Parenting Practices and Obesity in Low-Income African-American Preschoolers

Contractor and Cooperator Report No. 3
January 2005

By Scott W. Powers, Cincinnati Children's Hospital Medical Center, University of Cincinnati College of Medicine

Abstract

This study developed and administered a questionnaire to identify feeding practices among low-income African-American mothers and eating behaviors in their preschool children that are associated with childhood obesity. The findings do not appear to implicate feeding practices to childhood obesity in this sample of preschoolers. However, before concluding that feeding practices are not associated with childhood weight status, further research is needed to ensure that the constructs used accurately assess feeding practices in specific populations.. Further research is also needed using a larger sample of overweight children to compare the findings with those among children of normal weight.

This study was conducted by the Cincinnati Children's Hospital Medical Center under a cooperative research contract with USDA's Economic Research Service (ERS) Food and Nutrition Assistance Research Program (FANRP): contract number 43-3AEM-0-80078 (ERS project representative: Elizabeth Frazão). The views expressed are those of the authors and not necessarily those of ERS or USDA.

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

CONTENTS

Overview 1

Objective of the Study 2

Methods 2
- Semi Structured Qualitative Interviews 2
- Cognitive Interviews 3
- Development of PFQ 4
- Administration of PFQ 6

Results 6
- Sample Characteristics 6
- Descriptive Statistics 7
- WHP Correlations for the 7 Constructs 8

Future Research 9
- Factor Analysis 9
- Comparison to Prior Studies 12
- Comparisons Based on WHP Using Variables From PFQ2 Listed in Table 3 12

Conclusion 14

References 17

Parenting Practices and Obesity in Low-Income African American Preschoolers

Principal Investigator:
Scott W. Powers, Ph.D., ABPP
Associate Professor of Pediatrics
Cincinnati Children's Hospital Medical Center
University of Cincinnati College of Medicine

OVERVIEW: Although there is a strong genetic contribution to obesity (1), alterations in our genes cannot explain the recent obesity epidemic in children. There is clearly a strong environmental or "nurture" component to obesity that could be targeted in obesity prevention efforts in young children. Feeding practices are established before school age (2-4) and in the preschool years, parents largely determine a child's diet. Because a major nurturing role for parents is to provide food for their children, feeding and the shaping of eating behaviors in children cannot easily be separated from the overall task of parenting. Parents determine the social context for eating and may control the interaction by supplying emotional cues like verbal and non-verbal encouragement and discouragement to eat**.**

Based on work with Caucasian children in middle and upper-middle class families, it has been suggested that a child's obesity risk may be increased when parents exert a high degree of control over the feeding interaction (5, 6). This "control" has been conceptualized in two forms – both "pushing" children to eat and "restricting" children from eating. When feeding young children, for example, mothers that have a more controlling parenting style deliver a greater number of cues or prompts for their children to eat (7). However, these prompts could either be a cause or an effect of the child's eating behavior or weight (7-9). Additional studies have focused on the impact of parent practices used to shape the food intake of Caucasian children ages 4-11 years (10-12). They have shown that using food as a reward (13) or restricting access to food (14) may lead to overeating. For example, restricting children's access to palatable snack foods may increase consumption when restriction is removed. They have also shown that the relative weight of children is greater when parents report more restriction of children's access to these snack foods (15). Despite these provocative findings, it is not clear whether restriction of children's intake of certain foods leads to over consumption or if parents restrict foods in overweight children. There has been only one attempt to replicate any of these findings in African American families. Children in that study were ages 7-14 years (16).

In the United States, African American families are at increased risk of obesity and its complications, relative to Caucasian families (17-19). Although infant feeding practices in low-income African American mothers have been described (20-22), we are unaware of any research about how low-income African Americans feed their preschoolers or perceive the eating behaviors of their young children. This project sought to better understand maternal attitudes and practices around feeding of their preschool children (age 2 years 0 months to 5 years 11 months) and examines the relation of these factors to child weight among African Americans.

The long-term goal is to inform the development of obesity prevention interventions for this at-risk population.

OBJECTIVE OF THE STUDY: The purpose of this study was to develop and administer a preschool feeding questionnaire (PFQ2) to identify feeding behaviors in low-income African-American mothers and eating behaviors in their preschool children that are associated with the development of childhood obesity.

