

2021

## Disentangling the Role of Self-Esteem on Eating Disorders in African American Youth

Carly Alexandria Wagner

University of North Florida, carlywags3@gmail.com

Follow this and additional works at: <https://digitalcommons.unf.edu/etd>



Part of the [Clinical Psychology Commons](#)

---

### Suggested Citation

Wagner, Carly Alexandria, "Disentangling the Role of Self-Esteem on Eating Disorders in African American Youth" (2021). *UNF Graduate Theses and Dissertations*. 1029.

<https://digitalcommons.unf.edu/etd/1029>

This Master's Thesis is brought to you for free and open access by the Student Scholarship at UNF Digital Commons. It has been accepted for inclusion in UNF Graduate Theses and Dissertations by an authorized administrator of UNF Digital Commons. For more information, please contact [Digital Projects](#).

© 2021 All Rights Reserved

Disentangling the Role of Self-Esteem on Eating Disorders in African American Youth

by

Carly A. Wagner

A Thesis submitted to the Department of Psychology  
in partial fulfillment of the requirements for the degree of

Master of Science in Psychological Science

UNIVERSITY OF NORTH FLORIDA

COLLEGE OF ARTS AND SCIENCES

April 2021

Unpublished work © Carly Wagner

## DEDICATIONS

*I would like to thank my mentor, Dr. Dawn Witherspoon, for all the guidance, support, and advice throughout my graduate school experience. I also would like to thank my committee member Dr. Angela Mann for providing me with helpful feedback and support during this project. In addition, I would like to thank my friends, colleagues, and department faculty for making my time at the University of North Florida invaluable.*

## TABLE OF CONTENTS

Abstract .....	4
Self-Esteem .....	5
Self-Esteem in Youth .....	6
Self-Esteem and Gender .....	7
Self-Esteem in African Americans .....	8
Self-Esteem and Weight .....	10
Eating Disorders .....	11
Eating Disorders in Youth .....	17
Eating Disorders and Gender .....	18
Eating Disorders in African Americans .....	19
Eating Disorders and Weight .....	21
Eating Disorders and Self-Esteem .....	22
Summary of Previous Literature .....	23
Gaps in Previous Literature .....	23
Hypothesis .....	24
Method .....	26
Data Analysis Plan .....	29
Results .....	32
Discussion .....	37
References .....	49
Tables .....	72
Appendices .....	81

### Abstract

Self-esteem (SE) has been identified to have a significant impact on eating disorders (ED). Although previous studies have found a relationship between SE and EDs, further investigation is needed because SE and EDs affect gender, age, weight status, and ethnicity heterogeneously. In particular, there is limited research and inconsistent findings on the impact of SE on EDs in youth, males, and African Americans (AAs). This study had six aims: 1) Observe gender and age differences in SE, 2) Examine the impact of weight status on SE, 3) Observe gender and age effects on EDs, 4) Examine the impact of weight status on EDs, 5) Investigate the relationship between EDs and SE in youth, 6) Test mediation and moderation effects of weight, SE, and EDs. There were 215 male and female participants ( $M_{age}=13.3$ ) recruited from low-income, predominantly AA urban communities. To assess SE the Rosenberg Self-Esteem Scale was used and the Children's Eating Attitudes Test was used to assess eating disorder behaviors. Results from this study revealed that there were no gender and age differences in participants SE. Obese and overweight youth indicated the lowest levels of SE. There was a significant association between SE and EDs. Females had higher levels of EDs and higher rates of obesity than males. Underweight youth had the highest rates of eating pathology compared to other weight categories. Obese and overweight youth had the highest rates of bulimia, anorexia, and oral control related symptoms compared to underweight and normal weight youth. Overall, the relation between SE, weight status, and EDs in the current sample is not a linear relationship and further investigation is warranted.

*Keywords:* self-esteem, eating disorders, youth, African American

## **Disentangling the Role of Self-Esteem on Eating Disorders in African American Youth**

### **Self-Esteem**

Multiple fields in psychology have researched SE as a central construct because it can be conceptualized in numerous ways. SE consists of the extent to have positive or negative views towards the self (Abdel-Khalek, 2016). Positive thoughts and emotions towards the self are attributed to high SE and negative thoughts and emotions towards the self are attributed to low SE (Marcic & Grum, 2011). The universal definition of SE, though controversial, is divided into two definitions among researchers, the first is global SE and the second is specific or domain SE (Abdel-Khalek, 2016). Global SE encompasses psychological wellbeing and specific SE refers to behavior (Rosenberg et al., 1995). These two types of SE cannot be used interchangeably because SE is fostered by cognition and affect that contributes to an attitude, which is not universal. For example, an individual may have global low SE but a high specific SE in terms of peer relationships (Rosenberg et al., 1995).

Orth (2017) conducted a meta-analysis of longitudinal studies of the developmental trajectory of SE and found that SE systematically changes across the lifespan. The findings revealed that SE on average decreases from childhood to adolescence, increases in adulthood and decreases again in old age (Orth, 2017). Researchers previously have questioned whether SE derives from an individual's genes or environment; however, it has been understood that there are genetic factors that are influential as well as environmental factors from mainly childhood experiences that constitute SE (Orth & Robins, 2019). In terms of stability and change, genetic aspects can primarily explain SE stability and changes in SE can primarily be explained by environmental experiences (Neiss et al., 2002). There is a bidirectional relationship between SE and life satisfaction, where the level of SE impacts the level of life satisfaction and vice versa.

SE impacts a variety of outcomes in an individual's life that contribute to life satisfaction, such as relationships, health, and income; therefore, it is important to establish robust interventions that will impact individual's SE (Diener & Diener, 2009; Orth & Robins, 2019).

### **Self-Esteem in Youth**

The pivotal time of adolescence is an important period for SE development. Adolescent SE is portrayed through attitude and behavior (Abdel-Khalek, 2016). Influences of SE in youth impact decision-making, which can lead to positive or negative outcomes. Children and adolescents tend to conceptualize SE by the way others behave towards them (Searcy, 2007). High SE in youth can be identified as a protective factor when children are dealing with difficult experiences and it enhances resilience. Conversely, low SE in youth can put children at risk for developing mental, physical, and social issues (Hosogi et al., 2012). Adaptive and maladaptive development during childhood and adolescence translates into a decisive period for future health outcomes. A study that investigated SE trajectories in adolescence found that adolescents who have low SE are susceptible to abuse substances in adulthood to cope with negative experiences and emotions (Oshri et al., 2017).

Youth have many risk factors for developing low SE that are not as evident in adulthood. A study on 6,522 10-14 year old male and female participants found that elevated TV viewing was a salient risk factor for low SE. The study also found that successful school performance, participating in team sports, and having responsive parents serves as a protective factor against low SE (McClure et al., 2010). Previous studies have found that parenting styles have an impact on a child's SE development. The consistent findings reveal that authoritative parents influence high SE development in youth and neglectful and authoritarian parents influence low SE development in youth (Aremu et al., 2019; Oshri et al., 2017; Pinquart & Gerke, 2019). Along

with certain parenting styles, psychopathology is a substantial risk factor for low SE in youth because the development of mental health issues occurs during significant time periods, such as adolescence (Moksnes & Reidunsdatter, 2019). Low SE is a predictor especially in depression and anxiety in youth (Moksnes & Reidunsdatter, 2019). Another factor that has a substantial impact on youth's SE is social media and previous studies have found a significant relationship between the two (Burrow et al., 2017; Kelly et al., 2018; Valkenburg et al., 2006). Whether the feedback on a social media post is positive or negative can influence levels of SE, where positive feedback results in an increase in SE and negative feedback results in a decrease in SE (Woods & Scott, 2016).

### **Self-Esteem and Gender**

One of the main distinguishable factors of gender and SE is that males' global SE on average is higher than females' (Bleidorn et al., 2016). The trajectory of SE across the lifespan does not differ in gender, with an increase during childhood and adulthood and a decrease in adolescence and old age (Bleidorn et al., 2016). SE is contingent on multiple factors that vary from person to person depending on what is important to them and their self-concept. Regarding gender there are different contributing factors for SE. Overall males and females are similar in what constitutes SE such as success, physical appearance, and popularity; although in females, physical appearance is a more prominent aspect taken into consideration than males (Marcic & Grum, 2011). Beauty cultural pressures for females can contribute to explaining why males tend to have higher SE than females. Also puberty differences in gender can influence girls having lower SE because girls increase in BMI two times more likely than males due to pubertal changes (Olenik-Shemesh et al., 2018). Another explanation comes from females being more susceptible to depression and gender discrimination such as sexual violence than males, which is



associated with low SE (Zuckerman et al., 2016). According to the World Health Organization (2017), globally 1 in 3 females will experience gender-based violence. Zuckerman et al. (2016) conducted a meta-analysis on SE presentations in males and females from the years 2009 through 2013 and found that females who feel substantial gender discrimination, such as experiencing limitations in the job market or being negatively stereotyped, have low SE. Previous studies on stress and its impact on SE have found that stress levels are a contributor for SE (Bi et al., 2016; Kogler et al., 2017; Martyn-Nemeth et al., 2009). There are neurological differences in males and females when processing stress that has impacted SE levels. Males tend to use the regions of their brain that are involved in cognitive regulation when encountering stress, which have a positive association with SE. On the flip side, females tend to use the regions of their brain that are involved in self-referential and affective processing, which have a negative association with SE (Kogler et al., 2017).

### **Self-Esteem in African Americans**

It is a mistaken belief that AAs have lower SE than other races and ethnicities because of racial discrimination and stigmatization. Past research has similarly concluded that among other races and ethnicities, AAs tend to have higher SE than Whites, Asians, and Latinos (Bachman, 2011). AAs may report higher SE because of an instillation of pride at a young age and being exposed to a cultural ideal of self-value and worth (Bachman, 2011). Racial discrimination is prominently experienced by AAs. Out of the 101 AA adolescents that participated in a study; on average an adolescent experienced five incidents of racial discrimination every day (English et al., 2020). There have been inconsistent findings regarding the impact of racism towards AAs and SE (Chao et al., 2014; James, 2017; Johnson, 2020; Tynes et al., 2012). Johnson (2020) conducted a study to find out if racism towards AAs was linked to SE and internalized shame;

however, racism was not found to have a significant relationship to internalized shame or SE. There was only a negative relationship found between SE and internalized shame (Johnson, 2020). A different study did find a significant relationship between racism and SE. There, it was found that AAs who have high levels of perceived racism are more likely to have lower levels of SE and experience more psychological distress (Chao et al. 2014). Another study found that AAs who internalize racism tend to have low SE; although, those with high SE who feel susceptible to internalizing racism experience an ego threat, which negatively impacts the individual's ability to cope. Consequently, high SE associated with racism threats can result in deleterious psychological outcomes, such as depression (James, 2017). Also high SE has been found to be a protective factor against racial discrimination in terms of anxiety but not depression (Tynes et al., 2012).

Racial socialization has been identified to be a protective factor against perceived racial discrimination; consequently, it assuages the risk for low SE (Harris-Britt et al., 2007). AAs who have a positive group identity will have higher levels of SE. White individuals may have lower levels of SE than AAs because unlike AAs, White individuals have a weaker development of group identity (Zuckerman et al., 2016). SE is influential on racial identity and gender roles can moderate the relationship between the two. A study that investigated male's racial identity and SE found that AA males who devalued their racial identity experienced globally lower levels of SE and males who valued their racial identity had globally higher levels of SE (Mahalik et al., 2006). Another study where Buckley & Carter (2005) examined racial identity and SE in AA females revealed the same results; females who have a positive evaluation of being AA had higher SE than females who have a negative evaluation of being AA. However, the only significant difference between the two studies is that race identity in females is a significant

indicator for SE levels. But other important factors such as gender roles influence the level of SE an individual has (Buckley & Carter, 2005). Also race/ethnicity identity pressure for AAs is an evident factor that impacts SE. Specifically, AA youth who have race/ethnic identity pressures from family and peers have low SE longitudinally (Aoyagi et al., 2018).

### **Self-Esteem and Weight**

There are incongruent findings on how obesity influences SE levels in AA male and females; however, the relationship between obesity and SE in White Americans is well understood (Palmer, 2003). Previous research has found a significant relationship between an individual's weight status and SE. Individuals categorized as overweight or obese are more likely to have lower levels of SE and individuals categorized as normal weight or who have a lower BMI have higher levels of SE (Elran-Barak, 2019; Iannaccone et al., 2016; Kiviruusu et al., 2016). Internalizing negative feelings and thoughts about weight and body image increases the risk for low levels of SE (Iannaccone et al., 2016). A study that examined body-related emotions and its impact on the relationship between SE and weight in 7<sup>th</sup> grade students living near Montreal found that feelings of shame and guilt towards an individual's body mediated the relationship between SE and weight (Pila et al., 2015).

In regards to gender, the association between low SE and high BMI is more pronounced in AA females than AA males, which could be explained by females having more body dissatisfaction than males (Borders et al., 2006; Kiviruusu et al., 2016). A study on differences in gender perceptions on weight in a sample of white, black, Asian, and Hispanic 11-21 year olds male and female adolescents found that females especially with a low BMI more than males are more likely to misperceive themselves as being overweight. Also males and females who had

lower levels of SE misperceived themselves as being overweight more than those with higher levels of SE (Perrin et al., 2010).

According to the CDC (2019), 18.9% of low-income youth are obese and AAs have one of the highest rates obesity among Hispanics, whites, and non Hispanic Asians (CDC, 2020). Weight attitudes begin in early childhood and weight stigmatization impacts levels of SE across the lifespan (Puhl et al., 2006). It is not only weight status that influences low SE, but also the social factors that coincide with weight stigmatization. For example, individuals who experience weight-related teasing from peers and parents are vulnerable to lower levels of SE (Harriger & Thompson, 2012). There are inconclusive findings regarding SE and weight in younger children with some studies finding that there is a relationship and others finding that younger children with higher BMIs are not affected psychologically by their weight status (Sahoo et al., 2015; Williams et al., 2013). There are consistent results from SE and BMI studies that other age groups such as older children, adolescents, and adults who are obese tend to have lower SE in Caucasian, AA, Hispanic, and Pacific Islander (Williams et al., 2013).

### **Eating Disorders**

EDs have a harmful impact on health with detrimental consequences that can be life-threatening (National Institute of Mental Health, 2016). Abnormal eating habits that negatively affect an individual's mood, thinking, and behavior characterize an ED (American Psychiatric Association, 2013). The prevalence of EDs is increasing; at least 20 million women and 10 million men develop an ED within the lifespan (Wade et al., 2011). The DSM-5 categorizes anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED) into one group called threshold eating disorders (TED) and another group that only consists of other specified feedings and eating disorders (OSFED) (American Psychiatric Association, 2013). Although

EDs derive from dysfunctional cognition and behaviors towards food, there are independent diagnostic criteria because of the differences in etiology, epidemiology, diagnosis, and treatment (American Psychiatric Association, 2013). The complexity of EDs challenges researchers to conceptualize the etiology in order to provide further knowledge to establish interventions tailored to each individual independently (Dalle Grave, 2011).

