



ELSEVIER

Contents lists available at ScienceDirect

Appetite

journal homepage: [www.elsevier.com/locate/appet](http://www.elsevier.com/locate/appet)

## Research report

# Parent emotional distress and feeding styles in low-income families. The role of parent depression and parenting stress <sup>☆</sup>

Sheryl O. Hughes <sup>a,\*</sup>, Thomas G. Power <sup>b</sup>, Yan Liu <sup>a</sup>, Carla Sharp <sup>c</sup>, Theresa A. Nicklas <sup>a</sup><sup>a</sup> USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, 1100 Bates Ave, Houston, TX 77030, USA<sup>b</sup> Washington State University, 501A Johnson Tower, P.O. Box 644852, Pullman, WA 99164-4852, USA<sup>c</sup> Department of Psychology, 126 Heyne Building, University of Houston, Houston, TX 77204, USA

## ARTICLE INFO

## Article history:

Received 26 August 2014

Received in revised form 29 May 2015

Accepted 2 June 2015

Available online 4 June 2015

## Keywords:

Child eating behaviors

Feeding styles

Parent depression

Parenting stress

Preschoolers

## ABSTRACT

**Purpose:** Depression and other stressors have been associated with general parenting and child outcomes in low-income families. Given that parents shape child eating behaviors through their feeding interactions with their child, it is important to investigate factors that may influence parental feeding of young children. The aim of this study was to examine how depressive symptoms and parenting stress might influence the nature of parent feeding styles in low-income families. **Methods:** Questionnaires were completed by 290 African-American and Hispanic parents residing in a large urban city in the south-western United States. Twenty-six percent of the parents reported depressive symptoms above the clinical cutoff. Multivariate logistic regression was used to examine how depressive symptoms and parenting stress might influence the nature of parent feeding styles. **Results:** After adjusting for potential confounding variables (e.g., ethnicity, education, age), parents with an uninvolved feeding style reported less positive affect and more parenting stress than parents showing the other three feeding styles – authoritative, authoritarian, and indulgent. **Conclusions:** Because feeding styles tend to be associated with child obesity in low income samples, the results of this study provide important information regarding the parent–child eating dynamic that may promote less optimal child eating behaviors and the development of childhood obesity. This information could be useful for prevention studies aimed at changing parent behaviors that negatively impact the socialization of child eating behaviors.

© 2015 Elsevier Ltd. All rights reserved.

## Introduction

Childhood obesity is a significant public health problem and will most probably continue to be a problem in the United States and worldwide (Ogden, Carroll, Kit, & Flegal, 2012). Low-income children are at an increased risk for becoming obese making it vital that we better understand the early correlates of child weight status

among these high-risk populations (Ogden et al., 2012). Preschool is an optimal time for studying the development of child eating behaviors (Hughes, Power, Fisher, Mueller, & Nicklas, 2005; Hughes et al., 2011; Hughes, Shewchuk, Baskin, Nicklas, & Qu, 2008). By investigating eating behaviors in early childhood years, researchers are better able to capture the multiple factors present in parent–child social interactions that lay at the heart of how parents socialize child eating behaviors. Parenting is especially important during this time period in early childhood, as parents are generally responsible in providing food and feeding their young children. Although many preschoolers may already be overweight, this prevalence continues to increase throughout childhood (Ogden et al., 2012). By better understanding parenting characteristics that play a part in the development of childhood obesity, we may be able to promote prevention rather than treatment.

The quality of the parent–child relationship in early childhood is important to the development of the parent–child dynamic and associated child outcomes (Baumrind, 1971, 1989). Parenting theory posits an important distinction between parenting styles and practices. Parenting styles are conceptualized as the larger context within which parenting practices are expressed (Baumrind, 1971; Darling & Steinberg, 1993; Maccoby & Martin, 1983). Styles have the

**Abbreviations:** ANOVA, Analysis of Variance between Groups Data Entry; BMI, Body Mass Index; CES-D, Center for Epidemiologic Studies Depression Scale; CFSQ, Caregiver's Feeding Styles Questionnaire; CI, Confidence Interval; OR, Odds Ratio; PSI-SF, Parenting Stress Index – Short Form; SAS, Statistical Analysis Software.

<sup>☆</sup> **Acknowledgements:** This research was supported by funds from the U.S. Department of Agriculture, Grant No. 2006-55215-16695 and, in part, with funds from Kraft Foods Group, Inc. This work is a publication of the United States Department of Agriculture (USDA/ARS) Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, Texas, and had been funded in part with federal funds from the USDA/ARS under Cooperative Agreement 6250-51000. The contents of this publication do not necessarily reflect the views or policies of the USDA, nor does mention of trade names, commercial products, or organizations imply endorsement from the U.S. government.

\* Corresponding author.

