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Eating Disorder Pathology Among Individuals Living with Food Insecurity: A Replication Study

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Abstract

Eating disorders (EDs) are stereotypically associated with thin, White, affluent women and girls. One result of the ED stereotype has been a relative dearth of ED research with marginalized communities. The aim of the present study was to replicate recent findings showing an association between severity of food insecurity (FI) and increased ED pathology. Participants included 891 clients at an urban food bank. Results replicated previous research with participants in the most severe FI group reporting significantly higher levels of ED pathology, dietary restraint, anxiety, and depression. Findings provide further evidence that the thin, White, affluent, female ED stereotype offers a flawed portrait, and also highlight the need for additional psychological research that focuses on marginalized populations to address disparities in access to care. Both scholars and clinicians need to move away from the stereotypical portrait of who is and is not at risk for developing an ED.

In 2011, Kazdin and Blase argued that psychotherapy research needed to be rebooted if the field ever hoped to significantly impact the global burden of mental illness. They highlighted marked ethnic and racial disparities in who received mental health treatment, and proposed that the field needed to develop a portfolio of interventions, including lower cost interventions that could reach marginalized communities. Other researchers also have noted the need to develop innovative intervention models that specifically address both the psychological and social justice needs of impoverished communities (Goodman, Pugach, Skolnik, & Smith, 2013; Smith, 2005, 2010). Yet, innovative interventions cannot be developed to address problems if such problems go unrecognized secondary to stereotyped notions about who will and will not develop a particular form of mental illness. As such, one key first step in addressing the calls to action by Kazdin and Blase and others is to document the types of problems encountered by marginalized communities.

Eating disorders (EDs) represent a significant public health problem. EDs are associated with substantial psychological comorbidity (Swanson, Crow, Le Grange, Swendsen, & MeriKangas, 2011; Chamay-Weber, Narring, & Michaud, 2005), significant medical complications (Mehler, 2017a; 2017b), elevated mortality rates (Arcelus, Mitchell, Wales, & Nielsen, 2011), and role impairment (Hudson, Hiripi, Pope, & Kessler, 2007). EDs also are associated with similar quality of life impairment as compared to other disorders, such as depression, bipolar disorder, and Wilson's disease (Carta et al., 2014). Moreover, research indicates that ED pathology assessed in patients who are in their mid-20's predicts increased psychological distress 10 years later, even after controlling for body mass index (BMI), self-rated health, psychological distress, and education (Kärkkäinen, Mustelin, Raevuori, Kaprio, & Keski-Rahkonen, 2018). Yet, despite the burden of EDs, research suggests that only one quarter

of ED cases in the community ever seek treatment and even fewer receive it (Hart, Granillo, Jorm, & Paxton, 2011).

The ED community increasingly has recognized that antiquated notions, held by both clinicians and the general public, about who is and is not at risk for EDs represent one barrier to addressing ED treatment needs (Mitchison, Basten, Scott, & Murray, 2017; Sonneville & Lipson, 2018). Specifically, EDs have long been stereotypically associated with thin, White, affluent girls and young women (Bruch, 1973; Sonneville, & Lipson, 2018). Recent research disputes the accuracy of this perception (e.g., Mulders-Jones, Mitchison, Girosi, & Hay, 2017); however, research similarly indicates that clinicians maybe less likely to detect EDs in those who defy traditional stereotypes (Gordon, Brattole, Wingate, & Joiner, 2006). Further anecdotal reports suggest that those who differ from the ED stereotype are less likely to think they have an ED or perceive a need for treatment (Sonneville & Lipson, 2018; Patel, 2016).

Although researchers are beginning to produce data challenging ED stereotypes, much of the ED literature focuses on girls and young women, a majority of whom are White. As a result, a number of potentially at-risk populations have been understudied, if not ignored. One such population is those living with food insecurity (FI). FI refers to a state in which households have limited access to sufficient and nutritious food as a result of inadequate resources, including money (Coleman-Jensen, Rabbitt, Gregory & Singh, 2017). FI can be contrasted to food security, which occurs when households have reliable access to sufficient food, both in terms of quality and quantity, to support active and healthy living (Coleman-Jensen et al., 2017; Lang & Barling, 2012). FI is often perceived to be a problem for low- and middle-income countries; yet, almost 16 million households in the United States (U.S.) qualified as food insecure in 2016 (Coleman-Jensen et al., 2017). Although some U.S. children do experience FI, in many cases they are

protected from insufficient food intake and markedly disrupted eating patterns by adult caregivers and school meal programs (Bove & Olson, 2006; Coleman-Jensen et al., 2017; McIntyre, Glanville, Raine, Dayle, Anderson, & Battaglia, 2003). As a result, in roughly half of food insecure U.S. households with children, only adults experience FI (Coleman-Jensen, Rabbitt, & Singh, 2015).

There are two primary mechanisms that may explain why adults living with FI might experience elevated levels of ED pathology. First, Keys et al. (1950) and Tucker (2006) documented the development of ED symptoms (e.g., binge eating; sense of loss of control over eating) in adult male participants in the Minnesota Starvation Study. The Keys study has long been viewed by the ED community as providing robust evidence about the role of dietary restriction in the onset of ED pathology. Second, food insecure households in urban environments often simultaneously have limited access to affordable nutritious food (i.e., conditions associated with food deserts; Dutko, 2012; Kato & Irvin, 2013) and abundant access to food retailers (e.g., corner stores, fast food restaurants) selling inexpensive and highly palatable food (HPF; i.e., processed food high in salt, sugar and fat); these latter conditions have been referred to as food swamps (Kato & Irvin, 2013). Animal model research implicates HPF in the development of binge eating. In particular, some rats who consume normal amounts of food when on a diet of rat chow, initiate binge eating when HPF is introduced (Boggiano et al., 2007).

Based on these two lines of reasoning, in a previous study, we tested a series of hypotheses that associated increased levels of FI with increased levels of ED pathology in a sample of 503 participants presenting to food pantries affiliated with the San Antonio Food Bank (SAFB: Becker, Middlemass, Taylor, Johnson, & Gomez, 2017). A majority of participants were ethnic and racial minorities and poor. Results revealed that adults reporting the most severe level

of FI simultaneously reported significantly higher levels of ED pathology relative to those with less severe FI or those living on the margins between FI and food security. In the most severe food insecure group, with hungry children in the home, 17% met the cutoff for a current clinically significant ED. One finding that ran counter to our hypotheses, but supported the high risk nature of severe FI, was that 20% of the most severe food insecure group reported self-induced vomiting to counteract effects of eating or to prevent weight gain (Becker et al., 2017).