### ***Anorexia Nervosa***

AN is classified by three main features: restricted energy intake that leads to significantly low body weight, an intense fear of gaining weight that leads to interference of weight gain, and a dysfunctional perception of self regarding weight or shape (American Psychiatric Association, 2013; Mitchell & Peterson, 2005). Among mental disorders AN has the highest mortality rate with suicide rates of 12 per 100,000 per year (American Psychiatric Association, 2013). The emergence of AN can be substantially familial. Heritability in females varies between 22% and 76% (Baker et al, 2009). On the chromosome 1 region, serotonin receptor (HTR1D) and the delta opioid receptor (OPRD1) are significantly associated with AN. These receptors influence phenotypic aspects such as obsessive and anxious tendencies (Bulik et al., 2007). The reduction 5-HT<sub>2A</sub> genetic binding potential in the frontal, parietal, and occipital cortex have been identified as a risk gene for developing AN, suggesting that there are neuroendocrine issues in individuals at risk (Audenaert et al., 2003; Gorwood et al., 2003). Genetic susceptibility to AN can also be traced back to the variability in the estrogen receptor 2 gene (ESR2). This gene is linked to the neurology involved in behavior and the regulation of food intake. Therefore, ESR2 has been identified as being related to an increase in stress surrounding food consumption, which can exacerbate AN risk (Eastwood et al., 2002). Previous studies have found that early onset mental illness is explained by more genetic factors than environmental factors; therefore individuals

with AN who are diagnosed at a young age can explain the development due to genetic implications with a 41%-85% heritability (Anttila et al., 2018; Feng, 2016; Gorwood et al., 1998). The development of AN is partially explained by genetic factors, which stresses the importance of identifying individuals with the risk genes.

For environmental risk factors in AN, childhood eating behaviors and thoughts influence the level of risk aversion a person has. For instance, picky eating and digestive issues as a child has been found to be associated with AN, which could be explained by learned patterns of food avoidance (Karwautz et al., 2001; Marchi & Cohen, 1990). Focusing on risks associated from childhood into adolescence, researchers find that children, who had eating issues such as under eating, had an increased risk of developing AN in adolescence (Nicholls & Viner, 2009). Socioeconomic status can also be determinative. A study looking at the relationship between socioeconomic statuses and AN, found that individuals from higher socioeconomic status are more at risk. This finding is inconsistent across ED literature; however, the study explains the finding by stating that higher-level individuals seek treatment more than lower level (Lindberg & Hijern, 2003). The prevalence of AN is negligible in non-western societies due to positive eating behaviors and thoughts; non-western societies present a lower risk for this disorder. Conversely, western societies contain substantial incidences of eating pathology, which illustrate the cultures' negative perspectives on body image and satisfaction (Soh et al., 2006). A study comparing ED symptoms in China and Spain found rates for drive for thinness in China to be 7.94% and in Spain to be 8.89%. Also findings for rates of body dissatisfaction in China were 4.07% and Spain was 10.7% (Agüera et al., 2017). Examining the multiple sources of AN risk factors in an individual's environment, such as culture, socioeconomic status, and early development, provides insight into ANs complex nature.

***Bulimia Nervosa***

BN is categorized by recurrent episodes of binge eating where a sense of control is diminished and occurs in discrete period of time (within any 2-hour period), inappropriate compensatory behaviors to reduce weight, and a dysfunctional perception of self regarding weight or shape that results in negative feelings. Also for a diagnosis of BN, these features must occur on average once a week for 3 months (American Psychiatric Association, 2013; Mitchell & Peterson, 2005). There is a fourfold higher risk for developing BN in individuals with first-degree relatives who have had BN. Heritability is estimated to be 55%; however heritability is higher in binge eating behaviors than purging behaviors in BN (Bulik et al., 1998; Bulik et al., 2016). Abnormal neural functioning and a few genes in particular have been identified to provide insight to the development of BN. There is evidence that individuals with BN have interoceptive deficits that inhibit normal levels of stimulation in relation to hunger and satiety. Pancreatic polypeptide is secreted from the pancreas that evokes satiety and there are lower levels in individuals who are at risk for BN (Naessen et al., 2011). The *GPL1R* gene has been identified as a risk gene for BN because it is prominent in appetite control. Another risk gene is the serotonin transporter 5-HTT gene, which is involved in food intake and body weight regulation, and is evidently deregulated in individuals at risk for BN (Racine et al., 2009). Familial obesity is influential in developing BN; genotypes predisposing individuals to higher levels of BMI are at risk. The melanocortin-4 receptor gene (*MC4R*) is prevalent in people who are obese; consequently the *MC4R* warrants the development of BN (Hebebrand et al., 2002). Identifying the risk genes and heritability in BN is important because it helps explain the etiology.

Environmental factors for BN are heavily focused on body SE and body comparisons to other sources in the environment. A significant risk factor for BN is frequently fluctuating in

weight and partaking in dieting behaviors (Kendler et al., 1991). A study looking at athletes and the development of BN, found that athletes are vulnerable to developing BN. The vulnerability is possibly explained by the culture athletes are engulfed by; especially sports that accentuate weight requirements and endurance (Greenleaf et al., 2010). Exposure to thin body ideals in the media increases an individual's risk for body dissatisfaction; specifically those with high body dysphoria are vulnerable to BN (Young et al., 2001). A study that examined the role Facebook usage has on the development of BN and body dissatisfaction found that Facebook usage increases the bulimic symptoms. Furthermore, individuals who compared their body to Facebook posts had lower levels of SE and had the desire to lose weight (Smith et al., 2013). Familial aspects are another strong influence of the development of BN, specifically the mother-daughter relationship dynamic. For example, mothers who encouraged dieting and exercising because of disapproval of weight puts the individual at an elevated risk for BN (Bulik & Tozzi, 2004). The levels of sensitivity an individual has to certain environmental risk factors can explain the development of BN.

### ***Binge Eating Disorder***

BED is episodic binge eating of large quantities of food with a loss of control and occurs in a discrete period of time (within any 2-hour period), but there are no regular compensatory behaviors following, such as purging or restricting food intake. Also a BED diagnosis requires these behaviors to occur once a week for at least 3 months and to have negative emotions associated with these behaviors (American Psychiatric Association, 2013). It is apparent that BED often goes untreated due to underreporting and the disproportionate amount of shame. Alarming, of the cases of BED less than half receive treatment and individuals who are in their early 20s have higher risk (Kessler et al., 2013). Approximately 8% of the population of



overweight/obese has BED; however, not all individuals who have BED are obese (Smink et al., 2013). Binge eating is commonly reported in response to emotions, which indicates that individuals with BED may lack robust positive coping strategies like getting professional help (Gianini et al., 2013). BED can be identified as a way to elude negative emotions by focusing attention on the stimulation of eating food, but research has found that negative mood is prevalent at post binge as well (Stein et al., 2007). Adverse childhood experiences such as abuse, bullying, and discrimination are risk factors in the development of BED (Striegel-Moore et al., 2002). Regarding neurobiology of BED, there are findings that there are similar neurobiological features in BED and other addiction related disorders. Dysfunctional reward sensitivity is a salient feature that influences the development of BED along with compulsivity and impulsivity. Altered dopamine function and the imbalance in D1D2 receptors give insight to the development of BED (Kessler et al., 2016).

### ***Other Specified Feedings and Eating Disorders***

OSFED was previously classified as Eating Disorder Not Other Specified (EDNOS) in the DSM-IV; however, the category was renamed due to its vast criteria, which made the prevalence of this disorder the highest amongst ED diagnosis (Mancuso et al., 2015). Therefore, BED was made its own disorder and AN and BN has its own specific diagnostic criteria. OSFED encompasses EDs that do not meet the diagnosis for AN, BN, or BED. Examples of OSFED are atypical anorexia nervosa, low frequency BN and BED, purging disorder, and night eating syndrome (American Psychiatric Association, 2013; Smink et al., 2013). A diagnosis of Atypical AN consists of all the same criteria for AN, but an individual's weight is not below normal range and the individual has experiences significant weight loss (American Psychiatric Association, 2013; Moskowitz & Weiselberg, 2017). For low frequency BN and BED, the

criteria is the same as BN and BED, but the occurrence is at a lower frequency or for fewer than three months (American Psychiatric Association, 2013). Purging disorder contains the same behaviors to control weight by recurrent purging, but is not accompanied by binge-eating episodes. In comparison to BN, purging disorder has a higher mortality rate due to physiological health imbalances (Lydecker, et al., 2018). Night eating syndrome is characterized by ingesting large quantities of food after the evening meal that occurs at least twice per week. Individuals with night eating syndrome have an increased risk for obesity and other mental illness like depression and anxiety (Shillito et al., 2018).

### **Eating Disorders in Youth**

Rates of EDs are becoming more prevalent in American youth. According to the National Institute of Health (2017), the prevalence of EDs in the United States in youth is 2.7% and 3.8% of females and 1.5% of males having an ED. It is difficult to treat EDs and detect especially in children; therefore, children are being under diagnosed and untreated (Campbell & Peebles, 2014). ED's are recognized as early as 5 to 12 years old in children and are the third most common chronic condition in youth (Golden et al., 2016). Between the ages of 15-19 years old ED's are elevated, but ED behaviors and cognitions also become apparent in pre-adolescence (Micali et al., 2015). Childhood dysfunctional eating behaviors such as, eating non-food substances and disliking certain tastes or textures to foods once liked, can foreshadow eating pathology. For example, a study investigating the trajectory of eating behaviors starting in childhood found overeating at a young age puts the child at a 6-7% increased risk for developing BED (Herle et al., 2020). Significant psychosocial and biological experiences during childhood development can be predictive in the level of risk an individual has for developing an ED. In particular, girls who have advanced pubertal status and early pubertal timing have an increased

risk for developing an ED (Klump, 2013). There are several sex differences in how youth present EDs. A study examining sex differences in adolescents with EDs found that girls are more likely to be diagnosed with AN or BN than boys and boys are more likely to be diagnosed with OSFED (Kinasz et al., 2016).

### **Eating Disorders and Gender**

Most of ED literature is on females because of the misconception of a female-specific mental illness; however, males having an ED are beginning to gain attention as an increase in males is being diagnosed. EDs to begin with are stigmatized and being a male with an ED exacerbates the stigma associated, which can explain the often underreporting of males with an ED (Griffiths et al., 2015). According to the National Institute of Mental Health (2016), EDs are more prevalent among females than males, with an estimated 20 million women and 10 million men will have an ED (Hudson et al., 2007). Historically males were primarily being diagnosed with EDNOS/OSFED than any other ED because the DSM-IV had specific diagnosis criteria that would apply to females, such as the requirement for amenorrhea in AN. The DSM-5 changed ED criteria to be inclusive to males and there are already noticeable differences in prevalence (Raevouri et al., 2014). Etiology and clinical presentations differ slightly between females and males (Jones & Morgan, 2010).

One of the significant differences between males and females regarding EDs is risk factors. Homosexuality and pre-morbid weight increases susceptibility for developing an ED in males (Bramon-Bosch et al, 2000; Raevouri et al., 2014). The drive for thinness is a more prominent risk factor in females than males. Females with a drive for thinness are typically in the normal weight range and males who have a drive or thinness are above the average weight range (Wiseman et al., 2004). A study conducted to review the sex differences in EDs, found that

females with an ED are more likely to be within the normal BMI range and males with an ED tended to be overweight and obese (Jones & Morgan, 2010).

Among EDs, BED has similar numbers of males and females diagnosed; however, AN and BN are more often diagnosed in females (Striegel-Moore & Bulik, 2007). Researchers have explained the equal prevalence of BED in females and males by pointing to the concept that males tend to idealize a muscular body image; therefore, males do not engage in weight loss behaviors as frequently as do females who idealize thinness (Striegel-Moore & Bulik, 2007). Males have higher mental health co-morbidities than females, especially suicidal ideation, but females tend to self-harm more frequently (Bramon-Bosch et al, 2000; Jones & Morgan, 2010). Different hormonal differences in males and females affect ED presentation. For example, testosterone levels decrease in males, which debilitate sexual functioning, and in females circulating estrogen levels fluctuate, which impacts menstrual function (Støving et al., 2011).

### **Eating Disorders in African Americans**

EDs affect all racial and ethnic populations; therefore, it is essential to have a holistic understanding about the impacts EDs have on different racial and ethnic groups. In the past almost all of the ED diagnostic and assessment tools were developed for white females. Since ED's present heterogeneously across different populations, culturally sensitive diagnostic and assessment instruments are significant for tailoring prevention and treatment to each person (Rodgers et al., 2018). A research study that assessed the prevalence of ED in AAs found that AN was the least common in AAs with a life time prevalence of 0.17%, BN was more common and had life time prevalence of 1.49%, and BED was the most common with a life time prevalence of 5.08% (Taylor et al., 2007). AAs have a high risk for life stressors, racial discrimination and ethnic identity; therefore, utilizing cultural perspectives when identifying risk

factors for specific racial and ethnic groups is important. Placing emphasis on cultural competence, however, does not mean that all AAs can be generalized to fit in the risk factor group for AAs (Cassidy et al., 2015). A study examining body image and eating behaviors in Caucasian AA, and Asian participants found a significant relationship between body image and ED. AA have lower levels of body dissatisfaction and idealize larger body sizes than both Asians and Caucasians; however, when BMI was controlled all three groups had similar body size ideals (Gluck & Geliebter, 2002). Eating pathology was found to be lowest in AA compared to Caucasians and Asians, a finding which suggests that body ideal culture in AAs can be a protective factor from developing an ED (Gluck & Geliebter, 2002; Rodgers et al., 2018).

Body socialization in AAs can help explain lower levels of eating pathology due to eating and body cultural norms. Previous studies have found that AAs prefer to have a larger body type preference than other racial groups (Blostein et al., 2017; Capodilupo, 2015; Davis et al., 2009; Rodgers et al., 2018). It is not uncommon for AA mothers to influence their overweight child to gain more weight to look healthier (Davis et al., 2009). Findings have highlighted that AA mothers tend to underestimate the body mass index of their children. Consequently, children capture parents and peers' body perspectives and internalize them to mirror similar body perspectives (Davis et al., 2009). Larger body ideals that derive from AA body socialization can help explain why AAs are disproportionately affected by obesity (Capodilupo, 2015). AAs who have a strong racial identity have been found to have a lower prevalence of a drive for thinness, which can equate to lower body dissatisfaction (Blostein et al., 2017). Studies have found that lower levels of body dissatisfaction and lower drive for thinness moderates the risk for developing an ED. Body socialization among AAs regarding BED does not explain AAs susceptibility for developing BED (Blostein et al., 2017; Capodilupo, 2015).

## **Eating Disorders and Weight**

There are profound associations between EDs and weight status, such as obesity or low BMI being a cause and consequence of EDs (Da Luz et al., 2018). The DSM-5 uses body weight as a diagnostic criteria only for AN, which is low body weight and the severity of the disorder is based on current BMI (American Psychiatric Association, 2013). A study investigating the relation between BN and body weight found that about 65% of individuals with BN were within the normal weight BMI category. With many individuals with BN being a normal weight, there is difficulty in recognizing this ED (Hudson et al., 2007). For BED it is a common misconception that it is a disorder for people with an elevated BMI; however, the DSM-5 for BED does not have weight status as a diagnostic criteria (American Psychiatric Association, 2013; Dingemans & van Furth, 2012). It is more common for an individual who is obese to be diagnosed with BED because binge eating leads to weight gain (Davis, 2017). One study examining the relationship between obesity and EDs found that in the sample of 551 participants with BN and 123 participants with BED, 33% of participants with BN and 87% of participants with BED is obese or has been at some point in time (Villarejo et al., 2012). EDs and obesity share common biological and environmental etiologies and the manifestations of each can commonly be interconnected. For instance, childhood sexual abuse is a shared risk factor for both obesity and EDs (Day et al., 2009). There also is overlap in biological etiology for both that entails reward of food and hunger regulation (Rancourt & McCullough, 2015). Previous studies have found individuals with a higher BMI are more vulnerable to developing an ED than individuals with a lower BMI (Duncan et al., 2017; Iannaccone et al., 2016; Veillette et al., 2018).