E-mail address: [shughes@bcm.edu](mailto:shughes@bcm.edu) (S.O. Hughes).<http://dx.doi.org/10.1016/j.appet.2015.06.002>

0195-6663/© 2015 Elsevier Ltd. All rights reserved.

broadest influence on child behaviors because they create the emotional climate between the parent and child (Darling & Steinberg, 1993). Similar to parenting styles, feeding styles create an emotional climate in the parent–child eating relationship which has been shown to impact child eating outcomes. Feeding styles are defined by two dimensions: parent demandingness and responsiveness. Demandingness refers to the extent to which parents are demanding of their child's eating whereas responsiveness refers to how sensitive the parent is to the child's eating needs. Authoritative parents make appropriate nutritional demands on their child and show sensitivity toward the child's needs (high demand/high responsiveness); authoritarian parents are highly controlling and show little sensitivity to the child's needs (high demand/low responsiveness); indulgent parents exhibit little structure allowing children the freedom to determine their nutritional intake (low demand/high responsiveness); and uninvolved parents exhibit a lack of overall control and involvement in the feeding process (low demand/low responsiveness) (Hughes et al., 2005).

A number of studies with low-income families have linked parent feeding styles with a greater risk for childhood obesity. Across a series of studies with African American, White, Hispanic, and Asian families (child ages 3 to 11), indulgent feeding styles have been associated with higher child self-selected portion sizes; lower intake of fruit, vegetables, and dairy; higher intake of energy dense foods; and higher child weight status (Fisher, Birch, Zhang, Grusak, & Hughes, 2013; Hennessy, Hughes, Goldberg, & Hyatt, 2010, 2012; Hoerr et al., 2009; Hughes et al., 2005, 2008, 2011; Tovar et al., 2012). Although the link between feeding styles and child intake/weight status has been shown, the emotional process that takes place between the parent and child and parent characteristics that may help to explain that process has not been clearly established in the literature. One study examining parent emotional characteristics across feeding styles supported the emotional climate theory of parent–child eating interactions (Hughes et al., 2011). Using direct observation across three mealtimes, parents with an uninvolved feeding style exhibited higher negative affect and detachment with their child (as expected); authoritarian parents exhibited higher negative affect and intrusiveness; and authoritative and indulgent parents showed lower negative affect and intrusiveness during mealtimes (Hughes et al., 2011).

Despite this pattern of parental emotional displays observed during mealtimes, it is still unclear what correlates are in place that may influence how parents act with their children associated with their style of feeding. Depression is commonly seen among mothers of young children (Heneghan, Silver, Bauman, Westbrook, & Stein, 1998). Depression is a mood disorder that causes a persistent feeling of sadness and loss of interest (American Psychiatric Association, 2013). Depressed mothers are at a higher risk for low self-esteem, chronic stressors, and providing inappropriate and inconsistent discipline with their children (Goodman, 2007; Hall, Williams, & Greenberg, 1985; Sachs, Hall, & Pietrukowicz, 1995; Sack, Mason, & Higgins, 1985; Susman, Trickett, Iannotti, Hollenbeck, & Zahn-Waxler, 1985). Parenting stress, in particular, has been shown to correlate with high levels of depression in parents (Goodman & Tully, 2008). Parenting stress is defined as elevated stress associated with the demands of parenting (Haskett, Ahern, Ward, & Allaire, 2006). Parenting stress is therefore distinguishable from other forms of stress that go beyond the demands of parenting. Parental depression and parenting stress may interact with other risk factors to influence the emotional climate of the parent–child feeding relationship putting children at risk for childhood obesity.

Previous studies of maternal depression, anxiety, and stress show that maternal emotional distress or symptomatology was positively associated with restrictive feeding (Blissett & Farrow, 2007; Farrow & Blissett, 2005; Hurley, Black, Papas, & Caulfield, 2008; Mitchell, Brennan, Hayes, & Miles, 2009); pressure to eat (Francis, Hofer, &

Birch, 2001; Mitchell et al., 2009); and authoritarian, indulgent, or uninvolved feeding (Hurley et al., 2008). Three of these studies were studies of infants (Blissett & Farrow, 2007; Farrow & Blissett, 2005; Hurley et al., 2008) and three were studies of children between the ages of three and twelve (Francis et al., 2001; Mitchell et al., 2009; Tovar et al., 2012). All but one (Hurley et al., 2008) were studies of middle-class, white families. Two studies of preschool children looked specifically at the correlates of feeding styles in mothers of preschool children (Mitchell et al., 2009; Tovar et al., 2012), and in both cases, maternal emotional distress predicted authoritarian feeding behaviors or styles.

Together these studies show that maternal emotional distress tends to be associated with the maternal feeding styles linked to the development of childhood obesity in white, middle class populations. It appears, therefore, that mothers under high levels of emotional stress may not have the energy, time, or psychological resources to engage in feeding practices that contribute to healthy child weight. However, with the exception of Hurley et al. (2008) and Tovar et al. (2012), these studies did not include populations with the greatest obesity risk – low-income, African American and Latino parents (Ogden et al., 2012).

The purpose of this study was to examine the relationships between parental emotional distress and parent feeding styles in a sample of low-income African American and Latino parents with preschoolers. The specific aim was to examine how depressive symptoms and parenting stress might influence the nature of parent feeding styles. Given the inconsistent relationship between parent feeding styles, parent emotional distress, and childhood obesity in the feeding literature, it was unclear whether authoritarian, indulgent and/or uninvolved feeding styles would be associated with higher symptoms of depression and parenting stress within the parent–child relationship. We chose to take an exploratory approach to determining these relationships in this study.

