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Eating in the Absence of Hunger and Body Mass Index: Contextual Effects of Stress and Parenting

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An abstract of
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Abstract

Eating in the Absence of Hunger and Body Mass Index: Contextual Effects of Stress and Parenting

By Joya N. Hampton, MEd, MA

Obesity is a nationwide health concern which reflects significant disparities by race and ethnicity. In particular, African-American children have higher rates of overweight and obesity compared to children of other racial and ethnic groups. Further, dropout rates and treatment compliance are lower among African-Americans in pediatric weight management programs. Aside from the already identified public health issues that contribute to obesity development in this population, psychological factors may also play an important role in contributing to obesity disparity rates. Stress and parenting are two important constructs that are influenced by one's culture and have been determined to influence obesity development via direct and indirect mechanisms—they are also impacted by socioeconomic status. If those variables contribute significantly to eating behavior and body size, then increased focus might be placed on addressing psychological factors as treatment targets for this high-risk group. However, if those variables do not contribute significantly to *differential risk*, then greater focus on access to treatment and improved retention for this high-risk group may be the most cost-effective approach. The purpose of this study was to investigate the impact of stress and parenting variables on maladaptive eating behavior within a treatment-seeking sample of overweight/obese children. Models of differential risk (based on self-identified ethnicity and socioeconomic status) were used to assess the degree to which stress and parenting variables add explanatory power in understanding maladaptive eating behaviors in a treatment-seeking sample. Ninety parent-child dyads were recruited from a hospital-based pediatric weight management program. Authoritarian parenting style and parental feeding style predicted eating in the absence of hunger due to fatigue or boredom, and there were direct relationships between perceived stress and eating in the absence of hunger due to negative affect. The pattern of findings was similar across racial groups. However, within group correlational analyses indicated some differential associations among study variables by race/ethnicity. Study results suggest further investigation of the influence of parenting and stress variables is warranted but support the conclusion that issues related to access and retention may be even more important to address in order to enhance the success of African-American families in pediatric weight management programs.

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Introduction

Childhood obesity is a nationwide health concern that affects 31.8% of children (Ogden, Carroll, Kit, & Flegal, 2014) and is associated with a multitude of negative physical and mental health outcomes. The direct relationship between higher weights and metabolic syndrome leads to significant health consequences (Weiss et al., 2004). Further, children who are overweight or obese are also more likely to suffer from both internalizing and externalizing mental health disorders (Pervanidou & Lindquist, 2015; Puder & Munsch, 2010; Pulgarón, 2013).

Significant disparities exist in obesity prevalence, with 35.2% of African-American children being classified as overweight or obese compared to 28.5% of majority children. These statistics mirror the disparities in prevalence among African-American adults—76.2% of African-American adults are overweight or obese compared to 67.2% of majority group members (Ogden et al., 2014)—strongly suggesting that it is critical to understand, and hopefully intervene, at the earliest points in the chain of obesity development in this group. Further, these disparities persist across socio-economic lines for children (Gordon-Larsen, Adair, & Popkin, 2003; Kimm et al., 1996), as well as adults (Wang & Beydoun, 2007b; K. B. Wilson, Thorpe, & LaVeist, 2017). Thus, explanations relying primarily on differential access to resources are not sufficient to understand the observed disparities (Kumanyika, Whitt-Glover, & Haire-Joshu, 2014; Sutton, Magwood, Jenkins, & Nemeth, 2016).

While ultimately, obesity reflects an unbalanced energy equation in that energy intake is greater than energy expenditure (Dahlkoetter & Lindquist, 1979; Hill, Wyatt, & Peters, 2012), the causal mechanisms leading to this outcome appear to be quite complex. Genetic vulnerability is believed to play a significant role, but that role is not well understood (Comuzzie & Allison, 1998) (Llewellyn & Fildes, 2017). The current obesogenic environment provides unhealthy foods that

are easy to acquire quickly and cheaply, and a child's immediate environment may provide few opportunities to be physically active (Ard, 2007; Booth, Pinkston, & Poston, 2005). So far, environmental factors have been the primary targets of interventions for childhood obesity. However, a range of psychosocial contributors to childhood obesity can affect the developing child through encouraging higher energy input and lower output (Bronfenbrenner, 1986; El-Behadli, Sharp, Hughes, Obasi, & Nicklas, 2015; Harrison et al., 2011; Sharifi, Sequist, Rifas-Shiman, & Melly, 2016). Thus, psychological variables also warrant exploration as contributors to the childhood obesity problem, and these variables may reveal important additional targets for weight management interventions.

In the child eating literature the influences of stress (Jenkins, Rew, & Sternglanz, 2009) and parenting factors (Birch, Fisher, & Davison, 2003) are often cited as contributors to the development of maladaptive eating behaviors in children as well as to the development of higher weight (Latzer & Stein, 2013). Given ethnic and cultural differences in the experience of stress (Berry, Kim, Minde, & Mok, 1987; R. Clark, Anderson, Clark, & Williams, 1999) and beliefs about parenting (Brody, Flor, & Gibson, 1999; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000), it may be particularly useful to determine how these variables impact child eating behavior in children seeking treatment for overweight and obesity, with African-American children being of particular interest.

Eating in the Absence of Hunger

Eating in the absence of hunger (EAH) is conceptualized as eating ad libitum, or eating past the point an individual reports being full after having a meal (Fisher & Birch, 2002). This construct is the opposite of eating in response to physiological hunger and can be conceptualized as "non-hunger cued eating." Eating in the absence of hunger has been shown to be a behavioral

correlate of child weight (Hill et al., 2008), and to be related to problematic behaviors such as loss of control eating, as well as more general psychopathology such as depression and anxiety (Tanofsky-Kraff, 2008). In the empirical research literature, eating in the absence of hunger is typically defined as having three components.

Emotional Eating.

The first component of EAH, emotional eating, has been defined as eating as a way to respond to emotions, most commonly "depression, anxiety, loneliness, and anger" (Tanofsky-Kraff, Ranzenhofer, & Yanovski, 2008). Since negative affect is correlated with stress (Watson, Clark, & Tellegen, 1988), stress is one pathway through which emotional eating may be developed and maintained in children (Adam & Epel, 2007; Michels et al., 2012; Nguyen-Rodriguez & Lindquist, 20008). The chronic experience of stress (coupled with inadequate adaptive coping strategies) has been hypothesized to contribute to persistent emotional eating as a way to cope with negative affect.

Externally-cued Eating and Eating Due to Boredom/Fatigue.

The second component, external eating, has been defined as "eating in response to food-related stimuli, regardless of [one's] internal state of hunger or satiety" (van Strien, Frijters, Bergers, & Defares, 1986). In the literature pertaining to children and their propensity to engage in external eating, executive functioning deficits have been identified as being related to one's likelihood of engaging in such behaviors (Pieper & Laugero, 2013), as well as with weight status directly (Graziano, Calkins, & Keane, 2010). Specifically, in assessments of ad libitum eating tasks, or assessments that allow the child to eat as much as they want despite it having been determined that they are full, children who exhibit greater levels of impulsivity are more likely to

eat more even when satiated (Fay, White, Finlayson, & King, 2015; Nederkoorn, Dassen, Franken, Resch, & Houben, 2015; Kakoschke, Kemps, & Tiggemann, 2015).

The third component of EAH, eating due to boredom or fatigue, has not been found to be as related to child weight as eating due to negative affect (Tanofsky-Kraff et al., 2008). The fact that boredom can mirror depression (Farmer & Defares, 1986) may partly explain its weaker direct effects on weight.

Parenting Style and Parent Feeding Practices

Parenting variables have been identified in the research literature as potential contributors to the development of both emotional eating and external eating in children. Particularly, characteristics of an authoritarian parenting style, marked by high parental control and low parental warmth, have been related to increased child eating due to negative affect. Rhee and colleagues (2013) found that in a predominately Caucasian sample, child report of parental psychological control and firm control, and factors such as rejection, enforcement, intrusiveness, and inconsistent discipline, were negatively related to child's "eating self-efficacy," or the child's perception of their ability to refrain from eating unhealthy food when feeling negative emotions. Firm control was the only significant predictor of lower eating self-efficacy (Rhee, Pan, Norman, Crow, & Boutelle, 2013; E. Schludermann & Schludermann, 1970). Another study found that in a predominately Asian sample, child low self-control paired with high parental control mediated the relationship between negative emotions and emotional eating (Zhu, Luo, Cai, Li, & Liu, 2014). Similarly, findings from a native Dutch sample suggested that high parental psychological and behavioral control was related to greater emotional eating in a sample of adolescents (Snoek, Engels, Janssens, & van Strien, 2007). Further, a recent Canadian population-based epidemiological study found that children with authoritarian parents were more likely to be obese.

This relationship was moderated by poverty among preschool-aged children but not among school-aged children (Kakinami, Barnett, Séguin, & Paradis, 2015). It may be that by the time the children in the sample became school-aged, their maladaptive eating patterns had already become a persistent pattern and the increased weight was a result of that pattern.

Mechanisms.

The mechanisms by which authoritarian parenting style may contribute to the development of child emotional eating are not fully understood (Rhee, 2006). Some research suggests that authoritarian parenting is related to child emotion dysregulation. This may be due to parent modeling of dysregulated behaviors due to the parent's increased negative emotion and the "absence of positive affect" (Brown, 2004; A. S. Morris, Silk, Steinberg, Myers, & Robinson, 2007; Snoek et al., 2007). Modeling by parents with emotion regulatory deficits may encourage children to use food to cope with negative emotion and therefore display more eating dysregulation as well. Of course, it is difficult to disentangle evidence of modeling from evidence of heritability (Snoek et al., 2007). Nonetheless, relationships between disinhibited eating and emotion regulatory deficits have been reported. For example, Czaja and colleagues (2009) found that in a sample of 8 to 13-year olds (ethnic breakdown of participants not reported), loss of control eating was related to the use of dysfunctional emotion regulation strategies such as "withdrawal" and giving up" (Czaja, Rief, & Hilbert, 2009).

Additional studies have assessed how parent feeding practices impacts child eating and weight (Halbert et al., 2013). For example, a restrictive feeding style has been related to more child disinhibited (i.e. impulsive/external) eating (Birch et al., 2003). A 2009 Joyce & Zimmer-Gembeck study found that in a sample of Caucasian Australians, parental restriction was related to child disinhibited eating, and this relationship was moderated by parental strategies marked by chaos

and coercion (Joyce & Zimmer-Gembeck, 2009), lending support for the emotion dysregulation hypothesis. A study of a low-income, predominately African-American sample showed maternal restriction and control in feeding was related to preschooler's BMI, but only for mothers who were obese; thus, this relationship may be dependent on parental weight status and perhaps apparent emotion regulatory deficits (Powers, Chamberlin, Van Schaick, Sherman, & Whitaker, 2006). In the current study we predict that authoritarian parenting will be associated with child eating behaviors through the influence of overinvolved parent feeding practices.

Stress and Stress Coping

Stressful experiences coupled with inadequate adaptive coping strategies may lead to persistent emotional eating as a way to cope with negative affect. Stress is thought to influence eating behavior via hormonal mediators that increase appetite. Further, certain highly palatable foods interact with reward centers in the brain, potentially offering some relief from stress. Some theories suggest that these reward centers can become desensitized, thus over time more food is required in order to achieve the same effect (Adam & Epel, 2007; Berridge, 2009; Yau & Potenza, 2013).

The literature regarding eating due to negative affect in children is important in that it supports the conclusion that emotional eating behavior does occur in childhood (not just among adults)—suggesting that determining mechanisms that sustain this pattern could provide potential targets for early intervention (Michels et al., 2012; Torres & Nowson, 2007). For example, Martyn-Nemeth and colleagues (2009) found that in a predominately African-American sample of adolescents, stress and low self-esteem were related to depressive mood and use of avoidant coping strategies. They also found that avoidant coping was associated with more unhealthy eating behaviors (Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009). Gerke

(2013) found that daily hassles were related to eating pathology in a sample of adolescents (Gerke et al., 2013). Jenkins and Rew (2005) conducted a large (n = 1,026) cross-sectional investigation of 8 to 13-year-old children of multiple ethnicities and found that perceived stress was related to using eating as a coping strategy as well as with unhealthy eating behaviors. Notably, the relationship between unhealthy eating behaviors and perceived stress did not depend on socioeconomic status (Jenkins, Rew, & Sternglanz, 2005). It is important to note that the relationship between stress and emotional eating may not be weight dependent, as it has been found that BMI does not moderate the relationship between stress and emotional eating (Nguyen-Rodriguez & Lindquist, 2008).

Strategies used to cope with stressors can range from adaptive to maladaptive. Notably, emotion regulatory deficits (Telch, Agras, & Linehan, 2001) stem from one's inability to cope with the stressors of everyday life adaptively; one could use food as a way to cope (Davis et al., 2011). Research suggests that there are two dimensions of coping, i.e. voluntary versus involuntary, and engagement versus disengagement. The voluntary-involuntary dimension is based on control whereas the engagement-disengagement dimension is based on foundational concepts such as approach- avoidance (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). In the current study, indices of involuntary and disengagement coping styles are hypothesized to moderate the relationship between child perceived stress and child EAH.

Influence of Income and Ethnicity on Eating Behavior, Parenting, and Stress

Eating Behavior.

Research suggests that African-American children are more likely to engage in binge eating than children of other racial/ethnic groups (George & Franko, 2010). A recent epidemiological study reported that African-American children and adolescents are more likely to

engage in binge eating behaviors and be less distressed by it compared to Caucasian adolescents (Lee-Winn, Townsend, Reinblatt, & Mendelson, 2016). Further, disordered eating is more likely to occur in children and adolescents who are overweight. Evidence suggests that unhealthy weight control behaviors are more likely to occur in African-American overweight girls (i.e. fasting, skipping meals) (Rodgers, Watts, Austin, Haines, & Neumark-Sztainer, 2016). More work in this area is needed to determine the role of binge eating per se within the broader constellation of disordered eating behaviors, particularly since some research suggests that more diverse body image ideals may serve as a protective factor against disordered eating in this group (Bucchianeri et al., 2016; Hoek, 2006). Body image concerns, or the lack thereof, may be impacting minority children's motivation for weight management treatment.

Parenting.

