Food insecurity, food parenting practices, and child eating behaviors among low-income Hispanic families of young children

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Abstract

Food insecurity is associated with negative food parenting practices that may promote child obesity, including pressure to eat and food restriction. Less is known about the relationship between food insecurity and positive food parenting practices, including exposing the child to new foods and involving the child in food preparation. Further, few studies have investigated the associations between food insecurity and child eating behaviors that have been linked to poor dietary outcomes. Using baseline data collected as part of a larger pilot intervention, we examined the relationships between food security status, food parenting practices, and child eating behaviors in a predominately Hispanic, low-income sample of parents and their preschool aged children ($n = 66$). Between July of 2019 and 2020, caregivers recruited from 4 urban communities in

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Rhode Island completed assessments of household food security, food parenting practices, and four child eating behaviors: food responsiveness, emotional overeating, enjoyment of food, and satiety responsiveness. Although 46% of caregivers reported food insecurity, food insecurity was not directly associated with any food parenting practice. Children in food insecure households were rated as higher in levels of food responsiveness and enjoyment of food as compared to children in food secure households. Children in food insecure households were rated as lower in satiety responsiveness as compared to children in food secure households. Child emotional overeating did not vary by food security status. Future interventions to reduce child obesity among low-income Hispanic families should assess food security status and consider any level of food insecurity as a potential signal of unhealthy child eating behaviors.

Keywords

child eating behaviors; food insecurity; preschoolers; food parenting; Hispanic; low-income

1. Introduction

Overweight and obesity levels among preschool aged children in the U.S. remain high (Fryar et al., 2020), especially among low-income, Hispanic populations (Anderson et al., 2019). At the same time, the presence of food insecurity is a common experience for low-income and Hispanic families (Coleman-Jensen et al., 2021). Food insecurity occurs when households lack or have uncertain access to sufficient, safely accessible, and nutritious food (Anderson, 1990). Food insecurity is associated with poorer health and development among young children (Drennen et al., 2019; Gundersen & Ziliak, 2015). While direct links between food insecurity and adult diet and/or weight have been identified (Moradi et al., 2019), the relationship between food insecurity and child weight or diet is inconsistent (Eisenmann et al., 2011; Foster et al., 2019; Gamba et al., 2021; Kral et al., 2017), although associations have been reported among low-income Hispanic families (Crawford et al., 2007; Sharkey et al., 2012).

Food parenting practices and child eating behaviors may function as pathways through which food insecurity leads to unhealthy child weight among younger children who primarily depend on parents to manage food resources. Some have proposed that food insecurity may lead parents to pressure children to eat available food to avoid waste (Foster et al., 2019), or to restrict food consumption in an effort to make food last longer (Crawford et al., 2007). Uncertain or limited ability to access food may have direct associations with child eating behaviors. For example, food insecurity may prompt children to overeat when food is available (Tester et al., 2020). Such behavior could reduce satiety responsiveness, defined as the child's ability to regulate food intake in response to internal cues of fullness (Jansen et al., 2018). Further, stress associated is correlated with food insecurity in adults (Tomiyama et al., 2011), and may have similar associations in preschool children.

Research assessing the pathway between food insecurity and food parenting practices typically examines practices that reflect parental external control: pressure to eat, food restriction, and monitoring of food intake. Food insecurity has been associated with pressure

to eat among white youth (Adams et al., 2020; Darling et al., 2018) and Hispanic infants (Gross et al., 2012; Gross et al., 2018), but not among a sample of African American elementary age children (Feinberg et al., 2008). An association between food insecurity and food restriction has been reported in some studies (Bauer et al., 2015; Gross et al., 2012) but not others (Adams et al., 2020; Feinberg et al., 2008; Gross et al., 2018; Kral et al., 2017; Trappmann et al., 2015). To date, parental monitoring of the child's food intake has not been associated with current food insecurity (Adams et al., 2020; Kral et al., 2017). As much of the above research utilized infants (Gross et al. 2012; Gross et al., 2018), older youth (Bauer et al., 2015; Darling et al., 2018; Kral et al., 2017), samples with broad age spans (Adams et al., 2020; Berge et al., 2020; Feinberg et al., 2008), and predominately non-Hispanic populations (Adams, et al.,2020; Bauer et al., 2015; Darling et al., 2018; Feinberg et al., 2008; Kral et al., 2017), it is unclear whether the findings from these studies would generalize to Hispanic families with preschool aged children.

