

RECOLLECTED PRESSURE TO EAT IN CHILDHOOD PREDICTS COLLEGE  
STUDENT EATING BEHAVIORS

A Thesis  
by  
JORDAN MICHAEL ELLIS

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## **Abstract**

### **RECOLLECTED PRESSURE TO EAT IN CHILDHOOD PREDICTS COLLEGE STUDENT EATING BEHAVIORS**

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Picky eating (PE) is a childhood behavior that vexes many parents because of its links to poor diet quality and low body weight. How this behavior develops through childhood and into adulthood and whether it is predictive of adult eating behavior is relatively unstudied. Both PE in childhood and low intuitive eating (IE) in adulthood are associated with controlling feeding practices, eating disorder symptomology, and a low variety of preferred foods. Pressure to eat (PR), a parental controlling feeding practice aimed at encouraging a child to eat more, is positively associated with PE and a number of other childhood eating concerns. Current IE and disordered eating behaviors were measured in 170 college students using the Intuitive Eating Scale and the Eating Disorder Inventory, and childhood PE and PR were measured using parents' retrospective reports. It was hypothesized that PE and PR in childhood would predict low intuitive eating and disordered eating behaviors in college students. Furthermore, it was hypothesized the interaction between PE and PR would be a stronger predictor. Results revealed a significant negative correlation between PE and IE and

a significant positive correlation between and PE and disordered eating behaviors associated with bulimia. A regression analysis revealed PR predicted IE and disordered eating symptoms. PE in childhood was not a significant predictor of IE or disordered eating in the regression model. These findings support previous research that parental pressure may disrupt adaptive internal eating control associated with low intuitive eating and disordered eating behaviors.

*Keywords:* Picky, Fussy, Intuitive, Eating, Pressure, Disordered

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## **Foreword**

This thesis is written in accordance with the style of the *Publication Manual of the American Psychological Association (6<sup>th</sup> Edition)* as required by the Department of Psychology at Appalachian State University.

Recollected pressure to eat in childhood predicts college student eating behaviors

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### **Abstract**

Picky eating (PE) is a childhood behavior that vexes many parents because of its links to poor diet quality and low body weight. How this behavior develops through childhood and into adulthood and whether it is predictive of adult eating behavior is relatively unstudied. Current intuitive eating (IE) and disordered eating behaviors were measured in 170 college students using Intuitive Eating Scale and the Eating Disorder Inventory, and childhood PE and parental pressure to eat (PR) were measured using parents' retrospective reports. It was hypothesized that PE and PR in childhood would predict low intuitive eating and disordered eating behaviors in college students. Results revealed a significant negative correlation between PE and IE and a significant positive correlation between PE and disordered eating behaviors associated with bulimia. A regression analysis revealed PR predicted IE and disordered eating symptoms. PE in childhood was not a significant predictor of eating behaviors in college students. These findings support previous research that parental pressure may disrupt adaptive internal eating control associated with low intuitive eating and disordered eating behaviors.

*Keywords:* Picky, Fussy, Intuitive, Eating, Pressure, Disordered

## PRESSURE TO EAT PREDICTS ADULT EATING BEHAVIOR

### **Recollected pressure to eat in childhood predicts college student eating behaviors**

Picky eaters are defined as individuals who consume a very limited variety of food through the rejection of both unfamiliar and familiar foods. This definition most often refers to children, but emerging literature is beginning to explore the presence of picky eating in adults (Dovey, Staples, Gibson, & Halford, 2008; Wildes, Zucker, & Marcus, 2012). Picky eaters often report rejection of food based on the taste, texture, or sensory quality of the food. Picky eaters tend to have strong food preferences, require special preparation of their preferred foods, and present struggles around meal times (Dovey et al., 2008). Picky eating is also negatively correlated with eating enjoyment (Van der Horst, 2012). While still a novel research topic, the prevalence of picky eating behaviors that carry over to adulthood is currently unknown. There is also very little known about how childhood picky eating could affect future relationships with food, health, eating behaviors, and psychological well-being in adulthood.

Although future research will be required, Wildes et al. (2012) suggested that some eating disordered behavior could develop after or consequent to picky eating and picky eaters could be more vulnerable to developing eating, weight, and body shape concerns. On the other hand, intuitive eating is a positive adaptive eating style defined by characteristics that oppose disordered eating and encompass natural eating behaviors guided by internal cues. The purpose of this study is to examine relationships between intuitive eating in college students, their parents' retrospective reports of negative feeding practices, and their child's picky eating.

Inconsistencies in the measurement of picky eating have made the theoretical definition and the prevalence of picky eating difficult to establish (Powell, Farrow, &

Meyer, 2011). Using maternal reports, Jacobi, Schmitz, and Agras (2008) found that in a sample of 8-12 year old children, 19% of girls and 18% of boys were identified as picky eaters. Using a different measure of pickiness, Marchi and Cohen (1990) reported that the prevalence of picky eating ranged from 27-29%, remaining relatively stable across ages from 1 to 21 years old. Aligning with this estimate, using yet another measure of picky eating, Galloway, Fiorito, Lee, and Birch (2005) found that 27% of seven-year-old girls were defined as picky eaters. Although the measures of picky eating differ, a large number of children are reported as picky eaters, and results from longitudinal studies indicate that the prevalence rates can remain stable even into early adulthood (Marchi & Cohen, 1990). In a longitudinal study from age 2 to 11 years old, Mascola, Bryson, and Agras (2010) found that even though the incidence of picky eating begins to decrease after age six, the point prevalence tends to increase, indicating that picky eating can take a chronic course. Point prevalence was defined as the number of individuals who met picky eating criteria at a certain time point each year in the longitudinal study (Mascola et al., 2010). The possible stability of picky eating into young adulthood is interesting because picky eating is a construct that is thought to be transient and to resolve as the child ages, with only severe cases extending into adulthood (Wildes et al., 2012). There are currently no estimations of the prevalence of picky eating continuing into adulthood.

