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The Impact of Weight-Related Abuse on Self-Perception and Disordered Eating: A Model of Obesity

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Jessica K. Salwen

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Abstract of the Dissertation

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Obesity affects approximately one-third of the adult population in the U.S. and is one of the primary reasons for bullying in school. While weight-related abuse (WRA) is a specific risk factor for disordered eating (binge eating, emotional eating, night eating, and unhealthy weight control) and negative self-perception, and disordered eating and negative self-perception are predictive of obesity, these relationships have not been addressed with a comprehensive model. Thus, the current study evaluated a structural equation model in which severity of WRA predicted the emotional impact of WRA and negative self-perception, which predicted disordered eating, which in turn predicted current body mass index (BMI). This model was evaluated in a sample of 371 undergraduate students, and fit indices showed an excellent fit. Model fit was also explored based on onset of overweight; while age of onset of overweight (childhood vs. adolescence) did not significantly affect model fit, the model fit was significantly better in individuals who were overweight before age 20 as compared to those who were never overweight before age 20. These analyses suggest that WRA is a specific risk factor for obesity that largely acts through its effect on emotional impact of WRA, negative self-perception, and disordered eating. Further, this model suggests that it may be of particular import to include interpersonal interventions that specifically target the results of abuse. Future research utilizing a longitudinal design and/or a clinical population (e.g., individuals seeking treatment for weight loss) will help to validate these findings.

Dedication Page

I dedicate this dissertation to my dad, Richard Salwen, who passed away 4 years ago and would have been immensely proud of me.

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List of Abbreviations

Analysis of variance = ANOVA

Binge eating = BE

Body mass index = BMI

Comparative fit index = CFI

Emotional eating = EE

Emotional impact = EI

Night eating = NE

Night Eating Questionnaire = NEQ

Questionnaire on Eating and Weight Patterns (Revised) = QEWP-R

Root mean square error of approximation = RMSEA

Self-perception = SP

Three Factor Eating Questionnaire-18 (Revised) = TFEQ-18R

United States = U.S.

Unhealthy weight control = UWC

Weight-related abuse = WRA

Weight-Related Abuse Questionnaire = WRAQ

Weight-related teasing = WRT

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Introduction

Obesity, defined as having a body mass index (BMI) over 30.0 for adults, affects approximately one-third of U.S. adults and one-sixth of U.S. adolescents (Ogden, Carroll, Kit, & Flegal, 2014), with researchers estimating that rates of extreme obesity may be increasing (Sturm, 2007). Obesity is also a risk factor for a number of medical conditions, and is associated with increased rates of a variety of psychological problems, including anxiety, depression, suicide attempts, decreased quality of life, and binge eating (de Wit, van Straten, van Herten, Penninx, & Cuijpers, 2009; Dong, Li, Li, & Price, 2006; Kolotkin, Meter, & Williams, 2001). In addition to these psychological comorbidities, general childhood abuse rates are very high among obese individuals, with estimates ranging from 61 to 69% (Grilo, Masheb, Brody, Toth, Burke-Martindale, & Rothschild, 2005; Williamson, Thompson, Anda, Dietz, & Felitti, 2002), rates that are nearly double those found in a community sample (35%; Scher, Forde, McQuaid, & Stein, 2004). However, a recent meta-analysis showed an odds ratio of only 1.36 for childhood abuse leading to obesity (Danese & Tan, 2013; Grilo et al., 2005), suggesting that there may be other mechanisms involved in the relationship between abuse and obesity.

While some researchers suggest that the susceptibility of obese individuals to weight-related teasing (WRT), or verbal victimization specific to weight or shape (Quinlan, Hoy, & Costanzo, 2009), may be contributing to the aforementioned rates of general childhood abuse (Grilo et al., 2005; Jackson, Grilo, & Masheb, 2000), WRT has been most commonly investigated with regard to its impact on negative self-perception (body dissatisfaction and self-esteem) and disordered eating (unhealthy weight control and binge eating; e.g. Menzel et al., 2010; Neumark-Sztainer et al., 2002). However, more recent research concerning individuals with extreme obesity suggests that WRT and general childhood abuse may differ in their impacts

on adult outcomes (Salwen, Hymowitz, Vivian, & O'Leary, 2013). Additionally, an investigation of the differential impacts of general childhood abuse, WRT, and weight-related abuse (WRA; defined as significant verbal or physical victimization or maltreatment specific to one's weight) suggested that WRA is a stronger predictor of disordered eating in adulthood than either general childhood abuse or WRT (Salwen, Hymowitz, Bannon, & O'Leary, 2015). While WRA encompasses WRT, it also expands beyond teasing to include more severe occurrences and thus more accurately reflects the variability in individuals' experiences.

Furthermore, longitudinal research on WRT and long-term outcomes suggests that WRT leads to disordered eating through its impact on self-perception (e.g., Neumark-Sztainer et al., 2006; 2007; 2012), though this research typically does not include investigations of the initial impact of the WRT (e.g., Menzel et al., 2010). Recent research by Salwen and colleagues (2015) attempts to address this issue, and suggests that emotional impact of WRA is critical in explaining the relationship between WRA and disordered eating. However, this research did not include investigations of self-perception or its role in the development of disordered eating.

These findings highlight that it is not just the occurrence of WRA, but the resulting effect it has on an individual that determine its significance and role in shaping that individual's life. However, the implications of these findings have not been fully explored, particularly with regard to their associations with common consequents (i.e., BMI and negative self-perception) of WRA. A more nuanced understanding of the impact of this more specific form of general childhood abuse in the context of an additive or risk based model for the development and maintenance of obesity could provide important guidelines for obesity prevention and treatment. Thus, the major goal of this study is to develop a model of the severity and impact of WRA on negative self-perception and disordered eating, and on the development of obesity (Figure 1;

observed variables are described in full in the method section). In order to better illuminate the proposed mechanisms behind these pathways, it is important to first comprehensively review the existing literature.

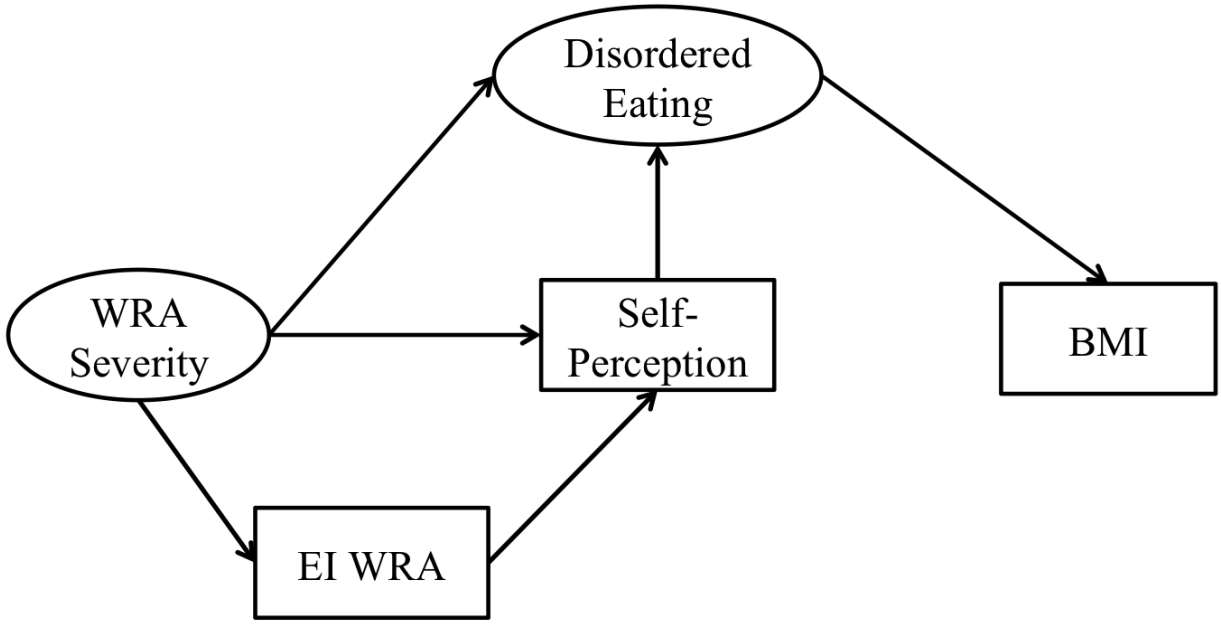

Figure 1. Proposed model for the current study without indicators. WRA=verbal weight-related abuse; EI=emotional impact; BMI=body mass index.

