

**Why Don't You Like That? Examining the Relationship Between Adult Eating Habits,  
Sensory Preferences, Thinking Patterns, and Age**

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### **Abstract**

Picky eating is a common behaviour among adults, yet the existing literature focuses primarily on children. Thus, little is known about the mechanisms behind picky eating in an adult population. This study investigated how sensory sensitivity and intuitive eating are related to picky eating among adults without prior diagnosis of an eating disorder. Participants ( $N = 142$ ; 81.7% female) were recruited via university communication systems to anonymously complete an online survey. The survey included measures of picky eating (Adult Picky Eating Questionnaire), sensory sensitivity (Glasgow Sensory Questionnaire), intuitive eating (Intuitive Eating Scale 2), stress and anxiety (Depression Anxiety and Stress Scale). Positive correlations were identified between picky eating and sensory sensitivity, anxiety, and stress, but not intuitive eating. Follow-up regression analysis revealed that when sensory sensitivity was included in the model other related factors (stress and anxiety) were unable to account for any additional variance in picky eating behaviour. This key finding suggests that sensory sensitivity is a primary factor in the presence and severity of picky eating behaviours among adults. These findings did not significantly differ between groups based on biological sex, age, ethnicity, or time lived in Canada which suggests that picky eating in adulthood is not restricted to a single population. This study expands our understanding of adult picky eating behaviour and makes suggestions for future research.

*Keywords:* picky eating, adult population, sensory sensitivity, anxiety, stress

## **Why Don't You Like That? Examining the Relationship Between Adult Eating Habits, Sensory Preferences, Thinking Patterns, and Age**

Pickiness is generally considered a trait that individuals either do, or do not, possess, but it is more accurate to view pickiness as a spectrum. People may exist at different points on this spectrum, based on the frequency and severity of picky eating (PE) behaviors they engage in, while still identifying as a picky eater. PE is the term used to describe a set of eating behaviors characterized by a lack of variety in one's diet, rejection of new foods, and strict requirements regarding the preparation and presentation of food (Taylor et al., 2015). With estimates as high as 59.3% of children engaging in PE behaviors, it is no big surprise that PE is generally regarded as a childhood phenomenon (Taylor et al., 2015). However, contrary to popular belief roughly 35% of adults also engage in PE behaviors and/or consider themselves to be picky eaters (Kauer et al., 2015). Despite how common PE is in adults the existing literature focuses primarily on children with only a few studies examining an adult population (e.g., Barnhart et al., 2021; Wildes et al., 2012). Little is known about why some adults engage in PE behaviors. The purpose of this study is to examine factors that may contribute to adult PE in individuals without prior diagnosis of an eating disorder, which, according to the American Psychiatric Association (APA; 2023), are conditions in which one experiences "severe and persistent disturbance in eating behaviors and associated distressing thoughts and emotions" that are detrimental to their mental and physical health (What are Eating Disorders? section, para. 1).

This study proposes to collect and examine data gathered on PE via an anonymous online survey. This data explores the relationships between various factors that are thought to contribute to adult PE. The specific factors that are investigated include sensory sensitivity, intuitive eating, anxiety, and stress. Further knowledge about the factors that contribute to adult PE has the

potential to aid in the understanding of how these behaviors are related to various psychological disorders (e.g., anxiety, ADHD). For example, there is only one diagnosis in the DSM-5-TR that currently contains a nutritional deficiency as part of its diagnostic criteria (i.e., hypocretin deficiency for Narcolepsy; APA, 2022). It is therefore possible that this research stream will eventually lead to the identification of nutritional deficits related to other psychological disorders and inform changes to their diagnostic criteria.

The following section includes a discussion of the current knowledge of PE and its place in the conceptualization of related psychological phenomena. First is a critical review of relevant literature on disordered eating. This is followed by discussions on PE's connections to both internalizing and externalizing symptoms as well as the potential role of ADHD and sensory sensitivity. Finally, a discussion on the current study and its aim to address gaps in the literature occurs.

## **Literature Review**

### **Disordered Eating's Relation to PE**

There is a lack of consensus in the existing literature regarding whether or not PE is related to disordered eating. For example, one study done with children found that there was no difference between picky and non-picky children on measures of disordered eating behaviors or beliefs (Jacobi et al., 2008). The authors did note however that their findings were limited by the fact that they used maternal reports and not data directly from the children (Jacobi et al., 2008). In contrast Kauer and colleagues (2015) found that picky eaters scored higher on a measure of disordered eating beliefs (e.g., feeling guilt after eating, intense worry about weight) than the non-picky comparison group, although neither group scored above clinical population means. Further support for the relation between PE and disordered eating comes from a study that

included data from 6895 adults who self-identified as picky eaters (Wildes et al., 2012).

