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Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake Among Overweight African American Adolescents

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MODERATING EFFECTS OF PARENTAL FEEDING PRACTICES AND EMOTIONAL EATING ON DIETARY INTAKE AMONG OVERWEIGHT AFRICAN AMERICAN ADOLESCENTS

by

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ABSTRACT

This study examined the effects of parental feeding practices and adolescent emotional eating (EE) on dietary outcomes among overweight African American adolescents. Based on Family Systems Theory, it was hypothesized that parental feeding practices, such as parental monitoring and responsibility, would buffer the effects of EE on poor dietary quality, whereas practices such as concern about a child's weight, restriction, and pressure-to-eat would exacerbate this relationship. Adolescents (N = 127; *M*age = 12.83 ± 1.74; *M*BMI % = 96.61 ± 4.14) provided baseline data from the Families Improving Together (FIT) for a Weight Loss trial and an ancillary study. Dietary outcomes (fruit and vegetables (F&Vs), energy intake, sweetened beverage, total fat, and saturated fat) were assessed using random 24-h dietary recalls. Validated surveys were used to assess adolescent-reported EE and parental feeding practices. Results demonstrated a significant interaction between EE and parental monitoring (adjusted analyses; $B = 0.524$, $SE = 0.176$, $p = 0.004$), restriction ($B = -0.331$, $SE = 0.162$, $p = 0.043$), and concern ($B = -0.602$, $SE = 0.171$, $p = 0.001$) on F&V intake; under high monitoring, low restriction, and low concern, EE was positively associated with F&V intake. There were no significant effects for the other dietary outcomes. These findings indicate that parental feeding practices and EE may be important factors to consider for dietary interventions, specifically for F&V intake, among overweight African American adolescents.

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CHAPTER 1

INTRODUCTION[1]

The prevalence rate of adolescent obesity in the U.S. is 20.6% (Hales et al., 2017), with higher rates of overweight or obesity shown among African American adolescents (40%) compared to their White peers (31%) (Ogden et al., 2014). Adolescent obesity has largely been attributed to physical inactivity, sedentary behaviors, and increased intake of energy-dense foods (Lee & Yoon, 2018). Problematic eating behaviors, such as emotional eating—the tendency to overeat in response to negative emotions—may also contribute to adolescent obesity (Lowe & Fisher, 1983). Specifically, emotional eating is related to unhealthy dietary intake, including increased intake of energy-dense foods and sweetened beverages, as well as reduced fruit and vegetable (F&V) intake, among diverse adolescent samples (e.g., African American and Latino) (Cartwright et al., 2003; Lopez-Cepero et al., 2019; Nguyen-Michel et al., 2007; Sims et al., 2008). Adolescent African Americans have shown higher rates of emotional eating compared to their White peers, and thus may be at greater risk for potential weight gain (Steinegger et al., 2005). Emotional eating is also associated with poor psychosocial outcomes (e.g., lower quality of life, mental health concerns, body dissatisfaction) (Munkholm et al., 2016; Rose et al.,

[1] Quattlebaum, M., Wilson, D. K., Sweeney, A. M., & Zarrett, N. (2021). Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake among Overweight African American Adolescents. *Nutrients*, *13*(6), 1920. https://doi.org/10.3390/nu13061920

2018). Moreover, growing evidence demonstrates a link between adolescent emotional eating and dietary intake and parental feeding practices (parental behaviors to influence their child's food intake or eating behaviors) (Birch & Fisher, 1998; van Strien et al., 2019). Thus, further examination of parental feeding practices may elucidate the relationship between emotional eating and poor dietary quality, which may be particularly important to African American adolescents.

African American adolescents and their families are disproportionately exposed to various social-environmental conditions (poverty, neighborhood disorder, lack of access to healthy foods) that may contribute to a greater risk of emotional eating and related health consequences (Copeland-Linder et al., 2011; McLoyd, 1990; Turner & Avison, 2003). African Americans may cope with these social-environmental factors and chronic stress by engaging in emotional eating, which may be due to a lack of resources (Hoggard et al., 2019). For example, one study showed that having limited access to high-dietary-quality foods in homes and neighborhoods was associated with greater consumption of high-fat, high-sugar foods within an adolescent sample (90.7% African American) (Hager et al., 2017). Thus, African American adolescents who experience emotional eating may be at risk of consuming more poor dietary quality foods readily available in their home and neighborhood environment. In addition, parental modeling may impact adolescents' eating patterns. In the context of the family system, parents may model poor eating habits, such as emotional eating in response to stress (Parks et al., 2016). Thus, understanding parenting moderators of emotional eating on dietary outcomes may be particularly important among high-risk overweight African American adolescents.

1.1 Theoretical Background

Family Systems Theory (FST) proposes that supportive, nurturing family interactions and positive parenting behaviors (warmth, communication) are important for promoting healthy development in adolescence, such as nutritious eating habits (Broderick, 1993; Kitzman-Ulrich et al., 2010; Wilson et al., 2017). Parenting styles, including authoritative (high responsiveness, high demandingness) and authoritarian (low responsiveness, high demandingness), have shown important associations with adolescents' eating behaviors and dietary intake (Maccoby & Martin, 1983). Specifically, authoritative practices have been linked to higher F&V intake in children and adolescents (Lytle et al., 2003), whereas authoritarian practices have been related to lower F&V intake (Alsharairi & Somerset, 2015). In line with FST, parental feeding practices, such as monitoring of child's eating [overseeing or tracking child's eating] and responsibility [perception of parental responsibility for child's eating]) have been associated with reduced sweetened beverage intake and lower rates of emotional eating in children and adolescents (Fleary & Ettienne, 2019; Kröller et al., 2013; Langer et al., 2017). In contrast, more restrictive parental feeding practices, including restriction [restricting child's access to foods], concern about child's weight [concern about child's risk for overweight], and pressure-to-eat [tendency to pressure child to increase food intake]) have been linked to high-fat, high-sugar intake and higher rates of emotional eating, and are considered health-reducing practices (Kröller et al., 2013; LeCroy et al., 2019). Based on FST, parental feeding practices, such as monitoring and responsibility, may help facilitate a positive home climate, which may buffer the negative effects of adolescent emotional eating on dietary outcomes.

Few previous studies have examined parenting factors (parenting styles and feeding practices) in relation to adolescent health outcomes among solely African American families, and of the studies to date, there have been inconsistent results. Specifically, some research suggests that restrictive parental feeding practices have been related to greater F&V intake among low-income samples of predominantly African American children (43% African American) (Hoerr et al., 2009). Furthermore, prior studies have shown that more demanding parenting practices (e.g., restriction and pressure-to-eat) were associated with increased self-regulation among African American adolescents, particularly within low-income families (LeCuyer et al., 2011; Tamis-LeMonda et al., 2008). Conversely, other studies have shown that more authoritative parental feeding practices are related to higher dietary quality among low-income minority children and adolescents (38% African American sample) (Arlinghaus et al., 2018). More recent investigations by our group that included a sample of African American adolescents demonstrated that parental responsiveness was associated with high dietary self-efficacy for eating healthy (Kipp et al., 2021; Loncar et al., 2021). Furthermore, another analysis showed that for African American adolescents who perceived higher parental pressure-to-eat, parental stress was associated with higher adolescent body mass index (BMI). The current study expands on past research by examining the moderation effects of parental feeding practices (both responsiveness and restrictive parenting practices) and adolescents' emotional eating on dietary outcomes among high-risk, overweight African American adolescents.

Considering these mixed findings, it is unclear if health-reducing or health-promoting parental feeding practices will differentially impact eating behaviors within

the current study's sample. Utilizing an ecological approach to consider cultural and environmental factors relevant to African American families and parenting approaches may elucidate these findings (Tamis-LeMonda et al., 2008). Additional research is needed to understand parental feeding practices and African American adolescents' eating behaviors, given that these practices may have critical moderating effects with emotional eating on dietary outcomes among high-risk African American adolescents.

