My Child at Mealtime: A Visually Enhanced Self-Assessment of Feeding Styles for Low-Income

Parents of Preschoolers

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Acknowledgements: Funding provided by USDA-NIFA-National Research Initiative 2009-55215-05019. The authors thank Larissa Leavens and Christine Davidson for their valuable assistance with data collection, Lynn-Kai Chao and Kathi Sylva for photography work, SETA Head Start of Sacramento, CA and the families who participated, and Dr. Sheryl Hughes for her consultation and feedback.

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Obesity rates for preschool-age children have dramatically increased in the last two decades. In the U.S., obesity rates in 2 to 5 year olds have risen continuously since 1980 (Fryer, Carroll, & Ogden, 2012). While the most recent data reflects a significant decline in this rate, down to 8% from the previous peak of more than 12% in 2010 (Ogden, Carroll, Kit, & Flegal, 2014), the rates remain high for African American (11.3%) and Hispanic (16.7) 2 to 5 year olds. Furthermore, low-income children this age demonstrate an even higher rate of obesity (14.4% of 2 to 4 year olds) than the general population (10.4% of all U.S. 2 to 5 year olds) (Dalenius, Borland, Smith, Polhamus, & Grummer-Strawn, 2012). Such statistics reflect an ongoing need for obesity prevention intervention efforts tailored for low-income ethnically diverse families with young children. A report by the Institute of Medicine (2011) notes that the environmental conditions in which these obesity trends are established start early in life and are largely influenced by parents and other adults that care for young children. As such, there has been an increased interest in understanding the processes by which parenting contributes to the development of obesity in young children (Sleddens, Gerards, Thijs, DeVries, & Kremers, 2011), and incorporating parent education into prevention intervention programs for parents of young children (Gerards, Sleddens, Dagnelie, De Vries, & Kremers, 2011).

Recent efforts toward understanding parent contributions to child obesity have differentiated between general parenting styles and parenting practices related to feeding, with each making significant yet distinct contributions to the development of children's dietary behaviors. In contrast to parenting practices which focus on directly influencing what a child eats (e.g. restriction of food, serving fruits and vegetables, pressure to eat), general parenting is

considered the “style” that parents adopt in their interactions with their children and is considered to set the contextual emotional environment in which specific interactions between parents and children take place (Darling & Steinberg, 1993). Parents can fall into one of four general parenting “styles” based on two dimensions: demandingness (i.e. attempts to control children’s behavior: high or low control) and responsiveness (i.e. acceptance of children’s demands and needs: child-centered or parent-centered) (Maccoby & Martin, 1983). Based on ratings of parents’ behaviors with their children on these two dimensions, parents can be classified as “authoritative”, “authoritarian”, “permissive”, or “neglectful.” In this model, authoritative parenting, characterized by demandingness high in control balanced with child-centered responsiveness, is considered to be the most beneficial to engendering positive development across a wide range of outcomes (Maccoby & Martin, 1983). In contrast, authoritarian (i.e. high control demandingness, parent-centered responsiveness), permissive (i.e. low control demandingness, child-centered responsiveness), and neglectful (i.e. low control demandingness, parent-centered responsiveness) are associated with less positive social and cognitive outcomes for children (Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). There is mounting empirical evidence for positive associations between authoritative general parenting and a host of positive diet-related outcomes in children, such as higher fruit/vegetable consumption, lower caloric intake, and in some studies, lower BMI (see Sleddens et al., 2011 for a review).