## **Eating Disorders and Self-Esteem**

Much research has found consistently that SE is a significant factor in the etiology of EDs (Espinoza et al., 2019; Ghaderi, 2001; Shisslak et al., 1998). However, there is skepticism whether low SE is a determinant for ED or if low SE is a consequence from developing an ED (Shisslak et al., 1998). A bidirectional relationship between SE and eating pathology can encapsulate the influences each has on one another (Espinoza et al., 2019). Low SE is a predictor for developing an ED and is apparent during and throughout the ED (Ghaderi, 2001). Individuals with EDs try to increase their SE by dieting and partaking in disordered eating, which puts the individual at greater susceptibility for developing an ED (Noordenbos et al., 2014). High SE can be a protective factor for developing an ED, which highlights the importance of SE interventions that address negative self-beliefs and dysfunctional thinking (Bos et al., 2006; Peck & Lightsey Jr, 2008). In a study that examined the relationship between SE and EDs in adolescent and adult females found that females with low SE also had high levels of perfectionism and a drive for thinness. This significant finding is stronger in those with AN than BN and BED (Puttevils et al., 2019). SE also plays a profound role during ED treatment because low SE contributes to hopelessness about change and thoughts on negative therapeutic outcomes (Linardon et al., 2019). Low SE in individuals with an ED primarily are challenged by SE related to weight, shape, and control; therefore, ED treatment is effected more by specific domain SE than overall SE (Linardon et al., 2019). Brochu et al. (2018) conducted a study on female adolescents with an ED and investigated the role SE and negative affect has on ED symptoms. The researchers found that low SE and negative affect exacerbate ED symptoms due to a lack of coping strategies and sense of self worth. Consequently, low SE can lead to individuals using ED behaviors to gain a sense of self and control (Brochu et al., 2018).

### **Summary of Previous Literature**

The ED literature is immense and previous research investigating the relationship between SE and EDs has found that there is a significant relationship; however, this finding may be not fully understood because of minimal variations in the age, gender, weight, and ethnicity of the participants. A previous study examining eating attitudes and SE using the ChEAT and the RSE on Malay girls ages 8-9, found that there is a significant relationship between disordered eating and SE (Shariff & Yasin, 2005). Gender differences in EDs has found consistent results that AN and BN are more common in females; however, BED is a diagnosis seen in both females and males. There is limited inclusion of males in peer-review articles related to EDs, which suggests that further research is needed to understand EDs in males (Murray et al., 2017). The inclusion of weight status in AA ED studies is limited; although, there are findings that individuals with a higher BMI are at risk for developing an ED and having lower levels of SE (Witherspoon et al., 2013). A previous study using the ChEAT and RSE on AA adolescents found that females had higher levels of eating pathology and lower levels of SE than males (Witherspoon et al., 2013). Across all ages and ethnicities, males tend to have slightly higher levels of SE. Previous literature that has focused on preadolescents and adolescents has concluded that these age groups have an increased risk in developing an ED and having low SE. Most of the literature on EDs predominantly uses a Caucasian sample and there is a lack of ED research on other ethnicities. EDs are prevalent in AAs; however, compared to other ethnicities AAs have lower levels of eating pathology and higher levels of SE.

### **Gaps in Previous Literature**

Over time extensive understandings on the complexity of EDs have surfaced; however, there are still unanswered questions. There are limitations and inconsistent findings in previous studies investigating EDs in AA male and female youth across different weight categories.



Ethnic differences in EDs are heterogeneous; therefore, there needs to be emphasis on the context of cultural experiences. If an ED study includes AAs in the study, there typically is a limited sample size, which would mitigate the validity and reliability of the findings. Most commonly in ED studies, the usual age group of the sample is in the emerging adulthood range (18-25), primarily college student samples. This age range is not generalizable to all ages because each age range contains different developmental aspects. Children in particular should be emphasized because they are the most vulnerable for abnormal development and interventions are beneficial during this time. There have been studies that included examining the impact of weight on EDs; although, the research primarily focuses on the relationship between BED and obesity (Da Luz et al., 2018; Dingemans & van Furth, 2012; Villarejo et al., 2012). Other weight statuses such as a lower BMI and other EDs such as AN, BN, and OSFED warrant further investigation of the relationship, especially in AAs. ED research profoundly encompasses females; however, the increase in ED prevalence in males needs to be examined. ED studies that do include males, AAs, or children are limited to a particular ED diagnosis, resulting in limited studies that examine AA youth's overall eating pathology in relation to SE. These limitations have resulted in using findings to create interventions that are targeted to primarily white female college students. It is necessary to gain a better understanding on the relation between SE and EDs in understudied populations to make interventions that are effective.

## **Hypothesis**

### ***Aim 1. Observe gender and age differences in SE***

**Hypothesis 1a.** Males will have higher SE than females.

**Hypothesis 1b.** Youth aged 13-16 will have lower SE than youth aged 11-12.

**Hypothesis 1c.** There will be an interaction between SE, gender, and age.

***Aim 2. Examine the impact of weight status on SE***

**Hypothesis 2.** As reported SE levels decrease, rates of BMI increase.

**Hypothesis 2a.** Youth who are overweight or obese will have lower SE than youth who are underweight or normal weight.

***Aim 3. Observe gender and age effects on EDs***

**Hypothesis 3.** Levels of eating pathology will vary between gender and age.

**Hypothesis 3a.** Females will have a higher total score on the ChEAT than males.

**Hypothesis 3b.** Youth aged 13-16 will score higher on the ChEAT than youth aged 11-12.

**Hypothesis 4.** There will be significant gender differences in scores on each of the four ChEAT subscales.

***Aim 4. Examine the impact of weight status on EDs***

**Hypothesis 5.** There will be a significant interaction between BMI categories and total ChEAT scores, with obese individuals having higher scores on the ChEAT than the other BMI categories.

**Hypothesis 5a.** Individuals who are underweight or normal weight will have higher scores on the anorexia and oral control subscales than those who are overweight and obese.

**Hypothesis 5b.** Individuals who are normal weight, overweight, and obese will have higher scores on the bulimia and food preoccupation subscales than those who are underweight.

**Hypothesis 5c.** There will be a significant interaction between BMI and scores on each of the four ChEAT subscales.

***Aim 5. Investigate the relationship between EDs and SE in youth***

**Hypothesis 6.** As levels of reported eating pathology increase, levels of SE will decrease.

***Aim 6. Testing Model 1 (see Figure 1) Model 2 (see Figure 2), Model 3 (see Figure 3), and Model 4 (see Figure 4)***

**Hypothesis 7.** SE is predicted to mediate the relation between BMI and total ChEAT scores in males (see Figure 1).

**Hypothesis 8.** SE is predicted to mediate the relation between BMI and total ChEAT scores in females (see Figure 2).

**Hypothesis 9.** BMI is predicted to moderate the relation between SE and total ChEAT scores in males (see Figure 3).

**Hypothesis 10.** BMI is predicted to moderate the relation between SE and total ChEAT scores in females (see Figure 4).

## **Method**

### **Participants**

The data for this study was collected from 235 youth. Participants were recruited from a health promotion/obesity randomized control trial (RCT) program known as “Challenge!” that was implemented in homes in a large Mid Atlantic city. The criteria for eligibility included age (11-16 years), English speaking, and residence in the low-income communities surrounding the medical center; weight was excluded in the criteria (Black et al., 2010).

The original sample included 235 youth from the RCT program “Challenge!” However, given our interest in AAs, we excluded data for 7 participants because they identified as another race besides AA. Additionally, participants were excluded if they did not answer at least 8 out of the 10 items on the Rosenberg Self-Esteem Scale; therefore, we excluded data for 13 participants. As a result, our final sample that participated consisted of 215 male (48.8%) and

female (51.2%) youth from low-income, predominantly AA urban communities. The age of the youth who participated was between 11-16 years old with a mean age of 13.3.

## **Procedure**

After receiving ethical approval by The University of Maryland School of Medicine Institutional Review Board and the public-school system, written consent and assent forms were completed by participants and caregivers. The participants and caregivers filled out a survey regarding demographic information that included age, gender, race/ethnicity, education, family size and income. The measures for SE and eating attitudes were self-administered on a computer presenting information auditorally and visually; research assistants helped participants with questionnaires if necessary and collected anthropometric measurements. Once the measures were finished, participants were compensated for their participation.

## **Measures**

**Demographics.** Caregiver and child questionnaires assessed information on demographics. Questions that the child answered included information on race/ethnicity and date of birth. The caregivers answered income level, marital status, education, and socioeconomic status questions. Items from this measure can be found in the Appendix A.

**Age.** Youth were put into groups based on previous literature and pubertal concerns. The first group is 11-12 year olds and the second group is 13-16 year olds. AA females have an average pubertal onset of 12 years old and in AA males the average pubertal onset is 12.6 years (Bleil et al., 2017; Lee et al., 2016).

**Weight status.** Trained researchers weighed each participant in triplicate to obtain each participant's weight. Body Mass Index (BMI) was calculated by the participant's weight (kilograms) divided by the height (centimeters). Assessment of BMI can be used as an indicator

of body fatness and divides BMI into categories (CDC, 2020). Based on participants' age and gender, weight status is categorized by percentile, where underweight  $<5^{\text{th}}$  percentile normal weight  $<85^{\text{th}}$  percentile, overweight  $\geq 85^{\text{th}}$  and  $<95^{\text{th}}$  percentile, and obese  $\geq 95^{\text{th}}$  percentile.

**Self-esteem.** The Rosenberg Self-Esteem Scale (RSE) was self-administered to participants to measure levels of SE. The RSE is a widely used measure of global SE and is used for most ages ( $\alpha=.92$ ; Rosenberg, 1979). It is a 10-item Likert scale with 5 positive statement and 5 negative statements. A 4-point rating scale makes up the scoring with answers that consist of strongly disagree (4) to strongly agree (1). The cutoff scores are divided into low-level SE (10-25), medium-level SE (26-29), and high-level SE (30-40) (García et al., 2019). A study using the RSE in a sample of 10 participants reported a medium effect size of Hedges  $d= 0.61$  (Anderson et al., 2017). Previous research using the RSE on male and female African Americans found an internal consistency of  $\alpha=.83$  (Witherspoon et al., 2013). Usage of the RSE with the current sample had a reliability of  $\alpha=0.82$ .

**Eating disorders.** The Children's Eating Attitudes Test (ChEAT) was self-administered to participants to measure levels of eating pathology. The ChEAT originated from The Eating Attitudes Test (EAT), which is for adolescents and adults, but the content was not generalizable to children (Garner et al., 1982). The ChEAT is a 26-item assessment that is administered to children with the purpose of examining eating behaviors ( $\alpha=.81$ ; Smolak & Levine, 1993). Previous research using the ChEAT on male and female African Americans reported the Cronbach's alpha to be .81 (Witherspoon et al., 2013). Usage of the ChEAT with the current sample had a reliability of  $\alpha=.48$ . However, an item analysis was conducted and items 9 (I vomit or throw up after I have eaten) and 19 (I can show self-control around food) were removed due to low variability or no endorsement. This resulted in the ChEAT having a Cronbach's alpha of .72.

The frequency of each eating attitude and behavior is on a Likert scale ranging from always (1) to never (6). It is divided into 4 subscales, anorexia (dieting), bulimia (bing/purge behaviors), food preoccupation, and oral control.

With the current sample, the anorexia subscale had a reliability of  $\alpha=.68$ , the bulimia subscale had a reliability of  $\alpha=.67$  after the removal of item 9 (I vomit or throw up after I have eaten), the food preoccupation subscale had a reliability of  $\alpha=.62$ , and the oral control subscale had a reliability of  $\alpha=.68$  after the removal of item 15 (take longer to eat). Scores range between 0-78 and scores above 20 indicate eating pathology. The following are examples from each subscale in the ChEAT: anorexia subscale; I think about being thinner (Item 11) and exercise to burn energy (Item 12), bulimia subscale; I vomit (Item 9) and I feel guilty after eating (Item 10), food preoccupation; too much thought to food (Item 21) and food controls my life (Item 18) oral control; others want me to eat more (Item 8) and take longer to eat (Item 15) (Smolak & Levine 1993).

### **Data Analysis Plan**

Responses to the 26-item eating attitudes assessment, 10-item SE assessment, and demographic questionnaire (age, race/ethnicity, highest level of education, hours worked per week, household income/size and dependents) were inserted into the Statistical Package for the Social Sciences (SPSS Version 25). Eating attitude and SE scores were calculated following the scoring guidelines (cut off scores) for each assessment. Also body mass index (BMI) were calculated based on CDC guidelines.

**Preliminary Analyses.** Descriptive statistics were conducted on participant's gender, age, BMI, eating disorder behaviors attitudes, SE, and SES (household income/size and

dependents) to obtain a robust understanding on the sample. To examine if gender, age, BMI, eating attitudes and SE were related a bivariate correlation was conducted.

***Aim 1. Observe gender and age differences in SE***

**Hypothesis 1a.** To test the hypothesis that males will have higher SE than females, an Independent Samples T-Test was conducted.

**Hypothesis 1b.** To test the hypothesis that youth aged 13-16 will have lower SE than youth aged 11-12; an Independent Samples T-Test was conducted.

**Hypothesis 1c.** To test the hypothesis that there will be an interaction between SE, gender, and age, an ANOVA was conducted.

***Aim 2. Examine the impact of weight status on the levels of SE***

**Hypothesis 2.** To test the hypothesis that as reported SE levels decrease rates of BMI increase, an Pearson's correlation was conducted.

**Hypothesis 2a.** To test the hypothesis that youth who are overweight and obese will have lower SE than those who are underweight or normal weight, an Independent Samples T-Test was conducted.

***Aim 3. Observe gender and age effects on EDs***

**Hypothesis 3.** To test the hypothesis that females will have a higher total score on the ChEAT than males, an Independent Samples T-Test was conducted.

**Hypothesis 3a.** To test the hypothesis that youth aged 13-16 will score higher on the ChEAT than youth aged 11-12; an Independent Samples T-Test was conducted.

**Hypothesis 3b.** To test the hypothesis that there will be a significant interaction between eating pathology, gender and age, an ANOVA was conducted.

**Hypothesis 4.** To test the hypothesis that there will be significant gender differences in scores on each of the four ChEAT subscales, an ANOVA was conducted.

***Aim 4. Examine the impact of weight status on EDs***

**Hypothesis 5.** To test the hypothesis that there will be a significant interaction between BMI categories and total ChEAT scores, with obese individuals having higher scores on the ChEAT than the other BMI categories, an ANOVA was conducted.

**Hypothesis 5a.** To test the hypothesis that individuals who are underweight or normal weight will have higher scores on the anorexia subscale and oral control subscale than those who are overweight and obese, an Independent Samples T-Test was conducted.

**Hypothesis 5b.** To test the hypothesis that individuals who have are normal weight, overweight, and obese will have higher scores on the bulimia and food preoccupation subscales than those who are underweight, an ANOVA was conducted.

**Hypothesis 5c.** To test the hypothesis that there will be a significant interaction between BMI and scores on each of the four ChEAT subscales, an ANOVA was conducted.

***Aim 5. Investigate the relationship between EDs and SE in youth.***

**Hypothesis 6.** To test the hypothesis that as levels of reported eating pathology increase levels of SE would decrease, a Pearson's correlation was conducted.