Few studies have examined the moderating effects of parental feeding practices and emotional eating on dietary outcomes among African American adolescents; however, studies on adolescents in general show the relevance of this research. A recent study examined the moderating role of parental feeding practices and adolescent reward sensitivity on dietary intake (sugar-sweetened beverages and snack foods [categorized as healthy or unhealthy]) among Flemish adolescents (Van Lippevelde et al., 2020). Reward sensitivity is recognized as an individual's responsiveness to reward cues (Franken & Muris, 2005) and has been associated with greater emotional eating, poor dietary habits, and risk for overweight (Davis et al., 2007; De Cock et al., 2016; Verbeken et al., 2012). Van Lippevelde et al. (2020) found that with greater restriction and pressure-to-eat, for adolescents with high reward sensitivity there was a positive association with high-fat, high-sugar snack intake (i.e., cookies, pastries, fries, etc.). Thus, parental feeding practices, such as restriction and pressure-to-eat, exacerbated consumption of sugar and fats among adolescents with high reward sensitivity. This prior study did not include an ethnically diverse adolescent sample, and thus the current study examined the moderating effects of parental restriction and pressure-to-eat on emotional eating in predicting African American adolescents' dietary intake.

Several other studies on inhibition and loss of control (LOC) eating also provide relevant information on moderated effects similar to those proposed in our study. For example, one study examined the interactive effects of parental feeding practices and preadolescent impulsivity (i.e. deficits in inhibition or control) on emotional eating among predominantly White preadolescents (10-13 years old) (Farrow, 2012). Farrow (2012) found that under low or average, but not high, levels of parental monitoring of a child's eating, preadolescent impulsivity was positively associated with emotional eating. Additional studies have examined the role of parental feeding practices in relation to child and adolescent LOC eating, which is recognized as a feeling of loss of control while eating, regardless of the amount of food consumed (Tanofsky-Kraff et al., 2009). LOC eating is often paired with negative emotions and increased intake of energy-dense foods and has been shown to coincide with emotional eating behaviors, particularly among overweight youth (Goossens et al., 2007, 2009; Shank et al., 2017). Given the parallels between emotional eating and LOC eating, including negative affect, risk for poor-dietary-quality intake, and weight gain, this construct may be particularly relevant to the present study. A recent study assessed the interactive effects of parental feeding practices and adolescent weight status on LOC eating among adolescents (Schmidt et al., 2019). The study findings indicated that for high maternal restriction of adolescent's eating, weight status was positively associated with LOC eating. Thus, the impacts of restrictive parental feeding practices on LOC eating may be particularly exacerbated among adolescents with overweight or obesity. In sum, these studies highlight the important moderating role of parental feeding practices on problematic eating behaviors tied to negative emotions, particularly among high-risk adolescents. This research is limited,

however, in that few past studies have examined these relationships among overweight African American adolescents. Thus, the present study fills this gap in past research by examining parental feeding practices as a moderator of adolescent emotional eating on dietary outcomes among overweight African American adolescents.

1.2 Study Purposes and Hypotheses

The purpose of the current study was to examine the moderating effects of parental feeding practices on adolescent emotional eating in predicting dietary outcomes (F&V, sweetened beverage, energy intake, total fat, saturated fat) among overweight African American adolescents in the Families Improving Together (FIT) for Weight Loss Trial. Based on FST and previous research (Farrow, 2012; Van Lippevelde et al., 2020), it was hypothesized that parental feeding practices, including monitoring child's eating and perceived responsibility, would buffer the association between adolescent emotional eating and dietary intake, such that higher dietary quality outcomes were more likely (higher F&V, lower sweetened beverage, energy intake, total fat, saturated fat). Conversely, it was hypothesized that parental feeding practices, such as restriction of child's eating, concern about child's weight, and pressure-to-eat, would exacerbate the association between adolescent emotional eating and dietary intake, such that lower dietary quality outcomes were more likely (lower F&V, higher sweetened beverage, energy intake, total fat, saturated fat).

CHAPTER 2

METHODS[2]

2.1 Participants

The current study included 127 African American parent-adolescent dyads from the FIT Weight Loss trial (Alia, Wilson et al., 2015; Wilson et al., 2015). The participants also took part in an ancillary study, the Understanding Heredity and the Environment in African American Risk of Hypertension (HEART) study (Coulon et al., 2016), which assessed stress and emotional eating in adolescents. Adolescents were eligible for participation if they 1) identified as African American, 2) were overweight or obese (BMI $\geq 85^{th}$ percentile), 3) were between 11-16 years old, 4) had internet access, and 5) had a parent or guardian willing to participate in the study. Adolescents were excluded from the study if they had a medical or psychiatric condition that may interfere with physical activity or dietary habits, were taking any medications that may impact their weight or appetite, or if they were currently enrolled in another structured weight-loss program. Participants residing in Columbia, SC, or neighboring towns, were recruited through local clinics, schools, and community centers (i.e. churches, recreational centers) (Huffman et al., 2016).

[2] Quattlebaum, M., Wilson, D. K., Sweeney, A. M., & Zarrett, N. (2021). Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake among Overweight African American Adolescents. *Nutrients*, *13*(6), 1920. https://doi.org/10.3390/nu13061920

2.2 Procedures

The purpose of the FIT trial was to examine the efficacy of a family-based motivational weight loss intervention versus a comprehensive health education program on reducing BMI in overweight or obese African American adolescents and their parents (ClinicalTrials.gov ID#: NCT01796067). Baseline assessments for this study were completed over a 2-week orientation period before starting the intervention. All FIT participants were also invited to complete the HEART study to further understand participants' stress measures, including emotional eating. On average, participants completed their FIT and HEART baseline visits within approximately two months of each other. The current study only evaluated the baseline data from both the FIT trial and HEART study. Sample characteristics of participants that took part in the larger FIT trial, as well as this subsample from the HEART study, are provided in Table 2.1.[3] Adolescents and their parents provided written informed assent and consent, respectively, prior to participation in the study. Both studies were approved by the University of South Carolina Institutional Review Board. After completing study procedures for FIT and HEART, participants were compensated with $20 for their baseline assessment visit. Additional details regarding study design and procedures for the FIT trial are available (Wilson et al., 2015).

[3] The FIT trial did not aim to address emotional eating behaviors, and thus we do not expect there to be significant differences in emotional eating responses among the participants that completed their baseline visit at pre-intervention versus during intervention. Prior studies utilizing data from the HEART study and FIT trial did not show significant effects when examining treatment effects in relation to time of measurement for a variable collected in the HEART study (Kipp et al., 2021).

2.3 Measures

Demographic Information

Demographics were collected on adolescent age, adolescent sex, parent education, parent income, parent marital status, and number of children under 18 years old living at home.

Anthropometrics

Adolescent and parent height and weight were measured by a trained research assistant with a Shorr height board and SECA 880 digital scale, respectively. Height was measured in centimeters and weight was measured in kilograms. Two measurements of height and weight were collected, and a third measurement was taken if there was a difference greater than 0.5 kilograms or 1.0 centimeters between the first two measurements. BMI was calculated with an average of the height and weight measurements based on the Center for Disease Control (CDC) for adolescents and adults, respectively.

Emotional Eating

Emotional eating was assessed with the Three-Factor Eating Questionnaire – Revised 18-item (TFEQ-R18), which is a revised version of the 52-item Three-Factor Eating Questionnaire (TFEQ). The TFEQ-R18 includes eighteen total items that assess emotional eating, uncontrolled eating, and cognitive restraint. The current study only assessed emotional eating. Emotional eating items (3 items) included statements such as, "When I feel anxious, I find myself eating." Responses are provided with a 4-point Likert scale from 1 (definitely true) to 4 (definitely false). Higher scores indicate greater emotional eating. This questionnaire has demonstrated good factor structure and

construct validity among adolescents (Anglé et al., 2009). Prior studies suggest that this measure has internal consistency, with acceptable Cronbach's alpha coefficients ranging from 0.77 to 0.84 (Karlsson et al., 2000). The current study also demonstrated internal consistency, with a Cronbach's alpha coefficient of 0.81.

