The Effects of Various Life Stressors on Food Addiction

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Honors Thesis

Abstract

Chronic stress has been found to be correlated with weight gain, which can lead to obesity (Torres & Nowson 2007). Obesity has tremendous health risks, including heart risks, the potential development of type 2 diabetes, and reduced lung performance (Fradkin et al., 2015). While there has been ample research on adverse childhood experiences and the likelihood to develop an eating disorder, there is a lack of research examining this association with food addiction. The Yale Food Addiction (YFAS) is a new 25-question scale with excellent validity used to examine food addiction based on the DSM-IV-TR (Gearhardt, Corbin, & Brownell, 2009). The participants in this study were 159 women, and the majority of participants were aged 18-39 years (86.20%). Self-reported height and weight was used to calculate BMI (M = 35.33, SD = 10.88). The participants completed the YFAS and an assessment to examine life stressors. Emotional abuse or neglect, witnessing family violence, and sexual abuse were found to be correlated with food addiction.

Keywords: stress, food addiction, eating habits, obesity

The Effects of Various Life Stressors on Food Addiction

Researchers have studied the importance of stress on individuals and how it alters eating habits, resulting in either under-eating or over-eating. Chronic stress has been studied and is found to be associated with a stronger preference for nutrient-dense and energy-dense food, which typically involves food high in fat and sugar. Chronic stress may also be correlated with weight gain, which can lead to an individual developing obesity (Torres & Nowson, 2007). There are many risk factors attributed to obesity. A 2007 study by Kopelman found that increased amounts of adipose tissue around the abdominals of an individual is a major contributor to hyperglycaemia (excess glucose in the blood), hyperlipidaemai (excess fat cells in the blood), insulin resistance, higher levels of insulin concentrated in plasma, and the development of hypertension. The development of type 2 diabetes is a major concern for young people and children and is correlated with increased body weight. An increase of body fat also leads to added cardiac stress. With additional fat cells that require oxygen, an increase in cardiac output must be provided. This leads to structural changes in the heart to meet oxygen demand, leading to wall stress (tension within the ventricle), and an increased resting heart. An increase in the amount of fat in the chest wall of an individual also results in subpar mechanical performance of the lungs. Lung volume is reduced and breathing patterns must be changed to deliver the amount of oxygen the heart requires to oxygenate the body. These changes in lung volume may result in sleep difficulties, including sleep apnea and snoring, which increase the chances of the individual to experience a stroke (2007).

Low socioeconomic status (SES) is correlated with obesity. A 2015 study by Fradkin et al. studied 4,824 fifth graders with a mean age of 11.12 years from major U.S. cities. Obesity status was measured by using a body mass index, and SES was measured based on furthest

amount of education attained in the household. The participants were assessed a second time two years later. The researchers found that the participants in the highest SES status had significantly lower obesity prevalence than participants in lower SES status at both the fifth and seventh grade levels when not taking race and ethnicity into consideration. When considering race and ethnicity, the same trend was found for White and Hispanic participants but not for African-American participants. With gender considered, the trend was seen most in White females and Hispanic male fifth graders (Fradkin et al., 2015).

While low socioeconomic status was found by Fradkin et al. to correlate with obesity, low socioeconomic status has also been found to correlate with adverse childhood experiences. Bradley and Corwyn (2002) discuss that fetal development in low-SES families is more likely to involve inadequate neurobehavioral development and growth retardation in utero. Once born, low-SES infants are more likely to suffer various injuries and die, and children in low-SES families with health problems are more likely to have severe effects of their health problems than children in high-SES families. Children in low-SES families are also more likely to experience violence from the community, peer aggression, and child abuse (Bradley & Corwyn, 2002).