Results of Becker et al. (2017) also indicated that more severe FI was associated with increased intentional dietary restraint. According to restraint theory (Herman & Polivy, 1975), intentional restriction of caloric intake increases risk for binge eating. Restraint scales typically link intentional dietary restriction with weight and shape concerns. For instance, restraint items on the Eating Disorders Examination-Questionnaire (EDE-Q: Fairburn, 2008) ask participants if they restrict to influence weight and shape. We hypothesized that adults living with FI might attempt to restrict for other reasons and that intentional restriction still might be associated with EDs regardless of the reason for which it was undertaken. As such, in Becker et al., we included three questions from the EDE-Q restraint scale but removed the weight and shape specifier. Instead, participants had the opportunity to explain *why* they restricted their intake in an open ended format. A secondary qualitative analysis (Middlemass et al., submitted), indicated that those living with FI rarely reported restricting for weight and shape reasons (< 3%); instead, they reported restricting intake to stretch food to make it last, to save food for children, or because they didn’t have sufficient resources to buy sufficient food. Nonetheless, dietary restraint still correlated with ED pathology.

This finding is important because if ED researchers use standard, unadjusted dietary restraint measures in food insecure populations they may fail to detect important restricting

behaviors secondary to the field's historic focus on weight and shape concerns as a driver of EDs. Indeed, in a recent study of FI and objectively measured overeating (Stinson, Votruba, Venti, Perez, Krakoff, & Gluck, 2018), results indicated that food insecure participants reported elevated disinhibition and hunger, but not restraint, relative to food secure participants. However, restraint was assessed with a traditional measure (i.e., the cognitive restraint subscale from the Three Factor Eating Questionnaire; Stunkard & Messick, 1985) that *only* assesses restraint for weight and shape concern reasons. Thus, it is plausible that food insecure participants in Stinson et al. did restrict to a greater degree than food secure individuals but this was not detected secondary to the ED field's selective attention to restraint due to weight and shape concerns.

To our knowledge, Becker et al. (2017) represents the first study to use a validated ED measure to assess the full range of ED pathology, including compensatory behaviors, in those living with FI. Two other studies investigated binge eating and found that food insecure participants reported more binge eating than food secure participants (Bruening, MacLehose, Loth, Story, & Neumark-Sztainer, 2012; Rasmusson, Lydecker, Coffino, White, & Grilo, 2019). Although there are scattered references to disordered and emotional eating in the food insecure literature (e.g., Bove & Olson, 2006), these are often side notes in studies that are predominantly focused on the association between FI and obesity (e.g., Adams, Grummer-Strawn, & Chavez, 2003). To date, Becker et al. (2017) is still the only study conducted with the primary aim of documenting the association between FI and ED, pathology, including compensatory behaviors.

The aim of the present study was, first and foremost, to determine if results of Becker et al. (2017) would or would not replicate in a larger sample that included more participants in the household level of FI, as this group was under-represented in Becker et al., raising the chance of spurious findings. Additionally, we hoped to increase the number of participants who reported

being on the margins of food security and FI compared to the 2017 study. Given the so-called replication crisis in psychology (Lindsay, 2015), and the fact that Becker et al. involves one aspect of the "troubling trio" identified by Lindsey (i.e., surprising result, as indicated by numerous personal communications by people in the ED field), replication seemed warranted.

We extended Becker et al. by including measures of depression and anxiety that could be used to identify participants who likely meet clinically severe depression and anxiety. To address critiques of the 2017 study, we collected self-reported weight and height data so that BMI could be calculated. Based on the findings in Becker et al., we tested six hypotheses in this current study. First, we hypothesized, that the highest level of FI (hungry children in the home) would be associated with higher levels of ED pathology, dietary restraint, depression, and anxiety. Second, that those living on the margins between FI and food security would report significantly lower scores on those same dependent variables. This was not based on a significant finding in Becker et al., but rather on a) observed patterns of scores (i.e., this group typically scored the lowest on the aforementioned variables) and b) a recognition that the *n* of this group in Becker et al. was relatively low (n = 41; 8.2%).

Third, we hypothesized that dietary restraint would significantly correlate with ED pathology per Middlemass et al. (submitted). Fourth, we posited that a greater percentage of those with the most severe FI would meet criteria for clinically significant ED pathology, depression, and anxiety. Fifth, based on Becker et al. (2017), we hypothesized that frequencies would not differ by gender, ethnicity, or race for ED pathology (for depression and anxiety, these analyses were exploratory), and sixth, that rates of reported ED symptoms, including compensatory behaviors such as vomiting, would show a linear trend with the lowest levels occurring in those experiencing marginal FI and the highest levels in those with the most severe

FI. We continue to report descriptive data on major ED symptoms because of the unexpected finding in Becker et al. showing that participants with the most severe level of FI did not only report increased binge eating but increased compensatory behaviors. We submit that it is important to determine if this also replicates.

Method

Participants

Participants included 891 adult clients presenting to client services at the San Antonio Food Bank (SAFB). Participants received a $7 gift card to the largest grocery store in the area in exchange for completing a self-report survey. Mean age of the sample was 42.07 years (*SD* = 14.36) and mean BMI based of self-reported weight and height was 30.73 (*SD* = 7.71). Table 1 provides demographic information of the participants, including gender, highest level of education, ethnicity and race, and annual household income. Approximately 75% of participants self-identified their ethnicity as Latino/Hispanic; the city of San Antonio is a majority-minority city with approximately 64% of the population identifying as Latino/Hispanic (U.S. Census Bureau, 2016).

Procedure

This study was approved by the Trinity University IRB and the SAFB, which served as an organizational partner. The SAFB service area consists of 16 counties in Southwest Texas, and research by Feeding America ranks Texas as the second most food insecure state in the U.S. (Feeding Texas, 2015). Moreover, San Antonio ranks among the nation's poorest cities, with San Antonio proper having a poverty rate of 17.3% in 2017 (Royall, 2018). In collaboration with over 500 partner agencies, the SAFB distributes food to approximately 58,000 individuals per week, and provides a number of client services at its headquarters, including help in applying for

federal and state programs (e.g., Supplemental Nutrition Assistance Program (SNAP) and Children's Health Insurance Program (CHIP), SAFB, n.d.).