Hughes and colleagues expanded on Maccoby and Martin’s (1983) original conceptualization of parenting styles by applying the typology to styles of feeding (Hughes, Power, Fisher, Mueller, & Nicklas, 2005). In this work they developed the Caregiver’s Feeding Styles Questionnaire (CFSQ), which can be used to identify styles of parent feeding that mirror

the traditional typology of parenting styles. The styles are based on two primary dimensions of feeding: demandingness (degree to which parents try to get their children to eat) and responsiveness (degree to which child-centered strategies are used to get children to eat). Parents classified as authoritative are high on both dimensions (i.e. they use child-centered strategies to get their children to eat) where authoritarian parents are high demand/low responsiveness (i.e. they use parent-centered strategies to get their children to eat), indulgent parents are low-demand/high responsiveness (i.e. they use child-centered approaches but do not set limits on their children's food access or eating), and uninvolved parents are low on both. Researchers utilizing the CFSQ have found feeding styles to be significant predictors of children's dietary behaviors and weight status (see Vollmer & Mobley, 2013 for a review).

The mounting evidence for associations between parenting styles, feeding styles, and children's dietary behaviors and weight status has led to wider implementation of interventions that promote authoritative general parenting and feeding styles (Gerards et al., 2011). However, the emerging evidence of the effectiveness of these approaches is somewhat mixed, leading to calls for more refined efforts (e.g. Kuhl, Clifford, & Stark, 2012). To improve these efforts with ethnically diverse low-income audiences, more studies aimed at understanding the unique contextual predictors and barriers to adopting positive feeding styles are needed. While the CFSQ has been widely used successfully in empirical research with low-income samples, the high reading level (Flesch-Kincaid grade level = 7.1) limits its utility as a self-administered tool with low-income parents given that education and literacy levels are limited (Green et al., 2009; Kirsch, Jungeblut, Jenkins, & Kolstad, 1993). However, self-assessment tools are something that researchers working in group-based programmatic settings often need (Townsend, Sylva, Martin, Metz, & Wooten Swanson, 2008). In addition, the CFSQ does not assess routine structure (e.g.

meals about the same time each day) within the home environment. There is emerging empirical support for this construct as a modifiable domain within parental control (Anderson & Whitaker, 2010) and thus should be included as a target of interventions with families of young children (Kuhl et al., 2012).

To improve the capacity to reliably assess feeding styles with caregivers of young children across a variety of settings, self-assessment tools that reflect ethnic diversity and low-literacy demands are needed (Ontai, Ritchie, Williams, Young, & Townsend, 2009; Townsend, Young, Ontai, Ritchie, & Williams, 2009). The current paper reports on the development of My Child at Mealtime (MCMT), a visually enhanced self-assessment tool to measure feeding styles of caregivers with preschool aged children, with items modeled after the CFSQ and expanded to include questions about structure and routine within the home environment. The multistage development process includes assessments of face validity and consistency with the CFSQ with ethnically diverse, low-income parents of preschool-aged children. Given that literacy is an issue for many low-income adults (Kirsch et al., 1993), MCMT draws from visual information processing theories in the design by incorporating ethnically diverse visual depictions of the behavior being addressed by each item. This technique has been shown to improve readability indices and learner understanding, while enhancing reliability and validity (Townsend et al., 2008). The validity of these visual enhancements is also assessed as part of the current paper. We expect that the final tool will measure the demandingness and responsiveness dimensions of parenting in a manner consistent with the existing CFSQ assessment tool, with the added family structure and routine items reflecting an additional dimension.

Method

Participants and Procedures

Cognitive interviews. A sample of 44 low-income, ethnically diverse (41% Hispanic, 21% African-American, 21% Caucasian, and 17% other) English-speaking parents were recruited from local area Head Start sites to complete cognitive interviews of the MCMT survey items. All interviews were conducted in English.

Individual interviews were conducted at the Head Start site where the parent's child was enrolled. The items tested were from the CFSQ (Hughes et al., 2005) with the addition of 8 potential items to assess the structure and routine of the mealtime environment. Parents were asked to review sub-sets of items with an interviewer using open-ended questions in order to improve readability and face validity (Banna, Becerra, Kaiser, & Townsend, 2010). For each item in the sub-set being tested, the interviewer asked parents to respond in their own words to the following prompts: "What do you think the question is asking?", "How would you answer the question?", "What would this behavior look like in your house?", "How would someone who parented differently from you answer the question?" and "What would the behavior look like in that house?" In cases where responses indicated misinterpretations of researcher intent, parents were told the intent of the question and asked to come up with their own wording to represent it. An iterative process was utilized whereby questions were re-worded based on the cognitive interviews, and then the new wording tested with different parents in subsequent interview sessions (see BLINDED FOR REVIEW, 2014 for a detailed report of the interview process).

