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Fatherhood and Food: Food Insecurity and Paternal Role Associations
with Father and Child Diet Quality

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Fatherhood and Food: Food Insecurity and Paternal Role Associations with Father and Child Diet Quality

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Fatherhood and Food: Food Insecurity and Paternal Role Associations with Father and Child

Diet Quality

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Health, nutrition, and weight have become topics of interest over the past decade as obesity, and related disease, in adults and children have become of great concern. There are many factors contributing to this epidemic, home and family lifestyle being among the most prevalent. When evaluating a family system, it is important to consider the role of all family system members; however, little obesity research has examined the father and how he might influence the family decision-making process or family outcomes. This study contributes to the body of research by examining whether family food insecurity is associated with the father's perception of his mealtime role, his feeding style, and his feeding practices. This study will also evaluate how a father's perception of his mealtime role, feeding style, and feeding practices are associated with his child's and his own dietary health.

Social learning theory

Social learning introduces the concept that human behavior can be learned through direct exposure or by the observation of actions and responses that are modeled (Bandura, 1971). As much behavior is acquired through rewards and discipline, social observation provides an opportunity to discover avenues to reach desired outcomes through someone else's direct experience (Bandura, 1971). Often for young children, the immediate caregivers will be the primary source of social learning, due to their frequency of contact. Gender roles are a primary area for social learning (Bussey & Bandura, 1984). Children will often look to a same-sex role model to determine gender appropriate behaviors.

In regards to the current study, it is expected that the fathers may be imitating the mealtime behaviors and habits of their own fathers, who served as their social model. The same behaviors that these fathers may be imitating are serving as the social model for their own

children. This intergenerational pattern suggests gender differences among the children, with boys being more heavily influenced by the fathers' behaviors.

Food insecurity

Food insecurity has been shown to play a significant role in child health, development, and overall family functioning (Bhattacharya, Currie, & Haider, 2004; Dinour, Bergen, & Yen, 2007; Grutzmacher, & Gross, 2011; Hauang, Oshima, & Kim, 2010; Kenney, 2008; Martin, & Ferris, 2007; Mello, Gand, Risica, Kirtania, Strolla, & Fournier, 2010). Bhattacharya et al. (2004) define the mildest forms of food insecurity as being "evident in household members' concerns about adequacy of the household food supply and in adjustments to household food management" without family members actually experiencing sensations of hunger (p. 843). As the severity of food insecurity increases, members of the family begin to experience hunger, usually beginning with a parent and then extending to children as the severity increases (Bhattacharya et.al, 2004). For children, there are various factors that contribute to the health (BMI, healthy eating, and physical activity levels, etc.) of children raised in food insecure households (Bhattacharya et.al, 2004; Grutzmacher, & Gross, 2011). Children residing in food insecure households consume fewer vegetables and fruits and often have a higher-fat intake than children in food secure households, which are all factors known to contribute to higher BMI (Grutzmacher, & Gross, 2011; Mello et. al, 2010). Bhattacharya et al. (2004) found that food insecurity is a more significant predictor of diet quality for preschool aged children than it is for school aged children.

Adults and parents often have similar health consequences to children when confronted with food insecurity. Adults living in poverty tend to have lower scores on the Healthy Eating Index, tend to be more obese, have higher fat consumption, and are less likely to participate in

fat-burning activities (Bhattacharya et. al, 2004; Mello et. al, 2010). A combination of these habits often results in adults having an overweight status. The children of overweight parents are also likely to become overweight, as children with even one obese parent are significantly more likely to become obese themselves (Martin & Ferris, 2007). In regards to fathers specifically, one study found significant associations between father and child BMI scores, indicating the need for further research in this area (Vollmer, Adamsons, Gorin, Foster, & Mobley, 2014). Dinour et al. (2007) found that among adults experiencing food insecurity, women were significantly more likely to become overweight than men, indicating that food insecurity may affect men and women in different ways. Based on these findings, I hypothesize that because men and women each experience unique health and role outcomes as result of food insecurity, mothers and fathers also might have distinct experiences and influences within the same family system.

It is clear that food insecurity has a negative association with children, adults, and families. The literature also shows that food insecurity has a negative emotional impact on families as the constant shortage of food causes stress among parents (Huang, Oshima, & Kim, 2010), especially if the parents and children experience hunger as the insecurity increases (Bhattacharya et. al, 2004). However, it is not clear how this insecurity affects parents in other areas, such as their feeding style towards their children or distribution of responsibilities during mealtime. Therefore, the current study will investigate the association of family food insecurity with the father's perceived role at mealtime, his feeding style and feeding practices, as well as ultimately on father and child healthy eating.

Financial influences on father involvement

Traditionally financial provision is considered to be one of the primary contributions of fathers (Kenney, 2008). This traditional gender-role arrangement may be suitable for certain

family structures, but it may not be adaptive or possible for all family formations. In the case of low-income families or non-residential fathers, an unrealistic expectation of financial support as a primary or the only form of a father's involvement can result in minimal or no involvement at all (Coley & Hernandez, 2006; Gavin, Black, Minor, Abel, Papas, & Bentley, 2002). Gavin et al. (2002) explain that father involvement is often negatively impacted due to the father's inability to provide financially. This limited involvement can be the result of multiple reasons, such as father emotional insecurity, mother gatekeeping, maternal grandmother gatekeeping, or legal custody arrangements (Coley & Hernandez, 2006; Gavin et al., 2002; Raub et al., 2013).

Low-income men often feel a sense of inadequacy in their contributions to their family, which discourages them from being involved in other areas (Coley et al., 2006). Other men may experience feelings of inadequacy in the eyes of their children's mother, or from society in general, which leads them to believe they have not "earned" a greater role in other aspects of their children's lives (Coley et al., 2006; Gavin et al. 2002). These feelings of inadequacy are then reinforced by the court-based emphasis on child support and father financial contribution (Raub et al., 2013). In scenarios concerning custody or visitation arrangements, a father's permitted rights are often positively correlated with his income level, further reinforcing traditional gender-roles (Raub et al., 2013). There are clear legal limitations to father involvement based on visitation and parenting agreements, but it is also important to consider how such rulings will influence a father's perception of his importance. This emphasis on fathers' financial contribution also can discourage more direct involvement from employed and residential fathers because men who provide a steady income for their children and/or family may feel that their most important role has been filled through their work (Raub, 2013).

The pressure for fathers to provide a substantial portion of the household income appears to affect fathers of multiple demographics, yet it discourages active involvement across employment and income statuses (Coley et al., 2006; Ruab et al., 2013). Given the consistent evidence that the pressure to provide financially may contribute to discouraging fathers from being actively involved with their children, it stands to reason that fathers of a food insecure household may also experience few clear incentives to become involved in their child's mealtime, nutrition, and feeding, although there is no existing literature to confirm or reject this concept. While the literature sufficiently explains that fathers are at risk for becoming less involved when their income is limited, no studies have researched how food insecurity specifically affects the role fathers perceive they have at mealtime. This study seeks to provide information on the association between food insecurity and fathers' self-perceived role at mealtime.