In an earlier project (23) we developed and analyzed a Preschool Feeding Questionnaire (PFQ1) to explore possible factors that may lead to childhood obesity in children between the ages of 2 to 5 years old. The PFQ1, designed as a self-administered questionnaire, was administered to 634 mothers to assess maternal feeding practices and beliefs. The questionnaire, containing 29 items, was factor analyzed and mean factors scores were calculated and linked to the children's measured and mother's self reported weight and height. Though we hypothesized that factors on PFQ1 would be related to obesity, results from this study did not suggest that there was a particular "feeding style" that was associated with overweight in young children. However, there were differences found in feeding behaviors between high and low income groups.

METHODS: Through the use of qualitative research methods with low-income African American mothers with preschool children enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in Hamilton County, Ohio, and Chicago, Illinois, we set forth to determine which PFQ1 items to retain for PFQ2 and how to rephrase these items so that the intent of the question was clear to the mothers. Mothers recruited for the each type of qualitative interview described below were limited to biological mothers. Foster mothers and other nonbiological mother caregivers were excluded in an effort to obtain a consistent source of information on the child. We also conducted a current literature search and examined scales (including parent feeding, parent concerns for child weight, and child eating) from other questionnaires that showed relations to child weight in Caucasian, higher income samples (10-12). The following provides a chronological summary of the methodology used to develop PFQ2:

Semi Structured Qualitative Interviews:

1. Thirty semi-structured qualitative interviews to identify differences in parenting practices between two groups of African American mothers were conducted. Fifteen were caregivers of normal weight (weight-for-height 25^{th} to 75^{th} percentile) children 48 to 60 months of age and 15 had overweight children (weight-for-height $\geq 95^{th}$ percentile). All the study subjects were low-income African American families living in Chicago. The subjects were recruited from The Friend Family Health Center (FFHC) in Chicago. The FFHC is a Federally Qualified Health Center affiliated with the University of Chicago Hospital and Medical Center. Approximately 14,000 children are served by this clinic with about 40,000 visits annually. Over 80% of the patients are low-income and African American. Interviews were designed to gain understanding about the complex social, cultural, and psychological aspects of feeding through examining topics such as daily family routines; mealtime practices; child's appetite, hunger cues, activity level, and television viewing; as well as disciplining, rewards, and mother's perception of her child's weight status. These interviews were audiotaped and transcribed.

2. Seven additional audiotaped interviews with African American mothers of 24-59 month old children in Chicago enrolled in WIC were conducted. The weight status of the child was not considered when determining eligibility for the interviews. Using original PFQ1 items, followed by probing questions, the interviews were designed to assess the mother's interpretations of PFQ1 items. These interviews were audiotaped and transcribed. We found the mothers consistently misunderstood PFQ1 items, interpreting items to mean something other than what was intended. In particular, the constructs "difficulty in child feeding", "pushing the child to eat more", and "using food to calm the child" were present among mothers but not captured by items on the questionnaire (24).
3. In addition to the semi structured interviews conducted in Chicago, we recruited 6 additional mothers in Cincinnati for semi-structured interviews that primarily focused on why mothers feed their children as they do and on the role feeding plays in the broader job of parenting. All mothers were African American and had a child enrolled in WIC between the ages of 48-60 months of age. Three of these mothers had normal weight (weight-for-height 25^{th} to 75^{th} percentile) children and 3 had overweight children (weight-for-height $\geq 95^{th}$ percentile). These interviews were audiotaped and transcribed. Consistent with the findings of the interviews conducted in Chicago, we found that while many of the mothers were able to provide answers to the PFQ1 question items, they did not clearly understand the meaning and intent of the items when follow up probes were utilized.

Cognitive Interviews: Six cognitive interviews were conducted at Cincinnati Children's Hospital Medical Center. Families that did not participate in the semi structured interviews discussed above were recruited. All mothers were African American and had a child enrolled in WIC between the ages of 48-60 months of age. Three of these mothers had normal weight (weight-for-height 25^{th} to 75^{th} percentile) children and 3 had overweight children (weight-for-height $\geq 95^{th}$ percentile). The cognitive interview is a method that was instituted in the early 1980's to develop and test survey questions, and it has greatly improved the validity and reliability of survey questionnaires (25, 26). Cognitive interviewing applies the theories and methods of cognitive psychology to questionnaire design. Respondents must comprehend the question, retrieve relevant information from memory, use the information retrieved, exercise problem solving and judgment, arrive at an answer, and, finally, decide whether to "adjust" the answer (e.g., for self-presentation purposes) before providing an answer. Response error can be due to problems at any of these cognitive stages. The cognitive interviews tested items developed by our research team for a structured feeding construct, as well as the items which had been used in earlier feeding studies (11, 12, 27) since earlier qualitative interviews revealed the limitations of many of the PFQ1 items. A trained cognitive interviewer administered each question to the respondent and asked a series of probes to determine the cognitive processes used in arriving at the answer. Mothers were also asked to describe the meaning of the various response choices (answers) that were presented with the question items. This method was used to uncover problems with items that are often not identified by pretests and other traditional questionnaire design procedures. For example, 'Does your child have a poor appetite?' was followed by the following probes:

- What were you thinking about when you answered the question I just asked you?
- Were you thinking about a specific event or experience?
- Were you thinking about the most recent time that this happened?