Participants were recruited from across the global west (more specifically Canada, Australia, the United States, and United Kingdom) and completed an online survey that inquired about their eating habits and beliefs in addition to their psychological wellbeing. Latent class analysis (a method of modeling that creates groups based on shared traits) revealed the existence of four distinct groups: 1) individuals who reported frequent picky and disordered eating symptoms, 2) individuals who reported frequent PE symptoms, 3) individuals who reported frequent disordered eating symptoms, and 4) individuals who reported few symptoms of picky or disordered eating. These findings demonstrate that PE can exist both with and without disordered eating symptoms (Wildes et al., 2012). Interestingly, the two largest groups identified were those with only PE symptoms and with both PE and disordered eating symptoms (comprising 28.7% and 31.8% of the sample, respectively; Wildes et al., 2012).

Both studies that support the notion that picky and disordered eating are related concepts examined adult populations (Kauer et al., 2015; Wildes et al., 2012). Meanwhile, the study that found no relationship focused on children (Jacobi et al., 2008). One possible explanation for this difference is that both adult studies used self-report data whereas the study on children relied on maternal reports. It is possible that while the information from the mothers accurately represented their understanding of their child's relationship with food it may not have captured the entire relationship, in particular the child's inner thoughts and beliefs. It is unlikely that these inner thoughts and beliefs about food were missed in the adult studies as participants reported their personal relationships with food as opposed to others inferring this relationship based on observations. Another possibility for this discrepancy is that PE serves as a risk factor for the future development of eating disorders or related behaviors and beliefs, a thought shared by

Wildes et al. (2012). This would explain why picky and disordered eating were not found to be related in the childhood population but were in the adult populations. The use of different methods between studies (i.e., self-report vs. maternal reports) plus the likelihood that the maternal reports missed components of the children's relationships with food, due to guessing about their child's food beliefs, necessitate caution when interpreting these findings.

Newly included in the DSM-5 is Avoidant/Restrictive Food Intake Disorder (ARFID; APA, 2013). ARFID is characterized by unusual eating habits that result in significant weight loss, nutritional deficits, and/or reliance on dietary supplements or a feeding tube to receive necessary nutrients (APA, 2022). Although ARFID is categorized as a restrictive eating disorder like Anorexia Nervosa (AN), weight loss experienced by ARFID patients is not the motivation for their unusual eating habits but rather a side effect of them (APA, 2022). Some of the reasons noted for ARFID patients' eating habits are a general lack of interest in eating, dislike of sensory qualities of food (e.g., smell, taste), and fear of negative consequences of eating that are unrelated to weight gain or body size (e.g., choking, allergic reaction; APA, 2022). Motivations for the eating patterns present in ARFID patients are incredibly similar to those of picky eaters. In fact, ARFID has been proposed as a severe form of PE, existing on the extreme end of the PE continuum, that requires clinical diagnosis and intervention (Wildes et al., 2012).

### **Internalizing and Externalizing Symptoms Related to PE**

Previous research that focused on children has found that PE is connected to increased symptoms of anxiety, depression, and ADHD (Zucker et al., 2015; Jacobi et al., 2008). In addition, data from maternal reports has found that young picky eaters display more severe aggressive and delinquent behaviors (Jacobi et al., 2008). Like their younger counterparts, adult picky eaters have been found to experience greater anxiety (Wildes et al., 2012) along with more

symptoms of depression and obsessive-compulsive disorder (OCD; Kauer et al., 2015) than their non-picky peers. These findings demonstrate that PE is related to both internalizing (e.g., distractibility, anxiety) and externalizing (e.g., hyperactivity, aggression) symptoms across the lifespan which is congruent with various eating disorders. For example, Kaye and colleagues (2004) examined 672 people ranging in age from 13-65 years old who had been diagnosed with AN, Bulimia Nervosa, or both AN and Bulimia Nervosa. They discovered that roughly two-thirds of these patients also had at least one chronic anxiety disorder, OCD being the most common at 41%, and that there were significantly more anxiety disorders in their patient sample than what has been estimated for non-clinical populations (Kaye et al., 2004). Even individuals who had spent a minimum of 12 months in recovery (i.e., no longer had symptoms) from AN and/or Bulimia Nervosa still reported experiencing significantly more anxiety than healthy controls (Kaye et al., 2004). Interestingly, in a study of children and adolescents diagnosed with either AN or ARFID it was found that patients with ARFID were more likely to also have an anxiety disorder (Zanna et al., 2021). While ARFID did not yet exist in the DSM when Kaye et al. (2004) did their study, and their sample was not identical to that of Zanna et al. (2021), when put together these findings suggest that not only does anxiety appear to be a component of disordered eating but also of PE. Zanna et al. (2021) also found that ARFID patients displayed more ADHD symptoms than AN patients, which aligns with previous research on childhood PE (Zucker et al., 2015).