Obesity in the United States

Obesity is a growing and costly problem in the United States (Center for Disease Control and Prevention, 2012; 2012b; Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). In fact, the Centers for Disease Control and Prevention estimated that in 2008, approximately $147 billion was spent in obesity-related medical costs (2012b). Additionally, in 2011 to 2012, 28.7% of adults 20 years or older were obese and 6.4% were extremely obese (BMI $\geq$ 40; Ogden et al., 2014; National Institute of Health, 1998). For adolescents, where obesity is defined as, "greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts," (Ogden et al., 2014, pp. 807) 16.9% of individuals ages 12-19 were obese (Ogden et al., 2014).

Researchers also predict that while increases in rates of adult obesity have slowed some, rates of extreme obesity are rapidly increasing (Sturm, 2007). Thus, there is a drastic need for furthering our understanding of factors that could potentially contribute to the development and/or maintenance of extreme obesity.

Weight-Related Teasing and Obesity

Unfortunately, WRT is very common, particularly in individuals with obesity. In a study of 4,746 middle and high school students, 21.2% of healthy weight (15^{th} to 85^{th} percentile) girls and 13% of healthy weight boys reported being teased about their weight by peers at least a few times per year. These rates also increase with weight status; 31.4% of moderately overweight girls and 26.3% of moderately overweight boys (85^{th} to 95^{th} percentile) reported teasing and 63.2% of very overweight girls and 58.3% of very overweight boys ($\geq 95^{th}$ percentile) reported teasing. Additionally, 47.2% of very overweight girls and 34% of very overweight boys reported WRT by their families (Neumark-Sztainer et al., 2002). In addition to the elevated rates of WRT in overweight and obese children and adolescents, obese adults also report substantial WRT, often referred to as stigma. In a sample of 2,449 predominantly overweight and obese individuals, Puhl and Brownell (2006) found that 68% had negative assumptions made about them by others, 51% had "nasty" comments made by family, 50% had loved ones feel embarrassed about their size, and 48% felt avoided, excluded, or ignored.

These rates are also likely affected by age of onset of obesity. Weight is one of the primary reasons for being bullied in school (Puhl, Peterson, & Luedicke, 2013; Puhl, Luedicke, & Heuer, 2011), with earlier weight gain or onset of obesity likely increasing one's risk for being a victim of such bullying. Additionally, individuals with childhood or adolescent onset of obesity report more WRT than individuals with adult onset (Jackson, Grilo, & Masheb, 2000),

and psychological impact of WRT is typically more severe with earlier onset or greater duration of the WRT (Madowitz, Knatz, Maginot, Crow, & Boutelle, 2012; Puhl & Luedicke, 2012). Research also indicates that earlier onset of obesity is associated with greater reports and earlier onset of WRT, body dissatisfaction, lower self-esteem, and binge eating (Stice, 2002; Wardle, Waller, & Fox, 2002). Further, this problem is also likely cyclical, wherein weight gain leads to more teasing, which then leads to additional weight gain.

Impact of Weight-Related Teasing

As the severity and/or frequency of WRT increases, the negative psychological impact of the teasing increases as well (Keery, Boutelle, van den Berg, & Thompson, 2005). Moreover, when participants reported being teased by both family and peers, the psychological impact of the teasing increased significantly across all indices. Research also demonstrates specific associations between WRT and disordered eating that are stable and reliable across time; a meta-analysis on associations of WRT by Menzel and colleagues (2010) showed moderate effect sizes for the relationships between WRT and dietary restraint (.35) and WRT and binging and/or purging (.36). In a longitudinal study, Neumark-Sztainer and colleagues (2002) found that frequent teasing by peers or family led to significantly more binge eating and unhealthy weight control behaviors (e.g. fasting, diet pills, vomiting, laxative, diuretics) for both boys and girls, suggesting that WRT may contribute to the development of disordered eating. These outcomes continue into adulthood as well; Eisenberg, Gerge, Fulkerson, and Neumark-Sztainer (2012) found that hurtful weight-related comments from family and significant others in young adulthood predicted disordered eating, even when previous teasing was controlled for. Similarly, recent research by Salwen and colleagues (2015) suggests that WRA predicts disordered eating behaviors above and beyond both WRT and general childhood abuse, further supporting the

specific relationship between WRA and disordered eating in adulthood.

Additionally, although many of these studies on WRT and disordered eating do not look directly at the impact of disordered eating on long term weight gain, other research has shown the detriment of these eating patterns. Common consequences of WRT, including unhealthy weight control behaviors, binge eating without compensatory behaviors, and binging and purging, have all been shown to increase weight long term (Fairburn, Cooper, Doll, Norman, & O'Conner, 2000; Neumark-Sztainer et al., 2006; Neumark-Sztainer, et al., 2007; Neumark-Sztainer, Wall, Story, & Standish, 2012). Similarly, other disordered eating behaviors (e.g. night eating and emotional eating) are also associated with both general childhood abuse (Allison, Grilo, Masheb, & Stunkard, 2007) and increased BMI (Stunkard, Berkowitz, & Wadden et al., 1996).

Weight-Related Teasing & Self-Perception

Experimental and longitudinal research also indicates that negative self-perception (as a combined measure of low self-esteem and body dissatisfaction) is crucial in the development of disordered eating (Neumark-Sztainer et al., 2006; 2007; 2012; Stice 2002). Further, not only is there a strong association between WRT and body dissatisfaction (effect size=.39; Menzel et al., 2010), but research by Benas and Gibb (200) also indicates that dysfunctional cognitions about eating mediate the relationship between verbal victimization and eating disorder symptoms. Similarly, in a study by Eisenberg, Neumark-Sztainer, and Story (2003), adolescents who reported more frequent WRT reported decreased self-esteem and increased body dissatisfaction. However, research thus far has not addressed how these negative self-perceptions develop. While research by Salwen and colleagues (2015) suggests that emotional impact of WRA is critical in explaining the development of disordered eating, this research has not yet been applied

to the existing literature that addresses self-perception as a mediator in the relationship between WRA and disordered eating, and disordered eating as a predictor of BMI. As not everyone who experiences WRA develops negative self-perceptions and disordered eating (see body of research by Neumark-Sztainer & colleagues for review), it is critical that research addresses which individuals are at risk for this pathway that leads to unhealthy behaviors.

Current Study

The primary goal of the present study is to investigate how WRA may lead to weight gain and obesity, and to compare this model in individuals with early versus late onset of obesity. Previous research suggests that severity of verbal WRA (measured by 3 indices: verbal WRA, duration of abuse, and # of sources of perpetration) would predict self-perception, which would predict disordered eating (measured by 4 indicators: binge eating, emotional eating, night eating, and unhealthy weight control), and disordered eating would predict BMI. I hypothesized that emotional impact of WRA would mediate the relationship between severity of WRA and negative self-perceptions within this comprehensive model, and that the inclusion of emotional impact of WRA would improve the overall model fit (Figure 2). Based on the extensive literature on age of onset of obesity affecting susceptibility to teasing, I also predicted that this model would fit better in individuals who reported earlier onset of obesity.

