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I. Introduction

Improving the diets of young children and reducing rates of childhood obesity is a major public health priority. In recognition of the important influence of the preschool environment on the health and nutritional status of children in New Haven, the Connecticut Public Health Foundation, the Community Alliance for Research and Engagement, and the Rudd Center for Food Policy and Obesity created the New Haven Preschool Nutrition Initiative in 2008-2009. The purpose of this initiative was to conduct a collaborative, community-based research project with a New Haven preschool. The project included the following steps:

- Conduct a self-assessment on current food policies and feeding practices, and barriers to healthy eating in school, home, and the community. Self-assessment methods include
  - a focus group with parents
  - a self-report parental questionnaire to examine family feeding practices, and parental beliefs and knowledge about nutrition and feeding practices
  - interviews with preschool staff
  - observation of the children at preschool

- Synthesize self-assessment data
  - meet with preschool staff to discuss results
  - develop and provide an evening workshop for parents to address key issues

- Identify promising and feasible interventions to increase children's fruit and vegetable consumption
  - collaborate with preschool staff to identify one strategy to test
  - teach staff how to empirically test an intervention

- Determine measures required to sustain the self-assessment process and identification of new strategies to improve children's nutrition

- Engage parents and preschool staff to utilize existing community resources for families, such as community agencies, faith-based organizations and local health professionals

- Conduct a review of scientific literature of healthy food consumption, health policy and other relevant studies. Compile and publish description of project intervention for dissemination
II. Background

A. The obesity epidemic has reached our youngest citizens

The percentage of children who are overweight or obese has more than tripled over the last three decades. Responding to this crisis, many researchers and interventionists have focused on reducing and preventing obesity among school-aged children and adolescents; however, the obesity epidemic is also affecting preschool-aged children: 12.4% of 2-5 year olds are obese, while thirty years ago only 5.0% were obese (CDC, 2008).

The latest analysis of NHANES data found that, with overweight and obesity combined, nearly a quarter of 2-5 year olds are overweight or obese (Ogden, 2008). As with older children and adults, there are significant racial and socioeconomic disparities in the prevalence of obesity among preschool-aged children. Black and Latino children are more likely to be obese than white children, and low and middle-income children more likely to be overweight than higher income children (Ogden et al., 2008).
B. The Promise of the Preschool Setting

Preschool-aged children are an important population for interventions because children in this age group are at a developmental stage when many food preferences, eating habits, and attitudes toward food are formed. Intervening during this stage and helping to shape children’s attitudes and behaviors may be the most effective method of primary prevention for obesity and other diet-related chronic disease.

With most aspects of child development, an individual child’s behavior can be predicted by a combination of “nature” and “nurture” factors, and this is also true for eating. Genetics are a major factor in determining children’s neophobia, taste sensitivity, and willingness to eat fruits and vegetables (Wardle and Cooke, 2008). The degree to which a child is neophobic is also strongly predictive of their willingness to eat fruits and vegetables; a child’s general enjoyment of food is also related to fruit and vegetable consumption. Very early experiences, such as breastfeeding and early introduction to fruits and vegetables have also been shown to be strong determinants of preschoolers’ intake.

Research indicates that the preschool environment has a major impact on children’s eating and physical activity behaviors. Russell Pate and others (2004) have found that the preschool environment is the single most important factor in predicting how physically active children are, even more than demographics, family influence, or a child’s BMI. The Healthy Start intervention for Head Start food service programs (Williams et al., 2004) demonstrated that training food service staff in how to reduce the saturated fat and sodium content of meals was effective in improving children’s diets and reducing cardiovascular risk factors. Therefore, whether or not the preschool’s policies and practices allow children the opportunity to eat healthy food and to be physically active can have a strong influence on their health and behavior.
C. Preschool Teachers are Key Players

One reason why the preschool environment is an excellent site for interventions is because teacher practices have been shown to have a strong effect on children’s food preferences and attitudes. For example, caregivers who model eating new foods or fruits and vegetables in front of children increase children’s willingness to try them (Hendy and Raudenbush, 2000). Repeatedly exposing a child to a certain food has also been shown in the lab setting to effectively increase children’s willingness to eat that food (Birch, 1990).

Further, when teachers carry out well designed preschool policies about nutrition and physical activity, they have a powerful impact on young children’s diets and exercise habits. The use of food as a reward or a punishment for behavior has been shown to influence a child’s preference for the reward food (usually sweets), as has the use of unhealthy foods for bribing children to eat healthy foods (Schwartz and Puhl, 2003).

Preschool teachers are also committed to complete child well-being. While K-12 teachers view student academic achievement as their primary responsibility, preschool educators tend to view themselves as also being responsible for children’s social, emotional, and physical development.
D. A gateway to parents

The preschool setting is also an important venue for intervention because it provides access to parents of preschool-aged children, a population that is otherwise difficult to reach. Parents may be willing to seek advice about parenting issues from preschool administrators and teachers, and are likely to view preschool educators as respected and trusted sources of knowledge.

Parents, of course, play a huge role in determining preschool-aged children’s diets and food preferences, as they are usually responsible for feeding them. Therefore, parents are an important partner in any intervention dealing with the eating habits of young children. Parental intake of fruits and vegetables is strongly predictive of child intake (Cooke et al., 2003; Wardle et al, 2003), so efforts to increase parental intake of healthy foods should support child interventions.
E. Focus on Fruits and Vegetables

Public health professionals have looked to increasing fruit and vegetable consumption as a means of both reducing obesity and improving overall health. Increased fruit and vegetable intake is associated with reduced obesity (McRory et al., 1999). Researchers hypothesize that fruits and vegetables, which are low in saturated fat and calories and high in fiber and micronutrients, displace foods in the diet that would result in weight gain, such as sugared beverages or processed snack foods high in saturated fat, sodium, and calories and low in fiber. Fruit and vegetable consumption has also been linked with a reduced risk of cardiovascular disease, stroke, diabetes, and some cancers, independent of obesity (Joshipura et al., 2001; Ford and Mokdad, 2000; Willett and Trichopoulos, 1996). Many obesity prevention advocates have argued for a focus on increasing fruit and vegetable consumption as a means of attaining healthy weight rather than focusing on calorie reduction as it results in potentially more health benefits and may have higher adherence rates (Rolls and Drewnowski, 2005; Harvard School of Public Health's Nutrition Source).
II. Design of the New Haven Preschool Nutrition Initiative (NHPNI)

A. Social Cognitive Theory

Figure 1 illustrates the determinants of preschooler vegetable consumption as informed by Social Cognitive Theory.
B. Intervention Design

The intervention was designed to act on the literature- and theory-based determinants described above. As illustrated below, the intervention targets:

- The preschool nutrition environment (policies and practices);
- Teacher self-efficacy to improve the nutrition environment;
- Teacher feeding practices;
- Teacher nutrition knowledge and perceived importance of nutrition;
- Parent nutrition knowledge and perceived importance of nutrition;
- Parent feeding practices; and
- Teacher research skills (as a means of promoting self-efficacy and commitment to a healthy nutrition environment).
The preschool nutrition environment, including policies and practices related to nutrition, are addressed through a self-assessment process with the preschool, incorporating information from parent and teacher focus groups, an interview with the preschool director, questionnaires about parent and teacher feeding behavior, and a meal observation at the school. Based on research showing that the involvement of teachers in their own action research promotes self-efficacy and leads to improved practice (Henson, 2001), teacher self-efficacy is addressed through the involvement of teachers in conceptualizing and conducting an action research project in the classroom; this action research project is designed to act on improving teacher feeding practices, as the goal of the project is for teachers to evaluate a classroom feeding strategy or environmental change.

The action research project also builds off of themes identified during the self-assessment. Teacher nutrition knowledge is acted on through a nutrition workshop tailored specifically to their current levels of knowledge. Parent nutrition knowledge and feeding practices are also targeted through a tailored workshop.