Dietary Outcomes

Adolescent dietary outcomes were collected using three random 24-hour dietary recalls conducted with a registered dietician, which has been shown to be a valid measure (Thompson & Subar, 2017). It is standard practice to conduct three 24-hour dietary recalls to determine dietary intake in adolescents (Ebbeling et al., 2012; Patrick et al., 2006). The telephone-administered recalls were completed on one weekend day and two weekdays, such that any differences in eating patterns from weekday to weekend would be captured. The days that dietary recalls were conducted were randomly selected and participants were not notified of the recall until the day of to ensure that participants did not adjust their eating behaviors. Adolescents were provided instructions at their FIT baseline visit on how to properly estimate portion sizes. During the recall, participants were asked to describe the type and amount of food they had eaten the day before. Daily F&V (with fried F&V items removed) and sweetened beverage intake (servings), energy intake (kilocalories), and total fat and saturated fat intake (grams) were estimated, and each outcome was averaged from the completed recalls for the current study.

Parental Feeding Practices

The Child Feeding Questionnaire (CFQ) was utilized to measure adolescent-reported parental feeding practices. The phrasing of the items was revised to reflect adolescent's perspective of their parent's feeding practices, as this measure is typically

completed by the parent. Prior studies have shown that this is a valid approach to assess adolescents' perception of parental feeding practices (Farrow, 2012). This questionnaire includes 21 items that assess the following five subscales: perceived parental responsibility, parental concern about child weight, parental restriction, parental monitoring, and parental pressure-to-eat. Responses are captured with a 5-point Likert scale to determine the frequency of feeding practices ("never" to "always") and the degree of agreement with a statement ("disagree" to "agree"). The current study included the following five subscales: perceived parental responsibility (3 items, i.e. "How often is your parent responsible for deciding if you have eaten the right kind of foods?"), parental concern about child weight (3 items, i.e. "How concerned is your parent about you dieting to maintain desirable weight?"), parental restriction (8 items, i.e. "Does your parent have to watch that you do not eat too much of your favorite foods?"), parental monitoring (3 items, i.e. "How often does your parent keep track of the sweets (candy, ice cream, cake, pies, pastries) that you eat?"), and parental pressure-to-eat (4 items, i.e. "If you say, 'I'm not hungry,' does your parent believe you should try to eat anyway?"). For each subscale, the scores were determined by the sum of items included in the respective subscale. This measure has been validated for adolescent populations and is considered a reliable scale (monitoring: $\alpha = 0.88$; responsibility: $\alpha = 0.60$; restriction: $\alpha = 0.72$; pressure to eat: $\alpha = 0.71$; concern: $\alpha = 0.82$) (Kaur et al., 2006). The current study showed adequate reliability for this scale as well (monitoring: $\alpha = 0.91$; responsibility: $\alpha = 0.66$; restriction: $\alpha = 0.88$; pressure to eat: $\alpha = 0.65$; concern: $\alpha = 0.88$).

Table 2.1 *Descriptive data for the subsample[1] & the full FIT sample[2]*

Variable	*(N = 127)*[1]	*(N = 241)*[2]
Adolescent age *M*(*SD*)	12.83 (1.75)	12.83 (1.75)
Adolescent z-BMI *(%, percentile)*	96.61 (4.14)	96.61 (4.25)
Adolescent sex (female), (%)	65.4%	63.50%
Parent age *M*(*SD*)	44.79 (8.74)	43.18 (8.65)
Parent BMI *M*(*SD*)	37.46 (8.02)	37.48 (8.35)
Parent sex (female), (%)	96.1%	95.90%
Parent education		
9 to 11 years	4 (3.2%)	6 (2.5%)
12 years	16 (12.7%)	32 (13.3%)
Some college	54 (42.9%)	99 (41.1%)
4-year college	22 (17.5%)	45 (18.7%)
Professional degree	30 (23.8%)	55 (22.8%)
Not reported/missing	1 (0.8%)	4 (1.7%)
Parent income *N* (%)		
<$10K	15 (11.9%)	36 (14.9%)
$10–24K	26 (20.6%)	49 (20.3%)
$25–39K	34 (27.0%)	64 (26.6%)
$40–54K	17 (13.5%)	31 (12.9%)
$55K+	34 (27.0%)	57 (23.7%)
Not reported/missing	1 (0.8%)	4 (1.7%)
Parental Marital Status		
Married	45 (35.7%)	83 (34.4%)
Divorced/separated	44 (34.9%)	77 (32%)
Widowed	3 (2.4%)	9 (3.7%)
Never married	25 (19.8%)	50 (20.7%)
Unmarried couple	9 (7.1%)	18 (7.5%)
Not reported/missing	1 (0.8%)	4 (1.7%)

Note. This table presents comparison demographic information for the full FIT trial sample and the subsample used for the current study. Of note, most demographic variables are similar between the two samples, suggesting little difference in sample characteristics. M = Mean; SD = Standard deviation; BMI = Body mass index, Avg. = Average; k = Thousand.

CHAPTER 3

DATA ANALYTIC PLAN[4]

3.1 Statistical Analysis

Analyses were conducted with IBM SPSS Statistics Version 26 and R-studio. The data were assessed for normality and outliers. Multicollinearity was examined to confirm that all VIF values were below 10 (Myers, 1990). A hierarchical linear regression was utilized to examine the interaction between parental feeding practices (responsibility, monitoring, concern, restriction, pressure to eat) and adolescent emotional eating predicting dietary outcomes (F&Vs, sweetened beverages, energy intake, total fat, saturated fat). Regression analyses for each dietary outcome were run with and without covariates. Unadjusted regression analyses were conducted and did not change the overall results for each dietary outcome. Adjusted regression analyses were also run to test the interactions separately for each dietary outcome, which did not result in significant changes to the overall results. For unadjusted analyses, the first step of the model included the main effects of the predictors, and the second step added the interaction terms; for adjusted analyses, a third step of the model added covariates. The third step of the model allowed us to examine whether adjusting for covariates impacted the model. Adjusted models included the following covariates: adolescent sex, adolescent age, parent education, parent BMI, and group treatment. These covariates have shown to be

[4] Quattlebaum, M., Wilson, D. K., Sweeney, A. M., & Zarrett, N. (2021). Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake among Overweight African American Adolescents. *Nutrients*, *13*(6), 1920. https://doi.org/10.3390/nu13061920

associated with adolescent dietary outcomes (Wardle et al., 2001). An omnibus F-test was utilized to evaluate effects with all interaction terms considered together in one model. This is a conservative statistical approach that has been utilized in prior studies assessing simultaneous interaction effects to decrease the likelihood of type 1 error rate. Separate models were constructed for each continuous dietary outcome. Adolescent sex (i.e., male vs. female), parent education (i.e., college vs. no college), and group treatment (i.e., intervention vs. control group) were dummy-coded for analyses.

Dietary data were cleaned prior to conducting analyses. Consistent with previous studies (Frankenfeld et al., 2012), to account for extreme scores in kcals, energy intake was corrected such that the minimum was set to 500 and the maximum was set to 5000, which resulted in the recoding of less than 2% of daily observations. Additionally, to account for extreme scores in total fat, saturated fat, and sweetened beverages, a Winsorizing approach was applied. Specifically, extreme scores were recoded to three times the interquartile range, which allowed for the inclusion of all data, while also reducing the effect of potential outliers. This approach led to the recoding of less than 6% of observations across the dietary outcomes.

Scores for emotional eating and parental feeding practices were calculated by norming each item before summation to allow each item to contribute equally to the overall scale score. Thus, summed scale scores were transformed to z-scores to aid in analysis and interpretation of statistical models. F&V intake was indexed by summing the averages of daily F&V intake. Analyses were conducted on participants with at least one dietary recall, as not all participants were able to complete three recalls. Simple slope analyses plotted at 1 SD above and below the mean were conducted to decompose the

significant interactive effects. The significant interactions were plotted. The alpha level was set to $p<0.05$. Overall, 23 participants were removed from analyses due to incomplete emotional eating and/or dietary recall data, resulting in a total of 127 participants with complete data that were included in analyses.

