

What Facets of Picky Eating Relate to Eating Concerns in Undergraduate Students?: The Moderating Effects of Negative Psychological Correlates

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Abstract

Purpose: Picky eating (PE) can occur in adulthood and is associated with mental health concerns. PE is often conceptualized as distinct from disordered eating (DE), but recent research maps positive relationships between these maladaptive eating phenotypes. Precisely what PE facets relate to DE remain unknown, as do factors such as negative psychological correlates that might explain relationships between PE facets and DE.

Methods: A large, undergraduate sample ($N=509$) completed an online survey assessing PE facets (Adult Picky Eating Questionnaire; meal presentation, food variety, meal disengagement, and taste aversion), disordered eating (Eating Disorder Examination Questionnaire), specifically eating concerns, and negative psychological correlates such as mental health concerns (Depression, Anxiety and Stress Scale - 21 Items) and inflexible eating (Inflexible Eating Questionnaire).

Results: Positive relationships emerged between PE facets, eating concerns, and negative psychological correlates. Negative psychological correlates moderated relationships between PE facets and eating concerns. Meal presentation, meal disengagement, and taste aversion were more strongly associated with eating concerns when mental health concerns and inflexible eating were higher. Food variety did not significantly explain variance in eating concerns.

Conclusions: Considering PE multidimensionally may yield important insights beyond the broader construct. Mental health concerns and inflexible eating may be treatment and research targets in addressing the overlap between PE facets such as meal presentation, meal disengagement, and taste aversion and eating concerns.

Level of Evidence: Level V, cross-sectional descriptive study.

Introduction

Picky eating (PE) is often a vexing behavior in children. Not surprisingly, existing knowledge of PE correlates focuses largely on children [1–4], a striking limitation considering that PE persists over time [5–6, but see 7], that childhood PE predicts adult PE [3, 8–9], and that approximately 35% of adults engage in PE [10]. Adult PE is associated with poor dietary quality [11–12] and significant psychological impairment including a range of mental health concerns and disordered eating [13–15] (e.g., dietary restraint, eating concerns, binge eating, and overall eating pathology) [13]. Furthermore, relationships between adult PE and disordered eating, specifically eating concerns, are strengthened by negative psychological correlates such as mental health concerns and inflexible eating in undergraduate students [13]. A critical piece missing from this research is precisely which facets of PE explain these relationships.

Picky Eating: Definitions, Multidimensional Structure, And Negative Psychological Correlates

PE includes difficulty trying new foods, eating a limited range of foods, and marked rigidity and sensory sensitivity around food presentation and preparation [1]. PE also includes the rejection of familiar foods which distinguishes it from related constructs like food neophobia [16]. Because PE in adults is less understood than PE in children, a multidimensional tool was created to assess four distinct facets of adult PE [17]: (1) meal presentation, or strong preferences regarding food preparation and presentation; (2) food variety, or restricted dietary intake across food groups; (3) meal disengagement, or avoidant behavior around mealtimes; and (4) taste aversion, or rejection of bitter or sour foods [17–18]. This multidimensional approach to assessing PE has been identified as a key area of future research to define and elaborate on the nuances of adult PE [19], including the overlap between PE, disordered eating, and negative psychological correlates.

Some research has examined PE in relation to disordered eating, with mixed results. One study found that a comorbid class (high PE and disordered eating symptoms) was the largest class via latent class analysis, and was associated with psychosocial impairment and poor mental health outcomes [14]. Other research found that all PE facets were related to social anxiety around eating as well as anxiety sensitivity when controlling for disordered eating symptoms [17]. In another study [19] picky eaters endorsed less disordered eating (including shape and weight concern behaviors) compared to “approaching” eaters, or eaters who had high enjoyment of food. However, picky eaters also endorsed more eating-related impairment and depressive symptoms than “moderate” eaters, or eaters with a moderate food approach and avoidance [19]. Related to this is research suggesting that childhood PE did not predict disordered eating in adulthood [20]. These mixed findings and others [21–24] suggest unclear relationships between PE and disordered eating, warranting further research mapping these relationships.

Relationships between PE and negative psychological correlates are clearer. Adult picky eaters endorse more obsessive-compulsive disorder and depressive symptoms than non-PE adults [14, 22]. Relatedly, positive relationships have been identified between PE and anxiety symptoms [17, 25], and preliminary evidence suggests that adult PE is positively associated with stress symptoms [13]. Additionally, picky eaters with Avoidant Restrictive Food Intake Disorder (ARFID) reported elevated eating inflexibility (rigidity around eating rules) [24]. Using a multidimensional approach to PE, one study found that meal presentation and meal disengagement predicted psychological inflexibility and psychosocial impairment [17]. Furthermore, meal disengagement predicted depressive symptoms [17], suggesting that meal disengagement may be a more proximal predictor of poor mental health than other facets of PE. Taken together, while PE is consistently associated with psychological impairment, there is mixed evidence regarding relationships with disordered eating, and little is known about which specific facets of PE are associated with negative psychological correlates and disordered eating.