## Subjects and methods

### Participants

Participants for this study were 290 African-American and Hispanic primary caregivers (mostly parents but included some grandparents) and their preschooler recruited from Head Start districts in a large urban city in the Southwestern part of the United States. The primary caregiver (referred to as parent hereafter) was defined as the person who was most often responsible for what the child ate outside of Head Start school day and was designated as the target parent in this study. Most of the parents were female (96%) with only a few fathers (2%) and grandmothers (2%) participating. These parents and their preschooler were part of a larger study designed to observe parent–child interactions in their homes multiple times during the dinner meal. In addition to observing these families during dinner, parents completed questionnaires related to parent and child characteristics that may impact the child eating environment.

### Procedures

Recruitment measures used in the study included active recruitment of parents during drop off and pick up of their child at the Head Start centers, presentations at Head Start parent meetings, and flyers posted at the Head Start centers to be returned to us with contact information. Flyers were posted at 45 Head Start centers across three Head Start districts. A total of 367 parents gave contact information to our staff with 312 parents signing up for participation. Once recruited, parents were scheduled for three home visits. Packets of questionnaires were given to the parents at the end of each home visit and returned to staff members at the next home

visit. Questionnaires were available in both English and Spanish. Spanish versions of the questionnaires were translated into Spanish and back translated into English by Spanish speaking staff members. Families were provided with graduated incentives at the end of each of the home visits for a total of \$125. Parents were consented for study participation at the beginning of the first home visit and confidentiality was assured. A total of 290 parents completed the study. The study was approved by the Institutional Review Board of Baylor College of Medicine.

## Measures

### Caregiver's Feeding Styles Questionnaire (CFSQ)

The CFSQ is a parent-report questionnaire that was developed to measure feeding styles in low-income parents and has been used extensively with Head Start families (Hughes et al., 2005, 2008, 2011). Compared to other instruments currently available that assess specific food parenting practices, this instrument measures the parent's overall feeding pattern along two dimensions (demandingness and responsiveness). A cross classification of high and low scores on these two dimensions identifies four feeding styles (authoritarian, authoritative, indulgent, and uninvolved). Dimensions are derived through 7 child-centered and 12 parent-centered feeding directives measured on a 5 point Likert scale. Child-centered feeding is defined as directives that promote internalization of parental values (e.g., reasoning, complimenting, and helping the child to eat) whereas parent-centered feeding is defined as directives that promote externalization or control of children's eating through external means (e.g., demands, threats, and reward contingencies). The feeding styles measured by the CFSQ have been associated with child dietary intake and BMI across multiple samples (Fisher et al., 2013; Hennessy et al., 2010, 2012; Hoerr et al., 2009; Hughes et al., 2005, 2008, 2011). Detailed scoring of this measure can be found in previous studies (Hughes et al., 2005, 2008). Evidence of test–retest reliability, internal consistency, convergent validity, and predictive validity has been demonstrated (Hughes et al., 2005). Confirmatory factor analyses support factorial invariance of this measure (Hughes et al., 2006). Cronbach's alphas for the child-centered and parent-centered directives in this study were acceptable (child-centered, 0.67; parent-centered, 0.83).

### Parenting Stress Index – Short Form (PSI-SF)

The 36 item PSI-SF is a parent report scale designed to measure the overall level of parenting stress experienced by a parent and reflects a direct derivative of the Parenting Stress Index full-length scale (Abidin, 1995). The parent's total stress score reflects the stresses reported in the areas of personal parental distress, stresses derived from the parent's interaction with the child, and stresses that result from the child's behavioral characteristics. Three subscales capture the primary components of the parent–child dyad: parental distress, parent–child dysfunctional interaction, and difficult child (Castaldi, 1990). This measure has been used successfully in studies with low-income parents (Roggman, Moe, Hart, & Forthun, 1994). However, a recent study using this measure with Head Start parents supported a single-factor model over the three-factor model supporting the use of the total stress score with Head Start families (Reitman, Currier, & Stickle, 2002). Cronbach's alpha for the total parenting stress score in this study was 0.94.

### Center for Epidemiologic Studies Depression Scale (CES-D)

The CES-D is a short 20-item self-report screener designed to measure the frequency and severity of depressive symptoms (not suicidal tendencies) in the general population (Radloff, 1977). The scale has high internal consistency, acceptable test–retest stability, excellent concurrent validity by clinical and self-report criteria, and substantial evidence of construct validity (Radloff, 1977). The

