.

The measure for BMI is derived from height and weight measures originally collected by the interviewer, with weight measured to the nearest half-pound and height to the nearest 1/8 inch (CDC, 2012). BMI categories were created using cutoffs that reflect the insights of major global health efforts and groups, such as the National Heart, Lung and Blood Institute (NHLBI) (Donato, 1998), the World Health Organization (Gallagher et al., 2000; Romero-Corral et al., 2008), and the Center for Disease Control (CDC, 2012). The categories are as follows: (< 18.49 = very/slightly underweight), (18.50–24.99 = normal weight) as the comparison category, (25.00–29.99 = slightly overweight), and (30.00 plus = very overweight). We measure perceptions of body weight using respondents' answers to the question: "How do you perceive yourself in terms of weight?" Categories were collapsed to match BMI categories, where (1 = very/slightly underweight), (2 = about right), as the comparison category, (3 = slightly overweight), and (4 = very overweight). After subtracting these, values were collapsed into three categories, where (1 = underestimation of weight), (2 = correct estimation of weight), as the omitted category, and (3 = overestimation of weight). Finally, we constructed a measure gauging weight related behaviors. Respondents were asked a screening question about their engagement in weight control behaviors. Those who answered negatively were coded (= 0) to indicate that they do not engage in weight

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[1]This process was managed by the University of North Carolina, School of Public Health and in accord with Institutional Review Board guidelines: http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html. Examples of consent forms are available in the Add Health documentation files for Wave III and IV.

control behaviors. Those who answered affirmatively were coded (= 1) to indicate their engagement in weight control behaviors and were subsequently asked a series of questions about specific strategies. These specific strategies have been categorized and coded so that: (1) normative behaviors: dieting, exercise, weight loss programs, (2) risky behaviors (alone or in combination with normative behaviors): purging, laxatives, fasting, diuretics, weight loss pills, dietary supplements, and (3) no weight or maintenance behaviors, as the comparison category.

Childhood Maltreatment Variables.—At Wave III, Add Health used a computer-assisted self-interviewing method (CASI)[2] to assess three forms of CM, including physical abuse, sexual abuse, and two forms of child neglect. There were no questions about CM experiences prior to Wave III. For each CM subtype, respondents were asked the frequency of a parent of caregiver committing acts of physical abuse, sexual abuse, physical neglect, or supervision neglect. Respondents were asked how often a parent or adult caregiver did the following: (1) slapped, hit, or kicked you, (2) touched you in a sexual way, forced you to touch him or her in a sexual way, or forced you to have sexual relations, (3) failed to take care of your basic needs, such as keeping you clean or providing food or clothing, or (4) left you home alone when an adult should have been with you. For supervision neglect, respondents were asked about experiences that happened prior to sixth grade. All other questions were based on experiences prior to age 18.

The original CM responses were dichotomized for each subtype[3]. Measures for physical abuse, sexual abuse, and physical neglect were coded to indicate (0 = never) and (1 = one or more times). For supervision neglect, the measure indicated (0 = less than 3 times) and (1 = three or more times). We used a higher threshold for supervision neglect because it is very common to report at least one instance of being left alone, and, whereas legal definitions may emphasize parental actions or inactions, research focused on impacts of neglect on children tend to emphasize severity. Because individuals may have experienced multiple types of maltreatment, and combinations may produce different outcomes than individual types, a mutually exclusive categorical variable was created, where (1 = no CM), serving as the omitted category, (2 = physical abuse only), (3 = sexual abuse alone or in combination with other maltreatment types), (4 = physical abuse and neglect only), and (5 = neglect only). The measure for sexual abuse was reserved as a single category irrespective to the co-occurrence of other forms of CM. This is due to its overall low base rate and high rate of co-occurrence with other forms (less than a third of respondents reporting sexual abuse reported sexual abuse only).

[2]A computer-assisted self-interviewing method mitigates the bias present in online questionnaires. Unlike basic online questionnaires that include self-selecting respondents, computer-assisted self-interviewing methods allow accurate random sampling that ensures a representative sample.
[3]Final models using two operationalization methods: continuous and dichotomous, both of which produced similar findings. The dichotomous method was selected, a decision made for several reasons. First, assessing childhood abuse as either present or absent is one of the most common techniques used by scholars assessing multiple forms maltreatment (e.g., Berenson & Andersen, 2006; Pepin & Banyard, 2006). Second, some measures are skewed towards 'never,' indicating that most respondents report no experiences. The presence/absence dichotomy represents the perspective that even one experience of abuse is a form of trauma that can have lasting effects.