Negative Psychological Correlates as Moderators of Relationships Between Picky Eating and Disordered Eating

Recently, Barnhart and colleagues [13] explored a range of negative psychological correlates as moderators of relationships between broad PE behavior and binge eating, dietary restraint, eating

concerns, and overall eating pathology in undergraduate students. Mental health concerns (e.g., anxiety, depression, and stress symptoms) and inflexible eating moderated relationships between PE and eating concerns such that PE was more strongly associated with eating concerns when mental health concerns and inflexible eating were higher [13]. As it is measured on the Eating Disorder Examination-Questionnaire, eating concerns captures a range of disordered eating attitudes and cognitions including the fear of loss of control during eating, social aspects of eating such as eating in secrecy and guilt about eating, and a preoccupation with eating, food, calories [26]. The PE literature suggests some overlap with eating concerns, especially in terms of the social aspects of eating [14, 17, 27]. However, it remains unclear precisely what it is about PE that is moderated by these negative psychological correlates to explain meaningful variance in eating concerns. To this end, Barnhart and colleagues [13] outlined the need to examine these research questions with a focus specific PE facets.

The Present Study

The present study builds on previous research demonstrating positive relationships between PE and disordered eating [14–15], specifically eating concerns [13], by examining relationships between PE facets and eating concerns. Given recent research pointing to overlap between broad PE, disordered eating, and negative psychological correlates including mental health concerns and inflexible eating [13], this study had two exploratory aims. First, we examined bivariate relationships between PE facets, eating concerns, and negative psychological correlates. Second, we examined negative psychological correlates as moderators of relationships between PE facets and eating concerns.

Methods

Participants

This secondary analysis [13] utilized undergraduate participants from a large, Midwestern university who completed an online survey on eating behaviors. Initially, 579 participants were recruited; of those, 70 participants were excluded due to completing 75% or less of the survey ($n = 42$), completing the survey multiple times ($n = 17$), or failing to meet quality standards (e.g., incorrect responses to attention checks; $n = 11$). The final sample ($N = 509$) ranged in age from 18 to 25 years ($M = 19.96$, $SD = 2.93$) and was primarily women ($n = 390$), White ($n = 438$), heterosexual ($n = 436$), and middle class ($n = 270$). Additionally, 6.3% and 2% of participants reported past and current eating disorder diagnosis, respectively. See Barnhart and colleagues [13] for additional participant information.

Measures

Anthropometry

Body mass index (BMI; kg/m^2) was calculated using self-reported height in feet and weight in pounds.

Demographics

Participants self-reported demographic characteristics including age, gender, socioeconomic status, year in school, race, and sexual orientation. Data were also collected on current and past eating disorder diagnosis, current and past PE, and adherence to a particular eating style (e.g., vegetarian, vegan, etc.).

Adult Picky Eating Questionnaire (APEQ)

Adult PE was examined using the APEQ [17]. The questionnaire yields four subscales that are typically averaged to create a total score: meal presentation, food variety, meal disengagement, and taste aversion. This study focused on the subscales, not the total score. Example items are “I have a strong preference toward specific food presentation (meal presentation),” “I eat a limited number of items from each food group (food variety),” “I usually feel that I have something better to do than eating (meal disengagement),” and “I reject bitter foods, even if they are only slightly bitter (taste aversion).” Participants completed 16 items, on a five-point Likert scale (1 = *Never*, 5 = *Always*). The APEQ has shown strong psychometric properties [17]. Higher scores indicated greater PE.

Eating Disorder Examination Questionnaire (EDE-Q)

Disordered eating was self-reported using the EDE-Q [26]. The 28-item scale assesses attitudes, cognitions, and behaviors relating to restraint, weight, shape, and eating concerns on a seven-point Likert scale (1 = *No days*; 7 = *Everyday*). This study focused on the eating concerns subscale. Each of the 28 items is preceded with “on how many of the past 28 days” and followed by the statements such as “Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?” The EDE-Q has strong psychometric properties [26]. The mean is calculated across all items in each scale, and higher scores indicate greater disordered eating.

Depression, Anxiety and Stress Scale – 21 Items (DASS-21)

Mental health concerns were assessed using the DASS-21, a short version of the 42-item instrument [28]. The DASS-21 measures depression, anxiety, and stress symptoms on a four-point Likert scale (0 = *Did not apply to me at all*; 3 = *Applied to me very much, or most of the time*). This study averaged scores from the three subscales for a total score, titled mental health concerns. Example items are “I experienced trembling (anxiety),” “I felt that I had nothing to look forward to (depression),” and “I found it hard to wind down (stress).” Higher scores indicate greater mental health concerns.

Inflexible Eating Questionnaire (IEQ)

Inflexible eating was assessed using the IEQ [29]. The 11-item scale assesses engagement in inflexible and rigid eating rules on a five-point Likert scale (1 = *Fully disagree*, 5 = *Fully agree*). This study used the scale’s total score with items such as, “To manage my eating through rules gives me a sense of control” and “not following my eating rules makes me feel inferior.” The IEQ has high internal consistency, construct and temporal stability [29], and higher scores indicate greater inflexible eating.