An important study is that of Barnhart et al. (2021) who investigated the connections between PE behaviors, symptoms of disordered eating, and various types of negative psychological symptoms including anxiety and depression. Their sample was comprised of just over five hundred undergraduate students ranging from 18-25 years of age. They found that PE

was positively correlated with both disordered eating and negative psychological symptoms which is consistent with the existing literature discussed thus far (Barnhart et al., 2021). The most interesting finding however was that together anxiety and stress moderate the relationship between PE and disordered eating such that the greater anxiety and/or stress that a picky eater experiences the greater their disordered eating beliefs (Barnhart et al., 2021). This finding highlights that anxiety and/or stress appear to be key components of the relationship between PE and disordered eating. The exact relationship between PE and these negative psychological correlates (i.e., anxiety and stress) is not yet known. It is possible that anxiety and/or stress serve as moderators for PE. Due to the use of self-report and maternal-report data, the findings regarding PE's relationship with internalizing and externalizing symptoms are limited and require caution when interpreting.

### **Potential Influence of ADHD & Sensory Sensitivity on PE**

ADHD has been linked to picky and disordered eating within both clinical and non-clinical populations (e.g., Zanna et al., 2021; Zucker et al., 2015). However, as discussed above, so have symptoms of anxiety and depression (e.g., Barnhart et al., 2021; Kaye et al., 2004; Jacobi et al., 2008; Kauer et al., 2015; Wildes et al., 2012). There is substantial overlap between inattentive symptoms of ADHD and anxiety which causes one to wonder whether it is this overlap that is responsible for the relationships ADHD shares with picky and disordered eating. Kaisari et al. (2018) explored how the different symptom types of ADHD (i.e., inattentive (e.g., difficulty concentrating) and hyperactive/impulsive (e.g., fidgeting)) are related to disordered eating behaviors among adults. An important component of this study is that they also included measures of negative mood and intuitive eating, specifically the ability to identify and respond to internal cues regarding hunger. They reported that both types of ADHD symptoms were

positively related to disordered eating while intuitive eating and negative mood serve as mediators for this relationship (Kaisari et al., 2018). The negative mood variable used by Kaisari et al. (2018) was a combination of individual anxiety, stress, and depression measures which obscures the results as it is unclear whether one or more of its components is responsible for their discovery. Furthermore, only inattentive symptoms of ADHD were found to be associated with diminished intuitive eating (Kaisari et al., 2018). The finding that ADHD symptoms are related to both intuitive and disordered eating is consistent with existing literature, namely that intuitive eating is negatively correlated with inflexible eating: the possession of strict beliefs regarding diet restrictions and feeling immense guilt if one's eating habits deviate from these beliefs (Duarte et al., 2017).

Another possible explanation for the relation between ADHD symptoms and PE is sensory sensitivity. Sensory sensitivity refers to difficulties in processing sensory information whereby individuals can experience an exaggerated (hypersensitivity) or diminished (hyposensitivity) response to sensory information (Panagiotidi et al., 2018). In a study examining children diagnosed with ADHD and Autism Spectrum Disorder (ASD), it was found that these neurodiverse children experienced significantly greater sensory sensitivity than their neurotypical peers (Cheung & Siu, 2009). This study also found that children with ADHD were the only group to experience an increase in sensory sensitivity with age whereas the others experienced a decrease (Cheung & Siu, 2009). It is important to note however that like other studies focusing on children Cheung and Siu (2009) are limited by their use of parental report data. The connection between ADHD symptoms and sensory sensitivity has, however, been demonstrated among a non-clinical adult population. More specifically, after excluding participants who reported any prior diagnosis of ADHD, ASD, or other mental illness,

Panagiotidi et al. (2018) found that ADHD symptoms are positively correlated with sensory sensitivity. This finding may enlighten the current study as sensory sensitivity's relation with ADHD could explain the higher rates of ADHD symptoms reported in patients with ARFID (Zanna et al., 2021). While this study is limited by its use of self-reported data, it is significant in that it demonstrates that ADHD symptoms are present within the general population not just individuals who have been diagnosed with ADHD.

### **The Current Study**

As discussed above, existing research on PE has identified connections to disordered eating, internalizing symptoms, and externalizing symptoms. Previous research has also identified connections between ADHD symptoms and disordered eating, sensory sensitivity, and intuitive eating. There are few studies however that utilize an adult population and therefore little is known about the factors related to PE in adulthood. This study aims to address this gap in the literature.