The literature regarding parenting practices across ethnic lines has been mixed. Some work suggests that African-American parents use more authoritarian general parenting techniques, perhaps due to contextual necessity (Hoff, Laursen, & Tardif, n.d.; Querido, Warner, & Eyberg, 2002), but may be less involved in parenting as it pertains to child eating behavior (Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005). However, the aforementioned Powers and colleagues (2005) study, for example, found that in a sample of low-income African-American parents, maternal restriction and control in feeding was positively related to BMI of the child (Powers et al., 2006). Another study found that in a sample of African-American and Caucasian children, parental pressure to eat, and concern for child's weight explained 15% of the variance in child total fat mass (Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002).

Further, there has been work suggesting there may be a direct relationship between African-American authoritarian parenting and child eating due to negative affect. For example,

Assari and colleagues (2015) found that high maternal support was protective against weight gain over a 12-year period among African-American female young adults (Assari, Caldwell, & Zimmerman, 2015). When all other variables were controlled for (i.e. age, family structure, and family socioeconomic status), maternal support was the only significant predictor of lower BMI over time. This study is particularly compelling in that it was a longitudinal study with a large sample (n = 227). Other studies have also reported that African-American adolescents who report experiencing more parental firm control are more likely to engage in emotional eating (Mason, 2011). These are especially important considerations given the research suggesting that African-American parents are more likely to use authoritarian parenting techniques (Querido et al., 2002).

Notably, it may be important to consider income variations within this ethnic group. There is little literature on African-American parents of higher income status and the way that income may impact their parenting behavior (Tamis-LeMonda, Briggs, McClowry, & Snow, 2008). Given the contextual necessity argument, perhaps African-American families with higher incomes may have less need to utilize authoritarian strategies, and that may lead to a different relationship between parenting style and child feeding depending on income (Pinderhughes et al., 2000).

The relationship between parenting and parent feeding practices in African-American parent-child dyads is interesting when considered within the larger context of cross-cultural differences in parenting practices as they relate to child psychopathology more generally. The research regarding authoritarian parenting tactics in African-American families has shown mixed results, with some studies indicating that these techniques are protective against externalizing behaviors while other studies indicate that it is a risk factor for both child internalizing and externalizing problems (Coley, Kull, & Carrano, 2014; Lau, Litrownik, Newton, Black, & Everson, 2005; Polaha, Larzelere, Shapiro, & Petit, 2004; Simons et al., 2002; Whaley, 2000).

Perhaps these reported differences depend on context. Therefore, when considering the relationship between parenting style and emotional eating, careful thought should be put into identifying the particular mechanism by which such parenting behaviors in a particular ethnic group may lead to negative emotion regulatory strategies that effect eating behavior.

Potential mechanisms by which parenting might lead to higher BMI are not addressed in the literature. As noted earlier, it could be that some parents are more likely to use maladaptive coping strategies, and there is a modeling or heritability effect. On the other hand, perhaps parents are more likely to use these parenting techniques in *response* to stress (i.e. perhaps due to being of lower socioeconomic status); we know that stress is directly related to emotional eating. Or, it could be that the literature about authoritarian parenting styles in African-American families being related to externalizing issues and not internalizing issues better reflects these relationships and that parent feeding practices may be the more relevant mechanism to consider when studying child weight status. The relationship between parenting and child weight could also be due to a third variable such as parental belief that their child is overweight leading to increased efforts to regulate their intake, and therefore the use of more firm control parenting. However, research suggests that African-American parents are more likely to perceive their child as being less overweight than they actually are (Doolen, Alpert, & Miller, 2009; Young-Hyman, 2003). Therefore, the later hypothesis may be relatively unlikely to be supported.

To conclude, the lack of generalizability due to homogeneity in socioeconomic status and race/ethnicity in the study samples typically studied is an issue in understanding the role of parenting in effecting child weight (i.e. Rhee et al., 2013; Snoek et al., 2007; Topham et al., 2011). This is a very important limitation in that one's culture and environment are very influential in determining parenting practices (Bornstein & Cheah, 2006; Harkness & Super, 2002; Whaley,

2000) and a child's socialization around food (Borah-Giddens & Falciglia, 2015; Bruss, Morris, Dannison, & Orbe, 2005; Ochs & Shohet, 2006). Overall, the literature is mixed on the relationship between parenting, parent feeding practices, and child eating behavior in African-American parent-child dyads.

Stress.

Approximately half of African-American children under the age of six live in poverty (Economic Policy Institute, 2012; U.S, 2014). The literature is overwhelmingly clear that low-socioeconomic status is highly related to obesity status (Wang & Beydoun, 2007a), as well as increased stress, which is itself related to obesity development (Adam & Epel, 2007; Dallman, 2010; Dallman & Lindquist, 2003). Further, living in poverty is related to the underdevelopment of various cognitive and psychological processes that could impact eating behavior in a positive manner (Evans & Schamberg, 2009; Shonkoff, Boyce, & McEwen, 2009). Hemmingsson (2014) describes psycho-emotional overload as a contributor to weight gain in the presence of socioeconomic disadvantage. It is argued that psychological and emotional distress can lead to maladaptive eating behaviors as well as contribute to stress responses in the body that impact weight via biological mechanisms (Hemmingsson, 2014).

Further, African-Americans are hypothesized to experience greater stress due to factors related to perceived stress due to discrimination and social standing—this greater stress has been associated with a multitude of negative health outcomes (Williams, Mohammed, Leavell, & Collins, 2010). Literature also suggests that the influence of cultural factors may lead to eating as a way of coping with such stress, potentially contributing to the development of eating behaviors that may be related to increased BMI (Liburd, 2003; Sims et al., 2008). Notably, in the

aforementioned Jenkins and Rew (2005) study, African-American children endorsed eating as a coping strategy more often than Caucasian children (Jenkins et al., 2005).

To our knowledge, there have been no within group studies examining the predictive power of stress in the development of EAH or obesity in African-American children. Several review (Sutherland, 2014), qualitative (Sims et al., 2008; Talleyrand, Gordon, Daquin, & Johnson, 2016), and quantitative (Walcott-McQuigg, 1995) studies, mostly in adult African-American women, have highlighted the role of stress and overeating behaviors, but no empirical work has analyzed this relationship in a sample of children and adolescents. Further, as much work focuses on children in poverty, we also do not know much about this relationship across the income spectrum.

Treatment-Seeking Families

The themes discussed above may be especially important to consider in families who are seeking treatment for a child who has been identified as being overweight or obese. Research suggests that caregivers of obese children report more mealtime stress (Piazza-Waggoner, Modi, Ingerski, Wu, & Zeller, 2011) and more general distress (Zeller et al., 2007). Studies also show that obese youth are at increased risk for more parental problematic parental feeding practices and poorer mealtime interactions (Boles, Reiter-Purtill, & Zeller, 2013). Parental concern about child weight has also been shown to be related to more restriction (Towner, Reiter-Purtill, Boles, & Zeller, 2015), which paradoxically, may lead to greater obesity over time (Faith, Scanlon, Birch, Francis, & Sherry, 2014).

Families of African-American children demonstrate higher dropout and lower treatment compliance in pediatric weight management interventions (Dhaliwal et al., 2014; Ligthart, Buitendijk, Koes, & van Middelkoop, 2017; Zeller et al., 2004), less knowledge of weight-related comorbidities and lower perceptions of risk for other health comorbidities compared to Caucasians

(Ratcliff, Bishop-Gilyard, Reiter-Purtill, & Zeller, 2010). If relationships among risk factors are shown in this study to be similar across racial/ethnic group, we would conclude that improving access to treatment and retention within current treatments may be the more cost-effective approach. However, if those relationships are more pronounced within certain groups, more attention may need to be placed on the development of culturally-sensitive interventions, perhaps addressing parenting style and stress experiences more directly. Finally, given that most of the existing work seeking to explain the role of the variables of interest on obesity has been done on community samples who have a range of BMIs from normal to above average, it may be important to investigate these important questions specifically in a clinical sample. We would expect similar, if not stronger predictive power among families with children needing intervention for weight management. If so, a stronger rationale could be made for developing treatment adaptations to address those additional mechanisms more directly rather than continuing to focus more exclusively on environmental changes (i.e. stimulus control) as is the emphasis in most current weight management interventions.

Gaps in the Literature

In sum, from the existing literature we do not know: 1) how eating in the absence of hunger (EAH) relates to BMI in a predominately African-American treatment-seeking sample of children, and 2) in what way parenting and parent feeding practices may differentially relate to child EAH in a predominately African-American sample of children seeking treatment. The impact of stress has been well-established as a correlate of poor coping and health outcomes in African-Americans. These variables may interact within a treatment seeking sample, and particularly within African-American families seeking treatment.

Aims and Hypotheses

Thus, the purpose of the current study was to analyze the impact of stress and parenting variables within a treatment-seeking sample of overweight or obese children. Models of differential risk (based on African-American race/ethnicity and socioeconomic status) may provide important information about whether or not these variables add additional explanatory power in understanding problematic eating behaviors in this treatment-seeking sample. The study aims are to 1) describe relationships between demographic variables (i.e. age, ethnicity, income, and gender) on key study variables in a treatment-seeking sample, 2) Examine the impact of child EAH on child body mass index (BMI), 3) Examine the impact of parenting variables on child EAH, 4) Examine the impact of stress variables on child EAH, and 5) Explore the possible influence of income and ethnicity on key stress and parenting variables.

Given the established relationship between EAH and BMI in children it was hypothesized that 1) child EAH will be associated with higher BMI. Given the established relationships between parenting and child feeding practices and how these variables relate to child feeding behaviors and weight, it is predicted that 2) there will be a direct relationship between authoritarian parenting and child EAH, and 3) a portion of the total effect of authoritarian parenting on EAH will be attributed to parent overinvolvement in child feeding practices (Figure 1). Given that previous work suggests that stress is associated with increased weight via both biological and behavioral mechanisms, it is predicted that 4) higher levels of perceived stress will be associated with higher child EAH, and stress coping will moderate the relationship between perceived stress and EAH (Figure 2).

Research Design and Methods

Participants and Recruitment Procedure

This cross-sectional study recruited 90 African-American and Caucasian children aged 8 to 17 (inclusive) and their primary guardian who were participating in a multidisciplinary child weight management clinic in a large southeastern urban medical center. The clinic provides evidence-based treatments for obesity-related illnesses and utilizes a family-based approach. Families are referred to the clinic by their primary care physicians. For this study trained research assistants approached families in the waiting room during their visits to the clinic. Parents or guardians who were willing to participate provided informed consent on an iPad, which allow the investigators access to data from the child's medical records. Children provided assent. Both parent and child then completed a battery of questionnaires while waiting for various provider sessions. To compensate participants for their time, parent and child earned a $15 gift cards ($30 in total provided to the dyad). Families were excluded from participation if the child had been diagnosed with a psychotic disorder or was intellectually disabled.

Measures

Demographics.

Demographic Questionnaire- Questionnaire used to gather information from both parent and child about racial/ethnic identification, age, and self-reported height and weight.

Socioeconomic Status- Parent self-reported income and parent occupation were combined into a composite variable to represent socioeconomic status. Each component was measured as followed:

- *Income* – parent reported income from less than $10,000 to $200,000 or above. Income ranges were coded 1 (lowest) to 11 (highest).
- *Occupation* – Occupation status of parents was retrieved from participant medical records. Occupations were coded using the Hollingshead's Four Factor Index of Social Status coding scheme in which 1 represents the "lowest" and 9 represents the "highest"

occupational status (J. Adams & Weakliem, 2011). For two-parent households we calculated the average of occupation scores. For single parent households, or for households in which only one occupation was reported, the occupation score was based on the reported parent's occupation. This strategy is consistent with Hollingshead's (1975) coding instructions (Hollingshead, 1975) and has been employed by previous research (Richels, Johnson, Walden, & Conture, 2013).

The composite variable score could range from 1 (lowest) to 20 (highest). The subscales that made up the composite variable were significantly correlated with one another in both the African-American and Caucasian samples (See Table 1 and Table 2). Additional information about parental highest level of education was able to be obtained for a subsample of participants. Although the highest level of education data was not used in study analyses due to small sample size, intercorrelations between all measured socioeconomic status variables can be found in Table 3.

Parenting and Parent Feeding Practices.

Parents' Child-Rearing Behavior Interview Questionnaire (PCBIQ)- Parents completed this 33-item self-report measure that assesses the presence or absence of specific parenting behaviors. The "parental control of child" and "parental supervision of child" subscales were used as factors that made up the authoritarian parenting latent variable. Response patterns from various subscales range from 1 ("Never") to 5 ("Often"), 1 ("Yes") to 2 ("No"), and 1 ("Not at all like me") to 5 ("Exactly like me"). Example items include "I expect my child to not question my authority" and "I really try to understand how my child sees things." Previous data show adequate internal consistency (α = .79), with variations by subtest (α = .44 - .81). Increased problematic feeding practices as assessed by this measure has been associated with poorer psychiatric outcomes in

children (J. G. Johnson, Cohen, Kasen, & Brook, 2008). The within sample reliability estimate for this study was .66.

Child Feeding Questionnaire (CFQ)- a 31-item questionnaire that measures parental control in child feeding, and parent perception and concern about child obesity. The measure assesses the construct using a 5-point Likert scale that ranges from 1 ("Never") to 5 ("Always"), and 1 ("Disagree") to 5 ("Agree"). The "restriction," "monitoring," and "pressure to eat" subscales were used to make a composite variable of parent overinvolved feeding. Example items include "I make sure my child does not eat too many sweets," and "my child should eat all of the food on their plate." Previous data show reliability estimates between .71 to .72 (Birch et al., 2001). The within sample reliability estimate for this study was .75. The factor structure has been amended for African-American samples (C. B. Anderson, Hughes, Fisher, & Nicklas, 2005) (Boles et al., 2010).

Child Stress.

Perceived Stress Scale (PSS)- Both parent and child completed this 12-item measure. Items assess one's evaluation of stress and coping over the last month. Subscales include psychological competency and psychological vulnerability. Participants answer on a 5-point Likert scale ranging from 0 ("Never") to 4 ("Very Often"). This measure has adequate reliability and validity. The measure has been shown to be related to number of life events and impact of life events (r = .20 - .49), as well as with depressive symptomatology (r = .18 - .76). Reliability estimates ranged from .84 to .86 (S. Cohen, Kamarck, & Mermelstein, 1983; Vacek, Coyle, & Vera, 2010). The within sample reliability estimate for this study was .62.