In addition to question wording, the interviews also solicited parent input on visuals to accompany each survey question. Interviewers asked parents for suggestions of visuals that would capture the intent of the question while reducing the need for additional wording. To capture real life situations that parents would find relatable, families from Head Start were recruited for photographs and whenever possible, photographs were taken in their homes. As

with the question wording, individual photographs were paired with questions and items were re-tested until consensus on an appropriate visual was reached. The readability of the completed survey was assessed using the Flesch-Kincaid readability index (Flesch, 1948).

Surveys. The visually enhanced survey resulting from the cognitive interviews was delivered to 119 low-income (participated in at least one federal assistance program), English-speaking parents (88.2% female, mean age = 33.73 years) of preschool aged children recruited from 8 Head Start and other day-care center locations operating in low-income neighborhoods in two mid-sized cities in Northern California. Families who participated in the cognitive interviews did not complete the final survey. Participants self-identified as White (28.3%), Black (17.3%), Hispanic or Latino (37%), American Indian (2.4%), Asian or Pacific Islander (8.7%) or other race (3.4%). Fifty-three percent indicated that they were married or cohabitating with a partner. The sample varied in educational status with 21.8 percent having less than a high school diploma, 26.9 percent having a high school diploma or equivalent, 39.3 percent having some college, and 10.2 with a bachelor's degree. Most participants (57%) spoke English as a primary language in the home but all indicated that they were comfortable enough with speaking and reading English to complete the questionnaire.

Surveys were completed by parents at their child's Head Start center either directly after drop-off or before pick-up. Parents were instructed to think of a child at home between the ages of 3 and 5 and fill out the questionnaire with that child in mind. If parents had more than one child between the ages of 3 and 5 they were asked to select only one child to be the focus of the survey. Parents were encouraged to ask questions if they were unsure of any items.

Results

Face validity and readability. Cognitive interviews (N = 44; BLINDED FOR REVIEW, 2014) revealed that the resulting version (see Table 1) of the client-driven assessment tool, *My Child at Mealtime* (BLINDED FOR REVIEW, 2011) is accessible to the target audience, and has consistent face validity. The interviews resulted in several changes to the response scale. First, the original 5-point scale was reduced to 4-points, eliminating the option for “never” based on participant reluctance to select the option for any of the items, and preference for the option “no/rarely.” Similarly, the option “always” was changed to “very often” due to participant reluctance to select it even when their interview indicated they engaged in the behavior on a regular basis. Participant feedback also resulted in the modification of the option “most of the time” to be altered to read “often.” Participants indicated perceiving these two wording options as equivalent. Thus, the option with the reduced literacy demand was selected. The final tool includes a 4-point response scale for all items (1=no/rarely; 2=sometimes; 3=often; 4=very often).

The addition of visuals allowed the text of the individual items to be reduced significantly, resulting in an average item Flesch-Kincaid Readability Index of grade 2.3 (range 0.50 to 6.8), reduced from an item average of 7.1 (range 0.50 to 12.5) in the CFSQ. For example, the original item “Encourage the child to eat by arranging the food to make it more interesting (for example, making smiley faces on the pancakes)” (Flesch-Kincaid = 11.2) was reworded as “I get my child to eat by making food fun” (Flesch-Kincaid = 1.2) with the accompanying visual depicting fun food arrangements (e.g. vegetables arranged in a smile) and children involved with meal preparation (e.g. child ripping lettuce for salad). With the pictures added, parents reported the resulting visually-enhanced tool: captured their attention, was easy to

read, had pictures that helped them understand the text, and made them think about their parenting. The average time for parents to complete the resulting tool was 15 minutes.