After a series of planning meetings with SAFB staff, we collectively agreed that data collection should take place in the waiting area of client services at SAFBs' headquarters. In order to not disrupt client services while collecting data, given the important nature of those services, the research team made several trips to SAFBs' headquarters to observe day-to-day operations (e.g., the ways in which SAFB staff interacted with clients, length of waiting and meeting times, and client flow at various times during the day). These observations were then used to develop the research protocol. Data collection began in late July of 2017 and finished in February of 2018.

After clients signed the client services waiting list, research assistants (RAs) approached individual clients using a standardized script, either in English or Spanish depending on the client's preference, to determine if the client wanted to participate in a short research study while they waited for their appointment. For clients who chose to participate, RAs used a second script to provide additional details about the study and to obtain consent. At least one RA who spoke Spanish was available at all times. After providing consent, clients received the survey in their preferred language, and completed it. Surveys were pre-coded with ID numbers so that all responses were anonymous. RAs remained nearby in case clients had questions. If clients encountered difficulty reading and/or understanding the survey, a RA would offer to read the survey and assist in selecting the appropriate response. RAs used soft voices when communicating with clients, which clients tended to mimic, to try and maximize confidentially and privacy if the room was crowded. If the room was not crowded, RAs encouraged clients to move to a less populated area of the waiting room to enhance privacy and confidentiality. After

completion of the survey, clients received a list of low-cost/free mental health resources, a behavioral activation handout, and their gift card. Clients also were informed of the opportunity to participate in a supplemental qualitative interview; those data are not reported here.

Measures

Food Insecurity (FI) Groups

In addition to collecting demographic information, we assessed FI. There are multiple ways to measure the continuum of food security to extreme FI. The U.S. Department of Agriculture (USDA) uses a classification system that first categorizes households as either food secure or food insecure; food insecure households are then divided into low food security and very low food security with additional notations regarding the experience of children (Coleman-Jensen et al., 2015). In contrast, the Radimer Cornell Food Insecurity Measure (RCFIM; Kendall, Olson, & Frongillo, 1995; Radimer, Olson, Greene, Campbell, & Habicht, 1992) is designed to classify people according to the Radimer continuum of FI, which consists of four groups that include a food secure group and three levels of FI, with the most severe level including households with children who do not have enough to eat (child hunger household: CHH). We used the RCFIM because it is shorter, which reduced response burden of participants. Sample questions, which are rated on a Likert scale (0 = *Not True*; 1 = *Sometimes True*; 2 = *Always True*), include: *"The food that I bought didn't last and I didn't have money to buy more,"* and *"I know my child(ren) are hungry sometimes, but I can't afford more food."* If a participant chooses *Not True* for all items, they are considered food secure, according to the Radimer continuum, and if they identify any item as true then they are considered food insecure. In order to determine the degree of FI, RCFIM questions are divided into three clusters that match the three conceptual levels of FI. Participants who select *Sometimes True* or *Always True* on any question in the

lowest severity cluster of questions (e.g., repeatedly eating the same thing secondary to lack of resources) and select *Not True* on all of the questions in the highest clusters (e.g., reporting going hungry because of food scarcity), they are classified in the lowest level of FI, Household FI; participants in this category report being anxious about having sufficient food or are eating the same thing repeatedly because they can't afford to purchase a more diverse diet.

Those who endorse some level of *True* on any higher severity questions but *Not True* for child hunger questions (e.g., reporting children going hungry), they are designated food insecure at the middle level, Individual FI; participants in this food insecure group report that they themselves are not eating sufficiently because of a lack of resources. If participants endorse any level of *True* for questions regarding child hunger, they are categorized as CHH FI. The rationale in designating CHH as the most severe level of FI is based on the presumption that most adults will do their best to shield children from hunger, yet adult participants reported that they were unable to feed their children sufficient food. Thus, if there are hungry children at home, presumably the adults are hungrier.

Consistent with our past research, we labeled the least severe group "Not Food Insecure" (NFI) as opposed to food secure because these individuals sought services from the SAFB, which suggests that they are living on the margins of food security and FI. One possible reason for this is because they collectively have slightly more income as compared to the other groups in our sample; 41% of the NFI group reported an annual income of less than $10,000, which is lower than the other groups (54.1% - 61.8%). Importantly, however, two-thirds of the NFI group earns $20,000 or less annually, and approximately 60% of respondents had one or more children living at home; the federal poverty level in 2017 for a three person household was $20,420. Per

the RCFIM, the sample was distributed as follows: NFI (*n* = 86), Household FI (*n* = 364), Individual FI (*n* = 246) and CHH FI (*n* = 192).

Further the NFI group (*M* = 1.88, *SD* = 1.50) reported a similar number of monthly visits to food pantries to obtain food compared to both the Household FI (*M* = 1.93; *SD* = 1.42) and Individual FI (*M* = 1.93, *SD* = 1.28) groups. The CHH FI group reported a somewhat more elevated rate of food pantry visits (*M* = 2.34; *SD* = 1.52). Both the internal consistency and the construct and criterion-related validity of the RCFIM have been supported (Kendall et al., 1995). We found excellent internal consistency within our sample (Cronbach's α = .941). Table 1 provides demographics for each sub-group.

Participants completed the self-report *Eating Disorder Diagnostic Scale* for DSM 5 (EDDS-5; Stice, Fisher, & Martinez, 2004), which is designed to assess the spectrum of EDs. Research with the EDDS-4 supports its internal consistency, convergent validity with ED risk factors, criterion validity with interview-based diagnoses, sensitivity to change, and predictive validity (Stice et al., 2004). However, we used the updated EDDS-5 because it assesses night eating, which is a form of overeating, and because Middlemass, who has extensive experience with marginalized, low-income populations, thought EDDS-5 was somewhat easier to understand. Because the night eating question was complicated, based on the education levels reported in Becker et al. (2017), we divided this item into two simple questions to help participants with comprehension. To score EDDS, we computed a standardized summed composite score per Stice et al. (2004) and Krabbenborg et al. (2012). In the present sample, EDDS items had excellent internal consistency (α = .906).

We used three items from the dietary restraint sub-scale of the *Eating Disorder Examination Questionnaire* (EDE-Q; Fairburn, 2008). The three items assessed deliberately

trying to limit the amount of food eaten, going long periods (8 or more waking hours) without eating, and trying to exclude liked foods from diet. To assess dietary restraint, the EDE-Q uses a 7-point Likert scale (0 = *No Days* to 6 = *Every Day*) to measure dietary restraint over the past 28 days. The three items included in this study demonstrated acceptable internal consistency (α = .725). As described earlier, we eliminated the statement specifying that dietary restraint was for weight and shape concerns.