CHAPTER 4

RESULTS[5]

4.1 Demographics and Anthropometrics

Of the 127 participants included in the current study, the sample of adolescents was predominantly female (65.4%), and the average age was 12.83 years old. The average BMI percentile for this sample of adolescents with overweight or obesity was 96.9, with similar rates of obesity among parents (BMI 37.46±8.022). Most parents had attended some college (42.9%) and the average income was between $25-39k.

4.2. Correlational Analysis

Correlation analyses indicated that adolescent emotional eating was significantly correlated with F&V intake ($r = 0.18$). Furthermore, parent education was significantly associated with parent body mass index ($r = -0.19$). A number of the parental feeding practices were significantly correlated with each other in the expected direction; these are modest correlations ranging from $r = 0.16$ to 0.49 (Table 4.1).

4.3 Parental Feeding Practices and Emotional Eating on Fruit and Vegetable Intake.

The moderating effect of parental feeding practices and adolescent emotional eating on F&V intake was assessed with unadjusted and adjusted hierarchical linear regression models (Table 4.2). Results of the adjusted model are presented. The first step of the regression model included only the main effects (parental feeding practices and

[5] Quattlebaum, M., Wilson, D. K., Sweeney, A. M., & Zarrett, N. (2021). Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake among Overweight African American Adolescents. *Nutrients*, *13*(6), 1920. https://doi.org/10.3390/nu13061920

emotional eating) and revealed an insignificant F change (p = 0.324). The second step of the model added all the interaction terms together in one model and yielded a significant F change (p = 0.001). The final step of the model added covariates and did not yield a significant F change from the second step of the model (p = 0.906), suggesting that the model did not change significantly with the addition of covariates. There was a significant main effect of emotional eating on F&V intake (B = 0.397, SE = 0.157, p = 0.013), such that greater emotional eating was associated with greater F&V intake. There was a significant interaction between parental feeding practices (monitoring of a child's eating) and emotional eating on F&V intake (B = 0.524, SE = 0.176, p = 0.004). There was also a significant interaction between parental feeding practices (restriction, concern about a child's weight, B = −0.331, SE = 0.162, p = 0.043; B = −0.602, SE = 0.171, p = 0.001, respectively) and emotional eating on F&V intake. Adjusted hierarchical linear regression analyses were also conducted with the inclusion of adolescent body mass index (zBMI) and removal of adolescent sex as covariates in the model. All original results for the final step of the adjusted model for F&V intake remained statistically significant ($p < 0.05$), except for a small change in one of the interaction effects (restriction, p = 0.055). Adolescent baseline zBMI was not a significant predictor in the adjusted model.

Simple slopes analyses indicated that for parents with high monitoring of a child's eating (*B* = 0.866, *SE* = 0.253, *p* = 0.001, Figure 4.1a), emotional eating was positively associated with F&V intake. Further, among parents with low restriction of a child's eating (*B* = 0.672, *SE* = 0.212, *p* = 0.002, Figure 4.1b) or low concern about a child's weight (*B* = 0.933, *SE* = 0.227, *p* = 0.000, Figure 4.1c), simple slopes analyses showed

that emotional eating was positively associated with F&V intake. None of the other parenting factors interacted with emotional eating in predicting F&V intake.

4.4 Parental Feeding Practices and Adolescent Emotional Eating on Energy Intake (kcals).

The moderating effect of parental feeding practices and adolescent emotional eating on energy intake was analyzed with a hierarchical linear regression model. The first step of the regression model included the covariates only and yielded a significant F-change (p=0.032). In the first step, there was a main effect of parent college education on energy intake (B=-297.480, SE=99.501, p=0.003), such that higher parent college education was associated with lower energy intake. The second step of the regression model included the covariates and main effects (parental feeding practices and emotional eating) and revealed an insignificant F change (p=0.549). The final step considered all the interaction terms in a single model and yielded an insignificant F change (p=0.502).

4.5 Parental Feeding Practices and Adolescent Emotional Eating on Sweetened Beverage Intake.

The moderating effect of parental feeding practices and adolescent emotional eating on sweetened beverage was analyzed with a hierarchical linear regression model. The final step considered all the interaction terms in a single model and yielded an insignificant F change (p=0.237), and thus no further analysis was conducted.

4.6 Parental Feeding Practices and Adolescent Emotional Eating on Total Fat Intake.

The moderating effect of parental feeding practices and adolescent emotional eating on total fat intake was analyzed with a hierarchical linear regression model. The

final step considered all the interaction terms in a single model and yielded an insignificant F change (p=0.470).

4.7 Parental Feeding Practices and Adolescent Emotional Eating on Saturated Fat Intake.

The moderating effect of parental feeding practices and adolescent emotional eating on saturated fat intake was analyzed with a hierarchical linear regression model. The final step considered all the interaction terms in a single model and yielded an insignificant F change (p=0.619).

Table 4.1 Correlations among parental feeding practices, adolescent emotional eating, and adolescent dietary intake.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Adolescent Age	-											
2. Adolescent Sex	0.05	-										
3. Treatment Group	−0.02	<0.01	-									
4. Parent BMI	−0.09	0.13	0.02	-								
5. Parent College	0.09	−0.16	−0.14	−0.19*	-							
6. Emotional Eating	−0.08	−0.08	0.03	0.13	0.11	-						
7. Parental Responsibility	−0.29**	0.05	−0.04	−0.002	0.01	0.13	-					
8. Parental Concern	−0.13	−0.13	−0.08	−0.09	0.16	0.14	0.40**	-				
9. Parental Monitoring	−0.11	−0.06	−0.07	−0.11	0.15	−0.07	0.49**	0.47**	-			
10. Parental Restriction	−0.33**	−0.09	−0.01	−0.02	0.01	0.18 *	0.41**	0.34**	0.46**	-		
11. Parental Pressure-to-Eat	−0.17	−0.13	0.09	<0.01	−0.02	0.16	0.22*	0.16	0.33**	0.41**	-	
12. Adolescent Fruit and Vegetable Intake	−0.06	−0.05	0.05	−0.01	0.07	0.18*	0.02	−0.04	0.06	0.03	0.02	-

Note: * Indicates correlations significant with alpha criteria of $p < 0.05$; ** indicates correlations significant with alpha criteria of $p < 0.001$. Column headings correspond to row names

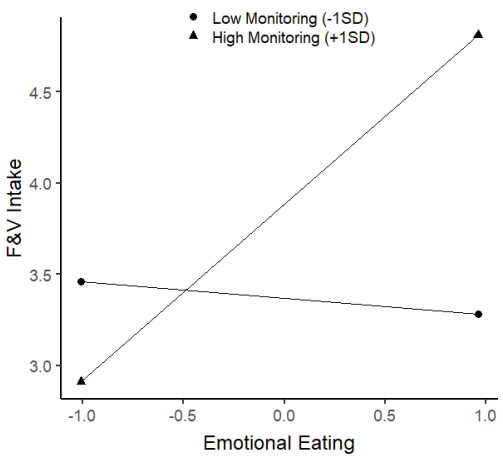
Table 4.2 *Hierarchical Regression Analyses Assessing the Interaction Effects of Parental Feeding Practices and Adolescent Emotional Eating on Adolescent Fruit and Vegetable Intake*