***Aim 6. Testing Model 1 (see Figure 1) Model 2 (see Figure 2), Model 3 (see Figure 3), and Model 4 (see Figure 4)***

**Hypothesis 7.** A Regression analysis was used to investigate the hypothesis that SE mediates the relation between BMI and total ChEAT scores in males (see Figure 1).

**Hypothesis 8.** A Regression analysis was used to investigate the hypothesis that SE mediates the relation between BMI and total ChEAT scores in females (see Figure 2).



**Hypothesis 9.** A Regression analysis was used to investigate the hypothesis that BMI moderates the relation between SE and total ChEAT scores in males (see Figure 3).

**Hypothesis 10.** A Regression analysis was used to investigate the hypothesis that BMI moderates the relation between SE and total ChEAT scores in females (see Figure 4).

## Results

### Preliminary Analyses

There were 105 (48.8%) males and 110 (51.2%) females AAs who were eligible for this current study. The average age was 13.3, with 93 (43.3%) aged 11-12 and 122 (56.7%) aged 13-16. There were 195 caregivers who filled out the demographic questionnaire and 107 (49.8%) of the participants reported living at or below the poverty line. Participants' weight statuses were placed into four categories: underweight, normal weight, overweight, and obese. There were 6 (2.8%) underweight, 124 (57.7%) normal weight, 27 (12.6%) overweight, and 58 (27.0%) obese youth (See Table 1).

Overall, the current sample was primarily healthy and categorized as normal weight (57.7%). It was expected that the participants would have primarily high SE and results revealed that 68.4% of participants had high SE. Within the BMI categories, participants in the underweight ( $n=5$ ), normal weight ( $n=88$ ), overweight ( $n=19$ ), and obese groups ( $n=35$ ) endorsed higher SE than medium or low. There were 3.72% of participants who scored higher than 20 on the ChEAT, indicating possible eating pathology. All of the 3.73% of participants were female ( $n=8$ ), with 1.40% participants being normal weight ( $n=3$ ), 0.47% being overweight ( $n=1$ ), and 1.86% being obese ( $n=4$ ).

A bivariate correlation was run to identify if gender, age, BMI, eating attitudes and SE were related. Age in both males and females was not associated with any variable. In males BMI

was only associated with total ChEAT scores and in females BMI was only associated with the oral control subscale. Additionally, in males only SE was associated with total ChEAT scores and in females SE was associated with total ChEAT scores as well as, the anorexia, bulimia, and food preoccupation subscales (See Tables 3 & 4).

***Aim 1. Observe gender and age differences in SE***

**Hypothesis 1.** An Independent Samples T-Test was run to test the hypothesis that males will have higher SE than females. The results of this analysis found that there was not a significant difference between males ( $M=32.75$ ,  $SD=.49$ ) and females ( $M=32.18$ ,  $SD=5.42$ ) SE levels,  $t(212.90) = .79$ ,  $p > .05$ .

**Hypothesis 1a.** An Independent Samples T-Test was run to test the hypothesis that youth aged 13-16 would have lower SE than youth aged 11-12. The results of this analysis found that there was no significant difference between youth aged 11-12 ( $M=32.78$ ,  $SD=5.12$ ) and youth aged 13-16 ( $M=32.22$ ,  $SD=5.35$ ) SE levels,  $t(202.50) = .78$ ,  $p > .05$ .

**Hypothesis 1b.** An ANOVA was run to test the hypothesis that levels of SE will vary based on gender and age. The results of this analysis found that there was no significant interaction between the effects of gender and age on SE,  $F(9,11)=1.48$ ,  $p > .05$ .

***Aim 2. Examine the impact of weight status on SE***

**Hypothesis 2.** A Pearson's correlation was run to test the hypothesis that as reported SE levels decrease rates of BMI increase. The results of this analysis found no significant association between SE and BMI,  $r(213) = -.10$ ,  $p > .05$ .

**Hypothesis 2a.** An Independent Samples T-Test was conducted to test the hypothesis that youth who are overweight and obese will have lower SE than those who are underweight or normal weight. The results of this analysis found that youth who are overweight and obese

( $M=31.55$ ,  $SD=5.52$ ) did have lower SE than those who are underweight or normal weight ( $M=33.05$ ,  $SD=4.98$ ),  $t(166.66) = 2.03$ ,  $p < .05$ .

***Aim 3. Observe gender and age effects on EDs***

**Hypothesis 3a.** An Independent Samples T-Test was run to test the hypothesis that females will have a higher total score on the ChEAT than males. The results of this analysis found a significant difference between males ( $M=4.20$ ,  $SD=.37$ ) and females ( $M=8.05$ ,  $SD=.70$ ) total scores on the ChEAT,  $t(213) = -2.95$ ,  $p < .05$ .

**Hypothesis 3b.** An Independent Samples T-Test was run to test the hypothesis that youth aged 13-16 will score higher on the ChEAT than youth aged 11-12. The results of this analysis found no significant difference between youth aged 11-12 ( $M=5.40$ ,  $SD=.67$ ) and youth aged 13-16 ( $M=5.39$ ,  $SD=5.56$ ) total scores on the ChEAT,  $t(181.19) = .01$ ,  $p > .05$ .

**Hypothesis 3c.** An ANOVA was conducted to test the hypothesis that levels of eating pathology will vary between gender and age. The results of this analysis found there was no significant interaction between the effects of gender and age on youth's total ChEAT score,  $F(9, 11) = .62$ ,  $p > .05$ .

**Hypothesis 4.** An ANOVA was run to test the hypothesis that there will be significant gender differences in scores on each of the four ChEAT subscales. The results of this analysis found there was only a significant interaction between the effects of male ( $M=7.28$ ,  $SD=.90$ ) and female ( $M=7.90$ ,  $SD=2.37$ ) scores on the Bulimia subscale,  $F(1, 213) = 6.41$ ,  $p < .05$ .

***Aim 4. Examine the impact of weight status on EDs***

**Hypothesis 5.** An ANOVA was run to test the hypothesis that there will be a significant interaction between BMI categories and EDs, with obese individuals having higher scores on the ChEAT than the other BMI categories. The results of this analysis found there were a significant

difference between the BMI categories and overall eating behaviors. Individuals who are underweight had the highest scores on the ChEAT ( $M=9.33$ ,  $SD=2.34$ ), individuals who are obese had the second highest scores ( $M=7.24$ ,  $SD=7.40$ ), individuals who are normal weight had the third highest ( $M=4.56$ ,  $SD=4.96$ ), and individuals who are overweight had the lowest scores ( $M=4.37$ ,  $SD=4.96$ ),  $F(3, 214) = 3.96$ ,  $p < .05$ .

**Hypothesis 5a.** An Independent Samples T-Test was run to test the hypothesis that individuals who are underweight or normal weight will have higher scores on the anorexia subscale and oral control subscale than those who are overweight and obese. The results of this analysis found a significant difference in anorexia subscale scores between individuals who are underweight or normal weight ( $M=1.14$ ,  $SD=2.43$ ) and those who are overweight and obese ( $M=2.91$ ,  $SD=4.43$ );  $t(166) = -3.33$ ,  $p < .05$ . Also, there was a significant difference in oral control subscale scores between individuals who are underweight or normal weight ( $M=1.06$ ,  $SD=2.20$ ) and those who are overweight and obese ( $M=.20$ ,  $SD=.69$ ),  $t(213) = 3.62$ ,  $p < .05$ .

**Hypothesis 5b.** An ANOVA was run to test the hypothesis that individuals who are normal weight, overweight, and obese will have higher scores on the bulimia and food preoccupation subscales than those who are underweight. The results of this analysis found a significant interaction between the effects of BMI on the bulimia subscale,  $F(3, 211) = 3.61$ ,  $p < .05$ . Individuals who are normal weight ( $M=7.31$ ,  $SD=1.38$ ), overweight ( $M=7.67$ ,  $SD=2.17$ ), and obese ( $M=8.33$ ,  $SD=2.39$ ) have higher scores on the bulimia subscale than those who are underweight ( $M=7.00$ ,  $SD=.00$ ). Additionally, the results of this analysis did not find a significant interaction between the effects of BMI on the food preoccupation subscale,  $F(3, 191) = 2.45$ ,  $p > .05$ .

**Hypothesis 5c.** An ANOVA was run to test the hypothesis that there will be a significant interaction between BMI and scores on each of the four ChEAT subscales. The results of this analysis found a significant interaction between the effects of the four ChEAT subscales on BMI,  $F(47, 109) = 1.70, p < .05$ .

***Aim 5. Investigate the relationship between EDs and SE in youth***

**Hypothesis 6.** A Pearson's correlation was run to test the hypothesis that as reported eating pathology increases levels of SE would decrease. The results of this analysis found a significant negative association between EDs and SE,  $r(213) = -.38, p < .05$ .

***Aim 6. Testing Model 1 (see Figure 1) Model 2 (see Figure 2), Model 3 (see Figure 3), and Model 4 (see Figure 4)***

**Hypothesis 7.** A regression analysis was used to investigate the hypothesis that SE mediates the relation between BMI and total ChEAT scores in males (see Figure 1). Results indicated that SE was not a significant mediator between BMI and total ChEAT score in males. SE was not significantly related to BMI ( $B=-0.88, p=0.12$ ) or total ChEAT ( $B=1.49, p=0.05$ ).

**Hypothesis 8.** A regression analysis was used to investigate the hypothesis that SE mediates the relation between BMI and total ChEAT scores in females (see Figure 2). Results indicated that SE was not a significant mediator between BMI and total ChEAT score in females. SE was not significantly related to BMI ( $B=-0.95, p=0.10$ ) or total ChEAT ( $B=-0.23, p=0.59$ ).

**Hypothesis 9.** A regression analysis was used to investigate the hypothesis that BMI moderate the relation between SE and total ChEAT scores in males (see Figure 3). The interaction between SE and total ChEAT scores in males was found not to be statistically significant,  $b = -.15, t(101) = -1.85, p = .07$ .

**Hypothesis 10.** A regression analysis was used to investigate the hypothesis that BMI will moderate the relation between SE and total ChEAT scores in females (see Figure 4). The interaction between SE and total ChEAT scores in females was found not to be statistically significant,  $b = -.14$ ,  $t(106) = -1.08$ ,  $p = .28$ .

## Discussion

The over-arching purpose of this study was to explain the influence SE has on EDs in AA youth. This study revealed compatible findings with previous research regarding the profound role SE plays in EDs (Bos et al., 2006; Brochu et al., 2018; Peck & Lightsey Jr, 2008). The current study provides an objective advancement in understanding the relation between SE and EDs in this understudied population. Existing measures for EDs and BMI are mainly normed for middle SES, white females in a college and clinical setting (Awad et al., 2015). Consequently, results from this study emphasize that there needs to be measures that address factors pertinent to other groups, including AAs and not only white males and females. It is possible that these findings would have differed if a white population were utilized instead of AAs. It would have been expected that in a white population there would have still been a negative correlation found between EDs and SE. Also, gender and age differences would have been similar if using a white population. However, it is possible that the non-linear relationship found in the AA sample would have been linear between BMI and SE and BMI and EDs if using a white population. With obese individuals having the highest rates of eating pathology and lowest levels of SE. Findings from this study regarding the influence that gender, age, and BMI have on eating pathology in a community-based AA sample exemplifies that previous findings with AAs is heterogeneous and that further research is needed.

The first aim of this study was to observe gender and age differences in SE. It was hypothesized that SE will vary based on gender and age. This hypothesis was not supported because there were no significant differences in SE levels in males and females. This finding was not consistent with previous research because past findings have revealed that males on average have higher SE than females (Bleidorn et al., 2016). Additionally, there were no significant differences between SE levels in 11-12 and 13-16 year olds. There are inconsistent findings from previous literature on SE in younger adolescents compared to older adolescents because it is difficult to pinpoint a consistent trend in SE fluctuations. It was hypothesized that there would be significant differences in SE between youth around middle school age compared to youth around high school age because previous research has found that SE decreases in early youth and increases later in youth; however, there was no concrete age that defined early youth and late youth (Orth, 2017). It is possible that there wasn't a significant difference between 11-12 and 13-16 year olds in SE because these ages were too close together, with 13 year olds typically still being in middle school; therefore, future studies should investigate SE in a more diverse age sample.

The second aim of this study was to examine the impact of weight status on SE. It was hypothesized that as BMI increases, SE would decrease; however, this hypothesis was not supported because there was no significant association found between total SE score and BMI. A supplementary analysis was run to see if there was an association between SE and BMI when looking at each gender separately, but there still was no significant association found. Additionally, it was hypothesized that when weight categories are analyzed categorically instead of continuously, youth who are overweight and obese will have lower SE than those who are underweight or normal weight. This hypothesis was supported because overweight and obese

youth had lower levels of SE than underweight and normal weight youth. These findings are consistent with previous literature since studies have revealed that individuals who are overweight or obese are more likely to have lower levels of SE, especially females (Elran-Barak, 2019; Iannaccone et al., 2016; Kiviruusu et al., 2016). A supplementary analysis was conducted to examine if there was a significant difference between males and females rates of obesity. Results indicated that females had higher rates of obesity than males. This finding emphasizes that females have an increased risk for being obese and having low SE compared to males.

It is possible that the conflicting findings regarding the relationship between BMI and SE, may be due to an unequal distribution of participants in each weight category. In particular, there were only 2.8% of participants in the underweight group. Therefore, the unequal distribution of weight across the sample may have skewed the relationship between BMI and SE. Alternatively, previous research has found that some youth who have low SE misperceive themselves as being overweight or obese more than those with high SE (Perrin et al., 2010). Also, those who are actually categorized as overweight or obese may misperceive themselves as being underweight or normal weight; therefore, SE levels are higher. Consequently, youth's misperception about their weight disrupts the linear relationship between BMI and SE that past researchers have discovered (Elran-Barak, 2019; Iannaccone et al., 2016; Kiviruusu et al., 2016). In this population specifically, the prevalence of high SE in those who are overweight and obese could be due to having higher levels of body satisfaction and idealizing larger body sizes, which can result in higher SE (Gluck & Geliebter, 2002).

The third aim of this study was to observe gender and age effects on EDs. When examining if there was a significant difference between males and females eating pathology levels, there was a significant difference. The results revealed that females had higher levels of



eating pathology than males. This finding is consistent with previous literature, as females are more susceptible to EDs than males (NIH, 2017). Within our sample only females had scores on the ChEAT greater than 20, indicating possible eating pathology; however, this finding does not mean that males do not have EDs. When examining if there was a significant difference in eating pathology levels between youth aged 11-12 and 13-16, there was no significant difference found. It was hypothesized that there would be a significant difference because past studies have found older youth particularly those between the ages of 15-19 are more susceptible to developing an ED than younger youth (Micali et al., 2015). It is unclear as to why there were no age differences in ChEAT total scores. It is possible that the age range was too constricted to real age related results. Or possibly, the non-significant finding was due to the sample consisting of AAs, therefore rates of EDs are expected to be lower (Rodgers et al., 2018). Previous findings have revealed differences in the prevalence of EDs between youth of different ages. Primarily older youth (13-19) engage in more eating pathology than younger youth (10-13) and the younger youth who do have eating pathology are typically diagnosed with EDNOS and are male (Campbell & Peebles, 2014; Peebles et al., 2006).

Regarding gender differences in scores on the four ChEAT subscales, there was a significant difference only between male and female scores on the Bulimia subscale. Females had higher levels of bulimia related symptoms than males, which is consistent with previous literature revealing rates of bulimia are higher in females (Hudson et al., 2007). It is possible that there were no gender differences in AN because the percentage of individuals who scored high on the AN subscale was small, which provides support for the previous findings that AN is the least common ED in AAs (Taylor et al., 2007). Previous research has also found that BED is the most common within AAs, with equal prevalence in females and males; therefore, it is possible

there were no gender differences found on the food preoccupation subscale (Striegel-Moore & Bulik, 2007).