Response distributions. Mean levels of individual item responses from the 119 participants who completed the resulting tool ranged from 1.39 to 3.42 with a minimum possible score of 1 and a maximum score of 4. All items were well distributed and thus kept for further analyses.

Table 1 *Resulting Individual Items for My Child at Mealtime*

1. ^a	I get my child to eat by explaining that the food is good for him.
2. ^b	My child sits and eats with an adult.
3. ^a	I tell my child she will get a treat for eating.
4. ^b	I plan meals.
5. ^a	I ask my child to try a little bit of a new food.
6. ^a	I remind my child to keep eating her food.
7. ^a	I prepare at least one food that I know my child will eat.
8. ^a	I praise my child for eating.
9. ^a	I help my child with eating (cut food, cool the food).
10. ^a	I get my child to eat by making food fun.
11. ^a	I tell my child he will get in trouble for not eating (no toys, time out).
12. ^a	My child eats a snack at about the same time every day.
13. ^b	My child eats dinner at about the same time every day.
14. ^a	I struggle with my child to get her to eat (pick her up and put her in the chair).
15. ^a	I warn my child he will not get a treat if he does not eat.
16. ^a	I say good things about the food my child is eating.

17. ^a	I ask my child to pick from foods already cooked.
18. ^a	I hand-feed my child to get her to eat.
19. ^a	I say to my child, “Hurry up and eat your food”.
20. ^a	I tell my child that she needs to eat an item on her plate (“Eat your chicken”).
21. ^a	I tell my child I do not like it that he is not eating.
22. ^a	I ask my child questions about the food she is eating.
23. ^a	I let my child serve himself.
24. ^a	I tell my child that I will reward her for eating with TV, playtime, or videogames.
25. ^b	A TV is on when my child eats.
26. ^b	My child skips meals.
27. ^a	I beg my child to eat his food.

189 ^a Items modeled after original CFSQ items; ^b Items added to assess family structure and routine

190 **Exploratory factor analyses.** Analysis of factor structure was conducted using MPlus
 191 5.2 (Muthén & Muthén, 2009) (see Table 2). Exploratory factor analysis of the 27 items
 192 utilizing a maximum likelihood estimator and varimax rotation resulted in a two factor structure
 193 similar to that reported for the original CFSQ (Hughes et al., 2005). The first factor (14 items)
 194 assessed child-centered strategies such as reasoning about the food and praising the child. The
 195 second factor (12 items) assessed parent-centered strategies such as physically struggling with
 196 the child to eat. Item 25, “A TV is on when my child eats” did not load on either factor and was
 197 therefore eliminated. The resulting Cronbach’s alpha reliability statistics were .795 and .833 for
 198 the child-centered and parent-centered factors, respectively. As expected the final two factors
 199 were significantly, although not highly, correlated at .165 ($p < .05$). Apart from the additional
 200 structure items, the factor loadings are identical to the original CFSQ items except for item 5, “I

ask my child to try a little bit of new food” (original CFSQ wording, “Tell the child to eat at least a little bit of food on his or her plate”), which loads onto the current child-centered factor where it did not in the CFSQ. Contrary to expectations, the additional structure and routine items (2, 4, 12, 13, & 26) loaded on the child-centered factor rather than as a third, independent factor.