Demographic and Childhood Controls.—A series of Wave I controls were included in analytical models. Race/ethnicity was a five category variable: African American, Latino, Native American, Asian/Pacific Islander, and other, with Non-Hispanic white as the reference group. Sex was measured so that (1 = male) and (0 = female). Respondent education is a continuous measure gauging actual years, asking respondents for highest level completed. A continuous measure for income gauges dollars in thousands, asking respondents about earnings before taxes. Finally, a series of childhood controls are included. The first is a measure of family structure, where (1 = both biological parents) (omitted), (2 = single parent), (3 = biological parent + social parent), (4 = living with relatives), (5 = foster/adoptive parents), and (6 = other arrangements). Family financial difficulty comes from parent reports, where (1 = difficulty paying bills), (0 = no difficulty). Parent nativity is measured so that (1 = foreign born), (0 = U.S. born).

Analytical Strategy

All analyses were performed using Stata SE, Version 15 (College Station, 2017). We produced imputed, weighted sample characteristics, displayed in Table 1. Tables 2 and 3 estimated categories of BMI and weight discordance using three models. The first model included CM only. The second added demographic controls and the third (full model) added childhood predictors. Table 4, estimated health behaviors, using four models. The first model included CM only. The second (the full model) added all demographic and childhood controls. The third model added BMI categories, while the final model added weight discordance.

Results

Sample Description

Table 1 displays imputed and weighted sample characteristics for the overall sample, and then by gender[4]. Several important sample characteristics are worth noting here. First, the total sample size consists of 15,170 respondents—with females comprising 53% of the sample and men comprising the remaining 47%. The average age of respondents in the sample is approximately 22 years of age. Average income for respondents totals to about $19,000, while the average level of education ranges between thirteen and fourteen years, or the equivalent of some college with no degree. The majority of respondents (54%) are white. African Americans comprise approximately 21% of the sample, followed by Hispanics/Latinos at about 9%. Across the sample, most respondents reported experiencing no maltreatment in their childhood years (57%), with about 15% reporting physical abuse, 12% reporting neglect, 2% reporting sexual abuse, and about 14% reporting a combination of physical abuse and neglect. When observing BMI categories, we note that about half of the sample falls within a normal weight. Approximately 4% of respondents classify as being slightly underweight based on their BMI, while 27% fall in the slightly overweight category, and 10% in the very overweight category. When it comes to respondent perceptions of

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[4]Two Proportion Z-tests were calculated for CM, BMI, weight perceptions, and weight behaviors. Results indicated statistically significant differences in the prevalence of all forms of maltreatment (except physical abuse) between men and women (p < 0.050). In addition, results showed significant differences between men and women in their proportions of all categories for BMI, weight perceptions/BMI discordance, and weight behaviors (p < 0.050).

body weight relative to BMI measurements, over half of the sample (about 55%) correctly estimates their weight, while 35% underestimate, and 10% overestimate. Finally, when it comes to weight control habits, 52% of respondents report no weight control behaviors, 33% report normative weight control behaviors, while 15% of respondents report behaviors that qualify as high-risk.

Looking at the sample characteristics by gender, we note similar percentages of men and women who reported physical abuse. However, results indicated that 2.5% of women reported sexual abuse while less than 1% of men reported such experiences. A little over 12% of women reported physical abuse and neglect, while over 16% of males reported these experiences. Finally, roughly 59% of women reported no maltreatment, compared with about 55% of men. Over half of women (53%) and about 47% of men fall within the normal BMI bracket. Moreover, about 33% of men and about 22% of women had a slightly overweight classification of BMI. A majority of men (about 51%) underestimated their weight relative to their BMI grouping, meaning they perceived themselves to weigh less than they actually did. Roughly, 22% of women underestimated their weight. Over half of women (62%) correctly estimated their weight relative to actual BMI compared to 47% of men. Approximately 3% of men and 16% of women overestimated their weight net of BMI grouping—meaning they categorized themselves in a higher weight category than was indicated by their BMI. For weight control behaviors, over 40% of women and 26% of men reported using normative behaviors to manage their weight. An estimated 20% of women and 10% of men reported high-risk weight control behaviors, like purging and using laxatives. A majority of men (64%) and about 40% of women reported no weight control efforts or activities.