Fathers and food insecurity

Traditional family roles typically place the responsibilities related to food (planning meals, cooking, feeding, etc.) on the mother, whereas, the father's primary responsibilities are focused on ensuring financial security (Kenney, 2008). When it comes to the father's role in households experiencing food insecurity, multiple studies have found that the father's involvement has significant impact on food insecurity (Garasky & Stewart, 2007; Nepomnyaschy, Miller, Garasky, & Nanda, 2014). Nepomnyaschy et al. (2014) found that inconsistent financial support from the father is associated with more significant food insecurity and can potentially be more harmful than no financial contribution.

Although irregular cash contributions from the father can be detrimental to a family experiencing food insecurity, the additional money can also benefit these households, as formal

support from the father was associated with less food insecurity during the early childhood years (Nepomnyaschy et al., 2014). Other studies have also found the preschool years to be most heavily affected by poverty and food insecurity, as school-aged children may experience less hunger by consuming up to two meals a day through school nutrition programs (Bhattacharya et al., 2004; Grutzmacher & Gross, 2011).

There is also evidence indicating a positive relationship between a father's control over finances and child greater food insecurity, whether the parents' incomes are pooled or kept separate (Kenney, 2008). Although the reason for this correlation is not clear, food-related responsibilities being a traditional role of women might discourage fathers' from delegating their portion of money towards food in the case of individual incomes.

This study will investigate the association between family food insecurity and the fathers' feeding styles and practices. Research has made it apparent that fathers play a significant role in household food insecurity, regardless of their residential status (Garasky & Stewart, 2007; Kenney, 2008; Nepomnyaschy et al., 2014). Although the financial contributions of fathers are important, father involvement and visitation has the most significant impact on food insecurity (Garasky & Stewart, 2007; Nepomnyaschy et al., 2014). However, it is unclear how food insecurity affects father involvement, especially in regards to his role at family mealtimes. The literature explains that fathers' inability to provide sufficient funds for their children and/or partners discourages fathers to pursue active involvement (Gavin et al. 2002). Although there are implications that direct father involvement can lessen the severity of food insecurity (Garasky & Stewart, 2007), research has not investigated the possible effects of family food insecurity on father behavior around meals. If fathers see their primary role as the financial provider, it is

probable that food insecurity will influence their perceived role at mealtime, feeding styles, and feeding practices.

Food insecurity and parent feeding

Household income is a significant indicator of family food availability, as income level is a critical factor in determining the amount of money that a family can delegate to food and each other area of family expense (Dammann & Smith, 2009; Gross, Mendelsohn, Fierman, Racine, & Massito, 2012; Inglis, Ball, & Crawford, 2009; McIntyre et al., 2003). When the amount of money a family can spend on food is limited, the head of the household must make alterations, in efforts to make ends meet (Dammann & Smith, 2009; Gross, Mendelsohn, Fierman, Racine, & Massito, 2012; Inglis, Ball, & Crawford, 2009). Dietary alterations are typically in the form of choosing lower quality foods, less healthful food choices, fasting, and irregular meal patterns (Dammann & Smith, 2009; Inglis et al., 2009), with the common priority of ensuring that children are fed a sufficient quantity (Dammann & Smith, 2009; McIntyre et al., 2003).

Household income is not the sole factor contributing to family nutrition decisions (Inglis et al., 2009), as food stamps often become an additional feature (Dammann & Smith, 2009). Many families resort to using food stamps as the primary method of accessing food, instead of the intended supplementary purpose, resulting in families exhausting a monthly supply of food stamps in as little as two weeks (Dammann & Smith, 2009). In efforts to maximize the amount of food, mothers often sacrifice the healthfulness of the foods they purchase (Dammann & Smith, 2009; Inglis et al., 2009). Inglis et al. (2009) found in their study comparing high-income and low-income mother that even high-income mothers will eliminate healthy food options in efforts to purchase a higher quantity of food when placed in a restricted budget scenario. As such, mothers' priority around child feeding during food shortages can quickly switch from

health and quality to amount consumed (Dammann & Smith, 2009; Gross et al., 2012). Research is not available to aid in the understanding of fathers' behaviors during food shortages.

Feeding practices are most commonly represented through three main factors related to the level of controlling found in parents feeding strategies: monitoring, restricting, and pressure to eat (Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson, 2001). The level of direct supervision while a child is eating is used to determine parents' monitoring behavior. Restriction is determined by the extent to which parents limit the quantity of food. Pressure to eat is described as times that parents use various methods to encourage children to eat more food (Birch et al., 2001).

Gross et al. (2012) explain that when experiencing food insecurity, mothers will likely demonstrate more controlling behaviors. In times of sufficient amounts of food, mothers will use more pressure to eat tactics, but use more restrictive behaviors when food is not readily available (Gross et al., 2012). These restricting behaviors are often found in permissive maternal feeding styles (Blissett & Haycraft, 2008), and in infancy, controlling feeding habits are associated with disruptions in the development of babies' self-regulating (Gross et al., 2012). Although research has shown that mothers adjust their child feeding methods during food insecurity, which affects the developmental process for children, there is no information indicating the influence of food insecurity on fathers' feeding practices towards children and what associations this might have with children's outcomes.

Although literature is available supporting the effects of income and food security on mother dietary decisions, there is little information explaining the relationship between food insecurity and paternal feeding practices. In knowing the influences of a limited food source on other parental feeding behaviors and impact of parental feeding practices on child health, it is

necessary to also develop an understanding of the effects of food insecurity on parent feeding practices. This study aims to whether food insecurity is associated with fathers feeding practices.

Parental feeding style and child health

The feeding styles that parents' implement in efforts to promote better diet quality for their children have been shown to influence the perception and relationship that their children have to different types of food (Papaioannou et al., 2013; Parick, Nicklas, Hughes, & Morales, 2005; Blissett & Haycraft, 2008; Vereecken, Rovner, & Maes, 2010). Much like parenting styles, parent-feeding styles can be categorized into the groups authoritarian, authoritative, and permissive according to the levels of feeding behaviors, such as food restricting, pressuring children to eat, and monitoring child's food intake (Blissett & Haycraft, 2008; Papaioannou et al., 2013; Parick, Nicklas, Hughes, & Morales, 2005; Vereecken, Rovner, & Maes, 2010). The category of permissive feeding style can further be broken-up into uninvolved and indulgent feeding styles (Hughes et al., 2005).

The parent feeding styles differ from feeding practices as the feeding styles are used to classify parents into feeding styles based the balance of their demanding and restrictive behaviors (Hughes et al., 2005), while feeding practices describe the parents feeding behaviors (Birch et al., 2001). Parents with authoritative feeding styles strike a balance of demanding and supportive behaviors (Hughes et al., 2005). Authoritarian feeding styles are much more demandingness without the support, while indulgent feeding styles provide support without demandingness (Hughes et al., 2005). Parents operating in an authoritative style to feeding tend to promote healthy eating habits by promoting opportunities for good choices, utilize teachable moments to help children understand how to make better food choices, and make fruits and vegetables more available (Papaioannou et al., 2013; Patrick et al., 2005). Authoritarian feeding

styles are most characterized by more applied pressure to eat, firm discipline, and less fruit and vegetable availability (Papaioannou et al., 2013; Patrick et al., 2005).