Other food parenting Practices have received limited attention. Indulging the child's food wishes and inattentiveness to the child's diet were linked to food insecurity in a study of low-income Hispanic infants (Gross et al., 2018) while food insecurity was marginally associated with using food as a reward among Mexican-American parents of preschoolers (Crawford et al., 2008). Little is known about the relationship between food insecurity and positive or autonomy supporting food parenting practices, such as encouraging the child to try new foods or involving the child in food preparation (Power et al., 2019).

Some studies have examined whether household food insecurity may work through child eating behaviors in ways that promote obesity, though this work has centered on narrowly defined child eating behaviors. Eating in the absence of hunger and eating past fullness were not significantly associated with food insecurity among 8 to 10 year-old children of predominately African American parents (Kral et al., 2017). Among preschool populations, indicators of child food fussiness have received the bulk of attention with no direct associations reported between food security status and food fussiness (Harris et al., 2019) or picky eating (Brown et al., 2018) in predominately non-Hispanic families. Similarly, null findings were noted among 5–7 year olds in diverse households (Berge, Fertig et al., 2020). This limited evidence highlights the need to investigate these relationships in Hispanic families and examine other relevant child eating behaviors, especially emotional overeating, enjoyment of food, satiety responsiveness, food responsiveness, as these have been associated with child overweight in preschoolers (Boswell et al., 2018; Domoff et al., 2015; Frankel et al., 2014).

To address these knowledge gaps, our primary aim was to examine the relationships between food security status, food parenting practices, and child eating behaviors in a predominately Hispanic, low-income sample of parents and their preschool aged children. We hypothesized that compared to food secure households, parents in food insecure households will be more likely to engage in negative food parenting practices (e.g., pressure to eat, indifference) and less likely to use positive food parenting practices (e.g.., offer new foods, regular mealtimes); we also hypothesized that parents of children in food insecure households will report higher levels of child food responsiveness, emotional overeating, and enjoyment of food, along with lower levels of satiety responsiveness as compared to parents of children

in food secure households. As an exploratory aim, we investigate whether food parenting practices mediate relationships between food security status and child eating behaviors or are independently associated with child eating behaviors.

2. Materials and Methods

2.1. Procedures and Sample

Data for this study were collected as part of the Strong Families Start at Home (SFSH), a pilot, randomized clinical trial focused on improving food parenting practices and child dietary outcomes among low-income, diverse parents of preschoolers (Fox et al., 2020). Before the intervention began and prior to randomization, 83 eligible participants were invited to participate. From this group, 66 primary caregivers completed baseline assessments administered by trained bilingual researchers between July 2019 and July 2020. Sixty assessments were collected during a 90 minute in-person home visit; six were collected via zoom between March and July 2020 due to COVID-19 research restrictions. This cross-sectional analysis used data from the pilot baseline assessments.

Study participants were recruited by trained nutritionists at Supplemental Nutrition Program for Women, Infants, and Children (WIC) clinics, study staff in WIC waiting rooms and in child welfare organization located in four urban areas in Rhode Island that serve predominately low-income Hispanic communities. Passive recruitment methods (flyersand posters in early education centers and pediatricians' offices in these communities) were also used. Eligibility for inclusion consisted of the following: participant is a primary caregiver of a 2–5 year old child, speaks English or Spanish, and is at least 18 years old. In addition, the primary caregiver and child had to eat at least 3 weekly dinners together have, access to a phone that video-records, and consent to being video-taped. Caregiver/ child dyads were excluded if the child was underweight, or had a feeding disorder, dietary restriction, or medical condition that impacts parental feeding practices. All study protocols and procedures were approved by the University of Rhode Island's Institutional Review Board (HU1819–007). Informed consent forms were provided, explained, and signed prior to data collection. For full details of the pilot study, see Fox et al. (2020).

2.2. Measures

Food Insecurity.—Food insecurity was assessed with a 2-item self-report screener that achieved high levels of sensitivity (97%) and specificity (83%) in a large sample of low-income, urban families of infants and toddlers (Hager et al., 2010). The original two items are part of the United States Department of Agriculture's Household Food Security Module (Coleman et al., 2021). Parents were asked how often they worried that food would run out and whether their food would last. Response choices for each question were: 1) Often true, 2) Sometimes true, and 3) Never true. Families were categorized as food insecure if they responded often or sometimes true to either item (Hager et al., 2010).

