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Gender Differences in Associations Between Stressful Life Events and Body Mass Index

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Abstract

Objective—To identify relationships between body mass index (BMI) and stressful life events and to determine whether relationships differ by gender.

Method—Logistic regression was used to examine effects of BMI and gender on likelihood of experiencing 12 stressful life events in the past year in a sample of 41,217 adults, including 23,058 women (55.9%) and 18,159 men (44.1%). Data were collected in the United States between 2001–2002. Analyses controlled for demographics and lifetime and past-year psychiatric disorders.

Results—Compared to normal weight (BMI = 18.5–24.9) women, overweight (BMI = 25.0–29.9), obese (BMI = 30.0–39.9), and extremely obese (BMI ≥ 40.0) women experienced more stressful life events. Among men, underweight (BMI < 18.5) was associated with fewer, and obesity and extreme obesity with more, stressful events. Overweight, obesity, and extreme obesity were associated with increased odds of several specific stressful life events, with odds ratios ranging from 1.19 to 3.26. Some relationships differed by gender.

Conclusions—Overweight women experience more stressful life events than normal weight women. Obese and extremely obese individuals of both genders are more likely to report several specific stressful life events and more stressful life events overall in the past year compared to normal weight individuals.

Précis—Body mass index (BMI) is associated with number of stressful life events experienced in the past year and with likelihood of experiencing several specific stressful events. Relationships differed by gender.

Keywords

Overweight; Obesity; Stress; Sex/gender

Introduction

Elevated body weight is associated with psychosocial stressors, including job strain, low socioeconomic status, financial/legal and health-related concerns, lack of social support, low self-esteem, and poor quality of life (Gerace and George, 1996, Hellerstedt and Jeffery,

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Conflict of Interest Statement

Both authors declare that they have no conflicts of interest.

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1997, Kouvonen et al., 2005, Raikkonen et al., 1996, Strickland et al., 2007, Wadden et al., 2006, Wamala et al., 1997). In the area of work stress, lower decision latitude or control, higher job demands, and higher effort-reward imbalance are generally associated with higher levels of stress and elevated body mass index (BMI) (Hellerstedt and Jeffery, 1997, Kouvonen et al., 2005). Most research regarding body weight and stress is cross sectional, so causality cannot be established, but Hellerstedt and Jeffery (1997) found greater job demands were associated with higher fat intake, and greater job latitude with more exercise. Higher job stress may therefore contribute to behaviors that lead to weight gain, and lower stress to behaviors that maintain healthy body weight.

Associations between stress and BMI vary by gender. Hellerstedt and Jeffery (1997) found higher BMI associated with higher job strain among women but not men. Niedhammer et al. (1998) found higher BMI was associated with lower decision latitude among women but with greater decision latitude and social support at work among men. Overweight and obese women are more likely to be unemployed and earn less than normal weight women, but body weight is not associated with unemployment or low earnings in men (Laitinen et al., 2002; Morris, 2007; Sarlio-Lahteenkorva and Lahelma, 1999). Overweight women are more likely than overweight men to experience discrimination when applying for jobs (Pingitore et al., 1994). Other psychosocial stressors, such as poor global quality of life and low self-esteem, have been associated with higher BMI in women, but have rarely been examined in men (Wadden et al., 2006, Wamala et al., 1997).

Stressful life events have been associated with higher rates of physical and psychological health problems (Holmes and Masuda, 1974). With few exceptions (Gerace and George, 1996, Strickland et al., 2007), prior research has not examined associations between the occurrence of a range of common life stressors and BMI, and we know of no studies examining these relationships in a general population sample. Gerace and George (1996) found that divorce, falling out with a close friend, and financial stress in the 12 months prior to an initial examination were associated with weight gain over the next seven years among firefighters and paramedics. Strickland et al. (2007), however, found no relationship between BMI and stressful life events among African American women, suggesting relationships between BMI and stress differ depending on the population or specific stressors (interpersonal, health-related, job-related) studied.