A permissive feeding style is categorized by little structure around the types or quantities of food the child consumes (Patrick et al., 2005). A child whose parents practice a permissive parenting style only experience food limitations based on the kinds and amounts of foods available (Patrick et al., 2005). This feeding style does not utilize teachable moments, leaving children with the inability to self-regulate their eating behavior, which can be detrimental in the development of eating habits (Blissett & Haycraft, 2008).

Although these have been found to be the most common trends among feeding styles, variation between men and women within these feeding styles has been found (Blissett & Haycraft, 2008). Blissett and Haycraft (2008) found that in the permissive feeding style, fathers apply more pressure to eat whereas mothers use more restrictive practices. In the authoritative style, fathers apply less pressure to eat, which is contrary to most mothers. Other studies that included mothers and fathers feeding styles had only a minimal number of fathers, thus providing no information on variation between mothers' and fathers' feeding styles.

The associations between parents' feeding style and child nutrition indicates that this is a necessary element to consider when studying nutrition and feeding within the family system (Blissett & Haycraft, 2008; Papaioannou et al., 2013; Parick, Nicklas, Hughes, & Morales, 2005; Vereecken et al., 2010). There is insufficient information in the available literature on the influence of the father's feeding style on children, as opposed to mothers. Yet, the fact that the few studies including a sufficient sample of fathers have found differences in the feeding behaviors of mothers and fathers within the same feeding style (Blissett & Haycraft, 2008) supports further investigation of feeding styles of fathers isolated from the influence of the

feeding styles of mothers, and how both are distinct from mothers' and fathers' feeding practices. This investigation is also necessary due the lack of exploration of fathers generally in the parental feeding style literature. Therefore, this study will evaluate how fathers' feeding styles are associated with children's healthy eating.

Hypotheses

- Food insecurity will be associated with lower quality diets in both fathers and children;
- Food insecurity will be associated with fathers' negative perception of his mealtime role, negative feeding practices (restrictive and demanding practices), and negative feeding styles (indulgent and authoritarian);
- Fathers' negative perceptions of their mealtime roles, negative feeding practices, and negative feeding styles will be associated with poorer quality father diets and poorer quality children's diets. Specifically, authoritarian, indulgent, and uninvolved feeding styles (relative to authoritative feeding styles), as well as restrictive and demanding feeding practices, will be associated with lower quality diets in children and fathers; such that fathers with a greater perceived role at mealtime will have higher quality eating and children with higher quality eating, as Additionally, fathers' diet quality will mediate the associations between mealtime role perceptions, feeding practices, feeding styles, and child diet quality; fathers will seek to improve their of own diets to model desired behaviors to their children, indicating that father HEI will moderate child HEI;
- The father's positive perception of his role at mealtime and an authoritative feeding style will be associated with his diet quality and his child's diet quality, (See figure 1 and figure 2 for full conceptual models). such that fathers with a greater perceived role mealtime and balanced feeding style will have higher quality eating and children with

higher quality eating, as fathers will seek to improve their own diet to model desired behaviors. Thus, authoritarian, indulgent, and uninvolved feeding styles, as well as restrictive and demanding feeding practices, will be associated to lower quality diets in children and fathers (See figure 1 and figure 2 for full conceptual model).

Methods

Participants

This study was approved by the Institutional Review Board at the University of Connecticut. The 150 fathers who participated in this study were recruited as a convenience sample through preschools in the immediate surrounding area. Eligibility for this study was limited to men who met the following criteria: must be the biological father of at least one child between the ages of three and five, must partake in at least one meal with said child on a weekly basis, must be at least 18 years of age, and must demonstrate fluency in both written and verbal English. There was no restriction based on race, income level, or education level.

Data collection

Each participating father gave written informed consent for himself and his child, as the children were under age 18. A copy of the consent form was distributed to each of the fathers. Upon completing the interview, fathers were compensated with a \$25 gift card. To collect the data, the fathers participated in a 60-90 minute structured interview with a trained researcher and reported their ethnicity, education level, and age. During the interview, fathers were asked to refer to their child who is between 3-5 years of age, or the youngest child if there were multiple children within this age range. Father income was determined by participation in government assistance programs, such as Head Start, Supplemental Nutrition Assistance Program, or

Woman, Infants, and Children. Fathers additionally responded to questions about their feeding style, feeding practices, concern for child weight, child eating behavior, and diet quality.

Measures

Number of meals per week with child

The frequency of meals that the father shares with his identified child in the current study was used as a control variable in the regression models. This variable was used as a continuous variable as fathers reported the average number of meals per week they share with their children.

Paternal feeding style

The Caregiver Feeding Style Questionnaire (CFSQ: Hughes et al. 2005) was used to determine the feeding style of each participating father. Hughes et al. (2005) have verified the validity of this measure with low-income parents of preschool children. This measure consists of a 19-item questionnaire used to calculate fathers' level of demandingness ($\alpha = .87$) and responsiveness. Reports to the responsiveness subscale items are in the form of "Never, Rarely, Sometimes, Often, or Always" and are compiled from both parent-centered ($\alpha = .81$) and child-centered ($\alpha = .68$) methods. The medians of these responses were used to establish classifications of fathers as demonstrating high or low levels of demandingness and responsiveness. These classifications were then used to assign a paternal feeding style of authoritarian (high demandingness and low responsiveness), authoritative (high demandingness and high responsiveness), indulgent (low demandingness and high responsiveness), or uninvolved (low demandingness and high responsiveness).

Paternal feeding practices

The Child Feeding Questionnaire (CFQ: L Birch et al., 2001) was used to measure father's level of responsibility for child feeding ($\alpha = .80$), perceived father weight ($\alpha = .77$),

perceived child weight ($\alpha = .75$), concern for child weight ($\alpha = .75$), restriction ($\alpha = .75$), pressure to eat ($\alpha = .72$), and monitoring of child's eating ($\alpha = .88$) using a 7-point likert scale with word anchors. The reliability of this measure has been affirmed for parents with children ages 2-11 including families with a wide-range of demographics. For the purposes of the current study, the original CFQ was adapted to focus on the restriction ($\alpha = .71$) and pressure to eat ($\alpha = .65$) subscales. Due to inconsistencies in scoring, one item was removed from the "pressure to eat" subscale. As "pressure to eat" is no longer the original subscale, this study will test the validity of the adapted subscale.

Role of the father at mealtime questionnaire

Fathers reported the level and style of mealtime involvement experienced by fathers via the Role of the Father at Mealtime Questionnaire (ROFMQ). The ROFMQ was developed for this project and was adapted from the Role of the Father Questionnaire (ROFQ: Palkovitz, 1984), consisting of 10 items that examine fathers' beliefs about their role specifically during mealtime. Items for this scale ask questions asking about the importance of the father's role and involvement in family mealtime activities (e.g. fathers eating meals with child, father involvement in food preparation, and father monitoring of child food intake). Each of these scales was scored on a 5-point scale with responses ranging from "strongly agree" to "strongly disagree" ($\alpha = .68$).