Food neophobia, which is characterized by an individual's rejection of novel foods, is considered an inherent adaptive trait that tends to diminish with age. Food neophobia can sometimes stabilize and parental pressure in childhood feeding has been associated with higher expressions of food neophobia. While picky eating and food neophobia are separate constructs, food neophobia often presents as a part of a picky

eater's behavior pattern (Dovey et al., 2008). Wildes et al. (2012) found that 76% of adult picky eaters also reported food neophobia. Food neophobia and picky eating in 7-year-old girls have been shown to have different predictors. Higher levels of anxiety and having a mother with food neophobia were predictive of food neophobia, whereas having never been breastfed, low variety in maternal vegetable intake, and having a mother who felt that there was no time to eat healthy was predictive of picky eating (Galloway, Lee, & Birch, 2003). These researchers also hypothesized that a parent's reaction to their young child's food neophobia, by using negative feeding practices, could influence whether the child develops into a picky eater in middle childhood.

Cross-sectional and longitudinal studies have consistently reported that parental pressure during feeding is correlated with higher levels of childhood picky eating and lower levels of food intake in children (Ventura & Birch, 2008). In one study, girls who received higher levels of maternal pressure to eat at age seven had higher levels of picky eating and lower consumption of fruits and vegetables at age nine (Galloway, Fiorito, Lee, & Birch, 2005). In another experimental study of preschoolers, Galloway, Fiorito, Francis, and Birch (2006) found that even mild encouragement to eat increased the amount of negative affective responses, lowered preference for the target food, and a reduced the rate of intake over time. In a more recent study, researchers used a mediation model demonstrating that parental negative feeding practices (e.g., using food as a reward or feeding to regulate emotion) mediate the relationship between health-related feeding goals and negative eating behaviors. The study provides further evidence that negative feeding practices seem to have a direct influence on children's eating behavior, rather

than simply being a reaction to eating behavior that parents perceive to be undesirable (Kiefner-Burnmeister, Hoffmann, Meers, Koball, & Musher-Eizenman, 2014).

Carper, Fisher, and Birch (2000) found that parental pressure to eat was associated with their five-year-old daughter's dietary restraint and emotional disinhibition. Around 60% of the girls in the study reported perceiving high levels of parental pressure and restriction during feeding. Daughters who reported high levels of parental pressure to eat were three times as likely to report dietary restraint, emotional disinhibition, and external disinhibition than daughters who had a lower perception of pressured feeding practices. Essentially, girls in the high pressure group were more likely to limit their food intake, eat in response to external factors such as emotion, and lack attention to hunger and satiety cues (Carper et al., 2000).

In a retrospective study on forced consumption, Batsell, Brown, Ansfield, and Pashall (2002) explored various characteristics associated with memorable episodes of forced consumption recalled from memory by college students. Researchers discovered that 70% of their 407 respondents reported they had experienced a forced consumption episode during their lifetime. Those who reported forced consumption were more likely to identify as significantly picky eaters in adulthood than those who did not recall a forced consumption episode. Those who reported experiencing a forced consumption episode also were more likely to be restrictive in their current eating behaviors (Bastell et al., 2002)

Children are typically thought to grow out of picky eating behaviors, but evidence is now suggesting that picky eating can persist into adulthood and can be the cause of significant psychosocial impairment (Wildes et al., 2012). Adult picky eaters who

present with significant psychosocial impairment can now be diagnosed with Avoidant/Restrictive Food Intake Disorder (ARFID) in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). Presently there has only been one investigation into adult picky eating in which Wildes and colleagues (2012) implemented a large survey study to begin the preliminary investigation of picky eating in adults. The study was aimed at determining whether picky eating is distinct from eating disorder symptoms. The researchers surveyed 6,895 participants who responded to requests to complete an online “public registry” of adult picky eating. According to responses, participants were separated into four different groups: (1) a picky eating group, (2) a comorbid group of picky eating and disordered eating, (3) a disordered eating group, and (4) a low pathology group exhibiting neither picky or disordered eating. Of the 6,895 participants 1,981 presented as picky eaters without eating disorder symptomology, and 2,195 presented as picky eaters with comorbid eating disorder symptomology. A higher level of clinical impairment was observed in the groups containing disordered eating symptoms, but higher levels of social eating anxiety were observed in the groups with picky eating (Wildes et al., 2012). Researchers concluded that picky eating and eating disorder symptoms are separate constructs. They also concluded that the comorbid group likely developed eating disorder symptoms after picky eating or possibly as a consequent of picky eating (Wildes et al., 2012). Subsequent studies are needed to determine the prevalence of adult picky eating in the general population and to establish severity levels that indicate a clinical significance.