Procedure

Procedures were approved by the Institutional Review Board prior to data collection (IRB protocol #1530232). University instructors shared a recruitment script about the survey with their students.

Interested students then provided informed consent and accessed the survey on Qualtrics. Participants provided demographic information followed by previously described self-report measures; median survey completion time was approximately 27 minutes. Participants received course credit or extra credit following survey conclusion and were asked to recruit their parents to complete a similar survey. However, only student responses were used in the present study.

Analytic Plan

Descriptive statistics, including mean, standard deviation, range, skew, and kurtosis were calculated. Next, internal consistency was examined across study variables, and missing data were examined. Missingness was low (APEQ (3.6%), EDE-Q (0.9%), DASS-21 (4.5%), and IEQ (0.8%)) and Little's Missing Completely at Random (MCAR) results revealed data were MCAR ($p = 1.000$); thus, missingness was assumed to be MCAR, and analyses utilized listwise deletion. Next, bivariate correlations were examined across study variables. Finally, homoscedasticity, normality, and linearity were examined to determine if residual variability met assumptions of multiple regression.

Model 1 moderation analyses [30] were calculated in PROCESS macro in SPSS 27. Moderation analyses examined if PE facets (i.e., meal presentation, food variety, meal disengagement, taste aversion) interacted with negative psychological correlates (i.e., mental health concerns and inflexible eating) in relation to eating concerns. Moderation models in PROCESS macro calculate an overall effect of all independent variables, including covariates, on the dependent variable; main effects of the independent variables and covariates on the dependent variable; the interaction of the independent variables on the dependent variable; and conditional moderation effects, which plot the interaction at various levels of the moderator (e.g., -1 SD below average, average, and + 1 SD above average). Eight moderation analyses were calculated, four examining the interaction of PE facets and mental health concerns on eating concerns, and four examining the interaction of PE facets and inflexible eating on eating concerns. BMI (mean centered) and gender (0 = men, 1 = women) were included in moderation analyses given they are related to the study variables [31–32] and thus could confound findings if unaddressed.

Results

Preliminary Results

See Table 1 for descriptive statistics and bivariate correlations. There were significant positive bivariate correlations between each facet of PE and eating concerns and negative psychological correlates (Table 1). Assumptions of multiple regression were confirmed via visual inspection of histograms, Q-Q plots, and scatterplots. Diagnostics confirmed there were no issues of multicollinearity (e.g., tolerance and variance inflation factors within acceptable ranges; [33]).

Negative Psychological Correlates as Moderators of Relationships Between Picky Eating Facets and Eating Concerns

The overall models assessing mental health concerns and meal presentation ($R^2 = .33, p < .001$), food variety ($R^2 = .31, p < .001$), meal disengagement ($R^2 = .36, p < .001$), and taste aversion ($R^2 = .31, p < .001$) contributed significant variance in eating concerns. Furthermore, mental health concerns significantly interacted with meal presentation in relation to eating concerns ($b = .31, p = .001, \Delta R^2 = .02, \Delta F(1,475) = 11.19$) such that meal presentation was more strongly associated with eating concerns when mental health concerns were higher (Fig. 1). While interactions between meal disengagement ($b = .15, p = .05$) and taste aversion ($b = .14, p = .06$) and mental health concerns were not significant in relation to eating concerns, conditional moderation effects were observed such that relationships between meal disengagement and taste aversion were more strongly associated with eating concerns when mental health concerns were higher. Interactions between mental health concerns and food variety were not significant, nor were conditional moderation effects present in relation to eating concerns (Table 2). Significant effects were retained with inclusion of BMI and gender covariates (Table 2).

The overall models assessing inflexible eating and meal presentation ($R^2 = .38, p < .001$), food variety ($R^2 = .35, p < .001$), meal disengagement ($R^2 = .43, p < .001$), and taste aversion ($R^2 = .34, p < .001$) contributed significant variance in eating concerns. Furthermore, inflexible eating significantly interacted with meal presentation ($b = .21, p = .0002, \Delta R^2 = .02, \Delta F(1,498) = 13.80$), meal disengagement ($b = .17, p = .0003, \Delta R^2 = .02, \Delta F(1,498) = 13.58$), and taste aversion ($b = .10, p = .03, \Delta R^2 = .01, \Delta F(1,498) = 4.98$) in relation to eating concerns such that meal presentation, meal disengagement, and taste aversion were more strongly associated with eating concerns when inflexible eating was higher (Figs. 2, 3, and 4). Interactions between inflexible eating and food variety were not significant, nor were conditional moderation effects present in relation to eating concerns (Table 3). Significant effects were retained with inclusion of BMI and gender covariates (Table 3).