Model	*B*	*SE*	*t*	*p*	R^2	ΔR^2	ΔF Sig
1 Intercept	2.419	0.140	17.268	0.000 *	0.056	0.056	0.324
Emotional Eating	0.361	0.152	2.378	0.019 *			
Responsibility	−0.051	0.171	−0.298	0.766			
Concern	−0.212	0.168	−1.262	0.209			
Monitoring	0.280	0.187	1.497	0.137			
Restriction	−0.027	0.167	−0.162	0.871			
Pressure-to-Eat	−0.068	0.166	−0.411	0.682			
2 Intercept	2.589	0.139	18.679	0.000 *	0.206	0.150	0.001*
Emotional Eating	0.395	0.151	2.613	0.010 *			
Responsibility	−0.121	0.162	−0.746	0.457			
Concern	−0.204	0.161	−1.261	0.210			
Monitoring	0.236	0.178	1.328	0.187			
Restriction	0.048	0.159	0.304	0.762			
Pressure-to-Eat	−0.031	0.158	−0.195	0.846			
EE*Responsibility	0.083	0.163	0.508	0.613			
EE*Concern	−0.575	0.164	−3.507	0.001 *			
EE*Monitoring	0.535	0.169	3.163	0.002 *			
EE*Restriction	−0.343	0.154	−2.222	0.028 *			
EE*Pressure-to-Eat	0.022	0.159	0.138	0.890			
3 Intercept	3.607	1.370	2.632	0.010 *	0.218	0.011	0.906
Emotional Eating	0.397	0.157	2.525	0.013 *			
Responsibility	−0.119	0.171	−0.695	0.489			
Concern	−0.236	0.167	−1.411	0.161			
Monitoring	0.256	0.186	1.376	0.172			
Restriction	0.009	0.169	0.052	0.959			
Pressure-to-Eat	−0.046	0.165	−0.278	0.781			
EE*Responsibility	0.113	0.171	0.659	0.511			
EE*Concern	−0.602	0.171	−3.528	0.001 *			

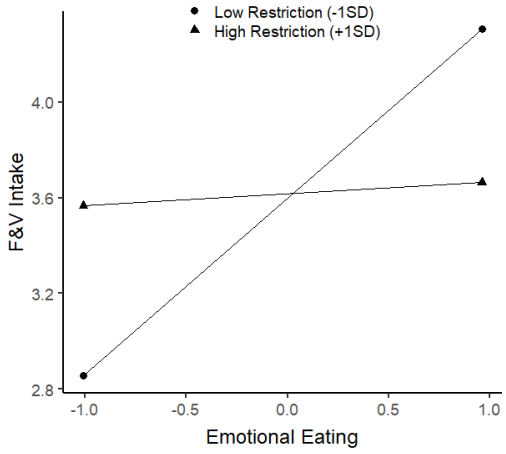
EE*Monitoring	0.524	0.176	2.981	0.004 *
EE*Restriction	−0.331	0.162	−2.047	0.043 *
EE*Pressure-to-Eat	0.034	0.165	0.206	0.837
Adolescent Age	−0.051	0.087	−0.586	0.559
Adolescent Sex	−0.251	0.298	−0.841	0.402
Treatment Group	0.107	0.277	0.386	0.701
Parent BMI	−0.009	0.018	−0.501	0.617
Parent College	−0.021	0.296	−0.070	0.945

Note: * Indicates a significant alpha criteria of $p < 0.05$. BMI = body mass index; EE = emotional eating. Models 1 and 2 include findings from the two steps of the unadjusted regression analyses; Model 3 includes the findings from the final step of the adjusted regression analyses.

1a



1b



1c

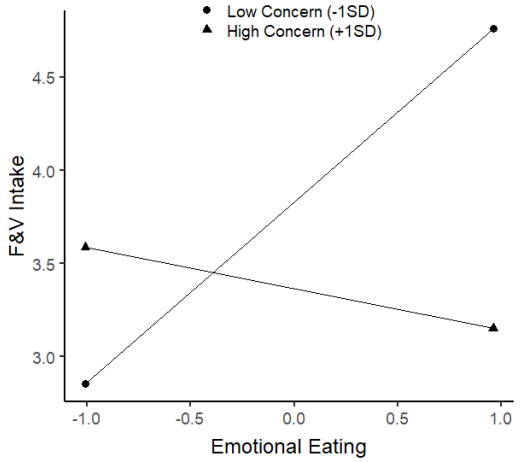


Figure 4.1 Significant Interactions of Parental Feeding Practices and Emotional Eating on Fruit & Vegetable Intake.

Note. Figure 1a displays the interaction between monitoring of child's eating and emotional eating on fruit and vegetable intake. Figure 1b displays the interaction between restriction of child's eating and emotional eating on fruit and vegetable intake. Figure 1c displays the interaction between concern about child's eating and emotional eating on fruit and vegetable intake.

CHAPTER 5

DISCUSSION[6]

The objective of the current study was to evaluate the interaction between parental feeding practices and adolescent emotional eating on dietary outcomes. The results demonstrated that with greater parental monitoring, emotional eating was positively associated with healthier dietary outcomes, specifically F&V intake. Further, with lower parental restriction and concern about child's weight, emotional eating was positively associated with F&V intake. Results also showed a significant negative association between parent college education and energy intake. No other findings were significant. Overall, these results demonstrated that higher levels of parental monitoring, as well as lower restriction and concern about child's weight, buffered the effect of emotional eating on unhealthy dietary outcomes, as only F&V intake was associated with emotional eating. These results are consistent with our initial hypothesis that greater monitoring and less restrictive parental feeding practices may buffer the relationship between adolescent emotional eating and low F&V intake in overweight African American adolescents.

In the current study, we found that under high parental monitoring of child's eating, adolescent emotional eating was positively associated with F&V intake. This finding of monitoring as a buffer of problematic adolescent eating habits aligns with prior research that shows that under low or average, but not high, levels of parental monitoring,

[6] Quattlebaum, M., Wilson, D. K., Sweeney, A. M., & Zarrett, N. (2021). Moderating Effects of Parental Feeding Practices and Emotional Eating on Dietary Intake among Overweight African American Adolescents. *Nutrients*, *13*(6), 1920. https://doi.org/10.3390/nu13061920

a positive association between impulsivity and emotional eating has been demonstrated among predominantly White preadolescents (Farrow, 2012). Thus, reduced parental monitoring may be related to greater emotional eating among preadolescents who are at risk for impulsivity. Together, the current study and past studies (Farrow, 2012) suggest that parental monitoring may be a protective moderating factor for adolescent eating behaviors among high-risk adolescents; however, our study extends these findings to include African American families. Considering that African American families face disproportionate social environmental chronic stressors that may place their families at greater risk for emotional eating compared to their White peers (Copeland-Linder et al., 2011; Hoggard et al., 2019; McLoyd, 1990; Turner & Avison, 2003), these findings are particularly important and may inform future interventions.

The current study also found that with lower levels of parental restriction of child's eating, adolescent emotional eating was positively associated with F&V intake. These findings suggest that reduced parental restriction may serve as a buffer of low F&V dietary intake in African American adolescents. A recent study found that under greater levels of parental restriction, reward sensitivity (i.e. response to reward cues) was positively associated with high-fat, high-sugar snack food intake (cookies, pastries, fries, etc.) among Flemish adolescents (Van Lippevelde et al., 2020). The current study is consistent with these past findings, as it indicates that less parental restriction may moderate adolescent emotional eating in improving dietary intake of F&Vs among overweight African American adolescents. While some prior research has shown that restrictive feeding practices are related to better health outcomes within low-income samples of predominantly African American families (Hoerr et al., 2009), the current

findings and some prior studies with low-income minority children (38% African American) indicate that supportive feeding practices may be protective (Arlinghaus et al., 2018). Notably, another study including a low-income sample of predominantly African American preadolescents (92% African American) found that parents with greater authoritarian and authoritative attitudes and behaviors predicted the highest adolescent dietary quality (Burke et al., 2019). The authors proposed that parents may be utilizing helpful parenting practices from both approaches. It is plausible that some African American parents utilizing modest restrictive parental feeding practices are also demonstrating support and warmth through other parenting practices (authoritative parenting), resulting in better dietary quality among youth. This study and other investigators suggest that parenting practices among African American families may be better understood with the utilization of culturally appropriate measures and further examination of within-group differences (Tamis-LeMonda et al., 2008). Thus, additional research with African American adolescents is needed to identify the role of relevant contextual factors, individual differences, or other parent–adolescent dynamics on adolescent dietary quality.