- What age was your child when this happened?
- Is it better if I change the question wording to_____?
- Do you have any suggestions about changing the question wording?
- Is the question easy for you to answer?
- Do you think that you would give me the same answer to the question in a few days? A week from now?

Mothers felt poor appetite mean that a child was sick or had an acute illness. Poor appetite was not a term used by mothers to reflect the child's eating style. We learned these mothers did not feel 'poor appetite' was normal for any child, regardless of the amount of food they consumed. Mothers used the term 'picky eater' to describe what a child ate or how it was prepared. To these mothers 'picky eater' did not indicate the amount of food a child ate, nor was it considered a negative trait. Findings such as these supported the elimination of all the original PFQ1 items since these items did not appear to be relevant among this population. Mothers were also asked the series of questions relating child's emotional state to feeding (e. g. "My child eats less when he is upset/tired/happy"). Mothers were generally found to be unable to describe specific emotional states in their children.

Development of PFQ2: At the completion of the qualitative methods described above, findings from each method were used to inform the development of PFQ2. In addition, members of the research team reviewed the published work of three validated feeding instruments; the Children's Eating Behavior Questionnaire (27), the Parental Feeding Style Questionnaire (11), and the Child Feeding Questionnaire (12). Based on findings from the various interview methods used, the research team concluded using existing items from PFQ1 with low-income African American mothers would likely measure constructs that do not clearly exist among this population. Therefore, we eliminated the constructs from PFQ1. Scales from questionnaires validated in other populations that had shown differences between normal weight and overweight children were retained for PFQ2 (11, 12, 27). In addition, a construct developed through cognitive interviewing in our qualitative research was retained. The final version of PFQ2, therefore, contained 39 closed-ended items that yield scores for seven constructs (Table 1). Additional items were included on PFQ2 to gather demographic information, child's height and weight and self reported maternal height and weight.

TABLE 1. CONSTRUCTS

CONSTRUCT NAME	ITEMS
Parental Control (Wardle, 11)	1. I allow my child to choose which foods to have for meals* 2. I decide how many snacks my child should have 3. I allow my child to wander around during a meal* 4. I decide when it is time for my child to have a snack 5. I allow my child to decide when s/he has had enough snacks to eat* 6. I decide the times when my child eats his/her meals 7. I let my child decide when s/he would like to have his/her meal* 8. I let my child eat between meals whenever s/he wants* 9. I insist my child eats meals at the table 10. I decide what my child eats between meals
Child's Food Responsiveness (Wardle, 27)	1. My child always asks for food 2. If given the chance, my child would always have food in his/her mouth 3. Given the choice, my child would eat most of the time 4. If allowed to, my child would eat too much 5. Even if my child is full, s/he finds room to eat his/her food
Child's Desire to Drink (Wardle, 27)	1. If given the chance, my child would always be having a drink 2. If given the chance, my child would drink continuously throughout the day
Maternal Restriction (Birch, 12)	1. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, pastries) 2. I have to be sure that my child does not eat too many high fat foods 3. I have to be sure that my child does not eat too much of her favorite foods 4. I intentionally keep some foods out of my child's reach 5. I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior* 6. I offer my child her favorite foods in exchange for good behavior* 7. If I did not guide or regulate my child's eating, she would eat too many junk foods 8. If I did not guide or regulate my child's eating, she would eat too much of her favorite foods
Maternal Pressure to Eat (Birch, 12)	1. My child should always eat all of the food on her plate 2. I have to be especially careful to make sure my child eats enough 3. If my child says "I'm not hungry", I try to get her to eat anyway 4. If I did not guide or regulate my child's eating, she would eat much less than she should
Maternal Concern for Child's Weight (Birch, 12)	1. How concerned are you about your child eating too much when you are not around him/her? 2. How concerned are you about your child having to diet to maintain a desirable weight? 3. How concerned are you about your child becoming overweight?