To assess depression, we used the eight-item *Patient Health Questionnaire* (PHQ-8; Razykov, Ziegelstein, Whooley, & Thombs, 2012). The PHQ-8 is identical to the PHQ-9, which maps onto the nine core symptoms of depression in DSM 5, except that the PHQ-8 excludes the question about passive thoughts of death or hurting oneself. The PHQ-9 was designed as a brief screening instrument for medical settings; research supports both criterion validity and construct validity (Kroenke, Spitzer, & Williams, 2001). Research also indicates that the PHQ-8 and PHQ-9 are highly correlated (r = .997) and have similar sensitivity and specificity (Razykov et al., 2012). Internal consistency in this sample was excellent (α = .939).

For anxiety, participants completed the *Generalized Anxiety Disorder* (GAD) 7-item scale, which was developed as a brief screening measure for generalized anxiety disorder (GAD-7), one of the most common types of anxiety (Spitzer, Kroenke, Williams, & Löwe, 2006). Research indicates that the GAD-7 has good criterion, construct validity, and good reliability (Spitzer et al., 2006). Research also supports its validity and reliability in the general population (Löwe et al., 2008). In the present sample, internal consistency was excellent (α = .947).

Because individuals with FI often have lower education levels, we reviewed all items using online software (i.e., Microsoft Word proofing tool, which provides a Flesch-Kincaid Grade Level); based on the results and as needed, we altered each question to meet a 6th grade

reading level. As we previously considered this issue in choosing the questions for the survey, many questions were unchanged. Due to the prevalence of Spanish speakers in San Antonio, all measures needed to be translated into Spanish. During the original Becker et al. (2017) study, we translated the full packet of measures into Spanish, then we had them back translated by an independent bilingual consultant to ensure the meaning of each question remained the same in English and Spanish. After this, the Spanish version of the overall survey was reviewed by a second bilingual consultant who grew up in San Antonio. During this process, we made a few minor changes to reflect San Antonio-based Spanish dialect, which was described to us by local speakers as a derivative of Mexican Spanish. This consultant provided feedback regarding any confusing constructs and made suggestions. The questionnaire was then piloted with both local English and Spanish speakers; during the pilot phase, participants were asked to highlight any concepts or questions they found confusing. Based on feedback, both versions were further refined. As a final check, one of the authors of Becker et al. (2017) subsequently walked through both the Spanish and English questionnaire with a native San Antonio bilingual speaker (Spanish first language), whose highest level of education was first grade. A few minor changes were made in response to this additional assessment to ensure accessibility. Copies of the adjusted measures are available upon request from the first author.

Approximately 90% of the Latinx population in San Antonio is of Mexican descent (Rentiera, 2011). The present study included two measures, the PHQ-9 and the GAD-7 that were not included in Becker et al. (2017). Both measures have Mexican Spanish versions (available at https://www.phqscreeners.com/select-screener/36); these were used in the present study. There is a Spanish version of the EDDS-4, but it was developed by Chilean researchers and piloted in Chile. Because Chilean Spanish differs from Mexican Spanish, we used our initial translation,

which had been reviewed by multiple local Spanish speakers of Mexican descent, and because no problems arose when it was originally implemented for our 2017 study.

Data Analysis

Preliminary Analyses

Preliminary analyses revealed a significant difference in age between the four food insecure groups, $F(3, 871) = 9.523$, $p = .0001$, partial $\eta^2 = .032$. Participants in the Individual ($M = 38.53$; $SD = 12.70$) and CHH ($M = 41.16$; $SD = 11.44$) FI groups were younger than in the NFI ($M = 44.86$; $SD = 17.59$) and Household FI ($M = 44.34$; $SD = 15.40$) groups. As such, age was co-varied in subsequent analyses. No differences between groups emerged based on the self-reported BMI.

For the main analyses, we ran four planned one-way ANCOVAs, with age as the covariate, to test hypotheses regarding the degree to which ED pathology, any-reason dietary restraint, depressed mood, and anxiety worsened as FI increased. These analyses tested clear a priori hypotheses; as such, we did not adjust for multiple tests. Post-hoc tests were only conducted if we found a significant omnibus test. Further, we investigated whether any reason dietary restraint correlated with ED pathology in this sample to replicate findings from Middlemass et al. (submitted).

Those living with FI are from marginalized populations and have been understudied by ED researchers, specifically, and mental health researchers more generally. In order to access and help FI individuals in culturally appropriate ways, a critical role for researchers is to facilitate partnerships with community stakeholders, such as non-profit organizations and policy makers; it is important to communicate in a way that is understandable to everyone involved. Frequencies are easier to comprehend than means, and this is particularly true in the case of

communicating the degree to which pathological behaviors are sufficiently common to be a public health problem (Becker, 2017; Fiske, Fallon, Blissmer, & Redding, 2014). As such, we include descriptive data (i.e., frequencies) for those who met the clinically significant cutoff for ED pathology, depression, and anxiety, and to test our hypotheses regarding lack of gender or ethnicity and race differences using chi-square tests. We also provide frequencies of specific ED behaviors/symptoms, given the unexpected finding in Becker et al. (2017) that severity of FI was associated with increased compensatory behaviors elevated weight/shape concerns in addition to increased binge eating. Note, we did not conduct statistical analyses on symptom frequency data secondary to concerns about multiple tests, but rather observed whether or not the data were consistent with the hypothesized linear trend

Results

Group Differences in Mean Scores and ED Pathology/Dietary Restraint Correlation

As predicted in our hypotheses, ED pathology significantly differed between the four food insecure groups, $F(3, 791) = 6.22$, $p = .0001$, partial $\eta^2 = .023$. Post-hoc analyses indicated that the CHH FI group reported increased ED pathology relative to the other three FI groups (all p values <.02, partial η^2 range = .015-.067*;* see Table 2 for means and standard deviations). In contrast, NFI participants reported significantly lower ED pathology relative to the other three groups (all p values <.02, partial η^2 range = .014 -.067). No significant difference in ED pathology emerged between Individual and Household FI groups.