There has been ample research regarding the relationship between adverse childhood experiences and the development of pathological eating habits. A 2002 study by Striegel-Moore, Dohm, Pike, Wilfley, and Fairburn examined if physical and sexual abuse, ethnicity-based discrimination, or bullying by peers is correlated with an increased risk for acquiring binge eating disorder in women. The researchers studied 162 women who have binge eating disorder, as well as 251 healthy women and 107 other psychiatric comparison women. An interview was conducted, and the researchers found that in White women, all variables studied were higher in the binge eating women than in healthy women. In African-American women, all variables

except ethnicity-based discrimination were higher in binge eating women than in healthy women (Striegel-Moore, Dohm, Pike, Wilfey, & Fairburn, 2002). Additionally, a 2002 meta-analysis of 53 studies by Smolak and Murnen found a small but significant positive relationship between childhood sexual abuse and eating disorders. The meta-analysis conducted by Smolak and Murnen helps provide an estimate of the relationship between childhood sexual abuse and eating disorders across a large amount of studies (Smolak & Murnen, 2002).

Adam and Epel (2007) discuss how stressors can influence food intake. An individual's brain reward system plays a large role in stress-eating. Adam and Epel discuss that repeated stimulation of the brain's reward system through eating to cope for stress promotes the compulsivity of over-eating. Physiologically, this is seen as the hypothalamic-pituitary-adrenal (HPA) axis is chronically stimulated, resulting in high levels of glucocorticord. This system regulates stressful food consumption as a survival mechanism, but also influences the regulation of appetite in the endocrine system (2007). Continuous stress-eating, which may lead to food addiction may eventually result in obesity.

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) acknowledges symptoms experienced by individuals with eating-related disorders are similar to symptoms individuals with substance-use disorders experience, without specifically mentioning "food addiction." Patterns of compulsive use and strong cravings are similar in both eating-related disorders and substance addiction. These similarities may be attributed to the same neural systems driving both food addiction and substance addiction (American Psychiatric Association, 2013). The incorporation of the fifth edition to include a comparison of eating-related disorders to substance addiction is an important comparison, but there is yet to be diagnostic criteria established for food addiction.

The Yale Food Addiction Scale is a self-report measurement was developed in 2009 and is used as a standard to assess food addiction. The criteria for food addiction in the scale is based on diagnostic criteria from the DSM-IV-TR for substance-use disorder. It assesses seven different food addiction symptoms and clinically significant distress or impairment (Meule & Gearhardt, 2014). It is important to incorporate the Yale Food Addiction Scale in applicable studies because it allows for a standard comparison across the field of psychology and because it is based on the standard diagnostic criteria for mental disorders, the DSM. There is a lack of research examining correlations between adverse childhood experiences and pathological eating habits using the Yale Food Addiction Scale. It is hypothesized that emotional and sexual abuse with be found to be correlated with food addiction.

Method

Participants

The data for this study is part of a larger data set. One-hundred fifty-nine women consented to participate and complete the measures. The majority of participants were aged 18-39 years (86.20%). Self-reported height and weight was used to calculate BMI (M = 35.33, SD = 10.88). Using this data, the majority of the participants were obese (62.10%). Complete demographic details can be found in Table 1. The participants were recruited online via a Facebook post-traumatic stress disorder support and a weight-loss support group to ensure adequate representation of participants with life stress.

Procedure

Surveys complete with the measures were given to the participants online and were expected to take approximately 45 minutes to complete. Once the survey was opened, the participants were given an informed consent form to complete in order to participate in the study.

The participants were required to be to be at least 18 years of age to participate in the study and were recruited online via social media.

Measures

Yale Food Addiction Scale (Gearhardt, Corbin, & Brownell, 2009). The Yale Food Addiction Scale (YFAS) is a 25-question scale used to examine food addiction based on the DSM-IV-TR. Gearhardt et al. have established that the scale has adequate validity and reliability (2009). See Appendix A for the Yale Food Addiction Scale.

Life Stressor Checklist – Revised (Wolfe & Kimerling, 1997). The Life Stressor Checklist – Revised (LSC-R) is a self-report questionnaire that assesses stressful or traumatic life events (1997). A section of this checklist consisting of 18 questions was used in this report, and was modified to have a Likert-like scale, which can be seen in Appendix B.