Discussion

First, we explored relationships between PE facets, eating concerns, and negative psychological correlates. Eating concerns and PE facets such as meal presentation and meal disengagement were positively related with medium strength, whereas eating concerns and food variety and taste aversion had small positive relations. Thus, some PE facets were more strongly related to eating concerns than others, a finding that is complemented by our bivariate data that suggest that meal presentation and meal disengagement were also more strongly related to mental health concerns and inflexible eating. These findings map onto previous research suggesting that PE is positively associated with significant psychological impairment [13–14, 17, 22, 24–25], as well as previous research that meal presentation and meal disengagement specifically were related to a range of negative psychosocial correlates [17].

Building on these bivariate data, in the second aim, moderation analyses examined negative psychological correlates as moderators of relationships between PE facets and eating concerns. Meal

presentation was more strongly associated with eating concerns when mental health concerns and inflexible eating were higher. Furthermore, meal disengagement and taste aversion were more strongly associated with eating concerns when inflexible eating was higher. Put another way, PE attitudes and behaviors such as strong preferences for specific food presentation, negative affect when food is not prepared/cooked the “right” way (meal presentation), avoiding mealtime, disengagement while sitting down for mealtime (meal disengagement), and rejection of bitter/sour food (taste aversion) were more strongly associated with eating concerns in undergraduates who self-reported higher mental health concerns and inflexible eating. This expands on previous research [13] by demonstrating that specific facets of PE such as meal presentation, meal disengagement, and taste aversion may explain these relationships. Though models examining mental health concerns as a moderator of relationships between meal disengagement and taste aversion and eating concerns were non-significant, conditional moderation effects revealed that at higher levels of mental health concerns, meal disengagement and taste aversion were more strongly associated with eating concerns. Although these preliminary data should be interpreted with caution, they suggest that future research could add to our understanding of their generality (e.g., clinical versus non-clinical PE and disordered eating presentations).

Perhaps surprisingly, for the PE facet of food variety, no significant interaction nor conditional moderation effects were evidenced in relation to eating concerns. This pattern of null findings is notable as food variety (i.e., eating a limited number of foods from known food groups (e.g., fruits, vegetables), not trying new types of foods, and eating from a narrow range of foods [17]) often sits at the forefront of PE conceptualizations [e.g., 1, 16], both in public and academic domains. Interestingly, this effect may map onto food variety reflecting food exposure whereas meal presentation, meal disengagement, and taste aversion may reflect more anxiety and/or control around food. Findings from the present work add to existing research mapping PE and disordered eating [13–15] such that it generates questions about precisely which facets of PE explain these relationships. Importantly, conclusions drawn from this research may benefit both researchers and clinicians through a more nuanced understanding of the complex links between PE, disordered eating, and negative psychological correlates.

Limitations And Future Directions

Of course, this study is not without limitations and future directions. First, cross-sectional data do not allow us to make causal attributions across study variables. While the statistical analyses, specifically moderation analyses, allow us to discern the role of both moderators on the relationship between PE facets and eating concerns, it is important for future research to confirm these exploratory findings with both experimental and experience sampling (e.g., ecological momentary assessment) methods to better map the temporal order and mechanistic links between PE, negative psychological correlates, and eating concerns. Second, though large and well-powered, the sample is convenient and primarily WEIRD (i.e., Western, Educated, Industrialized, Rich, and Democratic [34]); thus, findings are bound to undergraduate participants. Still, these effects suggest several important research avenues to build on constraints on generality [35], including how these effects unfold in more severe PE, disordered eating, and mental health populations, as well as how these effects unfold across development (e.g., from childhood to

adulthood). Finally, data collected in the present study were self-reported; thus, concerns common to descriptive, survey-based research such as social desirability and recall biases may compromise the validity of these findings. Future research using diverse methods to probe these constructs (e.g., behavioral) may build and substantiate observed effects.

Conclusions

Understanding precisely which PE facets interact with negative psychological correlates in relation to eating concerns provides useful information to researchers interested in targeting mutual mechanisms of PE and disordered eating, specifically eating concerns. The present study suggests that PE facets such as meal presentation, meal disengagement, and taste aversion (but not limited food variety) were more strongly associated with eating concerns when mental health concerns and inflexible eating were higher. These data inform clinical practice through knowledge of mental health concerns and inflexible eating as correlates that may worsen relationships between PE facets and disordered eating, which in turn may provide information about potential therapeutic targets in concurrent PE and disordered eating presentations.

What Is Already Known On This Subject?

Adult picky eating (PE) is positively associated with significant psychological impairment and disordered eating. Some negative psychological correlates such as mental health concerns and inflexible eating may strengthen the relationship between PE and disordered eating, specifically eating concerns, but which facets of PE describe these relationships is unknown.

What Does This Study Add?

Maps relationships between PE facets, eating concerns, mental health concerns, and inflexible eating. Identified specific PE facets (e.g., meal presentation, meal disengagement, taste aversion) that are more strongly related to eating concerns in adult participants with higher mental health concerns and inflexible.

Declarations

Conflicts of Interest: None of the authors have potential conflicts of interest to disclose.