TABLE 1. (CONTINUED)

CONSTRUCT NAME	ITEMS
Structured Feeding (CCHMC)	1. How often do you and your child sit down and eat together? 2. Over the past month, how often does your child eat outside your home at some kind of restaurant (including a fast food restaurant)?* 3. How often does your child eat in a bedroom?* 4. How often do you sit down with your child while he/she is eating (even if you are not eating)? 5. How often does your child pick out what you will prepare for him/her at mealtime?* 6. How often does your child eat and watch TV at the same time?* 7. How often does your child get something to eat or drink him/herself without asking permission?*

* denotes items which were reverse coded for analysis

Administration of PFQ2: Between April 2003 and October 2003, the revised Preschool Feeding Questionnaire (PFQ2) was administered to 300 low-income mothers of African American children 24 to 59 months of age enrolled in the Hamilton County, Ohio Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). For purposes of this study, the term 'mother' referred to the primary caregiver of the child and included biological mothers, grandmothers, and legal guardians. Mothers had to be English speaking and at least 18 years of age. Participants were excluded if their child had a chronic medical condition affecting feeding and/or appetite.

A member of the research team recruited mothers when they brought their child for a visit at one of seven WIC clinics in Hamilton County, Ohio. Selection of the seven WIC clinics was based on having a caseload of at least 500 African American children between the ages of 24-60 months and at least 60% of the clinic population being African American. WIC is a federally funded program that provides supplemental food and nutrition counseling to low-income women and their children (up to 5 years of age). To be income-eligible for WIC, family income must be at or below 185% of the federal poverty level. At the time of the survey, 185% of the poverty level was $34,040 per year for a family of four. Written consent was procured from all the mothers prior to completing the self-administered questionnaire. Each mother who completed the questionnaire received $5 compensation. The Institutional Review Boards at Cincinnati Children's Hospital Medical Center (CCHMC) and Ohio Department of Health (ODH) approved the study.

RESULTS:

Sample Characteristics: Of the 300 surveys administered, one did not meet inclusion criteria and was excluded from analysis. Table 2 summarizes the sample characteristics. Mothers ranged from 18 to 62 years of age (M= 27.9, SD = 7.64) and their children ranged in age from 24 to 59 months old (M = 41.4, SD = 9.9) at the time the mothers completed PFQ2. Mother's BMI ranged from 16.3 to 55.9 (M = 30.1, SD = 7.04) based on self-reported data.

Weight for height percentiles for each child were calculated using the NutStat program within Epi Info™ Version 3.01 Software based on both the 1978 & 2000 CDC growth references. Based on 1978 CDC growth data, 13% (38 children) had WHP $\geq$ 95th for sex based on their most current WIC measurements. Using the 2000 CDC growth data, 9% (28 children) had WHP $\geq$ 95th for sex based on their most current WIC measurements. All of the children were African American. Of the 307 eligible mothers approached, only 7 (2%) declined to participate in the project.

Table 2. SAMPLE CHARACTERISTICS

CHARACTERISTIC			% SUBJECTS (N = 299)
MOTHERS			
Low education level (high school diploma/GED or less)			68
Currently enrolled in school			26
Currently employed			43
Currently pregnant			15
Current smoker			23
Obese (body mass index $\geq$ 30 kg/m^2)			43
CHILDREN			
Attends childcare/daycare			52
Average hours per week (M =29.5, SD= 16.9)			
Weight for Height Percentile (WHP) for Age			
	1978* (N=298)	2000**(N=297)	
WHP $\leq$ 5th %ile	12 (4%)	16 (5%)	
WHP 6-84 %ile	218 (73%)	207 (70%)	
WHP 85-94th %ile	30 (2%)	46 (15%)	
WHP $\geq$ 95th %ile	38 (13%)	28 (9%)	
Normal weight	218	207	
Overweight/At risk	68 (23%)	74 (25%)	

* based on 1978 CDC growth data
** based on 2000 CDC growth data

Descriptive Statistics: Means and standard deviations for the complete sample (N=299) were calculated for each subscale of the PFQ2 (Table 3). Mean scores were derived by calculating the totals for each construct and dividing by the number of items in each construct. Additionally, reliability analyses were run and coefficient alphas were configured for each subscale. Coefficient alpha represents internal consistency reliability, which is the extent that items are highly intercorrelated suggesting that they measure the same thing (28). A coefficient alpha equal to or greater than .70 is generally considered acceptable and thus represents reliable factors. Therefore, it appears that some of the factors may not be as reliable for measuring what is intended (feeding behaviors) within this specific sample.