Family food insecurity

For this study, food insecurity level was determined by an United States Department of Agriculture (USDA) 18-item food security questionnaire. Based on the previously mentioned qualities, food insecurity is assessed on a 0-10 rating scale. Families who express the most extreme forms of food insecurity are rated as having level 10 food insecurity with scores

decreasing as the severity of food insecurity becomes milder. Thus, families who have never experienced food insecurity are seen as having level 0 food insecurity (Bickel et al., 2000).

USDA classifications identify families rated at level 2.32 and below as being food secure, and families who are 2.32 and above as food insecure (Bickel et al., 2000).

Diet quality

This study used the Healthy Eating Index (HEI-2010), which has demonstrated validity with children over age 2, to assign a comparable score to the quality of child eating. Guenther et al. (2008) found a single dietary recall to be reliable in reporting dietary intake within diverse samples. Each father reported his own and child diet for a day that he was actively involved in feeding his child. This recall method was modeled after the Nutrition Data System for Research (NDSR) as developed by the University of Minnesota Nutrition Coordinating Center (NCC), who specializes in standardization in recall (Feskanich, Sielaf, Chong, & Bartsch, 1989). To give fathers sufficient opportunity to recall their and their child's eating, a multiple-pass method was constructed in the form of five distinct chances for fathers to fully recall and report.

To produce a well-rounded, adequacy score, the HEI seeks to evaluate the extent to which an individual adequately and moderately consume particular foods. This index looks for an adequate consumption of total fruit, total vegetable, dairy (including soy beverages), total protein (including plant and seafood), dark green vegetable and beans, whole grains, oils including non-hydrogenated vegetable oils and oils in fish, nuts, and seeds. The HEI also measures moderating the consumption of saturated fat refined grains, sodium, calories from solid fats, alcoholic beverages, and added sugars. Higher scores from this scale represent a higher quality diet. As child diet was assessed through father-report, the results should be interpreted as

the father's perception of the child's diet. The father HEI variable will be used as the outcome variable for the father HEI model, and also will be used as a mediator in the child HEI model.

Methods

Data Analysis

Initial bivariate correlations tested which demographic variables should be included in later analyses as controls. Hierarchical linear regression analysis was used to examine whether various father qualities were significantly associated with the quality of the father and child diet. Number of meals per week with the child, Fathers' Food Insecurity, Role of the Father at Mealtime Questionnaire, Child Feeding Questionnaire, and Caregiver Feeding Style Questionnaire scores were used as independent variables, and father and child HEI scores were used as dependent variables (in separate regressions; see Figures 1 and 2 for conceptual models). In the child model, father HEI was included as an additional independent variable. Regression was used rather than structural equation modeling, as the sample size of 150 is more appropriate for regression than SEM (which typically requires a minimum sample of 200). Also, although there are two dependent variables (father and child healthy eating), it was still informative to test these outcomes separately.

Chi-squared tests and t-tests were used to test for gender differences within the child HEI variable. Chi-squared tests were used to test for differences between son/daughter HEI and food insecurity and father feeding style. T-tests were used to test for group differences between son/daughter HEI and ROFMQ.

For the regression models examining child HEI scores and father HEI, the household food insecurity variable and the paternal feeding style variable were both dummy coded. The household food insecurity categories were consolidated into one category, creating a

dichotomous variable (food secure vs. food insecure). The paternal feeding styles authoritarian, indulgent, and uninvolved were coded relative to fathers classified with authoritative feeding styles.

Additional hierarchical linear regression analyses were used to examine the child gender differences for each variable. Initially the child gender variable was used to split the sample. Next, a 4-step hierarchical linear regression analysis was used. The initial step used the number of meals per week with the child variable as a control. The second step consisted of the dichotomous food insecurity variable. The third step added dummy coded caregiver feeding styles. The fourth step included ROFMQ. The fifth step included father HEI and the final step added feeding practices to the model.

Results

Demographics and key variables

The sample for this study consists of 150 father-child dyads, although only father reports were used for the present research question. Fathers in this sample had a mean age of 37.37 years old, while the mean age of the children was 49.06 months (just over 4 years old). The fathers spent an average of 3.93 days per week with their children. Of the 150 participating children, 83 were boys and 67 were girls. Racial/ethnic background of the participants was quite diverse, with 57.3% white, 18.7% black, 16.7% other, 4.7% Asian, and 2% multiracial fathers. A majority (70.7%) of the fathers in this study were married or living with a partner (16%).

Within the household food security variable of this study, 84.7% of the fathers identified as their household being food secure. Each feeding style was well represented as the fathers were classified as 21.3% authoritative, 32.7% authoritarian, 30.7% indulgent, and 15.3% uninvolved. On a scale 0-5, the mean score for pressure to eat was 3.19, while the mean score for restriction

was 3.56. For the HEI, scores range from 0 to 100. The mean father HEI score was 53.34, while the mean child HEI score was 59.11 (see Table 1 for full descriptive characteristics of the sample).

Correlations

Based on the proposed conceptual models (figure 1 and figure 2), correlations suggest two significant associations. Father HEI was significantly associated with father's pressure to eat ($r = -.169, p = .04$). Child HEI is significantly associated with ROFMQ ($r = -.161, p = .05$). Additionally, food insecurity has two associations that were found to be trending on significance. Household food insecurity was associated with ROFMQ ($r = .153, p = .06$) and child HEI ($r = -.137, p = .095$) (see figure 2 for full correlations matrix). Further analyses were carried out to investigate the proposed hypotheses due to the exploratory nature of the current study and theoretical support for the conceptual models.

Chi-squared and t-tests

Chi-squared tests and t-tests were used to test the difference for sons and daughters for the child HEI ($\chi^2(1) = .37, p = .54$), ROFMQ ($t(146) = 1.50, p = .34$), and feeding styles ($\chi^2(3) = 3.05, p = .38$), but no significant differences were found between sexes. This indicates that the current variables did not differ for fathers of boys or girls.

Regression

Separate hierarchical linear regressions were used to test the association between food insecurity and father diet quality and child diet quality (tested in separate regression models), as mediated by the role of the father at mealtime, father feeding practices, father feeding style, and the father's own diet quality (for the child HEI model). For both the father and child analyses, the only control variable included was the number of meals per week the father shares with the

child, which was entered in the first block. Father-reported food insecurity level was entered in the next block, followed by each mediating variable (one per block), in efforts to understand the unique contributions of each variable.