The primary research question being asked is whether an individual's measures of sensory sensitivity and intuitive eating are related to their measure of PE in the general population of adults without prior diagnosis of an eating disorder. If a relationship between these variables is detected, then the secondary research question is what amount of variance within measures of PE can be attributed to measures of sensory sensitivity, intuitive eating, anxiety, and stress. Based on the existing literature it is hypothesized that PE will be positively correlated with sensory sensitivity and negatively correlated with intuitive eating. It is expected that the strength of the relationship will decrease with age as both sensory sensitivity and PE have been found to decrease with age for the majority of the population previously studied (e.g., Cheung & Siu, 2009; Kauer et al., 2015; Taylor et al., 2015). Further, the relationships are expected to be

stronger in males (biological sex) as ADHD is diagnosed more frequently in males than females (Nevid et al., 2018).

## Methods

### Participants

Participants were recruited through the use of PAWS announcements, a Letter of Invitation sent to the student researcher's friends and family, and the University of Saskatchewan Participant Pool (SONA). Participants recruited via the Participant Pool were granted one course credit in exchange for their time, otherwise no compensation was provided.

An initial sample of 207 participants was recruited, however, the final sample consisted of 142 participants. A total of 65 participants were excluded due to being under 18 years of age ( $n = 7$ ), responding incorrectly to attention check questions ( $n = 28$ ), reporting prior diagnosis of an eating disorder ( $n = 18$ ), taking less than 5 minutes to complete the survey ( $n = 3$ ), missing more than 10% of data from any single measure ( $n = 5$ ), and completing the survey more than once ( $n = 4$ ). Participants in the final sample ranged in age from 18 to 47 years ( $M = 22.18$ ,  $SD = 6.12$ ) and were primarily female ( $n = 116$ ), white ( $n = 76$ ), and had English as their first language ( $n = 118$ ).

### Materials

*Adult Picky Eating Questionnaire (APEQ; Ellis et al., 2017).*

This 16-item questionnaire was used to measure participants' PE behavior. Participants rated how well their current eating habits aligned with each statement (e.g., I do not like trying new foods) on a 5-point scale (1 = Never; 5 = Always). Scores can range from 16 to 80 with higher scores reflective of greater picky eating behaviors. The APEQ has shown that it

demonstrates strong internal consistency within each of its four subscales ( $\alpha = 0.77-0.84$ ) and construct validity ( $r = 0.48, p < 0.01$ ; Ellis et al., 2017).

***Glasgow Sensory Questionnaire (GSQ; Roberston & Simmons, 2023).***

This 42-item questionnaire was used to measure participants' level of sensory sensitivity. Participants used a 5-point scale (1 = Never; 5 = Always) to rate how often they have experienced the phenomenon described in each item over the previous 12 months. Sample items include "Do bright lights ever hurt your eyes/cause a headache?" and "Do you ever feel ill just from smelling a certain odour?". Resulting scores can range from 42 to 210 with higher scores reflecting greater sensory sensitivity. Items assess 7 different sensory modalities (e.g., visual, auditory) and cover both hyper- and hypo- responses to each of these 7 modalities. Panagiotidi et al. (2018) have previously found that the GSQ has strong internal consistency ( $\alpha = 0.93$ ) and construct validity ( $r = 0.55, p < 0.05$ ).

***Intuitive Eating Scale (IES-2; Tylka & Kroon Van Diest, 2013).***

The 6-item 'Reliance on Hunger and Satiety Cues' subscale of the IES-2 was used to attain a measure of participants' intuitive eating. Participants rated their agreement with each statement (e.g., I trust my body to tell me when to eat) on a 5-point scale ranging from strongly disagree to strongly agree. Final scores can range from 6 to 30 points with higher scores indicative of a greater awareness of, and reliance on, the body's hunger signals. The 'Reliance on Hunger and Satiety Cues' subscale has been found to have strong internal consistency ( $\alpha = 0.85$ ; Kaisari et al., 2018) and construct validity ( $r = 0.53, p < 0.01$ ; Herbert et al., 2013).

***Depression Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995).***

The 'Anxiety' and 'Stress' subscales, each containing 7 items, were used to assess participants' experiences of anxiety and stress. A 4-point scale (0 = Did not apply to me at all; 3

= Applied to me very much or most of the time) was used by participants to indicate how often each statement (e.g., I found it difficult to relax) applied to them over the prior week. Final scores for each subscale can range from 0 to 21 with higher scores indicating greater levels of stress or anxiety. Lovibond and Lovibond (1995) have shown that the 'Anxiety' and 'Stress' subscales have strong internal consistency ( $\alpha = 0.82$ ,  $\alpha = 0.90$ ) and construct validity ( $r = 0.81$ ,  $p < 0.05$ ).