Regression Results

Tables 2, 3, and 4 display results from multinomial logistic regression models that independently assess the three dependent variables, all of which have been coded so that one category is assigned as the comparison group (also called a base or reference category). Results from multinomial logistic regression models produce relative risk ratios, which, unlike odds ratios, observe probabilities of an event occurring. Thus, results from these tables indicate how independent variables relate to the probability of being in a certain category of the dependent variable as opposed to its assigned comparison category. Table 2 displays results predicting categories of BMI, with *normal BMI* as the comparison category. There were relatively few associations between CM and BMI categories. Across models, there were no differences in risks of *underweight* versus *normal weight*. Model 1 indicated that when compared with no CM, respondents who experienced a combination of physical abuse and neglect had an increased risk of being *very overweight* (RRR = 1.18, 95% CI [1.04, 1.34], p = .013). This association was robust across models that added demographic and childhood controls. Results across Models 1, 2, and 3 indicated that among women who reported physical abuse, there was a slight increased risk for being *slightly overweight*, compared to non-victims (RRR = 1.23, 95% CI [1.04, 1.54], p = .014). Those who experienced sexual abuse were also at an increased risk for being *slightly overweight* when compared to no CM (RRR = 1.54, 95% CI [1.06, 2.22], p = .023). Finally, reports of neglect among women were associated with increased risk for being *very overweight* (22%)

when compared to non-victims (RRR = 1.22, 95% CI [1.01, 1.49], *p* = .040). There were no significant effects in the male-only models presented in Table 2.

Table 3 displays results predicting the discordance between body weight perceptions and BMI classifications. The comparison group for these models was *no discordance*, indicating individuals who accurately perceived their weight. Results from Model 3 indicated that when compared to no CM, victims of physical abuse and of combined physical abuse and neglect had increased risks for *overestimating* their weight (RRR = 1.21, 95% CI [1.03, 1.42], *p* = .013; RRR = 1.23, 95% CI [1.03, 1.47], *p* = .026). These results were similar in the female-only models, indicated in Model 3, whereby reports of physical abuse and of both physical abuse and neglect combined are associated with increased risks for *weight overestimation* when compared to non-victims (RRR = 1.26, 95% CI [1.05, 1.51], *p* = .011; RRR = 1.26, 95% CI [1.04, 1.54], *p* = .020). Results from male-only models showed no significant effects when predicting discordance in Table 3.

The final table, Table 4, presents results predicting weight control behaviors (*normative* and *risky* compared with *no behaviors*). After the inclusion of demographic and childhood controls, results from the full model (Model 2) indicated no differences in *normative* behaviors by maltreatment type. However, results showed positive associations between maltreatment (minus sexual abuse) and *risky* behaviors. Risk for adopting *risky* health behaviors increased by 35% for victims of physical abuse (RRR = 1.35, 95% CI [1.17, 1.55], *p* < .001), 43% for victims of combined physical abuse and neglect (RRR = 1.43, 95% CI [1.24, 1.64], *p* < .001), and 33% for neglect only victims (RRR = 1.33, 95% CI [1.14, 1.55], *p* < .001). These results were robust across Models 3 and 4, which add BMI categories and weight discordance. Among females in Model 2, the full model, results indicated that physical abuse increased their risk for both *normative* and *risky behaviors*. When compared to non-victims, females who reported physical abuse had a 55% increased risk for adopting *risky* behaviors (RRR = 1.55, 95% CI [1.29, 1.86], *p* < .001), and a 20% increased risk in adopting *normative* behaviors (RRR = 1.20, 95% CI [1.03, 1.40], *p* = .018). In this same model, results also indicated that reports of both physical abuse and neglect among women had a 59% increase in the risk of adopting *risky* behaviors (RRR = 1.59, 95% CI [1.32, 1.92], *p* < .001), while reports of neglect increased this risk by 42% (RRR = 1.42, 95% CI [1.17, 1.73], *p* < .001). These results carry across Models 3 and 4, which added BMI groups and weight discordance, with little changes in magnitude and statistical significance. As in previous tables, Table 4 male-only models indicated no statistically significant effects when predicting health behaviors.

Discussion

In this national, longitudinal study of U.S. respondents, the present study produced several important findings. First, results indicated that a combination of physical abuse and neglect predicts BMI categorization, although no other CM categories do. Previous studies provide mixed findings in this regard. Some work has indicated that childhood maltreatment is associated with BMI and obesity over the life-course, especially childhood sexual abuse. Similar findings have suggested that childhood abuse has different effects on weight, dependent on the type of abuse. Emotional abuse (which we do not investigate here) has

been linked to lower BMI, while sexual abuse has been linked to increased BMI. Further insight into the effects of physical abuse co-occurring with neglect would be beneficial when examining outcomes related to body weight and body image. Results do indicate that childhood maltreatment, specifically, physical abuse and physical abuse and neglect, predicts the discordance between actual and perceived weight. Both maltreatment groups were more likely to hold overweight perceptions. These findings are generally consistent with work indicating linkages of maltreatment with perceptions of the body and distorted body image. Overall, results show that after accounting for the effects of BMI brackets and body weight perceptions, CM maintains a strong impact on health behaviors. Our findings suggest that risky weight control strategies are elevated among respondents who experienced maltreatment and that such risks persist regardless of weight related measures. Taken together, we suggest that such behaviors are not weight-related or weight-motivated, but rather maladaptive coping methods. Future work should focus on exploring why sexual abuse lacks strong associations to discordance in body weight perceptions and to health-related behaviors.