Response to Stress Questionnaire (RSQ)-A 57-item measure where participants answered questions on how they cope with stressors on a scale from 1 ("Not at all") to 4 ("A lot"). The items as a whole were meant to represent three dimensions of the stress response as recognized by the

research literature. These dimensions are voluntary vs. involuntary, engagement vs. disengagement, and primary vs. secondary control. The subscales used to make the latent factor of stress disengagement coping were "Disengagement Coping" (examines the extent to which one engages in avoidance, denial, or wishful thinking), and "Involuntary Disengagement Coping" (examines the extent to which one engages in emotional numbing, inaction, escape, or cognitive interference). "Involuntary Engagement Coping" (examines the extent to which one engages in or experiences rumination, intrusive thoughts, emotional arousal, physiological arousal, and impulsive action) was also included as an unhelpful coping style that could negatively impact eating behavior. The measure showed adequate reliability (α = .59 - .87) and validity (r = .30 - .50) (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). The within sample reliability estimate for this study was .93.

Eating Behavior.

Eating in the Absence of Hunger Scale (EAH)- a 14-item measure used to assess the frequency at which participants eat when they are not hungry. Designed for children and adolescents, the measure evaluates three emotional precipitants for eating: external cues, fatigue/boredom, and negative affect. Participants respond to questions on a five-point Likert scale from 1 ("Never") to 5 ("Always"). Example items include "How often do you start eating because you're feeling sad or depressed," "How often do you start eating because others are still eating," and "How often do you start eating because you're feeling tired." This measure has adequate reliability (r = .80 - .88) and validity. Validity estimates showed significant positive correlations between measure subscales, as well as indices of depression, anxiety, and emotional eating (Tanofsky-Kraff et al., 2008). The within sample reliability estimate for this study was .77. There has been no work, to

our knowledge, analyzing ethnic differences on the eating in the absence of hunger construct nor its subscales.

Child Weight.

Body Mass Index- Child weight was assessed using Body Mass Index as reported in participant medical records. Percentile scores were used in all analyses.

Figure Rating Scale- The Figure Rating Scale displays nine schematics of bodies of various sizes and has historically been used to assess body image disturbance. Adequate reliability and validity have been reported (Thompson & Altabe, 1991). Test-retest reliability estimates ranged from .77 - .84. A low correlation with social desirability has been reported (Lombardo, Battagliese, Pezzuti, & Lucidi, 2013; Wertheim, Paxton, & Tilgner, 2004).

The FRS has been shown to be valid, meaning it measures what it purports to measure, and that measurements are consistent with BMI (Lombardo et al., 2013). In the current study, BMI from the clinical sample was recorded from participant medical records. BMI and Figure Rating Scale (FRS) data were combined for post hoc analyses using World Health Organization (WHO) classifications as reference (de Onis, 2007). BMI data were categorized by weight category (i.e., Healthy Weight, Overweight, Obesity I, Obesity II, Extreme Obesity) (de Onis, 2007). The average figure rating score for children aged 7 to 12 (as reported by previous literature) is between 4 and 5 (Kronenfeld, Reba-Harrelson, Holle, Reyes, & Bulik, 2010). World Health Organization growth reference criteria for children was used to apply standard deviation cut-offs for weight status starting from the average of 4.5 (de Onis, 2007). Data was combined by assigning BMI categories to appropriate categories.

Statistical Analyses

IBM SPSS Statistics software and Mplus statistical modeling software were used for all analyses. Descriptive statistics were used to detect missingness and identify outliers. Outliers were defined using 1.5 interquartile range criteria (Hoaglin & Iglewicz, 1987). One outlier was identified on the parental supervision subscale. On this measure respondents answered "yes" or "no" to each item. We decided to keep this participant's data because this respondent answered in the affirmative to the majority of the questions in the subscale. This pattern of responding was not repeated on this participant's responses to other questionnaires in the battery, so the decision was made that the high score was not error or a response style; thus, the data were retained. Associations were analyzed with and without the outlier and associations remained the same. The child feeding questionnaire subscales of monitoring, pressure to eat, and restriction were determined to be skewed using the z-test as described by Kim (1996) (H.-Y. Kim, 2013). After log transforming the variables, the level of skewness remained the same so the data were used without the log transformation (Feng et al., 2014)

Correlation analyses were used to assess relationships between key study variables. Analysis of variance using IBM SPSS Statistics was used to assess mean differences on key study variables by demographic variables. MPlus statistical modeling software path analytic approaches were used to assess 1) the direct effect of EAH on BMI, 2) the direct effect of authoritarian parenting on EAH, 3) the indirect effect of parent overinvolvement in child feeding in the relationship between authoritarian parenting and EAH, 4) the direct effect of higher perceived stress on EAH, and 5) moderation of the perceived stress effect by stress coping. Socioeconomic status and ethnicity were analyzed as covariates to assess for potential attenuation of observed effects. Only participants who self-identified as African-American and Caucasian participants

were used in the primary analyses as there were too few participants in the other categories to allow for meaningful comparisons.

Results

Demographics

The mean age for child participants was 12.26 (*SD* = 2.38), and 67.8% of the sample identified as Black or African-American. The average socioeconomic status score was 9.39 (*SD* = 4.89). Complete demographic information for parent and child are presented in

Table 4. Analyses of variance showed that there were no sex or socioeconomic status differences on key study variables for African-Americans or Caucasians except that African-American participants had significantly higher BMI percentile scores (F (1, 88) = 7.16, p = .009) (See Figure 3).

Correlations

Among African-American participants in the sample, age and BMI percentile were unrelated to key study variables. Parental control was positively related to socioeconomic status (r = .27, p = .03). The use of pressure to eat feeding strategies was inversely related to parent occupation (r = -.32, p = .03). Perceived vulnerability to stress was positively related to EAH (r = .31, p = .01), with the effect being driven by eating due to negative affect (r = .37, p = .003). Competency to manage stress was most highly related to one's total perceived stress score (r = .53, p <.001). Parent occupation was related to participant's perceived competency to manage

stress (r = .33, p = .02) as well as total stress (r = .33, p = .02). All indices of stress coping were positively related to vulnerability to stress and overall perceived stress score (see Table 1). There was no relationship between parent and child stress (r = -.00, p = .99).

Among Caucasian participants, BMI percentile was inversely related to total use of disengagement coping strategies (r = -.39, p = .05), and positively related to parent occupation (r = .43, p = .02); this effect was driven by greater use of involuntary engagement coping (r = -.44, p = .02). Competency to manage stressors was inversely related to EAH due to negative affect (r = -.56, p = .001) and fatigue/boredom (r = -.41, p = .02). Perceived vulnerability to stressors was positively related to total disengagement coping (r = .47, p = .01); this effect was driven by involuntary engagement coping (r = .47, p = .01) and involuntary disengagement coping (r = .77, p < .001) (see Table 2). There was no relationship between parent and child stress (r = .15, p = .42).

Contextual Effects on EAH

Given that socioeconomic status was unrelated to key study variables, this variable was not used as a covariate in subsequent analyses. Given that correlations revealed no relationships between key study variables and EAH due to external cues, that variable was also not included in subsequent analyses. Both subscales of the perceived stress scale (i.e. vulnerability to stress and competency to manage stress) were used as separate predictors in analyses on the effects of stress (Wickrama et al., 2012). Lastly, due to differences in sample size between African-American and Caucasian participants, path analyses controlled for race/ethnicity. Models were also fitted within racial group to illustrate slopes within groups.

Direct effect of EAH on BMI.

There were limited effects of EAH on BMI (EAH_NA: β = .14, 95% CI [-.03, .37], EAH_FB: β = .15, 95% CI [-.13, .48]) in the primary model which did not control for racial group. This effect was similar when we accounted for race/ethnicity. Notably, when race/ethnicity was considered alongside EAH and BMI, race/ethnicity was associated with BMI (EAH_NA: β = -2.08, 95% CI [-4.58, -.44], EAH_FB: β = -1.99, 95% CI [-4.43, -.39]) (Table 1). Within group regression slopes showed moderate (Modest < .30, Moderate > .30 to <.60, Strong > .60) effects in the relationship between EAH and BMI for African-American participants, and minimal effects in the relationship between EAH and BMI for Caucasians (EAH_NA: African-American, β = .43, Caucasian, β = .07, EAH_FB: African-American, β = .31, Caucasian, β = .02) (Figure 4).

Indirect effect of parent feeding practices in the relationship between parenting and EAH.

There were significant joint effects of authoritarian parenting (EAH_FB: β = .11, 95% CI [.00, .23]) and parent overinvolvement in feeding (EAH_FB: β = -.17, 95% CI [-.34, .001]) on eating due to fatigue or boredom both with and without taking race/ethnicity into consideration. There was not a significant indirect effect (β = -.01, 95% CI [-.07, .01]). There was no relationship between authoritarian parenting or overinvolved child feeding practices and eating due to negative affect (Table 2 and Figure 5). Within group regression slopes showed modest effects in the relationship between authoritarian parenting and EAH due to fatigue/boredom, with the slope being steeper for African-Americans (African-American, β = .13, Caucasian, β = .07) (Figure 6).

Direct effect of higher perceived stress on EAH.

Perceived competency to manage stressors predicted EAH due to negative affect (β = -.18, 95% CI [-.35, -.02]), both when race/ethnicity was considered and when it was not (Table 3 and Figure 7). Within group regression slopes showed moderate effects in the relationship between

authoritarian parenting and EAH due to fatigue/boredom for African-Americans (β = -.44), and minimal effects for Caucasians ((β = -.09) (Figure 8). Perceived vulnerability to stress predicted EAH due to negative affect (β = .17, 95% CI [.07, .26]), both when and when not controlling for the effects of race/ethnicity (Table 4 and Figure 9).

Moderation of the perceived stress effect by stress coping.

Stress coping did not moderate the relationship between increased perceived stress competency and EAH due to negative affect (EAH_NA: β = -.02, 95% CI [-.75, .92]) (Figure 9), nor did stress coping moderate increased perceived stress vulnerability and EAH due to negative affect (EAH_NA: β = -.002, 95% CI [-.009, .002), whether or not controlling for the effects of race/ethnicity (Figure 1).

Post Hoc Analyses

Post hoc analyses were used to assess differences between actual and perceived body size (as determined by participant body size classification according to BMI cut-offs) to investigate the possibility that motivation for treatment might be impacted by body size goals. Correlations for individuals who did not fall into African-American or Caucasian racial categories were used to assess relationships between key study variables. A post hoc model including authoritarian parenting and child total stress was performed. Lastly, socioeconomic indicators (i.e. parent occupation and income) used to develop the socioeconomic status composite variable for this study were used to further assess their impact on key study variables.

Within subjects ANOVAS controlling for age were used to assess differences between actual and ideal body size between racial groups. For both groups, there was a significant difference between current BMI and ideal body size (African-Americans: $t(24) = 8.85$, $p < .001$),

Caucasians: ($t(17) = 6.00$, $p < .001$)). Analyses of covariance revealed that race/ethnicity did not differentially predict ideal body size (F (1, 43) = 1.31, p = .25).

For individuals who did not identify as either African-American or Caucasian, authoritarian parenting was significantly related to BMI percentile ($r = .75$, $p = .03$). EAH due to negative affect was inversely related to competency to manage perceived stressors ($r = -.71$, $p = .04$) and positively related to vulnerability to perceived stressors ($r = .85$, $p = .006$). Eating due to fatigue/boredom was also related to vulnerability to manage stressors ($r = .74$, $p = .03$).

There were no significant joint effects of authoritarian parenting (BMI: $\beta = .11$, 95% CI [-.01, .30]) and child total stress (BMI: $\beta = -.08$, 95% CI [-.26, .04]) in predicting BMI. The pattern held for EAH due to negative affect (Parenting: EAH_NA: $\beta = .08$, 95% CI [-.05, .20], Stress: EAH_NA: $\beta = .06$, 95% CI [-.01, .16]), as well as EAH due to fatigue or boredom (Parenting: (EAH_FB: $\beta = .11$, 95% CI [-.00, .22], Stress: EAH_FB: $\beta = .01$, 95% CI [-.05, .09]) when and when not considering the effects of race.

Analyses of variance showed that African-Americans with higher reported parent occupations had children with increased perceived stress competency (F (1, 60) = 3.99, p = .05), as well as more perceived stress overall (F (1, 60) = 3.76, p = .05). Caucasians with lower reported parent occupations had children with higher perceived stress (F (1, 28) = 3.92, p = .05). African-Americans with higher reported parent occupations also reported increased authoritarian parenting (F (1, 59) = 10.77, p = .002).

Discussion

The primary purpose of the current study was to assess the relationship between stress and parenting in understanding eating in the absence of hunger (EAH) in treatment-seeking children. Hypothesized relationships were also evaluated taking into account family socioeconomic status

indicators and ethnicity. Authoritarian parenting and parent feeding practices jointly predicted EAH due to fatigue/boredom. Both perceived competency to manage stress and perceived vulnerability to stressors predicted EAH due to negative affect; there was no moderation effect of stress coping in either relationship. Findings were not different when race/ethnicity was taken into account. In the total sample, socioeconomic status was not found to be associated with key study outcome variables, so it was not used in predictive analyses; however, associations between socioeconomic status and key study variables differed for African-American and Caucasian participants.

Eating in the Absence of Hunger and Body Mass Index

EAH was not correlated with body mass index in the current sample. Of note, EAH due to negative affect and fatigue/boredom in particular, have been shown to be more highly reported in obese youth (Tanofsky-Kraff et al., 2008), and other studies show an association across the weight continuum (Hill et al., 2008)—therefore we expected higher predictive power in this clinical sample. Perhaps for this sample, food type is more relevant as it relates to EAH in children with increased BMI. Research suggests that foods high in sugar, salt, and fat are often eaten in response to negative affect as these types of foods interact with reward centers in the brain to downregulate the stress response (Adam & Epel, 2007). According to the food addiction hypothesis, one can develop a tolerance to such foods and thereby need more of the foods to achieve the same effect of stress relief (Burrow, Skinner, Joyner, Vaughan, & Gearhardt, 2017). Consideration of food type could be particularly salient for African-American samples due to reported cultural differences in diet that is often marked by high fat, sugar, and salt (Airhihenbuwa et al., 1996; Hughes, 1997; Whitehead, 1992). Therefore, exploring food type in the context of EAH may be more tightly related to BMI in more at-risk samples. Of note, when examining within group slopes

the relationship between EAH and BMI was stronger for African-American children compared to Caucasian children, further suggesting that additional exploration of EAH as it relates to type of food eaten is warranted.