The fourth aim of this study was to examine the impact of weight status on EDs. It was hypothesized that there will be a significant interaction between BMI categories and total ChEAT scores, with obese individuals having higher scores on the ChEAT than the other BMI categories. This hypothesis was partially supported because there were a significant interaction between BMI categories and total ChEAT scores. However, obese individuals did not have the highest scores on the ChEAT compared to the other BMI categories. Individuals who were underweight had the highest scores on the ChEAT, with obese individuals being a close second to having the highest scores on the ChEAT (See Table 5). This finding is not supported by previous literature because previous studies have found that people with a higher BMI are more susceptible to EDs than those with a lower BMI (Duncan et al., 2017; Iannaccone et al., 2016; Veillette et al., 2018). It is possible that underweight youth scored highest on the ChEAT compared to other weight categories because these individuals engage in high rates of disordered eating, which is what the ChEAT primarily measures (Perez & Joiner, 2003). It is important to highlight however, that less than 3% of the participants were in the underweight category.

When investigating the relation between BMI and scores on the four ChEAT subscales, there was a significant interaction (See Table 5). The first hypothesis was that individuals who are underweight or normal weight would have higher scores on the anorexia subscale and oral control subscale than those who are overweight and obese. Findings did not support this hypothesis because individuals who are overweight and obese had higher scores on the anorexia and oral control subscales than individuals who are underweight or normal weight. This finding is not consistent with previous literature because individuals with AN are underweight (Hudson

et al., 2007). Instead in the current sample, overweight and obese individuals mirror symptoms associated with atypical AN and not AN. Previous studies have found that especially in youth atypical AN is primarily prevalent in overweight or obese individuals compared to individuals of normal or under weight (Sawyer et al., 2016).

The hypothesis that individuals who are normal weight, overweight, and obese will have higher scores on the bulimia and food preoccupation subscales than those who are underweight was partially supported. There was only a significant difference found between BMI and the bulimia subscale and no significant difference was found between BMI and the food preoccupation subscale. Obese individuals scored the highest on the bulimia subscale, which is interesting because previous literature has found that BN is typically found in individuals who are normal weight. It is unclear as to why there was no significant difference found between BMI and the food preoccupation subscale; however, it is possible that food preoccupation is evenly distributed within all weight categories due to the component of dysfunctional cognitive and behavioral eating.

The fifth aim of this study was to investigate the relationship between EDs and SE in youth. It was hypothesized that there would be an association between EDs and SE in male and female AA youth. This hypothesis was supported because there was a significant negative correlation between EDs and SE, emphasizing that as ED levels increase, SE levels decrease. This finding is congruent with previous literature findings that EDs and SE are highly associated (Espinoza et al., 2019).

The sixth aim of this study was to test mediation and moderation effects of weight, SE, and EDs. It was predicted that SE would mediate the relation between BMI and total ChEAT scores in males and females. This hypothesis was not supported by the results because there was

not a significant SE mediating effect between BMI and total ChEAT scores in either males or females. Additionally in the mediation analysis, it was expected that BMI would moderate the relation between SE and total ChEAT scores in males and females. Findings revealed that there was not a significant BMI moderating effect between SE and total ChEAT scores in either males or females. There are multiple possible reasons for the lack of findings. It is possible that neither SE mediated the effect between BMI and total ChEAT or BMI moderated the effect between SE and total ChEAT because it is not a linear relationship. Findings may also have been impacted by small sample size, especially in the underweight group.

The results of the current study indicate the possibility that there are several factors that can help explain the relationship between BMI, SE, and EDs in this sample. Previous research has found that there is a linear relationship between BMI and SES as well as, EDs and SES (Danielsen et al., 2012; Day et al., 2009). Also, in low SES groups there are higher rates of obesity. While in high SES groups there are higher rates of EDs. Researchers have postulated that in low SES individuals are likely buying low cost unhealthy foods and in high SES there is an increased pressure on weight and shape due to having a range of diet choices (Day et al., 2009). Research that utilizes white low SES populations has found lower levels of EDs, higher rates of obesity, and lower levels of SE (Danielsen et al., 2012). It is evident that within the current sample there was lower levels of EDs, higher rates of obesity, and higher levels of SE. Individuals of low SES tend to experience many stressors that could typically lead to psychopathologies like EDs; however, there may be a possible cohort effect that protects individuals of low SES from developing mental disorders (Li et al., 2007).

Other factors such as body and racial socialization can also help explain the relations found between BMI, SE, and EDs in this sample. Previous findings on the role racial

socialization plays on SE provide insight as to why SE levels were primarily medium (20.5%) or high (68.4%) within the current sample (Harris-Britt et al., 2007; Zuckerman et al., 2016).). AAs compared to white individuals have been found to have an instillation of pride and confidence in their race (Bachman, 2011). The tendency for AAs to have a positive group identity can provide evidence as to why findings regarding SE in the current sample differed from findings found in previous research using other ethnic samples (Bleidorn et al., 2016; Orth, 2017; Zuckerman et al., 2016). Body socialization is a possible factor that explains the non-linear relationship found between BMI and EDs and BMI and SE. Previous research has found that AA body socialization tends to consist of having a lower drive to be thin and have higher rates of body satisfaction (Awad et al., 2015; Blostein et al., 2017). It is plausible that within the current sample, body socialization acts as a protective factor against of EDs with few participants who had ChEAT scores above 20, indicating possible eating pathology.

### **Limitations**

The current investigation has several limitations. The Rosenberg Self-Esteem Scale and the Children's Eating Attitudes Test were used to measure levels of SE and eating pathology in children. These two measures were self-administered, which allows a possibility that underreporting occurred. Underreporting serves as a source of bias and future research studies should include corroborating sources of information. Even though the Children's Eating Attitudes Test had high reliability and validity, the test is intended to measure disordered eating more than EDs. Therefore, for this study a measure such as the Child Eating Disorder Examination (ChEDE) would have been a better choice to examine more accurate results relating to ED levels. The Child Eating Disorder Examination generates an overall score of ED level and has diagnostic items that can be used for a clinical ED diagnosis. Also the use of this measure

would diminish the issues associated with a self-administered test because it is semi-structured and interviewer based (Bryant-Waugh et al., 1996).

There are issues with utilizing BMI and BMI percentiles as a measure for body weight. Previous research has found that the BMI measure is an oversimplification of understanding the health of an individual because it does not take into consideration muscle mass, age, sex, or race (Humphreys, 2010; Imai et al., 2008). These factors influence what is deemed healthy weight; however, the BMI measurement groups all the factors together leaving individuals who may not be obese be categorized as obese or vice versa (CDC, 2020; Imai et al., 2008). The BMI measure could have possibly impacted the weight status recorded for this sample since factors like muscle mass, age, sex, or race not being taken into consideration (Humphreys, 2010). Future studies should use a more objective weight measurement like the relative fat mass index that takes confounding factors into account for a better understanding on the role weight plays on SE and EDs (Woolcott & Bergman, 2018).

The sample used in this study included only 11-16 years old, primarily low-income, African Americans in a large Mid Atlantic city. Consequently, generalizability is limited to this population and future studies should consider utilizing a more diverse population. For instance, including youth from different ethnic and geographic backgrounds would increase ecological validity. Additionally, the limited significant gender differences found related to SE levels and weight status could be due to the relatively small sample size used. Although the significant gender differences in eating pathology levels accentuates the susceptibility females have in exhibiting eating pathology.

Another limitation is that pubertal timing was not considered in this study. Previous studies have found puberty to be a profound influential factor in SE levels and eating pathology

levels (Harden et al., 2014; Lin, & Tsai, 2016; Vannucci et al., 2014; Williams et al., 2018).

Puberty is a crucial aspect in youth and providing information of pubertal maturation in this study's design would have helped explain age and gender differences in SE and eating pathology.

### **Future Directions**

The current study utilized a community-based sample, which allowed further understanding of SE and EDs that is representative to low-income, AA urban youth. Findings from this study revealed that this sample deviates from some previous research findings about SE and EDs in AA male and female youth. Consequently, future research should investigate a clinical sample that consists of male and female youth with a diagnosed ED. Comparing these studies' findings to findings utilizing a clinical sample will provide a deeper insight on the role SE plays on EDs in AA youth.

It would be appropriate for future research to examine cultural specific factors to AAs that would provide information on the relationship between SE and EDs in this population. Examining the intersectionality of biological and environmental risk factors for low SE and EDs that is specific to AAs, such as cardiovascular and metabolic health risks, or economic inequality and institutionalized racism, could allow further understanding of the postulation of obesity, SE, and ED prevalence in AAs (Cooper, 2004; Saab et al., 2015). Investigating cultural specific determinates could also provide advances in creating culturally relevant health materials. For instance, BMI levels differ across ethnicities and currently the CDC uses the same BMI and weight percentiles for everyone (CDC, 2020; Humphreys, 2010). This approach to BMI is problematic because the underlying health risk for obesity has been found to be different among ethnic groups. Also to be considered is the fact that certain Europeans groups have reported an

increased percentage of body fat at percentiles, larger than groups in the United States (CDC, 2020; Davis et al., 2013).

A limitation of this study is that it is a correlational study, which results in not being able to determine the directionality of the relations between SE and obesity, SE and EDs, and obesity and EDs; therefore, future studies should gather data using a longitudinal design. In the current study, SE was identified as a trait instead of a state, highlighting that SE levels in the sample were within a chronic SE perspective instead of a temporary SE perspective. Conceptualizing SE only within a chronic perspective could pose issues with the extent of the role SE plays within psychopathology because SE is not fully trait-like or completely state-like, and instead it consists of both (Donnellan et al., 2012). SE can be conceptualized in a multidimensional way with diverse interpretations; therefore, it is necessary to conduct a longitudinal study examining the role SE plays on EDs in AA youth (Abdel-Khalek, 2016; Donnellan et al., 2012).

## **Conclusion**

The objective of this study was to fill in the gaps by examining the role of SE on EDs in AA youth. This study has found that SE plays a significant role in EDs in AA youth, as well as gender and weight status. Similar to previous research, females endorsed higher rates of eating pathology and obesity than males (Borders et al., 2006; Hudson et al., 2007). AA youth who are obese endorsed higher anorexia and bulimia related eating pathology compared to underweight, normal weight, and overweight youth. For instance, obese individuals scored significantly higher on items in the anorexia and bulimia subscales like “I think about being thinner,” “I have been dieting,” and “I am aware of calorie content (Item 6).” There were no gender or age differences in SE; however, obese and overweight youth exhibited the lowest SE compared to youth who were underweight and normal weight.



To conclude, findings from this study may have implications for future interventions targeting SE and obesity in AA youth. Even though the study findings did not reveal a significant difference in SE levels between males and females, an intervention focusing on improving SE levels that is tailored to the specific needs of both male and female AAs could be effective in preventing EDs and creating better treatment outcomes. Also, due to the profound influence obesity plays in SE and EDs, there is an exigency to include obesity-based components when developing interventions for EDs. Previous successful ED prevention programs that incorporate a SE and a weight component did not target low-income AA male and female youth (Haines & Neumark-Sztainer, 2006; Pratt & Woolfenden, 2002). It is necessary to target this population for ED prevention programs targeting SE and obesity. Furthermore, the paucity of research on eating and weight concerns in AA youth highlights the urgent need for further research in understanding the link between obesity and EDs in this understudied population.

## References

- Abdel-Khalek, A. M. (2016). Introduction to the psychology of self-esteem. *Self-esteem: perspectives, influences, and improvement strategies*, 1-17.
- Abraham, P. A., Kazman, J. B., Zeno, S. A., & Deuster, P. A. (2013). Obesity and African Americans: physiologic and behavioral pathways. *International Scholarly Research Notices*, 2013.
- Agüera, Z., Brewin, N., Chen, J., Granero, R., Kang, Q., Fernandez-Aranda, F., & Arcelus, J. (2017). Eating symptomatology and general psychopathology in patients with anorexia nervosa from China, UK and Spain: A cross-cultural study examining the role of social attitudes. *PloS one*, 12(3).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.
- Anderson, K. E., Byrne, C. E., Crosby, R. D., & Le Grange, D. (2017). Utilizing telehealth to deliver family-based treatment for adolescent anorexia nervosa. *International Journal of Eating Disorders*, 50(10), 1235-1238.
- Anttila, V., Bulik-Sullivan, B., Finucane, H. K., Walters, R. K., Bras, J., Duncan, L., ... & Patsopoulos, N. A. (2018). Analysis of shared heritability in common disorders of the brain. *Science*, 360(6395), eaap8757.
- Aoyagi, K., Santos, C. E., & Updegraff, K. A. (2018). Longitudinal associations between gender and ethnic-racial identity felt pressure from family and peers and self-esteem among African American and Latino/a Youth. *Journal of youth and adolescence*, 47(1), 207-221.

- Audenaert, K., Van Laere, K., Dumont, F., Vervaet, M., Goethals, I., Slegers, G., ... & Dierckx, R. A. (2003). Decreased 5-HT<sub>2a</sub> receptor binding in patients with anorexia nervosa. *Journal of Nuclear Medicine*, 44(2), 163-169.
- Aremu, T. A., John-Akinola, Y. O., & Desmennu, A. T. (2019). Relationship between parenting styles and adolescents' self-esteem. *International quarterly of community health education*, 39(2), 91-99.
- Awad, G. H., Norwood, C., Taylor, D. S., Martinez, M., McClain, S., Jones, B., ... & Chapman-Hilliard, C. (2015). Beauty and body image concerns among African American college women. *Journal of Black Psychology*, 41(6), 540-564.
- Bachman, J. G., O'Malley, P. M., Freedman-Doan, P., Trzesniewski, K. H., & Donnellan, M. B. (2011). Adolescent self-esteem: Differences by race/ethnicity, gender, and age. *Self and Identity*, 10(4), 445-473.
- Baker, J. H., Maes, H. H., Lissner, L., Aggen, S. H., Lichtenstein, P., & Kendler, K. S. (2009). Genetic risk factors for disordered eating in adolescent males and females. *Journal of abnormal psychology*, 118(3), 576.
- Bi, Y., Ma, L., Yuan, F., & Zhang, B. (2016). Self-esteem, perceived stress, and gender during adolescence: Interactive links to different types of interpersonal relationships. *The Journal of psychology*, 150(1), 36-57.
- Black, M. M., Hager, E. R., Le, K., Anliker, J., Arteaga, S. S., Diclemente, C., Gittelsohn, J., Magder, L., Papas, M., Snitker, S., Treuth, M. S., & Wang, Y. (2010). Challenge! Health promotion/obesity prevention mentorship model among urban, black adolescents. *Pediatrics*, 126(2), 280-288.