Wildes et al. (2012) hypothesized social impairment is supported by some studies investigating food neophobia and case studies of adult picky eaters. Food neophobia, the rejection of novel foods, has been extensively investigated in children, but the research is extremely limited in adults. In adults, food neophobia has been shown to be negatively associated with the openness personality trait (Knapilla et al., 2011). A case study of two adults with high levels of picky eating and food neophobia reported that both of the individuals displayed a significant disruption in social functioning due to their limited food variety (Marcontell, Laster & Johnson, 2002).

A 17-year longitudinal study conducted by Kotler, Cohen, Davies, Pine, and Walsh (2001) examined the stability of disordered eating behaviors and whether or not childhood eating behaviors were predictive of participant's eating disorders in adulthood. Results indicated that childhood eating problems including conflicts around eating, struggles with food, and unpleasant mealtimes were predictive of a future subclinical diagnosis of anorexia nervosa (Kotler et al., 2001). Picky eating, which is often associated with the above childhood eating problems, was not shown to predict eating disorders in adulthood. A limitation of this study was that picky eating was only measured using a one-item scale as opposed to the three-item pickiness scale that is often used as a measure (Galloway, Farrow, & Martz, 2009; Galloway et al., 2003). Interestingly, a prior investigation by the same research group found that across a 10-year span, picky eating in early and late childhood was significantly associated with the development of anorexia nervosa in adolescence. In this earlier study, pickiness was defined by the presence of three of four behaviors: does not eat enough, is often choosy about food, usually eats slowly, and is usually not interested in food (Mascola et al.,

2010). Utilizing a four-item definition as opposed to a one-item definition of pickiness increased the reliability of the measurement and likely contributed to the significant results (Marchi & Cohen, 1990). Considering that the more current investigation also indicated that the stability of eating disorder behavior was moderate, and severe eating disorder symptoms in adolescence increased the risk of having an eating disorder as a young adult, the association early childhood picky eating could have with adult eating disorders should continue to be considered (Kotler et al., 2001).

Throughout the literature, picky eating has been measured through a number of different methods, with the major difference being quantity versus quality measurements of limited food intake. Limited food in picky eating has been measured in different studies by quantity (e.g., eating fewer calories overall), quantity of food types (e.g., eating only a few types of food), and quality (e.g., eating fewer fruits and vegetables). Complicating factors further, some measures of picky eating focus only on reduced food variety, whereas other studies include a component of reduced food quantity. Future work in this area needs to differentiate between food quality and quantity in order to understand the impact of picky eating on food intake, possible nutrient deficiencies, and BMI.

### **Intuitive Eating**

Intuitive eating (IE) is an adaptive eating style characterized by eating in response to internal cues of hunger and satiety. It is theorized that individuals who are conscious of these internal cues will satisfy their internal hunger cravings in a natural, nutritious, and non-restrictive way (Smith & Hawks, 2006; Tylka, 2006). IE includes three central characteristics: the unconditional permission to eat whatever food is desired whenever the

individual is hungry, eating for physical rather than emotional reasons, and the relying on internal signals for hunger and satiety to determine when and how much to eat (Tylka, 2006). Smith and Hawks (2006) designed a cross-sectional assessment to address concerns about the IE approach by examining relationships between IE, diet quality, the meaning of food, and body mass index (BMI). Critics of IE have raised concerns that the external control of food intake is essential to good nutrition, but this study discovered that IE indicates healthier eating behaviors. Their results indicated IE is associated with taking more pleasure in eating, lower BMIs, a more diverse diet, and eating breakfast (Smith & Hawks, 2006). While confirming the validity of the Intuitive Eating Scale (IES), Tylka (2006) found supporting evidence that intuitive eating is negatively correlated with eating disorder symptomology, desire for thinness, and body dissatisfaction. High scores on the IES were positively correlated with measures of self-esteem, use of positive coping strategies, optimism, and life satisfaction (Tylka, 2006). A review on IE by Dyke and Drinkwater (2013) concluded that intuitive eating is positively associated with psychological health indicators, improved dietary intake, and healthier eating behaviors.

IE is thought to be an internal characteristic with which humans are born, but it is often disrupted by early childhood feeding practices, dietary restraint, and other pressures that disrupt internal cues of hunger and satiety (Herbert, Blechert, Hautzinger, Matthias, & Herbert, 2013; Tylka, 2006). In a retrospective study of college students and their parents, Galloway et al. (2009) found that recollected controlling childhood feeding practices were significantly associated with current emotional eating, restrained eating, and low intuitive eating. Specifically, restriction and monitoring used during the

childhood feeding reported retrospectively by female college students were positively correlated with current emotional eating and negatively associated with eating for physical reasons (Galloway et al., 2009).

Denny, Loth, Eisenberg, and Neumark-Sztainer (2013) utilized a cross-sectional study of college students to examine associations between IE and disordered eating behaviors. Researchers measured aspects of IE by asking college students to self-report if they trusted their bodies to tell them how much to eat and to tell them to stop eating when full. Disordered eating behaviors were categorized into four groups: chronic dieting, unhealthy weight control, extreme weight control, and binge eating. Both men and women who reported trusting their bodies to tell them how much to eat had significantly lower odds of engaging in any of the disordered eating behaviors. Denny et al. (2013) found that females who were able to stop eating when satiated had one-third the odds of reporting binge-eating behaviors when compared to females who struggled to stop eating when full. The females who stopped eating when full were also less likely to engage in chronic dieting (Denny et al., 2013). The measures of IE in this study are limited because researchers only used two items from the 21-item intuitive eating scale, and this may have inflated the presence of intuitive eating in the sample.