Food Parenting Practices.—Parents completed the Food Parenting Inventory (FPI), a new measure of food parenting practices designed for diverse parents with young children (Power et al., 2019). Developed through focus groups with African American and Latina

mothers and validated with Latina mothers of preschool aged children, the FPI includes 53 items that assess three constructs: 1) encourage trying new foods; 2) mealtime structure, and 3) external control. Within these overall constructs, the original study identified 16 subscales, each consisting of 3–4 items found to have acceptable internal reliability as demonstrated by mean inter-item correlations ranging from .26 to .70 (Power et al., 2019). Respondents used Likert scales to rate their agreement with (1 = strongly disagree; 5 = strongly agree) or use of (1 = never; 5 = always) each item. Higher scores indicate greater agreement with or frequency of a food parenting practice. In the current study, items associated with 14 subscales were used (see Table 2 for a list of subscales). Items for two subscales reflecting mealtime structure (serving measured portions; parent decides portion size) were not administered to reduce data burden. Preliminary analyses indicated that the four FPI subscales related to encouraging trying new foods (offer new foods, encourage exploration of new foods, urge to eat new foods, repeated presentation of new foods) performed well as one scale. This scale, encourage trying new foods, consists of 13 items and achieved high internal reliability, α = .790.

Child Eating Behaviors.—The Children's Eating Behaviour Questionnaire (CEBQ) (Wardle et al., 2001) assesses parental perceptions of their child's eating behavior. The CEBQ consists of 35 items that map onto 8 eating behaviors. Parents rated each item on a five-point Likert scale with 1 = never, and 5 = always. Validity and reliability for the CEBQ are established (Carnell & Wardle, 2007) and the measure has been successfully used with diverse parents of young children (Domoff et al., 2015; Power et al., 2019). The current study utilized four subscales that have been found to have acceptable psychometric properties for low-income Hispanic and non-Hispanic parents of preschool age boys and girls: 1) food responsiveness (α = .79), a 5 item scale assessing potentially problematic eating behaviors, e.g., child eating past fullness, and whether the child eats primarily in response to external food cues (Carnell & Wardle, 2007); 2) emotional overeating (α = .86), a 4 item scale rating the child's inclination to eat in response to stressful emotions; 3) enjoyment of food (α = .82), a 4 item scale assessing the child's general appetite and approach to eating (Domoff et al., 2015), and 4) satiety responsiveness (α = .71), a 5 item scale assessing the child's eating in response to perceived fullness (Perez et al., 2018).

Demographic and Anthropometric Characteristics.—Participants completed a demographic questionnaire that included parental attributes (age, sex, relationship to child, race/ethnicity, educational attainment, employment status, partner status), child characteristics (age in months, sex), and household information (income, receipt of food assistance). Originally, height and weight of the child and parent were to be collected using standardized procedures by trained data collectors. Due to research restrictions related to the COVID pandemic, 89% of the sample were measured while 11% self-reported child and parent height and weight. Parental body mass index (BMI) was calculated using standard formulas and age- and sex-adjusted BMIz scores were calculated for the children using the 2000 Centers for Disease Control growth charts and publicly available SAS codes.

2.3. Statistical Analyses

All data were entered into a Research Electronic Data Capture database. Data analyses were conducted with SPSS v. 27 (IBM). Preliminary descriptive analyses assessed variable response distribution, normality, and data missingness. Chi-square analyses and independent samples t-tests compared food secure households to food insecure households on demographic characteristics to identify significant differences that would need to be adjusted in the multivariable regressions. Bivariate correlations between the FPI subscales and the four CEBQ scales were conducted using Pearson's r to explore these relationships and to identify significant predictors to include in the multivariable analyses of child eating behaviors. As the first step in hypothesis testing and to identify possible mediators of child eating behaviors, independent samples t-tests assessed whether food parenting practices varied by food insecurity. Next, we tested bivariate associations between food insecurity and child eating behaviors with independent samples t-tests.

A *post hoc* power analysis indicated that a sample size of 64 was sufficient for a regression equation with five predictors, with an effect size of $=.15$, an alpha of .10, and power of .80. For regression models predicting food parenting practices, we adjusted for demographic variables that significantly distinguished between food secure and food insecure families and then entered food security status into the model. For regressions predicting child eating behavior scales, household food security status, and significant demographic covariates were entered on the first step for hypothesis testing. Food parenting practices significantly correlated with each specific child eating behavior were entered in the second step as part of the exploratory analyses. As findings regarding household food security did not substantively change with the addition of food parenting practices, we present results from the final model with all variables. Relevant multivariable regressions utilize the encourage trying new food scale in place of the four related FPI subscales to maintain adequate power.