- Bleidorn, W., Arslan, R. C., Denissen, J. J., Rentfrow, P. J., Gebauer, J. E., Potter, J., & Gosling, S. D. (2016). Age and gender differences in self-esteem—A cross-cultural window. *Journal of personality and social psychology, 111*(3), 396.
- Bleil, M. E., Booth-LaForce, C., & Benner, A. D. (2017). Race disparities in pubertal timing: Implications for cardiovascular disease risk among African American women. *Population research and policy review, 36*(5), 717–738.
- Blostein, F., Assari, S., & Caldwell, C. H. (2017). Gender and ethnic differences in the association between body image dissatisfaction and binge eating disorder among Blacks. *Journal of racial and ethnic health disparities, 4*(4), 529-538.
- Borders, T. F., Rohrer, J. E., & Cardarelli, K. M. (2006). Gender-specific disparities in obesity. *Journal of community health, 31*(1), 57-68.
- Bos, A. E., Muris, P., Mulkens, S., & Schaalma, H. P. (2006). Changing self-esteem in children and adolescents: A roadmap for future interventions. *Netherlands Journal of Psychology, 62*(1), 26-33.
- Bramon-Bosch, E., Troop, N. A., & Treasure, J. L. (2000). Eating disorders in males: a comparison with female patients. *European Eating Disorders Review, 8*(4), 321-328.
- Brewerton, T. D. (2007). Eating disorders, trauma, and comorbidity: Focus on PTSD. *Eating disorders, 15*(4), 285-304.
- Bryant-Waugh, R. J., Cooper, P. J., Taylor, C. L., & Lask, B. D. (1996). The use of the eating disorder examination with children: A pilot study. *International Journal of Eating Disorders, 19*(4), 391-397.

- Buckley, T. R., & Carter, R. T. (2005). Black adolescent girls: Do gender role and racial identity: Impact their self-esteem?. *Sex roles*, 53(9-10), 647-661.
- Bulik, C. M., Sullivan, P. F., & Kendler, K. S. (1998). Heritability of binge-eating and broadly defined bulimia nervosa. *Biological psychiatry*, 44(12), 1210-1218.
- Bulik, C. M., Kleiman, S. C., & Yilmaz, Z. (2016). Genetic epidemiology of eating disorders. *Current opinion in psychiatry*, 29(6), 383.
- Bulik, C. M., Slof-Op't Landt, M. C., van Furth, E. F., & Sullivan, P. F. (2007). The genetics of anorexia nervosa. *Annu. Rev. Nutr.*, 27, 263-275.
- Bulik, C. M., & Tozzi, F. (2004). The genetics of bulimia nervosa. *Drugs of Today*, 40(9), 741-750.
- Burrow, A. L., & Rainone, N. (2017). How many likes did I get?: Purpose moderates links between positive social media feedback and self-esteem. *Journal of Experimental Social Psychology*, 69, 232-236.
- Campbell, K., & Peebles, R. (2014). Eating disorders in children and adolescents: state of the art review. *Pediatrics*, 134(3), 582-592.
- Capodilupo, C. M. (2015). One size does not fit all: Using variables other than the thin ideal to understand Black women's body image. *Cultural Diversity and Ethnic Minority Psychology*, 21(2), 268.
- Cassidy, O., Sbrocco, T., & Tanofsky-Kraff, M. (2015). Utilising non-traditional research designs to explore culture-specific risk factors for eating disorders in African-American adolescents. *Advances in Eating Disorders: Theory, Research and Practice*, 3(1), 91-102.

Centers for Disease Control and Prevention . (2009). *Differences in prevalence of obesity among black, white, and Hispanic adults: United States, 2006-2008*. Morbidity and Mortality Weekly Report, 58, 740-744.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5827a2.htm>

Centers for Disease Control and Prevention . (2019). *Childhood Obesity Facts*.

<https://www.cdc.gov/obesity/data/childhood.html>

Centers for Disease Control and Prevention . (2020). *Adult Obesity Facts*.

<https://www.cdc.gov/obesity/data/adult.html>

Center for Disease Control and Prevention (2020). *Body Mass Index*

(BMI). <https://www.cdc.gov/healthyweight/assessing/bmi/index.html>

Chao, R. C. L., Longo, J., Wang, C., Dasgupta, D., & Fear, J. (2014). Perceived racism as moderator between self-esteem/shyness and psychological distress among African Americans. *Journal of Counseling & Development*, 92(3), 259-269.

Cooper, R. S. (2004). Genetic factors in ethnic disparities in health. *Critical perspectives on racial and ethnic differences in health in late life*, 269-30.

Da Luz, F. Q., Hay, P., Touyz, S., & Sainsbury, A. (2018). Obesity with comorbid eating disorders: Associated health risks and treatment approaches. *Nutrients*, 10(7), 829.

Dalle Grave, R. (2011). Eating disorders: progress and challenges. *European Journal of Internal Medicine*, 22(2), 153-160.

- Danielsen, Y. S., Stormark, K. M., Nordhus, I. H., Mæhle, M., Sand, L., Ekornås, B., & Pallesen, S. (2012). Factors associated with low self-esteem in children with overweight. *Obesity facts*, 5(5), 722-733.
- Davis, C. (2017). A commentary on the associations among ‘food addiction’, binge eating disorder, and obesity: Overlapping conditions with idiosyncratic clinical features. *Appetite*, 115, 3-8.
- Davis, D. S., Sbrocco, T., & Williams, J. (2009). Understanding body image in African American and Caucasian first-graders: a partnership with the YMCA. *Progress in community health partnerships: research, education, and action*, 3(4), 277.
- Davis, J., Juarez, D., & Hodges, K. (2013). Relationship of ethnicity and body mass index with the development of hypertension and hyperlipidemia. *Ethnicity & disease*, 23(1), 65–70.
- Day, J., Ternouth, A., & Collier, D. A. (2009). Eating disorders and obesity: two sides of the same coin?. *Epidemiology and Psychiatric Sciences*, 18(2), 96-100.
- Diener, E., & Diener, M. (2009). Cross-cultural correlates of life satisfaction and self-esteem. In *Culture and well-being* (pp. 71-91). Springer, Dordrecht.
- Dingemans, A. E., & van Furth, E. F. (2012). Binge eating disorder psychopathology in normal weight and obese individuals. *International Journal of Eating Disorders*, 45(1), 135-138.
- Donnellan, M. B., Kenny, D. A., Trzesniewski, K. H., Lucas, R. E., & Conger, R. D. (2012). Using trait–state models to evaluate the longitudinal consistency of global self-esteem from adolescence to adulthood. *Journal of research in personality*, 46(6), 634-645.

- Duncan, A. E., Ziobrowski, H. N., & Nicol, G. (2017). The prevalence of past 12-month and lifetime DSM-IV eating disorders by BMI category in US men and women. *European Eating Disorders Review*, 25(3), 165-171.).
- Eastwood, H., Brown, K. M. O., Markovic, D., & Pieri, L. F. (2002). Variation in the ESR1 and ESR2 genes and genetic susceptibility to anorexia nervosa. *Molecular psychiatry*, 7(1), 86-89.
- Elran-Barak, R. (2019). Self-Esteem, Weight Status, and Trying to Lose Weight During Young Adulthood: The Roles of Sex and Ethnicity/Race. *Ethnicity & disease*, 29(3), 485-494.
- English, D., Lambert, S. F., Tynes, B. M., Bowleg, L., Zea, M. C., & Howard, L. C. (2020). Daily multidimensional racial discrimination among Black US American adolescents. *Journal of Applied Developmental Psychology*, 66, 101068.
- Espinoza, P., Penelo, E., Mora, M., Francisco, R., González, M. L., & Raich, R. M. (2019). Bidirectional relations between disordered eating, internalization of beauty ideals, and self-esteem: A longitudinal study with adolescents. *The Journal of Early Adolescence*, 39(9), 1244-1260.
- Feng, R. (2016). How much do we know about the heritability of BMI? *The American Journal of Clinical Nutrition*, 104(2), 243–244.
- García, J. A., y Olmos, F. C., Matheu, M. L., & Carreño, T. P. (2019). Self esteem levels vs global scores on the Rosenberg self-esteem scale. *Heliyon*, 5(3), e01378.
- Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The eating attitudes test: psychometric features and clinical correlates. *Psychological medicine*, 12(4), 871-878.



- Ghaderi, A. (2001). Review of risk factors for eating disorders: Implications for primary prevention and cognitive behavioural therapy. *Scandinavian Journal of Behaviour Therapy*, 30(2), 57-74.
- Gianini, L. M., White, M. A., & Masheb, R. M. (2013). Eating pathology, emotion regulation, and emotional overeating in obese adults with binge eating disorder. *Eating behaviors*, 14(3), 309-313.
- Gluck, M. E., & Geliebter, A. (2002). Racial/ethnic differences in body image and eating behaviors. *Eating behaviors*, 3(2), 143-151.
- Golden, N. H., Schneider, M., & Wood, C. (2016). Preventing obesity and eating disorders in adolescents. *Pediatrics*, 138(3), e20161649.
- Gorwood, P., Bouvard, M., Mouren-Simeoni, M. C., Kipman, A., & Ades, J. (1998). Genetics and anorexia nervosa: a review of candidate genes. *Psychiatric Genetics*, 8(1), 1-12.
- Gorwood, P., Kipman, A., & Foulon, C. (2003). The human genetics of anorexia nervosa. *European Journal of Pharmacology*, 480(1-3), 163-170..
- Greenleaf, C., Petrie, T., Reel, J., & Carter, J. (2010). Psychosocial risk factors of bulimic symptomatology among female athletes. *Journal of Clinical Sport Psychology*, 4(3), 177-190.
- Griffiths, S., Mond, J. M., Li, Z., Gunatilake, S., Murray, S. B., Sheffield, J., & Touyz, S. (2015). Self-stigma of seeking treatment and being male predict an increased likelihood of having an undiagnosed eating disorder. *International Journal of Eating Disorders*, 48(6), 775-778.

- Haines, J., & Neumark-Sztainer, D. (2006). Prevention of obesity and eating disorders: a consideration of shared risk factors. *Health education research*, 21(6), 770-782.
- Harden, K. P., Kretsch, N., Moore, S. R., & Mendle, J. (2014). Descriptive review: hormonal influences on risk for eating disorder symptoms during puberty and adolescence. *International Journal of Eating Disorders*, 47(7), 718-726.
- Harriger, J. A., & Thompson, J. K. (2012). Psychological consequences of obesity: weight bias and body image in overweight and obese youth.
- Harris-Britt, A., Valrie, C. R., Kurtz-Costes, B., & Rowley, S. J. (2007). Perceived racial discrimination and self-esteem in African American youth: Racial socialization as a protective factor. *Journal of Research on Adolescence*, 17(4), 669-682.
- Hebebrand, J., Fichter, M., Gerber, G., Görg, T., Hermann, H., Geller, F., ... & Hinney, A. (2002). Genetic predisposition to obesity in bulimia nervosa: a mutation screen of the melanocortin-4 receptor gene. *Molecular psychiatry*, 7(6), 647-651.
- Herle, M., De Stavola, B., Hübel, C., Abdulkadir, M., Ferreira, D. S., Loos, R. J., ... & Micali, N. (2020). A longitudinal study of eating behaviours in childhood and later eating disorder behaviours and diagnoses. *The British Journal of Psychiatry*, 216(2), 113-119.
- Hosogi, M., Okada, A., Fujii, C., Noguchi, K., & Watanabe, K. (2012). Importance and usefulness of evaluating self-esteem in children. *BioPsychoSocial medicine*, 6(1), 9.
- Hudson, J. I., Hiripi, E., Pope Jr, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological psychiatry*, 61(3), 348-358.

- Humphreys, S. (2010). The unethical use of BMI in contemporary general practice. *British Journal of General Practice*, 60(578), 696-697.
- Iannaccone, M., D'Olimpio, F., Cella, S., & Cotrufo, P. (2016). Self-esteem, body shame and eating disorder risk in obese and normal weight adolescents: A mediation model. *Eating behaviors*, 21, 80-83.
- Imai, K., Gregg, E. W., Chen, Y. J., Zhang, P., De Rekeneire, N., & Williamson, D. F. (2008). The association of BMI with functional status and self-rated health in US adults. *Obesity*, 16(2), 402-408.
- James, D. (2017). Internalized racism and past-year Major Depressive Disorder among African-Americans: The role of ethnic identity and self-esteem. *Journal of racial and ethnic health disparities*, 4(4), 659-670.
- Johnson, A. J. (2020). Examining associations between racism, internalized shame, and self-esteem among African Americans. *Cogent Psychology*, 7(1), 1757857.
- Jones, W., & Morgan, J. (2010). Eating disorders in men: A review of the literature. *Journal of Public Mental Health*, 9(2), 23-31.
- Karwautz, A., Rabe-Hesketh, S., Hu, X., Zhao, J., Sham, P., Collier, D. A., & Treasure, J. L. (2001). Individual-specific risk factors for anorexia nervosa: a pilot study using a discordant sister-pair design. *Psychological Medicine*, 31(2), 317-329.
- Karwautz, A. F. K., Wagner, G., Waldherr, K., Nader, I. W., Fernandez-Aranda, F., Estivill, X., ... & Treasure, J. L. (2011). Gene–environment interaction in anorexia nervosa:

- Relevance of non-shared environment and the serotonin transporter gene. *Molecular psychiatry*, 16(6), 590-592.
- Kelly, Y., Zilanawala, A., Booker, C., & Sacker, A. (2018). Social media use and adolescent mental health: Findings from the UK Millennium Cohort Study. *EClinicalMedicine*, 6, 59-68.
- Kendler, K. S., MacLean, C., Neale, M., Kessler, R., Heath, A., & Eaves, L. (1991). The genetic epidemiology of bulimia nervosa. *American Journal of Psychiatry*, 148(12), 1627-37.
- Kesgin, C. E. (2019). The Relationship between Eating Attitudes and Self-Esteem among University Students. *International Journal of Research in Social Sciences*, 9(4), 384-402.
- Kessler, R. C., Berglund, P. A., Chiu, W. T., Deitz, A. C., Hudson, J. I., Shahly, V., ... & Bruffaerts, R. (2013). The prevalence and correlates of binge eating disorder in the World Health Organization World Mental Health Surveys. *Biological psychiatry*, 73(9), 904-914.
- Kessler, R. M., Hutson, P. H., Herman, B. K., & Potenza, M. N. (2016). The neurobiological basis of binge-eating disorder. *Neuroscience & Biobehavioral Reviews*, 63, 223-238.
- Kinasz, K., Accurso, E. C., Kass, A. E., & Le Grange, D. (2016). Does sex matter in the clinical presentation of eating disorders in youth?. *Journal of Adolescent Health*, 58(4), 410-416.
- Kiviruusu, O., Kontinen, H., Huurre, T., Aro, H., Marttunen, M., & Haukkala, A. (2016). Self-esteem and body mass index from adolescence to mid-adulthood. A 26-year follow-up. *International journal of behavioral medicine*, 23(3), 355-363

Klabunde, M., Acheson, D. T., Boutelle, K. N., Matthews, S. C., & Kaye, W. H. (2013).

Interoceptive sensitivity deficits in women recovered from bulimia nervosa. *Eating behaviors*, 14(4), 488-492.

Klump, K. L. (2013). Puberty as a critical risk period for eating disorders: a review of human and animal studies. *Hormones and behavior*, 64(2), 399-410.

Kogler, L., Seidel, E. M., Metzler, H., Thaler, H., Boubela, R. N., Pruessner, J. C., ... & Habel,

U. (2017). Impact of self-esteem and sex on stress reactions. *Scientific reports*, 7(1), 1-9.

Lee, J. M., Wasserman, R., Kaciroti, N., Gebremariam, A., Steffes, J., Dowshen, S., ... &

Herman-Giddens, M. E. (2016). Timing of puberty in overweight versus obese boys. *Pediatrics*, 137(2).

Levinson, C. A., & Rodebaugh, T. L. (2012). Social anxiety and eating disorder comorbidity:

The role of negative social evaluation fears. *Eating behaviors*, 13(1), 27-35.

Li, S. T., Nussbaum, K. M., & Richards, M. H. (2007). Risk and protective factors for urban

African-American youth. *American Journal of Community Psychology*, 39(1-2), 21-35.