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Data Availability: The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code Availability: N/a.

Author Contributions (CRediT): Wesley R. Barnhart: Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Project Administration. **Lauren A Dial:**

Conceptualization, Methodology, Validation, Investigation, Data Curation, Writing - Original Draft, Project Administration. **Amy K. Jordan:** Conceptualization, Methodology, Investigation, Writing - Review & Editing, Project Administration. **Emma I. Studer-Perez:** Writing - Review & Editing. **Maria A. Kalantzis:** Writing - Review & Editing. **Dara R. Musher-Eizenman:** Conceptualization, Methodology, Validation, Investigation, Writing - Review & Editing, Supervision, Project Administration.

Ethics Approval: This study was performed in line with the principles of the Declaration of Helsinki. The present study received approved IRB review prior to data collection by Bowling Green State University's Institutional Review Board prior to data collection (#1530232)

Consent to Participate: All participants gave online informed consent prior to participating in the present study.

Consent for Publication: All participants have consented to having de-identified, group data published in a journal article.

References

- [1] Taylor CM, Wernimont SM, Northstone K, Emmett PM (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>
- [2] Jacobi C, Schmitz, G, Agras WS (2008) Is picky eating an eating disorder? *Int J Eat Disord* 41:626-634. <https://doi:10.1002/eat.20545>.
- [3] Mascola AJ, Bryson SW, Agras WS (2010) Picky eating during childhood: A longitudinal study to age 11 years. *Eat Behav* 11:253-257. <https://doi.org/10.1016/j.eatbeh.2010.05.006>
- [4] Zucker N, Copeland W, Franz L, et al (2015) Psychological and psychosocial impairment in preschoolers with selective eating. *Pediatrics* 136:E582-E590. <https://doi.org/10.1542/peds.2014-2386>
- [5] Antoniou EE, Roefs A, Kremers SPJ, et al. (2016) Picky eating and child weight status development: a longitudinal study. *J Hum Nutr Diet* 29(3):298-307. <https://doi.org/10.1111/jhn.12322>
- [6] Ashcroft J, Semmler C, Carnell S, van Jaarsveld CHM, Wardle J. (2008) Continuity and stability of eating behaviour traits in children. *Eur J Clin Nutr* 62(8):985-990. <https://doi.org/10.1038/sj.ejcn.1602855>
- [7] Cano SC, Tiemeier H, Van Hoeken DV, Tharner A, Jaddoe VWV, Hofman A, Verhulst FC, Hoek HW (2015) Trajectories of picky eating during childhood: A general population study. *Int J Eat Disord* 48(6):570-590. <https://doi:10.1002/eat.22384>.
- [8] Marchi M, Cohen P (1990) Early childhood eating behaviors and adolescent eating disorders. *J Am Acad Child Adolesc Psychiatry* 29:112-117. <https://doi.org/10.1097/00004583-199001000-00017>

- [9] Nicklaus S, Boggio V, Chabanet C, Issanchou, S (2005) A prospective study of food variety seeking in childhood, adolescence and early adult life. *Appetite* 44:289-297. <https://doi.org/10.1016/j.appet.2005.01.006>
- [10] Kauer J, Pelchat ML, Rozin P, Zickgraf HF (2015) Adult picky eating. Phenomenology, taste sensitivity, and psychological correlates. *Appetite* 90:219-228. <https://doi.org/10.1016/j.appet.2015.03.001>
- [11] Ellis JM, Galloway AT, Zickgraf HF, Whited MC. (2018) Picky eating and fruit and vegetable consumption in college students. *Eat Behav.* 30:5-8. <https://doi.org/10.1016/j.eatbeh.2018.05.001>
- [12] Zickgraf HF, Schepps K. (2016) Fruit and vegetable intake and dietary variety in adult picky eaters. *Food Qual Prefer* 54:39-50. <https://doi.org/10.1016/j.foodqual.2016.06.012>
- [13] Barnhart WR, Hamilton L, Jordan AK, Pratt M, Musher-Eizenman DR (2021) The interaction of negative psychological well-being and picky eating in relation to disordered eating in undergraduate students. *Eat Behav* 40: 101476. <https://doi.org/10.1016/j.eatbeh.2021.101476>
- [14] Wildes, JE, Zucker, NL, Marcus, MD (2012) Picky eating in adults: Results of a webbased survey. *Int J Eat Disord* 45:575-582. <https://doi.org/10.1002/eat.20975>
- [15] He J, Zickgraf HF, Essayli JH, Fan X (2020) Classifying and characterizing Chinese young adults reporting picky eating: A latent profile analysis. *Int J Eat Disord* 53:883-893. <https://doi.org/10.1002/eat.23231>
- [16] Dovey TM, Staples PA, Gibson EL, Halford JCG (2008) Food neophobia and 'picky/fussy' eating in children: A review. *Appetite* 50(2-3):181-193. <https://doi.org/10.1016/j.appet.2007.09.009>
- [17] Ellis JM, Galloway AT, Webb RM, Martz DM (2017) Measuring adult picky eating: The development of a multidimensional self-report instrument. *Psychol Assessment* 29(8):955–966. <https://doi.org/10.1037/pas0000387>
- [18] Ellis JM, Schenk RR, Galloway AT, Zickgraf HF, Webb RM, Martz DM (2018) A multidimensional approach to understanding the potential risk factors and covariates of adult picky eating. *Appetite* 125:1-9. <https://doi.org/10.1016/j.appet.2018.01.016>
- [19] Ellis JM, Zickgraf HF, Galloway AT, Essayli JH, Whited MC (2018) A functional description of adult picky eating using latent profile analysis. *Int J Behav Nutr Phys Act* 15:109. <https://doi.org/10.1186/s12966-018-0743-8>.
- [20] Pesch MH, Bauer KW, Christoph MJ, Larson N, Neumark-Sztainer D (2020) Young adult nutrition and weight correlates of picky eating during childhood. *Public Health Nutr* 23(6):987-995. <https://doi.org/10.1017/S136898001900346X>