The current study examines associations between the interaction of BMI and gender and the likelihood of experiencing stressful life events in the past year in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (Grant et al., 2003b). NESARC data were collected in 2001 and 2002 with the goal of determining the prevalence of alcohol use and associated physical and emotional disabilities. Variables examined included self-reported height and weight, the occurrence of twelve stressful life events in the past year, and a range of psychiatric and substance use disorders known to be associated with BMI (Barry et al., 2008, Petry et al., 2008). Based on the literature, we predicted that higher BMI would be associated with more stressful life events in the past year after controlling for psychiatric and substance use disorders. We also expected gender differences in associations between BMI and stressful life events.

Method

NESARC Sample

The target population of NESARC comprised non-institutionalized U.S. civilians over 18 from all fifty states and the District of Columbia. Young adults and African American and Hispanic individuals were over-sampled. Data were weighted to account for sampling methods, allowing for adjustment during analysis to represent U.S. population demographics of the 2000

Decennial Census. Potential NESARC respondents received written information about the survey. Those who provided written informed consent to participate were interviewed in person by interviewers from the U.S. Census Bureau. The response rate was 81%, with 43,093 respondents interviewed.

Assessment of BMI and Life Stressors

BMI, computed as kg/m^2 from self-reported height and weight, was available for 41,654 respondents. Respondents were classified into five groups (underweight: $\text{BMI} < 18.5$; normal weight: $\text{BMI} = 18.5\text{--}24.9$; overweight: $\text{BMI} = 25.0\text{--}29.9$; obese: $\text{BMI} = 30.0\text{--}39.9$; extremely obese: $\text{BMI} \geq 40.0$) (National Heart, Lung & Blood Institute, 1998). Pregnant women were excluded, leaving a sample of 41,217, including 23,058 women (55.9%) and 18,159 men (44.1%).

Respondents were asked whether any of twelve stressful life events had occurred in the prior year. The list of events was developed by NESARC based on adaptations of items from two existing measures, the List of Threatening Experiences (Brugha et al., 1985) and the Schedule of Recent Events (Brugha et al., 1985, Holmes and Rahe, 1967). Prior research finds these life events are frequently rated as threatening and reported in the year prior to development of affective disorders (Brugha et al., 1985). Factor analysis indicates the events fall into four major categories of stress: health-related, social, job, and legal (Dawson et al., 2005). Each event was coded dichotomously based on whether or not it occurred in the prior year. A continuous measure of total number of events in the past year was also calculated. Cronbach's alpha for the 12-item list was .60, suggesting modest intercorrelations among specific stressful life events.

Mood, anxiety, personality, and substance use disorders meeting Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 2000) criteria were evaluated using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV). The AUDADIS-IV's reliability and validity are good to excellent for assessing substance use disorders and fair to good for assessing mood, anxiety and personality disorders (Grant et al., 2003a).

Statistical Analysis

Multiple regression and chi-square analyses examined differences in demographic characteristics across the five BMI categories. Multiple regression and logistic regression analyses examined relationships of BMI category, and the interaction between BMI category and gender, with stressful life events. All analyses controlled for covariates, including demographics and lifetime and past-year diagnoses of any mood, anxiety, personality, alcohol use, and drug use disorder, and nicotine dependence (see Table 1). All analyses were conducted using SUDAAN (Research Triangle Institute, 2003), a software package that adjusts for weighting using Taylor series linearization. SUDAAN uses listwise deletion for missing data, so the actual number of respondents included in each analysis ranged from 40,889 to 41,068.

Results

Demographics

Table 1 shows demographic characteristics stratified by BMI category. All demographic features differed significantly across BMI categories. Subsequent analyses therefore controlled for all demographics.

Mean Number of Stressful Life Events

Table 2 shows the mean number of stressful life events in the past year for individuals in each BMI category in the total sample and in females and males only. BMI group differences were significant for the total sample and both genders; number of stressful life events increased with BMI. BMI by gender interactions were noted. Underweight males experienced fewer stressful events than normal weight males, and obese and extremely obese men experienced more stressful events than normal and overweight men. In contrast, underweight women were similar to normal weight women, but each increase above normal in BMI category in women was associated with more stressful events.