Authoritarian Parenting, Parent Feeding, and Eating in the Absence of Hunger

Authoritarian parenting and parent feeding were jointly predictive of EAH due to fatigue/boredom. Eating due to fatigue or boredom may be indicative of symptoms of depression or negative affectivity. Research indicates that boredom shares similarities between depression, apathy, and anhedonia (Goldberg & Eastwood, n.d.; Koball, Meers, Storfer-Isser, Domoff, & Musher-Eizenman, 2012). The construct of boredom has also been shown to be inversely related to negative affectivity, positively related to positive affectivity (Vodanovich, Verner, & Gilbride, 1991), as well as to be associated with physical and mental health concerns (Sommers & Vodanovich, 2000). Fatigue, the second aspect of the construct, is a symptom of low mood and depression (Baldwin & Papakostas, 2006). Given that boredom is related to depressive symptoms that are typically related to dysregulated eating behaviors, the findings may suggest a similar relationship between depressive symptomology, boredom, and overeating behavior. Treatment programs would do well to carefully assess the function of eating behaviors and be sensitive to differing emotional factors that may precipitate dysregulated eating behaviors. More nuanced assessment would provide more precise case conceptualization as well as more specific treatment targets.

Existing literature has reported similar findings as found in this study regarding authoritarian parenting and maladaptive eating behavior in children across ages and cultures (i.e. (Melis Yavuz & Selcuk, 2018; Rhee, 2006). Like aforementioned, this relationship could be the result of modeling of behavioral dysregulation (i.e. overeating in response to negative emotions)

by the parent or behavioral traits that are inherited from parents (Brown, 2004; A. S. Morris et al., 2007; Snoek et al., 2007). Extending the point that literature regarding the use authoritarian parenting strategies and child socioemotional outcomes has shown mixed results (Hoff et al., n.d.; Hughes et al., 2005; Querido et al., 2002), some work suggests that authoritarian parenting may only be detrimental to child mental health when authoritarian parenting is inconsistent with mainstream cultural values (Dwairy, 2009). This suggestion may have implications for the level of acculturation, or assimilation into the majority culture demonstrated within a particular sample (Berry et al., 1987), and it may be particularly relevant for racial/ethnic minority groups in pediatric weight management programs.

In this study, there was an inverse relationship between parent feeding and EAH due to fatigue/boredom. Existing literature reports that parental overinvolved child feeding practices are related to dysregulated child eating behaviors (e.g. Birch et al., 2003, Joyce & Zimmer-Gembeck, 2009). It appears that in this high-risk sample, parent *under* involvement in feeding is related to more dysregulated eating behaviors. Although not consistent with what has been reported in community samples, increased involvement in feeding and food choices are encouraged in family-based pediatric weight management programs (Stice, Shaw, & Marti, 2006). Further, the finding of under involvement in feeding being related to increased dysregulated eating behaviors was when authoritarian parenting was considered in the model. This pattern is what the research literature has found to occur in African-American families (i.e. Hoff, Laursen, & Tardif, n.d.; Querido, Warner, & Eyberg, 2002; Hughes, Power, Orlet Fisher, Mueller, & Nicklas, 2005). This highlights the need to find unique ways to get parents at varying levels of motivation willing to comply with treatment recommendations. Finally, parent feeding practices did not mediate the relationship between authoritarian parenting and EAH. The two constructs were also not correlated in this

sample, suggesting that perhaps there are other factors that may contribute to parenting and feeding styles employed.

Authoritarian parenting and under involved child feeding could also be indicative of other aspects of the environment that are distressing and could lead to emotional eating behaviors in the child. Indeed, this authoritarian parenting style, for example, is more likely to be used in the context of high-risk environments marked by poverty and safety-risks (Kotchick & Forehand, 2002). Such households may experience more stress and chaos that further contributes to child emotional and behavioral dysregulation that could negatively impact eating behavior (Fiese & Winter, 2010). These factors could also contribute to under involvement in child feeding. The demonstration of this relationship has important implications for treatment in this high-risk sample. If this high control/low warmth parenting style and low ability to manage child feeding is indeed suggestive of more difficult home environments, one might expect that there are implications for a family's ability to comply with treatment recommendations and maintain involvement in the program (Kotchick & Forehand, 2002). Therefore, clinicians must use their clinical sensitivities to understand the precipitants and functions of such parenting practices in order to work towards adjusting parenting styles to better serve a particular child's socioemotional well-being and thereby eating behaviors.

Although the current study did not provide evidence of socioeconomic status predicting the relationship between authoritarian parenting and eating behavior, there were interesting associations that are worth noting given the relationships between parenting and environmental context that have been reported in the research literature. In the current study, for African-American parent-child dyads, parental control was positively related to socioeconomic status and use of pressure to eat feeding strategies was inversely related to parent occupation. Post hoc

analyses revealed that higher parent occupation was related to increased use of authoritarian parenting techniques. In contrast, there was no relationship between parenting variables and socioeconomic status among Caucasian participants. These findings suggest that although our socioeconomic status composite variable was not predictive of key study variables, some independent indicators of advantage and disadvantage, like parent occupation, may be related to the types of parenting and parent feeding practices they employ. Although increased parent occupation may afford access to different spaces that offer broader exposure and advantage, in this sample, high parental control—a parenting style that the literature suggests is highly culturally based, was found across levels of occupations (Brody et al., 1999; Pinderhughes et al., 2000). Thus, additional research may be helpful in understanding whether or not cultural factors contribute explanatory power over and above socioeconomic indicators, and what impact those factors have on health behaviors and related interventions.

Perceived Stress, Coping, and Eating in the Absence of Hunger

Findings from this study suggest that there is a direct relationship between competency to manage perceived stressors and EAH due to negative affect as well as perceived vulnerability to manage stressors and EAH due to negative affect. There was no moderation effect of stress coping in this relationship. The pattern of findings was the same across race/ethnicity.

There was a direct effect of perceived competency to manage stress and EAH due to negative affect. These findings highlight the need to consider other variables that may be contributing to this relationship. For example, parent modeling of eating behaviors when stressed may lead to overlearned behaviors in children. Under stress, behaviors are more likely to become habitual (Schwabe & Wolfe, 2013). This type of learned behavior may be more intentional than one's general coping style that may be more trait-based. Therefore, coping styles that may be less

healthy in general may not always translate to eating to cope. Perhaps environmental factors such as parental modeling and a cultural norm of eating in response to both positive and negative emotions may play a stronger role in driving this relationship.

Further, EAH due to negative affect could be more highly related to trait factors as opposed to state factors. This idea is plausible given the high rates of comorbid depression and anxiety in treatment-seeking samples (Pervanidou & Lindquist, 2015; Puder & Munsch, 2010; Pulgarón, 2013). Further, competency to manage stress, or one's perceived ability to cope with stressors, is likely related to other factors such as one's broader level of self-efficacy (or self-esteem) that may relate to more internalizing psychopathology. Either could lead to heightened distress under stressful situations over time and increases the likelihood of engaging in habitual behaviors such as EAH (Abouserie, 1994; Adam & Epel, 2007). Perhaps developmentally, associations between coping style and eating strengthen as one grows older and becomes more aware.

Similarly, vulnerability to perceived stressors was positively related to EAH due to negative affect with and without taking racial/ethnic group into consideration. Lack of control and the frequency of unexpected stressors both contribute to how vulnerable one feels to stressors (Cohen et al., 1983) which could directly impact behavioral and emotional dysregulation (Miller, 1981). This pattern of findings highlights the potential need for training children and adolescents to manage distress related to stressors perhaps by increasing their self-efficacy to manage uncomfortable feelings related to stressors that may not be controllable. As the primary focus in current child weight management treatments is on energy input and output, distress that feels overwhelming for a child may negatively impact motivation for making changes in eating-related behaviors and reduce treatment compliance.

Interesting patterns of associations between socioeconomic status indicators and stress variables were found. For example, BMI was unrelated to key study variables among African-Americans but among Caucasians, BMI was inversely related to disengagement coping strategies (involuntary engagement coping) and was positively related to parent occupation. One hypothesis about this pattern, which would be consistent with what we know about disparities in obesity prevalence, relates to the fact that in this sample African-American participants had significantly higher BMI percentile scores. The even greater restriction of range in BMI percentiles for the African-American sample may have further reduced power to detect associations between BMI percentile and key study variables. Further, BMI for Caucasians increased with parent occupation while for African-Americans, parent occupation was unrelated to BMI but positively related to child's perceived competency to manage stress. Post hoc analyses indicated that children in African-American families with higher parent occupations had children that reported higher perceived stress competency, but higher stress overall. For Caucasian parents, lower parental occupational status was related to higher stress. This pattern of findings is consistent with research suggesting that level of stress reported does not necessarily abate with increased socioeconomic standing among African-Americans (Williams et al., 2010). Thus, it is plausible that African-American children of a higher socioeconomic status may feel more perceived competency to manage their stressors, as those stressors may not be as uncontrollable in nature and they may have more resources, but still report stress levels that are higher than what would be expected given their socioeconomic standing. Slopes for perceived competency to manage stress associated with EAH due to negative affect were modest, compared to the somewhat stronger relationship shown among Caucasians, suggesting that stress levels among African-Americans may be negatively impacting eating behaviors.

Relevance of Treatment Seeking Sample and Importance of Treatment Retention

It is important to underscore that the pattern of findings in the current study reflects associations within an overweight/obese clinical sample. It may be that more nuanced cultural differences would be salient in a lower risk sample with a wider range of weights. At the higher end of the BMI percentile, we may be seeing a pattern of specific problematic eating issues that is more similar across racial/ethnic groups. For example, post hoc analyses revealed there were no significant differences between actual and ideal body size between race/ethnicities, and race/ethnicity did not predict ideal body size. Given what we know from previous literature about differences in ideal body size between these racial/ethnic groups (Bucchianeri et al., 2016) (Hoek, 2006), this failure to find a difference may be unique to a treatment-seeking sample in which all the children have been diagnosed as overweight/obese.

Despite the pattern of results in this study being similar across races, as aforementioned, prior research with African-American families consistently demonstrate higher dropout and lower treatment compliance in pediatric weight management programs (Dhaliwal et al., 2014; Ligthart et al., 2017; Zeller et al., 2004). These parents also have a lower perception of risk for weight related comorbidities (Ratcliff et al., 2010), and are often dissatisfied with traditional weight management treatments at the primary care level (Ward, Gray, & Paranjape, 2009). Research has shown that there are strong cultural factors such as beliefs about food and its relation to cultural identity that may override efforts to adopt a healthier lifestyle (i.e. the belief that healthy food choices mean giving up a part of one's ethnic identity, the belief that cultural food staples are associated with health, and the lack of support for healthy lifestyle changes from friends and family) (Airhihenbuwa, Kumanyika, & Agurs, 1996; Hargreaves & Schlundt, 2002; James, 2004). Therefore, further efforts to identify those beliefs and understand the ways those beliefs may

impact participation in weight management programs should be a high priority. It may be helpful to use therapeutic approaches in primary and behavioral health settings that increase the likelihood that providers assess the role of cultural or environmental factors for individuals and better understand how those factors may impact a participant's efforts to lose or manage weight concerns (Kong, Tussing-Humphreys, Odoms-Young, Stolley, & Fitzgibbon, 2014).

Adjunct Treatment Modalities

Certain therapeutic techniques may be particularly useful as an adjunct to standard behavioral treatment for weight management in children. For example, Acceptance and Commitment Therapy (ACT) is a therapeutic technique that focuses on acceptance and mindfulness of internal experiences (i.e. thoughts, feelings, bodily sensations) while working towards identified values. In the context of pediatric weight management, for example, an ACT approach would promote accepting uncomfortable feelings related to stress and resisting food cravings so the patient can move more towards the value of having more energy to play with friends and spend time with family (Lillis & Kendra, 2014). Research suggests that ACT may be effective as an adjunct to standard behavioral treatment for obesity and may even promote long-term behavior change and reduction in the likelihood of weight regain after treatment. A 2008 open-trial of ACT by Forman and colleagues found changes in the expected direction for psychological targets such as urge-related eating behavior as well as weight (Forman, Butryn, Hoffman, & Herbert, 2009). This approach may be particularly amenable for minority treatment-seeking patients because ACT puts less focus on directly targeting behavior change that may run against cultural values, and more focus on understanding the function of behaviors and whether or not a behavior helps achieve value-laden goals.

Interpersonal Psychotherapy for the Prevention of Excessive Weight Gain is another treatment modality that has been studied in rural African-American girls. This therapeutic approach was originally designed to target improvement in interpersonal relationships and reduction of depressive symptomology. Research suggests that this treatment modality may be acceptable to African-American girls due to the focus on relationship that is common in collectivist cultures and may work well as an adjunct to standard behavioral treatment (Cassidy et al., 2013; Chui, Safer, Bryson, Agras, & Wilson, 2007). Motivational interviewing is another technique that is more relational in nature that is also been shown to be effective alongside standard behavioral treatment for weight loss (Armstrong, Mottershead, Ronksley, Campbell, & Hemmelgarn, n.d.; Hardcastle, Taylor, Bailey, Harley, & Hagger, 2013; Pollak et al., 2010). However the literature is mixed about this intervention's effectiveness with African-Americans and other minority groups (Feldstein Ewing, Wray, Mead, & Adams, 2012), with some work showing effectiveness with behavior change (Montgomery, Burlew, Wilson, & Hall, 2011; Resnicow et al., 2001) while others failed to show its added value as an adjunct to weight loss treatment in a sample of obese African-American women (Befort et al., 2008). More work is needed to determine whether this adjunctive treatment would be useful for at-risk minority youth.

Finally, encouraging greater satiety awareness in children may be a worthwhile treatment target. Appetite Awareness interventions take the emphasis away from food type and shifts it to how the body feels before and after eating. For example, the Appetite Awareness Training program (AAT) teaches individuals to pay attention to internal satiety cues before, during, and after eating. Research has shown that the program reduces binge eating (Craighead, 1995), and symptoms of bulimia (Dicker & Craighead, 2004) in adult samples. With the above psychological and cultural factors in mind, child appetite awareness training may be a worthwhile intervention to explore in

high risk racial/ethnic minority groups given its potential for a family-based approach (Craighead, 2018) its reduced focus on weight and caloric reduction, and its flexibility that contributes to easy dissemination (Marx, Reddy, & Welsh, 2015). Preliminary support for this assertion is a 2018 study led by Goode that found an Appetite Awareness program for overweight and obese African-American women was effective in reducing binge eating as well as increasing eating self- efficacy (Goode et al., 2018).