A similar pattern of overall significant differences between the four groups also emerged for any reason dietary restraint, $F(3, 801) = 14.21$, $p = .0001$, partial $\eta^2 = .051$, depression, $F(3, 848) = 7.54$, $p = .0001$, partial $\eta^2 = .026$, and anxiety, $F(3, 825) = 15.31$, $p = .0001$, partial $\eta^2 = .053$. Post-hoc tests largely supported the same pattern as was found for ED pathology. For

dietary restraint, the CHH FI group scored significantly higher relative to the other three groups (all *p* values <.0001, partial η^2 range = .029-.138), whereas the NFI group scored significantly lower (all *p* values <.001, partial η^2 range = .037-.138). Once again, Individual and Household FI groups did not significantly differ. With regards to depression, the CHH FI group differed from the Individual FI and NFI groups (*p* values <.05, partial η^2 range = .010-.086), though not the Household FI group. Consistent with ED pathology and dietary restraint, the NFI group differed from the other three groups (all *p* values <.0001, partial η^2 range = .033-.086) on depression, but no difference emerged between the Individual and Household FI groups. Finally, for anxiety, post-hoc tests showed that the CHH FI group reported significantly increased anxiety relative to the other three groups (all *p* values <.02, partial η^2 range = .011-.165), whereas the NFI group had significantly lower anxiety relative to the other three groups (all p values <.0001, partial η^2 range = .064-.165). Household and Individual FI groups, again, did not differ from one another on level of anxiety.

Based on the RCFIM, the most severe level of FI for adults can only occur if there are children in the household. Thus, it could be argued that results would differ if analyses only included participants who had children in the household. However, when the sample was limited to the 493 participants with children and main analyses re-run, results were fundamentally unchanged. All omnibus tests remained highly significant. Further, only three of the 24 post-hoc comparisons changed, with one comparison becoming non-significant and two becoming significant. In all three cases, effect sizes remained within the ranges reported above. As a result, we report results for the full sample.

We hypothesized that dietary restraint would be significantly correlated with ED pathology in this food insecure sample. As with Becker et al. (2017), we assessed dietary

restraint for any reason as opposed to solely for weight and shape concerns. Consistent with our hypothesis, dietary restraint was correlated with ED pathology, even when controlling for level of FI, (R_s = .24, n = 739, p = .0001).

Frequency of Clinically Significant ED Pathology, Depression and Anxiety

Consistent with Becker et al. (2017), we used Krabbenborg et al.'s (2012) cutoff of > 16.5 on the EDDS composite score to identify those with clinically significant EDs. In Becker et al., use of this cut point produced two groups with a similar mean difference (29.30) to that found in Krabbenborg et al. (28.29); the same was true with this sample (28.76). For depression and anxiety, a cut point of $\geq$ 10 identified those at a probable clinically significant level (Razykov et al., 2012; Spitzer et al., 2006). Overall, 10.6% of the total sample met criteria for clinically significant ED pathology, 24.8% met criteria for clinically significant depressed mood, and 34.3% met criteria for clinically significant anxiety. Table 3 provides the percentage of each food insecure group that met criteria for clinically significant for ED pathology, depression, and anxiety. Given the stereotype that EDs are a problem predominantly for White women and girls, and given the marginalized nature of this sample and the limited information generally on the mental health of those living with FI, the data are broken out by gender, ethnicity, and race for each food group. Information for depression and anxiety also is included.

Consistent with our hypotheses, the percentage of those scoring above 16.5 on the EDDS composite score in the total sample generally increased as FI increased; 16.7% of those in the CHH FI group met criteria for clinically significant ED pathology. Also consistent with our hypotheses, rates of those scoring above the ED cutoff did not significantly differ between male and female participants in either the total sample, χ^2 (1, N = 882) = .458, p =.498, or the CHH FI group, χ^2 (1, N = 174) = .899, p =.343. We found a similar pattern for depression and anxiety,

with the highest levels of both emerging in the CHH FI group. In order to better understand the relationship between gender and depression and anxiety, we conducted exploratory analyses in the total sample only. No gender frequency differences emerged for either depression, χ^2 (1, N = 859) = .009, p =.923, or anxiety χ^2 (1, N = 174) = 1.20, p =.274.

With regards to race and ethnicity, as hypothesized, there were no differences in frequency of clinically significant ED pathology either in the total sample, χ^2 (3, N = 713) = .061, p =.996, or the CHH FI group. χ^2 (3, N = 174) = 1.04, p =.792. On an exploratory basis, we tested for differences in levels of clinically significant depression, χ^2 (3, N = 855) = .998, p =.802, and anxiety by ethnic and racial group, χ^2 (3, N = 833) = 4.39, p =.223, within the total sample; once again there were no significant differences.

Frequencies of ED Behaviors and Weight/Shape Concerns

Table 4 presents frequencies of objective overeating (i.e., eating a large amount of food without a sense of loss of control), objective binge eating (i.e., eating a large amount of food with a sense of loss of control), and night eating (i.e., eating after waking from sleep) with distress. In addition to overeating and binge eating behaviors, the EDDS specifically asks about compensatory behaviors that aim to "*prevent weight gain or counteract the effects of eating,*" and includes a question assessing shape/weight concerns in language that is similar to the *Eating Disorder Examination* (EDE; Fairburn, 2008). A score of 4 or greater on the EDE is considered clinically significant for weight/shape concerns, and both the EDDS and the EDE use a 0-6 point measure that is scaled similarly. Table 4 includes the following compensatory behaviors: vomiting, laxative/diuretic use, skipping two meals in a row, and exercising harder than usual because of overeating, as well as the frequency of participants endorsing $\geq$4 on weight and shape importance.

As hypothesized, we observed a linear relationship between frequencies of reported overeating behaviors; for instance, the NFI group reported the lowest levels of objective overeating, objective binge eating, and night eating with distress while the CHH FI group reported the highest levels. The other two groups fell in between these extremes. Consistent with our hypotheses, we found that the CHH FI group reported the highest level of all compensatory behaviors. Contrary to our hypotheses, the other FI groups and the NFI group reported similar levels of compensatory vomiting, laxative/diuretic use, and exercising harder. With regards to weight and shape concerns, consistent with our hypotheses, the percentage of those scoring ≥ 4 was lowest in the NFI group and most elevated in the CHH FI group.

Discussion

The primary aim of the present study was to determine if findings from a previous study investigating the association between FI and EDs replicated. Secondly, we sought to address the call to action by Kazdin and Blase (2011) and others to document the types of problems faced by marginalized communities, particularly those who largely have been understudied (and largely ignored) by mental health researchers. Both aims are critical.