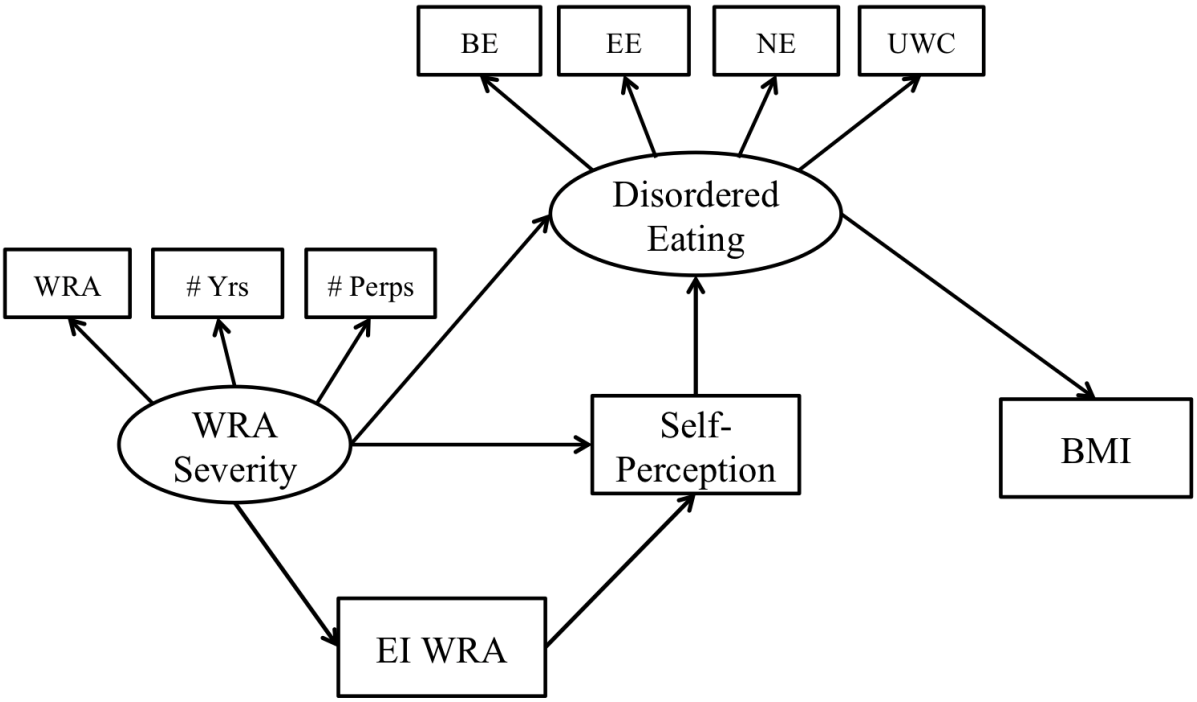

Figure 2. Hypothesized model with indicators. WRA=weight-related abuse; Yrs=years; # perps=number of sources of perpetration of WRA; EI=emotional impact; BE=binge eating; EE=emotional eating; NE=night eating; UWC=unhealthy weight control; BMI=body mass index.

These hypotheses were examined cross-sectionally in a sample of undergraduate students, as young adulthood is generally considered to be the peak time of onset for disordered eating (Hudson, Hiripi, Pope, & Kessler, 2007). Although the data on WRA were collected retrospectively, research has shown that the use of retrospective self-report measures of childhood abuse is more likely to produce false negatives than false positives (Hardt & Rutter, 2004). Additionally, a recent meta-analysis demonstrated that the method of assessment of abuse (e.g. longitudinal, retrospective self-report, legal records) does not significantly affect the relationship between abuse and obesity (Danese & Tan, 2013).

Method

Participants

Participants included a sample of 371 undergraduate students (44.7% men, 55.3%

women) from a large, northeastern university. The participants ranged in age from 18 to 39 years old (M = 19.58, SD = 2.30), and the majority was in the first (33.9%) or second year of undergraduate education (22.2%; M = 1.47 years completed, SD = 1.40). The ethnic breakdown of the sample was 48.9% Caucasian, 30.2% Asian, 8.2% Hispanic, 5.8% African American, 3.0% of multiple ethnicities, and 3.8% other. Participants' Body Mass Index (BMI; based on self-reported height and weight) ranged from 16.42 to 48.91 (M = 26.06, SD = 5.31), with 3% of the sample underweight, 39.4% at a healthy weight, and 39.6% meeting criteria overweight, 11.9% for class I obesity, 3.5% for class II obesity, and 2.7% for class III obesity (based on National Institute of Health guidelines, 1998). As was the goal in the data collection for this study, the BMI breakdown is more varied as compared to other studies on college students and weight, as many other studies include approximately 65-84% healthy weight individuals (e.g., Desai, Miller, Staples, & Bravender, 2010; Huang et al., 2003; Lowry et al., 2000; Racette et al., 2005).

While the initial sample included 404 participants, 33 were removed due to either a non-response to items asking about weight, height, onset of obesity, verbal WRA, binge eating, or night eating (n = 30) or clear mistakes (e.g., 12 lbs. as total weight) for items that required participants to type in answers (n = 3). These participants were not significantly different from the retained sample on age, education, ethnic background, or verbal WRA (all ps > .18).

Procedure

Participants registered for this study on a psychology department website, through which they were given a direct study link. Through the online survey website, participants who agreed to an informed consent completed numerous self-report questionnaires, including a basic demographics questionnaire. After they had completed the online questionnaires, participants

came into a lab to complete a final self-report questionnaire in-person (due to copyright restrictions). After completion of the study, participants were awarded course credit commensurate with the percentage of the questionnaires they completed.

Data were collected in two waves, and the second wave of data collection oversampled for participants who were overweight or obese. Participants in wave 2 did not significantly differ from wave 1 participants on variables that were not significantly related to weight based on previous research. All questionnaires and procedures were approved by the Human Subjects Institutional Review Board.

Measures

Night Eating Questionnaire (NEQ; Allison et al., 2008). The NEQ is a 14-item instrument designed to assess timing of eating patterns, eating during the evening and night, and sleep habits. Items are rated from 0 to 4, and response choices vary by item. Possible total scores range from 0 to 56, with scores over 25 indicating clinically significant symptoms of night eating syndrome. Cronbach's alpha for this subscale was acceptable, $\alpha = .64$, and was similar to the alpha reported by the questionnaire developers (Allison et al., 2008).

Onset of overweight. Onset of overweight was measured by an item from the general demographic questionnaire that asked, "At what age were you first overweight by 10 pounds or more?" Participants were then separated into 3 groups based on their responses; childhood onset (overweight before age 11; n = 104), adolescent onset (overweight between ages 11 and 19; n = 129), and other (onset after 20 or never; n = 138). Group breakdown was based on previous research suggesting the use of (or the validity of) these categories (Ogden et al., 2014; Nasr, Kaminski, & Sriram, 1982; Price et al., 1990).

Questionnaire on Eating and Weight Patterns – Revised (QEWP-R; Yanovski, 1993). The

QEWP-R was used to measure both Binge Eating and Unhealthy Weight Control.

Binge-Eating. As part of the QEWP-R, participants are initially asked if within the past 6 months, they have eaten an unusually large amount of food, and if they felt out of control during those times. While DSM-5 criteria require endorsement of both of these symptoms for full diagnosis, participants who endorsed at least one of the symptoms were administered 6 additional items based on DSM-5 criteria assessing binge eating symptomatology. This strategy was chosen in order to more fully evaluate general binge eating symptomatology and increase variability in this measure. For this study, these 6 additional items were rated on a 5-point Likert-type scale ranging from 1 (less than 1 day per week) to 5 (almost every day or more) instead of yes or no. These participants were also administered two items assessing their overall distress about both binge-eating and loss of control, with response choices ranging from 1 (not at all) to 5 (extremely). We created an overall score by summing the number of symptoms endorsed as either occurring at least once per week (binge eating experiences) or as being moderately distressing. Cronbach's alpha for this subscale was good, $\alpha = .91$.

Unhealthy Weight Control. Participants were asked if they engaged in the following behaviors after binge-eating: vomiting, fasting for at least 24 hours, exercising for more than 1 hour, or taking more than twice the recommended dose of laxatives, diuretics, or diet pills. For each behavior, participants were asked if they had engaged in that behavior at all within the past 3 months, and if so, at what frequency (from less than once per week to more than 5 times per week). A compound Unhealthy Weight Control measure was created by summing the number of behaviors in which participants engaged at least once per week. Cronbach's alpha for this subscale was low, $\alpha = .59$, though this low internal consistency is consistent with the content and aim of this scale, as the behaviors evaluated using this measure do not have to occur conjointly.

Self-Perception/Weight and Lifestyle Inventory (WALI; Wadden & Foster, 2006). Self-perception was measured by a 6-item subscale of the WALI that assesses satisfaction with one's appearance, weight, and current self-esteem and items have been demonstrated to adequately screen for symptoms of low self-esteem (Wadden et al., 2006). Response choices vary by item with high scores indicating negative self-perception. Total scores range from 6 to 36 and Cronbach's alpha for this self-perception subscale was good, $\alpha = .86$.

Three Factor Eating Questionnaire – Revised (TFEQ-18R; de Lauzon et al., 2004). The TFEQ-R18 consists of 18 items measuring three factors: Cognitive Restraint, Uncontrolled Eating, and Emotional Eating. For the purposes of this study we used the 6-item Emotional Eating subscale. For this subscale participants were asked to rate statements regarding a tendency to eat in response to emotions, including nervousness, depression, tension, loneliness, sadness, and anxiety, using a scale ranging from 1 (definitely false) to 4 (definitely true). Total scores range from 6 to 24, and Cronbach's alpha for this emotional eating subscale was good, $\alpha = .84$.