- [21] Ellis JM, Galloway AT, Webb RM, Martz DM, Farrow CV (2016) Recollections of pressure to eat during childhood, but not picky eating, predict young adult eating behavior. *Appetite* 97:58-63. <https://doi.org/10.1016/j.appet.2015.11.020>
- [22] Kauer J, Pelchat ML, Rozin P, Zickgraf HF (2015) Adult picky eating. Phenomenology, taste sensitivity, and psychological correlates. *Appetite* 90:219-228. <https://doi.org/10.1016/j.appet.2015.03.001>
- [23] Van Tine ML, McNicholas F, Safer DL, Agras WS (2017) Follow-up of selective eaters from childhood to adulthood. *Eat Behav* 26:61-65. <https://doi.org/10.1016/j.eatbeh.2017.01.003>
- [24] Zickgraf HF, Franklin ME, Rozin P (2016) Adult picky eaters with symptoms of avoidant/restrictive food intake disorder: comparable distress and comorbidity but different eating behaviors compared to those with disordered eating symptoms. *Int J Eat Disord* 4(1):26-26. <https://doi.org/10.1186/s40337-016-0110-6>
- [25] Zickgraf HF, Elkins A (2018) Sensory sensitivity mediates the relationship between anxiety and picky eating in children/ adolescents ages 8–17, and in college undergraduates: A replication and age-upward extension. *Appetite* 128:333-339. <https://doi.org/10.1016/j.appet.2018.06.023>
- [26] Fairburn CG, Beglin SJ (1994) Assessment of eating disorders: Interview or self-report questionnaire? *Int J Eat Disord* 16:363–370.
- [27] Marcontell DK, Laster AE, Johnson J (2003) Cognitive-behavioral treatment of food neophobia in adults. *J Anxiety Disord* 17(2):243-251. [https://doi.org/10.1016/s0887-6185\(02\)00123-8](https://doi.org/10.1016/s0887-6185(02)00123-8)
- [28] Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson, RP (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychol Assessment* 10(2):176.
- [29] Duarte C, Ferreira C, Pinto-Gouveia J, Trindade IA, 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>
- [30] Hayes AF (2018) Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (2nd ed.). New York, NY: The Guilford Press.
- [31] Hays NP, Bathalon GP, McCrory MA, Roubenoff R, Lipman R, Roberts SB (2002) Eating behavior correlates of adult weight gain and obesity in healthy women aged 55–65 y. *Am J Clin Nutr* 75(3):476-483. <https://doi.org/10.1093/ajcn/75.3.476>.
- [32] Striegel-Moore RH, Rosselli F, Perrin N, DeBar L, Wilson GT, May A, Kraemer HC (2009) Gender difference in the prevalence of eating disorder symptoms. *Int J Eat Disord* 42(5):471–474. <https://doi.org/10.1002/eat.20625>

[33] Belsley DA, Kuh E, Welsch RE (1980) Regression diagnostics: Identifying influential data and sources of collinearity. New York, NY: John Wiley.

[34] Henrich J, Heine SJ, Norenzayan A (2010) The weirdest people in the world? *Behav Brain Sci* 33:61-83. <https://doi.org/10.1017/S0140525X0999152X>

[35] Simonds DJ, Shoda Y, Lindsay DS (2017) Constraints on generality (COG): A proposed addition to all empirical papers. *Perspect Psychol Sci* 12:1123-1128. <https://doi.org/10.1177/1745691617708630>

Tables

Due to technical limitations the Tables are available as a download in the Supplementary Files.