Child diet quality

The first step of the model tested the amount of meals the father has with the child per week, and household food insecurity was added in the second step. Neither variable was associated with child diet quality (see table 2 for full results). In the third step of the analysis, paternal feeding styles were added, but no father feeding styles were significantly associated with child HEI. Yet, with the inclusion of feeding styles, household food insecurity was approaching significance ($\beta = -.140$, $p = .094$). In the fourth block fathers' self-perceived role at mealtime was added and was trending on significance with child diet quality ($\beta = -.147$, $p = .096$); fathers who felt they had a higher role at mealtime were associated with children with poorer quality diets. Father feeding practices were included into the fifth step of the model, but were not found to have no significant relationship with child diet quality, and were, therefore, omitted from the final analysis. Father HEI was added in the sixth block, and was significantly associated with child diet quality ($\beta = .373$, $p = .000$). With the addition of father HEI, ROFMQ was no longer significant (see Table 3 for full analysis results).

Father diet quality

As in the first regression analysis, the number of meals the father shared with his child per week was entered as a control variable. Second, food insecurity was added to the model. Next, father feeding styles were added to the model. Only one feeding style was significantly associated. Fathers with uninvolved feeding styles ($\beta = .231$, $p = .021$), relative to authoritative feeding styles, were positively associated with father HEI. This indicates that fathers with

uninvolved feeding styles are associated with higher quality diets than fathers with authoritative feeding styles. Also, indulgent feeding styles ($\beta = .188$, $p = .085$) and authoritarian feeding styles ($\beta = .195$, $p = .070$) were trending on significance; relative to authoritative fathers, authoritarian and indulgent fathers also had higher quality diets.

In the fourth block, ROFMQ was added to the model, but was found to have no significant relationship to father HEI scores. Father feeding practices were added in the fifth block, but again were found to have no significant relationship with father diet quality, and were, therefore, omitted from final analysis (see Table 4 for full results).

Discussion

Using a sample of 150 father-child dyads, this study tested the associations of household food insecurity with father diet quality and child diet quality, as well as whether these associations were mediated by the father role at mealtime, father feeding style, and/or father feeding practices. While the full-hypothesized models were not statistically significant, the role of the father at mealtime and father feeding styles were found to make meaningful contributions to father diet quality and child diet quality, and father diet quality was strongly associated with child diet quality, supporting a social learning model.

Child diet quality

Household food insecurity was not found to be associated with the father's perception of child diet quality, with or without the proposed mediators, which is contrary to previous research (Grutzmacher, & Gross, 2011; Mello et. al, 2010). A relationship that was trending on significance was found between the role of the father at mealtime and his perception of the child's diet quality within the analysis. Fathers who saw themselves as having a greater role and importance at mealtimes had children with poorer quality diets. This negative and somewhat

counter-intuitive association prompted further exploration. As feeding styles give indications of what the fathers are like during mealtime and not all “involvement” in mealtime might be positive involvement, it is informative to see if the relationship between fathers’ perceived mealtime role and child diet quality is more strongly associated within a particular feeding style.

To better understand the relationship between the ROFMQ and child HEI in the fourth step, interaction terms were created to probe possible interactions between fathers feeding styles and the father perceived role at mealtime. Although the feeding style interaction terms did not reach significance, the interaction terms between an authoritarian father and the ROFMQ approached significance at the level of a trend ($\beta=.243$, $p=.081$), which is worth investigating in future studies. The dummy coded variable for the fathers with authoritarian feeding styles was then used to compare correlations between the ROFMQ and child diet quality across authoritarian versus non-authoritarian fathers. At a $p=.002$ significance level, the ROFMQ was negatively associated with Child HEI scores for non-authoritarian fathers ($r=-.309$), but not significantly associated among authoritarian fathers and slightly positive ($r=.145$, $p=.325$). This indicates that fathers who view their role at mealtime as important, and who also fall into a permissive or authoritative feeding style, have children with lower quality diets.

The permissive feeding styles use less restrictive and demanding behavior. Studies have shown that too much restriction can have negative outcomes on children’s overall food consumption (Gross et al., 2012). While not encouraging restrictive feedings, perhaps restriction is a behavior that looks different for fathers specifically. Fathers may naturally be less restrictive, compared to mothers, and/or it might require higher levels of restriction from fathers to have the same negative effects.

ROFMQ transitioned from approaching significance to non-significance with the addition of father HEI as a predictor. As this transition suggests a mediation effect among variables, a Sobel's mediation test was used to investigate the relationships among ROFMQ, Child HEI, and Father HEI. However, the mediation among these variables was non-significant (Sobel's coefficient -0.80; $p= 0.42$).

As the current study was exploratory in nature, there is not previous literature available to explain the relationship between fathers' perceived mealtime involvement and child diet quality, but the present results are informative. As time progresses, fathers are becoming significantly more integrated into caretaking roles as women become increasingly involved in the work force (McBride et al., 2005). Within this realm of paternal caregiving, fathers are becoming increasingly involved in meals (Mallan et al., 2014). As these fathers transition into these roles, they will need more initial support to gain caregiving experience and learn positive ways to be involved in children's mealtimes and feeding. Thus, future studies should further investigate fathers' perceptions of healthful diets.

Based on traditional gender roles, which have heavily impacted the socialization of men and women today, women are most typically responsible for food and meal choices for the family whereas the fathers serve as the breadwinners (Kenney, 2008). Due to this gender socialization, it is likely that men receive significantly less exposure to meal preparation, nutrition, and meal planning, as these roles are stereotypically left to women (Bussey & Bandura, 1999). Bandura (1962), through social learning theory, explains that children observe the behaviors modeled for them by their caregivers. Through repeated exposure, the children will begin to form role perceptions around the behaviors of their caregivers. Most commonly, men will follow the example set by their same-sex caregiver (Floyd & Morman, 1998). Although men

today are taking more initiative in mealtime and caregiving, due to traditional gender roles, the appropriate behaviors might not have been modeled for them by a same-sex caregiver, leaving them without an example of how to be positively involved in meals and caregiving (Floyd & Morman, 1998). As family gender roles shift with the prevalence of dual-income homes, boys and men must also receive more training in positive mealtime habits, as this is becoming a more significant part of their role as fathers.

Additionally, the current study indicates that fathers with a better quality diet are associated with children with higher diet qualities. This finding is consistent with previous research (Vollmer et al., 2014). This finding reinforces the conceptual model and the social learning theory, in that fathers who have better diets may pass these habits on to their children. Thus, it is increasingly important for fathers to monitor their own dietary intake, as it may influence their children.

Father diet quality

Household food insecurity was not significantly associated with father HEI scores, ROFQM, paternal feeding styles, or parent feeding practices. There was also no association between the fathers' role at mealtime and the quality of the fathers' diet. However, paternal feeding styles were found to be associated with father diet quality. Compared to fathers with authoritative feeding styles, fathers who had uninvolved feeding styles had higher quality diets. This is contrary to previous research, as another study found that fathers who participate more frequently in family meals have been associated with higher intakes of fruits and vegetables and less frequent consumption of fast food (Berge, MacLehose, Loth, Eisenberg, Fulkerson, & Neumark-Sztainer, 2012).