TABLE 3. DESCRIPTIVE STATISTICS (N=299)

Variables	Mean	SD	Range	Alpha
Parental Control	3.99	.489	1-5	.67
Child's Food Responsiveness	1.50	.81	0-4	.74
Child's Desire to Drink	2.62	1.08	0-4	.77
Maternal Restriction	3.77	.82	1-5	.64
Maternal Pressure to Eat	3.58	.89	1-5	.54
Maternal Concern for Child's Weight	2.44	1.37	1-5	.81
Structured Feeding	2.86	.44	0-4	.47

WHP Correlations for the 7 Constructs: Pearson correlation coefficients were calculated between each of the average construct scores and child's weight for height percentile (WHP) and are described below in Table 4.

TABLE 4. CORRELATIONS BY CONSTRUCT AND WHP

Construct Name	WHP	Parental Control	Child's Food Responsiveness	Child's Desire to Drink	Maternal Restriction	Maternal Pressure to Eat	Maternal Concern for Child's Weight
Parental Control	.102		-.049	-.167**	.222**	.056	.096
Child's Food Responsiveness	-.006			.363**	.171**	.147*	.164**
Child's Desire to Drink	-.075				.123*	.157**	-.011
Maternal Restriction	.006					.307**	.288**
Maternal Pressure to Eat	-.179**						.190**
Maternal Concern for Child's Weight	.081						
Structured Feeding	.077	.555**	-.201**	-.299**	-.006	-.018	-.051

*p<.05
**p<.001

Maternal pressure to eat significantly correlated with WHP in this sample (r = -.179, p<.001). This finding indicates that lower WHP is associated with higher scores on the maternal pressure to eat construct and suggests that parents of children with lower WHP report using more pressure to get their children to eat. This is consistent with the results of Birch et al., who, in a sample of 394 parents of females aged 5-9 years, found a significant negative correlation between child

weight status and maternal pressure to eat (12). Spruijt-Metz and colleagues revealed a significant negative correlation between total fat mass assessed by dual-energy X-ray absorptiometry (DEXA) and maternal pressure to eat after controlling for maternal concern for child's weight (16).

Additionally, in previous work, Birch and colleagues have found marginally significant correlations with child weight status and maternal restriction ($r=.13$, $p=.06$), with parents of heavier children reporting use of more restriction in their feeding practices. Restricting children's access to "junk" food and snacks increased their intake of these foods when parental monitoring was removed (12, 29, 30, 31). The prevailing theory is that maternal food restriction may be a causal factor in childhood obesity because children become unable to develop appropriate internal cues for food intake regulation based on the imposition of external cues in their environment (i.e. maternal restriction). Similarly, in a sample of 120 mothers of both Caucasian (N=74) and African American (N=46) youth ranging in age from 7-14 years, maternal food restriction ($r=.26$, $p<.001$) and maternal concern for child weight ($r=.53$, $p<.001$) correlated significantly and positively with total fat mass (16). Our data obtained from a sample of 299 African American caregivers of preschoolers age 2-5 years did not reveal a significant correlation between child weight status and maternal restriction nor a correlation between child weight status and maternal concern for child weight.

FUTURE RESEARCH:

Factor Analysis: Preliminary findings from a planned factor analysis with a varimax rotation resulted in an eight factor solution for 22 items retained with eigenvalues greater than 1. A planned factor analysis was chosen in an attempt to confirm previously specified factors or constructs identified in the literature within a sample of low income African American caregivers of preschool children. A varimax rotation was chosen because it is the most common orthogonal rotation method and maximizes the variance of the squared loadings (28). Items were retained if they loaded at or above .40 on a single factor and the difference was greater than .20 between that factor loading and any other loading on another factor. Two factors had 4 items, two factors had 3 items, and 4 factors had 2 items. Table 5 provides a summary of the factors with corresponding items. The final factor structure accounted for 66.5% of the variance in item responses. Some of the factors were renamed to reflect the items retained within each construct. Child's food responsiveness (Factor 1), maternal concern for child's weight (Factor 2), maternal restriction (Factor 4), and child involvement in food preparation (Factor 5) all had coefficient alpha's above .70 ranging from .74-.81. Maternal control (Factor 3), eating environment (Factor 6), maternal presence during meal (Factor 7), and maternal pressure to eat (Factor 8) all had coefficient alpha's above .50 but below .70. Seventeen PFQ2 items were eliminated as they failed to load onto a factor (Table 6).