Odds of Experiencing Specific Stressful Life Events

Table 3 shows odds ratios and 95% confidence intervals resulting from the logistic regression analyses, controlling for covariates, with specific stressful life events in the past year as the dependent variables. Relative to normal weight women, overweight, obese and extremely obese women were significantly more likely to have experienced the death or serious illness of a family member or close friend, to be fired or laid off, to be unemployed, to have had trouble with a boss or co-worker, and to have experienced serious financial problems. Obese and extremely obese women or their family members were significantly more likely to have had trouble with the police, been arrested or sent to jail, and to have been crime victims or have a family member who was victimized. Extremely obese women were more likely to have had problems with a neighbor, friend or relative compared to normal weight women. Overweight, obese, and extremely obese women were significantly less likely than normal weight women to have separated, divorced or ended a relationship.

Obese men were significantly more likely than normal weight men to have experienced the death of a family member or friend. Obese and extremely obese men were more likely than normal weight men to have experienced the serious illness or injury of a family member or friend, to have had trouble with a boss or coworker and to have experienced financial problems. Extremely obese men were significantly more likely than normal weight men to have been fired or laid off. Relative to normal weight men, overweight men were significantly more likely to have been separated, divorced or to have ended a relationship, but obese and extremely obese men did not differ from normal weight men in this regard.

There were significant BMI by gender interaction effects on the likelihood of death or serious illness of a family member or close friend, unemployment, and separation/divorce/ending a relationship. Interactions indicated that associations between BMI and stressful life events were stronger and more consistent for women than men. For death or serious illness of a family member or close friend, the likelihood that women experienced these events increased with each increase in BMI category above normal weight, while only obese and extremely obese, but not overweight, men had increased odds. Higher than normal BMI was strongly associated with greater likelihood of unemployment among women, but BMI showed no association with likelihood of unemployment among men. For divorce/separation/ending a relationship, there was a negative association with increased BMI among women but not men, for whom the only significant finding was increased odds for overweight men.

Discussion

Higher BMI was associated with more stressful life events and with risk for several specific life events in both genders in this large population sample. Relationships differed by gender, however. For total number of stressful life events and several specific events (death or illness of family member or close friend, trouble with boss or co-worker, major financial problems), the risk was higher for overweight as well as obese and extremely obese women, whereas only

obese and extremely obese men showed these associations. For other events (unemployment, respondent or family member had trouble with police, was arrested or went to jail, respondent or family member was victim of a crime), likelihood for women increased with body weight, but there were no significant associations between BMI and risk for men.

This study was cross-sectional, so causal pathways between relationships cannot be determined. That stress can contribute to increased body weight through activation of the hypothalamic-pituitary-adrenal axis and secretion of the stress hormone cortisol is well documented (Bjorntorp, 2001). Stress could also contribute to elevated body weight by interfering with healthy eating habits (Jones et al., 2007) or regular exercise (Smith et al., 2005). Kaplan and Kaplan (1957) speculated that eating is physiologically incompatible with anxiety and may thus have anxiety reducing effects. Women are more likely than men to eat in response to negative emotions (Larsen et al., 2006), possibly explaining more consistent relationships of BMI to life stressors among women.

Conversely, being overweight or obese could increase vulnerability to stressful life events. Excess body weight is associated with health problems and premature mortality, and overweight and obese individuals are more likely to have overweight and obese family members (Price and Lee, 2001). Recent research suggests that friends, siblings, and spouses of individuals who become obese are more likely to become obese themselves (Christakis and Fowler, 2007), possibly explaining the greater likelihood that an overweight or obese person had experienced the death or serious illness of a family member or close friend. However this explanation does not account for gender differences.

Overweight and obesity are associated with unemployment and low earnings among women, but men do not experience similar disadvantages related to excess body weight (Laitinen et al., 2002, Morris, 2007, Sarlio-Lahteenkorva and Lahelma, 1999). Longitudinal studies suggest that obesity contributes to work limitations and unemployment among women (Laitinen et al., 2002, Tunceli et al., 2006). Obese job applicants are rated as less qualified and viewed as having poorer work habits than normal weight applicants with the same qualifications (Klesges et al., 1990). Overweight women are less likely than overweight men to be hired for a position despite equal qualifications (Pingitore et al., 1994). Our findings that overweight and obese women are more likely to have been fired or laid off, to be unemployed, and to have had trouble with a boss or coworker are consistent with prior research suggesting that overweight and obese women experience weight-based discrimination in the workplace.