Increasing teachers’ self-efficacy and building their nutrition knowledge and action research skills also makes the NHPNI intervention sustainable. Engaging the preschool director and her teachers in the process of evaluating their programs and practices and helping them build knowledge and skills to do future self-evaluations increases the likelihood that the preschool will continue to work towards an ever-improving nutrition environment.
C. Recruitment

A letter inviting collaboration in the New Haven Preschool Nutrition Initiative was mailed out to 24 preschools in New Haven. This list included sites participating in the USDA Child and Adult Care Food Program (CACFP), Head Start and School Readiness sites, Catholic Charity sites, sites affiliated with Yale University, and small community sites. Four preschools expressed interest: the Farnam Nursery School in the Fair Haven neighborhood of New Haven, the Edith B. Jackson Child Care Program in the East Rock neighborhood, the Montessori School on Edgewood in the Edgewood neighborhood, and the Westville Community Nursery School in the Westville neighborhood. These schools represent four geographically and culturally distinct neighborhoods in New Haven. The Edith B. Jackson program dropped out of the study due to unforeseen scheduling and staffing issues, and the Montessori School on Edgewood requested work on a different intervention later in the year, leaving two preschools remaining.

First Lesson Learned: There is considerable interest in the topic of nutrition among a diverse array of New Haven preschools
D. Timelines

The first step was to meet with the director and create a project timeline. These are illustrated below:

![Farnam Nursery School: Project Timeline]

![Westville Community Nursery School: Project Timeline]
IV. Our Partner Preschools

A. Farnam Nursery School

Farnam Nursery School is located in the Fair Haven neighborhood of New Haven. The preschool program is located within Farnam Neighborhood House, a community center serving the Fair Haven community with a range of other programs for children (e.g., after school care, summer camps, sports teams, and educational programming). Most of the parents identified themselves as Hispanic and reported annual family incomes of less than $50,000; over a third reported incomes of less than $10,000 per year. All of the parents who completed the survey reported they were between 25 and 34 years old. In terms of parental education, the majority of parents reported completed some college or an associate’s degree. Farnam charges tuition based on a sliding scale ranging from $2 - $80 per week. The director noted that most parents pay at the lower end of the scale.

The physical space in which the preschool is located consists of two small rooms with a total space of approximately 300 square feet. The preschool has access to a small, poorly equipped playground across the street, but the director noted that they often do not go to it for safety concerns. Enrollment is limited to a maximum of 15 children. At the time of our study, 11 children were initially enrolled; during the course of the study, two children stopped attending the preschool and a new child enrolled. The school employs two full-time teachers, one of whom is the director, and one half-time paraprofessional helps with after care programs. The program is NAEYC-accredited and a School Readiness site. Three of the children predominantly spoke Spanish at home. The preschool provides morning and afternoon snacks, and parents send in lunches from home.

B. Westville Community Nursery School

Westville Community Nursery School is located in the Westville neighborhood of New Haven. The majority of the Westville parents report a total annual family income of $50,000 or more and most also report having completed a four-year college education or beyond.
Westville serves a School Readiness site and makes an effort to serve families with a range of incomes. The children attending the preschool are predominantly white. Tuition is $10,000 for the year, although a third of the families receive assistance from School Readiness or Care 4 Kids funds. Most parents report being between 35 and 44 years old.

Westville is NAEYC-accredited, with two full-time teachers, two part-time teachers, and one director. All of the staff are educated and have several years of experience. The physical space of the preschool is quite large. Located within a church, the preschool occupies one large room, which has been divided into separate learning stations. The preschool also has a spacious and well-equipped playground. The program serves 26 children, some of whom do not attend every day of the week. Parent involvement is emphasized; families are invited to attend morning meetings and the school maintains a board of overseers made up entirely of parents. The preschool provides a morning snack, but parents generally sign up to make snack for the whole class for each day. If a parent has not signed up for snack, the preschool provides it. No afternoon snack is provided; parents send in lunches.

Demographic information from parent survey

<table>
<thead>
<tr>
<th></th>
<th>Farnam</th>
<th>Westville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0</td>
<td>100% (n=18)</td>
</tr>
<tr>
<td>Black</td>
<td>12% (n=1)</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>88% (n=7)</td>
<td>0</td>
</tr>
<tr>
<td>Parent age</td>
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<td></td>
</tr>
<tr>
<td>Under 35 years old</td>
<td>100% (n=8)</td>
<td>28% (n=5)</td>
</tr>
<tr>
<td>35 years old and over</td>
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<td>72% (n=13)</td>
</tr>
<tr>
<td>Parent education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college or less</td>
<td>100% (n=8)</td>
<td>28% (n=5)</td>
</tr>
<tr>
<td>Some graduate school</td>
<td>0</td>
<td>72% (n=13)</td>
</tr>
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<td>Household income (annual)</td>
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<tr>
<td>$0-24,999</td>
<td>50% (n=4)</td>
<td>5% (n=1)</td>
</tr>
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<td>$25,000-49,999</td>
<td>25% (n=2)</td>
<td>17% (n=3)</td>
</tr>
<tr>
<td>$50,000 and above</td>
<td>0</td>
<td>78% (n=14)</td>
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<tr>
<td>Child’s gender</td>
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<td></td>
</tr>
<tr>
<td>Boy</td>
<td>50% (n=4)</td>
<td>50% (n=9)</td>
</tr>
<tr>
<td>Girl</td>
<td>50% (n=4)</td>
<td>50% (n=9)</td>
</tr>
<tr>
<td>Mean child age (years)</td>
<td>3.5 ± 0.55</td>
<td>3.5 ± 0.45</td>
</tr>
</tbody>
</table>
V. Preschool Self-Assessment

A. Teacher Survey and Results

The project began with the administration of the Beliefs About Children’s Eating Questionnaire (BACE-Q), developed by researchers at the Rudd Center. This self-report questionnaire assesses teachers’ views on the changeability of children’s food preferences and their perceptions of their role in feeding children. It is an 18-item scale of statements about children’s food preferences, with responses on a 5 point Likert scale ranging from 1= “Strongly disagree” to 5= “Strongly agree.” Seven items are reverse-coded. The scale has four subscales: Changeability of Children’s Food Preferences; Influence of School; Need to Change Children's Food Preferences; and Perceptions of Fruits and Vegetables.

Beliefs about eating and weight by Farnam and Westville teachers

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Farnam (mean, sd)</th>
<th>Westville (mean, sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changeability of children’s food preferences</td>
<td>4.0 ± 0.43</td>
<td>4.0 ± 0.60</td>
</tr>
<tr>
<td>Influence of school</td>
<td>4.0 ± 0.91</td>
<td>4.0 ± 1.0</td>
</tr>
<tr>
<td>Whether adults should intervene</td>
<td>3.4 ± 1.13</td>
<td>3.7 ± 0.52</td>
</tr>
<tr>
<td>Importance of fruits and vegetables</td>
<td>4.2 ± 0.97</td>
<td>4.3 ± 0.52</td>
</tr>
</tbody>
</table>

The teachers at both Farnam (n=3) and Westville (n=3) scored similarly to one another on the subscales. At both preschools, the teachers, on average, agree (but not strongly agree) that children’s food preferences can be modified during the preschool years; that there are several influences within the preschool that can play a role in changing children’s food preferences; and that fruits and vegetables are an important part of a preschooler’s diet. Both groups averaged between neutral and agree on the subscale meaning to assess whether adults should intervene in changing children’s food preferences.

Second Lesson Learned:
Preschool teachers believe children’s food preferences can be altered and the preschool plays a fairly important role.
B. Interview with director and focus group with staff

The preschool director was interviewed by Ms. Kenney using a semi-structured interview protocol. The goal of the interview was to collect the director’s perspective on strengths in current nutrition policies as well as challenges to children’s healthy eating.

Ms. Kenney also led a focus group with the preschool’s teachers to assess their:

- perspectives on the quality of the nutrition environment at the preschool
- current nutrition and feeding knowledge
- current nutrition and feeding practices
- concerns about children’s eating
- ideas about what could be done to improve the nutrition environment.