There were no missing data for food security status and three CEBQ scales; however, one participant skipped one item on the CEBQ emotional overeating scale; seven participants were missing one item on an FPI scale or subscale; and six participants were missing income data. Thus, although the percentage of variables with missing data is low with ($< 1\%$), exclusion of all missing data would reduce the sample size by 11 participants, a drop of 17%. Analysis of missing data patterns revealed no discernible patterns, suggesting the data are missing at random. To address loss of power, we utilized multiple imputation to impute missing data for the multivariable regressions. Multiple imputation methods are the best method for addressing data missing at random with small samples due to multiple imputation's ability to maintain adequate power for analyses while keeping Type 1 errors and coefficient bias low (McNeish, 2017). In order to maximize reproducibility and efficiency without loss of power, it is now recommended to go beyond the previous standard of data analysis with 3–5 imputed datasets (McNeish, 2017; White et al., 2011). For this study, 11 full datasets were created that substituted imputed values for all missing data. We present the results from the pooled data. For all analyses, significance is defined as $p < .05$.

3. Results

3.1. Food Security Status and Participant Characteristics

Overall, 66 children and their primary caregivers participated in baseline assessments. Most parents were Hispanic (87%), female (95%), the target child's mother (91%), with a mean age of 34 ± 7.5 years old (Table 1). The families were predominately low-income, with 77% earning less than $35,000 per year. Only 25% of caregivers were employed full time. Almost half (45.5%) of households reported food insecurity and 85% received some form of food assistance. Families experiencing food insecurity had significantly lower levels of educational attainment, $\chi^2 (1) = 8.8$, $p = .003$, than those without food insecurity. Significant income differences, $\chi^2 (1) = 6.5$, $p = .039$, were also found with 70% of food insecure families reporting incomes of less than $25,000 as compared to 42% of food secure families. Levels of employment and receipt of food assistance were similar across both groups. Child BMIz-scores did not vary by food security status ($p = .15$).

3.2. Food Parenting Practices and Child Eating Behaviors

Although no food parenting practice significantly correlated with child food responsiveness (Table 2), 11 FPI subscales were significantly ($p < .05$) correlated with at least one other child eating behavior. Subscales measuring encouraging exploration of new foods, inconsistent mealtimes, and food restriction were marginally or not significantly associated with any child eating behavior.

Offer new foods ($p = .018$), urge child to eat new foods ($p = .003$), and repeated presentation of new foods ($p =.025$) corresponded to significantly higher scores on child emotional overeating. The fourth related practice, encourage exploration of new foods, had a marginal positive association with emotional overeating ($p = .067$). These four practices were not associated with any other child eating behavior. As noted earlier, these results led to the decision to combine the four subscales into one scale, encourage trying new foods. This scale had a higher correlation with child emotional overeating ($r = .396$, $p =.001$) as compared to the individual subscales.

Parental mealtime structure subscales were significantly associated with three child eating behaviors. Parental use of family meals ($p= .001$), regular timing of meals ($p = .003$) and child involvement in food preparations ($p = .005$) corresponded to significantly higher scores on child enjoyment of food. Two mealtime structure subscales were significantly correlated with lower satiety responsiveness: regular mealtimes ($p = .001$) and child involvement in food preparation ($p = .002$). Indifferent feeding was the only mealtime structure subscale to significantly correlate with emotional overeating, with a positive association ($p = .033$).

Parental external control subscales also had significant correlations with three child eating behaviors. Using food as a reward ($p = .016$) and greater responsiveness to child's fullness cues ($p = .025$) were associated with higher scores on emotional overeating. Pressure to eat correlated with lower enjoyment of food ($p = .001$) while parental monitoring was associated with higher enjoyment of food ($p = .003$). Greater pressure to eat also was significantly correlated with higher satiety responsiveness ($p = .016$) while using food as a reward had a marginal association with higher satiety responsiveness ($p = .056$)

3.3. Food Insecurity and Food Parenting Practices

Food insecurity was not significantly correlated with any of the 14 FPI subscales (Table 3). Both food secure and food insecure households had similar reports of parental encouragement of new foods, mealtime structure, and external control. As no significant relationships were found, further hypothesis testing with multiple regression analysis was not needed. Further, the lack of a significant relationship between these variables suggests that FPI subscales do not mediate the relationship between food insecurity and child eating behaviors.

3.4. Food Insecurity and Child Eating Behaviors

Significant and marginal relationships were found between food security status and three child eating behaviors (Table 3). As compared to children in food secure households, children in food insecure households receive significantly higher parental ratings on food responsiveness, $t(64) = -2.74$, $p = .008$. Marginal differences were found with lower enjoyment of food, $t(64) = -1.78$, $p = .080$, and higher satiety responsiveness, $t(64) = 1.88$, $p = .065$, for children in food insecure households.