Women who were overweight in adolescence or young adulthood have lower household incomes and higher rates of household poverty seven years later than normal weight women (Gortmaker et al., 1993). We controlled for household income, but still found overweight among women and obesity and extreme obesity among women and men to be associated with serious financial problems.

Increased BMI was associated with lower risk for one type of stressful life event among women -- being separated or divorced or ending a steady relationship. This was not the case for men, who were more likely to end a relationship if overweight, with no change in risk associated with obesity or extreme obesity. The implications of this finding are unclear.

Causal pathways between BMI and stressful life events remain to be explored, but these results indicate that overweight and obese individuals, particularly women, experience stressors that could add to their already elevated risk for serious health problems (Kivimaki et al., 2002, McTigue et al., 2006, Must et al., 1999). Both stress and obesity can trigger an inflammatory response in the immune system, and inflammation contributes to the etiology of atherosclerosis, type II diabetes and metabolic syndrome (Black, 2003). Stress could also interfere with ability to successfully engage in weight loss programs (Danhauer et al., 2004). Awareness and

sensitivity to challenges facing overweight and obese patients can help health care providers work more effectively with them to develop plans for losing weight and adopting healthier lifestyles.

Strengths and Limitations

This study is the first we know of to examine associations between BMI and a range of recent stressful life events, as well as gender differences in those associations, in a epidemiologic sample. Limitations of this study include its cross-sectional nature and the fact that BMI was based on self-reported height and weight rather than objective measurements. Self-reported height and weight are not perfectly accurate, but correlate highly with actual measurements (Roberts et al., 1998; Stunkard and Albaum, 1981). Strengths of this study include a large sample size and ability to control for psychiatric and substance use disorders and demographic characteristics known to be associated with both overweight/obesity and life stressors. Unfortunately, several factors that could affect relationships among BMI, gender, and stressful life events were not assessed by NESARC and thus not included as covariates. For instance, social support and physical activity could attenuate the negative impact of stressful events, and higher levels of physical activity are likely to be associated with lower BMI. (Bowles et al., 2004).

Conclusion

This study provides evidence that overweight and obese individuals are more likely than their normal weight peers to experience a variety of stressful life events. Women who are even moderately overweight are more likely than normal weight women to experience several stressors, whereas among men increased likelihood of life stressors is confined to the obese and extremely obese BMI categories. Stress may contribute to weight gain through a physiological stress response or negative effects on eating and exercise habits. Conversely, being overweight or obese can contribute to stress by contributing to poor health or social factors like workplace discrimination. Health care practitioners working with overweight and obese patients are advised to be aware of additional life stressors their patients face when developing recommendations and interventions aimed at weight loss.

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Table 1
Demographic characteristics of sample by body mass index (BMI) category (United States, 2001–2002).