1. Farnam.

The interview was completed by the director and the focus group was attended by all three preschool staff (one paraprofessional, one teacher, and the director, who also teaches). Several key themes emerged from the qualitative data collected from the staff focus group and director interview. First, it became clear that the teachers and director are already quite committed to providing a healthy nutrition environment within the preschool. The director, using NAEYC accreditation policies as a frame, recently implemented firm guidelines for what parents could send in for lunches: lunch must contain foods from at least two different food groups; milk and water are the only beverages allowed (no juice, juice drinks, soda, or energy drinks); fruit must be sent in with each lunch; and candy, cookies, cakes, Jello, other sweets, chips, and other junk “snack” food are not allowed. Nuts are also not allowed due to allergy concerns. The preschool provides milk to children. The center also holds to its own standards with the morning and afternoon snacks it provides, and makes an effort to serve fruits and vegetables and snack time. Both the director and her teachers asserted that the school’s strong policies had helped in improving children’s diets; the director noted that having a written policy was especially
helpful because it made it easier to firmly enforce their guidelines with parents. The teachers believe that the healthy snacks they serve have helped to improve children’s diets, as they may be exposed to fruits, vegetables, and other foods that they are not exposed to in the home.

A second theme that emerged is the teachers’ perception of themselves as playing an important role in keeping children healthy and in the formation of children’s food preferences, which echoed the teachers’ scores on the questionnaire. Farnam’s teachers do not see their roles as being limited only to developing children’s academic skills. Rather, they see themselves as responsible for the whole child, as caregivers responsible for children’s emotional, social, and physical development as much as they are responsible for academic development. While recognizing the primary impact that parents have on children’s development, and also citing the impact of the broader environment (such as mass media, neighborhood, and peers), the teachers believed in their ability to positively and significantly influence children’s health and habit formation.

A third theme that emerged from this data was a strong concern about children’s diets outside of the preschool and the role of parents in feeding children. They reported that children “eat junk” when they are at home (when asked for examples of junk, the teachers cited pizza, McDonald’s, fries, sugary cereals, and chips). They are concerned that the food the children eat at the preschool constitutes the only balanced meals the children will get all day. They are less worried about older parents or those with grandparents, because they think those parents or grandparents serve healthier food (especially grandparents, who may be more likely to cook healthy traditional foods such as beans and rice). They are worried that parents do not have enough time to cook a proper meal as many are working multiple jobs, and so they give the children junk food because it is the most convenient option. The teachers also believe that the children might not be getting enough food for a

Summary: Farnam Staff Focus Groups and Interview Themes

- Commitment to healthy nutrition at the preschool
- Perception of teachers as being an important influence on children’s eating
- Concern about nutrition at home
- Importance of a written policy
nutritionally adequate diet. The director was particularly concerned that parents may be affecting children’s intake because of their own preferences. In other words, she believes that children are not getting exposed to fruits, vegetables, and other healthy foods at home because the parents do not like them themselves and therefore do not purchase or prepare them. The preschool has also had difficulty engaging parents in the past. Although they have tried several strategies for drawing parents into the preschool for workshops (providing meals, providing child care, changing the time of the event to try to accommodate work schedules), they have found that parents are still often unable or reluctant to come into the school.

2. Westville.

The interview with Westville’s director and the focus group with Westville’s teachers revealed several themes. As with the teachers at Farnam, the teachers and director are clearly committed to promoting a healthy food environment. They see healthy feeding practices as part of their role as professionals, reinforcing their scores on the questionnaire. The teachers reported that they feel it is their responsibility to model healthy eating, expose children to a wide variety of foods, teach children how to enjoy foods in moderation, help them acquire socializing skills during mealtimes as well as motor skills related to serving oneself, and build their awareness of their own hunger (“listening to their bodies”). The director and teachers report using recommended feeding practices, such as encouraging, but not forcing, children to try new foods; reducing stress and anxiety at meal times; repeating exposure; and eschewing the use of food as a reward or comparing children’s behavior.

While the Westville teachers were similar to the Farnam teachers in describing the importance of the role of parents, their perception of parents’ attitudes and behaviors was quite different, possibility reflecting the experience of a serving a community with greater economic resources. Teachers felt as though the parents fed their children quite healthily, and in response, Westville’s nutrition guidelines are considerably more relaxed and vague than Farnam’s. Parents are simply instructed to pack a healthy lunch (sandwiches,
leftovers, or crackers and cheese are suggested) and are told they cannot pack sweets of any kind. However, Westville does have a policy banning parents from bringing in cupcakes, cakes, cookies, ice cream, or other sweets for the preschool to share on their child’s birthday. Parents are instead instructed to bring in fruit platters or other healthy treats. Westville’s staff reported having very few problems with parents in terms of complying with the preschool’s nutrition guidelines; they believed that parents only sent in unhealthy items when they were feeling stressed. The director and teachers believe that this good relationship with parents stems from the participatory nature of the preschool, in that the school is overseen by a parent board (so the nutrition guidelines are essentially set by parents themselves) and parents are welcome to come in and spend the day with their child at any time. Parents are also invited to sign up to prepare morning snack for the whole preschool at any time. Teachers felt that parents trusted them and that they could serve as a resource for parents who were having problems feeding their child.

A significant theme emerging from the Westville staff interview and focus group was parental concern over picky eating. The teachers and director felt that parents were quite anxious about their children’s willingness to eat certain foods. The teachers felt from their experience that picky eating is a phenomenon that children will eventually grow out of and that it should not be a source of stress. However, they believed that parents did not feel this way and thus may be using potentially unhealthy feeding practices, such as cooking separate meals for children based on their demands, using sweets to reward consumption of vegetables, deceiving their children by “hiding” vegetable purees in foods readily accepted by the children (such as ice cream or macaroni and cheese), and allowing mealtimes to be a battle of wills between the parents and the child. Teachers were particularly concerned about the practice of hiding

<table>
<thead>
<tr>
<th>Summary: Westville Staff Interview/Focus Group Themes</th>
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<tbody>
<tr>
<td>• Commitment to healthy nutrition at the preschool</td>
</tr>
<tr>
<td>• Collaboration with parents and good nutrition at home</td>
</tr>
<tr>
<td>• Parental stress over picky eating</td>
</tr>
<tr>
<td>• Confusion over healthfulness of organic/natural foods</td>
</tr>
<tr>
<td>• Lack of concern about obesity</td>
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</tbody>
</table>
vegetables in less healthy foods; they believed it was harmful both because it involved
deception and because it would not teach children to choose healthy foods on their own.

Some confusion over nutrition was also evident from the qualitative staff data. The staff
thought of cheese and refined carbohydrates as very healthy foods, and also revealed that
the teachers felt that “natural” foods were healthier than conventionally produced foods, no
matter their nutrient profile. While the teachers expressed confidence in their nutrition
knowledge, they also believe that it is important for a preschool teacher to be up-to-date on
current research in children’s nutrition.

Finally, while the teachers are committed to healthy nutrition for their students and believe
strongly in the importance of promoting healthy habits in this age group to promote better
long-term health, they are not concerned about obesity prevention in particular. No
concerns were expressed about helping children maintain a healthy weight, although they
did note that if there were a child who was already overweight, they would work with the
parents to find solutions for helping the child attain a healthy weight.

C. Mealtime Observation

A structured meal observation was performed by the researcher during lunch and/or snack
time at the school to assess teacher feeding practices and nutritional quality of foods
served.

1. Farnam

During the researcher-administered meal observation, it was noted that parents were
clearly complying with the nutrition guidelines set by the preschool. In addition, teachers
utilized best practices for creating a healthy environment at lunchtime; they encouraged
children to eat without forcing them, and specifically encouraged children to eat the fruit in
their lunches. They modeled eating fruits and healthy foods in their own lunches and kept
the environment calm, encouraging the children to socialize as they ate.
However, the meal observation revealed that the portion sizes of children’s lunches were excessive for a preschool-aged child. While the USDA MyPyramid for Preschools recommends lunches for preschoolers with a maximum of one ounce of grains, 1 cup of fruits and vegetables, and one once of meat or beans, several of the lunches contained portions of grains, fruits, and proteins twice that size. In addition, the nutritional quality of the meals was still fairly low. Proteins, if included in the lunch at all, were high in saturated fat (mostly red lunch meats and cheese); bread products and crackers were mostly refined; and the added sugar content of the meals was quite high. Most of the children had cheese or jelly sandwiches, accompanied by sugary yogurt drinks or yogurt cups, fruit, and large portions of crackers (one child had a bag containing twelve Ritz crackers in addition to his sandwich, fruit, and yogurt). Whole grains were also rare.