Our results also indicated that under low parental concern about child's weight, emotional eating was positively associated with F&V intake. Thus, decreased levels of parental concern may be protective of unhealthy dietary intake among African American adolescents. Few studies have examined parental concern about child's weight as a moderating factor of adolescent eating behaviors or diet, however, this parental feeding practice has been related to elevated adolescent stress-eating (Smith et al., 2020), weight status (Spruijt-Metz et al., 2002), and greater utilization of other restrictive parental

feeding practices (Polfuss & Frenn, 2012). Further research is needed to elucidate the moderating effects of parental concern about child's weight on adolescent emotional eating and dietary intake and to examine the possible associations with weight stigma (Gold & Vander Weg, 2020). Of note, the results of this study showed a main effect of parent college education and adolescent energy intake, such that greater parent college education predicted lower energy intake. This finding aligns with prior research indicating that higher parental education levels are associated with healthier dietary intake among children and adolescents (Scaglioni et al., 2018). On average, the adolescents' caregivers in our sample reported an educational status lower than a 4-year degree (58%), which may be important for understanding energy intake among our adolescent participants. Further studies should consider the relationship between parental education and parental feeding practices on adolescent dietary intake.

Our results indicated that the final unadjusted models for energy intake, sweetened beverage intake, total fat intake, and saturated fat intake did not yield significant effects. Although sweetened beverage, energy, total fat, and saturated fat intake have been linked to parental feeding practices (Blaine et al., 2017; Desbouys et al., 2020; Scaglioni et al., 2018), limited studies have assessed emotional eating in relation to these dietary outcomes. In addition, there is growing research demonstrating that more than three dietary recalls are needed to show valid dietary assessments among adolescents (Hendrie et al., 2013). However, emotional eating has been more closely linked to F&V intake, with some studies showing greater intake and others indicating lower intake of F&Vs (Cartwright et al., 2003; Nguyen-Michel et al., 2007). More studies are needed to elucidate which dietary outcomes are related to adolescent emotional eating and further

delineate how parenting factors may moderate emotional eating on understanding dietary outcomes. There may be individual differences in the type and amount of food that adolescents consume when eating in response to negative emotions. While some adolescents increase consumption of specific foods while engaging in emotional eating, others increase their overall intake of a variety of foods (Nguyen-Michel et al., 2007). Thus, within our sample, the moderating effect of parental feeding practices may be more useful in examining emotional eating related to specific foods, such as F&V, rather than the overall amount or the nutritional makeup of food intake. It is also plausible that adolescents may be more willing to add more F&Vs to their diet than remove high-fat, high-sugar foods, but it will be important for longitudinal data to expand on the current research. Additional research on family eating behaviors, such as family mealtime or parental emotional eating, may also inform the relationship between adolescent emotional eating and dietary intake.

This study has several limitations. First, it is a cross-sectional study, and causal inferences cannot be made, and we cannot confirm the direction of our effects. Longitudinal analyses are needed to better understand the influence of the home climate on adolescent emotional eating and dietary intake over time. Specifically, longitudinal data would provide insights into whether parental feeding practices elicit changes in emotional eating and dietary intake or if these problematic eating behaviors evoke certain parental feeding practices. Further, evaluating the development of emotional eating within the context of the home environment from childhood into adolescence will be informative. Second, this study is limited in that only three dietary recalls were administered and not all participants were able to complete each recall, which may result

in unreliable dietary data (St. George, Wilson et al., 2016). Though it is the gold standard that diet-related studies collect three dietary recalls, research indicates that between 8 to 32 recalls are recommended for adequate reliability (St. George, Wilson et al., 2016). Further, our findings are limited given that the sample included overweight or obese adolescents from an urban area in the Southeast U.S., which may hinder generalizability to normal-weight adolescents or families living outside the Southeast.

In summary, the findings in the current study suggest that, under high parental monitoring, as well as low restriction and concern about a child's weight, emotional eating is related to greater F&V intake. Thus, parental feeding practices such as monitoring, as well as lower levels of restrictive practices, may be related to F&V dietary outcomes among African American adolescents. These findings are particularly noteworthy, considering the mixed literature regarding monitoring feeding practices versus restrictive feeding practices and adolescent eating behaviors within African American families (Arlinghaus et al., 2018; Hoerr et al., 2009). Additional data are needed to further elucidate potential cultural differences in these parenting practices, including the influence of social environmental conditions and risk factors that are salient to African American families. Moreover, future studies are needed to better address how parenting factors or other relevant constructs may attenuate adolescent emotional eating and promote more adaptive coping strategies, such as eating higher-dietary-quality options (e.g., F&Vs). Given the notable influence of parental feeding practices on adolescent eating behaviors shown in our findings, it will also be important for future interventions to integrate a family systems approach.

REFERENCES

Alia, K. A., Wilson, D. K., McDaniel, T., St. George, S. M., Kitzman-Ulrich, H., Smith, K., Heatley, V. S., & Wise, C. (2015). Development of an innovative process evaluation approach for the families improving together (FIT) for weight loss trial in African American adolescents. *Evaluation and Program Planning*. https://doi.org/10.1016/j.evalprogplan.2014.12.020

Alsharairi, N. A., & Somerset, S. M. (2015). Associations between Parenting Styles and Children's Fruit and Vegetable Intake. *Ecology of Food and Nutrition*. https://doi.org/10.1080/03670244.2014.953248

Anglé, S., Engblom, J., Eriksson, T., Kautiainen, S., Saha, M. T., Lindfors, P., Lehtinen, M., & Rimpelä, A. (2009). Three factor eating questionnaire-R18 as a measure of cognitive restraint, uncontrolled eating and emotional eating in a sample of young Finnish females. *International Journal of Behavioral Nutrition and Physical Activity*. https://doi.org/10.1186/1479-5868-6-41

Arlinghaus, K. R., Vollrath, K., Hernandez, D. C., Momin, S. R., O'Connor, T. M., Power, T. G., & Hughes, S. O. (2018). Authoritative parent feeding style is associated with better child dietary quality at dinner among low-income minority families. *American Journal of Clinical Nutrition*. https://doi.org/10.1093/ajcn/nqy142

Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. In *Pediatrics*.

Blaine, R. E., Kachurak, A., Davison, K. K., Klabunde, R., & Fisher, J. O. (2017). Food parenting and child snacking: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*. https://doi.org/10.1186/s12966-017-0593-9

Broderick, C. B. (1993). Understanding family process: Basics of family systems theory. In *Understanding family process: Basics of family systems theory.*

Burke, M. P., Jones, S. J., Frongillo, E. A., Blake, C. E., & Fram, M. S. (2019). Parenting styles are associated with overall child dietary quality within low-income and food-insecure households. *Public Health Nutrition*. https://doi.org/10.1017/S1368980019001332

Cartwright, M., Wardle, J., Steggles, N., Simon, A. E., Croker, H., & Jarvis, M. J. (2003). Stress and dietary practices in adolescents. *Health Psychology*, *22*(4), 362–369. https://doi.org/10.1037/0278-6133.22.4.362

Copeland-Linder, N., Lambert, S. F., Chen, Y. F., & Ialongo, N. S. (2011). Contextual Stress and Health Risk Behaviors Among African American Adolescents. *Journal of Youth and Adolescence*. https://doi.org/10.1007/s10964-010-9520-y

Coulon, S. M., Wilson, D. K., Van Horn, M. L., Hand, G. A., & Kresovich, S. (2016). The Association of Neighborhood Gene-Environment Susceptibility with Cortisol and Blood Pressure in African-American Adults. *Annals of Behavioral Medicine*. https://doi.org/10.1007/s12160-015-9737-9

Davis, C., Patte, K., Levitan, R., Reid, C., Tweed, S., & Curtis, C. (2007). From motivation to behaviour: A model of reward sensitivity, overeating, and food preferences in the risk profile for obesity. *Appetite*. https://doi.org/10.1016/j.appet.2006.05.016

De Cock, N., Van Lippevelde, W., Vervoort, L., Vangeel, J., Maes, L., Eggermont, S., Braet, C., Lachat, C., Huybregts, L., Goossens, L., Beullens, K., Kolsteren, P., & Van Camp, J. (2016). Sensitivity to reward is associated with snack and sugar-sweetened beverage consumption in adolescents. *European Journal of Nutrition*. https://doi.org/10.1007/s00394-015-0981-3