Strengths and Limitations

This study had notable strengths. The first being that it was a study that investigated possible racial/ethnic differences in the relationships among psychosocial variables in a clinical sample of children in treatment for weight concerns. This study explored clinical questions while simultaneously taking into account race/ethnicity and class—a line of inquiry often understudied in the clinical psychological literature. Finally, this study used path analytic approaches that identify both direct and indirect effects (Land, 1969).

This study also had limitations. While the measurement of indices of socioeconomic status was a worthwhile addition to the study, the data was not as precise as would have been ideal. There was missing data on some indices due to participants not providing the information, or the information not being found during chart review. Measurement issues are a common problem when assessing socioeconomic status in quantitative research (Cowan et al., 2012). We also had only one caregiver report on the parenting variables, which may or may not be the best representation of the parenting that the child experiences regularly and how it impacts their eating behavior. Finally, the strength of focusing on a clinical sample in this study also functions as a weakness in that we had a restricted range of BMI percentiles, which likely limited our ability to identify relationships between predictor variables and BMI percentile as an outcome variable.

Future Directions

The current findings suggest several directions for future research. A larger sample size with a greater proportion of children in the overweight range would increase power. A larger sample size would also allow further exploration of potential racial/ethnic group effects. Further, an important next line of inquiry is to explore how parent stress impacts parent feeding practices as well as general parenting style. Research suggests that parental stress can impact consistency of parenting (Pinderhughes et al., 2000) as well as the quality of parent's feeding practices (Piazza-Waggoner et al., 2011; Zeller et al., 2007; Zeller, Boles, & Reiter-Purtill, 2008)**.** Further, concern about child weight might interact with parent feeding practices as well as parenting style more generally. Given that African-American families may experience lower concern about child weight status due to less internalization of the thin ideal, there may be other important cultural differences noted (Doolen et al., 2009) (Young-Hyman, 2003). Other indicators of socioeconomic status, such as zip code, may serve as a better indicator of advantage/disadvantage as it pertains to the built environment that impact behaviors such as access to outdoor activities, social activities, and food accessibility (Casagrande, Whitt-Glover, Lancaster, Odoms-Young, & Gary, 2009).

Further exploration of the different types of stressors experienced such as interpersonal concerns, environmental difficulties, trauma, perceived discrimination, and the chronicity of stressors and whether or not certain stress indices are more likely to lead to dysregulated eating in a racially diverse treatment-seeking sample may be useful. More information is also needed about cultural beliefs surrounding food and the role of these beliefs in effecting children's eating behavior. A more complete understanding of racial/ethnic differences about the role of food may help reduce the behavior change gaps that we see between racial/ethnic groups in outcome studies for weight management (Ratcliff et al., 2010). Further, assessing the role of acculturation could be

an important next step, as families who identify less with mainstream culture may also be less likely to comply with mainstream treatment recommendations and practices. Finally, we limited our analyses to comparing African-American and Caucasian participants, but future studies would do well to study other racial/ethnic groups. However, it was notable that our post hoc analyses showed similar associations among individuals who did not identify as either African-American or Caucasian, further highlighting the possibility that racial/ethnic identity may play less of a role when one is studying families with a child already in treatment for weight concerns.

Conclusion

This current study sought to add psychosocial inquiry to the childhood obesity research with a special emphasis on exploring the potential role of race/ethnicity and socioeconomic status. Primary goals of the study were to provide more information about variables that might contribute to the understanding of racial/ethnic disparities in obesity rates and weight treatment outcomes, as well as to provide discussion points to suggest ways in which interventions may be more sensitive to cultural factors. Findings suggested that relationships among parenting, stress, and eating behaviors were similar across racial/ethnic groups in this treatment-seeking sample.

Given that on average African-American families experience poorer outcomes in pediatric weight management programs, results from this study suggest that it may be cost effective to explore additional ways to retain these families in treatment programs. Using more third-wave therapeutic modalities as adjunct treatments to standard behavioral therapies for weight management may help us understand the function of maladaptive health behaviors in ways that may be culturally driven, as well as help families approach overweight/obesity diagnoses in ways that are non-stigmatizing and enhance engagement. Such considerations may help tailor treatments to individual family needs and promote greater success in managing child health outcome

Tables and Figures

Table 1.

Correlation coefficients between key study variables for African-Americans

Variable	1	2	3	4	5	6	7	8	9
1. BMI	-								
2. Age	.15 (n = 61)	-							
3. Income	.02 (n = 60)	.06 (n = 60)	-						
4. Parent Occupation	-.005 (n = 45)	.14 (n = 45)	.38* (n = 44)	-					
5. SES	-.003 (n = 61)	.01 (n = 61)	.85** (n = 60)	.68** (n = 45)	-				
6. EAH_NA	.25 (n = 60)	.04 (n = 60)	.00 (n = 59)	.04 (n = 44)	.01 (n = 60)	-			
7. EAH_EXT	.07 (n = 61)	-.21 (n = 61)	-.06 (n = 60)	-.11 (n = 45)	.001 (n = 61)	.20 (n = 60)	-		
8. EAH_FB	.23 (n = 60)	-.06 (n = 60)	-.09 (n = 59)	.02 (n = 44)	-.01 (n = 60)	.59** (n = 60)	.26* (n = 60)	-	
9. EAH_TOT	.22 (n = 61)	-.05 (n = 61)	-.03 (n = 60)	-.05 (n = 45)	-.005 (n = 61)	.84** (n = 60)	.60** (n = 61)	.81** (n = 60)	-
10. PSS_Comp	-.02 (n = 61)	.05 (n = 61)	-.08 (n = 60)	.33* (n = 45)	-.009 (n = 61)	-.11 (n = 60)	-.13 (n = 61)	.05 (n = 60)	-.09 (n = 61)
11. PSS_Vuln	-.04 (n = 61)	.18 (n = 61)	.14 (n = 60)	.18 (n = 45)	.20 (n = 61)	.37** (n = 60)	.15 (n = 61)	.11 (n = 60)	.31* (n = 61)
12. PSS_Tot	-.05 (n = 61)	.18 (n = 61)	.08 (n = 60)	.33* (n = 45)	.16 (n = 61)	.26* (n = 60)	.07 (n = 61)	.12 (n = 60)	.22 (n = 61)
13. DC	-.09 (n =57)	-.13 (n = 57)	.04 (n = 56)	-.03 (n = 44)	.11 (n = 57)	.15 (n = 56)	.17 (n = 57)	.05 (n = 56)	.13 (n = 57)
14. IE	-.09 (n = 56)	-.03 (n = 56)	-.02 (n = 55)	.01 (n = 44)	.006 (n = 56)	.19 (n = 55)	.11 (n = 56)	.17 (n = 55)	.20 (n = 56)
15. ID	-.11 (n = 56)	.05 (n = 56)	-.008 (n = 55)	-.01 (n = 44)	.02 (n = 56)	.12 (n = 55)	.11 (n = 56)	.11 (n = 55)	.17 (n = 56)
16. RSQ_Total	-.10 (n = 57)	-.05 (n = 57)	.03 (n = 56)	-.007 (n = 44)	.08 (n = 57)	.15 (n = 56)	.11 (n = 57)	.09 (n = 56)	.15 (n = 57)
17. RST	-.04 (n = 60)	-.14 (n = 60)	.12 (n = 59)	-.17 (n = 44)	.07 (n = 60)	-.06 (n = 59)	.09 (n = 60)	-.20 (n = 59)	-.08 (n = 60)
18. PE	-.04 (n = 60)	.11 (n = 60)	-.12 (n = 59)	-.32* (n = 44)	-.16 (n = 60)	-.06 (n = 59)	-.05 (n = 60)	-.02 (n = 59)	-.04 (n = 60)
19. MN	-.14 (n = 60)	-.08 (n = 60)	-.09 (n = 59)	-.19 (n = 44)	-.13 (n = 60)	.04 (n = 59)	.10 (n = 60)	-.12 (n = 59)	.02 (n = 60)
20. Parent Feeding Practices	-.10 (n = 60)	-.04 (n = 60)	-.03 (n = 59)	-.35* (n = 44)	-.09 (n = 60)	-.03 (n = 59)	.05 (n = 60)	-.16 (n = 59)	-.05 (n = 60)
21. Parental Control	.08 (n = 60)	-.03 (n = 60)	.23 (n = 59)	.15 (n = 44)	.27* (n = 60)	.13 (n = 59)	.07 (n = 60)	.25 (n = 59)	.16 (n = 60)
22. Parental Supervision	-.04 (n = 59)	.06 (n = 59)	-.21 (n = 58)	.21 (n = 43)	.03 (n = 59)	-.15 (n = 58)	-.07 (n = 59)	.01 (n = 58)	-.13 (n = 59)
23. Authoritarian Parenting	.03 (n = 60)	-.03 (n = 60)	.08 (n = 59)	.21 (n = 44)	.20 (n = 60)	.07 (n = 59)	.00 (n = 60)	.26* (n = 59)	.10 (n = 60)
24. FRS_Current	.31 (n = 33)	.52** (n = 33)	.08 (n = 33)	.25 (n = 25)	.13 (n = 33)	-.17 (n = 32)	.06 (n = 33)	.06 (n = 32)	.02 (n = 33)
25. FRS_Ideal	.02 (n = 25)	.62 (n = 25)	.16 (n = 25)	.07 (n = 19)	.13 (n = 25)	.30 (n = 24)	.31 (n = 25)	.15 (n = 24)	.32 (n = 25)

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

a. Boxes shaded in gray are significant correlations. Boxes shaded in dark gray identify correlations that were predicted in the study model.

Correlation coefficients between key study variables for African-Americans (cont'd)

Variable	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. BMI																
2. Age																
3. Income																
4. Parent Occupation																
5. SES																
6. EAH_NA																
7. EAH_EXT																
8. EAH_FB																
9. EAH_TOT																
10. PSS_Comp	-															
11. PSS_Vuln	.07 (n = 61)	-														
12. PSS_Tot	.53** (n = 61)	.88** (n = 61)	-													
13. DC	.04 (n = 57)	.44** (n = 57)	.40** (n = 57)	-												
14. IE	-.01 (n = 56)	.35** (n = 56)	.31* (n = 56)	.78** (n = 56)	-											
15. ID	.02 (n = 56)	.35** (n = 56)	.33* (n = 56)	.79** (n = 56)	.89** (n = 56)	-										
16. RSQ_Total	.08 (n = 57)	.44** (n = 57)	.42** (n = 57)	.90** (n = 57)	.96** (n = 56)	.95** (n = 56)	-									
17. RST	.03 (n = 60)	.15 (n = 60)	.14** (n = 60)	.09 (n = 56)	-.05 (n = 55)	-.13 (n = 55)	.07 (n = 56)	-								
18. PE	-.09 (n = 60)	.10 (n = 60)	.04 (n = 60)	-.11 (n = 56)	-.08 (n = 55)	-.07 (n = 55)	-.06 (n = 56)	.26* (n = 60)	-							
19. MN	-.09 (n = 60)	.17 (n = 60)	.10 (n = 60)	-.04 (n = 56)	-.07 (n = 55)	-.10 (n = 55)	-.02 (n = 56)	.47** (n = 60)	.18 (n = 60)	-						
20. Parent Feeding Practices	-.06 (n = 60)	.19 (n = 60)	.13 (n = 60)	-.03 (n = 56)	-.09 (n = 55)	-.14 (n = 55)	-.005 (n = 56)	.79** (n = 60)	.67** (n = 60)	.72** (n = 60)	-					
21. Parental Control	.11 (n = 60)	-.03 (n = 60)	.02 (n = 60)	-.10 (n = 56)	.04 (n = 55)	-.00 (n = 55)	.02 (n = 56)	.08 (n = 59)	.12 (n = 59)	-.04 (n = 59)	.08 (n = 59)	-				
22. Parental Supervision	.15 (n = 59)	.10 (n = 59)	.15 (n = 59)	-.09 (n = 55)	-.11 (n = 54)	-.12 (n = 54)	-.11 (n = 55)	-.05 (n = 58)	-.10 (n = 58)	-.02 (n = 58)	-.08 (n = 58)	-.03 (n = 59)	-			
23. Authoritarian Parenting	.22 (n = 60)	-.02 (n = 60)	.08 (n = 60)	-.14 (n = 56)	.03 (n = 55)	-.02 (n = 55)	-.007 (n = 56)	.04 (n = 59)	.10 (n = 59)	-.05 (n = 59)	.05 (n = 59)	.90** (n = 60)	.30* (n = 59)	-		
24. FRS_Current	-.26 (n = 33)	.02 (n = 33)	-.10 (n = 33)	-.14 (n = 32)	-.12 (n = 32)	-.09 (n = 32)	-.12 (n = 32)	-.10 (n = 32)	-.17 (n = 32)	-.12 (n = 32)	-.18 (n = 20)	-.05 (n = 32)	.12 (n = 32)	.05 (n = 32)	-	
25. FRS_Ideal	-.29 (n = 25)	.00 (n = 25)	-.14 (n = 25)	.10 (n = 25)	-.01 (n = 25)	-.09 (n = 25)	-.01 (n = 25)	.10 (n = 25)	.10 (n = 25)	-.11 (n = 25)	.04 (n =25)	.19 (n = 25)	-.21 (n = 25)	.10 (n = 25)	.57** (n = 25)	-

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).
b. Boxes shaded in gray are significant correlations. Boxes shaded in dark gray identify correlations that were predicted in the study model.

Table 2.