Results supported the overwhelming majority of our ED hypotheses and replicated key results from Becker et al. (2017). More specifically, as hypothesized, those in the CHH FI group reported significantly higher levels of ED pathology as compared to the other FI groups, while those living on the margins of FI and food security (the NFI group) endorsed the lowest level of ED pathology (Table 1). Further, 16.7% of the CHH FI group crossed the cut off point for a current and clinically significant ED. This closely compares to the 17% previously found in Becker et al. Thus, two studies now support the argument that severe FI may be associated with elevated levels of ED pathology. Further, rates of clinically significant EDs in the CHH FI group

markedly exceeded those found in previous community-based samples in the U.S. (e.g., 7% 12-month prevalence of Hudson et al., 2007). In addition, as found in Becker et al., rates of clinically significant ED pathology did not differ by gender or ethnicity and race.

It should be noted that use of self-report measures, which are often required when conducting unfunded research in a novel area, may lead to inflated reporting of symptoms relative to interviewer-based assessments, such as those used in Hudson et al. (2007). Thus, results of this study need to be confirmed with interviewer-based measures. However, results do support the importance of conducting such follow-up studies with food insecure individuals, a population that has largely been ignored by the ED field.

Results indicated that elevated ED pathology scores were not exclusively driven by binge eating behaviors, consistent with Becker et al. (2017). Indeed, 17.2% of the CHH FI group in the current study reported engaging in self-induced vomiting to control weight or offset the effects of eating; this is relatively similar to the 20.4% rate found in Becker et al. With the exception of laxative use (12.3% current study versus 22.8% Becker et al.), rates of both compensatory behaviors and elevated weight/shape concerns were remarkably consistent in the CHH FI group across both studies. Thus, a key unexpected finding of Becker et al. (i.e., elevated rates of compensatory behaviors and weight and shape concerns in CHH FI group) also replicated.

In conversations with researchers who specialize in FI (e.g., Seligman, personal communication, May 9, 2018), one question that has emerged is whether or not behaviors that appear to be ED pathology are simply normative coping responses within a U.S. based urban food insecure population. This does not appear to be the case given that almost 90% of the total sample did not meet criteria for a clinically significant ED and a majority of participants within each food group did not endorse ED behaviors, such as binge eating, night eating, and vomiting.

Thus, FI cannot be equated to an ED; the overwhelming majority of participants in both studies who are living with FI do not appear to report experiencing elevated ED pathology. Rather, findings indicate that a distinct sub-group of individuals living with FI may develop an ED, and that severe FI may be a potent stressor that triggers the onset of EDs in vulnerable individuals leading to elevated rates when compared to community norms.

It is important to note that because the present study is cross-sectional, it is impossible to determine whether or not FI is, in fact, a prospective ED risk factor; longitudinal research is needed to tease apart the nature of the association. Longitudinal research and qualitative research also is needed to determine the degree to which existing explanatory models of the development and maintenance of EDs apply to or need to be altered to address the experiences of those living with FI (e.g., trans-diagnostic model of EDs; Fairburn, Cooper & Shafran, 2003). For instance, results from Middlemass et al. (submitted), as noted above, suggest that those living with FI restrict their food intake to stretch food to make it last, to save food for children, or because they don’t have sufficient resources to buy sufficient food. Thus, models may need to be expanded to account for intentional dietary restriction, which once again correlated with ED pathology in this study, when it is undertaken for economic reasons versus weight and shape concerns.

The present study supports the contention that severity of FI is correlated with ED pathology. Further research is needed to determine if FI serves as a prospective risk factor for the development of an ED, given that there are multiple plausible pathways (e.g., increased intentional dietary restraint, easy access to HPF, magnified economic stress secondary to FI) that might drive such a relationship. The present study provides additional evidence that the thin, White, affluent, female ED stereotype offers a flawed portrait of who is and is not at risk for EDs. Future research needs to determine the degree to which findings generated from research

with those who largely match the stereotype also apply to those who differ from the stereotype in significant ways.

Results of the present study also supported our hypotheses that FI severity would be associated with a worsening of both depression and anxiety; indeed 32.1% and 45.5% of the CHH FI group appear to be contending with clinically significant depression and anxiety, respectively. In contrast to EDs, a small but significant body of research does exist on the association of FI with depression and anxiety. Consistent with this study, previous research supports an association between FI and depression and anxiety (Klienmann et al., 1998; Palar et al., 2015; Sorsdahl, Slopen, Siefert, Seedat, Stein, & Williams, 2010; Weaver & Hadley, 2009). For instance, Alaimo, Olson, and Frongillo (2002) found that food sufficient adolescents reported a lower frequency of major depression (5.9%) compared to food insecure adolescents (12.2%). Similarly, in two related studies, Hadley and Patil (2006; 2008) identified that FI was associated with both depression and anxiety symptomatology in Tanzanian participants.

It is important to note that, as with EDs, the etiology underlying the association between FI and anxiety and depression remains unknown. Much of the existing data, including results from the present study, are correlational, which limits our ability to draw conclusions about causation. Some limited research, however, does support the argument that FI may be a risk factor for depression and anxiety (Palar et al., 2015). For instance, despite a lack of pre-starvation depression, volunteers in the Keys et al. study experienced significant increases in depression (Keys et al., 1950; Tucker, 2006), while men who were not deprived of food, yet living in the same study conditions, did not develop depression. Further, Hadley and Patil (2008) found that changes in FI, dependent on season, predicted changes in anxiety and depression symptoms. Nonetheless, as with EDs, not everyone who is food insecure develops anxiety and

depression. Thus, it is important for future research to identify additional risk factors that interact with FI to trigger clinically significant levels of anxiety and depression.

A critical feature of the present study is the fact that participants were impoverished, with 56.2% of the total sample earning under $10,000 per year and an additional 24.7% earning less than $20,000 per year. Poverty and mental illness are interconnected; poverty increases risk for mental illness and mental illness increases the odds that someone will stay or become impoverished (Lund et al., 2011). Importantly, studies conducted in low- and middle-income countries suggest that mental health interventions positively impact economic status (Lund et al., 2011). Given that over four decades of research supports the contention that impoverished people are both interested in psychotherapy and can benefit from it (Smith, 2005; Goodman et al., 2013), it is imperative that increased attention is focused on fully understanding the psychological impact of FI so that scalable interventions can be developed to help this understudied and marginalized population.

People living with FI want help. Indeed, during both the collection of data for this study and for Becker et al. (2017), RAs were repeatedly surprised by expressions of gratitude from participants who reported being shocked that anyone cared enough to ask about their experiences; we must ask about their experiences. We cannot presume that interventions developed for food secure populations can be imported wholesale for food insecure populations. Indeed, a common component of ED treatment is to establish a regular pattern of eating; this obviously becomes more challenging when people simply cannot afford to eat regularly. At the same time, an untreated ED may worsen the experience of FI because out of control binge eating may hamper a person’s ability to ration food across the month. Untreated anxiety and depression may also negatively impact a person’s ability to cope with the chronic stressor of FI.