	Underweight BMI < 18.5	Normal weight BMI=18.5–24.9	Overweight BMI=25.0–29.9	Obese BMI=30.0–39.9	Extremely Obese	<i>p</i> (F or χ^2)
N	853	16005	14479	8636	1244	
Age (Years) ^d	44.5 (25.4)	43.4 (29.1)	46.9 (28.9)	46.7 (21.4)	45.0 (16.6)	<0.001
Sex						<0.001
Male	19.6 (16.6–23.0)	40.8 (39.8–41.9)	59.8 (58.7–60.8)	51.5 (50.1–52.8)	35.2 (31.7–38.9)	
Female	80.4 (77.0–83.4)	59.2 (58.1–60.2)	40.2 (39.2–41.3)	48.5 (47.2–49.9)	64.8 (61.1–68.3)	
Race-ethnicity						<0.001
White	71.7 (67.1–75.9)	72.7 (69.1–76.1)	71.2 (67.8–74.4)	68.0 (64.6–71.2)	66.7 (62.1–71.1)	
Black	7.7 (5.8–10.2)	8.5 (7.4–9.8)	10.8 (9.5–12.3)	15.3 (13.6–17.2)	19.6 (16.8–22.8)	
Native American	1.9 (1.0–3.6)	1.9 (1.6–2.3)	2.0 (1.6–2.4)	2.8 (2.3–3.4)	2.3 (1.3–3.9)	
Asian	10.8 (7.7–14.9)	6.5 (4.9–8.5)	3.3 (2.6–4.2)	1.9 (1.4–2.5)	0.6 (0.2–2.5)	
Hispanic	7.9 (6.0–10.4)	10.4 (8.5–12.7)	12.8 (10.1–16.0)	12.0 (9.5–15.2)	10.8 (7.6–15.2)	
Education						<0.001
Less than high school	19.9 (17.1–23.1)	13.6 (12.7–14.5)	15.9 (14.5–17.3)	18.5 (17.1–20.1)	17.5 (14.6–20.8)	
High school	30.6 (26.7–34.9)	27.6 (26.3–28.9)	29.0 (27.6–30.4)	31.9 (30.5–33.4)	36.0 (32.6–39.6)	
Some college or higher	49.6 (44.9–54.0)	58.8 (57.2–60.4)	55.1 (53.6–56.6)	49.5 (47.9–51.2)	46.5 (42.5–50.5)	
Marital status						<0.001
Married/living with	46.4 (42.2–50.8)	56.8 (55.5–58.2)	66.5 (65.4–67.5)	64.5 (63.0–65.9)	56.5 (53.1–60.0)	
Widowed	12.7 (10.4–15.4)	6.7 (6.2–7.2)	6.2 (5.7–6.6)	6.5 (6.0–7.1)	6.5 (5.1–8.4)	
Divorced/separated	11.9 (9.7–14.6)	10.6 (10.0–11.1)	10.7 (10.2–11.3)	12.1 (11.4–12.9)	14.7 (12.6–17.0)	
Single/never married	29.0 (25.4–32.8)	25.9 (24.5–27.4)	16.7 (15.7–17.7)	16.9 (15.7–18.1)	22.3 (19.7–25.1)	
Number of children ^a	1.5 (2.3)	1.7 (3.8)	2.1 (2.4)	2.3 (2.8)	2.3 (2.5)	<0.001
Annual income						<0.001
\$10,000 or less	18.3 (15.7–21.2)	10.7 (10.0–11.4)	7.9 (7.3–8.6)	9.0 (8.3–9.9)	11.9 (10.1–13.9)	
\$10,001–25,000	25.7 (22.4–29.3)	20.3 (19.3–21.3)	20.2 (19.9–22.2)	21.0 (19.9–22.2)	26.3 (23.6–29.2)	