scale has been widely used, extensively validated, and correlates with other measures of depression (Lewinsohn, Hoberman, & Rosebaum, 1988; Weissman, Sholamkas, Pottengaer, Prusoff, & Locke, 1977). The scale measures the frequency with which a given symptom was experienced during the previous week. Each variable ranges from 0 to 3 and a higher numerical response represents a greater expression of depressive affect. A standard cut-score of 16 or greater has been identified as an indication of clinically significant depressive symptoms (Weissman et al., 1977); however, this work was conducted largely in non-minority samples (Eaton & Kessler, 1981). Research examining the factor structure of the CES-D in low-income samples support four individual factors of the CES-D scale (depressive affect, positive affect, somatic complaints, and interpersonal problems) (Nguyen, Kitner-Triolo, Evans, & Zonderman, 2004). The prevalence of somatization symptoms may be a stronger marker of depression among some groups such as African-Americans (Baker, Parker, Wiley, Velli, & Johnson, 1995). Therefore, examining the individual sub-constructs of the CES-D may provide better information than the total CES-D score in some ethnic groups (Nguyen et al., 2004). We therefore decided to use the individual subscales in this study as opposed to the total score. Cronbach's alphas for the individual subscales in this study were considered acceptable except for interpersonal problems (i.e., depressive affect, 0.87; positive affect, 0.66; somatic complaint, 0.64; interpersonal problems, 0.54). Previous research supports the measurement equivalency of the CES-D in samples with differential characteristics including race and socioeconomic status (Nguyen et al., 2004; Roberts & Vernon, 1983).

### Anthropometrics

Parent and child height was measured by trained staff to the nearest 0.1 cm and weight to the nearest 0.1 kg (Lohman, Roche, & Martorell, 1992). Participants were asked to dress in light clothing and remove their shoes. Measurements were taken twice and averaged. If a difference of more than .5 cm for height or 3 kg for weight were seen, a third measurement was taken and the three measures were averaged. Age- and gender-specific BMI z scores were calculated for children using the revised 2000 growth charts from the Centers for Disease Control and Prevention (Kuczmarski et al., 2002). Parents' BMI was calculated according to CDC criteria and classified on CDC cutoffs as normal weight (BMI  $\leq$  24.9), overweight (BMI  $\geq$  25) or obese (BMI  $\geq$  30).

### Statistical analyses

All statistical analyses were run using the Statistical Analysis Software (SAS) (version 9.3, SAS Institute Inc, Cary, NC, 2010). Numerical (i.e., Kolmogorov–Smirnov D) and graphical methods were used to test for data normality. Demographic characteristics were described using means, standard deviations, frequencies, and percentages. An independent t-test was used for continuous variables and a chi-square test was used for categorical variables (descriptive analyses). The p-value for all analyses was set at 0.05.

Feeding style differences in depressive symptoms and parenting stress were examined using ANOVA. Tukey HSD test was used to follow up the significant effects of feeding styles. A multivariate logistic regression using a hierarchical regression approach (meaning that the independent variables were entered into the analyses in a sequence of blocks) was used to then examine these relationships. Specifically, three regression steps/blocks were included in this analysis. In the first block, parent age, parent ethnicity/race, parent education level, parent BMI, child age, child gender, and child BMI z-scores were entered as covariates. In the second block, the subscales of the CES-D (parent depressive affect, positive affect, somatic complaints, and interpersonal problems) were entered as variables. In the third block, the total parenting stress score from

the Parenting Stress Index – Short Form was entered as a variable. Feeding style (uninvolved versus the other three styles combined) was the dependent variable. The analyses were conducted in this way because the uninvolved feeding style was the only group with elevated scores on depressive symptoms and stress. Since the regressions were a follow-up to the ANOVAs (where the uninvolved parents had elevated levels on these constructs) we created a dichotomous predictor to reduce the number of variables in the equation. To assess the model fit of the sequence of blocks, the likelihood ratio  $X^2$  test and  $-2$  Log likelihood ( $-2$  LL) were used. To test the improvement of the model fit by adding the subsequent block, the change in  $-2$  Log Likelihood ( $-2$  LL) and the change in degrees of freedom across subsequent models were calculated, and a Chi-square test was conducted to test a significant level ( $p$ -value) of the change in  $-2$ LL between the blocks. An odds ratio (OR) and 95% confidence interval (CI) were used in examining the significant predictors of feeding styles.

## Results

The mean age of the parents in this study was  $31.5 \pm 7.5$  years. Among all parents, only 18.6% were at a healthy weight, while 61.5% of the children were considered at a healthy weight. A total of 45.2% of the parents were African American and 62.8% had achieved a high school degree or less (Table 1). A total of 25.5% of the parents reported depressive symptoms based on the total depression scale score of greater than or equal to 16. The CES-D provides cutoff scores for identifying individuals at risk for clinical depression (i.e., a score of 16 or greater).

The ANOVA analyses compared depressive symptoms and parenting stress across the four feeding styles. Examination of these analyses showed a significant effect of feeding style on positive affect and parenting stress (Table 2). Post hoc analyses indicated that the uninvolved style was significantly different from the authoritative and indulgent feeding styles.