### ***Demographics.***

Age, biological sex, ethnicity, and first language were reported via a brief demographic questionnaire. Participants also reported how long they have lived in Canada and whether or not they had ever been diagnosed by a medical professional with an eating disorder.

### ***Attention Checks.***

A total of three attention check questions were included within the survey to aid in the assessment of response quality. One attention check question was located within each of the following measures: APEQ, GSQ, and DASS-21. Participants who failed to correctly respond to one or more of these questions had their data excluded from analysis.

### **Design**

This study employed a between-subjects correlational design. All participants anonymously completed the same online survey a single time using a device of their choosing. PE was the dependent variable while intuitive eating, sensory sensitivity, anxiety, and stress serve as independent variables. Ethical approval for the study was received from the University of Saskatchewan's Department of Psychology Research Ethics Committee prior to beginning data collection (Psy-REC # 23-045).

## **Procedure**

Once recruited, participants received a link to access the online survey hosted via the SurveyMonkey platform. Participants recruited via the Participant Pool received the link directly from the SONA system immediately after signing up for the study. All other participants contacted the student researcher via email to express their interest in the study and received the link in the student researcher's response. Upon following the link participants were presented with a virtual consent form and given the opportunity to ask questions about their role in the study. All participants provided informed consent prior to the survey being initiated by clicking the continue button and again upon submitting the completed survey. Following informed consent being obtained participants were presented with the APEQ to attain a measure of their current PE behaviors. Since PE serves as this study's dependent variable the APEQ was presented first to limit the effects of response fatigue. The APEQ was followed by the IES-2, GSQ, and DASS-21. These measures were presented one at a time and each served to assess the independent variables examined in this study: intuitive eating, sensory sensitivity, anxiety, and stress, respectively. A short demographic questionnaire was then administered to participants before they were presented with a debriefing form that included additional details of the study and the researchers' contact information. In total the survey took approximately 30 minutes for participants to complete.

## **Data Analysis**

Following the removal of participant data that did not meet the inclusion criteria (i.e., pass attention checks, no prior eating disorder diagnosis, minimum 18 years old) the remaining data was used to determine participants' scores on the various measures. To study the properties of the data (mean, variance, skewness, and kurtosis) and to search for outliers, Descriptive

Statistics were calculated. To determine reliability of the measures, Cronbach's Alpha was used, and comparisons were made with data from researchers who have reported similar coefficients. Once this was completed and to test hypotheses, correlations were calculated, and a correlational matrix created, to identify relationships between the variables. Since sufficient relationships were identified a hierarchical regression analysis was conducted to determine the percentage of variance that could be attributed to each individual factor examined. Demographic differences were also examined.

## **Results**

Prior to calculating the reliability of each scale, missing data from the 142 participants was replaced with the whole number nearest each question's mean response. Each scale demonstrated an acceptable level of reliability that would not have benefited from the removal of any items. The scales had robust alpha measures and performed similarly to what is in the literature so there is no concern about limitations in that regard. See Table 1 for a summary of each scale's reliability rating.

Since the descriptive statistics on the scales used were satisfactory, see Table 2 for details, no data transformations were conducted. The next step to determine whether an individual's measures of sensory sensitivity and intuitive eating are related to their measure of PE was to create a correlational matrix. See Table 3 for the correlational matrix that was created. The variables Stress and Anxiety were included in the correlational matrix to aid in the determination of whether regression analysis was required. The significant correlation found between participants' scores on the APEQ and GSQ is in line with the hypothesis that PE and sensory sensitivity would be positively correlated. Contrary to the hypothesis that PE and intuitive eating

would be negatively correlated, the correlation between intuitive eating (IES-2) and PE (APEQ) was not significant.

Stepwise multiple linear regression was used to test which of the variables (sensory sensitivity, intuitive eating, anxiety, and stress) contributed uniquely to PE. The overall regression was statistically significant ( $R^2 = 0.34$ ,  $F(1, 140) = 71.44$ ,  $p < 0.001$ ). It was found that sensory sensitivity significantly predicted PE ( $\beta = 0.58$ ,  $p < 0.001$ ). Intuitive eating ( $\beta = 0.04$ ,  $p = 0.57$ ), anxiety ( $\beta = -0.02$ ,  $p = 0.78$ ), and stress ( $\beta = 0.06$ ,  $p = 0.49$ ) were excluded from the model as they did not significantly predict unique PE after accounting for the contribution of sensory sensitivity.