In addition to the above findings, the present study produced results from gender-specific models. Results from these analyses concluded that the effects of CM on all outcome variables are unequivocally specific to women. Findings here found no significant associations between CM and BMI classifications, of distorted body perception, or of weight control strategies among males who experienced maltreatment. Given that other studies have generally found few gender differences in the effects CM on other social-behavioral outcomes (Kendall-Tackett, Williams, & Finkelhor, 1993; Sternberg et al., 2006), this finding suggests that vulnerabilities associated with childhood maltreatment may be propelled by social messages that equate women's weight with self-worth. CM contributes to low self-esteem and unstable self-perceptions (Kim & Cicchetti, 2006; Turner et al., 2010). As such, emphasis on female thinness may lead women to focus on weight loss as a means of resolving self-dissatisfaction.

The present study embodies a series of note-worthy limitations. Initially, the fact that the data is fifteen years old may yield outdated interpretations. The definitions of child maltreatment, body image, and weight control have seemingly evolved somewhat in the past couple of decades. A more recent dataset would likely yield more representative and comprehensive results. Secondly, our childhood maltreatment measures are characterized by several limitations. Since maltreatment reports are retrospective, asking adult respondents to think back to instances of abuse during their childhoods, responses may be subject to recall bias and inaccurate recollections. These questions were asked only in one wave, further limiting these measures since we are unable to check consistency in reports of abuse across respondents. Second, the maltreatment measures pertain to abuse and neglect by a parent or caregiver only, and furthermore, include neglect measures that are narrow in their scope of measurement. As a result, respondents may have reported no maltreatment despite having experienced it. This results in the collapsing of categories for the sake of statistical analyses among certain maltreatment subtypes characterized by low frequencies. Third, childhood reports were obtained retrospectively, by asking adults to think back and recall events of maltreatment during their childhood, making these measures subject to recall bias. Additionally, since childhood abuse items were asked only in the first wave, their reports

cannot be checked for consistency. Thus, it becomes unclear whether these measures are capturing events and experiences that really happened, or is they are reconstructed memories formed over time.

Fifth, childhood maltreatment is assessed using type-specific measures that differentiate between the presence and absence of a specific abuse experience, a method that highlights a person's relative experience during childhood and its influence on future outcomes that are relative to the effects of other types of experiences. While we were able to assess whether or not someone was maltreated and in what particular way, the frequency of this maltreatment and its severity both go unaccounted for. We do note, however, that results from ancillary analyses using a continuous specification of childhood maltreatment produced similar results as the ones presented here. The measures assessing health behaviors were designed to gauge whether or not a person engages in a specific action rather than their frequency of that engagement. Activities such as exercise, though healthy in normative amounts, could become a high-risk strategy if used excessively. Thus, some respondents who report dieting, exercise, and normative weight-control strategies may actually be participating in these strategies at high-risk levels.

Next, despite the inclusion of various controls, the present study does not control for everything that may confound the effects of childhood maltreatment. If other factors—like subjective physical health, subjective mental health, parental education, and other early childhood adversities—had been accounted for, results might have yielded a more complex story. In addition, social desirability may bias results in the underreporting of risky weight behaviors or in the over-reporting of normative behaviors. Finally, the present study does not use data that allows for the measurement of trajectories or changes in the outcome over time.

Findings from this study can offer useful insight to health professionals and to community program developers aimed at helping the childhood maltreatment cause. Although programs aimed at the cause are continually developed, most are designed around intervention and prevention—leaving out instances of maltreatment that occurred long ago, that went unaccounted for, and whereby victims remain negatively impacted by these experiences. Because respondents from this study are recalling abuse that happened in childhood, it is important to consider the possibility that they did not receive help and might still need support. There still is no foundation guiding efforts to help adults with a past of childhood maltreatment. It would be useful to examine the compounding impacts of multiple morbidity over time, since this can possibly reduce or impede resilient outcomes. In addition, researchers should consider following health trajectories that gauge changes in ailments associated with changes in resilience. This can offer valuable insight into the processes of resilience over time and the way it manifests at varying degrees of wellness and morbidity. We should also aim at identifying periods of greater vulnerability over the life-course that would indicate increased need for resiliency support. This would help guide efforts at enhancing resilience for adult survivors.