A hierarchical/block regression analysis was conducted with feeding styles as the dependent variable using the uninvolved feeding style as the referent relative to the other three styles combined (Table 3). The uninvolved feeding style was used as the referent because it was the feeding style with the greatest differences in depressive symptoms and stress. A series of demographic variables were entered in the first block (parent age, parent ethnicity/race, parent education level, parent BMI, child age, child BMI z-scores, and child gender) as potential confounding variables. None of the demographic variables were significantly associated with feeding styles in this step. In the second block, the parent depression subscales were entered into the model. Higher levels of positive affect were associated with three times more likelihood of identifying with the other three feeding styles compared to the uninvolved feeding style (OR = 2.93, 95% CI = 1.72, 5.01). After adding the parent depression subscales to the model (block 2), the child BMI z-score was significantly associated with feeding styles (OR = 0.85, 95% CI = 0.74, 0.98). When the total parenting stress score was added to the model in the third block, child BMI z-score (OR = 0.86, 95% CI = 0.74, 0.99), positive affect (OR = 2.60, 95% CI = 1.51, 4.50), and parenting stress (OR = 0.43, 95% CI = 0.24, 0.77) were significantly associated with feeding styles. In summary, the uninvolved parents were more likely to report higher parenting stress and less likely to report positive affect.

## Discussion

The aim of this study was to examine how depressive symptoms and parenting stress might influence the nature of parent feeding styles in low-income families. The results of this study showed that after adjusting for potential confounding variables,

**Table 1**

Descriptive statistics for demographic and psychosocial variables ( $n = 290$ ).

Child	
Age (year), mean (SD)	4.43 (0.7)
BMI z-score, mean (SD)	0.8 (1.2)
Gender, n (%)	
Male	142 (49.0)
Female	148 (51.0)
Weight status, n (%)	
Normal (<85th percentile)	176 (61.5)
Over weight ( $\geq 85$ th and <95th percentile)	55 (19.2)
Obese ( $\geq 95$ th percentile)	55 (19.2)
Missing	4
Parent	
Age (year), mean (SD)	31.5 (7.5)
BMI ( $\text{kg}/\text{m}^2$ ), mean (SD)	31.7 (7.9)
Weight status, n (%)	
Normal/Underweight <25.0	54 (18.6)
Overweight 25.0–<30.0	82 (28.3)
Obese $\geq 30.0$	154 (53.1)
Ethnicity/race, n (%)	
African American	131 (45.2)
Hispanic	159 (54.8)
Education, n (%)	
Less High school	86 (29.7)
High School	96 (33.1)
Some College or above	108 (37.2)
Marital Status, n (%)	
Married	120 (41.4)
Divorced/Widow/Separate	88 (30.3)
Never married	82 (28.3)
Employ status, n (%)	
Unemployed	152 (52.4)
Part time (<40 hrs/week)	70 (24.1)
Full time ( $\geq 40$ hrs/week)	68 (23.5)
Feeding styles, n (%)	
Authoritative	57 (19.7)
Authoritarian	78 (26.9)
Indulgent	94 (32.4)
Uninvolved	61 (21.0)
Depression (total score), n (%)	
No depressive symptoms (score <16)	216 (74.5)
Depressive symptoms (score $\geq 16$ )	74 (25.5)
Parenting Stress (total score), mean (SD)	2.0 (0.6)

parents with an uninvolved feeding style reported less positive affect and more parenting stress than parents showing the other three feeding styles – authoritative, authoritarian, and indulgent. This is important as few studies have shown associations between these constructs. In a study of Head Start families, preschoolers with indulgent or uninvolved parents had lower intake of fruit, juice, vegetables, and dairy compared to preschoolers with authoritarian parents (Hoerr et al., 2009). In a separate study examining mental health in families with infants, maternal stress and depression was associated with uninvolved feeding (Hurley et al., 2008). However, beyond these studies, it appears that there is a dearth of literature linking these constructs. More research is needed to better understand the mechanisms in place that can better explain these relationships.

To date, the literature investigating the impact of depression and parenting stress on the quality of the parent–child relationship in low-income families has targeted academic and psychosocial adjustment outcomes in young children (Brody & Flor, 1997). There is a dearth of studies examining the impact of these types of parent stressors on the feeding relationship that may impact the weight status of the child (see El-Behadli, Sharp, Hughes, & Nicklas, 2015 for a review). In a handful of studies, researchers showed an association between maternal mental health and restrictive feeding practices in one year old children (Blissett & Farrow, 2007; Farrow & Blissett, 2005). Similarly, another study showed an association

**Table 2**

Unadjusted means (standard deviations) of depressive symptoms and parenting stress by feeding styles (n = 290).

	Authoritative a	Authoritarian b	Indulgent c	Uninvolved d	F statistics
Depression symptoms					
Depressive affect	0.42 ± 0.45	0.43 ± 0.51	0.39 ± 0.57	0.54 ± 0.59	F (3,286) = 0.94
Positive affect	2.26 ± 0.65	2.12 ± 0.74	2.23 ± 0.69	1.85 ± 0.62	F (3,286) = 4.88** <sub>ad,cd</sub>
Somatic complaints	0.64 ± 0.47	0.68 ± 0.50	0.67 ± 0.48	0.72 ± 0.46	F (3,286) = 0.30
Interpersonal problems	0.29 ± 0.51	0.39 ± 0.53	0.31 ± 0.46	0.36 ± 0.57	F (3,286) = 0.56
Parenting stress	1.87 ± 0.60	2.09 ± 0.60	1.88 ± 0.61	2.27 ± 0.56	F (3,286) = 6.90*** <sub>ad,cd</sub>

Note: Post hoc testing was conducted using Tukey's HSD test.

ad = Authoritative significantly different from Uninvolved; cd = Indulgent significantly different from Uninvolved.