Weight-Related Abuse Questionnaire (WRAQ; Salwen & Hymowitz, unpublished manuscript). The WRAQ is a 15-item questionnaire that assesses the average frequency of negative weight-related events before the age of 21, in addition to the emotional impact of and context surrounding the abuse. While there are two separate abuse subscales (verbal WRA and physical WRA), only the verbal subscale was used herein as verbal WRA is more prevalent and has a more direct relationship with disordered eating (Grilo et al., 2005; Salwen et al., 2015). On this subscale, participants are asked "Before age 21: how often did the following things happen to you?" This subscale consists of 8 items, for example: "Someone called you names because of your weight," **"**Someone embarrassed you in front of others because of your weight," and

"Someone threatened to abandon you because of your weight." Items are rated from 0 (never) to 6 (more than 20 times per year); a mean score is then computed, with final scores ranging from 0 to 6. Cronbach's alpha was excellent for the verbal abuse WRAQ subscale, $\alpha = .93$.

Participants who endorse any verbal WRA are then asked, "What was the impact of these occurrences on you? Did you feel…" They are then provided with a list of 14 possible emotional reactions (e.g., anger, anxiety, sadness, embarrassment, hopelessness) and rate each emotional reaction from 0 (not at all) to 5 (extremely), with total scores ranging from 0 to 70. Cronbach's alpha was excellent for the emotional impact subscale, $\alpha = .96$.

Participants who endorse any verbal WRA are also asked about duration of abuse, their body size and shape at the time of the abuse, the relational impact of the abuse, and the perpetrators of the abuse. For this study, duration of the WRA and number of sources of WRA were used to measure severity of WRA. An item asking how many years the verbal WRA went on for was used to measure duration of the WRA. For number of sources, participants were asked, "who treated you this way?" and were asked to check off any of the following choices that applied: parent, sibling, other family member, friend, classmate, significant other/romantic partner, other. The variable number of sources of WRA was made by summing the number of categories of perpetrators. For participants who denied any verbal WRA, emotional impact of WRA, duration of WRA, and number of sources of WRA were coded as 0 for analyses.

Results

Data Analysis

All data were examined for missing values and normality. A multiple imputation missing values assessment was run, including all items for study variables that all participants should have answered (N=40). For example, all participants should have answered 2 binge-eating items

(loss of control and large amount of food), but not all participants should have answered additional binge eating items; the structure of the online questionnaire system allowed participants who denied both initial binge eating symptoms to move on to the next questionnaire. Thus, items on binge eating that only select participants were prompted to answer were not included in this initial analysis. This analysis showed that for these 40 study items, 27 items (67.5%) had complete data for all of the initial 404 participants. Further, 374 participants (92.57%) had complete data for all 40 variables. Missing response rates for these 40 items ranged from 6.4% (onset of overweight) to 0%. Missing value pattern analyses indicated that the most common pattern was to have no missing values, followed by missing onset of overweight. In reviewing the data in greater depth, it is likely that several participants who were never overweight did not answer this item, despite specific instructions to input "00" into the given text box if this were the case. Participants missing more than 25% of the items on a questionnaire were removed from analyses (total removed = 33, final N = 371). Preliminary analyses were conducted using SPSS (version 21) and latent variable analyses were conducted using SPSS AMOS.

For the included 371 participants, due to the randomness of the missing values (aside from onset of overweight) if more than 75% of the items for a variable were answered, within-subject mean imputation was used to replace missing values. For all included participants 0 to 1.9% of data were missing across questionnaires. Based on a review of the frequency plots and descriptive statistics for study variable data, all other data appear to have been entered correctly and no outliers were observed. Further, all study variables with the exception of unhealthy weight control were normally distributed. Although unhealthy weight control was positively skewed, it was assumed to be an appropriate approximation of the population.

Data were also examined for demographic differences to evaluate the potential for combined analyses. Verbal WRA, number of sources of WRA, duration of WRA, emotional impact of WRA, binge eating, emotional eating, night eating, unhealthy weight control, self-perception, and BMI were all evaluated for significant differences based on gender (independent samples t-test), ethnicity (analysis of variance [ANOVA]), and year of education (ANOVA). Bonferroni corrected significance cut-off for all analyses = .005 [.05/10].

As is shown below in Table 1, only 3 of the relationships investigated were significant. With regard to gender, women reported significantly more emotional eating than men (t (369) = -4.01, $p < .001$). However, as other forms of disordered eating were not significantly different based on gender and past research has also demonstrated this gender difference (e.g., Oliver, Wardle, & Gibson, 2000), a combined gender sample was retained. To ensure that this variable did not affect the final model, model fit was compared based on gender and is described in full in the results section.

With regard to ethnicity, BMI significantly differed based on ethnic background, with a post-hoc Tukey-test indicating that Asian participants had significantly lower BMIs than participants who reported themselves to be Caucasian (mean difference = -1.99, $p = .02$), Hispanic (mean difference =-3.96, $p = .003$), or African American (mean difference = -4.56, $p = .003$). A combined ethnicity sample was retained because although Asian participants had significantly lower BMIs, this variation is consistent with U.S. obesity trends (Ogden et al., 2014), and other model variables did not differ by ethnic background. Thus, while these participants may have had lower BMIs, cultural differences likely led them to be subject to similar experiences as individuals of other ethnic backgrounds at slightly higher BMIs (Barnett, Keel, & Conoscenti, 2001). To ensure that this variable did not affect the final model, model fit

was compared based on ethnicity and is described in full in the results section.

With regard to years of education, BMI differed significantly based on years of education, with a post-hoc Tukey-test indicating that participants who had not yet completed one year of college had significantly lower BMIs than participants who had completed 3 years of college (mean difference = -2.78, p = .01) or 4 years of college (mean difference = -3.56, p = .01). As the significance for the mean differences was less than the corrected cut-off of .005, a combined education sample was retained.

Table 1.

	Gender		Ethnicity		Education	
	t	*p*	*F*	*p*	*F*	*p*
Verbal WRA	-.43	.67	.17	.97	2.77	.01
Duration of WRA	-1.42	.16	1.49	.19	2.83	.01
Sources of WRA perpetration	-.24	.81	1.26	.28	1.16	.33
Emotional impact of WRA	-2.68	.01	.57	.72	1.99	.07
Binge eating	-.53	.59	.51	.77	.19	.98
Emotional eating	-4.01	<.001	.20	.96	.48	.83
Night eating	-2.40	.02	1.31	.26	.59	.74
Unhealthy weight control	-.79	.43	.72	.61	1.24	.29
Self-perception	-2.48	.01	1.97	.08	1.34	.24
BMI	.58	.56	5.02	<.001	3.37	.003

Table 1. Significant differences based on demographics for model variables. WRA=weight-related abuse; BMI=body mass index.

General Findings

Overall, 64.4% of participants reported experiencing verbal WRA before age 21. For participants who endorsed experiencing verbal WRA, sources included classmates (70.6%), friends (39.2%), siblings (30.2%), parents (27%), other family members (27.5%), significant others/romantic partners (9%), and other (1.6%; 4/6 participants wrote in strangers). With regard to disordered eating, 13.7% reported symptoms consistent with binge eating disorder, 12.1% reported clinically significant night eating, and 33.4% reported engaging in unhealthy weight control behaviors at least once per week. Means and standard deviations for all model variables

are presented below in Table 2, and correlations are presented in Table 3.

Table 2.

	Mean	*SD*
Verbal WRA	1.08	1.31
Duration of WRA	3.24	4.24
Sources of WRA perpetration	1.20	1.33
Emotional impact of WRA	1.06	1.32
Binge eating	3.77	3.34
Emotional eating	12.84	4.48
Night eating	18.37	6.20
Unhealthy weight control	.59	1.12
Self-perception	18.89	6.20
BMI	26.06	5.31

Table 2. Means and standard deviations of model variables. WRA=weight-related abuse; BMI=body mass index.

Table 3.

	Yrs WRA	WRA Sources	EI WRA	BE	EE	NE	UWC	SP	BMI
Verbal WRA	.60***	.58***	.64***	.30***	.32***	.24***	.25***	.40***	.40***
Yrs WRA	--	.61***	.64***	.22***	.28***	.22***	.19***	.33***	.34***
WRA Sources		--	.61***	.21***	.24***	.18**	.25***	.36***	.31***
EI WRA			--	.29***	.42***	.36***	.25***	.51***	.34***
BE				--	.41***	.36***	.24***	.31***	.16**
EE					--	.40***	.28***	.44***	.18***
NE						--	.21***	.32***	.12*
UWC							--	.28***	.14**
SP								--	.40***

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

Table 3. Correlations among model variables. WRA=weight-related abuse; Yrs=years; EI=emotional impact; BE=binge eating; EE=emotional eating; NE=night eating; UWC=unhealthy weight control; SP=self-perception; BMI=body mass index.

Additionally, variables were compared on onset of obesity (childhood, adolescent, or other) using univariate analysis of variance (ANOVA); results are presented below in Table 4.