While picky eating and low intuitive eating display certain commonalities, their relationships with body mass index (BMI) seem to differ. Studies have shown that girls who are picky eaters were significantly less likely to be overweight, though not underweight, compared to the nonpicky eaters (Galloway et al., 2005; Marchi & Cohen, 1990). Conversely, a review of child eating, parenting, and weight, points out that other studies have shown no association between picky eating and weight status, but none of

these studies have controlled for parental weight status or socioeconomic status (Ventura & Birch, 2008). Picky eating in adults has not been associated with weight status (Wildes et al., 2012). Dovey and colleagues (2008) state that although picky eaters may have lower BMIs compared to non-picky eaters, evidence suggests that picky eating is associated with nutrient deficiencies, low of fruit and vegetable intake, and high consumption of sweets.

Intuitive eating has been shown consistently to be inversely associated with BMI, indicating that those who score higher on measures of intuitive eating have lower BMIs (Denny et al., 2013; Dyke & Drinkwater, 2013). Ventura and Birch (2008) concluded that although parental pressure has consistently been shown to be associated with lower BMI, a full understanding of the direction of this relationship is unclear. Galloway et al. (2006) found that children who were more likely pressured to eat at home had lower BMI scores.

### **Present Study**

In summary, picky eating tends to have elements of a non-adaptive eating style that is associated with a low variety of preferred foods, lack of eating enjoyment, struggles at meal times, and emotional and external disinhibition (Carper et al, 2000; Dovey et al., 2008; Galloway et al., 2006; Van der Horst, 2012). Although picky eating is not considered an eating disorder, it is associated with eating disorders, and it is thought that eating disorders could develop with or due to picky eating (Jacobi et al., 2008; Marchi & Cohen, 1990; Wildes et al., 2012). Picky eating is also positively correlated with the parental controlling feeding practices of pressure and restriction (Carper et al., 2000; Van der Horst, 2012). Intuitive eating is an adaptive eating style that is negatively correlated with eating disorder symptomology, desire for thinness, body

dissatisfaction, and parental restriction and monitoring in feeding (Galloway et al., 2009; Tylka, 2006). Intuitive eating is positively correlated with a more diverse diet, greater enjoyment in eating, emotional inhibition, psychological health indicators, and healthy eating behaviors (Dyke & Drinkwater, 2013; Smith & Hawks, 2006).

Picky eating and low levels of intuitive eating display many similar characteristics, so it is believed the two constructs are related and that picky eating in childhood may be predictive of intuitive eating in young adults. Given that picky eating generally wanes over childhood, there has been little interest in whether early picky eating could affect future relationships with health and eating behaviors in adulthood. However, findings from the present study could indicate that early picky eating and parental pressure to eat may have long-term implications for the development of healthy eating in adulthood. Further research in this area could aid in the development of interventions for picky eaters and their parents during childhood and could promote healthier eating behaviors in adulthood.

In the present study we will use archival data to investigate the relationship between childhood picky eating, parental pressure used in childhood, and intuitive eating in adulthood. To our knowledge, the relationship between these three constructs has not been examined. It is hypothesized that parental recollections of their child's pickiness and their own use of pressure will be predictive of intuitive and disordered eating in young adulthood. Specifically higher levels of picky eating and parental pressure will predict lower levels of intuitive eating and higher levels of symptoms associated with bulimia and a drive for thinness. Due to the conflicting relationships between the variables of interest and BMI, it is unclear how BMI may contribute to analysis in the present study.

## Methods

### Participants

Participants included 170 college students (121 women; 49 men) and one parent for each. Participants selected for the study were from both the United States and the United Kingdom. Ninety-eight students volunteered from an undergraduate psychology research pool at Appalachian State University in the US, and 72 undergraduate students volunteered from a research pool at Loughborough University in the UK. Student age ranged from 16 to 25 years old. Of the 176 students who reported their ethnicity approximately 96.6% of the sample identified as Caucasian, 2.3% identified as Black, and 1.1% identified as Asian. The original study published from this data set only analyzed the participants from the US (Galloway et al., 2009).

A post-hoc analysis was calculated using G\*Power to determine the power of our current sample of 180 participants for one-tailed bivariate correlations. For an effect size of .20 and error probability of  $p < .05$  we can achieve a power of .86 with the current sample size (Faul, Erdfelder, Buchner, & Lang, 2009). This indicates that if our variables are correlated at .20 or greater, 86% of the time we can expect to find a statistically significant effect; however, 14.4 % of the time we can expect to make a type 2 error.

### Procedure

The appropriate Institutional Review Boards at each university approved the study's procedure. Each of the 170 participants completed a questionnaire for the study and then mailed a questionnaire for a parent to complete and send back to the researchers. All participants completed informed consent. Students from the US sample received class research credit, and parents were given the opportunity to win a \$50 gift card to a

hardware store. Questionnaires were completed by students in a classroom in both the US and UK, with as many as 40 students in the classroom at a time. After completing the questionnaire, students in the US had their height and weight measured privately by a trained research assistant in a separate room. Participants from the UK self-reported height and weight measurements. The entire procedure took approximately 60 minutes to complete. After completing the questionnaires, the students addressed envelopes so the researchers could mail the parent questionnaires.