\*\* p &lt; .01.

\*\*\* p &lt; .001.

between maternal depression and the use of pressure to eat with five year old daughters (Francis et al., 2001). Although these results support the impact of mental health on parent feeding, these studies were conducted with middle-class White families assessing only a limited number of highly controlling maternal feeding practices (i.e., restriction, monitoring, and pressure to eat). Similar to the work of Tovar et al. (2012), our study extends the work on maternal mental health and feeding by taking a much more comprehensive approach to feeding instead of studying specific goal oriented feeding practices. In the current study we measured broader feeding styles of parents which take into account the quality of the parent–child eating relationship. In our study, the parent uninvolved feeding style (which is considered a permissive type of style) was associated with psychological distress and higher child weight status. Cultural and socioeconomic differences may exist in parents' approaches to feeding, especially in groups that are at a higher risk for childhood obesity. In families with reduced resources and higher levels of stress, parents may focus less attention on the feeding experience. There is a possibility that this situation may account for the higher prevalence of overweight and obesity in low-income children.

Unexpectedly, although significant effects were found for positive affect and parenting stress, there were no significant differences between the feeding styles in depressive symptoms (i.e., depressive affect, somatic complaints, and interpersonal problems). This contrasts with other studies showing relationships between depressive symptoms and authoritarian feeding styles (Mitchell et al., 2009) and controlling feeding practices (e.g., Francis et al., 2001; Mitchell et al., 2009; Tovar et al., 2012). The lack of findings was not due to restricted variance in depressive symptoms, because one

quarter of the mothers in this sample met or exceeded the clinical cut off on the CES-D. Therefore, in this low-income, minority sample, it was parenting stress, not depressive symptoms (or likely general stress) that predicted feeding style – i.e., the demands of rearing and feeding children in a resource poor environment, not general psychological stress, may have contributed to the development of an uninvolved feeding style. Gross, Mendelsohn, Fierman, Racine, and Messito (2012), for example, found that food insecurity in low income, Latina mothers predicted controlling feeding practices. Although that study revealed differences in the feeding practices of mothers of infants, whereas the current study focused on feeding styles of mothers of preschoolers, it is possible that food insecurity might have contributed to the current patterns of results, with food insecurity increasing parenting stress and thereby impacting feeding behavior. Future studies in this population should examine the relationships between general stress, parenting stress, psychological symptoms, food insecurity, and feeding styles and practices.

It was interesting that child BMI z score became a significant predictor when depression was added to the regression equation. This suggests that parents are responding to the child's weight status when depression is also considered. Given that this is the first study to our knowledge that found associations among the uninvolved feeding style, depression, and stress, more studies are needed to replicate these findings.

### Limitations

The design of this study was cross-sectional restricting any causal inferences based on the results of this study. The use of

**Table 3**

Odds Ratios (95% confident interval) for feeding styles associated with depressive symptoms and parenting stress (n = 290; ref: Uninvolved).

	Block 1	Block 2	Block 3
Model fit –2LL	270.0	252	243
Change in –2LL (p-value)		0.001	0.003
Parent			
Age (year)	1.02 (0.98,1.07)	1.03 (0.98,1.07)	1.02 (0.98,1.07)
Hispanic (ref: AA)	0.91 (0.46,1.81)	1.14 (0.53,2.42)	1.30 (0.60,2.81)
Education (ref: less than HS)			
High school	1.76 (0.74,4.18)	1.59 (0.64,3.94)	1.61 (0.64,4.04)
Some college or above	0.85 (0.39,1.88)	0.54 (0.23,1.26)	0.49 (0.20,1.17)
BMI (kg/m <sup>2</sup> )	0.97 (0.93,1.01)	0.97 (0.93,1.01)	0.97 (0.93,1.01)
Child			
Age (year)	1.01 (0.63,1.60)	0.90 (0.57,1.43)	0.99 (0.62,1.56)
BMI z-score	0.79 (0.60,1.04)	0.85 (0.74,0.98)	0.86 (0.74,0.99)
Male	1.29 (0.71,2.35)	1.17 (0.62,2.20)	1.16 (0.61,2.21)
Depressive symptoms			
Depressive affect		0.98 (0.42,2.31)	0.97 (0.41,2.30)
Positive affect		2.93 (1.72,5.01)	2.60 (1.51,4.50)
Somatic complaints		1.02 (0.38,2.74)	1.26 (0.46,3.45)
Interpersonal problems		1.54 (0.72,3.30)	1.92 (0.86,4.28)
Parenting Stress			0.43 (0.24,0.77)

questionnaires for assessing study constructs may provide restricted information regarding what actually takes place in these families during mealtime. In addition, the fact that parents were the sole source of report raises the possibility of shared method variance inflating associations. Longitudinal and/or observational studies may provide a more comprehensive picture of the nature and direction of the quality of the parent–child eating relationship. Moreover, we did not control for parent gender. It is possible that different underlying psychological processes may be relevant for mothers and fathers when considering the links between parental depression, stress, feeding styles and child weight outcomes. Finally, we were particularly interested in examining the effects of parent stress in particular. Stress is, however, a multi-component construct (Hammen, 1991) and many other forms of stress may be affecting feeding styles and eating behaviors in children. Future studies may include measures of stress beyond just parenting stress to include chronic independent stress (e.g., illness in the family) and episodic independent stress (e.g., a car accident).