TABLE 5. ITEMS RETAINED BASED ON FACTOR ANALYSIS (N=22)

FACTOR	NEW CONSTRUCT	ITEMS	ORIGINAL CONSTRUCT
1	**Child Food Responsiveness**	1. If allowed to, my child would eat too much 2. Even if my child is full, s/he finds room to eat his/her food 3. Given the choice, my child would eat most of the time 4. If given the chance, my child would always have food in his/her mouth	Child's Food Responsiveness (Wardle, 27)
2	**Maternal Concern for Child's Weight**	1. How concerned are you about your child eating too much when you are not around him/her? 2. How concerned are you about your child having to diet to maintain a desirable weight? 3. How concerned are you about your child becoming overweight?	Maternal Concern for Child's Weight (Birch, 12)
3	**Maternal Control**	1. I decide how many snacks my child should have 2. I decide when it is time for my child to have a snack 3. I decide the times when my child eats his/her meals 4. I decide what my child eats between meals	Parental Control (Wardle, 11)
4	**Maternal Restriction**	1. If I did not guide or regulate my child's eating, s/he would eat too many junk foods 2. If I did not guide or regulate my child's eating, s/he would eat too much of his/her favorite foods	Maternal Restriction (Birch, 12)
5	**Child Involvement in Food Preparation**	1. I allow my child to choose which foods to have for meals 2. How often does your child pick out what you will prepare for him/her at mealtime?	Parental Control (Wardle, 11) Structured Feeding (CCHMC)
6	**Eating Environment**	1. How often does your child eat in a bedroom? 2. I allow my child to wander around during a meal	Structured Feeding (CCHMC) Parental Control (Wardle, 11)
7	**Maternal Presence During Meal**	1. How often do you and your child sit down and eat together? 2. How often do you sit down with your child while he/she is eating (even if you are not eating)?	Structured Feeding (CCHMC)
8	**Maternal Pressure to Eat**	1. My child should always eat all of the food on his/her plate 2. If my child says "I'm not hungry", I try to get him/her to eat anyway	Maternal Pressure to Eat (Birch, 12)

TABLE 6. ITEMS ELIMINATED BASED ON FACTOR ANALYSIS (N=17)

CONSTRUCT NAME	ITEMS
Parental Control (Wardle, 11)	5. I allow my child to decide when s/he has had enough snacks to eat 6. I let my child decide when s/he would like to have his/her meal 7. I let my child eat between meals whenever s/he wants 8. I insist my child eats meals at the table
Child's Food Responsiveness (Wardle, 27)	1. My child always asks for food
Child's Desire to Drink (Wardle, 27)	1. If given the chance, my child would always be having a drink 2. If given the chance, my child would drink continuously throughout the day
Maternal Restriction (Birch, 12)	1. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, pastries) 2. I have to be sure that my child does not eat too many high fat foods 3. I have to be sure that my child does not eat too much of her favorite foods 4. I intentionally keep some foods out of my child's reach 5. I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior 6. I offer my child her favorite foods in exchange for good behavior
Maternal Pressure to Eat (Birch, 12)	1. I have to be especially careful to make sure my child eats enough 2. If I did not guide or regulate my child's eating, she would eat much less than she should
Structured Feeding (CCHMC)	1. Over the past month, how often does your child eat outside your home at some kind of restaurant (including a fast food restaurant)? 2. How often does your child get something to eat or drink him/herself without asking permission?

There is some consistency between the factor structure of the PFQ2 and the constructs of the Child Feeding Questionnaire (12), the Parent Feeding Style Questionnaire (11), and the Children's Eating Behaviour Questionnaire (27) when tested in our sample of African American caregivers of preschool aged children aged 2-5 years. Four out of 5 items loading on food responsiveness (Factor 1) are the same items that make up the construct food responsiveness on the CEBQ (27). The construct concern for child's weight (Factor 2) is consistent with the CFQ (11). Two out of four items comprising the construct pressure to eat from the CFQ (12) load onto pressure to eat (Factor 8) of the PFQ2. Four out of ten items of the control construct (Factor 3) are consistent with the control construct of the PFS (11). Two of eight items on the restriction construct (Factor 4) are consistent with the restriction construct of the CFQ (11). The construct desire to drink from the CEBQ (27) did not result in a stable factor. The items retained from the a priori construct named structured feeding loaded onto three different factors (5, 6, and 7) with items from Wardle's control construct. This suggests that items thought to reflect specific feeding behaviors previously validated in predominately Caucasian populations by Birch and Wardle may reflect different aspects of feeding and the eating environment in this sample of low income African American caregivers of preschoolers. When data from our sample was factor analyzed, some of the items loaded on the same constructs that both Birch (12) and Wardle (11, 27) developed. However, among our sample, several of the items were classified into new constructs (factors) as described in Table 6. In addition, some items were eliminated because a relationship could not be detected between those particular items and the other items. This suggests that the eliminated items, which had the greatest response variance, did not represent the latent construct very well in this sample.

Comparison to Prior Studies: Based upon published literature regarding mother-child feeding relationships (11, 12, 27) we will be examining how the results from our population compare to their work. Table 7 shows some preliminary comparisons.