Correlation coefficients between key study variables for Caucasian participants

Variable	1	2	3	4	5	6	7	8	9
1. BMI Percentile	-								
2. Age	-.12 (n = 29)	-							
3. Income	.11 (n = 27)	-.11 (n = 27)	-						
4. Parent Occupation	.43* (n = 26)	-.30 (n = 26)	.74** (n = 24)	-					
5. SES	.16 (n = 29)	-.05 (n = 29)	.90** (n = 27)	.80** (n = 26)	-				
6. EAH_NA	.13 (n = 29)	-.36 (n = 29)	.25 (n = 27)	.20 (n = 26)	.23 (n = 29)	-			
7. EAH_EXT	-.01 (n = 29)	.13 (n = 29)	.20 (n = 27)	-.03 (n = 26)	.18 (n = 29)	.16 (n = 29)	-		
8. EAH_FB	.05 (n = 29)	-.35 (n = 29)	.29 (n = 27)	.31 (n = 26)	.34 (n = 29)	.63** (n = 29)	.15 (n = 29)	-	
9. EAH_TOT	.09 (n = 29)	-.28 (n = 29)	.32 (n = 27)	.22 (n = 26)	.33 (n = 29)	.86** (n = 29)	.54** (n = 29)	.79** (n = 29)	-
10. PSS_Comp	-.27 (n = 29)	.19 (n = 29)	.10 (n = 27)	-.12 (n = 26)	-.004 (n = 29)	-.56** (n = 29)	-.13 (n = 29)	-.41* (n = 29)	.52** (n = 29)
11. PSS_Vuln	-.03 (n = 29)	.19 (n = 29)	-.11 (n = 27)	-.28 (n = 26)	-.13 (n = 29)	.17 (n = 29)	.08 (n = 29)	.11 (n = 29)	.17 (n = 29)
12. PSS_Tot	-.23 (n = 29)	.34 (n = 29)	-.03 (n = 27)	-.38 (n = 26)	-.14 (n = 29)	-.23 (n = 29)	-.02 (n = 29)	-.19 (n = 29)	-.21 (n = 29)
13. DC	-.34 (n = 25)	-.14 (n = 25)	.02 (n = 24)	-.09 (n = 22)	-.006 (n = 25)	.15 (n = 25)	-.007 (n = 25)	.29 (n = 25)	.18 (n = 25)
14. IE	-.44* (n = 25)	-.11 (n = 25)	.02 (n = 24)	-.14 (n = 22)	-.04 (n = 25)	-.03 (n = 25)	.01 (n = 25)	.18 (n = 25)	.05 (n = 25)
15. ID	-.29 (n = 24)	-.03 (n = 24)	-.17 (n = 23)	-.44* (n = 21)	-.25 (n = 24)	.13 (n = 24)	.22 (n = 24)	.23 (n = 24)	.23 (n = 24)
16. RSQ_Total	-.39* (n = 25)	-.15 (n = 25)	-.009 (n = 24)	-.16 (n = 22)	-.06 (n = 25)	.04 (n = 25)	.01 (n = 25)	.25 (n = 25)	.11 (n = 25)
17. RST	-.23 (n = 29)	-.22 (n = 29)	-.23 (n = 27)	-.27 (n = 26)	-.12 (n = 29)	-.13 (n = 29)	.02 (n = 29)	-.06 (n = 29)	-.08 (n = 29)
18. PE	.15 (n = 29)	-.15 (n = 29)	-.16 (n = 27)	.10 (n = 26)	.22 (n = 29)	-.20 (n = 29)	.40* (n = 29)	-.19 (n = 29)	-.03 (n = 29)
19. MN	.33 (n = 29)	-.20 (n = 29)	.24 (n = 27)	.26 (n = 26)	-.06 (n = 29)	-.14 (n = 29)	.11 (n = 29)	-.02 (n = 29)	-.04 (n = 29)
20. Parent Feeding Practices	.14 (n = 29)	-.27 (n = 29)	-.06 (n = 27)	.07 (n = 26)	.009 (n = 27)	-.23 (n = 29)	.28 (n = 29)	-.14 (n = 29)	-.07 (n = 29)
21. Parental Control	.30 (n = 27)	-.42* (n = 27)	-.07 (n = 26)	.08 (n = 24)	.001 (n = 27)	.32 (n = 27)	.23 (n = 27)	.34 (n = 27)	.40* (n = 27)
22. Parental Supervision	-.30 (n = 28)	.26 (n = 28)	-.06 (n = 26)	-.07 (n = 25)	-.02 (n = 28)	-.18 (n = 28)	.04 (n = 28)	-.30 (n = 28)	-.20 (n = 28)
23. Authoritarian Parenting	.24 (n = 28)	-.32 (n = 28)	-.08 (n = 26)	-.01 (n = 25)	.04 (n = 28)	.25 (n = 28)	.20 (n = 28)	.15 (n = 28)	.28 (n = 28)
24. FRS_Current	.29 (n = 20)	.32 (n = 20)	-.09 (n = 19)	-.04 (n = 18)	-.11 (n = 20)	-.18 (n = 20)	.16 (n = 20)	-.05 (n = 20)	-.07 (n = 20)
25. FRS_Ideal	.32 (n = 18)	.18 (n = 18)	.12 (n = 17)	.29 (n = 17)	.25 (n = 18)	-.31 (n = 18)	-.48* (n = 18)	-.05 (n = 18)	-.40 (n = 18)

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

c. Boxes shaded in gray are significant correlations. Boxes shaded in dark gray identify correlations that were predicted in the study model.

Correlation coefficients between key study variables for Caucasian participants

Variable	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. BMI																
2. Age																
3. Income																
4. Parent Occupation																
5. SES																
6. EAH_NA																
7. EAH_EXT																
8. EAH_FB																
9. EAH_TOT																
10. PSS_Comp	-															
11. PSS_Vuln	-.41* (n = 29)	-														
12. PSS_Tot	.32 (n = 29)	.73** (n = 29)	-													
13. DC	.07 (n = 25)	.30 (n = 25)	.39 (n = 25)	-												
14. IE	.01 (n = 25)	.47* (n = 25)	.53** (n = 25)	.81** (n = 25)	-											
15. ID	-.16 (n = 24)	.77** (n = 24)	.71** (n = 24)	.71** (n = 24)	.82** (n = 24)	-										
16. RSQ_Total	.02 (n = 25)	.47* (n = 25)	.53** (n = 25)	.90** (n = 25)	.96** (n = 25)	93** (n = 24)	-									
17. RST	-.01 (n = 29)	-.04 (n = 29)	-.05 (n = 29)	.03 (n = 25)	.24 (n = 25)	.19 (n = 24)	.22 (n = 25)	-								
18. PE	.12 (n = 29)	-.37* (n = 29)	-.29 (n = 29)	-.21 (n = 25)	-.20 (n = 25)	-.27 (n = 24)	-.23 (n = 25)	-.01 (n = 29)	-							
19. MN	-.02 (n = 29)	-.19 (n = 29)	-.22 (n = 29)	-.04 (n = 25)	-.09 (n = 25)	-.17 (n = 24)	-.05 (n = 25)	.44* (n = 29)	.17 (n = 29)	-						
20. Parent Feeding	.05 (n = 29)	-.31 (n = 29)	-.29 (n = 29)	-.11 (n = 25)	-.03 (n = 25)	-.14 (n = 24)	-.03 (n = 25)	.65** (n = 29)	.61** (n = 29)	.78** (n = 29)	-					
21. Parental Control	-.28 (n = 27)	-.04 (n = 27)	-.25 (n = 27)	-.09 (n = 23)	-.19 (n = 23)	.004 (n = 22)	-.12 (n = 23)	.10 (n = 27)	.11 (n = 27)	.08 (n = 27)	.15 (n = 27)	-				
22. Parental Supervision	.13 (n = 28)	.02 (n = 28)	.12 (n = 28)	-.12 (n = 24)	.02 (n = 24)	-.14 (n = 23)	-.08 (n = 24)	.10 (n = 28)	.15 (n = 28)	-.11 (n = 28)	.18 (n = 28)	-.02 (n = 27)	-			
23. Authoritarian Parenting	-.28 (n = 28)	.05 (n = 28)	-.16 (n = 28)	-.12 (n = 24)	-.18 (n = 24)	-.06 (n = 23)	-.15 (n = 24)	.04 (n = 28)	.12 (n = 28)	.11 (n = 28)	.14 (n = 28)	.97** (n = 27)	.13 (n = 28)	-		
24. FRS_Current	-.004 (n = 20)	-.24 (n = 20)	-.24 (n = 20)	-.22 (n = 19)	-.31 (n = 19)	-.24 (n = 18)	-.27 (n = 19)	-.36 (n = 20)	.18 (n = 20)	.14 (n = 20)	-.01 (n = 20)	-.15 (n = 18)	-.36 (n = 19)	-.22 (n = 19)	-	
25. FRS_Ideal	.15 (n = 18)	-.11 (n = 18)	-.01 (n = 18)	-.07 (n = 17)	-.22 (n = 17)	-.11 (n = 16)	-.11 (n = 17)	-.38 (n = 18)	-.24 (n = 18)	.07 (n = 18)	-.23 (n = 18)	-.29 (n = 16)	-.48 (n = 17)	-.25 (n = 17)	.30 (n = 18)	-

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

d. Boxes shaded in gray are significant correlations. Boxes shaded in dark gray identify correlations that were predicted in the study model.

Table 3.

Correlation coefficients between socioeconomic variables

	Variable	1	2	3
1.	Income	-		
2.	Parent Occupation	.51** (n = 68)	-	
3.	Highest Level of Education	.47** (n = 40)	.61** (n = 35)	-
4.	Socioeconomic Status	.86** (n = 87)	.73** (n = 71)	.61** (n =41)

Table 4.

Demographic information for child and parent

Variable	Child	Parent
Age (Mean)	12.26 (*SD* = 2.38)	40.19 (*SD* = 11.21)
Race/Ethnicity		
Black or African-American	61 (67.8%)	--
Caucasian	29 (32.2%)	--
Gender		
Male	40 (44.4%)	10 (11.1%)
Female	50 (55.6%)	47 (52.2%)
BMI (kg/m^2) (Mean)	36.72 (*SD* = 10.09)	36.37 (*SD* = 9.36)
BMI Percentile (Mean)		
Black or African-American	98.96 (*SD* = 1.48)	
Caucasian	96.98 (*SD* = 5.40)	
Eating in the Absence of Hunger*		
Negative Affect	1.9 (*SD* = .86)	
External	2.0 (*SD* = .92)	
Fatigue/Boredom	2.6 (*SD* = .94)	
Income	--	
Less than $10,000	--	6 (6.9%)
$10,000 to $59,999	--	50 (57.4%)
$60,000 to $200,000	--	29 (33.2%)
$200,000 or above	--	2 (2.3%)
Parent Occupation	--	5.66 (*SD* = 1.71)
Socioeconomic Status	--	9.39 (*SD* = 4.89)

a. *Of note, average EAH scores were lower than what has been previously found in obese samples. Tanofsky-Kraff and colleagues (2008) reported means of 4.5 for negative affect, 4.5 for external, and 3.5 for fatigue/boredom.

Table 1.

Eating in the absence of hunger (EAH) subscales predicting BMI

MODEL	Estimate	S.E.	P-Value
Total Sample			
BMI			
EAH_NA	.14	.10	.14
EAH_FB	.15	.15	.31
Race/Ethnicity Covariate			
BMI			
EAH_NA	.19	.10	.06
Race/Ethnicity	-2.08	1.03	.04*
BMI			
EAH_FB	.17	.15	.25
Race/Ethnicity	-1.99	1.01	.04*

b. Note. For the total sample, both EAH_NA and EAH_FB are individual predictors. For the race/ethnicity covariate models race/ethnicity and EAH variables were modeled simultaneously.

Table 2.

Total, indirect, and direct effects for parenting and EAH models

	Total Effects			Indirect Effects			Direct Effects		
MODEL	**Estimate**	**S.E.**	**P-Value**	**Estimate**	**S.E.**	**P-Value**	**Estimate**	**S.E.**	**P-Value**
Total Sample									
EAH _NA									
Parenting	.08	.07	.23	-.005	.01	.66	.09	.07	.21
Feeding	-	-	-	-	-	-	-.13	.12	.30
EAH _F.B.									
Parenting	.11	.06	.06	-.007	.01	.51	.11	.05	.04*
Feeding	-	-	-	-	-	-	-.17	.08	.04*
Race/Ethnicity Covariate									
EAH _NA									
Parenting	.08	.07	.23	-.005	.01	.65	.09	.07	.20
Feeding	-	-	-	-	-	-	-.14	.13	.28
Race/Ethnicity	-	-	-	-	-	-	.58	.58	.32
EAH _F.B.									
Parenting	.11	.06	.06	-.007	.01	.51	.11	.05	.04*
Feeding	-	-	-	-	-	-	-.17	.09	.04*
Race/Ethnicity	-	-	-	-	-	-	.13	.41	.74

Note. All variables modeled simultaneously.

Table 3.

Total, indirect, and direct effects for perceived stress competency and EAH model controlling for age

MODEL	Estimate	S.E.	P-Value
Total Sample			
EAH_NA			
Step 1			
PSS_Comp	-.18	.08	.02*
Stress Coping	.01	.01	.29
Step 2 (effects together)			
PSS_ Comp	-.20	.08	.02*
Stress Coping	.01	.01	.20
Total Model			
PSS_ Comp	-.21	.18	.24
Stress Coping	.01	.04	.75
PSS*RSQ	.00	.003	.95
EAH_FB			
Step 1			
PSS_ Comp	-.04	.06	.48
Stress Coping	.01	.009	.28
Step 2 (effects together)			
PSS_ Comp	-.05	.06	.37
Stress Coping	.01	.009	.25
Total Model			
PSS_ Comp	.03	.10	.72
Stress Coping	.02	.02	.34
PSS*RSQ	-.001	.002	.45
Race/Ethnicity Covariate			
EAH_NA			
Step 1			
PSS_ Comp	-.20	.08	.01*
Stress Coping	.01	.01	.31
Step 2 (effects together)			
PSS_ Comp	-.22	.08	.01*
Stress Coping	.01	.01	.21
Total Model			
PSS_ Comp	-.22	.18	.21
Stress Coping	.01	.04	.70
PSS*RSQ	.00	.00	.98
EAH_FB			
Step 1			
PSS_ Comp	-.04	.06	.45
Stress Coping	.01	.009	.28
Step 2 (effects together)			
PSS_Comp	-.06	.06	.35
Stress Coping	.01	.009	.25
Total Model			
PSS_ Comp	.06	.19	.72
Stress Coping	.03	.04	.33
PSS*RSQ	-.002	.003	.44

Note. Step 1 shows individual effects, Step 2 shows simultaneous effects, and Total model shows model results with interaction. For the race/ethnicity covariate models, the race/ethnicity variable was input alongside all Steps.

Table 4.