### Summary: Farnam Lunch Observation (parent-provided lunch)

- Teachers’ use of best practices for feeding
- Excessive portion sizes
- Lunches high in added sugars, high fat proteins, and refined carbohydrates

### Summary: Westville Snack Observation

- Teachers’ use of best practices for feeding
- Unusual snacktime structure where children can choose to eat or not
  - Calmer meal environment
  - Slower eating
  - Children learning to eat only when they are hungry

2. Westville

The meal observation at Westville took place during morning snack. One teacher was observed feeding the children and seven children were observed eating. This observation revealed two major themes. First, the Westville teachers demonstrated their expertise in and commitment to healthy feeding practices. They encouraged children to try the fruit served at snack, but did not push the children to eat it if they refused. They assisted the
children (particularly the very young ones) with setting up a place setting for themselves, teaching them how to pour, how to serve themselves, and how to count out an appropriate portion for their hunger level. In addition, they created an extraordinarily calm, soothing eating environment.

Second, the preschool’s unique approach to serving snack was observed. While most preschools and child care centers serve snack at a fixed time in the morning and afternoon, requiring all children to sit down at a table and eat, Westville sets up snack as an optional choice for children during their “free choice time.” As a result, children who are not hungry and would prefer to spend their time in dramatic play or painting, for example, are not forced to eat snack. In addition, only a few children at a time will come over to the table to eat, so the environment is very quiet. Teachers remind the children that snack is available and give them several opportunities to come and eat, but no child is forced to eat. The director believes that this system allows children to learn how to gauge their own hunger levels. She feels that in her decades of experience this is a superior system to the traditional one because it reduces unnecessary eating on the part of the child, allows them more time to do other activities, and teaches them how to make their own choices. The researcher observed that the children were remarkably calm during snack and appeared to eat smaller portions than what has been typically observed in more traditional snack situations. None of the children who had not participated in snack complained of hunger later in the day.

D. Parent Survey and Results

The Child Feeding Questionnaire, a self-report questionnaire developed by Birch and colleagues to assess parental feeding styles, was distributed to all parents at each preschool. This measure uses a 1 – 5 scale to assess seven domains of feeding young children: Perceived Responsibility, Perceived Parent Weight, Perceived Child Weight, Concern about Child Weight, Monitoring, Restriction, and Pressure to Eat.
Both parent groups expressed a high level of “Perceived responsibility,” indicating that they feel they are very responsible for feeding children, deciding portion sizes, and deciding what their child eats. Parents at both preschools were similarly neutral (a score of “3”) regarding their own weight and their children’s weight – indicating that they were both “just right.” Despite this, parents at Farnam were considerably more concerned about their children’s weight than parents in Westville. Parents at Farnam also scored higher on the Monitoring subscale, indicating that they monitor their child’s intake of junk foods closely. Both parent groups report not using restrictive feeding styles. Parents at Farnam reported being more concerned with their children being hungry and not eating enough, and using feeding styles to encourage their children to eat.

These results align with initial expectations about parent concerns in these two different groups and also echo teachers’ descriptions of parents at each preschool. Westville parents do not worry very much about their children’s weight, and perhaps because of their above average access to healthy foods, also restrict their children’s intake less. If all of the food in the house is healthy, then monitoring or restricting intake of certain foods may become less of a concern. In contrast, Farnam’s parents, whose families are at higher risk for both food insecurity and childhood obesity, are more worried about their children’s
weights and their consumption of junk food, even as they are concerned about their children actually eating enough. These results indicate that the Farnam parents are clearly in a more conflicted and stressful situation when it comes to child feeding and nutrition, and need uniquely targeted help.

Third Lesson Learned:
Parents from low resource communities are concerned about both food insecurity and childhood obesity

E. Parent focus groups

Ms. Kenney conducted parent focus groups at each preschool to assess their views on:

- the quality of the nutrition environment at the preschool
- their own levels of nutrition and feeding knowledge
- their own nutrition and feeding practices
- their concerns about children’s eating
- what could be done to improve the nutrition environment.

1. Farnam

Five parents from the preschool’s 11 families attended the focus group. Several of the themes raised by teachers in their own focus group were reinforced by parents. Parents unanimously agreed that the preschool teachers were clearly committed to good nutrition. They also expressed gratitude for the preschool’s nutrition policies. While one parent related that she had difficulty complying with the guidelines at first, she and the other parents stated that the guidelines had been helpful not just in ensuring that the preschool environment itself was healthy, but had also helped them change their own purchasing patterns at home. They expressed relief to know that their children were getting healthy meals at school. Parents appeared to view the preschool as an important ally in their own efforts to get their children to eat healthily.
Another theme that emerged from the parent focus group was a strong concern over picky eating. Parents reported that much of their time at meals was taken up with trying to convince their children to eat. Parents’ concern was not as much with their children refusing to eat healthy foods as their children refusing to eat all foods. Several parents also reported cooking separate meals for their children because they refused to eat the same foods as parents, and reported that this made preparing meals more expensive. However, when asked whether they were firm with their children in encouraging them to eat the same foods as parents, parents reported that they were indeed firm with them and would not let them eat whatever they wanted. It appeared that their perception of themselves in a disciplinary function did not actually match their own reported behavior with their children.

A third theme from the parent focus group was the influence of food marketing in children’s choices. One parent noted that her child was affected by advertising for everything, including toys, games and food. Other parents noted that their children were more likely to try items with a character on them and more likely to ask for food items with licensed characters in the grocery store.

Different parents expressed varying levels of concern over their children’s weight and healthy eating. One parent reported that she had been concerned about her child’s weight, but all of the other parents reported that it was not a problem for them. One parent reported that she felt as though she had to constantly monitor what her child ate; two parents reported that they monitored their child’s intake of unhealthy foods from time to time, but that it was not a major concern; and another parent reported that he did not care whether or not his children ate junk food.

Summary: Farnam Parent Focus Group Themes

- Trust in preschool for nutrition advice
- Preschool policies helping to change food patterns at home
- Concern about picky eating and how to deal with it
- Influence of food marketing on children’s preferences
- Mixed concerns about healthy weight
2. Westville

All 26 families were invited to participate in the parent focus group; 6 parents attended. Themes from the parent focus group closely mirrored those from the staff focus group and director interview. Also echoing a theme brought up at the Farnam, Westville parents expressed their appreciation for the preschool’s nutrition guidelines, stating that it had helped them with maintaining healthy shopping habits both for school foods and home foods. Westville parents also expressed their trust in the director and teachers and appreciation of their expertise and help. They felt as though they were respected and valued by the teachers but also felt that they could easily ask the staff for advice on feeding and other parenting issues. This matched the teachers’ perceptions of their relationship.

Also consistent with results from the staff qualitative data was a strong parental concern about picky eating. All parents expressed their concern about picky eating several times throughout the meeting. Interestingly, parental experience appeared to moderate this concern; those parents who had already had one or more children were less anxious about the phenomenon than newer parents. Several of these newer parents seemed quite preoccupied with their children’s picky eating and reported heightened stress levels at meal times. All parents reported that, with work pressures and other time demands, they often stopped trying to serve their children healthy food in favor of feeding their children something that they felt assured that they would eat. Picky eating was seen both as a barrier to consuming fruits and vegetables and as a concern that was a higher priority to parents than good nutrition itself.

**Summary: Westville Parent Focus Group Themes**

- Trust in preschool for nutrition advice
- Preschool policies helping to change food patterns at home
- Concern about picky eating and how to deal with it
- Lack of concern about food marketing
- Confusion over healthfulness of organic/natural foods
- Lack of concern about obesity
Along with picky eating, parents also reported feeding behaviors that confirmed teachers’ perceptions in the staff focus group and director interview. Several parents cited their use of sweets as an incentive for eating vegetables, and all parents except one discussed the frequency of their hiding vegetables in foods such as macaroni and cheese, chicken nuggets, and ice cream.