Table 4.		
	F	Sig diffs.
Verbal weight-related abuse	58.08***	a, b
Duration of WRA	69.84***	a, b, c
Sources of WRA perpetration	63.13***	a, b, c
Emotional impact of WRA	60.38***	a, b, c
Binge eating	4.89**	a, b
Emotional eating	7.86***	a, b
Night eating	2.87	none
Unhealthy weight control	10.27***	a, b
Self-perception	26.19***	a, b
BMI	79.69***	a, b, c
a. childhood vs. adolescent; b. childhood vs. not before 20; c. adolescent vs. not before 20		

Table 4. One-way ANOVAs comparing model variables based on onset of overweight. WRA=weight-related abuse; BMI=body mass index. *p<.05; **p<.01; ***p<.001

Latent Variable Analysis

Latent variable analysis was used herein to evaluate the hypothesis that emotional impact of WRA would mediate the relationship between severity of verbal WRA (measured by 3 indices: verbal WRA, duration of WRA, and # of sources of WRA) and negative self-perception, that severity of verbal WRA would predict disordered eating (measured by 4 indicators: binge eating, emotional eating, night eating, and unhealthy weight control) and negative self-perception, and that negative self-perception would predict disordered eating, which would predict BMI. In the initial model with severity of WRA predicting disordered eating and negative self-perception, self-perception predicting disordered eating, and disordered eating predicting BMI, all relationships were positive and significant (all βs > .43, ps < .001). However, the overall model showed a poor fit (X^2 (32, N = 371) = 422.111, p < .001). To further investigate the fit of this model, we examined the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and PCLOSE. In a good-fitting model, CFI > .95, RMSEA < .05 with a 90% confidence interval including .00 as the lower bound, and

PCLOSE > .5 (Brown & Kudek, 1993; Byrne, 2010). Based on these criteria, this initial model did now show an acceptable fit across all indices; CFI = .68, RMSEA = .18 with a 90% confidence interval from .17 to .20, and PCLOSE = .00.

However, with the introduction of emotional impact of WRA as a mediator in the relationship between severity of WRA and self-perception, the model fit improved significantly, X^2 (2, N = 371) = 335.66, $p < .0001$. Of note, while a low chi-square value is desired for the model fit, a significant, high chi-square value is desired for the test examining differences between models. In the new model, while all paths within the model except the path between severity of WRA and self-perception were positive and significant (all *p*s < .001) and fit improved for the CFI (CFI=.95), other fit indices were still not adequate; RMSEA = .07, with a 90% confidence interval from .05 to .09, and PCLOSE = .02. Although X^2 (30, N = 371) = 86.45, $p < .001$, chi-square is typically not a useful indicator of fit for large samples (Byrne, 2010). These values suggest that while the model itself may have a good fit, it likely is not adequately capturing the variability in the population, thereby highlighting the import for the planned analyses based on onset of overweight.

With regard to onset of overweight, I primarily explored the fit of this model based on whether or not participants reported being overweight before age 20. The model in which paths were constrained to be equal across groups showed an adequate fit, X^2 (70, N = 371) = 129.67, $p < .001$, CFI=.94, RMSEA = .05 (95% confidence interval from .04 to .06), PCLOSE = .58. However, the fit was improved in the unconstrained model, X^2 (60, N = 371) = 111.47, $p < .001$, CFI=.95, RMSEA = .05 (95% confidence interval from .03 to .06), PCLOSE = .57. Nested model comparisons indicated that the unconstrained model significantly improved model fit, X^2 (10, N = 371) = 18.21, $p = .05$.

Because the unconstrained model showed a significantly better fit, I explored model fit separately for the two groups. The model for the never overweight before 20 group did not show an acceptable fit across indices, X^2 (30, N = 135) = 67.91, $p < .001$, CFI=.91, RMSEA = .10 (95% confidence interval from .07 to .13), PCLOSE = .01. However, the model for the overweight before 20 group showed an excellent fit across indices, X^2 (30, N = 236) = 43.47, $p = .05$, CFI=.97, RMSEA = .04 (95% confidence interval from .00 to .07), PCLOSE = 62. To ensure that model fit was solely past on perceived past overweight and not current weight status, this model was also compared based on current BMI (healthy versus overweight+) and results showed that equal versus constrained models did not differ significantly, X^2 (10, N = 371) = 8.54, $p = .58$.

To further specify the impact of onset of overweight, model fit was compared for participants who reported childhood as compared to adolescent onset of overweight. In this analysis, only participants who reported being overweight before age 20 and by at least 10 pounds (n=236) were included. The model in which paths were constrained to be equal across groups showed an excellent fit, X^2 (70, N = 236) = 93.44, $p = .03$, CFI=.95, RMSEA = .04 (95% confidence interval from .01 to .06), PCLOSE = .84, as did the unconstrained model, X^2 (60, N = 236) = 83.12, $p = .03$, CFI= .95, RMSEA = .04 (95% confidence interval from .02 to .06), PCLOSE = .99. Nested model comparisons indicated that the unconstrained model did not significantly improve fit, X^2 (10, N = 236) = 10.32, $p = .41$. Based on these data, I maintained a final sample of individuals who had been overweight by 10 pounds or more before the age of 20. This full and final model is pictured below (Figure 3).

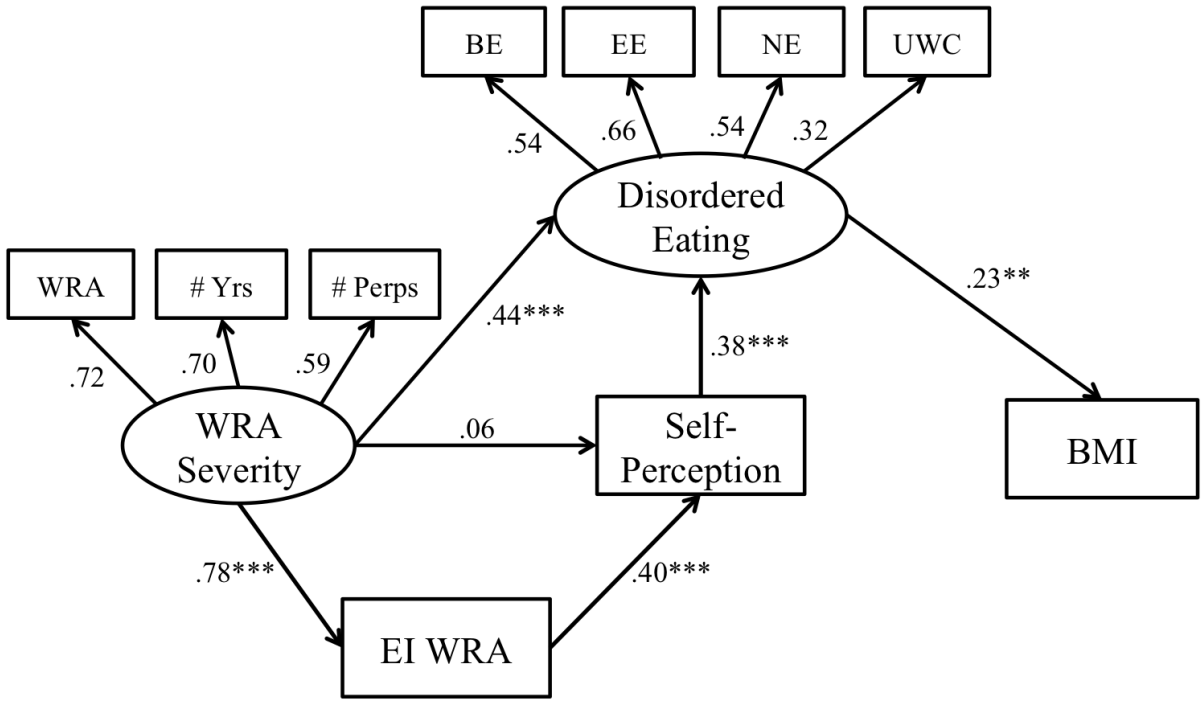

Figure 3. Final model including only participants who reported onset of overweight before age 20. WRA=weight-related abuse; Yrs=years; # perps=number of sources of perpetration of WRA; EI=emotional impact; BE=binge eating; EE=emotional eating; NE=night eating; UWC=unhealthy weight control; BMI=body mass index. *p<.05; **p<.01; ***p<.001

Lastly, based on initial demographics analyses, model fit was also compared based on ethnicity (Asian vs. others) and gender (men vs. women) in individuals who had been overweight before age 20. These analyses were performed to ensure that these demographic factors were not in some way altering the model fit. Results showed that equal versus constrained models did not differ significantly based on ethnicity, X^2 (10, N = 236) = 9.44, p = .49, or based on gender, X^2 (10, N =236) = 5.54, p = .85.