3.5. Multivariable Regressions Predicting Child Eating Behaviors

The results from the regression model predicting food responsiveness were consistent with the bivariate analyses (Table 4). After controlling for education and income, children in food insecure households were rated by parents as significantly higher on food responsiveness than those in food secure households ($p = .022$). As no food parenting practices significantly correlated with this child eating behavior, no additional variables were added to the model.

Household food insecurity was not associated with child emotional overeating in the regression analyses. Of the four FPI variables, only encourage trying new foods had a significant and positive relationship with emotional overeating. In contrast, indifferent feeding practices, use of food as a reward, and responsive to child's fullness cues were not significantly associated with emotional overeating.

Household food insecurity significantly predicted higher parental ratings of child enjoyment of food ($p = .011$). Additionally, three FPI subscales were significantly associated with this eating behavior. Eating meals as a family ($p = .022$) and monitoring child's intake of food ($p = .045$) predicted higher scores on child enjoyment of food. In contrast, pressure to eat was associated with lower enjoyment of food ($p = .012$). Regular mealtimes had a marginal positive relationship with child enjoyment of food ($p =.057$), while child involved with food preparation was not significant ($p=.533$).

After controlling for income and education, household food insecurity had a significant negative relationship with satiety responsiveness ($p = .014$). Unexpectedly, FPI mealtime structure subscales of regular mealtimes ($p = .001$), and child involved in food preparation ($p = .024$), were associated with lower satiety responsiveness. In contrast, pressure to eat had a non-significant positive relationship with satiety responsiveness ($p = .162$).

4. Discussion

To our knowledge, this research represents one of the first to examine relationships between food security status with a broad array of food parenting practices and with child eating behaviors that have been associated with overweight among preschoolers. In this sample of low-income, primarily Hispanic caregivers of preschool aged children, almost half reported household food insecurity, substantially higher than the 25% of Rhode Island households reporting food insecurity during the COVID-19 pandemic (Rhode Island Community Food Bank, 2020). Further, household food insecurity was significantly associated with three child eating behaviors - food responsiveness, enjoyment of food, and satiety responsiveness. Unexpectedly, food insecurity was not associated with any positive or negative food parenting practice.

Consistent with our hypotheses, children in food insecure households showed higher levels of food responsiveness and enjoyment of food as compared to children in food secure households. Because food parenting practices did not differ by food security status, our findings suggest that the relationship between food insecurity and these two child eating behaviors may work through other mechanisms. Stress related to household food insecurity is one plausible pathway that may lead to increased child food responsiveness and enjoyment of food. Older children are often aware of household food insecurity (Fram et al., 2011; Tester et al., 2020) and this awareness is associated with child stress and anxiety (Leung et al., 2020). This process may be similar for preschool aged children and, in fact, previous studies have reported that food insecure parents of preschoolers evidence high levels of stress (Johnson & Markowitz, 2018). While studies have not assessed preschooler awareness of food insecurity or household stress, household stress was found to increase preschoolers' responsiveness to food, described as the child "wanting" food, and their enjoyment or "liking" of food (Lumeng et al., 2014). Household stress can also reduce a young child's ability to self-regulate eating (Miller & Lumeng, 2018). Lowered self -regulation is linked to increased food responsiveness and enjoyment of food, and decreased satiety responsiveness among preschoolers (Frankel et al., 2014).

As expected, child satiety responsiveness also varied by food security status, with children in food insecure households rated as lower in satiety responsiveness as compared to children in food secure households. Among adults and adolescents, food insecurity can lead to overeating when food is available (Bruening et al., 2012; Dinour et al., 2007) and restriction of food is associated with overeating in children (Birch et al., 2003). Food insecurity may prompt overeating in ways that interfere with a preschool child's ability to self-regulate food, leading to reduced satiety responsiveness. A qualitative study of preschool teachers described patterns of overeating by children in response to hunger (Sigman-Grant et al., 2008), but more research is needed to understand how food insecurity may lead to lowered satiety responsiveness in preschool children.