A series of t-tests were conducted to examine the possible influence of demographic differences on PE scores. Participants were divided into two groups, using a median split, for tests that examined participant age and amount of time spent living in Canada. No difference in PE was detected on the basis of age ( $t(140) = -0.68$ , two-sided  $p = 0.50$ ) or how long participants had lived in Canada ( $t(140) = 1.09$ , two-sided  $p = 0.28$ ). Examination of biological sex did not reveal any PE differences either ( $t(140) = -0.45$ , two-sided  $p = 0.65$ ). A one-way ANOVA was performed to determine whether differences in PE existed based on participant ethnicity. Participants were categorized into three groups based on the ethnicity they reported: Caucasian ( $n = 76$ ), Asian ( $n = 28$ ), and Other ( $n = 38$ ). The one-way ANOVA revealed that there was not a significant difference in PE between different ethnic groups ( $F(2, 139) = 3.06$ ,  $p = 0.05$ ). The one-way ANOVA was approaching significance so post-hoc tests were conducted to confirm the findings. Post-hoc Bonferroni testing did not find significant differences between Caucasian and Asian ( $p = 0.11$ ), Caucasian and Other ( $p = 0.19$ ), or Asian and Other ( $p = 1.00$ ).

## Discussion

Previous research has found connections between PE and elevated symptoms of depression, anxiety, ADHD, and disordered eating (e.g., Barnhart et al., 2021; Kauer et al., 2015; Wildes et al., 2012; Zucker et al., 2015). The literature has, however, focused primarily on PE within children leaving much unknown about PE within an adult population. This study aimed to identify mechanisms underlying PE behaviours among adults. Aligning with existing research, positive relationships were identified between PE and negative psychological symptoms (anxiety and stress). A significant relationship between PE and sensory sensitivity was also detected that indicates it may be an underlying mechanism for PE among adults.

No significant relationship was detected between PE and intuitive eating. Existing literature (e.g., Kaisari et al., 2018) has focused on the impact that intuitive eating has on disordered eating; a factor which this study did not examine. Given that Kaisari et al. (2018) found that intuitive eating mediates the relationship between ADHD symptoms and disordered eating it is possible that intuitive eating may serve as a mediator for the relationship between PE and disordered eating such that with more PE, the intuitive eating is related negatively to disordered eating rather than PE being directly related to intuitive eating as hypothesized here. It is also possible that intuitive eating does not contribute to PE like it does disordered eating. As our sample excluded participants with prior eating disorder diagnoses it is possible that we only examined individuals on the mild side of the PE continuum or who experienced PE behaviours without any disordered eating symptoms (Wildes et al., 2012). Intuitive eating may not influence these mild PE cases and only come into play for severe PE cases. Future research should examine whether there are key differences between mild and severe presentations of PE and whether factors such as anxiety, stress, and intuitive eating contribute to these differences. While

severe PE might be a form of disordered eating, there is no proof that the two concepts are identical. Additional work is needed in order to clarify the relationship between PE and disordered eating.

A significant positive correlation between PE and sensory sensitivity was detected. The greater an individual's sensory sensitivity the more PE behaviours they experience. This finding is consistent with existing literature that links ADHD symptoms to both sensory sensitivity (e.g., Cheung & Siu, 2009; Panagiotidi et al., 2018) and PE (e.g., Zanna et al., 2021; Zucker et al., 2015). PE was also found to have significant positive correlations with both anxiety and stress which is consistent with existing literature (e.g., Barnhart et al., 2021; Wildes et al., 2012; Zucker et al., 2015). Greater PE behaviors is therefore connected to increased experiences of negative psychological symptoms. This finding indicates that PE can be psychologically harmful for adults and highlights the importance of furthering our understanding of the phenomenon.

A follow-up regression analysis was performed with the goal of identifying what proportion of the relationship between PE and sensory sensitivity could be attributed to experiences of stress and anxiety. Interestingly, the relationship between PE and sensory sensitivity was so profound that the other factors (stress and anxiety) were unable to account for any additional difference in PE behaviours. Thus, much like some ARFID patients, it appears that the sensory characteristics of food are a primary motivator for engaging in PE behaviors. This finding that ARFID and PE appear to both be motivated by sensory sensitivity may support the notion that ARFID exists on the extreme end of the PE continuum (Wildes et al., 2012). However, it is still not clear whether ARFID and PE exist on the same continuum or if they are distinct phenomena.

Participant age had no effect on the relationship between PE and sensory sensitivity. Based on prior findings that both factors decreased with age (e.g., Cheung & Siu, 2009; Kauer et al., 2015; Taylor et al., 2015) we had expected to observe something similar. This finding, or lack thereof, is limited by the population examined in this study. Our sample was composed primarily of undergraduate students with only 14.1% of participants older than 25 years of age. It is possible that age effects went undetected due to the sample not being diverse enough regarding the human lifespan. Future research should emphasize recruiting individuals within both the middle and late stages of adulthood as opposed to primarily early adulthood.