Figures

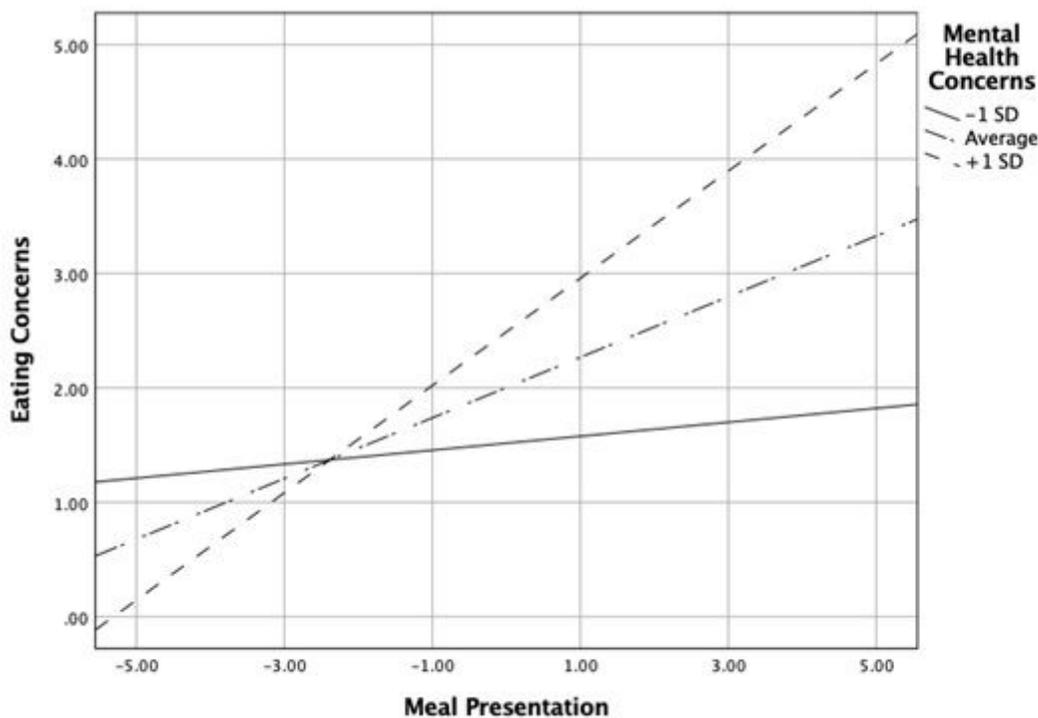


Figure 1

Conditional moderation of meal presentation and eating concerns by mental health concerns.

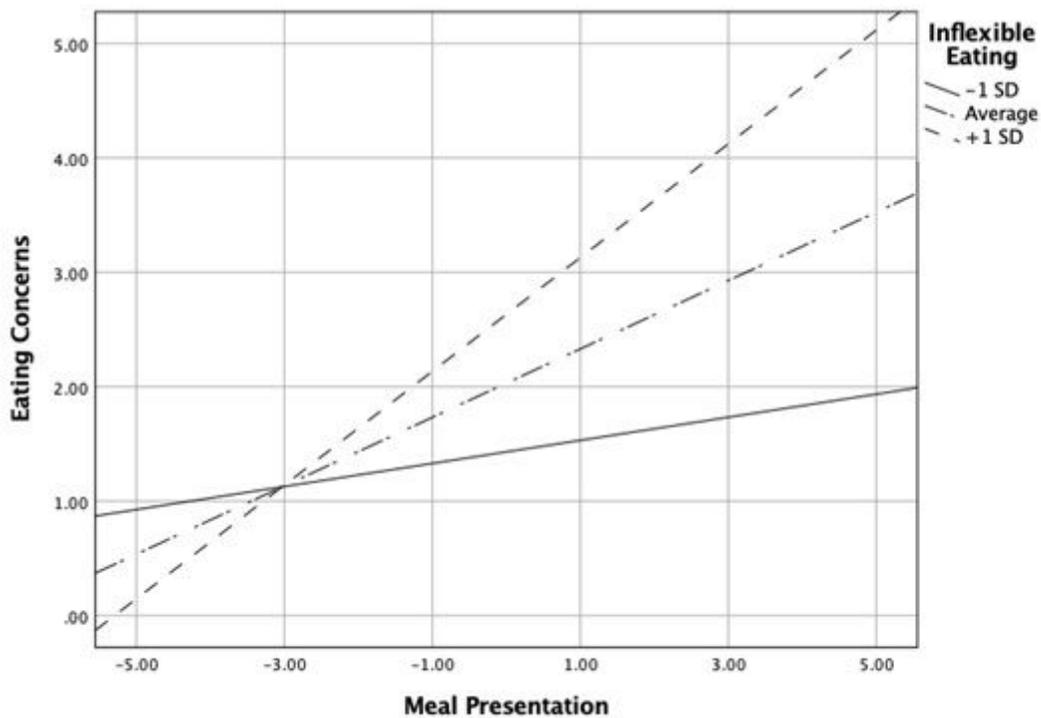


Figure 2

Conditional moderation of meal presentation and eating concerns by inflexible eating.