### **Measurements**

**Background information.** Students provided demographic information and details about their childhood household. This included information about with whom the student lived as a child and with whom they currently live while in college. Parents also provided demographic information including self-reported height and weight, level of education, occupation, and questions regarding the child's early feeding history. Because the UK sample did not have their height and weight measured during administration of the other measures, student self-reported BMI was used in the present analysis.

**Parent retrospective Child Feeding Questionnaire.** Parents completed a retrospective version of the Childhood Feeding Questionnaire (CFQ). The CFQ aims to capture the use of controlling feeding practices through the following subscales: parental use of pressure to influence their child to eat, parental restriction over the child's food intake, and the monitoring of the child's eating. The CFQ was adapted from present to past tense to be used retrospectively. The CFQ is scored using a 5-point Likert scale for each item, with higher scores indicating higher levels of controlling feeding practices. Parents were encouraged to recall their feeding practices at the time when their child was

5-10 years old. The CFQ pressure to eat subscale used in the present analysis demonstrated good internal reliability for research purposes ( $\alpha = .76$ ).

The retrospective parental CFQ also includes a “Pickiness” subscale. This subscale includes three items designed to capture the parent’s retrospective perceptions on their child’s willingness to eat during mealtimes. Each item is measured on a 5-point Likert scale, and a total score is calculated by taking the mean of items scores. Higher scores represent a higher level of pickiness. The pickiness scale showed good internal consistency ( $\alpha = .88$ ).

**Student retrospective Child Feeding Questionnaire.** Students completed a modified retrospective version of the Child Feeding Questionnaire for Children (CFQC), which measured the student’s recollections about controlling feeding practices their parents used when they were younger. The questionnaire, designed for use with young children, was modified for college students. Students were asked to think back to when they were a child and report about controlling feeding practices, specifically pressure to eat, that the person who was most responsible for their feeding may have used. The CFQC uses 5-point response items that range from (1) never to (5) always, with higher scores indicating higher levels of parental control. The CFQC has shown predictive validity for restrained eating and emotional eating. The modified CFQC pressure subscale demonstrated good internal reliability for research purposes ( $\alpha = .76$ ).

**Intuitive Eating Scale.** The intuitive eating scale (IES) is a 21-item questionnaire developed to serve as a measure for adaptive eating. The IES consists of three subscales which are comprised of seven items each: unconditional permission to eat, eating for physical reasons, and reliance on signs of hunger/satiety. The IES can also

be used as a total measure of intuitive eating. Higher scores on the IES indicate more positive eating behaviors. The IES has demonstrated strong construct validity and test-retest reliability (Tylka, 2006). The total IES score demonstrated good internal reliability ( $\alpha = .90$ ).

**Eating Disorder Inventory-2.** The eating disorder inventory (EDI-2) is a questionnaire that was developed to measure psychological and behavioral traits that are often associated with eating disorders. The current study administered three of the eight subscales from the EDI-2 to the college student sample: drive for thinness, bulimia, and body dissatisfaction. Subjects are asked to respond on a 6-point Likert scale ranging from “usually” to “never.” The EDI-2 has demonstrated high test-retest reliability indicating an acceptable stability over time (Andreas & Thomas, 2006). The EDI-2 has also shown acceptable validity and has been recommended as an excellent screening tool for eating disorders (Nevonen & Broberg, 2001). In the present study, the EDI-2 demonstrated good internal reliability on both the Bulimia ( $\alpha = .80$ ) and Drive for Thinness subscales ( $\alpha = .91$ ).

## Results

A basic descriptive analysis included an assessment of normality and internal consistency for each variable of interest. Student and parent recollections of pressure-to-eat scores were combined to create a total pressure variable. Gender was coded as female = 0 and male = 1). Because we have directional hypotheses, one-tailed Pearson correlations were used to examine the relationships between picky eating in childhood, parental pressure to eat, BMI, total IES score, IES subscale scores, and the EDI Bulimia and Drive for Thinness subscales. A hierarchical regression analysis was calculated to

determine whether pickiness and pressure are predictive of lower levels of intuitive eating as indicated by the IES. The planned steps included the main effects of picky eating and pressure, the interaction between picky eating and pressure, student BMI, and student Gender. The same hierarchical predictors were also analyzed to determine if they predictive of the EDI Bulimia and Drive for Thinness.

Characteristics of the student-parent dyads ( $n = 170$ ) are presented in Table 1. The student sample was 71.2% women ( $n = 121$ ) and 28.8% men ( $n = 49$ ). The sample consisted of 98 (57.6%) students from the US and 72 (42.4%) from the UK.

One-tailed Pearson correlations among the variables of interest are presented in Table 2. There was a significant negative relationship between picky eating and the total IES score; however, picky eating was not significantly correlated with any of the IES subscales. Recollected parental pressure in feeding was also negatively correlated with total IES and with two of the IES subscales: unconditional permission to eat and eating for physical reasons.

There was a significant negative relationship between BMI and IES, indicating that participants with a lower BMI were more intuitive eaters. In addition, there were significant positive relationships between BMI and the EDI Bulimia and Drive for Thinness subscales, indicating that higher BMI was linked to more disordered eating behaviors. Gender was positively correlated with IES and negatively related to both the EDI Bulimia and Drive for Thinness subscales, indicating women were more likely to score low on the IES and high on the two EDI subscales.