Total, indirect, and direct effects for perceived stress vulnerability and EAH model controlling for age

MODEL	Estimate	S.E.	P-Value
Total Sample			
EAH_NA			
Step 1			
PSS_Vuln	.17	.05	.001**
Stress Coping	.01	.01	.29
Step 2 (effects together)			
PSS_Vuln	.17	.06	.005**
Stress Coping	-.006	.01	.68
Total Model			
PSS_Vuln	.29	.15	.06
Stress Coping	.03	.04	.47
PSS*RSQ	-.002	.003	.36
EAH_FB			
Step 1			
PSS_Vuln	.05	.03	.17
Stress Coping	.01	.009	.28
Step 2 (effects together)			
PSS_Vuln	.02	.04	.60
Stress Coping	.007	.01	.48
Total Model			
PSS_Vuln	.01	.11	.88
Stress Coping	.00	.03	.88
PSS*RSQ	.00	.00	.93
Race/Ethnicity Covariate			
EAH_NA			
Step 1			
PSS_Vuln	.16	.05	.001**
Stress Coping	.01	.01	.31
Step 2 (effects together)			
PSS_Vuln	.17	.06	.006**
Stress Coping	-.006	.01	.67
Total Model			
PSS_Vuln	.28	.16	.07
Stress Coping	.03	.04	.50
PSS*RSQ	-.002	.003	.38
EAH_FB			
Step 1			
PSS_Vuln	.05	.03	.17
Stress Coping	.01	.009	.28
Step 2 (effects together)			
PSS_Vuln	.02	.04	.61
Stress Coping	.007	.01	.48
Total Model			
PSS_Vuln	.01	.11	.88
Stress Coping	.00	.03	.88
PSS*RSQ	.00	.00	.93

Note. Step 1 shows individual effects, Step 2 shows simultaneous effects, and Total model shows model results with interaction. For the race/ethnicity covariate models, the race/ethnicity variable was input alongside all Steps

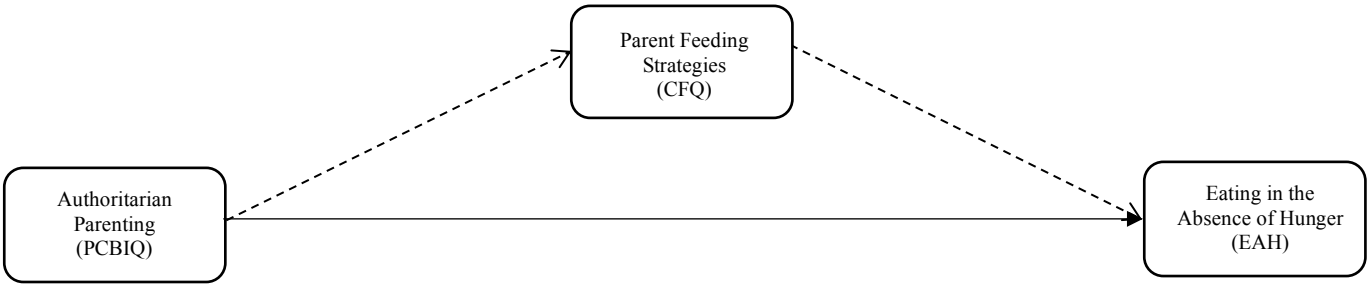

Figure 1. Proposed indirect path of overinvolved parent feeding practices in the relationship between authoritarian parenting and eating in the absence of hunger (EAH)

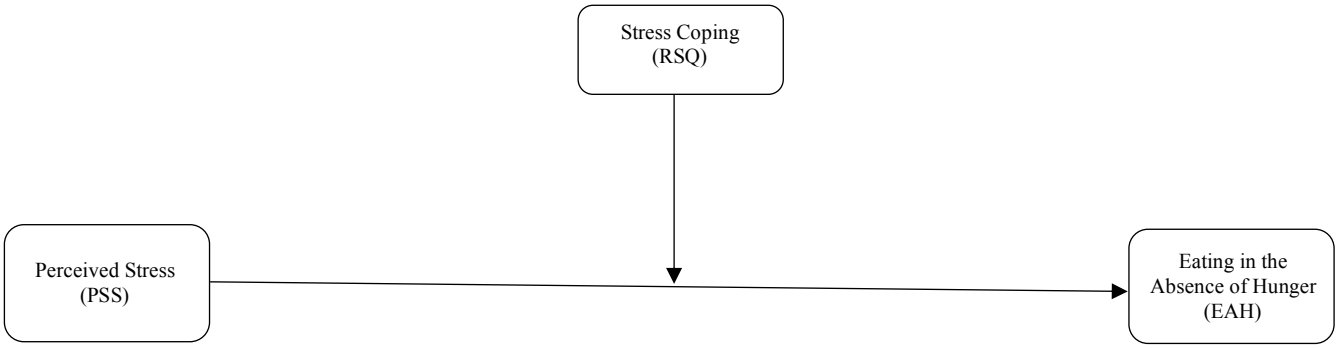

Figure 2. Proposed moderation of stress coping in the relationship between perceived stress and eating in the absence of hunger (EAH)

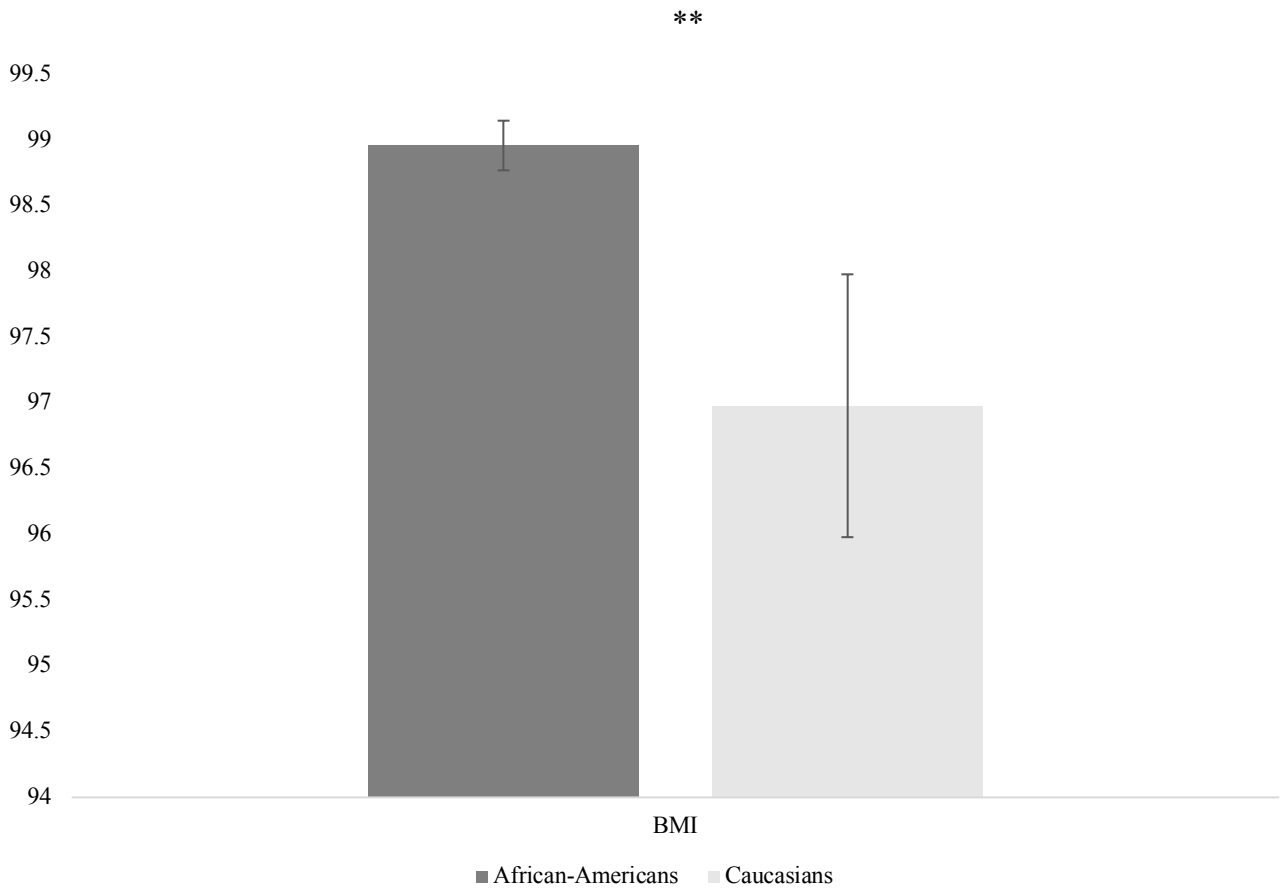

Figure 3. BMI Percentile differences between African-American and Caucasian Participants

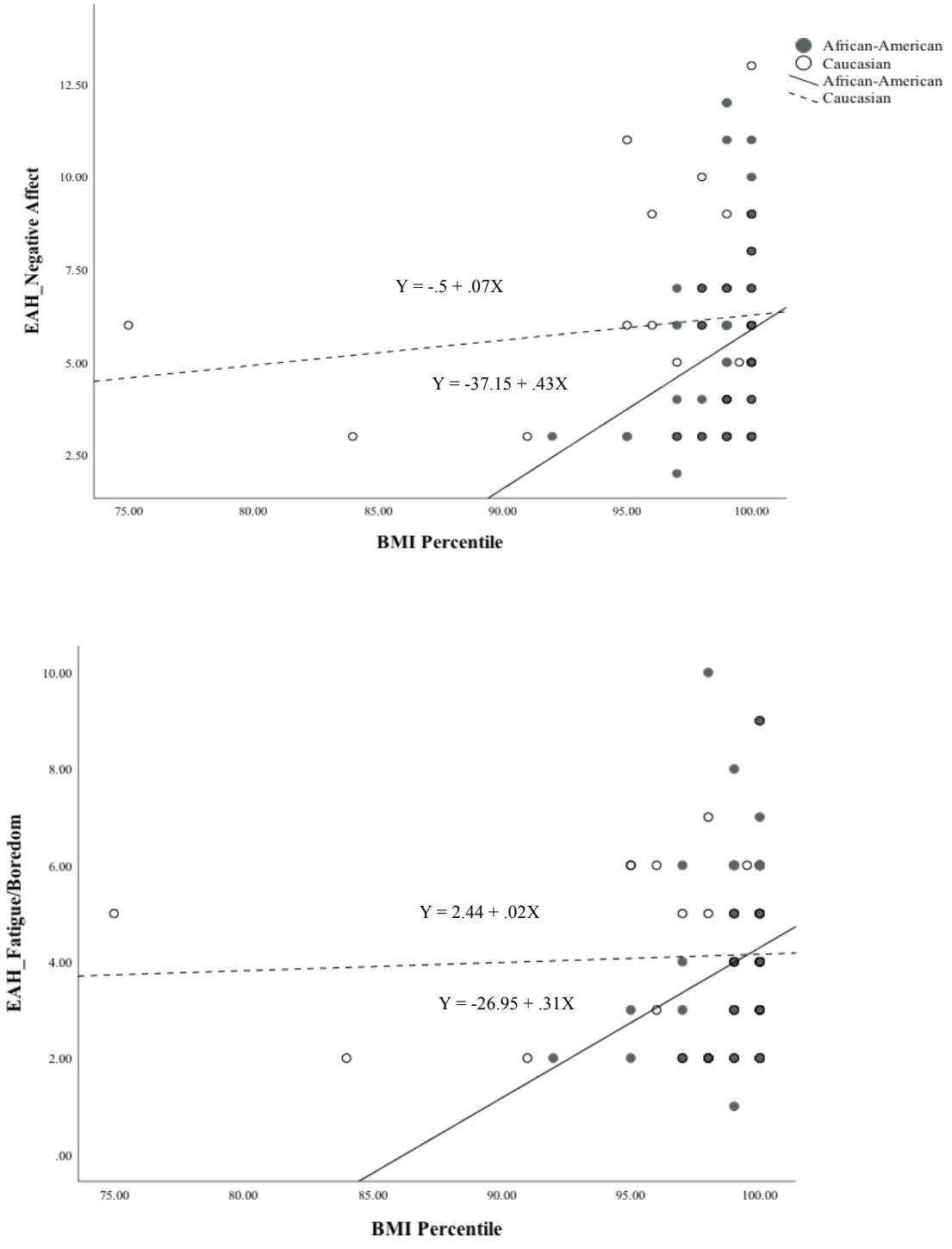

Figure 4. The relationship between BMI Percentile and EAH within racial groups

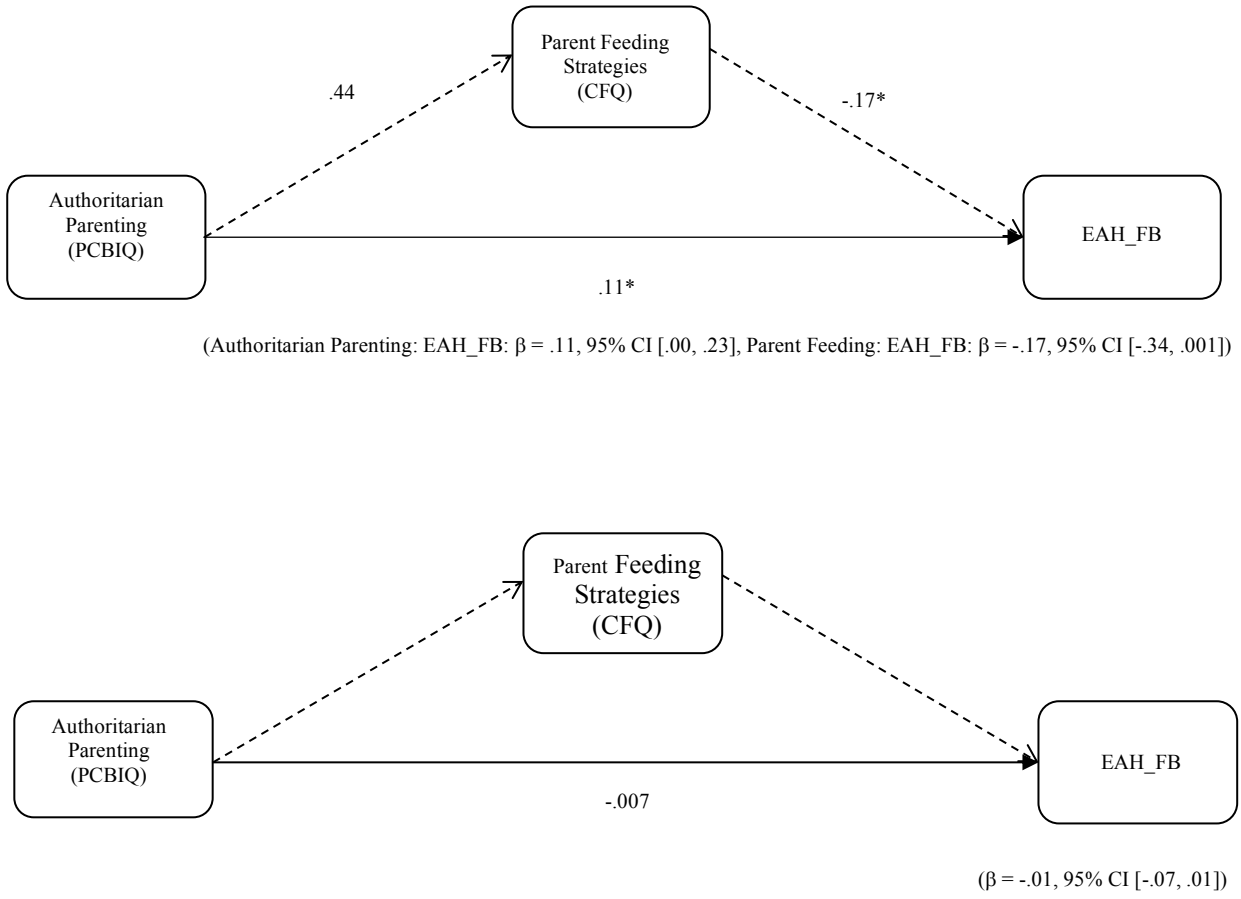

Figure 5. Joint and indirect effects of parenting and parent feeding variables on eating in the absence of hunger (EAH) due to fatigue/boredom