\$25,001–50,000	25.5 (22.0–29.3)	29.8 (28.7–30.8)	31.2 (30.2–32.2)	32.8 (31.3–34.2)	34.0 (30.7–37.4)	
Over \$50,000	30.5 (26.5–34.9)	39.3 (37.5–41.2)	40.7 (39.0–42.4)	37.2 (35.5–39.0)	27.9 (24.5–31.6)	<0.05
Region of country						
Northeast	18.4 (11.6–27.8)	19.5 (13.3–27.7)	20.8 (14.7–28.6)	18.3 (13.1–25.0)	16.0 (11.2–22.4)	
Midwest	23.2 (17.5–30.0)	22.4 (16.5–29.8)	22.8 (17.1–29.7)	25.1 (19.4–31.8)	26.2 (19.8–33.8)	
South	36.2 (29.4–43.6)	34.1 (27.7–41.2)	35.1 (28.9–41.9)	36.6 (30.7–43.0)	39.7 (33.3–46.5)	
West	22.3 (15.7–30.5)	24.0 (17.0–32.6)	21.3 (15.2–29.1)	20.0 (14.4–27.0)	18.1 (12.9–24.8)	
Urbanicity						<0.001
Urban	77.8 (72.7–82.2)	82.1 (78.7–85.0)	80.0 (76.5–83.1)	77.8 (74.2–81.0)	74.5 (69.5–78.9)	
Rural	22.2 (17.8–27.3)	17.9 (15.0–21.3)	20.0 (16.9–23.5)	22.2 (19.0–25.8)	25.6 (21.2–30.5)	
Any Mood Disorder ^b						<0.001
Any Alcohol Use Disorder ^e						<0.001
Lifetime	22.0 (18.5–25.9)	19.2 (18.3–20.2)	17.1 (16.2–18.0)	24.0 (22.7–25.4)	32.2 (29.2–35.4)	
Past-Year	13.3 (10.7–16.4)	9.2 (8.6–9.9)	7.6 (7.0–8.2)	11.3 (10.5–12.3)	16.4 (14.2–18.9)	
Any Anxiety Disorder ^c						<0.001
Lifetime	18.9 (15.9–22.3)	15.9 (14.8–17.0)	16.1 (15.1–17.2)	20.8 (19.5–22.1)	27.7 (24.6–30.9)	
Past-Year	13.9 (11.3–17.0)	10.1 (9.4–10.9)	10.2 (9.4–11.0)	13.5 (12.4–14.6)	19.6 (17.0–22.5)	
Any Personality Disorder ^d	15.6 (12.6–19.1)	13.9 (13.0–14.9)	14.0 (13.2–14.9)	18.0 (16.9–19.1)	23.3 (20.5–26.3)	<0.001
Any Alcohol Use Disorder ^e						<0.001
Lifetime	19.8 (16.7–23.3)	28.3 (26.5–30.1)	33.5 (31.7–35.3)	33.1 (31.3–35.0)	31.6 (28.2–35.2)	
Past-Year	6.4 (4.8–8.4)	9.5 (8.8–10.3)	8.9 (8.2–9.6)	7.4 (6.6–8.2)	6.9 (5.2–9.1)	<0.001
Any Drug Use Disorder ^f						0.46
Lifetime	9.2 (6.9–12.0)	10.7 (9.9–11.6)	10.5 (9.7–11.3)	10.3 (9.4–11.3)	12.5 (9.9–15.5)	
Past-Year	2.4 (1.5–3.8)	2.5 (2.2–2.9)	1.9 (1.6–2.2)	1.6 (1.2–1.9)	1.8 (1.1–3.0)	0.001
Nicotine Dependence						0.27
Lifetime	19.5 (16.2–23.3)	17.9 (16.8–19.1)	17.5 (16.4–18.8)	19.0 (17.8–20.3)	17.8 (15.4–20.1)	
Past-Year	16.1 (13.1–19.7)	13.9 (13.0–14.9)	12.1 (11.2–13.2)	12.6 (11.6–13.7)	10.8 (8.9–13.1)	<0.001