Table 3 presents correlations among the predictor variables and revealed a significant positive relationship between childhood picky eating and recollections of

pressure. There was not a significant relationship between current BMI and childhood picky eating or pressure. However, there was a significant relationship between gender and picky eating, indicating that parents were more likely to report their daughters to be picky eaters.

Three hierarchical regressions were used to analyze the predictive quality of picky eating, pressure to eat, their interaction, current BMI, and gender. The three outcome variables were set as the total IES score, the EDI Bulimia subscale, and the EDI Drive for thinness subscale. Unstandardized regression coefficients (B) with standard errors (SE) and standardized regression coefficients ( $\beta$ ) for the final hierarchical regression models are shown in Table 4. The final model explained 24% of the variance in intuitive eating. Female college students who had higher BMIs and received higher levels of pressure to eat during childhood were likely to be low intuitive eaters.

The final model explained 19% of the variance in the EDI Bulimia subscale. Female college students with higher BMIs who received higher levels of pressure to eat during childhood, were likely to score high on the EDI Bulimia subscale.

The final model explained 27% of the variance in the EDI Drive for Thinness subscale. Female college students with higher BMIs were likely to score high on the EDI Drive for Thinness subscale. The interaction between picky eating and pressure made a significant contribution to the variance in step 2 and remained a significant predictor until the addition of gender as a predictor in step 4.

### **Discussion**

The limited research supporting the DSM-5 ability for clinicians to now diagnose Avoidant-Restrictive Food Intake Disorder (ARFID) in adult populations calls for further

research into the stability of picky eating beyond childhood and how picky eating and parent feeding practices in childhood may predict eating behaviors in adulthood (Wildes et al., 2012). The purpose of this study was to examine recollections of pressure to eat and picky eating in middle childhood as predictors of positive and negative eating behaviors in college students. Findings from our research suggest that parental pressure to eat in childhood is a significant predictor of intuitive eating and disordered eating behaviors in college students. Although childhood picky eating was significantly correlated with intuitive eating and the bulimia subscale in college students, picky eating was not a significant predictor of any of the outcome variables in the final model.

The bivariate correlational findings in this study largely supported the original hypotheses. Results showed both picky eating and parental pressure in childhood to be negatively correlated to intuitive eating in college. We also found picky eating and pressure to have significant positive correlations with disordered eating behaviors associated with bulimia. In contrast to our predictions, picky eating and pressure alone were not correlated with drive for thinness.

BMI was negatively correlated with intuitive eating behaviors. Due to its association with anorexia, we expected the drive for thinness subscale to be negatively correlated with BMI; however, results indicated BMI was positively correlated with negative eating behaviors associated with both bulimia and anorexia. This finding may reflect our use of a general college sample as opposed to an eating disorder sample. Congruent with previous research, men displayed higher levels of intuitive eating, and women students were more likely to display higher levels of disordered eating behaviors (Denny et al., 2013).

Our findings indicated that men who were pressured to eat as children and had a high current BMI reported lower intuitive eating and higher levels of disordered eating behaviors associated with bulimia as college students. These results support previous research indicating that parental pressure to eat is associated with external, emotional, and restrained eating, and disordered eating (Batsell et al., 2002; Carper et al., 2000; Galloway et al., 2006). These findings are unique in that they may point to intuitive eating as the innate positive eating construct that parental pressure may disrupt during childhood. These results align with the hypothesis that the external control associated with parental pressure may disrupt adaptive internal eating control related to intuitive eating (Tylka, 2006). Our results are further supported by a large recent correlational study, in which the researchers found a predictive relationship between parental controlling feeding practices (restriction and pressure) and extreme weight control behaviors in adolescents using parent-child dyads (Loth, MacLehose, Fulkerson, Crow, & Neumark-Stainer, 2014). Unlike the present study, Loth et al. (2014) found these relationships to be more salient in adolescent boys.

Picky eating and pressure were not significant independent predictors of drive for thinness; however, the interaction between picky eating and pressure remained a significant predictor of drive for thinness until gender was added in the final step of the model. This finding is important in that it may indicate a child who is a picky eater and experiences parental pressure is more likely than those who experience one or the other, or neither, to develop a drive for thinness. The interaction did not remain a significant predictor in the final model, but these relationships may warrant further exploration. Our results did not support the previous findings that picky eating in early childhood is

predictive of anorexia nervosa (Mascola et al., 2010). Furthermore, our results did not support previous findings that struggles and conflicts at mealtimes and with food are predictive of subclinical anorexia nervosa (Kotler et al., 2001)

Although the literature has been inconclusive, childhood picky eaters have been shown to be of lower weight compared to non-picky eaters, and it was hypothesized that this trend would extend into adulthood. Our results indicated there is no significant relationship between picky eating in childhood and BMI in adulthood. We also found that current BMI was positively related to disordered eating symptomology and negatively related to intuitive eating. Recent research into “food addiction” has revealed that 83% of individuals who met criteria for bulimia nervosa also met cut-off criteria for “food addiction,” which is significantly associated with higher current/lifetime BMI and the compulsive consumption of calorie dense food. Furthermore, those who meet criteria for “food addiction” are likely to meet criteria for Eating Disorder Not Otherwise Specified (EDNOS; Gearhardt, Boswell, & White, 2014). Our measures of disordered eating may have been sensitive to groups of individuals with addictive eating behaviors, which could explain the unexpected significant positive relationship with BMI on the drive for thinness subscale.