Although we hypothesized that limited or uncertain access to food in the household might promote emotional overeating by the child, the results do not support this relationship. It is unclear why emotional overeating is the only child eating behavior to have a null relationship with food insecurity. Although average scores on emotional overeating were

much lower than scores for the other eating behaviors in our study, such findings have been reported in research with similar populations (Domoff et al., 2015; Perez et al., 2018; Power et al., 2020). A recent study that assessed child food insecurity, a more sensitive indicator of limited or uncertain food access among children, reported significant associations with emotional overeating among Hispanic preschoolers (Eagelton et al., 2021). Future research with this population should assess the relationships between child eating behaviors with measures of both household and child food security status.

In general, our results contradict those from the few studies investigating associations between household food insecurity and similar child eating behaviors. For example, a study assessing the same eating behaviors found no associations between household food insecurity with food responsiveness, emotional overeating, enjoyment of food, or satiety responsiveness, among a predominately white group of youth with obesity (Oberle et al., 2019). In comparison, the current study involved preschool aged Hispanic children who were not selected for their weight status, which may explain the discrepant findings. Eating in the absence of hunger, a behavior correlated with food responsiveness, enjoyment of food, and satiety responsiveness in an observational study (Carnell & Wardle, 2007), was not associated with food insecurity in a sample of primarily non-Hispanic low-income toddlers (Asta et al., 2016) and predominately African-American 8–10 year olds (Kral et al., 2017). These mixed findings point to the importance of including broad measures of child eating behaviors in studies assessing the relationships between food security and obesity-promoting eating behaviors in preschool age children.

Contrary to our hypotheses, food parenting practices did not vary by household food security status. Although unexpected, this finding adds to the literature as both negative and positive food parenting practices were assessed. The null association between food insecurity and negative food parenting practices, particularly pressure to eat and food restriction, echo results from some (Berge, Fertig, et al., 2020; Crawford et al., 2007; Feinberg et al; 2007; Kral et al., 2017), but conflict with other studies (Adams et al., 2020; Bauer et al., 2015; Gross et al., 2012, Gross et al., 2018). Our failure to find significant associations may reflect that these food parenting practices in low-income Hispanic households are not associated with concurrent food insecurity. As early, persistent, and worsening food insecurity have been identified as drivers of pressure to eat and restrictive food parenting practices (Adams, et al.; Gross et al., 2018; Nguyen et al., 2020), longitudinal assessments of food insecurity are needed to fully understand these relationships. Additionally, food insecurity may influence other aspects of the family food environment, such as access to healthy or unhealthy foods (Nackers & Appelhans, 2013), in ways that adversely impact child eating behaviors or dietary outcomes.

Food parenting practices did not mediate any association between food insecurity and child eating behaviors; however, they were associated with three child eating behaviors in the exploratory analyses. Two patterns of associations warrant attention. First, no FPI scale was significantly associated with child food responsiveness. These results are similar to the FPI validation study (Power et al., 2019), which identified only one significant association (regular timing of meals/snacks) with food responsiveness. An earlier study also found no association between parental feeding style and food responsiveness among low-income

preschoolers (Frankel et la., 2014). Recent studies involving preschool aged children suggest that overt restriction of food (e.g., keeping some foods out of the child's reach) may increase a child's food responsiveness (Boswell et al., 2018) while covert food restriction (e.g., not buying unhealthy palatable foods) may lower food responsiveness (Jansen et al., 2018). As the FPI's food restriction scale did not include items that distinguish between covert and overt food restriction, consideration should be given to expanding the FPI to include direct measurement of these two parenting practices.

Second, although food insecurity did not predict child emotional overeating, parental practices around encouraging the child to try new foods were positively related to this eating behavior, which is associated with higher child BMIz scores (Domoff et al., 2015). The findings are unexpected and have not been reported previously. Larger studies are needed to confirm these relationships, especially as a recent obesity prevention program successfully increased FPI scales related to encouraging the child to try new food at 6 and 12 months post-program for intervention mothers as compared to a randomized control group (Hughes et al., 2021).

Finally, food insecurity and specific food parenting practices had independent associations with the child's enjoyment of food and satiety responsiveness in the exploratory regressions. While this may mean that both contribute to explaining child eating behaviors, it is important to consider that food insecurity may cause eating behaviors to change, which may then provoke changes in the use of food parenting practices. Evidence supporting either pathway is limited, and research exploring the direction of effects between caregiving behaviors and eating behaviors in young children is mixed (Berge, Miller, et al., 2020; Tovar et al., 2016). Longitudinal designs are needed to determine the direction of these relationships in order to better guide intervention efforts.