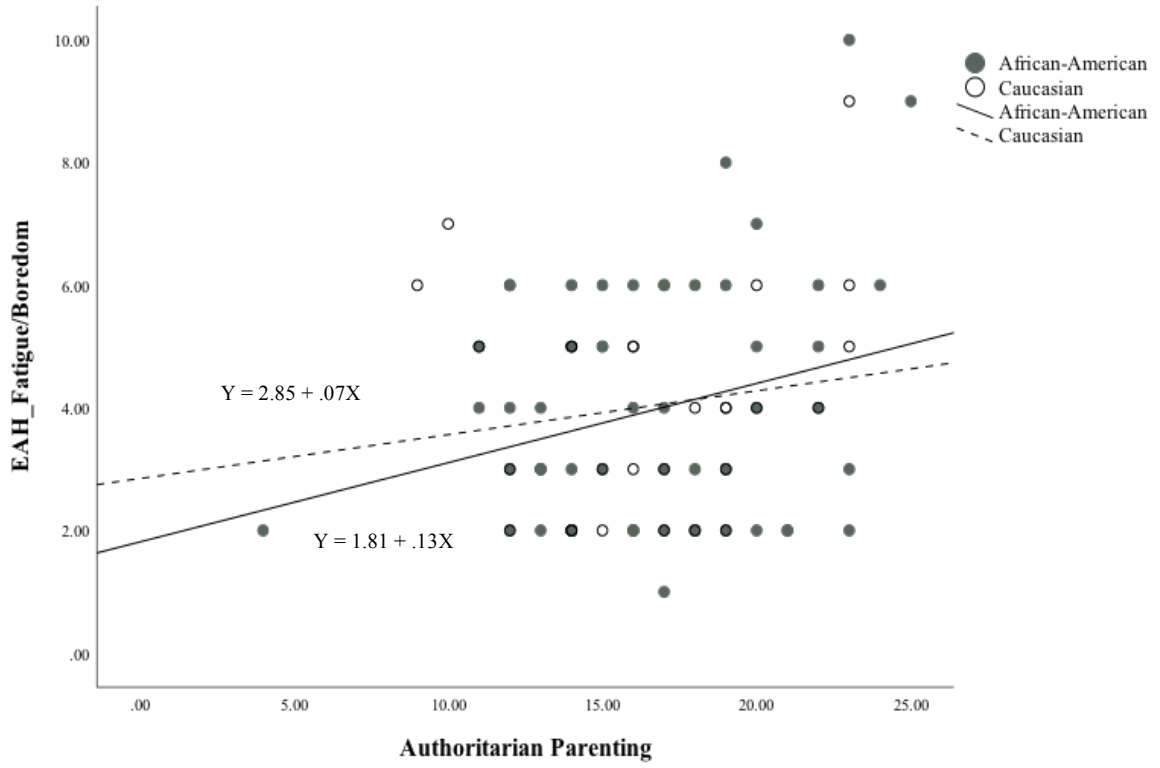

Figure 6. The relationship between Authoritarian Parenting and EAH_FB within racial groups

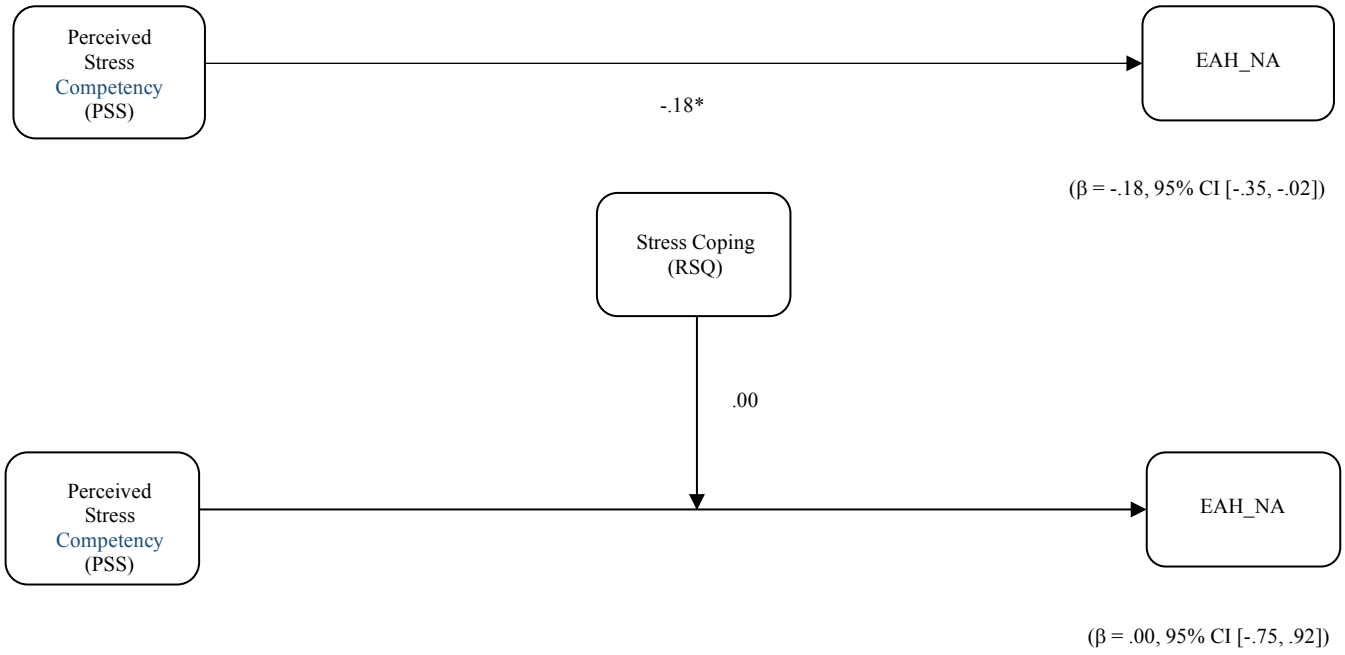

Figure 7. Direct and moderation effects of perceived stress competency on eating in the absence of hunger (EAH) due to negative affect

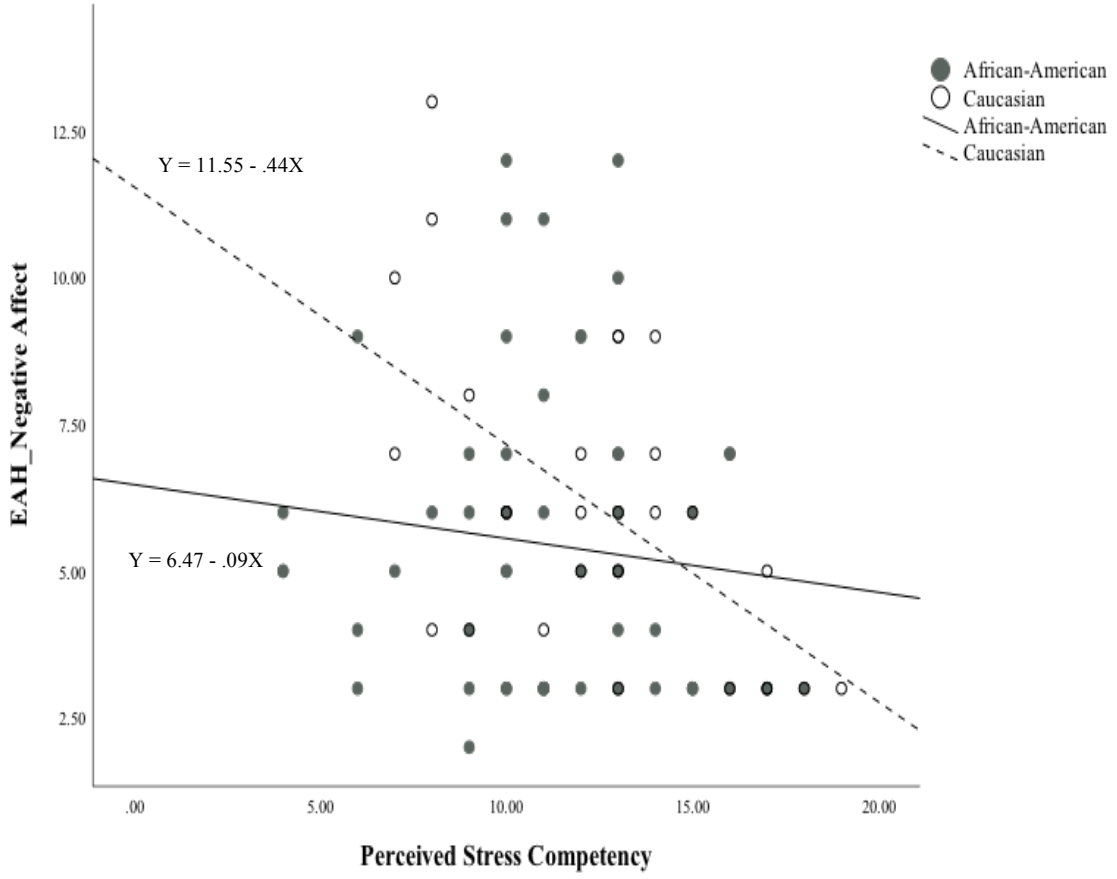

Figure 8. The relationship between Perceived Stress Competency and EAH_NA within racial groups

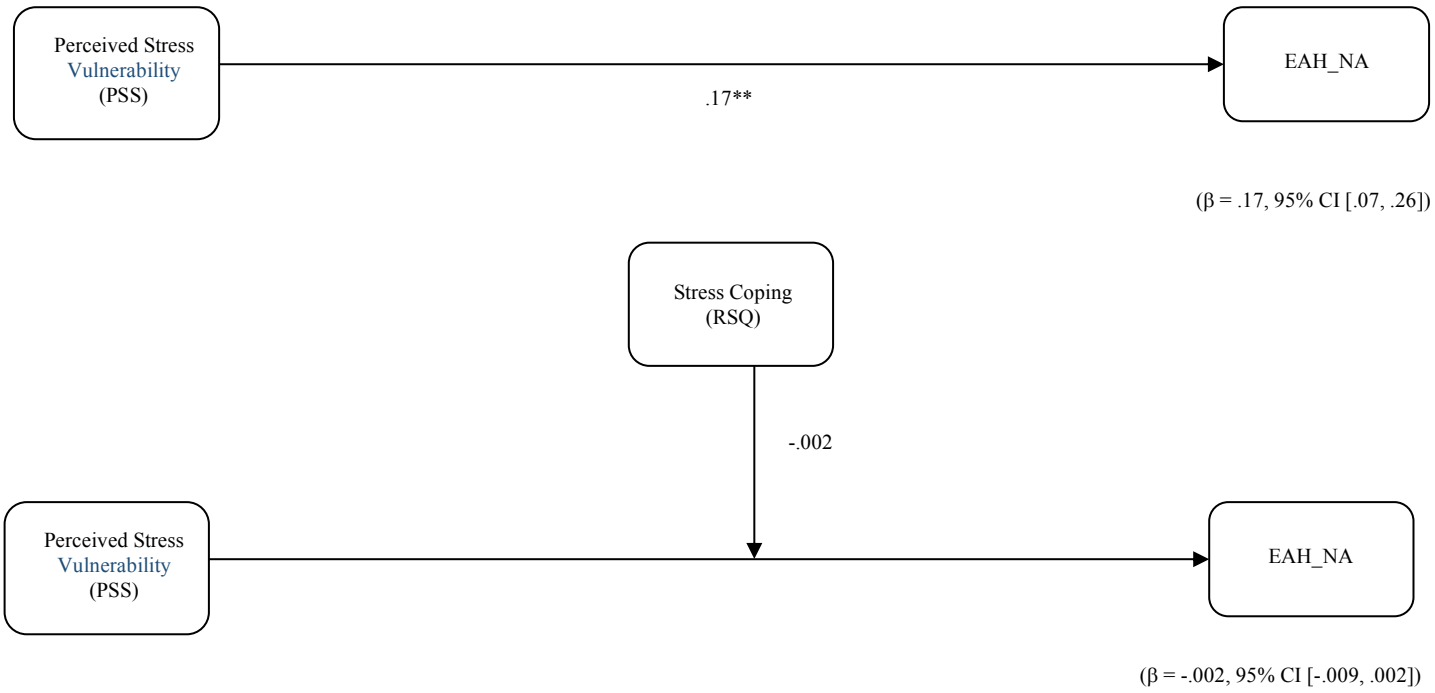

Figure 9. Direct and moderation effects of perceived stress vulnerability on eating in the absence of hunger (EAH) due to negative affect

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