In contrast to Farnam’s parents, Westville parents reported that they did not feel as though television, licensed characters, or other forms of marketing influenced their children’s food preferences. They reported that since they did not allow their children to watch network television, did not visit fast food restaurants, and did not shop in supermarkets carrying food products branded with licensed characters, their children were not exposed to these influences. However, they did express concern that they would not be able to keep their children from being exposed once they entered elementary school. Their reports of no outside influences sharply contrasted reports from teachers, who noted that most of the children in the preschool were influenced by television and licensed characters.

Parents’ perception of natural, organic, and “unprocessed” foods as necessarily being healthy resembled the teachers’ beliefs as well. Parents stated that they felt products made with refined cane sugars were healthier and less caloric for their children than high fructose corn syrup, and that nitrate-free hot dogs and organic fried snack foods were a healthy choice. Parents also expressed confusion and uncertainty over the use of vitamin supplements, wondering whether a fortified food or a vitamin pill would be healthy for their children.
V. Action Research Project

After the completion of the self-assessment data collection, the teachers and researcher began the process of collaborating on an action research project together. The teachers collaborated with the researcher in identifying a theme about the preschool nutrition environment that had arisen in the focus groups and conceptualizing a strategy that they could use in the classroom to address this issue. From there, the researcher and teachers worked together to design an experiment plan for evaluating their chosen strategy that would be easily implemented in their classroom environment.

A. Farnam

1. Strategy and experiment design

The Farnam teachers and director decided that they wanted to evaluate whether involving children in preparing vegetables would make them more likely to both eat them and express liking for them. They chose to focus on vegetables instead of fruit was because they felt that the children already consumed and liked a variety of fruits. The teachers decided their strategy would be to take the children to the local Farmer’s Market and have them pick out two vegetables, cauliflower and sweet potatoes, to prepare in two teams of four children. Cauliflower and sweet potatoes were identified by the teachers as appropriate because most of the children had not been exposed to them yet (thus helping to eliminate potential repeated exposure effects) and they felt that the children would not reject them outright. At the preschool, the teachers would lead the children assigned to the cauliflower in a developmentally appropriate activity to help prepare the vegetable on one day and then do the same with the children assigned to the sweet potato on the next day. Using recipes given to them by the researcher, the teachers decided to prepare the vegetables by roasting them. They involved the children by having them help to wash, dry, and peel the vegetables and by brushing them with olive oil and seasoning.
To evaluate this educational strategy, we co-designed a simple, brief experiment. The teachers first fed the children the test vegetables, prepared with exactly the same method as they would be ultimately prepared by the children, as part of regular afternoon snack; children were not involved in preparation at all. This was to assess each child’s baseline consumption and liking of the vegetable prepared in this way. A week later, the teachers used the preparation involvement strategy described above and consumption and liking were assessed again for each child. One week following this test, consumption and liking were assessed for each child a third time, without involving children in preparation, to assess whether any effect from cooking was maintained after the activity.

We planned to measure consumption by weighing children’s plates before and after eating to the nearest gram. Liking was assessed using the Preschool Preference Survey, a measure which shows three depictions of faces with captions: a smiling face with the words “I like it,” a neutral face with the words “It’s OK,” and a frowning face with the words “I don’t like it.” The researcher explains each face to the child and asks them to point to the face that represents how they feel about the taste of the vegetable. Our plan was to compare pre- and post-cooking consumption and liking for all children to see if there had been a general effect in the classroom. Our second goal was to compare changes in consumption and liking for those children who participated with those children who did not participate, to see whether cooking had an effect for just those children who participated; this was an attempt to control for possible repeated exposure effects.
2. Results

The preschool teachers carried out their educational strategy according to plan, except they were not able to take the children to the Farmer’s Market and this component was dropped. In addition, teachers found themselves reluctant to exclude children when they actually performed their activities in the classroom, so the original plan to compare children who had cooked with children who had not was abandoned. Because the sample size at Farnam was so small and was even smaller than expected on several days due to shifting attendance, we felt that complex statistical analyses would be unreliable. Therefore, we have presented simple means and ranges below.

Four out of ten children were present for the baseline test of cauliflower; six were present for the cooking. On the day in which the cauliflower was served without the children participating in cooking, the mean amount consumed was 33 grams and the range was quite large (0 to 77 grams), as some children refused to eat it at all. On the day in which the children helped prepare the vegetable, the mean amount consumed increased almost twofold, to 61 grams. The range also tightened to 48-72 grams, as more children were willing to try it during this cooking episode. The planned follow-up test of the cauliflower consumption was abandoned because the teachers, who were very encouraged by the children’s positive response to the cauliflower, felt nervous that serving the vegetable a third time might have negative consequences if it made the children tired of eating it.

**Farnam: Mean and range of consumption in grams**

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<thead>
<tr>
<th></th>
<th>Cauliflower</th>
<th>Sweet Potato</th>
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<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td>33 (0-77)</td>
<td>13 (0-36)</td>
</tr>
<tr>
<td><strong>Cooking</strong></td>
<td>61 (48-72)</td>
<td>15 (1-45)</td>
</tr>
<tr>
<td><strong>Post-cooking</strong></td>
<td>*****</td>
<td>12 (2-58)</td>
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Seven out of ten children participated in the baseline test of sweet potato consumption, seven participated in the cooking test, and seven participated in the follow-up test; six of these were the same children. Involving the children in cooking appeared to have a similar effect on this vegetable, though the effect did not seem to be as strong and did not appear
to hold up over time. On the day in which the sweet potatoes were served without any child participation, mean consumption was 13 g, with consumption ranging between 0 and 36 grams. When children participated in cooking the vegetable, mean consumption increased slightly to 15 g, but was still highly variable with some children refusing to eat it; consumption ranged between 1 and 45 grams. The teachers were less nervous about serving the sweet potatoes a third time and so agreed to perform a follow-up test in which the children did not participate in cooking. On this day, mean consumption fell back to baseline, at 12 g, and the range continued to be large, between 2 and 58 grams. This drop in consumption appeared to confirm the teachers’ intuitive fears that the children would be less likely to eat the vegetables if they were served too often. Examining the data for each child over time, we found that one child’s consumption rose steadily across the three times points, one child’s consumption remained quite low throughout, one child’s consumption rose during the cooking test and then fell at the third test. The strategy’s effect on preferences in this group was also unclear as there was no discernable pattern of either increased or decreased liking over time.

While observing the children during the experiments, the teachers and researcher identified several notable trends. Although the teachers had expected that the children would be reluctant to eat cauliflower and easily willing to eat sweet potatoes, the opposite occurred. The teachers observed that palatability and appearance had played a large role in the process. They observed that the roasted cauliflower had an appealing taste, smell, and appearance. Therefore, the children were willing to try the cauliflower because it looked appealing, and then were willing to eat large servings of it because it tasted good. In addition, the teachers felt that children’s consumption was also influenced by the fact that

<table>
<thead>
<tr>
<th>Farnam Action Research Results: Summary</th>
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<tbody>
<tr>
<td>• Participating in cooking appeared to increase children's consumption of the vegetables</td>
</tr>
<tr>
<td>• Cauliflower was better liked than sweet potato</td>
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<tr>
<td>• Palatability, appearance, and difficulty chewing were observed by teachers as playing an important role</td>
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<tr>
<td>• Teachers’ self-efficacy to perform research improved</td>
</tr>
<tr>
<td>• Commitment to future action research projects</td>
</tr>
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</table>
the roasted cauliflower was soft and easier for the children to chew (a concern with children in this age group, who often have difficulty chewing tough vegetables and meats). In contrast, the roasted sweet potatoes did not look as attractive to the children. The vegetable had been cut into thick rounds, which was an unfamiliar shape to them, and several pieces also looked slightly burnt (even though they were not) because the edges of the rounds had caramelized in the oven. The children also appeared to have more difficulty chewing the more fibrous sweet potatoes. A third observation was that children who had eaten less for lunch were more likely to eat the snack than children who had eaten a larger quantity of food at lunch.