Discussion

The present study was conducted to evaluate a model of the severity and impact of verbal WRA on self-perception, disordered eating, and BMI in a sample of undergraduate students. As hypothesized, emotional impact of WRA mediated the relationship between severity of verbal WRA and self-perception in a comprehensive model of WRA, self-perception, disordered eating,

and BMI. These data suggest that for individuals who report significant emotional upset following verbal WRA, they likely develop negative feelings about themselves and patterns of disordered eating. Further, those negative feelings also increase and maintain disordered eating behaviors, which lead to increased BMI. Similar to previous research (e.g., Neumark-Sztainer et al., 2006; 2007; 2012), in this model, negative self-perception was significantly related to disordered eating, which in turn predicted current BMI. Additionally, building upon past research by Salwen and colleagues (2015), this model suggests that emotional impact of WRA is a critical factor in the long-term development of disordered eating and increased BMI through its impact on self-perception. However, it is also possible that individuals who are more aware of or concerned about their weight may be at greater risk for suffering emotional damage from the WRA, and therefore developing disordered eating behaviors. Longitudinal research on the relationships among perceptions of weight, WRA, and BMI would help to further illuminate the directionality and/or reciprocity of these relationships.

While the initial model with the full sample did not fit well, exploratory analyses suggested that the model fit was significantly better for individuals who had been overweight before age 20 than for individuals who had never perceived themselves to be overweight in childhood or adolescence. However, model fit did not differ by current weight status or by onset of overweight (childhood vs. adolescence). These exploratory results suggest that the relationships among verbal WRA, negative self-perception, disordered eating, and BMI are particularly salient for individuals who believe they have been overweight at some point during childhood or adolescence. These analyses highlight not only the importance of having a history of overweight, but also the importance of *perceived* weight status. It may be that for individuals who are victims of WRA, they are more aware of their weight, and thus are more susceptible to

maladaptive thoughts and behaviors. In fact, in line with the results of this study highlighting the importance of the emotional impact of WRA, extensive research by Thomson and Stice (2001) suggests that internalization of societal opinions of attractiveness leads to the development of both body-dissatisfaction and disordered eating. Thus, it is likely that individuals who are the victims of WRA are led to believe their bodies do not meet this societal ideal, thereby increasing their upset and thus their risk for the development of these mental health problems.

These results also lend additional insight into possible variance in the relationship between early abuse and obesity in adulthood, as while this relationship is reliable, it is also small (Danese & Tan, 2013). These findings suggest that the relationship between childhood abuse and obesity may be low because there are other variables that are important to explain substantial variance in the association. Further, it is possible that BMI is not dependent specifically on exposure to early abuse, but instead on individuals' emotional, cognitive, and behavioral reactions to this early abuse.

Clinical Considerations

It is also important to consider the possibility that disordered eating may lead to increased weight through a variety of other factors, such as depression, decreased social activity, and social anxiety leading to fear of exercising in public. For example, disordered eating could lead to symptoms of depression such as worthlessness, increased appetite, decreased energy, and general behavioral inhibition, which would then decrease activity and increase eating (and possibly decrease cognitive skills necessary to maintain healthy dieting strategies), leading to increases in weight. Thus, exploring this model in combination with a variety of these other psychosocial factors will also be important in future research evaluating the impact of WRA on BMI.

Additionally, knowing these variables are important in explaining the relationship

between abuse and obesity may have notable implications for weight loss treatment. While Wing and Hill (2001) suggest that "successful" weight loss should be defined as a loss of 10% of initial body weight maintained over 1 year; many programs fall short of these criteria. For example, a recent meta-analysis of primary care based behavioral weight loss programs demonstrated that one year post-treatment participants had maintained a loss of 3-5 lbs (Booth, Prevost, Wright, & Gulliford, 2014). Typical behavioral weight loss treatment is designed to address current problematic patterns of diet and exercise and often does not include interventions that address possible developmental causes of obesity, such as verbal WRA and the resulting emotional impact (Wadden, Butryn, Hong, & Tsai, 2014). Further, investigations of why individuals drop out of behavioral weight-loss treatments rarely assess interpersonal or developmental factors (Moroshko, Brennan, & O'Brien, 2011).

When programs go beyond more basic behavioral strategies, they typically add interventions such as assertiveness training and cognitive restructuring (e.g., Leahey, Xu, Unick, & Wing, 2014). While these interventions may be effective for addressing current interpersonal conflicts or negative beliefs about relationships, they may not be sufficient for addressing the initial abuse itself. Research on general child abuse indicates that Cognitive Behavioral Therapy (CBT) has shown the most efficacy for symptom improvement shortly after exposure to a trauma in childhood (Cohen, Berliner, & Mannarino, 2000); however in adults, therapies that include exposure, emotion regulation, and interpersonal skills components may be most effective for the treatment of childhood trauma (Cloitre, Koenen, Cohen, & Han, 2002). If early abuse is the initiating factor for thoughts (i.e., self-perception) and behaviors (i.e., disordered eating) that lead to weight gain, but the resulting psychological impact of the abuse is either not addressed or addressed ineffectively, this could possibly explain why these interventions are not very

successful.

In the treatment of eating disorders, CBT and Interpersonal Therapy (IPT) lead to fairly similar remission rates for both binge eating disorder (79% vs 73% at posttreatment, respectively) and bulimia nervosa (48% vs 28% at posttreatment, respectively; Wilfley et al., 2002; Agras, Walsh, Fairburn, Wilson, & Kraemer, 2000). Though these treatment models include fairly separate mechanisms, both target an important component (interpersonal experience versus cognitions) of the model described herein. Thus, it is possible that utilizing a treatment strategy that targets both interpersonal problems and cognitions and acceptance of oneself and the environment (e.g., Acceptance and Commitment Therapy, Dialectical Behavioral Therapy) could produce improved results.

The current study, in conjunction with the aforementioned research on interventions for obesity, childhood trauma, and eating disorders, suggests that adding interventions that more specifically interpersonal and cognitive difficulties could improve the effectiveness of behavioral weight loss programs. Further, it is critical that these interventions not only address cognitive difficulties, but that they focus on self-perceptions, including body image, body dissatisfaction, and self-esteem. Similarly, interpersonal interventions should address not only improvement in current interpersonal effectiveness, but also the emotional and developmental pathways that dictate individuals' current approaches to relationships and interpersonal interactions.

Of note, programs that address the impact of WRA more closely to when it occurs (e.g., in childhood or adolescence) may be more effective in preventing or treating disordered eating and negative self-perception as pathways to obesity. Research indicates that school-wide bullying prevention programs are moderately successful in improving self-esteem, social competence, and peer acceptance, and mildly effective in students' participation in bullying

(Merrell, Gueldner, Ross, & Isava, 2008). However, general improvement in school may only be the first step, particularly because prevention programs were shown to only slightly reduce actually bullying incidents. Additionally, as WRA may be perpetrated by both peers and family members (Eisenberg et al., 2012; Neumark-Sztainer et al., 2002) and continues into adulthood (Puhl & Brownell, 2006; Friedman et al., 2005), it is crucial that education and prevention efforts are also expanded to other social spheres (e.g., the workplace, the family) and that healthcare providers are aware of the detrimental effects of these experiences. For example, assessment of WRA in children, adolescents, and adults by healthcare providers could be beneficial in identifying individuals who are experiencing this form of abuse and therefore are at risk for a variety of other physical and mental health problems. When individuals do endorse WRA, family therapy may also be a strong treatment option, particularly if family members are a source of the WRA and/or do not understand their impact on the child or adolescent in question.

Strengths, Limitations, & Future Research

It is important to note that this study had several critical strengths. First, as disordered eating typically onsets in late adolescence to young adulthood (Hudson et al., 2007), the age of the population used herein allowed for good variability in disordered eating measures. Further, due to both the large sample and the collection strategy involving oversampling of overweight or obese participants, it was possible to make comparisons based on onset of overweight and current weight status. Lastly, while other studies on these constructs have either focused on general childhood abuse or WRT (Danese & Tan, 2013; Menzel et al., 2010), research indicates that neither of these constructs are as closely related to disordered eating as is WRA (Salwen et al., 2015). Thus, the more comprehensive assessment of not only this specific form of childhood abuse but of the variability in possible forms of maltreatment serves to strengthen these findings

and contribute to the treatment of individuals who have experienced abuse.