Alm, Olsen, and Honkanen (2015) explain that family meal choices are heavily influenced by child preferences and preparation time, while other times children may choose dinner alternatives for the family. In this case, fathers who are less involved in mealtimes may be less exposed to the food choices that appeal most to their children. By missing these “kid-focused” meals, fathers may be able to make better dietary choices of their own.

It should also be considered that, although some of these fathers may have uninvolved feeding styles towards their children, they may be more conscientious regarding their own diet.. Thus, fathers with authoritative feeding styles might be more involved in feeding and might share the same foods as the preschool-aged children, leaving these authoritative fathers with lower quality diets. Interaction variables were created for each feeding style to test the relationship between the fathers’ perceived mealtime role and father feeding styles. Relative to authoritative feeding styles, authoritarian ($\beta=.123$, $p=.377$), indulgent ($\beta=.016$, $p=.911$), and uninvolved ($\beta=.010$, $p=.933$) feeding styles were examined as interaction terms, none of which suggested a significant relationship with the fathers’ perception of their mealtime role. Of course, the indications of this finding are limited as the fathers’ mealtime role is based on self-perception for this study.

Due to children’s preferences for unhealthful foods and the busy schedules of modern culture, families are often sacrificing the quality of their diets (Alm et al., 2015). Bandura (1962) emphasizes that the behaviors that are modeled for children by their caregivers can strongly influence the behavior development of these children. As these children develop and find themselves in new situations, and especially as they become parents themselves, they might naturally resort to the behaviors that were presented to them by their parents.

This concept emphasizes the importance of fathers utilizing mealtimes to model healthy eating habits for their children. In theory, fathers with authoritative feeding styles will improve their own diets by modeling the consumption of healthy foods and avoiding energy dense foods. Fathers with uninvolved feeding styles and indulgent feeding styles will be able to model their own healthy habits to encourage their child to try healthy foods. If the child adopts these healthy habits, they may also be passed on to the next generation through the social learning process.

Limitations and Implications

The most significant limitation to the current study is the lack of variation within the sample in terms of food security/insecurity. Notably, 84.7% of fathers in the present study fell into the category of being food secure, which led to a substantial lack of power when analyzing the food insecurity data. For strong conclusions to be made in the area of food insecurity's influence on fathers, further studies should be conducted with samples that have greater occurrence of varying levels of food insecurity.

This study is also limited as it is cross-sectional in nature. In order to have more thorough evaluations, future studies should measure perspectives and behaviors over a longer period of time. Additionally, these data were collected only through father reports. Although this is informative to the father perspective, the findings cannot extend beyond this perspective. Future studies should include observational measures and/or the use of multiple reporters, such as mothers or other caregivers. There is a lack of prior research on the topic, but the present significant findings indicate that fathers at mealtime should be an area for continuing research.

Despite these limitations, there are several implications as resulting from this study. First, the significant findings of the current study reinforce the need for more extensive research to examine the role and influence of fathers in the area of mealtime and feeding. While this area of

literature is growing, there are gaps still remaining. Second, future studies should also examine the role of parenting behavior on parent health, as there is logical and theoretical support for this phenomenon. As fathers are progressively more involved in caregiving, the choices made for their children, such as diet and meals, increasingly influence the father's health, as well as his child's. Fathers should, therefore, be encouraged to adopt healthy lifestyle choices and model these choices for their children. As social learning theory indicates (Bandura, 1962) the children will more naturally adopt these choices themselves. This may lead to meaningful change in the intergenerational cycle, as these children become parents and then replicate the diet quality and child feeding habits of their own parents.

Finally, interventions should be structured to include and facilitate the education of fathers in the importance of nutrition. These interventions are a crucial element for providing men with the skills and information that they may not have received through their own caregivers. As fathers are better able to model positive mealtime behaviors and choices, they hopefully also can begin to instill these habits in the next generation.