3. Self-Efficacy and Commitment to Future Action Research

At the end of the action research experiment, the teachers approached the researcher with a new idea for an experiment that they had generated by themselves. They reported that they felt confident in being able to set up the experiment, but asked for help with analysis. The researcher delivered a scale to the preschool so that the teachers would be able to continue performing plate-waste experiments in their action research projects in feeding.

B. Westville

1. Strategy and experiment design

Based on the teachers’ concern about parents deceiving children about vegetables, the teachers initially expressed interest in setting up an experiment to test whether “hiding” vegetables in blander comfort foods would result in children’s developing a preference for those vegetables; the teachers hypothesized that it would not. However, they also expressed interest in developing a classroom strategy that they could incorporate into their practice, and so decided that the initial idea might not help them as much (though they are interested in testing it in the future). Similarly to the Farnam teachers, the Westville teachers expressed interest in evaluating whether involving children in preparation would increase their consumption of and preference for certain vegetables. They already involve
children in cooking projects from time to time as a learning activity, and wanted to assess whether it actually improves consumption and liking. Their strategy, therefore, closely resembled Farnam, allowing us to qualitatively compare the effects of the strategy in two demographically distinct settings.

The teachers conceptualized the experiment somewhat differently. They chose four seasonal winter vegetables that they believed were largely unfamiliar to the children: butternut squash, cauliflower, spinach, and sweet potatoes. The vegetables were fed to the children and their consumption and liking was assessed as with the Farnam group (a baseline assessment with no participation one week; an assessment after the children had participated in cooking the vegetable the next week; and a follow-up assessment again without participation on the third week), but the servings were staggered in two waves. The goal of this design was to be able to create an internal control group within the school; the teachers wanted to give all children the chance to participate in cooking, but recognized the need to compare children who had cooked with a group that had not cooked. Therefore, we used this design so that we would be able to use those children who cooked in the second wave as an internal control group to compare with the children who cooked in the first wave (our exposed group).

As in Farnam, we planned to measure consumption by weighing children’s plates before and after eating to the nearest gram. Liking was assessed using the Preschool Preference Survey. Our plan was first to compare pre- and post-cooking consumption and liking for all children, regardless of whether they participated or not, to see if there had been a general effect in the classroom. Our second goal was to compare changes in consumption and liking for those children who participated with those children who did not participate, to see whether cooking had an effect for just those children who participated; this was an attempt to control for possible repeated exposure effects.
2. Results

When the strategy experiment was operationalized, several of the original analysis plans had to be reworked. The teachers had anticipated being able to have all children come to eat snack for full data collection, but in reality were reluctant to alter the children’s normal snack routine of being able to choose for themselves whether or not they eat. Turnout for snack was even lower than normal levels due to the fact that the preschool had recently introduced a variety of new choice activities and toys for the children, so they were mainly interested in exploring those rather than eating. We counted children who came to snack but refused to eat as having eaten 0 grams of food, and counted children who did not choose to eat at all as missing. As with Farnam, because the sample size was smaller than expected, we felt that statistical analyses and comparisons between children who cooked versus children who did not would be unreliable. Therefore, we present simple means and ranges below.
Ten children participated in the baseline squash assessment; four participated in the cooking assessment; and four participated in the post-cooking assessment. On the day in which the children were served the butternut squash without participating in cooking, the mean consumption was 7 grams, with a large range as several children refused to eat it (0-24 grams). On the day in which children participated in cooking, mean consumption rose to 20 grams, although the range of consumption was still large (0-29 grams). At the post-cooking assessment, it appeared that consumption rose further, to 43 grams; however, it was noted that the mean was severely skewed by one child, who ate a total of 104 grams (the teachers noted that this child was often hungry and posited that he might not have eaten breakfast that day). Excluding this child, the mean consumption still increased to 27 grams, with the range remaining large (1-54 grams). Because consumption continued to rise, it is difficult to say whether the act of cooking or the repeated exposure (or neither) influenced children’s consumption.

Seventeen children participated in the baseline cauliflower assessment; six participated in the cooking assessment. Somewhat surprisingly, the Westville teachers also opted not to have a follow-up assessment of the cauliflower since it was clear that we would be unable to perform any of the statistical comparisons we had planned to do, and they did not want to unnecessarily expose the children to excess in case it would have a negative effect on their preferences. On the day in which children were served the cauliflower the first time, without participating in cooking, the mean cauliflower consumption was 8 grams, with a very large range (between 0-53 grams), as several children refused to eat it. When children participated in cooking, the mean rose dramatically, to 49 grams. Again, however, this increase was skewed by the consumption of the same child mentioned above, who appeared quite hungry and ate 101 grams of cauliflower on this day. Excluding this child, consumption still increased with

Westville Action Research Project Results: Summary

- Participating in cooking appeared to increase children’s consumption of the vegetables
- Palatability, appearance, hunger, and familiarity were observed by teachers as playing an important role
cooking to 37 grams, with a smaller range (between 7-54 grams). Liking did not change over time for any children for either the cauliflower or the sweet potatoes.

After recognizing that their commitment to the children’s routine would preclude them from collecting detailed quantitative data, and after expressing their concern that exposing the children too frequently to these vegetables might have adverse effects, the teachers also chose to abandon the plans for the next wave of serving vegetables. Instead, they opted to serve the spinach and sweet potatoes once, involving the children in preparation, and qualitatively observe the children’s reactions. The teachers noted that serving spinach within a recipe for spinach pancakes seemed to improve the children’s perception of spinach, and that when the spinach was incorporated into a recognizable food, though still identifiable and not “hidden” in the food, the children seemed more comfortable with eating the vegetable. When serving the sweet potatoes mashed with a small amount of maple syrup, the teachers also noted that the addition of a familiar, sweet taste seemed to convince several reluctant children to try the vegetable.

Qualitatively, the teachers and researcher noted several interesting aspects of the feeding process. As we had seen at Farnam, the palatability of the vegetables appeared to play a strong role in children’s willingness to eat them. The teachers were quite surprised at how readily the children ate cooked cauliflower, as they had often seen them refuse the vegetable in its raw form. Children appeared to like the smell and appearance of the cooked cauliflower, squash, spinach, and sweet potatoes, and found these vegetables easier to chew. The teachers also noted that the children who cooked ate the vegetable enthusiastically and without prodding, and that several children who had had no interest in eating the vegetables during the baseline assessment, when the vegetable was simply offered, were interested in eating the vegetables when they were able to cook.

3. Self-Efficacy and Commitment to Future Action Research

Throughout the action research process, teachers were engaged in suggesting ideas for future experiments and hypotheses in the current experiment. Teachers expressed their
interest in researching the effect of deceptive feeding practices on children’s preferences for fruits and vegetables and expressed that their comfort with setting up experiments to compare pre- and post-exposure data had increased.

VI. Planning for Change

Parent and teacher needs assessment data were analyzed to identify needs that could be addressed with the workshop. We combined the teacher and parent workshops because we wanted to capitalize on the existing relationships between the teachers and parents. From our focus groups we learned that the teachers were knowledgeable resources and were respected and trusted by the parents due to their expertise and care, so we wanted to create an environment for learning in which the teachers could help with parental knowledge acquisition.

A. Identification of Needs: Parent and Teacher Workshops

Based on themes from the parent and teacher focus groups, a workshop was designed to increase knowledge and skills in the following areas:

- Basic nutrition principles, with a particular focus on the health benefits of whole grains, fiber, fruits and vegetables, and unsaturated fat and the detrimental effects of refined carbohydrates, added sugars, trans fats, and saturated fat;
- Deciphering food labels to find these elements in food;
- The negative impacts of using food as a behavioral incentive;
- Reducing parental stress and anxiety at meal times;
- Strategies to address picky eating and increase fruit and vegetable consumption;
- Use of cultural foods to promote health; and
- Tips for incorporating more fruits and vegetables into the diet without extra expense.