Despite the strength of the methodology used in this study, there are several limitations to consider. Primarily, due to the use of self-report questionnaires, some of the associations between variables may have been artificially inflated. Additionally, while severity of WRA and disordered eating were measured by multiple indicators, self-perception was not. Thus, some variance in this construct was likely lost. Future research separating the constructs of self-esteem, body image, and social comparisons will likely be useful in assessing the full scope of the development and impact of negative self-perceptions. Further, self-reported height and weight are often reported inaccurately, thereby limiting the conclusions that can be drawn from our measure of BMI. However, meta-analyses indicate that while direct measurement of height and weight is always preferable, self-report is adequate for studies not involving clinical populations or measured changes in weight (Bowman & DeLucia, 1992; Engstrom, Paterson, Doherty, Trabulsi, & Speer, 2003). Thus, while BMI was acceptable for the model explored herein, future research using more accurate measures of height and weight (e.g., obtaining measured height and weight in an office visit) would strengthen these findings. Lastly, while the model presented herein is designed chronologically, the data were collected cross-sectionally, and thus conclusions that can be drawn with regard to causality are limited. It is also possible that this model may be cyclical, as disordered eating can result from a desire to lose weight (DSM-5, APA) and weight gain may lead to increased risk for WRA.

A second limitation of the questionnaires used in this study was the exclusive use of retrospective reports of WRA and age of onset of obesity. As described previously, although one study suggests that retrospective reports are more likely to result in underreporting as opposed to false positives (Hardt & Rutter, 2004) and the WRAQ demonstrates sufficient test-retest

reliability (Salwen & Hymowitz, unpublished manuscript), there remains a potential for biased reporting. Additionally, age at which an individual was overweight by at least 10 lbs may also be subject to biased reporting, as retrospective reports of onset of weight problems are often inconsistent or inaccurate (Goodman, Hinden, & Khandelwal, 2000). To account for this problem, onset of obesity was measured only as childhood, adolescent, or over 20/never; however, it is still possible that individuals were miscategorized. Further, it is possible that perceptions of overweight status were heavily influenced by external factors (e.g., WRT, family weight, cultural standards). Thus, participants may have inaccurately reported that they were never overweight when medically they would have been considered overweight, and vice versa. Future research utilizing a longitudinal design is necessary for validation of this model and further predictive inferences about these relationships and/or causality.

Third, while I did assess for who the perpetrators of WRA were, I did not evaluate the duration or impact of WRA separately for each of these different sources. Recent research suggests that different perpetrators of WRA may be related to different patterns of disordered eating (Bannon, Salwen, Hymowitz, & O'Leary, 2015). Thus, future research more thoroughly evaluating this model based on different sources of perpetration of WRA may provide useful information on different pathways toward the development and maintenance of obesity. Further, it is also possible that experiencing WRA from different sources may be related to differences in other psychosocial outcomes. For example, perpetration of WRA by classmates may lead to impairments in educational functioning on the development of peer-related social skills. However, perpetration of WRA by a significant other would be more likely to lead to problems with romantic relationships and/or sexual functioning.

Finally, the sample used to evaluate this model was also somewhat limited, as we utilized

a convenience sample of undergraduate students. The mean age in this sample was 19.58 years, and thus over half of participants' age of onset of overweight may not have been captured correctly, as this variable was split at age 20. Future research evaluating this model in a sample with a much wider age range or in individuals all over the age of 20 is necessary to validate the utility of categorizing onset of obesity based on this age point. Further, while the typical onset of disordered eating is late adolescence to young adulthood (Hudson et al., 2007), suggesting that a college student population may be optimal for studying the phenomena discussed herein, the restricted sample does limit the generalizability of our findings. It would be particularly beneficial to explore this model in a sample of individuals with extreme obesity, as rates of WRA are likely higher in this population. For example, in a sample of patients presenting for bariatric surgery, Friedman and colleagues (2005) found that 97.9% received "nasty" comments from family, 86% had loved ones feel embarrassed about their size, and 55.9% felt avoided, excluded, or ignored (Friedman, Reichmann, & Costanzo et al., 2005). Additionally, as bariatric, or weight-loss, surgery is the first line of treatment for extreme obesity (Wang et al., 2014), evaluation of this model in a surgical population may be of particular import. Although there does not appear to be any direct research on WRT or stigmatization and post-surgical outcomes, individuals who report greater stigmatization are less likely to seek medical care (see Puhl & Heurer, 2009), and lack of medical follow-up is associated with less post-surgical success (Fried, Hainer, & Basdevant, et al., 2007).

Further, post-surgery, disordered eating has also been shown to lead to less successful outcomes. Symptoms of binge eating disorder (with the exception of eating a large amount of food), emotional eating, and night eating have all been shown to lead to poorer post-surgical weight-loss outcomes (Canetti et al., 2009; Grothe, Dubbert, & O'Jile, 2006; Niego, Kofman,

Weiss, & Geliebter, 2007). Additionally, although body dissatisfaction does improve in most patients (van Hout, Verschure, & Van Heck, 2005), some researchers have found that it is not significantly related to BMI (Grilo 2005b; Hrabosky, Masheb, & White et al., 2006), suggesting that there may be more complex underlying mechanisms. Thus, if this model fit well in a pre-surgery population, it would suggest possible avenues for intervention, thereby decreasing the potential for these variables to affect post-surgical success.

Conclusions

This research demonstrates that severity of verbal WRA predicts both disordered eating and self-perception, self-perception predicts, disordered eating, and disordered eating predicts BMI. This model also highlights the importance of emotional impact of WRA in the development of negative perceptions about oneself. Thus, the relationship between WRA and BMI is complex, and in this model is based on the emotions, cognitions, and behaviors that result from exposure to WRA. Further, this research suggested that the associations in variables within this model may be different based on whether one was ever overweight by at least 10 lbs before age 20. Overall, these data are important for understanding how WRA and BMI are related, and can help explain the aforementioned low correlations between abuse and BMI. Specifically, these findings suggest that the pathway is not direct. This research also suggests possible areas that may be important to target in weight-loss interventions. Future research is needed to fully explore the implications of this model in both behavioral and surgical weight loss treatments.

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Appendix A
Weight-Related Abuse Questionnaire: Verbal Abuse Subscale

People sometimes have negative experiences related to their weight, and we'd like to find out about some of these experiences, and how they impacted you. The following questionnaire is made up of two sections, each of which asks about different kinds of negative experiences. The first is about verbal or psychological experiences and the second is about physical experiences.

Section 1:

BEFORE AGE 21: Did anyone ever tease, pick on, or criticize you, make you feel bad or call you names?

Yes _____ No _____

Of all the teasing, criticism, and name calling you experienced BEFORE AGE 21, approximately what percentage was because of your weight? _____

BEFORE AGE 21: How often did the following things happen to you?

	0 Never	1 Once per year	2 Twice per year	3 3 to 5 times per year	4 6 to 10 times per year	5 11 to 20 times per year	6 More than 20 times per year
1. **Someone** laughed at you because of your weight	0	1	2	3	4	5	6
2. **Someone** called you names because of your weight	0	1	2	3	4	5	6
3. **Someone** criticized you or put you down because of your weight	0	1	2	3	4	5	6
4. **Someone** yelled at you because of your weight	0	1	2	3	4	5	6
5. **Someone** embarrassed you in front of others because of your weight	0	1	2	3	4	5	6
6. **Someone** forced you to go on a diet because of your weight	0	1	2	3	4	5	6
7. **Someone** harassed you because of your weight	0	1	2	3	4	5	6
8. **Someone** threatened to abandon you because of your weight	0	1	2	3	4	5	6

9. Has anyone ever ended a relationship with you because of your weight? Yes_____ No (never) _____

How many times has this happened? _____
Which of the following people have done this (check all that apply)?
__Friend __Significant other/dating partner __Parent __Sibling __ Other: _____

IF YOU SELECTED *NEVER* FOR ALL 9 QUESTIONS ABOVE, PLEASE SKIP THE REMAINDER OF THIS SECTION AND CONTINUE ON TO <u>SECTION 2</u>

What was the impact of these occurrences on you? Did you feel……..

	0 Never	1 Slightly	2 Somewhat	3 Moderately	4 Very	5 Extremely
Angry	0	1	2	3	4	5
Anxious	0	1	2	3	4	5
Ashamed	0	1	2	3	4	5
Confused	0	1	2	3	4	5
Embarrassed	0	1	2	3	4	5
Frustrated	0	1	2	3	4	5
Helpless	0	1	2	3	4	5
Hopeless	0	1	2	3	4	5
Inadequate	0	1	2	3	4	5
Isolated	0	1	2	3	4	5
Lonely	0	1	2	3	4	5
Sad	0	1	2	3	4	5
Unloved	0	1	2	3	4	5
Unwanted	0	1	2	3	4	5

To what extent were the following areas affected?