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Figure 1

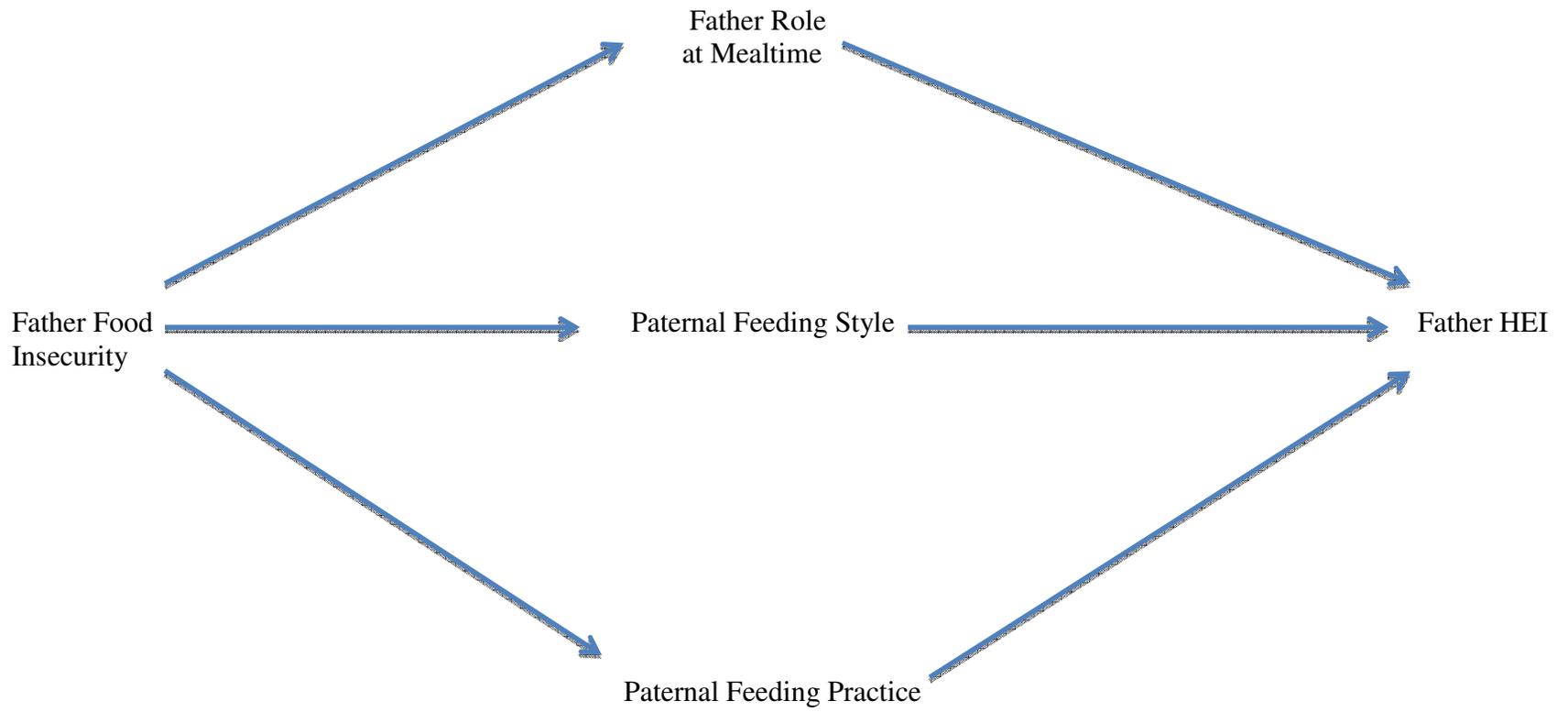


Figure 2

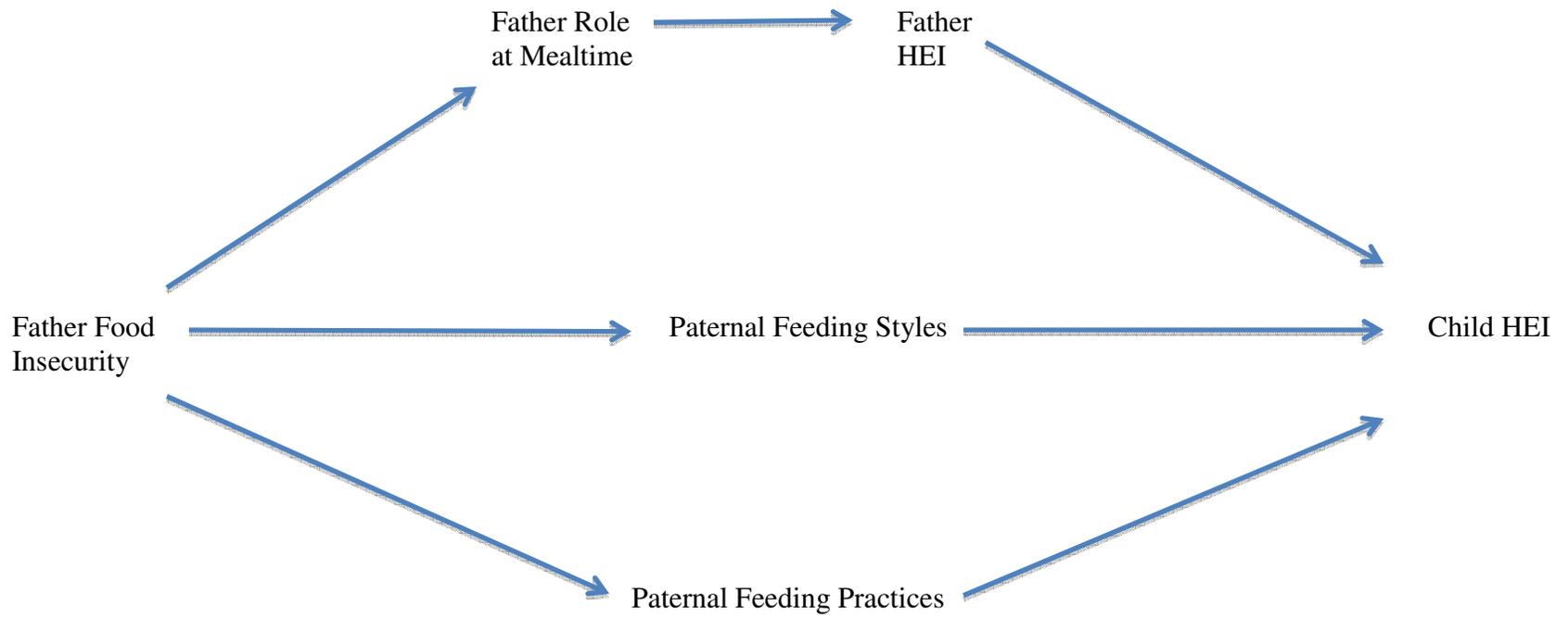
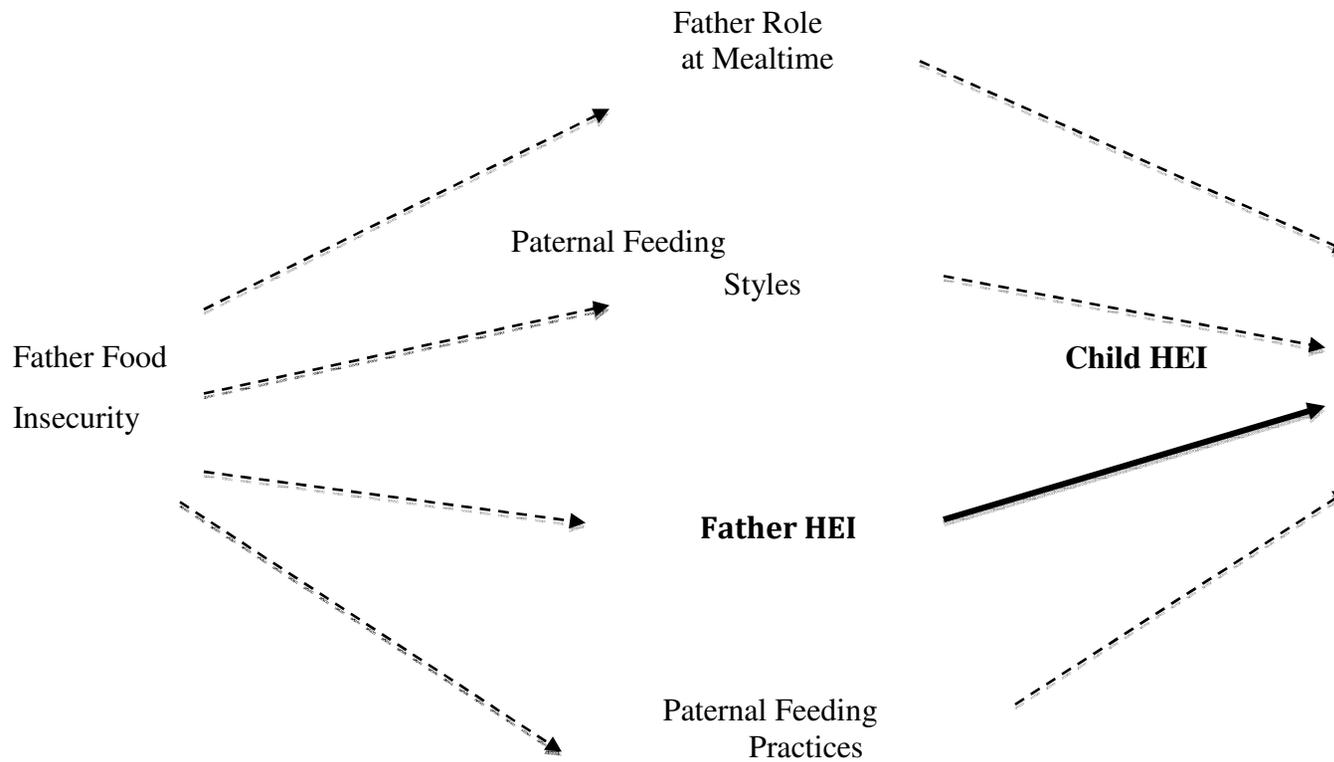
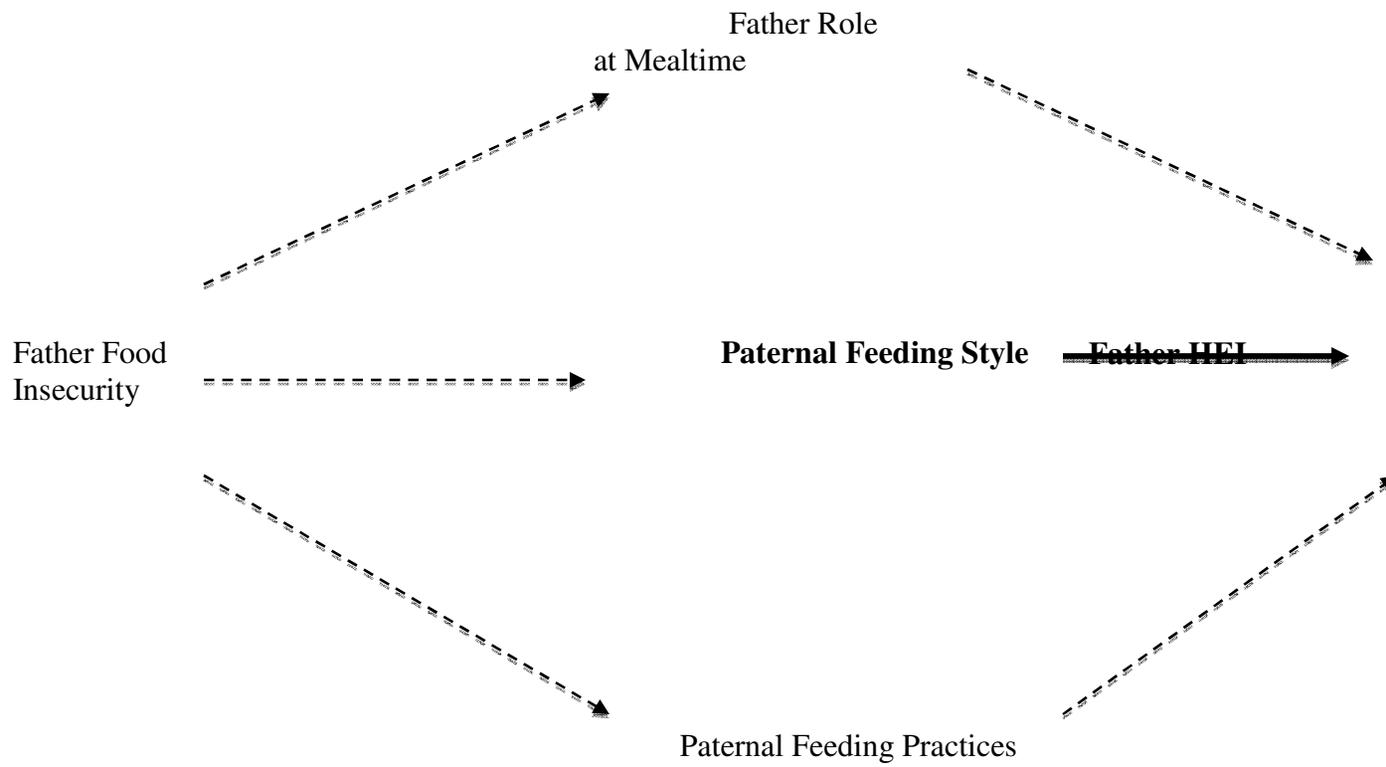