A possible explanation for why picky eating was not a significant predictor of disordered behaviors associated with bulimia may be that these behaviors are associated with a “loss of control” in stopping or inhibiting bingeing behaviors (Wu et al., 2013). Conversely, picky eaters often display behaviors of control over food and eating environments and certain food rules governing what they will eat (Boquin, Moskowitz, Donovan, & Lee, 2014; Dovey et al., 2009). This “control” or regulatory issue would also

align with why we did not find picky eating to be a significant predictor of intuitive eating, considering low intuitive eating is associated with a disrupted ability to internally regulate a response to hunger or satiety (Tylka, 2006).

In an attempt to define types of child picky eaters, Boquin et al. (2014), classified picky eaters into four groups: The Sensory Dependent, The General Perfectionists, The Behavioral Responders, The Preferential Eaters. Tharner et al. (2014) recently utilized a latent profile analysis to examine distinct eating behavior profiles in children based on measures of food approach and food avoidance. Picky eaters displayed an eating behavior profile defined by a significantly lower “food approach” and significantly higher “food avoidance” pattern compared to the general population. Future research into types of picky eaters could be helpful in determining if certain picky eaters are more susceptible to controlling feeding practices. For instance, anorexia nervosa is strongly associated with perfectionistic qualities and need for control; thus, perfectionistic type picky eaters may be more likely to develop disordered eating if other contextual influences such as parental pressure to eat are present (Halmi et al., 2000). Qualities such as perfectionism could also help explain the comorbidity between picky and disordered eating in adulthood and would likely be an illuminating exploration.

Other future research directions include relationships between adult picky eaters and intuitive eating, the refinement of what traits and behaviors characterize both child and adult picky eaters, a further exploration of contextual factors that may contribute to impairment in picky eaters, and environmental determinants of positive eating behaviors. One study has shown that positive suggestions to encourage the tasting of disliked foods and exposure without pressure can increase food acceptance, although another

experimental study revealed that even mild encouragement to eat increased negative responses, lowered food preference, and decreased intake of the food over time (Galloway et al., 2006; Wardle et al., 2003). Future directions include continuing the development and testing of brief parental and pediatric interventions that increase food acceptance within an environment that encourage eating enjoyment and intuitive eating.

The present study has several limitations. The retrospective nature of the study does not allow us to determine if college students were accurately reporting their experience of being pressured to eat in childhood. Researchers should work to answer similar questions using a longitudinal design. This study also utilized self-reported BMI, and although this approach has shown inaccuracies in comparison to measured BMI in the general population, some research supports its validity in college student sample (Quick et al., 2014; Rowland, 1990). Also, because an archival data set was used, we were unable to obtain the college students' recollection of picky eating; thus, we relied only on the parental report of picky eating. The retrospective methodology also limits our ability to determine if parental reporting on picky eating and pressure could be a reaction to their child's current eating behaviors. While the retrospective design provides an interesting and convenient perspective of how behaviors in childhood may predict behaviors in adulthood, the validity of using a retrospective design for this purpose has not been tested (Galloway et al., 2006).

This study is unique in that it assessed the predictive quality of the interaction between childhood picky eating and parental pressure to eat and also examined the previously unexplored relationship between picky eating and intuitive eating.

Most eating behavior research focuses on negative outcomes associated with eating behavior, but knowing what may or may not predict positive eating behaviors, such as intuitive eating, is important to inform the development of healthy lifestyles. Moreover, the Intuitive Eating Scale has also been shown to be a strong predictor overall psychological well-being (Tylka, 2006). Although it is important to confirm these findings within additional adult populations and within longitudinal designs, these data provide evidence that children pressured by their parents to eat may be more likely to develop disordered eating patterns in young adulthood. It is possible that parental pressure to eat can disrupt the adaptive eating behaviors such as intuitive eating in young adulthood. While future studies may be needed to confirm whether the development of interventions for childhood picky eating is warranted, we believe that the literature supports the need for interventions aimed at the reduction of parental pressure. Future interventions research should include continued development of simple and positive exposure-based food acceptance interventions that can be easily disseminated to parents and primary care clinicians.

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Table 1

*Characteristics of student-parent dyads across samples*

	US (n = 98)	UK (n = 72)
	Mean (SD)	Mean (SD)
Student Age (years)	18.49 (0.95)	21.43 (1.75)
Parent Age (years)	47.91 (4.95)	48.75 (6.93)
Student BMI (kg/m <sup>2</sup> )	24.26 (5.34)	23.53 (3.52)
Picky Eating	2.11 (1.30)	2.43 (1.13)
Pressure	2.42 (0.65)	2.89 (0.66)
Intuitive Eating	3.49 (0.60)	3.18 (0.59)
EDI Bulimia	1.86 (0.68)	2.24 (0.83)
EDI Drive for Thinness	3.05 (1.23)	3.11 (1.39)

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\* $p \leq .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

*Note.* Picky eating, pressure, and intuitive eating were scored on a 5-point scale and EDI bulimia and EDI drive for thinness were scored on a 6-point scale.