Table 2 *Resulting factor structure of My Child at Mealtime.*

Item #	Factor One ($\alpha = .79$) “Child Centered”	Factor Two ($\alpha = .83$) “Parent Centered”
1	.451	.087
2 ^a	.523	-.236
4 ^a	.532	-.148
5	.505	.039
7 ^a	.425	.142
8	.447	.182
9	.302	.246
10	.581	.119
12 ^a	.385	-.177
13 ^a	.517	-.137
16	.577	.050
17	.369	.124
22	.559	.123
23 ^a	.415	.048
3	.120	.471
6	.233	.586

11	.146	.531
14	-.023	.587
15	.219	.545
18	-.014	.528
19	.055	.397
20	.141	.576
21	-.049	.668
24	.127	.604
26	-.192	.359
27	-.255	.556
25	-.159	.226

^aNew items added to original CFSQ items

The scores on each of these sub-scales can be used on their own to assess relative associations between child-centered and parent-centered feeding behaviors with outcomes of interest. Alternatively, a proportion score of child-centered feeding behaviors to overall feeding behaviors can be derived to create an overall score across all the items that reflect the extent to which parents use child-centered approaches in their feeding interactions. Such an approach may be beneficial for smaller sample sizes whereby the distribution of participants across the four feeding style categories (detailed below) may be limited.

Feeding styles. To parallel the CFSQ, feeding style categories were derived following the method described by Hughes and colleagues (Hughes et al., 2005). The total mean of the final 26 items was calculated to determine a “demandingness” score reflecting the degree to which parents report doing something to encourage or discourage children’s eating behaviors.

The proportion of these behaviors for which parents use child-centered strategies is then calculated by taking the mean of the child-centered items and dividing it by the mean of the 26 items (i.e. demandingness) to derive a “responsiveness” score. While cutoff points have been established for the original CFSQ (Hughes et al., 2012), the alteration of the response scale from 5 points to 4 precludes their use for MCMT. Thus, the original process of calculating median splits for demandingness and responsiveness was followed (1.23 and 2.31 respectively). Scores above the median were considered “high” while scores below the median were considered “low.” High and low categories were then combined to create four dimensions consistent with Maccoby and Martin’s original conceptualization (1983): authoritative (high on both), authoritarian (low responsiveness, high demandingness), indulgent (high responsiveness, low demandingness), and neglectful (low on both).

To determine whether the styles reflected in the MCMT tool varied by ethnicity, chi-square analyses were conducted for feeding styles x ethnicity. There was a significant effect of ethnicity across the four feeding styles (Pearson chi-square = 19.321 (df = 9), $p < .05$) suggesting ethnic differences in feeding style classifications (see Table 3). Hispanics/Latinos were most likely to be authoritarian (13.7%) and indulgent (12.0%), whereas Whites and African Americans were more evenly distributed across the categories. The most prominent feeding style in this sample was indulgent, which is consistent with other work focused on low-income families of young children (e.g. Hughes et al., 2011; Hughes, Shewchuck, Baskin, Nicklas, & Qu, 2008). The final assessment tool, with visual enhancements can be found online at

BLINDED FOR REVIEW.

Table 3 *Feeding style by ethnicity.*

Ethnicity	Feeding Style	Total
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	Authoritative	Authoritarian	Indulgent	Uninvolved	
White	9 (7.7%)	5 (4.3%)	11 (9.4%)	9 (7.7%)	34
African American	0 (0%)	8 (6.8%)	8 (6.8%)	7 (6.0%)	23
Latino/Hispanic	5 (4.3%)	16 (13.7%)	14 (12.0%)	9 (7.7%)	44
Other	7 (6.0%)	4 (3.4%)	4 (3.4%)	1 (0.9%)	16
Failed to answer					2
Total	21 (17.9%)	33 (28.2%)	37 (31.6%)	26 (22.2%)	117

Discussion

The results demonstrate that the visually enhanced, self-administered *My Child at Mealtime* survey measures feeding styles in ethnically diverse, low-income parents of preschool aged children in a manner consistent with the CFSQ. The cognitive interviews support the face validity of MCMT with the target population. Factor analysis confirmed a factor structure consistent with previous conceptualizations of parenting styles (Maccoby & Martin, 1983) and feeding styles (Hughes et al., 2005). Specifically, the current results demonstrate that MCMT measures responsiveness and demandingness dimensions of parent feeding, which can be used to identify authoritative, authoritarian, indulgent, and neglectful feeding styles. There was also support for the addition of the “structure” items to the survey. However, they appear to further contribute to the child-centered factor rather than compose a separate dimension of child feeding. Even when these items are included, the factor structure is consistent with that reported for the CFSQ (Hughes et al., 2005).