### Conclusions

There is a growing body of literature that supports prevention efforts aimed at changing parent behaviors that negatively impact the socialization of child eating behaviors. In our study, 25% of low-income minority parents were at risk for depression. Our results provide important information regarding families with psychological distress and its association with the parent–child eating dynamic. This psychological distress in low-income populations may promote less optimal child eating behaviors thus influencing the development of childhood obesity. These results could provide useful information for the development of prevention studies.

### References

- Abidin, R. R. (1995). *Parenting Stress Index. Professional manual* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders, 5th edition. DSM5*. Arlington, VA: American Psychiatric Association.
- Baker, F. M., Parker, D. A., Wiley, C., Velli, S. A., & Johnson, J. T. (1995). Depressive symptoms in African American medical patients. *International Journal of Geriatric Psychiatry, 10*, 9–14.
- Baumrind, D. (1971). Current patterns of parental authority. *Developmental Psychology Monograph, 4*(1 Pt. 2), 1–103.
- Baumrind, D. (1989). Rearing competent children. In W. Damon (Ed.), *Child development today and tomorrow*. San Francisco, CA: Jossey Bass.
- Blissett, J., & Farrow, C. (2007). Predictors of maternal control of feeding at 1 and 2 years of age. *International Journal of Obesity (2005), 31*(10), 1520–1526.
- Brody, G. H., & Flor, D. L. (1997). Maternal psychological functioning, family processes, and child adjustment in rural, single-parent, African American families. *Developmental Psychology, 33*(6), 1000–1011.
- Castaldi, J. (1990). *Affective and cognitive patterns in the mother-child relationship during the second year of life*. Charlottesville: University of Virginia.
- Darling, N., & Steinberg, L. (1993). Parenting style as context. An integrative model. *Psychological Bulletin, 113*(3), 487–496.
- Eaton, W. W., & Kessler, L. G. (1981). Rates of symptoms of depression in a national sample. *American Journal of Epidemiology, 114*(4), 528–538.
- El-Behadli, A., Sharp, C., Hughes, S. O., & Nicklas, T. (2015). Maternal depression, life stress, and feeding styles. Towards a framework for theory and research in child obesity. *British Journal of Nutrition, 113*, S55–S71.
- Farrow, C. V., & Blissett, J. M. (2005). Is maternal psychopathology related to obesogenic feeding practices at 1 year? *Obesity Research, 13*(11), 1999–2005.
- Fisher, J., Birch, L., Zhang, J., Grusak, M., & Hughes, S. O. (2013). External influences on children's self-served portions at meals. *International Journal of Obesity, 37*, 954–960.
- Francis, L. A., Hofer, S. M., & Birch, L. L. (2001). Predictors of maternal child-feeding style. Maternal and child characteristics. *Appetite, 37*(3), 231–243.
- Goodman, S. (2007). Depression in mothers. *Annual Review of Clinical Psychology, 3*, 107–135.
- Goodman, S. H., & Tully, E. (2008). Children of depressed mothers. Implications for the etiology, treatment, and prevention of depression in children and adolescents. In J. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 415–440). New York: Guilford Press.
- Gross, R. S., Mendelsohn, A. L., Fierman, A. H., Racine, A. D., & Messito, M. J. (2012). Food insecurity and obesogenic maternal infant feeding styles and practices in low-income families. *Pediatrics, 130*(2), 254–261.
- Hall, L. A., Williams, C. A., & Greenberg, R. S. (1985). Supports, stressors, and depressive symptoms in low-income mothers of young children. *American Journal of Public Health, 75*(5), 518–522.
- Hammen, C. (1991). Generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology, 100*, 555–561.
- Haskett, M. E., Ahern, L. S., Ward, C. S., & Allaire, J. C. (2006). Factor structure and validity of the Parenting Stress Index – Short Form. *Journal of Clinical Child and Adolescent Psychology, 35*(2), 302–312.
- Heneghan, A. M., Silver, E. J., Bauman, L. J., Westbrook, L. E., & Stein, R. E. (1998). Depressive symptoms in inner-city mothers of young children. Who is at risk? *Pediatrics, 102*(6), 1394–1400.
- Hennessy, E., Hughes, S., Goldberg, J., & Hyatt, R. R. (2010). Parent behavior and child weight status among a diverse group of underserved rural families. *Appetite, 54*(2), 369–377.
- Hennessy, E., Hughes, S., Goldberg, J., & Hyatt, R. R. (2012). Permissive parental feeding behaviors is associated with an increase in intake of low nutrient-dense foods among American children living in rural communities. *Journal of the Academy of Nutrition and Dietetics, 112*, 142–148.