Research shows that childhood trauma is linked to high rates of disordered eating—which is characterized by risky weight control behaviors captured in this study (Behar, Arancibia, Sepúlveda, & Muga, 2016). The strong correlation between CM and eating disorders means

that people with eating disorders may be suffering from post-traumatic stress disorder (PTSD) (Fischer, Stojek, & Hartzell, 2010) in addition to a range of other issues, such as suicidal ideation and poor mental health (Berkman, Lohr, & Bulik, 2007). Developing treatment programs for individuals with eating disorders with histories of childhood abuse should take these combinations of issues into account. For instance, a malnourished patient with eating disorders should first be rehabilitated and stabilized before trauma treatment is initiated.

In addition, a focus on weight to the exclusion of health behavior does little to discourage the use of extreme and unsafe weight control strategies, particularly in populations vulnerable to unstable or negative self-perceptions. Future work should further investigate the nuanced effects across different types of maltreatment on health and dietary behavior. Exploring the mediating effects of coping styles may offer insight into the differences across these groups. Scholars should also assess the association between maltreatment and mental health and its possible link to physical health and dietary behaviors, in addition to the roles of various coping strategies (therapy, medication) in the relationship between childhood maltreatment and physical health. One other type of investigation could operate from the perspectives of various sociodemographic dispositions, as certain environments may differentially influence the effects of maltreatment on the progression of weight control into adulthood. Expounding upon outreaching relationships between physical health and trauma may yield intuition to many uncertainties about health behavior throughout the stages of life, and offer insight into how human interaction may influence these aspects of physical health.

In all, more substantial efforts are needed to reach beyond what we know and address the many limitations in current research. New insights can help improve the quality of life for those who experienced trauma long ago. Long-term collaborative efforts can also improve the ways we understand and respond to childhood abuse, and to enhance the quality of policy decisions and social services that affect the welfare of childhood abuse victims, both past and present.

Acknowledgments

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Table 1.

Imputed Summary Statistics for Analytical Variables – Add Health (*N* = 15,170)

	FULL SAMPLE (*N* = 15,170)			FEMALES (*n* = 8,015)			MALES (*n* = 7,155)		
	%	**x̄**	**σ**	**%**	**x̄**	**σ**	**%**	**x̄**	**σ**
Childhood Maltreatment									
Physical Abuse Only	14.65	—	—	14.52	—	—	14.79	—	—
Sexual Abuse Only	1.72	—	—	2.47	—	—	0.88	—	—
Physical Abuse and Neglect	14.12	—	—	12.14	—	—	16.34	—	—
Neglect Only	12.23	—	—	11.49	—	—	13.07	—	—
No Maltreatment (omitted)	57.28	—	—	59.38	—	—	54.93	—	—
Body Mass Index (BMI) Categories	—	—	—	—	—	—	—	—	—
Slightly Underweight (< 16.00 – 18.49)	3.47	—	—	4.78	—	—	2.01	—	—
Normal (18.50 – 24.99) (omitted)	49.84	—	—	52.54	—	—	46.81	—	—
Slightly Overweight (25.00 – 29.99)	27.05	—	—	22.13	—	—	32.55	—	—
Very Overweight (30.00 or higher)	19.64	—	—	20.55	—	—	18.63	—	—
Perceived Weight / BMI Discordance	—	—	—	—	—	—	—	—	—
Underestimating Weight	35.32	—	—	21.95	—	—	50.60	—	—
Correct Weight Estimation (omitted)	54.73	—	—	62.02	—	—	46.57	—	—
Overestimating Weight	9.95	—	—	16.03	—	—	3.13	—	—
Weight Control Behaviors	—	—	—	—	—	—	—	—	—
Normative	33.34	—	—	40.27	—	—	25.56	—	—
Risky	15.10	—	—	19.58	—	—	10.08	—	—
None (omitted)	51.57	—	—	40.15	—	—	64.36	—	—
Respondent Race	—	—	—	—	—	—	—	—	—
African American	21.05	—	—	22.17	—	—	19.59	—	—
Hispanic / Latino	8.69	—	—	8.46	—	—	9.01	—	—
Native American / Indian	0.57	—	—	0.49	—	—	0.67	—	—
Asian / Pacific Islander	6.72	—	—	6.18	—	—	7.44	—	—
Other Race	9.24	—	—	8.85	—	—	9.80	—	—
White (omitted)	53.72	—	—	53.84	—	—	53.49	—	—
Respondent Age	—	21.96	1.77	—	21.86	1.77	—	22.06	1.78
Respondent Education	—	13.19	1.97	—	13.32	1.98	—	13.03	1.93
Respondent Income (in thousands)	—	18,901	23,394	—	18,673	23,692	—	19,158	23,056
Childhood Family Structure	—	—	—	—	—	—	—	—	—
Single Biological Parent	22.98	—	—	23.69	—	—	22.18	—	—
Biological Parent + Social Parent	14.84	—	—	14.61	—	—	15.09	—	—
Living with Relatives	3.87	—	—	4.25	—	—	3.44	—	—
Adoptive / Foster Parents	3.05	—	—	2.98	—	—	3.12	—	—
Other Arrangement	2.37	—	—	2.71	—	—	1.98	—	—
Both Biological Parents (omitted)	52.90	—	—	51.75	—	—	54.19	—	—
Childhood Money Issues *(vs no issues)*	18.83	—	—	19.51	—	—	18.07	—	—
Foreign Born Parents *(vs US Born)*	17.76	—	—	16.42	—	—	19.26	—	—