For this population, our workshop was designed as a guided discussion. We attempted to build self-efficacy and tap into existing social support by asking parents to share their own
strategies and encouraging parents to use the knowledge gained in the lecture portion of the workshop to help identify solutions for their own and other parents’ feeding problems.

The workshop was delivered by Ms. Kenney and Dr. Kathryn Henderson. The entire staff (one paraprofessional, one teacher, and one teacher/director) attended; two parents attended, though several more were expected. Because of the low attendance the workshop facilitators recognize that the original design would not be appropriate for such a small group and instead led a small group discussion about nutrition and led a question and answer session from the parents.

**Comparison of Parent Workshop Needs, Low-SES versus High-SES populations**

<table>
<thead>
<tr>
<th>Farnam (Low-SES)</th>
<th>Westville (High-SES)</th>
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<tbody>
<tr>
<td>Deciphering food labels</td>
<td>Deciphering food labels</td>
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<tr>
<td>Reducing stress at mealtimes</td>
<td>Reducing stress at mealtimes</td>
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<td>Food as a behavioral incentives</td>
<td>Food as a behavioral incentives</td>
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<tr>
<td>Strategies to address picky eating</td>
<td>Strategies to address picky eating</td>
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<tr>
<td>Basic nutrition principles</td>
<td>Environmental influences on eating</td>
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<tr>
<td>Shopping for healthy foods on a budget</td>
<td>Confusion over natural/organic foods</td>
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<tr>
<td>Use of cultural foods to promote health</td>
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<tr>
<td><strong>Workshop style</strong>: Guided discussion</td>
<td><strong>Workshop style</strong>: Lecture with discussion</td>
</tr>
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Westville

Based on themes from the parent and teacher focus groups, a workshop was designed to increase knowledge and skills in the following areas:

- Environmental influences on eating;
- Nutritional values of natural and organic foods;
• Deciphering potentially deceptive food labels to find whole grains, trans fats, and added sugars in packaged foods;
• Negative impacts of using food as a behavioral incentive;
• Reducing parental stress and anxiety at meal times; and
• Strategies to address picky eating and increase fruit and vegetable consumption.

This workshop was designed as a mixture of a lecture format with guided discussion. We attempted to build self-efficacy and tap into existing social support by asking parents to share their own strategies and encouraging parents to use the knowledge gained in the lecture portion of the workshop to help identify solutions for their own and other parents' feeding problems. The workshop was delivered by Ms. Kenney and Dr. Schwartz. The entire staff (four teachers and one administrator) and seven mothers attended.

Reactions during the workshop were enthusiastic and positive. The evaluations returned indicated that the respondents were “likely” or “definitely” going to use the feeding and nutrition strategies outlined in the workshop, and both respondents wrote that the workshop had been helpful in helping them access social support and reinforcing their commitment to healthy eating and feeding. Despite this, the respondents indicated that they did not feel any more confident about effectively feeding their children fruits and vegetables, suggesting that a more intensive educational session may be needed.
B. Review of Results, Commitment to Action, and Access to Resources

After all of the self-assessment, action research, and workshop components had been completed, the director and teachers at each preschool met with the researcher to examine the results and collaboratively identify areas of strength and areas which could be improved upon in the preschool. Ms. Kenney presented the director and teachers with the results of their action research project as well as the themes identified through the staff focus group and interview, the parent focus group, the teacher surveys, and the parent survey.

Farnam

From the Farnam self-assessment, the following areas of strength were identified:

- Nutrition Policies
- Teachers’ Exposing Children to Healthy Foods
- Teachers Using Best Practices for Feeding Children
- Teachers’ Commitment to Nutrition and Trusting Relationship with Parents

Working off of these strengths, we identified several areas in which the strengths could be built upon to make improvements to the environment. We discussed how the already strong nutrition policies could be further developed to address:

- **Appropriate portion sizes for children.** Ideas for policy action included distributing USDA MyPyramid for Preschoolers guidelines to parents and setting a policy that limits the amount of crackers or snacks that can be sent in with the lunch entrée and fruit.
- **Added sugars in yogurts.** Ideas for action included educating parents about the sugar content in yogurt and how to check for sugar content on food labels and setting a policy that only yogurt containing real fruit is allowed (which would help to exclude the brands highest in sugar, such as Trix yogurts by Dannon or Go-Gurts by Yoplait).
• **Refined carbohydrates.** Ideas for increasing the whole grain content in children’s diets while respecting the fact that purchasing whole grain foods may pose a financial challenge for this population included setting a policy that all crackers must be whole grain, setting a policy that breads must be whole grain at least two times per week, or setting a policy that if a parent sends in a jelly sandwich it at least must be whole grain (to reduce the sandwich’s glycemic load). The preschool also committed to serving only whole grain crackers during snack.

• **Variety of foods served.** Ideas for increasing the variety of the foods that parents could serve to children included bringing a microwave into the classroom so that hot foods could be served. In addition, the teachers reviewed information about food safety recommendations from the USDA to correct their misconception that leftovers could not be served cold. The teachers discussed altering their food policy to allow leftovers to be sent in to school for lunch.

We also discussed building off of the preschool’s strength as a trusted ally for parents to improve parental feeding behaviors:

• **Increasing parental consumption and liking of fruits and vegetables.** Ideas included engaging the parents in taste tests with their children and sharing the recipes for roasted vegetables used in the action research project.

• **Helping parents gain cooking skills.** The teachers suggested holding an event at night for parents to learn cooking skills together, and framing it as a social event and allowing parents to share their own knowledge and recipes with one another.

• **Coaching parents on reducing mealtime stress.** The teachers discussed how they might share their own strategies for how they keep mealtimes calm at the preschool.

The researcher also shared several resources with the preschool, identifying agencies that continually provide new information. The Farnam teachers were introduced to the new USDA MyPyramid for Preschoolers and talked about the various resources that they could use both for themselves and for helping parents. They were also introduced to the various resources provided by the Center for Science in the Public Interest, including a handout of...
ideas for keeping snacks healthy. The Rudd Center provided several handouts on basic nutrition principles, feeding picky eaters, and shopping healthily on a budget. We also discussed plans to partner with Rudd in the future for more parent workshops that could help with increasing cooking skills and nutrition knowledge.

VII. Conclusions

A. Successes of the project

Strengths of this study included its community participatory process. There has been a call recently for more intervention studies to be developed and performed with community input, and this study was designed such that teachers, administrators, and parents were involved in setting goals for the research, generating ideas for interventions, and designing their own experiment within the study. In addition, the collaborative process allowed for enhanced sustainability of the intervention, so that teachers and administrators, who have now gained skills in self-evaluation and action research, can continue a self-assessment process of their nutrition environment in the future and continue to use action research to promote evidence-based practice in the classroom.

The incorporation of teachers’ expertise in working with this population was also a strength of this study. Previous obesity prevention or fruit and vegetable promotion interventions in this setting have tended not to tap into the funds of knowledge available from teachers’ experiences with feeding children. They also have tended to ignore special determinants of preschoolers’ eating patterns and preferences, such as picky eating, neophobia, role modeling, and repeated exposure. We were able to tap into teachers’ knowledge bases both to find ways of appropriately structuring vegetable promotion strategies for the children in their own preschool and to find insights on preschool-aged children’s cognitive and emotional processes that affect their intake which are not currently present in the literature. This incorporation of teacher knowledge, along with their engagement in the research process, also generated several new ideas for policy guidelines and future interventions, which are described below.
Teachers at both schools were able to evaluate the nutrition environment in their preschools and identify areas for change. They engaged in the evaluation of a strategy to attempt to improve their nutrition environment. They also committed to future changes in policies and practices to continually improve. Finally, they reinforced their commitment to helping parents of young children improve their own nutrition and feeding practices.