The current study possesses several strengths, including a diverse and understudied sample, the use of a food parenting measure assessing both positive (e.g., exposure to new foods) and negative (e.g., pressure to eat) practices that was developed with low-income, Hispanic parents (Power et al., 2019), and a well-validated measure of household food security (Hager et al., 2010). Some limitations also deserve note. The small sample size in this pilot study reduced the power to find significant associations and precluded the examination of available moderator variables, such as child gender (Nguyen et al. 2020), and participation in food assistance programs (Foster et al., 2019). Given the number of analytic tests performed, some significant associations may have occurred by chance. Findings may not generalize beyond this sample of low-income, predominately Hispanic female caregivers and their preschool aged children. The cross-sectional nature of the data prevents the drawing of causal inferences. As all primary measures relied on maternal self-report, social desirability bias and measurement error may have occurred. Future studies would benefit from independent assessments of child and parental eating behaviors (Yelverton et al., 2021), and greater representation from male caregivers or fathers (Foster et al., 2019).

5. Conclusion

This study supports the importance of considering household food security as a critical component of the family food environment for low-income, Hispanic families with preschoolers. Food insecurity was directly associated with child eating behaviors that correlate with preschool overweight and poor diet (Boswell et al., 2018; Domoff et al., 2015; Frankel et al., 2014). These associations were present even though food insecurity was not directly associated with food parenting practices in this sample. These results and the high rates of household food insecurity in this population suggest that obesity prevention efforts among low-income Hispanic families need to assess food security status (Gundersen & Ziliak, 2015), consider any level of food insecurity as a risk factor to unhealthy child eating behaviors, and connect food insecure families to food resources, such as WIC and SNAP. Further, food assistance programs could play a critical role by developing interventions to support children's healthy eating behaviors. From a policy perspective, ensuring that participation in food assistance programs results in food security for the family may be one key way to reduce eating behaviors associated with childhood obesity in Hispanic preschoolers.

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Table 1

Sample Demographic Attributes by Food Security Status

Demographic Characteristics	Food Secure (*n*=36)	Food Insecure (*n*=30)	Total Sample (*n*=66)
Parent/Household Characteristics			
M Age in years (*SD*)	33.6 (6.4)	33.1 (8.7)	33.6 (7.5)
M BMI (*SD*)	25.8 (5.6)	23.6 (6.3)	24.8 (6.0)
% Mother (n)	88.9 (32)	93.3 (28)	90.9 (60)
% Hispanic Ethnicity (n)	83.8 (32)	90.0 (27)	86.6 (58)
Educational Attainment [**]			
% High school degree/GED (n)	33.3 (12)	70.0 (21)	50.0 (33)
% > High school degree/GED (n)	66.7 (24)	36.7 (9)	50.0 (33)
Income [*]			
% < $25,000 (n)	41.7 (15)	70.0 (21)	54.5 (36)
% $25,000 or more (n)	50.0 (18)	20.0 (6)	36.4 (24)
% Missing (n)	8.3 (3)	10.0 (3)	9.1 (6)
% Born in US (n)	40.5 (15)	36.7 (11)	38.8 (26)
% Lives with partner (n)	76.5 (26)	62.1 (18)	69.8 (44)
% Employed full time (n)	25.0 (9)	25.0 (7)	25.0 (16)
% Receives some food assistance (n)	83.3 (30)	86.7 (26)	84.8 (56)
Child characteristics			
% Male (n)	60.0 (21)	50.0 (15)	55.4 (36)
M Age in months (*SD*)	44.1 (11.2)	42.7 (10.1)	43.5 (10.6)
M Child BMIz (*SD*)	.496 (1.1)	.918 (1.1)	.685 (1.1)

[*] $p < .05$

[**] $p < .001$

Table 2

Pearson bivariate correlations between food parenting practices and child eating behaviors

Food Parenting Practices	CEBQ - Child Eating Behaviors			
	Food responsiveness Pearson's *r*	Emotional Overeating Pearson's *r*	Enjoyment of Food Pearson's *r*	Satiety Responsiveness Pearson's *r*
FPI scales **Encourage trying new foods**				
Offer new foods	−.059	.292 *	.045	−.008
Encourage exploration	−.052	.228 +	.071	.115
Urge to eat new foods	.126	.365 **	.070	.159
Repeated presentation	.030	.278 *	.081	.105
Mealtime Structure				
Family meals	.172	.086	.416 **	−.114
Regular timing of meals/snacks	.069	−.165	.355 **	−.408 **
Inconsistent mealtimes	−.070	.156	−.213	.084
Indifferent feeding	.095	.269 *	−.013	.223 +
Child involved in food preparation	−.040	−.043	.345 **	−.383 **
External Control				
Pressure to eat	−.070	.148	−.360 **	.314 *
Restriction	.088	.129	−.074	−.021
Food as Reward	.120	.298 *	−.026	.236 +
Responsive to child's fullness cues	.028	.278 *	.209	.002
Monitoring	.026	.027	.399 **	−.115