Notes:

[1.]The measure for sexual abuse was reserved as a single category irrespective to the co-occurrence of other forms of CM.

Table 2.

Multinomial Logistic Regression Models Predicting Actual Body Mass Index (BMI) Category

	Model 1			Model 2			Model 3		
	Under Weight	Slightly Over	Very Over	Under Weight	Slightly Over	Very Over	Under Weight	Slightly Over	Very Over
FULL SAMPLE (N = 15,170)									
Physical Abuse	0.85 [0.64,1.12]	1.10 [0.99,1.23]	1.07 [0.94,1.22]	0.85 [0.64,1.13]	1.10† [0.98,1.24]	1.11 [0.98,1.27]	0.85 [0.64,1.12]	1.11† [0.99,1.25]	1.12† [0.98,1.28]
Sexual Abuse	1.25 [0.65,2.40]	1.22 [0.89,1.65]	1.23 [0.87,1.74]	1.04 [0.54,2.01]	1.32† [0.97,1.80]	1.13 [0.80,1.61]	1.02 [0.52,1.97]	1.34† [0.98,1.84]	1.15 [0.81,1.65]
Physical & Neglect	0.98 [0.74,1.28]	1.05 [0.93,1.18]	1.25*** [1.10,1.42]	1.02 [0.77,1.34]	0.98 [0.87,1.10]	1.16* [1.02,1.32]	1.00 [0.76,1.32]	0.99 [0.87,1.11]	1.18* [1.03,1.34]
Neglect	0.85 [0.62,1.15]	1.10 [0.97,1.25]	1.12 [0.97,1.28]	0.85 [0.62,1.16]	1.08 [0.95,1.23]	1.09 [0.95,1.26]	0.84 [0.61,1.14]	1.09 [0.96,1.24]	1.11 [0.96,1.28]
FEMALES (n = 8,015)									
Physical Abuse	0.91 [0.66,1.27]	1.16† [0.99,1.37]	1.09 [0.92,1.30]	0.91 [0.65,1.27]	1.22* [1.03,1.44]	1.17† [0.98,1.40]	0.91 [0.65,1.26]	1.23* [1.04,1.54]	1.18† [0.99,1.41]
Sexual Abuse	1.21 [0.60,2.44]	1.55* [1.08,2.22]	1.45† [0.98,2.13]	1.15 [0.57,2.32]	1.50* [1.04,2.16]	1.32 [0.88,1.97]	1.14 [0.56,2.31]	1.54* [1.06,2.22]	1.34 [0.89,2.00]
Physical & Neglect	1.07 [0.76,1.50]	1.08 [0.90,1.30]	1.32** [1.10,1.57]	1.05 [0.75,1.47]	1.00 [0.83,1.21]	1.17 [0.97,1.40]	1.04 [0.74,1.47]	1.02 [0.84,1.23]	1.19† [0.98,1.43]
Neglect	0.92 [0.64,1.33]	1.14 [0.95,1.37]	1.26* [1.05,1.52]	0.90 [0.62,1.30]	1.11 [0.92,1.34]	1.20† [0.99,1.46]	0.89 [0.62,1.29]	1.13 [0.93,1.36]	1.22* [1.01,1.49]
MALES (n = 7,155)									
Physical Abuse	0.74 [0.42,1.30]	1.02 [0.86,1.19]	1.04 [0.86,1.27]	0.74 [0.42,1.31]	1.00 [0.85,1.18]	1.04 [0.85,1.26]	0.73 [0.42,1.29]	0.10 [0.85,1.18]	1.04 [0.86,1.27]
Sexual Abuse	0.75 [0.10,5.59]	0.98 [0.54,1.78]	0.74 [0.33,1.64]	0.77 [0.10,5.75]	0.99 [0.54,1.80]	0.71 [0.32,1.59]	0.74 [0.10,5.56]	1.01 [0.55,1.84]	0.74 [0.33,1.67]
Physical & Neglect	0.99 [0.61,1.60]	0.94 [0.81,1.10]	1.18† [0.99,1.44]	0.94 [0.58,1.52]	0.95 [0.81,1.25]	1.14 [0.95,1.37]	0.91 [0.56,1.48]	0.96 [0.82,1.13]	1.16 [0.96,1.39]
Neglect	0.80 [0.45,1.43]	1.01 [0.85,1.20]	0.96 [0.78,1.18]	0.75 [0.42,1.34]	1.05 [0.88,1.25]	0.98 [0.79,1.21]	0.73 [0.41,1.31]	1.06 [0.89,1.26]	0.99 [0.81,1.23]