Results

The relationship between total food addiction (as measured by the Yale Food Addiction Scale) and life stressors (as measured by Life Stressor Checklist – Revised) was investigated using Pearson product-moment correlation coefficient. There was a strong, positive correlation between five of the life stressors and total food addiction. Positive correlations were found for question 4 of the LSC-R (emotional abuse or neglect) and total food addiction, r(159) = .19, p = .02; question 12 of LSC-R (witnessed family violence) and total food addiction, r(159) = .24, p = .003; question 15 of LSC-R (made to sexually touch somebody or be sexually touched by somebody before the age of 16) and total food addiction, r(159) = .33, p < .001; question 16 of LSC-R (made to sexually touch somebody or be sexually touched by somebody after the age of 16) and total food addiction, r(159) = .43, p < .001; question 17 of LSC-R (forced to have sex before the age of 16) and total food addiction), r(159) = .43, p < .001; and question 18 of LSC-R

(forced to have sex after the age of 16) and total food addiction, r(159) = .19, p < .001. All correlations can be seen in Table 2.

A standard multiple regression was performed between food addiction as the dependent variable and life stressors as independent variables in order to determine which life stressors contributed most to the variance in food addiction scores. Table 2 displays the correlations between the variables. The unstandardized regression coefficients (B), the standardized regression coefficients (B), and the squared semi-partial correlations (S) can be seen in Table 3.

The overall model was significantly different than zero, F(5, 137) = 9.76, p < .001. Altogether, 26% (24% adjusted) of the variability in food addiction scores was predicted by knowing scores on these five IV's (R = .51, $R^2 = .26$, $adj R^2 = .24$). However, only LSC-R question 16 (made to sexually touch somebody or be sexually touched by somebody after the age of 16) and LSC-R question 17 (forced to have sex before the age of 16) were significant predictors of food addiction. The size and direction of the relationships suggests that women who reported experiencing these particular life stressors most often also had the greatest number of food addiction symptoms. Between the two, however, LSC question 16 (made to sexually touch somebody after the age of 16) was a more powerful predictor, as indicated by the standardized Betas (LSC16: $\beta = .242$, $Cl_{.95}$ [. 08, .70]; LSC 17: $\beta = .238$, $Cl_{.95}$ [. 12, .83]).

Discussion

The hypothesis that emotional and sexual abuse will be correlated with food addiction was supported. The results found emotional abuse or neglect was shown to be correlated with total food addiction. A 2008 study by Stirling and Amaya-Jackson found that children who experienced early abuse or neglect may develop significant behavior problems, such as depression, aggression, and emotional instability. The researchers found that these behaviors

may continue in the individual long after the abuse or neglect has ceased (Stirling & Amaya-Jackson, 2008). A 2001 study by Gearhardt, White, and Potenza found the patients the researchers studied with food addiction had significantly higher levels of depression (2011). This suggests that individuals who experienced emotional abuse may develop food addiction as a way to cope with their depressive symptoms.

Forced to touch an individual sexually, forced to be touched sexually, or forced to engage in unwanted sex were also shown to be correlated with food addiction. Researchers Boudewyn and Liem in 1995 found that sexual abuse in childhood predicted depression, self-harm, and suicide ideation and attempts in the individuals as adults. The more severe the sexual abuse, the more frequent the sexual abuse was, and the longer the sexual abuse occurred, the more severe the symptoms of self-harm and depression were in adulthood (1995). As discussed with emotional abuse and neglect, food addiction may similarly develop in individuals who have been sexually abused as a way to cope with their depression. Interestingly, the data for this study show that being forced to touch or forced to be touched sexually after the age of 16, as opposed to before the age of 16, was the strongest predictor for food addiction. A 1993 study by Kendall-Tackett, Williams, and Finkelhor found that the earlier the age the sexual abuse was, the less likely they were to recall the abuse (1993). This trend suggests that details of the sexual abuse may be more repressed by the individuals the earlier in life it occurred and may not be as traumatizing. This may explain why being forced to touch or forced to be touched sexually after the age of 16, as opposed to before the age of 16, was the best predictor of food addiction.