Further support for the ability of the tool to meaningfully categorize parents by feeding style is evidenced by the pattern of ethnic distribution across the feeding style categories, which is somewhat consistent with those reported in previous studies (Hoerr et al., 2009; Hughes et al.,

2005). For instance, Hispanics in the current sample were more likely to be indulgent and authoritarian. The higher rate of classification of Hispanics into the indulgent feeding style is consistent with previous reports of the feeding styles (Hughes et al., 2005) and practices of Mexican-American parents whereby they tend to use less control and allow children more free access to food in the home (e.g. Melgar-Quinonez & Kaiser, 2004; Kaiser, Melgar-Quinonez, Lamp, Johns, & Harwood, 2001). Tests of the validity of MCMT in predicting child dietary and health outcomes are underway (BLINDED FOR REVIEW, 2014).

The resulting MCMT assessment tool increases the capacity of researchers to quickly assess feeding styles with ethnically diverse, low-income samples. The use of visuals in MCMT allows for complex questions to be posed with significantly reduced literacy demands, decreasing the amount of effort and time respondents must take to process their answers. The tailoring of the visual information to the racial and ethnic make-up of the audience is noteworthy. Participants expressed appreciation that the visuals depicted individuals and families that they could identify with; something several noted they do not usually encounter. As such, the use of visual information in assessments may be particularly useful when effort is taken to represent the specific target audience being assessed. In light of this need, an online visual library was developed to enable the MCMT tool to be tailored to represent specific ethnic groups as well as a range of traditional foods and practices (BLINDED FOR REVIEW, 2014).

Golley and colleagues note that successful child obesity interventions target parents and allow for prompt barrier identification, self-monitoring, and specific goal-setting (Golley, Hendrie, Slater, & Corsini, 2010). MCMT is a tool that meets these criteria by actively engaging parents in reflecting on their parenting and the barriers existing in their environments. Intervention components can then be tailored to target key barriers relevant to specific parents or

groups of parents they may be working with. For example, MCMT was used to inform a guided goal setting (GGS) intervention to improve the home dietary environments for young children (Shilts, Sitnick, Ontai, Townsend, 2013). Further tests of the GGS intervention utilizing MCMT on impacting parenting and pediatric obesity are currently underway. Taken as a whole, the results indicate MCMT provides a measure of feeding styles consistent with the CFSQ with this sample of ethnically diverse, low-income parents of preschool aged children. By reducing the literacy demand, the resulting tool enables programs to utilize self-assessments to quickly measure feeding styles with low-income audiences.

Limitations and Future Directions

There are several limitations to the current study worth noting. First, the sample size is relatively small for scale testing. The current study was focused primarily with scale development and feasibility of use of the final tool as a self-assessment with the target audience. Scale testing and further validation of the tool is necessary with a larger sample size to assess its full utility. Likewise, the current sample is somewhat well-educated with almost 50 percent of the sample having at least some college or a bachelor's degree. Future work is needed to determine whether less educated samples would respond in a similar fashion. Such information is important given that obesity prevention programs targeting low-income families, such as the federally funded Supplemental Nutrition Education Assistance Program – Education, and Expanded Food and Nutrition Education Programs, often contain clientele with a diversity of educational backgrounds. A better understanding of potential differences in responses to the tool would be helpful to inform resulting programming based on their scores. Finally, to truly understand how this tool operates across the population as a whole, future studies should test the

301 tool with samples with a diversity of income levels and educational backgrounds and include
302 concurrent assessments of the CFSQ to establish convergent validity.

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