Despite the importance of addressing mental health concerns in marginalized populations, research indicates that poor communities are less likely to seek treatment for mental illness and are more likely to stop treatment early. Yet, positive outcomes improve when psychological interventions are tailored to attend to contextual stressors associated with poverty (Goodman et al., 2013). Research by Patel et al. (2010) indicates that empirically supported behavioral interventions can be both tailored for impoverished communities and task-shifted to lay providers to reduce the cost of scaling, but tailoring is critical (Smith, 2010). Further, it will require clinical psychology to both better understand the lived experience of those who are forced to contend with FI and to adopt a social justice perspective that recognizes that poverty is not limited to material deprivation but social capital deprivation, too (Smith, 2010).

This study has a number of limitations. First, although we back translated Spanish translations to make sure that the English and Spanish versions were comparable, we did not have the resources to conduct a validity study of the measures in Spanish and did not use a specific cultural framework to structure translations of the measures (e.g., Alegria et al., 2009). Second, to address the typical low educational levels of this population, we modified some questions in our measures to make them understandable. Although this is both common and necessary when conducting research with low-education, marginalized populations, it is less than optimal from a psychometric perspective. Third, this study is cross-sectional and cannot determine causation. As noted above, both longitudinal and qualitative studies are needed to elucidate the relationships identified and replicated in this study. Fourth, although we collected self-report weight and height data to calculate BMI, there are good reasons to think that participants may not have an accurate perception of their weight, given that both visiting a doctor and scales are luxuries for low-income populations who do not have enough food. For this

reason, we did not conduct analyses on BMI beyond checking to see if significant differences existed across groups. Fifth, this study only recruited participants who were food insecure or living on the margins of FI. Thus, participants do not represent the full continuum of food security to FI. Not surprisingly, the number of participants in the lowest level of FI only comprises a small percentage of the total sample. Although we more than doubled the number in the NFI group compared to our first study, they still remain a distinct minority of the sample, which is a limitation

The sample in the present study is largely Latinx/Hispanic. Given the historic focus on White individuals in the ED literature, we argue this is a strength of the present study. However, it also is a weakness because it is unclear to what degree findings from the present study will generalize to other ethnic and racial populations living with FI.

In conclusion, the present study replicates previous research showing that higher levels of FI are associated with increased levels of ED pathology, depression, and anxiety. We add our voices to previous calls for increased research with marginalized, understudied populations so that their lived experiences can be understood and used to tailor existing behavioral interventions to meet their needs. Only then will our field be able to fully respond to calls by Kazdin and Blase (2011) and others (Kazdin, 2017; Smith, 2010) to address the treatment gap and provide psychological services for those who are currently underserved.

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Table 1
Participant Gender, Education, Ethnicity, Race, Marital Status & Household Income

	Total Sample (N = 891)		Not Food Insecure (*n* = 86)		Household Food Insecure (*n* = 364)		Individual Food Insecure (*n* = 246)		CHH^ Food Insecure (*n* = 192)	
	n	**%**	n	%	n	%	n	%	n	%
Gender										
Male	**287**	**32.4**	31	36.0	125	34.4	71	29.0	60	31.3
Female	**600**	**67.3**	55	64.0	238	65.6	174	71.0	132	68.6
Education[a]										
No/some grade school	**74**	**8.4**	12	14.0	31	8.6	15	6.2	15	7.9
Finished grade school	**59**	**6.7**	9	10.5	24	6.6	10	4.1	16	8.4
Some high school	**189**	**21.4**	15	17.4	74	20.4	53	21.9	47	24.7
High school/GED	**278**	**31.5**	20	23.3	125	34.4	77	31.8	56	29.5
Some college/technical	**234**	**26.5**	20	23.3	91	25.1	77	31.8	46	24.2
Bachelors +	**47**	**5.4**	20	11.7	17	4.7	10	4.1	10	5.3
Ethnicity & Race										
Latino/Hispanic	**673**	**76.2**	64	75.3	267	74.0	186	75.6	155	80.7
Black/African American	**52**	**5.9**	7	8.2	20	5.5	15	6.1	10	5.2
White/Caucasian	**89**	**10.1**	8	9.4	46	12.7	24	9.8	11	5.8
Other	**69**	**7.8**	6	7.2	28	7.8	20	8.1	15	7.8
Marital Status										
Single	**351**	**39.5**	32	37.2	148	40.7	105	42.7	65	34.0
Married or living with a partner	**287**	**32.3**	29	33.7	99	27.2	83	33.7	76	39.8
Separated	**88**	**9.9**	4	4.7	36	9.9	30	12.2	18	9.4
Divorced	**113**	**12.7**	12	14.0	56	15.4	23	9.3	22	11.5
Widowed	**49**	**5.5**	9	10.5	25	6.9	5	2.0	10	5.2
Current Annual Household Income										
< $10,000	**477**	**56.2**	34	41.0	215	61.8	125	54.1	102	54.8
$10,000-$20,000	**210**	**24.7**	21	25.2	81	23.3	60	26.0	48	25.8
$20,000-$30,000	**85**	**10**	12	14.4	25	7.1	24	10.4	24	13
$30,000+	**71**	**8.3**	15	18.0	24	7.0	22	9.5	10	5.3

[a] Education indicates highest level of education completed.
^ CHH = Child Hunger Household.
% reported as valid % based on those responding to a given item.
Note: Three participants did not provide complete food insecurity data and could not be classified into a food insecure group.