While it was not part of the hypothesis, witnessing family violence was found to correlate with food addiction symptoms. Killpatrick and Williams (1997) studied children aged 6-12 and found that witnessing domestic violence was a significant predictor for developing PTSD

(Killpatrick & Williams, 1997). Furthermore, Mason et al. found that PTSD symptoms were associated with an increase of food addiction symptoms (Mason et al., 2014). Witnessing family violence may lead to post-traumatic stress disorder, which may increase the chances of developing a food addiction. This is significant because there is a lot of media attention regarding sexual and emotional abuse and its long-term effects on an individual, but witnessing family violence was found to be correlated with food addiction symptoms as well.

Adam and Epel (2007) discuss how stressors can influence food intake. An individual's brain reward system plays a large role in stress-eating. The researchers discuss that repeated stimulation of the brain's reward system through eating to cope for stress promotes the compulsivity of over-eating (2007). The various stressors discussed that are correlated with food addiction may have triggered compulsive stress-eating in the participants studied. Continuous stress-eating, which may lead to food addiction may eventually result in obesity.

Limitations of this study include a lack of a diversity in the participant pool, including a lack of males and and an uneven distribution of BMI. A second limitation is the assumption that BMI accurately measures for adipose tissue. BMI is based on height and weight, and may attribute muscle mass as adipose tissue. Not incorporating socioeconomic status is another limitation of this study. As discussed, a low socioeconomic status is widely regarded in research to correlate with adverse childhood experiences and obesity. Future studies should incorporate socioeconomic status to further examine any relationships between SES and food addiction. Importantly, BMI, age, sex, and race were not included in the analysis. This is a limitation because in the sample studied, BMI and age were significantly correlated with food addiction. BMI and age may be better predictors of food addiction than the life stressors studied, and this should be further examined in future studies. Future studies should also address the lack of

diverse participants and incorporate males and a more even distribution of BMI. Social support should be examined in future participants as well. If an individual experiencing life stressors has a sufficient social support system, the individual may be less likely to have maladaptive eating habits.

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Table 1

Des	criptiv	e Sto	itistic
Desi	CIIDIIV	c Dii	$\iota\iota\iota\iota \iota \iota\iota\iota\iota\iota\iota$

%	Mean	Standard Deviation	N
	-	-	156
48.00%			
38.20%			
7.80%			
5.40%			
0.50%			
	-	-	159
80.70%			
11.80%			
6.60%			
0.90%			
			159
100%	-	-	126
	35.55	10.88	126
25.00%			
12.10%			
62.10%			
	48.00% 38.20% 7.80% 5.40% 0.50% 80.70% 11.80% 6.60% 0.90% 100% - 25.00% 12.10%	48.00% 38.20% 7.80% 5.40% 0.50%	48.00% 38.20% 7.80% 5.40% 0.50%