Underweight BMI < 18.5	Normal weight BMI=18.5–24.9	Overweight BMI=25.0–29.9	Obese BMI=30.0–39.9	Extremely Obese	<i>p</i> (F or χ^2)
Values represent weighted percentages (unless otherwise noted) and numbers in parentheses are 95% confidence intervals.					
^a Values represent means, numbers in parentheses are standard deviations.					
^b Includes major depression, dysthymia, manic episode, hypomanic episode.					
^c Includes generalized anxiety disorder, panic disorder without agoraphobia, panic disorder with agoraphobia, agoraphobia without panic, social phobia, specific phobia.					
^d Includes antisocial, avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and histrionic personality disorders.					
^e Includes alcohol abuse and dependence.					
^f Includes abuse or dependence of cannabis, cocaine, heroin, opiates other than heroin and methadone, stimulants, tranquilizers, sedatives, hallucinogens, inhalants/solvents, or other drugs.					

Table 2
Mean (S.E.) Number of Stressful Life Events by Body Mass Index (BMI) and Gender in the Past Year (United States, 2001–2002).

	Underweight BMI < 18.5	Normal weight BMI = 18.5–24.9	Overweight BMI = 25.0–29.9	Obese BMI = 30.0–39.9	Extremely Obese BMI=40.0+	BMI <i>p</i>	BMI x Gender Interaction <i>p</i>
Total Sample	1.60 (0.06)	1.58 (0.02)	1.63 (0.02)	1.75 (0.02)	1.94 (0.06)	<i>p</i> <.001	<i>p</i> <.01
Female Only	1.67 (0.07)	1.57 (0.02)	1.72 (0.02)	1.80 (0.03)	1.98 (0.07)	<i>p</i> <.001	
Male Only	1.37 (0.12)	1.60 (0.03)	1.56 (0.02)	1.71 (0.03)	1.86 (0.11)	<i>p</i> <.001	

Note. Controlling for age, ethnicity, education, income, marital status, number of children, urban/rural residence, region of the country, any lifetime mood disorder, any past-year mood disorder, any lifetime anxiety disorder, any past-year anxiety disorder, any personality disorder, any lifetime alcohol use disorder, any past-year alcohol use disorder, any lifetime drug use disorder, any past-year drug use disorder, lifetime nicotine dependence, and past-year nicotine dependence.

Table 3

Odds of Experiencing Life Stressors in Last 12 Months by Body Mass Index and Gender with Interaction Effects (United States, 2001–2002).

	Underweight BMI < 18.5	Normal weight BMI=18.5–24.9	Overweight BMI=25.0–29.9	Obese BMI=30.0–39.9	Extremely Obese BMI=40.0+
Any family member or close friends died. Female OR (95% C.I.)	1.18 (0.97–1.45)	1.00 (1.00–1.00)	1.23 (1.13–1.34)**	1.38 (1.24–1.53)**	1.22 (1.01–1.48)**
Male OR (95% C.I.)	0.93 (0.57–1.50)	1.00 (1.00–1.00)	0.97 (0.88–1.06)	1.16 (1.04–1.31)*	1.16 (0.87–1.51)
Any family member or close friends had serious illness or injury. Female OR (95% C.I.)	1.06 (0.87–1.29)	1.00 (1.00–1.00)	1.19 (1.10–1.29)**	1.30 (1.18–1.42)**	1.45 (1.22–1.72)**
Male OR (95% C.I.)	0.89 (0.56–1.41)	1.00 (1.00–1.00)	0.97 (0.89–1.05)	1.26 (1.13–1.40)**	1.44 (1.09–1.89)**
Moved/anyone came to live with you. Female OR (95% C.I.)	0.90 (0.67–1.22)	1.00 (1.00–1.00)	1.02 (0.90–1.15)	1.00 (0.86–1.15)	0.78 (0.60–1.03)
Male OR (95% C.I.)	0.90 (0.52–1.53)	1.00 (1.00–1.00)	0.93 (0.82–1.05)	0.96 (0.83–1.12)	1.11 (0.77–1.61)
Fired or laid off from job. Female OR (95% C.I.)	1.14 (0.74–1.73)	1.00 (1.00–1.00)	1.30 (1.07–1.57)**	1.27 (1.01–1.60)**	1.84 (1.26–2.70)**
Male OR (95% C.I.)	0.55 (0.27–1.11)	1.00 (1.00–1.00)	1.01 (0.87–1.18)	1.20 (0.98–1.46)	1.61 (1.02–2.52)*
Unemployed and looking for work for > 1 month. Female OR (95% C.I.)	1.31 (0.94–1.82)	1.00 (1.00–1.00)	1.30 (1.11–1.53)**	1.20 (1.01–1.42)**	1.82 (1.35–2.45)**
Male OR (95% C.I.)	0.45 (0.23–0.88)	1.00 (1.00–1.00)	0.97 (0.84–1.12)	0.97 (0.80–1.18)	0.96 (0.63–1.45)
Had trouble with boss or coworker. Female OR (95% C.I.)	1.05 (0.74–1.51)	1.00 (1.00–1.00)	1.32 (1.12–1.56)**	1.48 (1.26–1.73)**	1.66 (1.22–2.25)**
Male OR (95% C.I.)	0.55 (0.30–1.01)	1.00 (1.00–1.00)	1.06 (0.89–1.27)	1.32 (1.09–1.59)**	1.85 (1.21–2.81)**
Changed jobs, job responsibilities or work hours. Female OR (95% C.I.)	1.02 (0.78–1.33)	1.00 (1.00–1.00)	1.09 (0.97–1.21)	1.09 (0.96–1.24)	1.13 (0.90–1.42)
Male OR (95% C.I.)	0.87 (0.52–1.43)	1.00 (1.00–1.00)	0.98 (0.87–1.10)	1.07 (0.94–1.22)	0.83 (0.60–1.15)
Got separated or divorced or broke off steady relationship.			Interaction: Wald F(4) = 0.72, $p=.58$		