- Hoerr, S. L., Hughes, S. O., Fisher, J. O., Nicklas, T., Liu, Y., & Shewchuk, R. M. (2009). Associations among parental feeding styles and children's food intake in families with limited incomes. *International Journal of Behavioral Nutrition and Physical Activity, 6*, 55.
- Hughes, S. O., Anderson, C. B., Power, T. G., Micheli, N., Jaramillo, S., & Nicklas, T. A. (2006). Measuring feeding in low-income African-American and Hispanic parents. *Appetite, 46*(2), 215–223.
- Hughes, S. O., Power, T. G., Fisher, J. O., Mueller, S., & Nicklas, T. A. (2005). Revisiting a neglected construct. Parenting styles in a child-feeding context. *Appetite, 44*(1), 83–92.
- Hughes, S. O., Power, T. G., Papaioannou, M., Cross, M., Nicklas, T., Hall, S., et al. (2011). Emotional climate, feeding behaviors, and feeding styles. An observational analysis of the dinner meal in Head Start families. *International Journal of Behavioral Nutrition and Physical Activity, 8*(60), 1–11.
- Hughes, S. O., Shewchuk, R. M., Baskin, M., Nicklas, T., & Qu, H. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental & Behavioral Pediatrics, 29*(5), 403–410.
- Hurley, K. M., Black, M. M., Papas, M. A., & Caulfield, L. E. (2008). Maternal symptoms of stress, depression, and anxiety are related to nonresponsive feeding styles in a statewide sample of WIC participants. *Journal of Nutrition, 138*(4), 799–805.
- Kuczumarski, R. J., Ogden, C. L., Guo, S. S., Grummer-Strawn, L. M., Flegal, K. M., Mei, Z., et al. (2002). 2000 CDC Growth Charts for the United States. Methods and development. *Vital and Health Statistics. Series 11, Data From the National Health Survey*, (246), 1–190.
- Lewinsohn, P. M., Hoberman, H. M., & Rosebaum, M. (1988). A prospective study of risk factors for unipolar depression. *Journal of Abnormal Psychology, 97*(3), 251–264.
- Lohman, T., Roche, A., & Martorell, R. (1992). Anthropometric standardization reference manual. *Medicine and Science in Sports and Exercise, 24*(8), 952.
- Maccoby, E., & Martin, J. (1983). Socialization in the context of the family. Parent–child interaction. In P. H. Mussen (Ed.), *Handbook of child psychology* (pp. 1–101). New York, NY: Wiley.
- Mitchell, S., Brennan, L., Hayes, L., & Miles, C. L. (2009). Maternal psychosocial predictors of controlling parental feeding styles and practices. *Appetite, 53*(3), 384–389.
- Nguyen, H. T., Kitner-Triolo, M., Evans, M. K., & Zonderman, A. B. (2004). Factorial invariance of the CED-D in low socioeconomic status African Americans compared with a nationally representative sample. *Psychiatry Research, 126*, 177–187.
- Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2012). Prevalence of obesity and trends in body mass index among US children and adolescents, 1999–2010. *Journal of the American Medical Association, 307*(5), 483–490.
- Radloff, L. S. (1977). The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385–401.
- Reitman, D., Currier, R. O., & Stickle, T. R. (2002). A critical evaluation of the Parenting Stress Index – Short Form (PSI-SF) in a head start population. *Journal of Clinical Child and Adolescent Psychology, 31*(3), 384–392.
- Roberts, R. E., & Vernon, S. W. (1983). The Center for Epidemiologic Studies Depression Scale. Its use in a community sample. *American Journal of Psychiatry, 140*(1), 41–46.
- Roggman, L. A., Moe, S. T., Hart, A. D., & Forthun, L. F. (1994). Family leisure and social support. Relations with parenting stress and psychological well-being in Head Start parents. *Early Childhood Research Quarterly, 9*, 463–480.
- Sachs, B., Hall, L. A., & Pietrukowicz, M. A. (1995). Moving beyond survival. Coping behaviours of low-income single mothers. *Journal of Psychiatric and Mental Health Nursing, 2*(4), 207–215.
- Sack, W. H., Mason, R., & Higgins, J. E. (1985). The single-parent family and abusive child punishment. *The American Journal of Orthopsychiatry, 55*(2), 252–259.
- Susman, E. J., Trickett, P. K., Iannotti, R. J., Hollenbeck, B. E., & Zahn-Waxler, C. (1985). Child-rearing patterns in depressed, abusive, and normal mothers. *The American Journal of Orthopsychiatry, 55*(2), 237–251.
- Tovar, A., Hennessy, E., Pirie, A., et al. (2012). Feeding styles and child weight status among recent immigrant mother-child dyads. A cross-sectional analysis. *International Journal of Behavioral Nutrition and Physical Activity, 9*, 62.
- Weissman, M. M., Sholamkas, D., Pottenger, M., Prusoff, B. A., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations. A validation study. *American Journal of Epidemiology, 106*, 203–214.