LIFE STRESSORS AND FOOD ADDICTION

Table 2

Correlations Between Food Addiction and Life Stre	essors																					
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Food Addiction	-																					
2. Natural Disaster	.02	-																				
3. Serious Accident	06	.27**	-																			
4. Serious Physical/Mental Illness	.13	.16*	.22*	-																		
5. Emotional Abuse/Neglect	.19*	.11	.25*	.22**	-																	
6. Physical Neglect	.08	.06	.00	.25**	.42**	-																
7.Abortion/Miscarriage	.09	.15	.02	.02	.20*	.23**	-															
8. Separation From Child Against Will	.15	.12	00	00	.20*	.25**	.26**	-														
9. Adoption/Foster Care	.01	.06	01	01	.22**	.34**	.18*	.34**	-													
10. Serious Money Problems/Homeless	.15	.12	.13	.13	.29**	.18*	.29**	.20**	.08	-												
11. Caregiver	.04	.09	.17*	.17*	.14	.35**	.31**	.13	.09	.24**	-											
12. Sudden Death of Loved One	.06	.15	.22**	.22**	.21**	.23**	.25**	.12	04	.12	.25**	-										
13. Witnessed Family Violence	.24**	.12	.04	.04	.33**	.35**	.09	.24**	.23**	.19*	.04	.23**	-									
14. Physically Attacked (not sexually) by Stranger	.08	.21*	.18*	.18*	.08	.35**	.17*	.18*	.17*	.16*	.28**	.17*	.22**	-								
15. Sexual Harassment	.15	.18*	.29**	.29**	.18*	.23**	.12	03	02	.23**	.19*	.17*	.06	.16*	-							
16. Forced Sexual Contact – Before Age 16	.33**	.01	.02	.02	.14	.24**	.22**	.21**	.19*	.02	.14	.09	.18*	.28**	.20*	-						
17. Forced Sexual Contact – After Age 16	.43**	.07	.12	.12	.24**	.32**	.08	.19*	.18*	.08	.14	.08	.20*	.20*	.21**	.41**	-					
18. Forced Intercourse – Before Age 16	.43**	.03	.03	.03	.17*	.24**	.11	.29**	.20*	.19*	.07	.03	.29**	.17*	.18*	.52**	.44**	-				
19. Forced Intercourse – After Age 16	.33**	.06	.13	.13	.30**	.23**	.16*	.41**	.22**	.27**	.18*	.11	.15	.11	.23**	.23**	.59**	.41**	-			
20. BMI	.69**	.09	06	04	.11	12	.07	08	18	10	.04	.02	.17	03	.07	.34**	.24*	.35**	.05	-		
21.Race	02	.17*	.14	.06	.17*	.15	.01	.05	.01	.02	.05	.11	.03	.23**	.06	.13	.06	.06	.07	.06	-	
22. Age	.15*	.01	.06	06	.04	02	.11	.16*	04	.09	.01	.13	.09	.00	.00	02	.17*	.12	.06	.20*	.09	-

^{**}*p* < .01; **p* < .05

LIFE STRESSORS AND FOOD ADDICTION

Table 3
Standard Multiple Regression of Life Stressor Variables on Food Addiction

Variable	B	SE B	sr² (unique)	β
Constant	6.63	.65		
LSC4	.10	.12	.00	.06
LSC15	.14	.13	.00	.09
LSC16	.34*	.16	.03	.24
LSC17	.47*	.18	.04	.23
LSC18	.10	.16	.00	.06

^{*}p < .05; LSC4 = emotional abuse or neglect; LSC15 = made to sexually touch somebody before the age of 16; LSC16 = made to sexually touch somebody after the age of 16; LSC17 = forced to have sex after the age of 16

Appendix A

Yale Food Addiction Scale

This survey asks about your eating habits in the past year. People sometimes have difficulty controlling their intake of certain foods such as:

- Sweets like ice cream, chocolate, doughnuts, cookies, cake, candy, ice cream
- Starches like white bread, rolls, pasta, and rice
- Salty snacks like chips, pretzels, and crackers
- Fatty foods like steak, bacon, hamburgers, cheeseburgers, and French fries
- Sugary drinks like soda pop

When the following questions ask about "CERTAIN FOODS" please think of ANY food similar to those listed in the food group or ANY OTHER foods you have had a problem with in the past year.

IN THE PAST 12 MONTHS HAVE YOU:

Answer the following using:

- 0 Never
- 1 Once a month
- 2 2-4 times a month
- 3 2-3 times a week
- 4 4 or more times or daily
- 1. I find that when I start eating certain foods, I end up eating much more than planned.
- 2. I find myself continuing to consume certain foods even though I am no longer hungry.
- 3. I eat to the point where I feel physically ill.

- 4. Not eating certain types of food or cutting down on certain types of food is something I worry about.
- 5. I spend a lot of time feeling sluggish or fatigued from overeating.
- 6. I find myself constantly eating certain foods throughout the day.
- 7. I find that when certain foods are not available, I will go out of my way to obtain them.

 For example, I will drive to the store to purchase certain foods even though I have other options available to me at home.
- 8. There have been times when I consumed certain foods so often or in such large quantities that I started to eat food instead of working, spending time with my family or friends, or engaging in other important activities or recreational activities I enjoy.
- 9. There have been times when I consumed certain foods so often or in such large quantities that I spent time dealing with negative feelings from overeating instead of working, spending time with my family or friends, or engaging in other important activities or recreational activities I enjoy.
- 10. There have been times when I avoided professional or social situations where certain foods were available, because I was afraid I would overeat.
- 11. There have been times when I avoided professional or social situations because I was not able to consume certain foods.
- 12. I have had withdrawal symptoms such as agitation, anxiety, or other physical symptoms when I cut down or stopped eating certain foods. (Please do NOT include withdrawal symptoms caused by cutting down on caffeinated beverages such as soda pop, coffee, tea, energy drinks, etc.)