Lin, C. Y., & Tsai, M. C. (2016). Effects of family context on adolescents' psychological

problems: Moderated by pubertal timing, and mediated by self-esteem and interpersonal relationships. *Applied Research in Quality of Life*, 11(3), 907-923.

Linardon, J., Kothe, E. J., & Fuller-Tyszkiewicz, M. (2019). Efficacy of psychotherapy for

bulimia nervosa and binge-eating disorder on self-esteem improvement: Meta-analysis. *European Eating Disorders Review*, 27(2), 109-123.

- Lindberg, L., & Hjern, A. (2003). Risk factors for anorexia nervosa: a national cohort study. *International Journal of Eating Disorders*, 34(4), 397-408.
- Lydecker, J. A., Shea, M., & Grilo, C. M. (2018). Driven exercise in the absence of binge eating: Implications for purging disorder. *International Journal of Eating Disorders*, 51(2), 139-145.
- Mahalik, J. R., Pierre, M. R., & Wan, S. S. (2006). Examining racial identity and masculinity as correlates of self-esteem and psychological distress in black men. *Journal of Multicultural Counseling and Development*, 34(2), 94-104.
- Mancuso, S. G., Newton, J. R., Bosanac, P., Rossell, S. L., Nesci, J. B., & Castle, D. J. (2015). Classification of eating disorders: comparison of relative prevalence rates using DSM-IV and DSM-5 criteria. *The British Journal of Psychiatry*, 206(6), 519-520.
- Marchi, M., & Cohen, P. (1990). Early childhood eating behaviors and adolescent eating disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, 29(1), 112-117.
- Marcic, R., & Grum, D. K. (2011). Gender differences in self-concept and self-esteem components. *Studia Psychologica*, 53(4), 373.
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B., & Bryant, F. B. (2009). The relationships among self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Research in nursing & health*, 32(1), 96-109.

McClure, A. C., Tanski, S. E., Kingsbury, J., Gerrard, M., & Sargent, J. D. (2010).

Characteristics associated with low self-esteem among US adolescents. *Academic pediatrics*, 10(4), 238-244.

Micali, N., De Stavola, B., Ploubidis, G., Simonoff, E., Treasure, J., & Field, A. E. (2015).

Adolescent eating disorder behaviours and cognitions: gender-specific effects of child, maternal and family risk factors. *The British Journal of Psychiatry*, 207(4), 320-327.

Mitchell, J. E., & Peterson, C. B. (Eds.). (2005). *Assessment of eating disorders*. Guilford Press.

Moksnes, U. K., & Reidunsdatter, R. J. (2019). Self-esteem and mental health in adolescents—level and stability during a school year. *Norsk Epidemiologi*, 28(1-2).

Moskowitz, L., & Weiselberg, E. (2017). Anorexia nervosa/atypical anorexia nervosa. *Current problems in pediatric and adolescent health care*, 47(4), 70-84.

Murray, S. B., Nagata, J. M., Griffiths, S., Calzo, J. P., Brown, T. A., Mitchison, D., ... & Mond, J. M. (2017). The enigma of male eating disorders: A critical review and synthesis. *Clinical Psychology Review*, 57, 1-11.

Naessen, S., Carlström, K., Holst, J. J., Hellström, P. M., & Hirschberg, A. L. (2011). Women with bulimia nervosa exhibit attenuated secretion of glucagon-like peptide 1, pancreatic polypeptide, and insulin in response to a meal. *The American journal of clinical nutrition*, 94(4), 967-972.

National Institute of Mental Health (2016). *Eating*

*Disorders*. <https://www.nimh.nih.gov/health/topics/eating-disorders/index.shtml>.

- National Institute of Mental Health (2017). *Prevalence of Eating Disorders in Adolescents*. [https://www.nimh.nih.gov/health/statistics/eating-disorders.shtml#part\\_155062](https://www.nimh.nih.gov/health/statistics/eating-disorders.shtml#part_155062)
- Neiss, M. B., Sedikides, C., & Stevenson, J. (2002). Self-esteem: a behavioural genetic perspective. *European Journal of Personality*, 16(5), 351-367.
- Nicholls, D. E., & Viner, R. M. (2009). Childhood risk factors for lifetime anorexia nervosa by age 30 years in a national birth cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*, 48(8), 791-799.
- Noordenbos, G., Aliakbari, N., & Campbell, R. (2014). The relationship among critical inner voices, low self-esteem, and self-criticism in eating disorders. *Eating disorders*, 22(4), 337-351.
- Olenik-Shemesh, D., Heiman, T., & Keshet, N. S. (2018). The role of career aspiration, self-esteem, body esteem, and gender in predicting sense of well-being among emerging adults. *The Journal of genetic psychology*, 179(6), 343-356.
- Orth, U. (2017). The lifespan development of self-esteem. In *Personality development across the lifespan* (pp. 181-195). Academic Press.
- Orth, U., & Robins, R. W. (2019). Development of self-esteem across the lifespan.
- Oshri, A., Carlson, M. W., Kwon, J. A., Zeichner, A., & Wickrama, K. K. (2017). Developmental growth trajectories of self-esteem in adolescence: associations with child neglect and drug use and abuse in young adulthood. *Journal of youth and adolescence*, 46(1), 151-164.



- Palmer Jr, C. J. (2003). Body Mass Index, self-esteem, and suicide risk in clinically depressed African American and White American females. *Journal of Black psychology*, 29(4), 408-428.
- Peck, L. D., & Lightsey Jr, O. R. (2008). The eating disorders continuum, self-esteem, and perfectionism. *Journal of Counseling & Development*, 86(2), 184-192.
- Peebles, R., Wilson, J. L., & Lock, J. D. (2006). How do children with eating disorders differ from adolescents with eating disorders at initial evaluation?. *Journal of Adolescent Health*, 39(6), 800-805.
- Pelletier Brochu, J., Meilleur, D., DiMeglio, G., Taddeo, D., Lavoie, E., Erdstein, J., ... & Frappier, J. Y. (2018). Adolescents' perceptions of the quality of interpersonal relationships and eating disorder symptom severity: The mediating role of low self-esteem and negative mood. *Eating disorders*, 26(4), 388-406.
- Perez, M., & Joiner Jr, T. E. (2003). Body image dissatisfaction and disordered eating in black and white women. *International Journal of Eating Disorders*, 33(3), 342-350.
- Perrin, E. M., Boone-Heinonen, J., Field, A. E., Coyne-Beasley, T., & Gordon-Larsen, P. (2010). Perception of overweight and self-esteem during adolescence. *International Journal of Eating Disorders*, 43(5), 447-454.
- Pila, E., Sabiston, C. M., Brunet, J., Castonguay, A. L., & O'Loughlin, J. (2015). Do body-related shame and guilt mediate the association between weight status and self-esteem?. *Journal of health psychology*, 20(5), 659-669.

- Pinquart, M., & Gerke, D. C. (2019). Associations of parenting styles with self-esteem in children and adolescents: a meta-analysis. *Journal of Child and Family Studies*, 1-19.
- Porter, J. S., Stern, M., Mazzeo, S. E., Evans, R. K., & Laver, J. (2013). Relations among teasing, body satisfaction, self-esteem, and depression in treatment-seeking obese African American adolescents. *Journal of Black Psychology*, 39(4), 375-395.
- Pratt, B. M., & Woolfenden, S. (2002). Interventions for preventing eating disorders in children and adolescents. *Cochrane Database of Systematic Reviews*, (2).
- Puhl, R. M., & Brownell, K. D. (2006). Confronting and coping with weight stigma: an investigation of overweight and obese adults. *Obesity*, 14(10), 1802-1815.
- Puttevils, L., Vanderhasselt, M. A., & Vervaeke, M. (2019). Investigating transdiagnostic factors in eating disorders: Does self-esteem moderate the relationship between perfectionism and eating disorder symptoms?. *European Eating Disorders Review*, 27(4), 381-390.
- Racine, S. E., Culbert, K. M., Larson, C. L., & Klump, K. L. (2009). The possible influence of impulsivity and dietary restraint on associations between serotonin genes and binge eating. *Journal of psychiatric research*, 43(16), 1278-1286.
- Rancourt, D., & McCullough, M. B. (2015). Overlap in eating disorders and obesity in adolescence. *Current diabetes reports*, 15(10), 78.
- Raevuori, A., Keski-Rahkonen, A., & Hoek, H. W. (2014). A review of eating disorders in males. *Current opinion in psychiatry*, 27(6), 426-430.

- Resnick, M. D. (2000). Disordered eating among adolescents: associations with sexual/physical abuse and other familial/psychosocial factors. *International Journal of Eating Disorders*, 28(3), 249-258.
- Rikani, A. A., Choudhry, Z., Choudhry, A. M., Ikram, H., Asghar, M. W., Kajal, D., ... & Mobassarrah, N. J. (2013). A critique of the literature on etiology of eating disorders. *Annals of neurosciences*, 20(4), 157.
- Rodgers, R. F., Berry, R., & Franko, D. L. (2018). Eating disorders in ethnic minorities: An update. *Current psychiatry reports*, 20(10), 90.
- Rosenberg, M. (1979). *Conceiving the Self*. New York: Basic Books.
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American sociological review*, 141-156.
- Saab, K. R., Kendrick, J., Yracheta, J. M., Lanaspa, M. A., Pollard, M., & Johnson, R. J. (2015). New insights on the risk for cardiovascular disease in African Americans: the role of added sugars. *Journal of the American Society of Nephrology*, 26(2), 247-257.
- Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., & Bhadoria, A. S. (2015). Childhood obesity: causes and consequences. *Journal of family medicine and primary care*, 4(2), 187.
- Sawyer, S. M., Whitelaw, M., Le Grange, D., Yeo, M., & Hughes, E. K. (2016). Physical and psychological morbidity in adolescents with atypical anorexia nervosa. *Pediatrics*, 137(4).

- Searcy, Y. D. (2007). Placing the horse in front of the wagon: Toward a conceptual understanding of the development of self-esteem in children and adolescents. *Child and Adolescent Social Work Journal*, 24(2), 121.
- Shariff, Z. M., & Yasin, Z. M. (2005). Correlates of children's eating attitude test scores among primary school children. *Perceptual and motor skills*, 100(2), 463-472.
- Shillito, J. A., Lea, J., Tierney, S., Cleator, J., Tai, S., & Wilding, J. P. (2018). Why I eat at night: A qualitative exploration of the development, maintenance and consequences of Night Eating Syndrome. *Appetite*, 125, 270-277.
- Shisslak, C. M., Crago, M., Renger, R., & Clark-Wagner, A. (1998). Self-esteem and the prevention of eating disorders. *Eating Disorders*, 6(2), 105-117.
- Simpson, K. J. (2002). Anorexia nervosa and culture. *Journal of psychiatric and mental health nursing*, 9(1), 65-71.
- Smink, F. R., van Hoeken, D., Dijkstra, J. K., Deen, M., Oldehinkel, A. J., & Hoek, H. W. (2018). Self-esteem and peer-perceived social status in early adolescence and prediction of eating pathology in young adulthood. *International Journal of Eating Disorders*, 51(8), 852-862.
- Smink, F. R., van Hoeken, D., & Hoek, H. W. (2013). Epidemiology, course, and outcome of eating disorders. *Current opinion in psychiatry*, 26(6), 543-548.
- Smith, A. R., Hames, J. L., & Joiner Jr, T. E. (2013). Status update: Maladaptive Facebook usage predicts increases in body dissatisfaction and bulimic symptoms. *Journal of affective disorders*, 149(1-3), 235-240.

- Smolak, L., & Levine, M. P. (1994). Psychometric properties of the children's eating attitudes test. *International Journal of Eating Disorders*, 16(3), 275-282.
- Soh, N. L., Touyz, S. W., & Surgenor, L. J. (2006). Eating and body image disturbances across cultures: A review. *European Eating Disorders Review: The Professional Journal of the Eating Disorders Association*, 14(1), 54-65.
- Stein, R. I., Kenardy, J., Wiseman, C. V., Dounchis, J. Z., Arnow, B. A., & Wilfley, D. E. (2007). What's driving the binge in binge eating disorder?: A prospective examination of precursors and consequences. *International Journal of Eating Disorders*, 40(3), 195-203.
- Støving, R. K., Andries, A., Brixen, K., Bilenberg, N., & Hørder, K. (2011). Gender differences in outcome of eating disorders: a retrospective cohort study. *Psychiatry research*, 186(2-3), 362-366.
- Striegel-Moore, R. H., & Bulik, C. M. (2007). Risk factors for eating disorders. *American psychologist*, 62(3), 181.
- Striegel-Moore, R. H., Dohm, F. A., Pike, K. M., Wilfley, D. E., & Fairburn, C. G. (2002). Abuse, bullying, and discrimination as risk factors for binge eating disorder. *American Journal of Psychiatry*, 159(11), 1902-1907.
- Taylor, J. Y., Caldwell, C. H., Baser, R. E., Faison, N., & Jackson, J. S. (2007). Prevalence of eating disorders among Blacks in the National Survey of American Life. *International Journal of Eating Disorders*, 40(S3), S10-S14.

- Tynes, B. M., Umana-Taylor, A. J., Rose, C. A., Lin, J., & Anderson, C. J. (2012). Online racial discrimination and the protective function of ethnic identity and self-esteem for African American adolescents. *Developmental psychology*, 48(2), 343.
- Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *CyberPsychology & behavior*, 9(5), 584-590.
- Vannucci, A., Tanofsky-Kraff, M., Ranzenhofer, L. M., Kelly, N. R., Hannallah, L. M., Pickworth, C. K., ... & Yanovski, J. A. (2014). Puberty and the manifestations of loss of control eating in children and adolescents. *International Journal of Eating Disorders*, 47(7), 738-747.
- Veillette, L. A., Serrano, J. M., & Brochu, P. M. (2018). What's Weight Got to Do With It? Mental Health Trainees' Perceptions of a Client With Anorexia Nervosa Symptoms. *Frontiers in psychology*, 9, 2574.
- Villarejo, C., Fernández-Aranda, F., Jiménez-Murcia, S., Peñas-Lledó, E., Granero, R., Penelo, E., ... & Casanueva, F. F. (2012). Lifetime obesity in patients with eating disorders: increasing prevalence, clinical and personality correlates. *European Eating Disorders Review*, 20(3), 250-254.
- Wade, T. D., Keski-Rahkonen, A., & Hudson, J. I. (2011). Epidemiology of eating disorders. *Textbook of psychiatric epidemiology*, 343-360.
- Wardle, J., & Cooke, L. (2005). The impact of obesity on psychological well-being. *Best practice & research clinical endocrinology & metabolism*, 19(3), 421-440.