	0 Never	1 Slightly	2 Somewhat	3 Moderately	4 Very	5 Extremely
Relationships with family members	0	1	2	3	4	5
Relationships with friends	0	1	2	3	4	5
Relationships with significant others/dating partners	0	1	2	3	4	5

How old were you when you were first teased, criticized, or called names because of your weight? _____

For how many years did this go on? _____
Is it still going on? Yes _____ No_____

Who treated you this way? (**check all that apply**)

__ Parent __ Sibling __ Other family member
__Friend(s) __ Classmate __ Significant other/dating partner/husband/wife
__Other (explain_____)

During the period of time when this teasing was going on, what was your *highest* weight?

__very underweight __underweight /thin __average weight
__a little overweight __somewhat over weight __very overweight

During the period of time when this teasing was going on, what was your *lowest* weight?

__very underweight __underweight /thin __average weight
__a little overweight __somewhat overweight __very overweight

Appendix B
Disordered Eating Questionnaires

BINGE EATING (QUESTIONNAIRE ON EATING AND WEIGHT PATTERNS)

1. During the past 6 months, did you often eat an unusually large amount of food within a two hour period (an amount most people would agree is unusually large)? (circle one) Yes No

2. During the times when you ate an unusually large amount of food, did you often feel you could not stop eating or control what or how much you were eating? (circle one) Yes No

3. During the past 6 months, how often, on average, did you have times when you ate unusually large amounts of food and felt that your eating was out of control. If there were weeks it was not present, just average those in. (circle one)
   a. Less than one day per week
   b. One day per week
   c. Two or three days per week
   d. Four or five days per week
   e. Nearly every day or more

4. How often did you have the following experiences during these occasions:

	Never	Rarely	Sometimes	Often	Always
a. Eating much more rapidly than usual	1	2	3	4	5
b. Eating until you felt uncomfortably full	1	2	3	4	5
c. Eating large amounts of food when you didn't feel physically hungry	1	2	3	4	5
d. Eating alone because you were embarrassed by how much you were eating	1	2	3	4	5
e. Feeling disgusted with yourself, depressed, or feeling guilty after overeating	1	2	3	4	5
f. Eating large amounts of food throughout the day with no planned meal times	1	2	3	4	5

UNHEALTHY WEIGHT CONTROL (QUESTIONNAIRE ON EATING AND WEIGHT PATTERNS)

1. During the past 3 months, did you ever make yourself vomit to avoid gaining weight after binge eating?

(circle one) Yes No

If yes: how often, on average, was that?
k. Less than once per week
l. Once per week
m. Two or three times per week
n. Four or five times per week
o. More than five times per week

2. During the past 3 months, did you ever take more than twice the recommended dose of laxatives in order to avoid gaining weight after binge eating?

(circle one) Yes No

If yes: how often, on average, was that?
a. Less than once per week
b. Once per week
c. Two or three times per week
d. Four or five times per week
e. More than five times per week

3. During the past 3 months, did you ever take more than twice the recommended dose of diuretics (water pills) in order to avoid gaining weight after binge eating?

(circle one) Yes No

If yes, how often, on average, was that?
a. Less than once per week
b. Once per week
c. Two or three times per week
d. Four or five times per week
e. More than five times per week

4. During the past 3 months, did you ever fast (not eat anything at all for at least 24 hours) in order to avoid gaining weight after binge eating?

(circle one) Yes No

If yes, how often, on average, was that?
a. Less than once per week
b. Once per week
c. Two or three times per week
d. Four or five times per week
e. More than five times per week

5. During the past 3 months, did you ever exercise for more than one hour specifically in order to avoid gaining weight after binge eating?

(circle one) Yes No

If yes, how often, on average, was that?
a. Less than once per week
b. Once per week
c. Two or three times per week
d. Four or five times per week
e. More than five times per week

6. During the past 3 months, did you ever take more than twice the recommended dose of a diet pill in order to avoid gaining weight after binge eating?

(circle one) Yes No

If yes, how often, on average, was that?
a. Less than once per week
b. Once per week
c. Two to three times per week
d. Four to five times per week
e. More than five times per

NIGHT EATING QUESTIONNAIRE					
Directions: Please circle ONE answer for each question.					
1. How hungry are you usually in the morning?	0 Not at all	1 A little	2 Somewhat	3 Moderately	4 Very
2. When do you usually eat for the first time?	0 Before 9 am	1 9:01 am to 12 pm	2 12:01 pm to 3 pm	3 3:01 pm to 6 pm	4 6:01 pm or later
3. Do you have cravings or urges to eat snacks after supper, but before bedtime?	0 Not at all	1 A little	2 Somewhat	3 Very much	4 Extremely
4. How much control do you have over your eating between supper and bedtime?	0 Not at all	1 A little	2 Some	3 Very much	4 Complete
5. How much of your daily food intake do you consume *after* supper?	0 None	1 1-25%	2 26-50%	3 51-75%	4 76-100%
6. Are you currently feeling blue or down in the dumps?	0 Not at all	1 A little	2 Somewhat	3 Very much	4 Extremely
7. When you are feeling blue, is your mood lower in the: _____Check here if your mood doesn't change during the day	0 Early morning	1 Late morning	2 Afternoon	3 Early evening	4 Late evening/ night
8. How often do you have trouble getting to sleep?	0 Never	1 Sometimes	2 About half the time	3 Usually	4 Always
9. Other than to use the bathroom, how often do you get up at least once in the middle of the night?	0 Never	1 Less than once per week	2 About once per week	3 More than once per week	4 Every night
IF NO ON #9, PLEASE GO ON TO THE NEXT SECTION					
10. Do you have cravings or urges to eat snacks when you wake up at night?	0 Not at all	1 A little	2 Somewhat	3 Very much	4 Extremely
11. Do you need to eat in order to get back to sleep when you awake at night?	0 Not at all	1 A little	2 Somewhat	3 Very much	4 Extremely
12. When you get up in the middle of the night, how often do you snack?	0 Never	1 Sometimes	2 About half the time	3 Usually	4 Always
IF NO ON #12, PLEASE SKIP TO #15					
13. When you snack in the middle of the night, how aware are you of your eating?	0 Not at all	1 A little	2 Somewhat	3 Very much	4 Completely
14. How much control do you have over your eating while you are up at night?	0 Not at all	1 A little	2 Some	3 Very much	4 Complete
15. How long have your difficulties with night eating been going on? _____ months _____ years					

EMOTIONAL EATING SUBSCALE (THREE FACTOR EATING QUESTIONNAIRE – REVISED)				
	Definitely True (4)	**Mostly True (3)**	**Mostly False (2)**	**Definitely False (1)**
1. I start to eat when I feel anxious.	4	3	2	1
2. When I feel sad, I often eat too much.	4	3	2	1
3. When I feel tense or ‘‘wound up’’, I often feel I need to eat.	4	3	2	1
4. When I feel lonely, I console myself by eating.	4	3	2	1
5. If I feel nervous, I try to calm down by eating.	4	3	2	1
6. When I feel depressed, I want to eat.	4	3	2	1

Appendix C

Self-Perception Questionnaire

SELF-PERCEPTIONS

1. How satisfied are you with your current weight?

_____ Very satisfied
_____ Moderately satisfied
_____ Slightly satisfied
_____ Neutral
_____ Slightly dissatisfied
_____ Moderately dissatisfied
_____ Very dissatisfied

2. How satisfied are you with your current shape/figure/physique?

_____ Very satisfied
_____ Moderately satisfied
_____ Slightly satisfied
_____ Neutral
_____ Slightly dissatisfied
_____ Moderately dissatisfied
_____ Very dissatisfied

3. How satisfied are you with your current overall appearance?

_____ Very satisfied
_____ Moderately satisfied
_____ Slightly satisfied
_____ Neutral
_____ Slightly dissatisfied
_____ Moderately dissatisfied
_____ Very dissatisfied

4. Pick the one sentence that best describes your overall feelings about yourself. "in general, I am…"

_____ Very happy with who I am
_____ Happy with who I am
_____ Okay with who I am but have some mixed feelings
_____ Unhappy with who I am
_____ Very unhappy with who I am

5. "As compared with most people, I think I have…"

_____ Very good self-esteem
_____ Good self-esteem
_____ Average self-esteem
_____ Poor self-esteem
_____ Very poor self-esteem

6. Pick the one sentence that best describes your feelings about the way you looked the last time you lost a lot of weight. "I was…"

_____ Very happy with the way I looked
_____ Happy with the way I looked
_____ Okay with the way I looked, but with some mixed feelings
_____ Unhappy with the way I looked
_____ Very unhappy with the way I looked