- 13. I have consumed certain foods to prevent feelings of anxiety, agitation, or other physical symptoms that were developing. (Please do NOT include consumption of caffeinated beverages such as soda pop, coffee, tea, energy drinks, etc.)
- 14. I have found that I have elevated desire for or urges to consume certain foods when I cut down or stop eating them.
- 15. My behavior with respect to food and eating causes significant distress.
- 16. I experience significant problems in my ability to function effectively (daily routine, job/school, social activities, family activities, health difficulties) because of food and eating.
- 17. My food consumption has caused significant psychological problems such as depression, anxiety, self-loathing, or guilt.
- 18. My food consumption has caused significant physical problems or made a physical problem worse.
- 19. I kept consuming the same types of food or the same amount of food even though I was having emotional and/or physical problems.
- 20. Over time, I have found that I need to eat more and more to get the feeling I want, such as reduced negative emotions or increased pleasure.
- 21. I have found that eating the same amount of food does not reduce my negative emotions or increase pleasurable feelings the way it used to.

Appendix B

Life Stressor Checklist – Revised Questions

Now we are going to ask you some questions about events in your life that are frightening, upsetting, or stressful to most people. Please think back over your whole life when you answer these questions. Some of these questions may be upsetting events you don't usually talk about. Your answers are important, but you do not have to answer any questions that you do not want to. Thank you.

Answer the following using:

- 0 Happened to me once
- 1 Happened to me several times
- 2 Witnessed it
- 3 Doesn't apply
- 1. Have you ever been in a serious disaster (for example, an earthquake, hurricane, large fire, explosion)?
- 2. Have you ever had a very serious accident or accident-related injury (for example, a bad car wreck or an on-the-job accident)?
- 3. Have you ever had a very serious mental illness (for example, cancer, heart attack, serious operation, felt like killing yourself, hospitalized because of nerve problems)?
- 4. Have you ever been emotionally abused or neglected (for example, being frequently shamed, embarrassed, ignored, or repeatedly told that you were "no good")?
- 5. Have you ever been physically neglected (for example, not fed, not properly clothed, or left to take care of yourself when you were too young or ill)?
- 6. WOMEN ONLY: Have you ever had an abortion or miscarriage (lost your baby)?

- 7. Have you ever been separated from your child against your will (for example, the loss of custody or visitation or kidnapping)?
- 8. Were you put in foster care or put up for adoption?
- 9. Have you ever had serious money problems (for example, not enough money for food or a place to live)?
- 10. Have you ever been responsible for taking care of someone close to you (not your child) who had a severe physical or mental handicap (for example, cancer, stroke, AIDS, nerve problems, can't hear, see, walk)?
- 11. Has someone close to you died suddenly or unexpectedly (for example, sudden heart attack, murder, or suicide)?
- 12. When you were young, did you ever see violence between family members (for example, hitting punching, kicking, slapping)?
- 13. Have you ever been robbed, mugged, or physically attacked (not sexually) by someone you did not know?
- 14. Have you ever been bothered or harassed by sexual remarks, jokes, or demands for sexual favors by someone at work or school (for example, a coworker, a boss, a customer, another student, a teacher)?
- 15. Before the age of 16, were you ever touched or made to touch someone else in a sexual way because he/she forced you in some way or threatened to harm you if you didn't?
- 16. After the age of 16, were you ever touched or made to touch someone else in a sexual way because he/she forced you in some way or threated to harm you if you didn't?
- 17. Before the age of 16, did you ever have sex (oral, anal, genital) when you didn't want to because someone forced you in some way or threatened to hurt you if you didn't?

18. After the age of 16, did you ever have sex (oral, anal, genital) when you didn't want to because someone forced you in some way or threatened to hurt you if you didn't?