Figure 3



Note: Dotted lines are not significant; bold lines are significant

Figure 4



Note: Dotted lines are not significant; bold lines are significant

Table 1

Means and Standard Deviations for Demographic and Key Variables (N = 150)

Variables	Mean	(SD)
Child age (months)	49.06	(8.19)
Parent age (years)	37.37	(7.52)
# of days with child (per week)	3.93	(0.32)
ROFQM	40.95	(4.75)
CFQ		
Pressure to eat	3.19	(1.12)
Restriction	3.56	(0.88)
HEI		
Father	53.34	(15.53)
Child	59.11	(15.12)
	<u><i>n</i></u>	<u><i>%</i></u>
Child gender		
Boy	83	55.3
Girl	67	44.7
Parent ethnicity		
Asian	7	4.7
Black	28	18.7
White	86	57.3
Other	25	16.7
Multiracial	3	2
Father marital status		
Married	106	70.7
Living with a partner	24	16.0
Separated	4	2.7
Single never married	8	5.3
Other	8	5.3
Household Food Security		
Secure	127	84.7
Insecure	23	15.3
Father Feeding Style		
Authoritative	32	21.3
Authoritarian	49	32.7
Indulgent	46	30.7
Uninvolved	23	15.3

Table 2

Correlations of model variables

	1)	2)	3)	4)	5)
Household Food Security					
ROFMQ	.153 †				
CFQ: Restriction	.110	-.266*			
CFQ: Pressure to Eat	.077	-.221*	.430*		
Child HEI	-.137†	-.161†	-.050	-.85	
Father HEI	-.118	-.067	-.114	-.169†	.406**

Note: ** significant $p < .01$; * significant $p < .05$; †significant $p < .10$;

Table 3
Results of Hierarchical Regression Analysis for Child HEI Scores (N = 150)

	Child HEI														
	Model 1			Model 2			Model 3			Model 4			Model 5		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Meals per week w/ child	-.161	.248	-.054	-.199	.247	-.067	-.172	.250	-.057	-.172	.249	-.057	-.100	.232	-.033
Food Insecurity				-5.61	3.45	-.134	-5.85	3.47	-.140 [†]	-4.98	3.49	-.119	-3.32	3.26	-.080
Feeding Style: Authoritarian							1.43	3.46	.044	.986	3.45	.031	-1.38	3.25	-.043
Feeding Style: Indulgent							1.70	3.53	.052	2.88	3.58	.088	.550	3.36	.017
Feeding Style: Uninvolved							6.48	4.15	.155	5.60	4.16	.134	1.97	3.94	.047
ROFMQ										-.471	.281	-.147 [†]	-.418	.262	-.131
Father HEI													.369	.077	.376*
<i>R</i> ²			.003			.021			.039			.057			.190

Note: * $p < .05$, [†] $p < .10$

Table 4
Results of Hierarchical Regression Analysis for Father HEI Scores (N = 150)

	Father HEI											
	Model 1			Model 2			Model 3			Model 4		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Meals per week w/ child	-.205	.252	-.067	-.238	.252	-.078	-.195	.252	-.064	-.195	.253	-.064
Food Insecurity				-4.86	3.51	-.114	-4.75	3.49	-.112	-4.48	3.54	-.105
Feeding Style: Authoritarian							6.54	3.49	.199 [†]	6.41	3.51	.195 [†]
Feeding Style: Indulgent							5.96	3.55	.178 [†]	6.31	3.63	.188 [†]
Feeding Style: Uninvolved							10.11	4.18	.238 [*]	9.84	4.23	.231 [*]
ROFQM										-.142	.285	-.044
<i>R</i> ²			.005			.017			.060			.062

Note: * $p < .05$, [†] $p < .10$