Table 2
Means and Standard Deviations for Age, Eating Disorder Pathology, Dietary Restraint, Depressive Mood and Anxiety

	Not Food Insecure	**Household Food Insecure**	**Individual Food Insecure**	**CHH^ Food Insecure**
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Age	44.86 (17.59)[a]	44.34 (15.40)[a]	38.53 (12.70)[b]	41.16 (11.44)[c]
EDDS	-3.87 (9.99)[a]	-0.54 (11.63)[b]	.03 (10.56)[b]	2.68 (12.45)[c]
EDEQ-DR	0.61 (1.23)[a]	1.32 (1.56)[b]	1.23 (1.53)[b]	1.87 (1.58)[c]
PHQ-8	3.38 (5.39)[a]	6.38 (6.74)[b, c]	5.99 (6.11)[b]	7.32 (6.59)[c]
GAD-7	3.72 (5.30)[a]	8.05 (7.06)[b]	7.58 (6.25)[b]	9.49 (6.75)[c]

Age: CHI versus all other groups p<.05; Individual versus Household and Not Food Insecure (NFI) <.0001.
EDDS: CHH versus all other groups, p<.02; NFI versus all other groups p<.02.
EDEQ-DR: CHH versus all other groups, p<.0001; NFI versus all other groups p<.001
PHQ-8: CHH versus Individual and NFI p<.05; NFI versus other groups p<.0001.
GAD-7: CHH versus all other groups, p<.02; NFI versus all other groups p<.0001
Note: ^ CHH = Child Hunger Household.
EDDS = Eating Disorder Diagnostic Scale; scores on the EDDS are standardized scores.
EDEQ DR = EDEQ dietary restraint minus instruction that restriction is for weight and shape concerns.
PHQ-8 = Patient Health Questionnaire-8.
GAD-7 = General Anxiety Disorder-7.
Some participants did not complete enough items to score the full EDDS, PHQ-8, and/or GAD-7 or did not complete the three EDEQ dietary restraint items. They were excluded from this table and corresponding analyses for each measure for which that occurred.

Table 3: *Frequencies of Clinically Significant Eating Disorder Pathology, Depression and Anxiety*

	Not Food Insecure	**Household Food Insecure**	**Individual Food Insecure**	**CHH^ Food Insecure**
Clinically Significant Eating Disorder[a]	Available *n* = 78	Available *n* = 327	Available *n* = 223	Available *n* = 174
Total Sample	**5 (6.4%)**	**37 (11.3%)**	**14 (6.3%)**	**29 (16.7%)**
Male	3 (10.3%)	12 (10.7%)	2 (3.0%)	7 (12.7%)
Female	2 (4.1%)	25 (11.6%)	12 (7.7%)	22 (18.5%)
Latino/Hispanic	3 (5.2%)	27 (11.3%)	12 (7.0%)	24 (16.9%)
White	0 (0.0%)	5 (12.5%)	1 (5.6%)	2 (20.0%)
Black/African American	0 (0.0%)	3 (15.0%)	0 (0.0%)	2 (22.2%)
Other	2 (33.3%)	2 (8.3%)	1 (5.6%)	1 (7.7%)
Clinically Significant Depression	Available *n* = 82	Available *n* = 349	Available *n* = 241	Available *n* = 187
Total Sample	**7 (8.5%)**	**92 (26.4%)**	**54 (22.4%)**	**60 (32.1%)**
Male	6 (20.0%)	37 (30.6%)	13 (18.8)	14 (23.3%)
Female	1 (1.8%)	55 (24.1%)	41 (24.0%)	46 (36.2%)
Latino/Hispanic	5 (8.2%)	63 (24.7%)	40 (21.9%)	49 (32.7%)
White	0 (0.0%)	15 (34.9%)	5 (20.8%)	3 (27.3%)
Black/African American	0 (0.0%)	5 (25.0%)	3 (21.4%)	5 (50.0%)
Other	2 (33.3%)	9 (32.1%)	6 (30.0%)	3 (20.0%)
Clinically Significant Anxiety	Available *n* = 85	Available *n* = 343	Available *n* = 232	Available *n* = 178
Total Sample	**10 (11.8%)**	**124 (36.2%)**	**73 (31.5%)**	**81 (45.5%)**
Male	6 (19.4%)	49 (41.2%)	25 (37.3%)*	21 (36.8%)
Female	4 (7.4%)	75 (33.6%)	47 (28.7%)*	60 (49.6%)
Latino/Hispanic	7 (11.1%)	82 (32.0%)	53 (29.8%)	69 (47.6%)
White	1 (12.5%)	18 (43.9%)	8 (36.4%)	4 (36.4%)
Black/African American	0 (0.0%)	10 (52.6%)	6 (46.2%)	3 (42.9%)
Other	2 (33.3%)	14 (58.3%)	6 (33.3%)	5 (35.7%)

[a] Scoring above 16.5 standardized cutoff on EDDS; or $\geq$ 10 on PHQ-8 or GAD-7

* One participant who met criteria for GAD did not list gender; thus male and female combined = 72.

Note: ^ CHH = Child Hunger Household.

Available n's = available total/composite scores for each measure within each food insecurity (FI) category for total sample; valid percentages calculated on total number of scores on main dependent variable within each food insecure category for total sample; gender and ethnicity and race sample percentages calculated as valid percentages of scores within food insecure group and gender or ethnicity.

Table 4
Frequencies of Overeating and Eating Disorder Symptoms

	Not Food Insecure	**Household Food Insecure**	**Individual Food Insecure**	**CHH^ Food Insecure**
Objective Overeating	Available n = 85 10 (11.8%)	Available n = 352 68 (19.3%)	Available n = 243 40 (16.3%)	Available n = 186 41 (22.0%)
Objective Binge Eating	Available n = 84 10 (11.9%)	Available n =350 47 (13.4%)	Available n =240 39 (16.3%)	Available n =188 50 (26.6%)
Night Eating with Distress	Available n = 82 8 (9.8%)	Available n = 350 72 (20.6%)	Available n = 238 62 (26.1%)	Available n = 187 857 (30.5%)
Vomiting[b]	Available n = 84 8 (9.5%)	Available n = 352 29 (8.2%)	Available n = 242 18 (7.4%)	Available n = 186 32 (17.2%)
Laxatives/Water Pills[b]	Available n = 84 7 (8.3%)	Available n = 348 31 (8.9%)	Available n = 242 18 (7.4%)	Available n = 187 23 (12.3%)
Skipped at Least 2 Meals in a Row[b]	Available n = 82 13 (15.9%)	Available n = 352 127 (36.1%)	Available n = 242 106 (43.8%)	Available n = 185 102 (55.1%)
Exercised Harder than Usual b/c Ate Too Much[b]	Available n = 83 72 (20.6%)	Available n = 350 72 (20.6%)	Available n = 240 65 (27.1%)	Available n = 187 66 (35.3%)
Weight & Shape Concerns ≥4	Available n = 84 10 (11.9%)	Available n = 354 74 (20.9%)	Available n = 243 63 (25.9%)	Available n = 186 52 (28.0%)

[a] Night eating after waking from sleep a large amount of food with distress.
[b] Behavior was done to prevent weight gain or counteract the effects of eating
^ CHH = Child Hunger Household
Note: Available n's = available responses for each food insecurity group; valid percentages calculated based on total number of responses on each dependent variable in each food insecurity category.

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