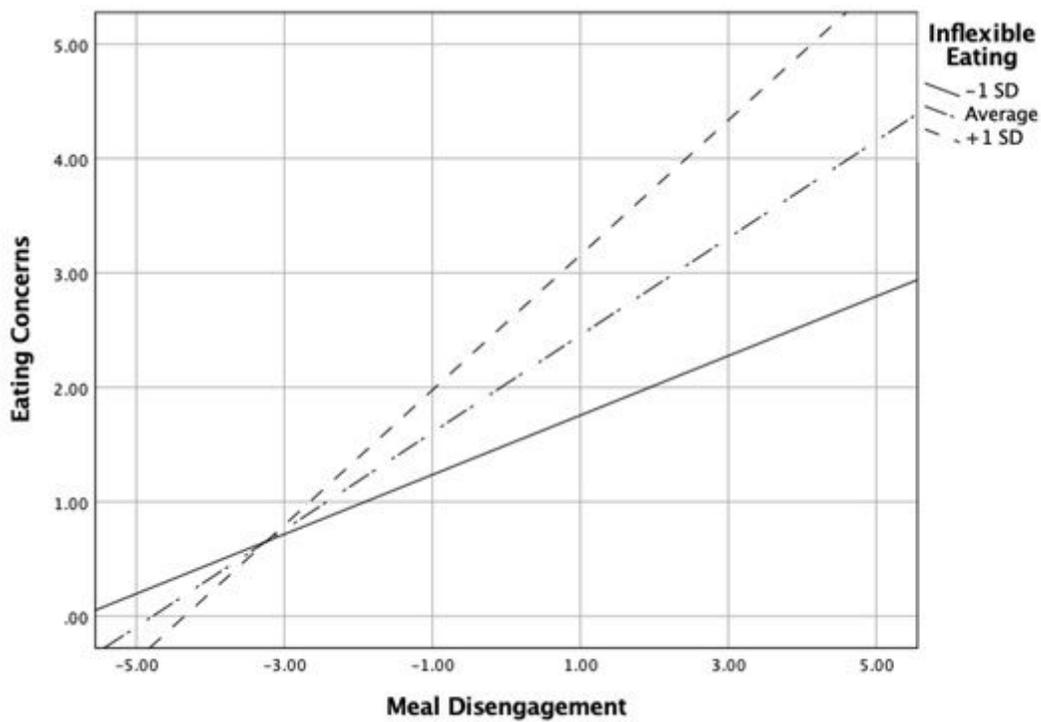


Figure 3

Conditional moderation of meal disengagement and eating concerns by inflexible eating.

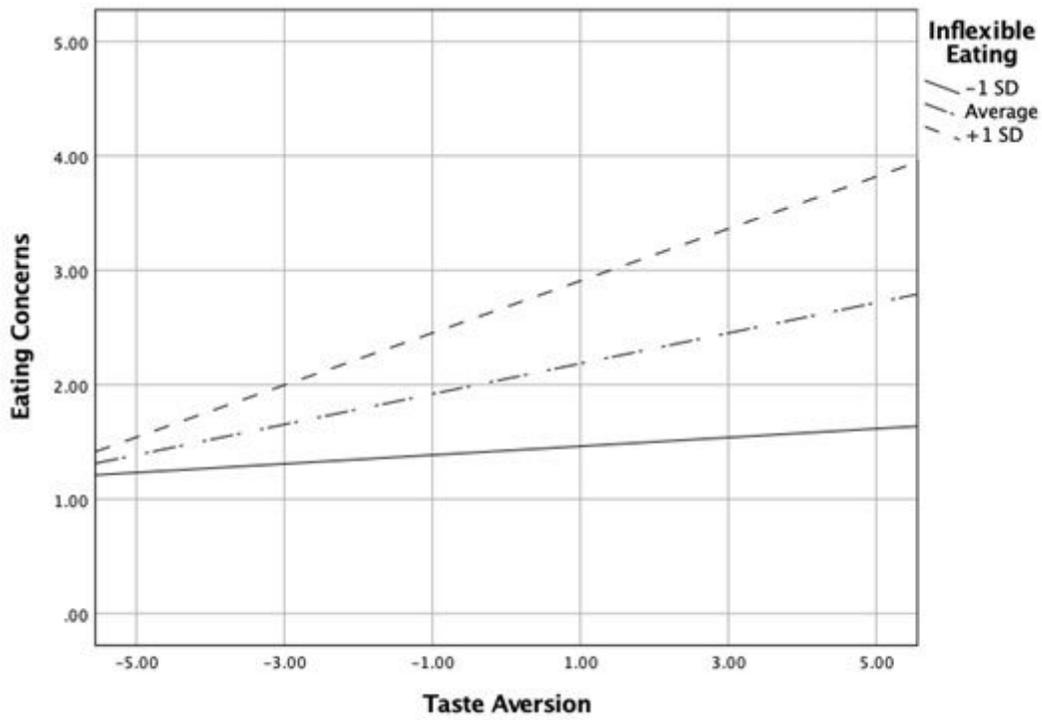


Figure 4

Conditional moderation of taste aversion and eating concerns by inflexible eating.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Tables.pdf](#)