Desbouys, L., Méjean, C., De Henauw, S., & Castetbon, K. (2020). Socio-economic and cultural disparities in diet among adolescents and young adults: A systematic review. In *Public Health Nutrition* (Vol. 23, Issue 5). https://doi.org/10.1017/S1368980019002362

Ebbeling, C. B., Feldman, H. A., Chomitz, V. R., Antonelli, T. A., Gortmaker, S. L., Osganian, S. K., & Ludwig, D. S. (2012). A randomized trial of sugar-sweetened beverages and adolescent body weight. *New England Journal of Medicine*. https://doi.org/10.1056/NEJMoa1203388

Farrow, C. V. (2012). Do parental feeding practices moderate the relationships between impulsivity and eating in children? *Eating Behaviors*. https://doi.org/10.1016/j.eatbeh.2011.11.015

Fleary, S. A., & Ettienne, R. (2019). The relationship between food parenting practices, parental diet and their adolescents' diet. *Appetite*. https://doi.org/10.1016/j.appet.2019.01.008

Franken, I. H. A., & Muris, P. (2005). Individual differences in reward sensitivity are related to food craving and relative body weight in healthy women. *Appetite*. https://doi.org/10.1016/j.appet.2005.04.004

Frankenfeld, C. L., Poudrier, J. K., Waters, N. M., Gillevet, P. M., & Xu, Y. (2012). Dietary Intake Measured from a Self-Administered, Online 24-Hour Recall System Compared with 4-Day Diet Records in an Adult US Population. *Journal of the Academy of Nutrition and Dietetics*. https://doi.org/10.1016/j.jand.2012.06.003

Gold, J. M., & Vander Weg, M. W. (2020). Investigating the relationship between parental weight stigma and feeding practices. *Appetite*. https://doi.org/10.1016/j.appet.2020.104635

Goossens, L., Braet, C., & Decaluwé, V. (2007). Loss of control over eating in obese youngsters. *Behaviour Research and Therapy*, *45*(1), 1–9. https://doi.org/10.1016/j.brat.2006.01.006

Goossens, L., Braet, C., Van Vlierberghe, L., & Mels, S. (2009). Loss of control over eating in overweight youngsters: The role of anxiety, depression and emotional eating. *European Eating Disorders Review*, *17*(1), 68–78. https://doi.org/10.1002/erv.892

Hager, E. R., Cockerham, A., O'Reilly, N., Harrington, D., Harding, J., Hurley, K. M., & Black, M. M. (2017). Food swamps and food deserts in Baltimore City, MD, USA: Associations with dietary behaviours among urban adolescent girls. *Public Health Nutrition*. https://doi.org/10.1017/S1368980016002123

Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2017). Prevalence of Obesity Among Adults and Youth: United States, 2015-2016. *NCHS Data Brief*, *288*, 1–8.

Hendrie, G., Sohonpal, G., Lange, K., & Golley, R. (2013). Change in the family food environment is associated with positive dietary change in children. *International Journal of Behavioral Nutrition and Physical Activity*. https://doi.org/10.1186/1479-5868-10-4

Hoerr, S. L., Hughes, S. O., Fisher, J. O., Nicklas, T. A., Liu, Y., & Shewchuk, R. M. (2009). Associations among parental feeding styles and children's food intake in families with limited incomes. *International Journal of Behavioral Nutrition and Physical Activity*. https://doi.org/10.1186/1479-5868-6-55

Hoggard, L. S., Volpe, V., Thomas, A., Wallace, E., & Ellis, K. (2019). The role of emotional eating in the links between racial discrimination and physical and mental health. *Journal of Behavioral Medicine*, *42*(6), 1091–1103. https://doi.org/10.1007/s10865-019-00044-1

Huffman, L. E., Wilson, D. K., Kitzman-Ulrich, H., Lyerly, J. E., Gause, H. M., & Resnicow, K. (2016). Associations between culturally relevant recruitment strategies and participa nt interest, enrollment and generalizability in a weight-loss intervention for african American families. *Ethnicity and Disease*, *26*(3), 295–304. https://doi.org/10.18865/ed.26.3.295

Karlsson, J., Persson, L. O., Sjöström, L., & Sullivan, M. (2000). Psychometric properties and factor structure of the Three-Factor Eating Questionnaire (TFEQ) in obese men and women. Results from the Swedish Obese Subjects (SOS) study. *International Journal of Obesity*. https://doi.org/10.1038/sj.ijo.0801442

Kaur, H., Li, C., Nazir, N., Choi, W. S., Resnicow, K., Birch, L. L., & Ahluwalia, J. S. (2006). Confirmatory factor analysis of the child-feeding questionnaire among parents of adolescents. *Appetite*. https://doi.org/10.1016/j.appet.2006.01.020

Kipp, C., Wilson, D. K., Sweeney, A. M., Zarrett, N., & Van Horn, M. L. (2021). Effects of Parenting and Perceived Stress on BMI in African American Adolescents. *Journal of Pediatric Psychology*, 1–11. https://doi.org/10.1093/jpepsy/jsab025

Kitzman-Ulrich, H., Wilson, D. K., St. George, S. M., Lawman, H., Segal, M., & Fairchild, A. (2010). The integration of a family systems approach for understanding youth obesity, physical activity, and dietary programs. *Clinical Child and Family Psychology Review*. https://doi.org/10.1007/s10567-010-0073-0

Kröller, K., Jahnke, D., & Warschburger, P. (2013). Are maternal weight, eating and feeding practices associated with emotional eating in childhood? *Appetite*. https://doi.org/10.1016/j.appet.2012.11.032

Langer, S. L., Seburg, E., JaKa, M. M., Sherwood, N. E., & Levy, R. L. (2017). Predicting dietary intake among children classified as overweight or at risk for overweight: Independent and interactive effects of parenting practices and styles. *Appetite*. https://doi.org/10.1016/j.appet.2016.12.011

LeCroy, M. N., Siega-Riz, A. M., Albrecht, S. S., Ward, D. S., Cai, J., Perreira, K. M., Isasi, C. R., Mossavar-Rahmani, Y., Gallo, L. C., Castañeda, S. F., & Stevens, J. (2019). Association of food parenting practice patterns with obesogenic dietary intake in Hispanic/Latino youth: Results from the Hispanic Community Children's Health Study/Study of Latino Youth (SOL Youth). *Appetite*. https://doi.org/10.1016/j.appet.2019.05.006

LeCuyer, E. A., Swanson, D. P., Cole, R., & Kitzman, H. (2011). Effect of African- and European-American maternal attitudes and limit-setting strategies on children's self-regulation. *Research in Nursing and Health*. https://doi.org/10.1002/nur.20460

Lee, E. Y., & Yoon, K. H. (2018). Epidemic obesity in children and adolescents: risk factors and prevention. In *Frontiers of Medicine* (Vol. 12, Issue 6, pp. 658–666). https://doi.org/10.1007/s11684-018-0640-1

Loncar, H., Wilson, D. K., Sweeney, A. M., Quattlebaum, M., & Zarrett, N. (2021). Associations of parenting factors and weight related outcomes in African American adolescents with overweight and obesity. *Journal of Behavioral Medicine*. https://doi.org/10.1007/s10865-021-00208-y

Lopez-Cepero, A., Frisard, C. F., Lemon, S. C., & Rosal, M. C. (2019). Association between emotional eating, energy-dense foods and overeating in Latinos. *Eating Behaviors*. https://doi.org/10.1016/j.eatbeh.2019.03.001

Lowe, M. R., & Fisher, E. B. (1983). Emotional reactivity, emotional eating, and obesity: A naturalistic study. *Journal of Behavioral Medicine*. https://doi.org/10.1007/BF00845377

Lytle, L. A., Varnell, S., Murray, D. M., Story, M., Perry, C., Birnbaum, A. S., & Kubik, M. Y. (2003). Predicting adolescents' intake of fruits and vegetables. *Journal of Nutrition Education and Behavior*. https://doi.org/10.1016/S1499-4046(06)60331-X

Maccoby, E. E., & Martin, J. (1983). Socialization in the Context of the Family: Parent-Child Interaction. In *Handbook of Child Psychology: {Vol}.~4. {Socialization}, Personality, and Social Development*.