PRESSURE TO EAT PREDICTS ADULT EATING BEHAVIOR

Table 2

*One-Tailed Pearson Correlations Among Predictor and Outcome Variables*

	Total Childhood Pressure <sup>a</sup>	Childhood Picky Eating	Current BMI	Gender <sup>g</sup>
IES Total <sup>b</sup>	-.17*	-.14*	-.25**	.35**
Unconditional <sup>c</sup>	-.13*	-.13	-.15*	.36**
Physical <sup>d</sup>	-.18*	-.11	-.23**	.28**
Satiety <sup>e</sup>	-.04	-.06	-.24**	.15*
EDI <sup>f</sup> -Bulimia	.17*	.16*	.32**	-.16*
EDI-Drive for Thinness	.02	.13	.24	-.43**

\* $p \leq .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

<sup>a</sup> Total Pressure = Average of parent and student retrospective reporting of pressure to eat

<sup>b</sup> IES = Intuitive Eating Scale; High scores = higher levels of intuitive eating

<sup>c</sup> Unconditional Permission to Eat IES Subscale

<sup>d</sup> Eating for Physical Reasons IES Subscale

<sup>e</sup> Reliance on Signs of Hunger and Satiety Subscale

<sup>f</sup> EDI = Eating Disorder Inventory; High scores = higher levels of disordered eating behaviors

<sup>g</sup> Gender = Female (0). Male (1).

PRESSURE TO EAT PREDICTS ADULT EATING BEHAVIOR

Table 3

*One-Tailed Correlations Among Predictors*

	Childhood Picky Eating	Total Childhood Pressure	BMI	Gender <sup>a</sup>
Childhood Picky Eating	-	-	-	-
Total Childhood Pressure	0.28**	-	-	-
BMI	0.00	-0.12	-	-
Gender	-0.15*	-0.00	0.08	-

\* $p \leq .05$ ; \*\* $p < .01$

<sup>a</sup> Gender = Female (0). Male (1)

PRESSURE TO EAT PREDICTS ADULT EATING BEHAVIOR

Table 4

*Hierarchical Regression of Eating Behavior Outcomes in College Students*

	Intuitive Eating Scale		EDI <sup>a</sup> Bulimia Scale		EDI Drive for Thinness Scale	
	B(SE)	β	B(SE)	β	B(SE)	β
<i>Step 1</i>	ΔR <sup>2</sup> = .039*		ΔR <sup>2</sup> = .042*		ΔR <sup>2</sup> = .016	
Total Pressure	-0.125 (0.070)	-.142	0.145 (0.088)	.130	-0.036 (0.150)	-.019
Picky Eating	-0.051 (0.039)	-.103	0.078 (0.049)	.126	0.137 (0.084)	.130
<i>Step 2</i>	ΔR <sup>2</sup> = .004		ΔR <sup>2</sup> = .016		ΔR <sup>2</sup> = .030*	
Total Pressure	-0.113 (0.071)	-.128	0.116 (0.089)	.104	-0.103 (0.150)	-.055
Picky Eating	-0.051 (0.039)	-.103	0.079 (0.049)	.127	0.160 (0.084)	.153
Interaction (PRxPE) <sup>b</sup>	-0.045 (0.051)	-.068	0.108 (0.064)	.130	0.249 (0.109)	.178*
<i>Step 3</i>	ΔR <sup>2</sup> = .069**		ΔR <sup>2</sup> = .107***		ΔR <sup>2</sup> = .051**	
Total Pressure	-0.147 (0.070)	-.167*	0.169 (0.085)	.152*	-0.041 (0.149)	-.022
Picky Eating	-0.046 (0.038)	-.093	0.071 (0.046)	.115	0.130 (0.081)	.124
Interaction (PRxPE)	-0.033 (0.050)	-.050	0.089 (0.060)	.107	0.228 (0.106)	.162*
BMI	-0.035 (0.010)	-.265***	0.055 (0.012)	.331***	0.063 (0.021)	.228**
<i>Step 4</i>	ΔR <sup>2</sup> = .132**		ΔR <sup>2</sup> = .024*		ΔR <sup>2</sup> = .176***	
Total Pressure	-0.175 (0.065)	-.198**	0.184 (0.084)	.165*	0.028 (0.135)	.015
Picky Eating	-0.015 (0.036)	-.030	0.055 (0.046)	.088	0.053 (0.074)	.051
Interaction (PRxPE)	0.008 (0.046)	.012	0.067 (0.061)	.081	0.127 (0.097)	.091
BMI	-0.040 (0.009)	-.302***	0.057 (0.012)	.347***	0.075 (0.019)	.270***
Gender <sup>c</sup>	0.505 (0.094)	.375***	-0.271 (0.123)	-.160*	-1.236 (0.196)	-.432***
<i>Final Model</i>	R <sup>2</sup> = .244***		R <sup>2</sup> = .189***		R <sup>2</sup> = .273***	

\*p ≤ .05. \*\* p < .01. \*\*\*p < .001; B=unstandardized regression coefficient, β=standardized coefficient

<sup>a</sup> EDI = Eating Disorder Inventory

<sup>b</sup> PRxPE = Interaction between picky eating and pressure scores

<sup>c</sup> Gender = Female (0). Male (1).

## **Vita**

Jordan Michael Ellis was born in Charlotte, North Carolina to Michael and Sharon Ellis. He graduated from the University of North Carolina at Asheville in May 2011. He was awarded a Bachelor of Science degree, majoring in Health and Wellness Promotion. After working as a health and wellness coordinator in community mental health for two years, he entered Appalachian State University in the fall of 2013 to begin study toward a Master of Arts degree in Clinical Health Psychology. He was awarded this degree in May 2015, and plans to continue his education in a Clinical Psychology doctoral program.