***
p .001;

**
p .01;

*
p .05;

†
p .10

Notes:

[1] Relative Risk Ratios, with 95% Confidence Intervals in brackets.

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[2] Models control for respondent age, education, income, childhood household structure, childhood home finances, and parent nativity, race, and sex.

[3] DV = Actual BMI, where "Under" = Very/Slightly Underweight, "Slightly Over" = Slightly Overweight, "Very Over" = Very Overweight, where the comparison group is "Normal BMI".

Table 3.

Multinomial Logistic Regression Models Predicting "Perceived – Actual BMI" Discordance

	Model 1		Model 2		Model 3	
	Under Estimate	Over Estimate	Under Estimate	Over Estimate	Under Estimate	Over Estimate
FULL SAMPLE (N = 15,170)						
Physical Abuse	1.00 [0.90,1.11]	1.20* [1.03,1.41]	1.01 [0.91,1.13]	1.21* [1.03,1.42]	1.01 [0.91,1.13]	1.21* [1.03,1.42]
Sexual Abuse	0.68* [0.50,0.93]	1.41† [0.96,1.06]	0.82 [0.59,1.13]	1.16 [0.79,1.71]	0.82 [0.59,1.14]	1.16 [0.78,1.70]
Physical & Neglect	1.24*** [1.12,1.38]	1.13 [0.95,1.33]	1.08 [0.97,1.20]	1.24* [1.04,1.48]	1.08 [0.97,1.20]	1.23* [1.03,1.47]
Neglect	1.16** [1.04,1.30]	1.03 [0.85,1.24]	1.10 [0.98,1.23]	1.07 [0.88,1.30]	1.10 [0.98,1.24]	1.07 [0.88,1.30]
FEMALES (n = 8,015)						
Physical Abuse	0.95 [0.80,1.12]	1.30** [1.09,1.55]	1.00 [0.84,1.19]	1.26* [1.06,1.51]	1.00 [0.84,1.19]	1.26* [1.05,1.51]
Sexual Abuse	0.92 [0.62,1.36]	1.23 [0.82,1.84]	0.84 [0.57,1.26]	1.20 [0.80,1.80]	0.84 [0.56,1.26]	1.18 [0.79,1.79]
Physical & Neglect	1.12 [0.94,1.34]	1.28* [1.06,1.56]	1.00 [0.83,1.20]	1.28* [1.05,1.56]	0.99 [0.83,1.19]	1.26* [1.04,1.54]
Neglect	1.16 [0.97,1.38]	1.09 [0.88,1.35]	1.10 [0.92,1.32]	1.09 [0.88,1.35]	1.10 [0.92,1.32]	1.08 [0.87,1.34]
MALES (n = 7,155)						
Physical Abuse	0.97 [0.84,1.12]	0.97 [0.64,1.48]	1.00 [0.86,1.15]	0.95 [0.62,1.45]	1.00 [0.87,1.16]	0.95 [0.62,1.45]
Sexual Abuse	0.74 [0.43,1.30]	1.02 [0.24,4.27]	0.74 [0.42,1.29]	1.02 [0.24,4.28]	0.76 [0.43,1.33]	1.00 [0.24,4.25]
Physical & Neglect	1.13† [0.98,1.29]	1.03 [0.69,1.54]	1.12 [0.97,1.29]	1.00 [0.67,1.50]	1.13† [0.98,1.30]	1.00 [0.67,1.52]
Neglect	1.07 [0.92,1.25]	1.01 [0.65,1.58]	1.09 [0.94,1.27]	1.00 [0.64,1.57]	1.10 [0.94,1.28]	1.01 [0.64,1.58]

***
p .001;

**
p .01;

*
p .05;

†
p .10

Notes:

[1] Relative Risk Ratios, with 95% Confidence Intervals in brackets.

[2] Models control for respondent age, education, income, childhood household structure, childhood home finances, and parent nativity, race, and sex.

[3] DV = Discordance between Perceived Body Weight and BMI, where "Under Estimate" = Underestimation of weight relative to BMI. "Over Estimate" = Overestimate relative to BMI, where the comparison group is "Accurate Estimation of Weight relative to BMI.