McLoyd, V. C. (1990). The Impact of Economic Hardship on Black Families and Children: Psychological Distress, Parenting, and Socioemotional Development. *Child Development*. https://doi.org/10.1111/j.1467-8624.1990.tb02781.x

Munkholm, A., Olsen, E. M., Rask, C. U., Clemmensen, L., Rimvall, M. K., Jeppesen, P., Micali, N., & Skovgaard, A. M. (2016). Eating behaviours in preadolescence are associated with body dissatisfaction and mental disorders - Results of the CCC2000 study. *Appetite*. https://doi.org/10.1016/j.appet.2016.02.020

Myers, R. H. (1990). *Classical and Modern Regression with Applications* (2nd ed.). Duxbury/Thompson Learning.

Nguyen-Michel, S. T., Unger, J. B., & Spruijt-Metz, D. (2007). Dietary correlates of emotional eating in adolescence. *Appetite*. https://doi.org/10.1016/j.appet.2007.03.005

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA - Journal of the American Medical Association*, *311*(8), 806–814. https://doi.org/10.1001/jama.2014.732

Parks, E. P., Kazak, A., Kumanyika, S., Lewis, L., & Barg, F. K. (2016). Perspectives on Stress, Parenting, and Children's Obesity-Related Behaviors in Black Families. *Health Education and Behavior*, *43*(6), 632–640. https://doi.org/10.1177/1090198115620418

Patrick, K., Calfas, K. J., Norman, G. J., Zabinski, M. F., Sallis, J. F., Rupp, J., Covin, J., & Cella, J. (2006). Randomized controlled trial of a primary care and home-based intervention for physical activity and nutrition behaviors: PACE+ for adolescents. *Archives of Pediatrics and Adolescent Medicine*. https://doi.org/10.1001/archpedi.160.2.128

Polfuss, M. L., & Frenn, M. (2012). Parenting and Feeding Behaviors Associated With School-Aged African American and White Children. *Western Journal of Nursing Research*. https://doi.org/10.1177/0193945911402225

Rose, M. H., Nadler, E. P., & Mackey, E. R. (2018). Impulse Control in Negative Mood States, Emotional Eating, and Food Addiction are Associated with Lower Quality of Life in Adolescents with Severe Obesity. *Journal of Pediatric Psychology*. https://doi.org/10.1093/jpepsy/jsx127

Scaglioni, S., De Cosmi, V., Ciappolino, V., Parazzini, F., Brambilla, P., & Agostoni, C. (2018). Factors influencing children's eating behaviours. In *Nutrients*. https://doi.org/10.3390/nu10060706

Schmidt, R., Hiemisch, A., Kiess, W., & Hilbert, A. (2019). Interaction effects of child weight status and parental feeding practices on children's eating disorder symptomatology. *Nutrients*, *11*(10). https://doi.org/10.3390/nu11102433

Shank, L. M., Crosby, R. D., Grammer, A. C., Shomaker, L. B., Vannucci, A., Burke, N. L., Stojek, M., Brady, S. M., Kozlosky, M., Reynolds, J. C., Yanovski, J. A., & Tanofsky-Kraff, M. (2017). Examination of the interpersonal model of loss of control eating in the laboratory. *Comprehensive Psychiatry*, *76*, 36–44. https://doi.org/10.1016/j.comppsych.2017.03.015

Sims, R., Gordon, S., Garcia, W., Clark, E., Monye, D., Callender, C., & Campbell, A. (2008). Perceived stress and eating behaviors in a community-based sample of African Americans. *Eating Behaviors*. https://doi.org/10.1016/j.eatbeh.2007.06.006

Smith, A. D., Sanchez, N., Reynolds, C., Casamassima, M., Verros, M., Annameier, S. K., Melby, C., Johnson, S. A., Lucas-Thompson, R. G., & Shomaker, L. B. (2020). Associations of parental feeding practices and food reward responsiveness with adolescent stress-eating. *Appetite*. https://doi.org/10.1016/j.appet.2020.104715

Spruijt-Metz, D., Lindquist, C. H., Birch, L. L., Fisher, J. O., & Goran, M. I. (2002). Relation between mothers' child-feeding practices and children's adiposity. *American Journal of Clinical Nutrition*. https://doi.org/10.1093/ajcn/75.3.581

St. George, S. M., Van Horn, M. L., Lawman, H. G., & Wilson, D. K. (2016). Reliability of 24-Hour Dietary Recalls as a Measure of Diet in African-American Youth. *Journal of the Academy of Nutrition and Dietetics*. https://doi.org/10.1016/j.jand.2016.05.011

Steinegger, C., Dorn, L., Goody, C., Khoury, P. R., & Daniels, S. R. (2005). Emotional eating in adolescent females. *Journal of Adolescent Health*. https://doi.org/10.1016/j.jadohealth.2004.11.116

Tamis-LeMonda, C. S., Briggs, R. D., McClowry, S. G., & Snow, D. L. (2008). Challenges to the study of African American parenting: conceptualization, sampling, research approaches, measurement, and design. In *Parenting*. https://doi.org/10.1080/15295190802612599

Tanofsky-Kraff, M., McDuffie, J. R., Yanovski, S. Z., Kozlosky, M., Schvey, N. A., Shomaker, L. B., Salaita, C., & Yanovski, J. A. (2009). Laboratory assessment of the food intake of children and adolescents with loss of control eating. *American Journal of Clinical Nutrition*, *89*(3), 738–745. https://doi.org/10.3945/ajcn.2008.26886

Thompson, F. E., & Subar, A. F. (2017). Dietary assessment methodology. In *Nutrition in the Prevention and Treatment of Disease*. https://doi.org/10.1016/B978-0-12-802928-2.00001-1

Turner, R. J., & Avison, W. R. (2003). Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of Health and Social Behavior*. https://doi.org/10.2307/1519795

Van Lippevelde, W., Vervoort, L., Vangeel, J., & Goossens, L. (2020). Can parenting practices moderate the relationship between reward sensitivity and adolescents' consumption of snacks and sugar-sweetened beverages? *Nutrients*, *12*(1). https://doi.org/10.3390/nu12010178

van Strien, T., Beijers, R., Smeekens, S., Winkens, L. H. H., & Konttinen, H. (2019). Parenting quality in infancy and emotional eating in adolescence: Mediation through emotion suppression and alexithymia. *Appetite*. https://doi.org/10.1016/j.appet.2019.104339

Verbeken, S., Braet, C., Lammertyn, J., Goossens, L., & Moens, E. (2012). How is reward sensitivity related to bodyweight in children? *Appetite*. https://doi.org/10.1016/j.appet.2011.11.018

Wardle, J., Guthrie, C., Sanderson, S., Birch, L., & Plomin, R. (2001). Food and activity preferences in children of lean and obese parents. *International Journal of Obesity*. https://doi.org/10.1038/sj.ijo.0801661

Wilson, D. K., Kitzman-Ulrich, H., Resnicow, K., Van Horn, M. L., George, S. M. S., Siceloff, E. R., Alia, K. A., McDaniel, T., Heatley, V. S., Huffman, L., Coulon, S., & Prinz, R. (2015). An overview of the Families Improving Together (FIT) for weight loss randomized controlled trial in African American families. *Contemporary Clinical Trials*, *42*, 145–157. https://doi.org/10.1016/j.cct.2015.03.009

Wilson, D. K., Sweeney, A. M., Kitzman-Ulrich, H., Gause, H., & St. George, S. M. (2017). Promoting Social Nurturance and Positive Social Environments to Reduce Obesity in High-Risk Youth. In *Clinical Child and Family Psychology Review* (Vol. 20, Issue 1, pp. 64–77). https://doi.org/10.1007/s10567-017-0230-9

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