The sample being composed primarily of undergraduate students may also pose problems regarding the ADHD aspect of the study. People with ADHD are known to be less likely to enroll in post-secondary programs (Barkley et al., 2006). As this study did not inquire about nor exclude participants for an existing ADHD diagnosis there is a high probability that any participants with ADHD had relatively minor presentations. Future studies should aim to recruit participants with both mild and severe presentations of ADHD to better reflect the general population. While we did not directly assess ADHD symptoms, it has been established that they are related to experiences of sensory sensitivity (e.g., Panagiotidi et al., 2018). Future studies would benefit from including a more direct measurement of ADHD symptoms as well as inquiring about participants' diagnostic status. Medications commonly used to treat ADHD frequently include loss of appetite as a side effect. Future research investigating PE among adults with ADHD should examine whether differences exist depending on medication status.

Also contrasting with existing literature, biological sex had no effect on the relationship between PE and sensory sensitivity. This is surprising given that ADHD has been connected to PE (e.g., Zanna et al., 2021; Zucker et al., 2015) and is diagnosed more often in biological males

(e.g., Nevid et al., 2018). This could be due to the low number of biological males included in the study sample ( $n = 26$ ). Future studies should aim to have a more even sample distribution regarding biological sex.

While analyses that examined sample demographics were not what we anticipated they are significant as they suggest that PE is not restricted to a singular population. Rather, PE can influence adults regardless of age, biological sex, ethnicity, etc. The importance of future research into adult PE is emphasized by the significant positive correlation between PE and both stress and anxiety. Further understanding of the mechanisms underlying PE, such as sensory sensitivity as identified here, can aid in the identification of individuals at risk of developing harmful PE habits. Furthermore, greater understanding of factors that contribute to PE among adults can aid in the development of treatments aimed at reducing, or limiting, PE to levels below those found in ARFID patients. Such treatments may also be effective with ARFID patients whose unusual eating habits are motivated by the dislike of food's sensory qualities. In conclusion, while the results of this study suggest that PE operates similarly among adults as it does children, there are still aspects of PE in adulthood that remain unclear and require further investigation.

## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5<sup>th</sup> ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). <https://doi.org/10.1176/appi.books.9780890425787>
- American Psychiatric Association. (2023, February). *What are Eating Disorders?* Retrieved March 27, 2024 from <https://www.psychiatry.org/patients-families/eating-disorders/what-are-eating-disorders>
- Barkley, R. A., Fischer, M., Smallish, L., & Fletcher, K. (2006). Young adult outcome of hyperactive children: Adaptive functioning in major life activities. *Journal of the American Academy of Child & Adolescent Psychiatry*, 45(2), 192-202. <https://doi.org/10.1097/01.chi.0000189134.97436.e2>
- Barnhart, W. R., Hamilton, L., Jordan, A. K., Pratt, M., & Musher-Eizenman, D. R. (2021). The interaction of negative psychological well-being and picky eating in relation to disordered eating in undergraduate students. *Eating Behaviors*, 40, 101476. <https://doi.org/10.1016/j.eatbeh.2021.101476>
- Cheung, P. P. P. & Siu, A. M. H. (2009). A comparison of patterns of sensory processing in children with and without developmental disabilities. *Research in Developmental Disabilities*, 30(6), 1468-1480. <https://doi.org/10.1016/j.ridd.2009.07.009>
- Duarte, C., Ferreira, C., Pinto-Gouveia, J., Trindade, I. A., & Martinho, A. (2017). What makes dietary restraint problematic? Development and validation of the Inflexible Eating Questionnaire. *Appetite*, 114, 146-154. <https://doi.org/10.1016/j.appet.2017.03.034>

- Ellis, J. M., Galloway, A. T., Webb, R. M., & Martz, D. M. (2017). Measuring adult picky eating: The development of a multidimensional self-report instrument. *Psychological Assessment, 29*(8), 955-966. <https://doi.org/10.1037/pas0000387>
- Herbert, B. M., Blechert, J., Hautzinger, M., Matthias, E., & Herbert, C. (2013). Intuitive eating is associated with interoceptive sensitivity. Effects on body mass index. *Appetite, 70*, 22-30. <https://doi.org/10.1016/j.appet.2013.06.082>
- Jacobi, C., Schmitz, G., & Agras, W. S. (2008). Is picky eating an eating disorder? *International Journal of Eating Disorders, 41*(7), 626-634. <https://doi.org/10.1002/eat.20545>
- Kaisari, P., Dourish, C. T., Rotshtein, P., & Higgs, S. (2018). Associations between core symptoms of attention deficit hyperactivity disorder and both binge and restrictive eating. *Frontiers in Psychiatry, 9*, 103. <https://doi.org/10.3389/fpsyt.2018.00103>
- Kauer, J., Pelchat, M. L., Rozin, P., & Zickgraf, H. F. (2015). Adult picky eating. Phenomenology, taste sensitivity, and psychological correlates. *Appetite, 90*, 219-228. <https://doi.org/10.1016/j.appet.2015.03.001>
- Kaye, W. H., Bulik, C. M., Thornton, L., Barbarich, N., & Masters, K. (2004). Comorbidity of anxiety disorders with anorexia and bulimia nervosa. *The American Journal of Psychiatry, 161*(12), 2215-2221. <https://doi.org/10.1176/appi.ajp.161.12.2215>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33*(3), 335-343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Nevid, J. S., Greene, B., Knight, L. J., Johnson, P. A., & Taylor, S. (2018). *Essentials of abnormal psychology in a changing world* (4th Canadian ed.). Pearson Canada Inc.