- Williams, N. A., Fournier, J., Coday, M., Richey, P. A., Tyavsky, F. A., & Hare, M. E. (2013). Body esteem, peer difficulties and perceptions of physical health in overweight and obese urban children aged 5 to 7 years. *Child: care, health and development*, 39(6), 825-834.
- Williams, V. S., Soliman, A. M., Barrett, A. M., & Klein, K. O. (2018). Review and evaluation of patient-centered psychosocial assessments for children with central precocious puberty or early puberty. *Journal of Pediatric Endocrinology and Metabolism*, 31(5), 485-495.
- Wiseman, C. V., Peltzman, B., Halmi, K. A., & Sunday, S. R. (2004). Risk factors for eating disorders: Surprising similarities between middle school boys and girls. *Eating Disorders*, 12(4), 315-320.
- Witherspoon, D., Latta, L., Wang, Y., & Black, M. M. (2013). Do depression, self-esteem, body-esteem, and eating attitudes vary by BMI among African American adolescents?. *Journal of pediatric psychology*, 38(10), 1112-1120.
- Wonderlich, S. A., Lilienfeld, L. R., Riso, L. P., Engel, S., & Mitchell, J. E. (2005). Personality and anorexia nervosa. *International Journal of Eating Disorders*, 37(S1), S68-S71.
- Woods, H. C., & Scott, H. (2016). # Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of adolescence*, 51, 41-49.
- Woolcott, O. O., & Bergman, R. N. (2018). Relative fat mass (RFM) as a new estimator of whole-body fat percentage— A cross-sectional study in American adult individuals. *Scientific reports*, 8(1), 1-11.
- World Health Organization (2017). *Violence against women*. <https://www.who.int/news-room/fact-sheets/detail/violence-against-women>

Young, E. A., McFatter, R., & Clopton, J. R. (2001). Family functioning, peer influence, and media influence as predictors of bulimic behavior. *Eating Behaviors*, 2(4), 323-337.

Zuckerman, M., Li, C., & Hall, J. A. (2016). When men and women differ in self-esteem and when they don't: A meta-analysis. *Journal of Research in Personality*, 64, 34-51.



**Tables****Table 1***Youth Demographic & Baseline Data: Age, Gender, & BMI Categories*

Variable	<i>n</i> (%)	<i>M</i> ( <i>SD</i> )
Sample Size	215	
Age in years		13.3 (1.017)
11 y/o	16 (7.4%)	
12 y/o	77 (35.8%)	
13 y/o	73 (34.1%)	
14 y/o	36 (16.8%)	
15 y/o	10 (4.7%)	
16 y/o	3 (1.2%)	
Gender		
Male	105 (48.8%)	
Female	240 (51.2%)	
BMI Percentiles*		
Underweight BMI < 5 <sup>th</sup> %	6 (2.8%)	
Normal weight BMI < 85 <sup>th</sup> %	124 (57.7%)	
Overweight BMI ≥ 85 <sup>th</sup> % and < 95 <sup>th</sup> %	27 (12.6%)	
Obese	58 (27.0%)	

**Table 2***Descriptive of Means, Standard Deviations, and Minimum/Maximum*

Measure	<i>M</i>	<i>SD</i>	Minimum	Maximum	<i>n</i>
SE Total	32.46	5.24	17.00	32.46	215
ChEAT	5.40	5.96	.00	5.40	215
Anorexia	1.70	3.29	.00	1.70	168
Bulimia	7.59	1.83	7.00	7.60	215
Food Preoccupation	.66	1.76	.00	.66	195
Oral Control	.72	1.75	.00	.72	215

**Table 3***Correlations in Males*

Variable	1	2	3	4	5	6	7	8
1. Age	–	-.01	-.01	-.01	-.00	.10	.10	-.03
2. BMI		–	-.13	-.21*	.04	.12	-.18	-.51
3. SE Total			–	-.23*	-.14	-.04	-.11	-.09
4. ChEAT Total				–	.62**	.42**	.44**	.50**
5. Anorexia					–	.44**	-.05	-.02
6. Bulimia						–	-.031	-.04
7. Food Preoccupation							–	.25*
8. Oral Control								–

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Table 4***Correlations in Females*

Variable	1	2	3	4	5	6	7	8
1. Age	–	.04	-.08	-.05	-.06	-.14	.02	.07
2. BMI		–	-.06	.03	.18	.12	-.09	-.36**
3. SE Total			–	-.46**	-.36**	-.47**	-.39**	-.15
4. ChEAT Total				–	.86**	.73**	.67**	.42**
5. Anorexia					–	.83**	.20	.12
6. Bulimia						–	.39**	.07
7. Food Preoccupation							–	.40**
8. Oral Control								–

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Table 5***One-Way Analysis of Variance of Scores on the ChEAT subscales by Weight Status*

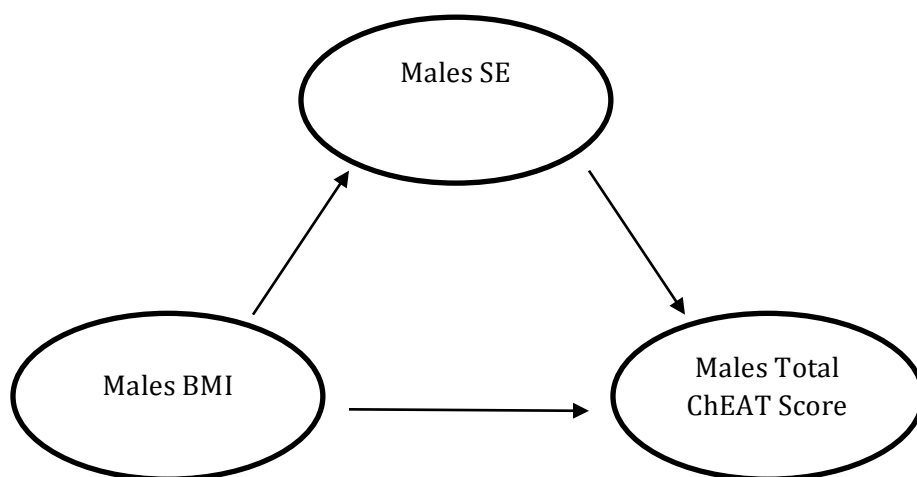
	Mean Scores (SD)				ANOVA		
	Underweight	Normal Weight	Overweight	Obese	(df)	F	p
Anorexia	1.50 (1.73)	1.07 (2.19)	1.42 (1.83)	2.15 (2.91)	(3, 164)	5.66	<.01*
Bulimia	7.00 (.00)	7.22 (.76)	7.08 (.29)	7.62 (1.47)	(3,211)	3.61	<.01**
Food Preoccupation	2.50 (2.65)	.48 (1.09)	.00 (.00)	.47 (1.39)	(3,191)	2.45	.07
Oral Control	4.40 (1.52)	.66 (1.61)	.00 (.00)	.19 (.68)	(3,211)	12.45	<.01*

\*Significant differences between overweight/obese groups and underweight/normal weight groups.

\*\*Significant differences between normal weight/overweight/obese groups and underweight groups.

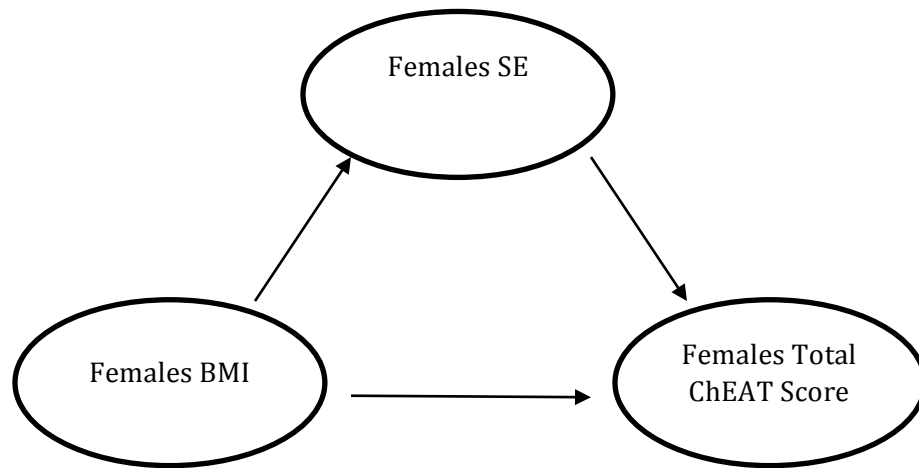
**Figures****Figure 1**

*SE is predicted to mediate the relation between BMI and total ChEAT scores in males*



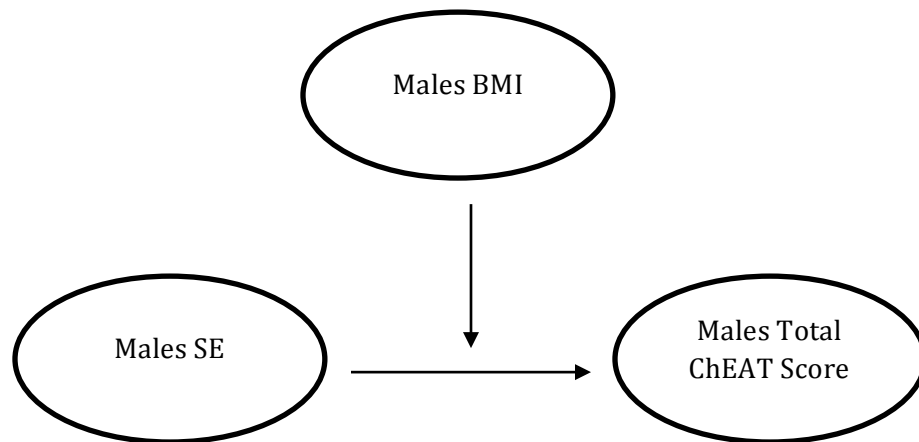
**Figure 2**

*SE is predicted to mediate the relation between BMI and total ChEAT scores in females*



**Figure 3**

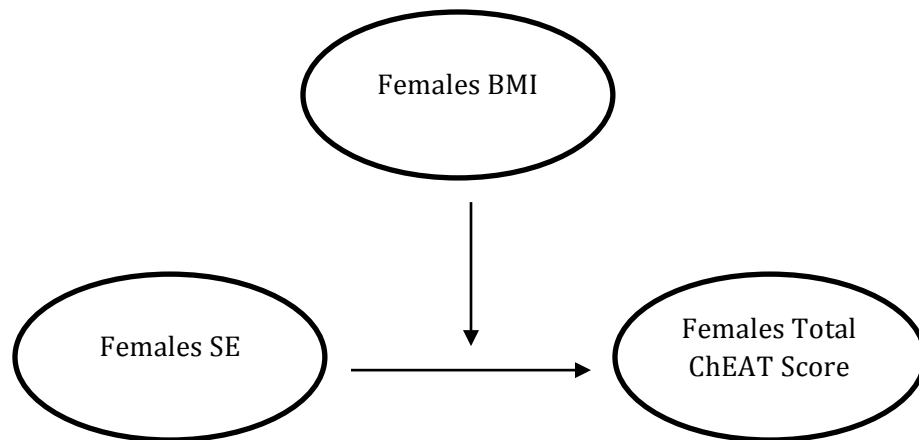
*BMI is predicted to moderate the relation between SE and total ChEAT score in males*





**Figure 4**

*BMI is predicted to moderate the relation between SE and total ChEAT score in females*



**Appendix A**  
**Demographic Questionnaire**

## Primary Caretaker

### Baseline Demographics Interview Form

ID: \_\_\_\_\_ Today's date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Your date of birth: \_\_\_\_/\_\_\_\_/\_\_\_\_  
mm / dd / yyyy mm / dd / yyyy

**What is your gender?**

- ☐
- male
- ☐
- female

**What is your relationship to the teen?**

- |  |  |
|--|--|
| <input type="checkbox"/> Mother                      | <input type="checkbox"/> Stepmother/father's partner |
| <input type="checkbox"/> Father                      | <input type="checkbox"/> Aunt                        |
| <input type="checkbox"/> Grandfather                 | <input type="checkbox"/> Uncle                       |
| <input type="checkbox"/> Grandmother                 | <input type="checkbox"/> Cousin                      |
| <input type="checkbox"/> Brother                     | <input type="checkbox"/> Other relative              |
| <input type="checkbox"/> Sister                      | <input type="checkbox"/> Non-relative                |
| <input type="checkbox"/> Stepfather/mother's partner |  |

**Does your teen have any disabilities that would prevent him/her from being physically active?**...

- ☐ Yes
- ☐ No

### Is there a history of Diabetes in your family?

- ☐ Yes
- ☐ No

**If YES, Who?... (check all that apply)**

- |  |  |
|--|--|
| <input type="checkbox"/> Teen's Mother               | <input type="checkbox"/> Teen's Sister               |
| <input type="checkbox"/> Teen's Father               | <input type="checkbox"/> Teen's Aunt on father side  |
| <input type="checkbox"/> Teen's Paternal Grandfather | <input type="checkbox"/> Teen's Uncle on father side |
| <input type="checkbox"/> Teen's Paternal Grandmother | <input type="checkbox"/> Teen's Aunt on mother side  |
| <input type="checkbox"/> Teen's Maternal Grandfather | <input type="checkbox"/> Teen's Uncle on mother side |
| <input type="checkbox"/> Teen's Maternal Grandmother | <input type="checkbox"/> Teen's Cousin               |
| <input type="checkbox"/> Teen's Brother              | <input type="checkbox"/> Other relative              |

**What is the highest grade you have completed?**

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> 5 <sup>th</sup> grade or less | <input type="checkbox"/> 10 <sup>th</sup> | <input type="checkbox"/> Vocational school |
| <input type="checkbox"/> 6 <sup>th</sup>               | <input type="checkbox"/> 11 <sup>th</sup> | <input type="checkbox"/> Associate degree  |
| <input type="checkbox"/> 7 <sup>th</sup>               | <input type="checkbox"/> 12 <sup>th</sup> | <input type="checkbox"/> Bachelor's degree |
| <input type="checkbox"/> 8 <sup>th</sup>               | <input type="checkbox"/> GED              | <input type="checkbox"/> Master's degree   |
| <input type="checkbox"/> 9 <sup>th</sup>               | <input type="checkbox"/> Some college     | <input type="checkbox"/> Doctorate degree  |

**How often do you work for money?**

- ☐ Unemployed
- ☐ Retired
- ☐ Work part-time (less than 25 hours per week)
- ☐ Work full-time (25 or more hours per week)

**What is your household income?**

	Per Year	Per Month	Per Week
<input type="checkbox"/>	Less than \$5,000	Less than \$418	Less than \$97
<input type="checkbox"/>	\$5,000 - \$9,999	\$418 - \$833	\$97 - \$192
<input type="checkbox"/>	\$10,000 - \$14,999	\$834 - \$1,250	\$193 - \$288
<input type="checkbox"/>	\$15,000 - \$19,999	\$1,251 - \$1,666	\$289 - \$384
<input type="checkbox"/>	\$20,000 - \$24,999	\$1,667 - \$2,083	\$385 - \$480
<input type="checkbox"/>	\$25,000 - \$29,999	\$2,084 - \$2,500	\$481 - \$576
<input type="checkbox"/>	\$30,000 - \$34,999	\$2,501 - \$2,916	\$577 - \$673
<input type="checkbox"/>	\$35,000 - \$39,999	\$2,917 - \$3,333	\$674 - \$769
<input type="checkbox"/>	\$40,000 - \$44,999	\$3,334 - \$3,750	\$770 - \$865
<input type="checkbox"/>	\$45,000 - \$49,999	\$3,751 - \$4,166	\$866 - \$961
<input type="checkbox"/>	More than \$50,000	More than \$4,167	More than \$961

**How many people are dependent on this income?**.....**Who resides in the same household with the teen?**

- |  |   |
|--|---|
| <input type="checkbox"/> Mother            | <input type="checkbox"/> Grandmother              |
| <input type="checkbox"/> Father            | <input type="checkbox"/> Grandfather              |
| <input type="checkbox"/> Father's partner  | <input type="checkbox"/> Aunts/Uncles, # _____    |
| <input type="checkbox"/> Mother's partner  | <input type="checkbox"/> Cousins, # _____         |
| <input type="checkbox"/> Brothers, # _____ | <input type="checkbox"/> Other Relatives, # _____ |
| <input type="checkbox"/> Sisters, # _____  | <input type="checkbox"/> Non-relatives, # _____   |