+
p < .10

*
p < .05

**
p < .01

Table 3

Independent samples t-tests comparing food parenting practices and child eating behaviors by food security status

Food Parenting Practices	Food Secure *m (SD)*	Food Insecure *m (SD)*	Total *m (SD)*
FPI Scales			
Encourage Trying New Foods	3.5 (0.7)	3.5 (0.8)	3.5 (0.7)
Offer new foods	3.3 (0.9)	3.6 (0.8)	3.5 (0.8)
Explore new foods	3.5 (1.2)	3.2 (1.0)	3.3 (1.1)
Urge child to eat	3.7 (0.8)	3.7 (3.3)	3.7 (0.9)
Repeated presentation	3.4 (1.0)	3.4 (1.2)	3.4 (1.0)
Mealtime Structure			
Family meals	3.7 (0.9)	3.7 (0.8)	3.7 (0.9)
Regular timing of meals/snacks	3.8 (0.9)	3.5 (1.2)	3.7 (1.0)
Inconsistent mealtimes	2.2 (0.9)	2.4 (0.7)	2.3(0.8)
Indifferent feeding	2.7 (1.2)	2.7 (1.2)	2.7 (1.1)
Child involved in food preparation	2.0 (1.0)	1.8 (0.9)	1.9 (0.9)
External Control			
Pressure to eat	3.6 (1.2)	3.8 (1.2)	3.7 (1.2)
Restriction	4.0 (1.1)	4.4 (0.9)	4.2 (1.0)
Food as reward	3.1 (1.1)	2.9 (1.1)	3.0 (1.1)
Responsive to child's fullness cues	3.7 (1.2)	3.7 (1.1)	3.7 (1.1)
Monitoring	3.4 (1.2)	3.4 (1.2)	3.4 (1.2)
CEBQ - Child Eating Behaviors			
Food responsiveness [**]	2.3 (1.1)	3.03 (1.0)	2.6 (1.1)
Emotional overeating	1.5 (0.6)	1.7 (0.8)	1.6 (0.7)
Enjoyment of food [+]	3.6 (1.0)	4.0 (0.9)	3.8 (0.9)
Satiety responsiveness [+]	3.1 (0.9)	2.7 (0.7)	2.9 (0.8)

[+] $p < .10$

[**] $p < .001$

Table 4

Adjusted Regressions of Associations Between Household Food Insecurity and Food Parenting Practices with Child Eating Behaviors[a]

Household and Parent Variables	CEBQ - Child Eating Behaviors			
	B	SE	t – value	95% CI
Food Responsiveness				
Household Food Insecurity [*]	.692	.302	2.294	[.101,1.283]
Emotional Overeating				
Household Food Insecurity	.236	.178	1.322	[−.114, .585]
FPI Subscales				
Encourage trying new foods [*]	.304	.119	2.548	[.070, .537]
Food as reward	.106	.080	1.322	[−.051, 262]
Responsive to child's fullness cues	.103	.075	1.368	[−.044, .250]
Indifferent feeding	.083	.075	1.105	[−.064, .230]
Enjoyment of Food				
Household Food Insecurity [*]	.517	.202	2.551	[.120, .913]
FPI Subscales				
Family Meals [*]	.256	.111	2.298	[.038, .474]
Regular mealtimes	.184	.097	1.904	[−.005, .374]
Child involved in food preparation	.077	.124	.623	[−.165, .319]
Pressure to eat [*]	−.200	.080	−2.503	[−.357, −.044]
Monitoring [*]	.170	.085	2.002	[.004, .336]
Satiety Responsiveness				
Household Food Insecurity [*]	−.449	.183	−2.459	[−.807, −091]
FPI Subscales				
Regular mealtimes [**]	−.266	.083	−3.195	[−.430, −.103]
Child involvement in food Preparation [*]	−.247	.110	−2.250	[−.462, −.032]
Pressure to eat	.105	.075	1.400	[−.042, .253]

[*]
p < .05

[**]
p < .01

Note. B = *b* coefficient; *SE* = Standard Error; CI = Confidence Interval; FPI = Food Parenting Inventory.

[a]Regressions adjusted for income (< $25,000 vs $25,000) and maternal education (GED/High school degree vs > GED/High School degree).