- Panagiotidi, M., Overton, P. G., & Stafford, T. (2018). The relationship between ADHD traits and sensory sensitivity in the general population. *Comprehensive Psychiatry, 80*, 179-185. <https://doi.org/10.1016/j.comppsy.2017.10.008>
- Robertson, A.E. & Simmons, D.R. (2023) The Glasgow Sensory Questionnaire, *Open Science Framework*. <https://doi.org/10.17605/OSF.IO/H95N4>
- Taylor, C. M., Wernimont, S. M., Northstone, K., & Emmett, P. M. (2015). Picky/fussy eating in children: Review of definitions, assessment, prevalence and dietary intakes. *Appetite, 95*, 349-359. <https://doi.org/10.1016/j.appet.2015.07.026>
- Tylka, T. L., & Kroon Van Diest, A. M. (2013). The Intuitive Eating Scale–2: Item refinement and psychometric evaluation with college women and men. *Journal of Counseling Psychology, 60*(1), 137-153. <https://doi.org/10.1037/a0030893>
- Wildes, J. E., Zucker, N. L., & Marcus, M. D. (2012). Picky eating in adults: Results of a web-based survey. *International Journal of Eating Disorders, 45*(4), 575-582. <https://doi.org/10.1002/eat.20975>
- Zanna, V., Criscuolo, M., Mereu, A., Cinelli, G., Marchetto, C., Pasqualetti, P., Tozzi, A. E., Castiglioni, M. C., Chianello, I., & Vicari, S. (2021). Restrictive eating disorders in children and adolescents: A comparison between clinical and psychopathological profiles. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 26*, 1491-1501. <https://doi.org/10.1007/s40519-020-00962-z>
- Zucker, N., Copeland, W., Franz, L., Carpenter, K., Keeling, L., Angold, A., & Egger, H. (2015). Psychological and psychosocial impairment in preschoolers with selective eating. *Pediatrics, 136*(3), e582–e590. <https://doi.org/10.1542/peds.2014-2386>

**Table 1***Reliability of Scales*

Scale	Cronbach's Alpha	N of Items
APEQ	.82	16
GSQ	.90	42
IES-2	.76	6
DASS-21		
Anxiety	.77	7
Stress	.76	7

*Notes.* APEQ = Adult Picky Eating Questionnaire. GSQ = Glasgow Sensory Questionnaire. IES-2 = Intuitive Eating Scale. DASS-21 = Depression Anxiety and Stress Scales.  $N = 142$  for all analyses.

**Table 2***Descriptive Statistics of Scales*

Scale	<i>M</i>	<i>SD</i>	Variance	Minimum	Maximum	Skewness	Kurtosis
APEQ	38.99	8.93	79.70	21	63	.22	-.53
GSQ	103.61	20.27	410.96	60	181	.72	1.20
IES-2	20.46	4.04	16.28	10	30	-.26	-.17
DASS-21							
Anxiety	6.63	4.18	17.47	0	20	.59	.05
Stress	8.80	3.85	14.79	1	20	.55	.09

*Notes.* APEQ = Adult Picky Eating Questionnaire. GSQ = Glasgow Sensory Questionnaire. IES-2 = Intuitive Eating Scale. DASS-21 = Depression Anxiety and Stress Scales. *N* = 142 for all analyses.

**Table 3***Correlations of Factors Thought to be Related to PE*

	APEQ	IES	Stress	Anxiety	GSQ
APEQ	1				
IES-2	-.02	1			
Stress	.37**	-.18*	1		
Anxiety	.30**	-.16	.69**	1	
GSQ	.58**	-.10	.57**	.55**	1

*Notes.* APEQ = Adult Picky Eating Questionnaire. IES-2 = Intuitive Eating Scale. Stress and Anxiety refer to the corresponding subscales of the Depression Anxiety and Stress Scales. \* =  $p < .05$ , \*\* =  $p < .001$ .  $N = 142$  for all analyses.