Table 4.

Multinomial Logistic Regression Models Predicting Type of Weight Control Behaviors

	Model 1		Model 2		Model 3		Model 4	
	Normative	Risky	Normative	Risky	Normative	Risky	Normative	Risky
FULL SAMPLE (N = 15,170)								
Physical Abuse	1.10† [0.99,1.23]	1.32 *** [1.15,1.52]	1.09 [0.98,1.22]	1.35 *** [1.17,1.55]	1.07 [0.96,1.20]	1.31 *** [1.13,1.52]	1.09 [0.98,1.22]	1.33 *** [1.16,1.54]
Sexual Abuse	1.11 [0.82,1.49]	1.46 * [1.02,1.49]	0.99 [0.73,1.35]	1.19 [0.82,1.71]	0.94 [0.69,1.30]	1.10 [0.75,1.62]	0.98 [0.72,1.34]	1.17 [0.81,1.69]
Physical & Neglect	0.84 ** [0.75,0.93]	1.25 ** [1.09,1.44]	0.98 [0.87,1.09]	1.43 *** [1.24,1.64]	0.96 [0.85,1.09]	1.40 *** [1.21,1.63]	0.97 [0.86,1.09]	1.41 *** [1.22,1.63]
Neglect	0.92 [0.81,1.03]	1.22 ** [1.05,1.42]	1.01 [0.90,1.14]	1.33 *** [1.14,1.55]	0.99 [0.87,1.12]	1.29 ** [1.10,1.51]	1.01 [0.90,1.14]	1.33 *** [1.14,1.55]
FEMALES (n = 8,015)								
Physical Abuse	1.22 ** [1.05,1.42]	1.53 *** [1.28,1.83]	1.20 * [1.03,1.40]	1.55 *** [1.29,1.86]	1.17 * [1.00,1.37]	1.50 *** [1.24,1.81]	1.19 * [1.02,1.39]	1.52 *** [1.27,1.83]
Sexual Abuse	0.94 [0.68,1.32]	1.16 [0.77,1.75]	1.05 [0.75,1.48]	1.21 [0.80,1.83]	0.99 [0.67,1.41]	1.11 [0.72,1.69]	1.04 [0.74,1.47]	1.19 [0.78,1.80]
Physical & Neglect	0.91 [0.77,1.07]	1.55 *** [1.29,1.86]	1.01 [0.86,1.19]	1.59 *** [1.32,1.92]	1.01 [0.85,1.20]	1.59 *** [1.31,1.93]	1.00 [0.85,1.18]	1.56 *** [1.30,1.89]
Neglect	1.00 [0.85,1.18]	1.39 ** [1.14,1.68]	1.07 [0.91,1.27]	1.42 *** [1.17,1.73]	1.04 [0.88,1.24]	1.37 ** [1.11,1.67]	1.07 [0.91,1.27]	1.42 ** [1.16,1.73]
MALES (n = 7,155)								
Physical Abuse	1.06 [0.90,1.25]	1.17 [0.92,1.48]	1.01 [0.85,1.19]	1.08 [0.85,1.38]	1.00 [0.84,1.19]	1.07 [0.83,1.37]	1.01 [0.86,1.19]	1.09 [0.85,1.38]
Sexual Abuse	0.85 [0.43,1.66]	1.35 [0.61,2.98]	0.86 [0.44,1.70]	1.35 [0.61,3.02]	0.91 [0.45,1.83]	1.47 [0.64,3.41]	0.86 [0.43,1.69]	1.34 [0.60,2.99]
Physical & Neglect	0.93 [0.79,1.09]	1.17 [0.93,1.46]	0.94 [0.80,1.11]	1.19 [0.95,1.50]	0.92 [0.77,1.09]	1.15 [0.91,1.47]	0.95 [0.81,1.12]	1.20 [0.95,1.51]
Neglect	0.93 [0.78,1.12]	1.17 [0.92,1.50]	0.98 [0.81,1.17]	1.22 [0.95,1.57]	0.97 [0.80,1.17]	1.21 [0.94,1.58]	0.98 [0.82,1.17]	1.22 [0.95,1.57]

***
p .001;

**
p .01;

*
p .05;

†
p .10

Notes:

[1] Relative Risk Ratios, with 95% Confidence Intervals in brackets.

[2] Models control for respondent age, education, income, childhood household structure, childhood home finances, and parent nativity, race, and sex.

[3] DV = Health Behaviors, where "Normative Behaviors" = diet, exercise, weight loss programs, "Risky Behaviors" = purging, laxatives, fasting, diuretics, diet pills, and other supplements, with the comparison group being "No Dieting Behaviors."