	Underweight BMI < 18.5	Normal weight BMI=18.5–24.9	Overweight BMI=25.0–29.9	Obese BMI=30.0–39.9	Extremely Obese BMI=40.0+
Female OR (95% C.I.)	1.02 (0.71–1.48)	1.00 (1.00–1.00)	0.79 (0.66–0.95)**	0.75 (0.60–0.93)**	0.55 (0.35–0.86)**
Male OR (95% C.I.)	1.16 (0.54–2.48)	1.00 (1.00–1.00)	1.23 (1.02–1.49)**	0.81 (0.63–1.05)	0.87 (0.48–1.58)
Had problems with neighbor, friend, or relative.			Interaction: Wald F(4) = 4.06, $p < .01$		
Female OR (95% C.I.)	1.25 (0.83–1.90)	1.00 (1.00–1.00)	1.00 (0.84–1.18)	1.17 (0.97–1.41)	1.66 (1.23–2.24)**
Male OR (95% C.I.)	0.87 (0.36–2.08)	1.00 (1.00–1.00)	1.00 (0.81–1.24)	1.24 (0.96–1.60)	1.60 (0.86–2.97)
Experienced major financial crisis, bankruptcy, or been unable to pay bills on time.			Interaction: Wald F(4) = 0.24, $p = .92$		
Female OR (95% C.I.)	1.27 (0.86–1.88)	1.00 (1.00–1.00)	1.29 (1.12–1.48)**	1.88 (1.62–2.17)**	3.26 (2.54–4.17)**
Male OR (95% C.I.)	1.29 (0.67–2.49)	1.00 (1.00–1.00)	0.98 (0.84–1.15)	1.36 (1.15–1.61)**	2.02 (1.35–3.02)**
You or a family member had trouble with police, got arrested, or sent to jail.			Interaction: Wald F(4) = 1.96, $p = .11$		
Female OR (95% C.I.)	0.68 (0.42–1.11)	1.00 (1.00–1.00)	1.18 (0.98–1.42)	1.23 (1.02–1.47)**	2.09 (1.52–2.88)**
Male OR (95% C.I.)	0.50 (0.18–1.37)	1.00 (1.00–1.00)	0.99 (0.81–1.21)	1.02 (0.81–1.28)	1.49 (0.92–2.43)
You or a family member been victim of crime.			Interaction: Wald F(4) = 1.39, $p = .25$		
Female OR (95% C.I.)	0.93 (0.59–1.47)	1.00 (1.00–1.00)	1.03 (0.86–1.23)	1.28 (1.06–1.56)*	1.48 (1.06–2.07)*
Male OR (95% C.I.)	0.71 (0.29–1.73)	1.00 (1.00–1.00)	1.05 (0.88–1.25)	1.23 (1.00–1.52)	1.79 (1.10–2.91)
			Interaction: Wald F(4) = 0.30, $p = .88$		

Note. Reference group: Normal weight (BMI=18.5–24.9). OR = Odds Ratio. CI=Confidence interval. * and **OR differs significantly from reference group (Wald F is significant and C.I. does not include 1.00).

* Wald F significant at $p < .05$.

** Wald F significant at $p < .01$. ORs are computed controlling for age, ethnicity, education, income, marital status, number of children, urban/rural residence, region of the country, any lifetime mood disorder, any past-year mood disorder, any lifetime anxiety disorder, any past-year anxiety disorder, any personality disorder, any lifetime alcohol use disorder, any past-year alcohol use disorder, any lifetime drug use disorder, any past-year drug use disorder, lifetime nicotine dependence, and past-year nicotine dependence.