TABLE 7. MEAN SCORES FROM PFQ2 COMPARED TO WARDLE (11, 27) AND BIRCH (12)

Construct	PFQ2 Mean	Wardle Mean	Birch Mean	Mean Difference	Possible Range
Parental Control	3.99	4.0	--	-.01	1-5
Child's Food Responsiveness	1.50	2.35*	--	-.85	0-4
Child's Desire to Drink	2.62	2.75*	--	-.13	0-4
Maternal Restriction	3.77	--	4.0	-.23	1-5
Maternal Pressure to Eat	3.58	--	2.5	1.08	1-5
Maternal Concern for Child's Weight	2.44	--	2.3	.14	1-5
Structured Feeding	2.86	--	--	--	0-4

***** average > 1 sample from prior reports

Comparisons based on WHP using variables from PFQ2 listed in Table 3: Based on the 2000 CDC growth data, 28 preschoolers were above the 95th percentile (BMI for age) in our sample. Therefore, we have limited power to detect differences between the weight categories described in Table 2. A One Way Analysis of Variance (ANOVA) was conducted to evaluate group differences on the factor scores. There were no significant differences between groups on any of the factor scores. In an attempt to increase our group sample size we aggregated the data of subjects with WHP between 85-94th and WHP $\geq$ 95th percentiles (at risk/overweight) and

compared them to the normal weight group (defined as WHP >5th and < 85th percentile). An independent samples t-test was conducted to detect difference between the normal weight preschoolers and the combined at risk/overweight group. A significant difference was detected for concern for child's weight [t (118) = 2.29, p<.05]. Caregivers of at risk and overweight preschoolers reported more concern for child weight status (M=2.75, SD=1.46) than caregivers of normal weight preschoolers (M=2.30, SD = 1.31). No additional differences were revealed.

Previous studies published by Wardle and colleagues and Birch and colleagues (11,12, 27) have employed the 1978 CDC/WHO growth charts for categorizing and comparing youth weight for height percentiles. Thus, to maintain consistency when comparing our findings with prior work, we also analyzed the data with the 1978 norms. These norms yielded a larger sample of children in the overweight and at-risk categories. A One Way Analysis of Variance (ANOVA) was conducted to evaluate group differences on the factor scores. One significant group difference was detected [F (3, 291) = 3.44, p<.05] for pressure to eat. Post hoc tests indicate that caregivers of underweight (WHP $\leq$ 5th percentile) preschoolers (M=4.13, SD= .86) report using more pressure to facilitate eating behavior than caregivers of overweight (WHP$\geq$ 95th percentile) preschoolers (M= 3.28, SD=.83). An independent samples t-test was conducted to detect difference between the normal weight preschoolers and the combined at risk/overweight group. A significant difference was detected for concern for child's weight [t (284) = 2.13, p<.05]. Caregivers of at risk and overweight preschoolers reported more concern for child weight status (M=2.73, SD=1.46) than caregivers of normal weight preschoolers (M=2.32, SD = 1.33). No other significant differences were indicated between caregivers of underweight preschoolers and either normal weight or at risk preschoolers.

CONCLUSION:

These findings offer additional information regarding the contribution of environmental factors in the etiology of childhood obesity. Interestingly, the findings do not appear to implicate feeding practices in relation to childhood obesity in this sample of African American preschoolers. However, since coefficient alpha's for the questionnaire were below 0.70 for 4 out of 7 factors, caution is advised when interpreting these results as it is possible that the constructs used to evaluate feeding practices may not be the most optimal for use with African American populations. It may be that mothers do not understand the questions and constructs in the way intended by the developers of the questionnaire. For instance, recent analysis of 7 interviews conducted as part of the development of the PFQ2 revealed that questions were interpreted by respondents to mean something other than what was intended (Jain et al., in press). Therefore, it is possible that although certain behaviors and feeding practices may be present, they are not being adequately captured by the survey questions. Further research needs to be conducted to ensure accurate assessment of feeding practices in multicultural populations before concluding that there is no association with child weight status. In addition, further research needs to be conducted using a larger sample of overweight children to compare the findings against those of normal weight.

References

1. Chagnon Y, Perusse L, Weisnagel S, Rankinen T, Bouchard C. The human obesity gene map: the 1999 update. *Obes Res*. 2000;8:89-117.

2. Hill JO, Trowbridge FL. Childhood obesity: future directions and research priorities. *Pediatrics*. 1998;101:570-574.

3. Kohl HW, Hobbs KE. Development of physical activity behaviors among children and adolescents. *Pediatrics*. 1998;101:549-554 (suppl).

4. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. *Pediatrics*. 1998;101 (suppl):539-549.

5. Satter EM. Internal regulation and the evolution of normal growth as the basis for prevention of obesity in children. *J Am Diet Assoc*. 1996;96:860-864.

6. Satter E. The feeding relationship: problems and interventions. *J Pediatr*. 1990;117:S181-S191.

7. Drucker RR, Hammer LD, Agras WS, Bryson S. Can mothers influence their child's eating behavior? *J Dev Behav Pediatr*. 1999;20:88-92.

8. Klesges RC, Coates TJ, Brown G, et al. Parental influences on children's eating behavior and relative weight. *J Appl Behav Anal*. 1983;16:371-378.

9. Klesges RC, Malott JM, Boschee PF, Weber JM. The effects of parental influences on children's food intake, physical activity, and relative weight. *Int J Eat Disord*. 1986;5:335-346.

10. Wardle J, Guthrie C, Sanderson S, Birch L Plomin R. Food and activity preferences in children of lean and obese parents. *Int J Obesity*, 2001;25:971-977.

11. Wardle J, Sanderson S, Guthrie CA, Rapoport L, Plomin R. Parental feeding style and intergenerational transmission of obesity risk. *Obesity Research*, 2002;10:453-462.

12. Birch LL, Fisher JO, Grimm-Thomas K, Markey CN, Swayer R, Johnson SL. Confirmatory factor analysis of the child feeding questionnaire: a measure of parental attitudes, beliefs, and practices about child feeding and obesity proneness. *Appetite*, 2001;36:201-210.

13. Birch LL, Zimmerman SI, Hind H. The influence of social-affective context on the formation of children's food preferences. *Child Dev*. 1980;51:856-861.

14. Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr*. 1999;69:1264-1272.

15. Fisher JO, Birch LL. Restricting access to foods and children's eating. *Appetite*. 1999;32:405-419.

16. Spruijt-Metz D, Lindquist CH, Birch LL, Fisher JO, Goran MI. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002;75:581-586.

17. MMWR. Update: prevalence of overweight among children, adolescents, and adults--United States, 1988-1994. *JAMA*. 1997;277:1111.

18. Campaigne BN, Morrison JA, Schumann JC, et al. Indexes of obesity and comparisons with previous national survey data in 9- and 10-year-old black and Caucasiangirls: The National Heart, Lung, and Blood Institute Growth and Health Study. *J. Pediatr*. 1994;124:675-680.

19. Kuczmarski R, Flegal K, Campbell S, Johnson C. Increasing prevalence of overweight among US adults: the National Health and Nutrition Examination Surveys, 1960 to 1991. *JAMA*. 1994;272:205-211.

20. Bentley M, Gavin L, Black MM, Teti L. Infant feeding practices of low-income, African-American adolescent mothers: an ecological, multigenerational perspective. *Soc Sci Med*. 1999;49:1085-1100.

21. Underwood S, Pridham K, Brown L, et al. Infant feeding practices of low-income African American women in a central city community. *J Community Health Nurs*. 1997;14:189-205.

22. Bronner YL, Gross SM, Caulfield L, et al. Early introduction of solid foods among urban African-American participants in WIC. *J Am Diet Assoc*. 1999;99:457-461.

23. Baughcum AE, Powers SW, Johnson SB, Chamberlin LA, Deeks CM, Jain A, Whitaker RC. Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *Dev Beh Ped*. 2001;6:391-408.

24. Jain A, Sherman, SN, Chamberlin, LA, Whitaker RW. Mothers misunderstand questions on a feeding questionnaire. *Appetite*. In Press.

25. Jobe J, Mingay D. Cognitive laboratory approach to designing questionnaires for surveys of the elderly. *Public Health Reports*. 1990;105:518-24.

26. Jobe J, Mingay D. Cognitive research improves questionnaires. *Am J Public Health*. 1989;79:1053-55.

27. Wardle, J, Guthrie, C, Sanderson, S, Rapoport, L. Development of the children's eating behaviour questionnaire. *J Child Psychol*, 2001;42:963-970.

28. DeVellis, RF. (1991) Scale development: Theory and Applications. Newbury, California: Sage.

29. Birch, LL, Fisher, JO. Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr,* 2002; 71:1054-61.

30. Birch, LL, Fisher, JO, Davison, KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls eating in the absence of hunger. *Am J Clin Nutr,* 2003;78:215-20.

31. Francis, LA, Hofer, SM, Birch, LL. Predictors of maternal child-feeding style: maternal and child characteristics. *Appetite,* 2001;37:231-243.