B. Lessons Learned

We found several aspects of the community-oriented process that ultimately made quantitative evaluation difficult to impossible, and should be considered by researchers aiming to perform collaborative research in preschool settings in the future. Unlike public K-12 schools, which are generally structured quite similarly due to their oversight by local, state, and federal government entities, preschools vary dramatically in administrative structure, teacher preparation, financing, space requirements, size, and parent involvement. As such, their structuring of meal times varies dramatically as well. Some schools have a full food service with an on-site kitchen, others have meals delivered to them, others have parents provide meals for their children, and still others have some combination of the above. These system variations, both within and outside of food services, make it difficult to develop interventions that can be applied to all preschools. It is indeed even difficult to categorize preschools in such a way that interventions could be developed for specific classes of preschools.

In many ways, this makes a community based approach even more important. Researchers clearly cannot press their own intervention structure on preschools that may not be able to support it; input is needed from the intervention preschools themselves to ensure that the intervention structures matches the needs and abilities of the preschool. In the instance of this project, the small size of the preschools limited our ability to make conclusions based in firm quantitative data; we simply did not have enough children, teachers, or parents to draw firm conclusions. The reluctance of the teachers to alter the preschoolers’ normal routines when their experiment was operationalized also prohibited us from quantitatively evaluating their vegetable promotion strategy, as it led to the
effective disintegration of their action research project design. Previous community based researchers have also had difficulty with convincing community members of the need for a control group; future researchers will likely need to address this.

This intervention study also had several limitations. Our voluntary recruitment process, which allowed for preschools to self-select into the study, limits the generalizability of our findings. Preschools who were interested in participating in such a project may not be representative of preschools in general. In addition, the preschools who opted to participate in our study were already seriously invested in maintaining a healthy nutrition environment; while they felt they were in need of this type of intervention to promote self-directed research and self-assessment of nutrition policies, we may not have been able to see an effect of the intervention due to their high baseline knowledge, self-efficacy, and commitment to nutrition.

In terms of limitations of the intervention design itself, it may be that the dose of the intervention is not strong enough. Our plan to increase teachers’ self-efficacy to perform action research by guiding them through a hands-on experiment may not have been enough; it is possible that accompanying this experiential learning with a more formally structured class on research methods may be necessary. The dose of the workshops also may not have been adequate for increasing teacher and parent knowledge of nutrition and optimal feeding behaviors. It may also be necessary to increase the parent component of the intervention. Although the intervention was designed to focus primarily on the preschool environment itself, it has become clear that even within the school setting parental influence is quite strong and is an important determinant of children’s consumption.

C. Ideas for the Future

The preliminary findings from this intervention do indicate that clear, strong policies on nutrition and feeding at the preschool play an important role in determining the preschool's nutrition environment and also play a strong role in affecting teacher and parent practices
and attitudes. Strong nutrition policies do not only ensure that preschool food meets basic nutrition guidelines. In the case of Farnam, they were used for obesity prevention as well, limiting children’s exposure to sugared beverages, sweets, and salty, high-fat snacks. At Westville, the policies were used to promote a healthier food environment at celebrations by limiting children’s exposure to cupcakes, cakes, and other traditional party foods. In addition, parents and teachers believed that the policies had helped with improving food purchasing and serving patterns at home, as the parents became used to the policies and grew to alter their shopping habits to fit the policy. Therefore, policies can be used as an effective tool to promote a healthier nutrition environment in the preschool and may even have spillover effects into the home.

This intervention demonstrated that involvement of teachers in researching the modification of children’s eating patterns in a preschool setting is crucial. Researchers should consider tapping into teachers’ expertise and knowledge of the study population when designing interventions and evaluations. In addition, the project highlighted that preschools may be an especially opportune environment for health interventions, as preschool teachers within two very different and demographically diverse preschools view themselves as being responsible for the promotion of children’s physical, social, and emotional development rather than their cognitive and academic development alone. Preschool parents also appear to have a stronger, more trusting relationship with preschool teachers and administrators, setting preschool educators up as key leaders and trusted voices to help parents change their own behaviors at home. Future research should be performed to assess preschool teachers’ self-perceptions and the strength of the relationship between parents and preschools in a larger, more diverse sample of preschools, to see how public health and education efforts may align. The impact of high teacher morale and teacher experience on the nutrition and feeding environment should also be evaluated.

A more rigorous implementation and evaluation of this intervention should be performed to assess the necessary dose for increasing teacher self-efficacy to improve their nutrition environment, involving longer follow-up to see whether teachers continue to generate
action research ideas, maintain nutrition knowledge, and constantly evaluate quality of nutrition environment after the intervention has ended.

This intervention also demonstrated that researchers need to consider several strong and important differences between low-income and high-income preschools. As highlighted above, there are clearly commonalities between preschools that can facilitate interventions, but there are important considerations that need to be taken into account when working with lower-SES schools. Most research on preschool-aged populations to date, especially within laboratory settings, has focused on behaviors in middle- to high-SES populations. The results from the child feeding questionnaire administered in the Farnam population showed these parents scoring higher regarding concern about their child’s weight, restriction, monitoring, and pressure to eat. This could either indicate that these issues are truly more of a concern for this population, or it could indicate that the feeding questionnaire, which was developed from research based in mostly white, middle- to high-SES populations, is not an appropriate scale for more culturally diverse and low-SES populations. Qualitatively, we found from teacher and parent focus group data that food budgets and hunger are much more of a concern in this population and that this plays a critical role in designing an appropriate obesity prevention intervention. The parents are concerned with ensuring their child eats primarily, and the healthfulness of the food is a secondary priority; their anxiety over their children’s picky eating leads to providing inexpensive, filling foods that they know will not be rejected or wasted by the children. Interventions that encourage parents to expose children repeatedly to fruits and vegetables without taking into consideration the expense of wasted food that necessarily follows from this practice will likely be ineffective.

Summary: Future Ideas for Research

- Strengthening Nutrition Policies
- Utilizing Teacher Knowledge in Designing Interventions
- Assessing the role of high teacher morale in influencing the nutrition environment
- Improving interventions for low-income populations and balancing food insecurity with obesity concerns
- Framing obesity prevention interventions for preschool populations
Finally, future researchers and interventionists should consider the impact of how they frame their interventions with this population. During focus groups, parents and teachers at both Farnam and Westville expressed that they were not too concerned with their children’s weight because they are not overweight now. Further, a few parents and teachers of actually overweight children also did not view these children as being overweight. This is consistent with the findings of Jain et al. (2001) and Sherry et al. (2004), who also found in focus groups with mothers a lack of awareness of child weight issues and a lack of concern about preventing weight gain. However, the parents were overwhelmingly concerned with picky eating. It may be that future obesity prevention interventions for preschool-aged parents focusing on dietary change should emphasize general nutrition and picky eating, as parents may otherwise feel an intervention is unnecessary.

Through the teacher action research project, several ideas for interventions emerged. Future research should explore palatability and how taste and texture can be manipulated to promote consumption. In addition, a promising area of intervention may be modifying children’s eating schedules; we found that children who were actually hungry were more likely to eat vegetables without complaint than children who were not hungry. Many preschool and parental feeding schedules result in children eating very often, so they are never hungry. This may lead to increase pickiness for healthy foods and may also be detrimental for obesity prevention by teaching children to eat without hunger; a feeding schedule that capitalizes on children’s natural hunger states may be worth further research. Along with this, presenting vegetables on their own so that they are not competing with other foods on the plate may be an effective method of promoting consumption and preventing pickiness (i.e. serving vegetables for snack or presenting them as a “first course” before serving the rest of a larger meal).

Summary: Ideas for Future Preschool Interventions

- Manipulating palatability
- Modifying eating schedules to capitalize on children’s natural hunger
- Serving fruits and vegetables without competing foods on the plate
- Switching to Westville’s snack time structure of allowing children to choose whether or not they eat
Finally, Westville’ system of serving snack, while it was somewhat detrimental to effectively evaluating the teacher’s strategy, may be an effective obesity prevention intervention in and of itself. Their program of allowing children the choice of eating or not, with teacher supervision, appears to promote healthy eating behaviors on multiple levels. Teachers ensure that children who are hungry have the chance to eat, but children are not made to eat. This appears to have the result of both helping children learn to gauge their own hunger levels and also refrains from socializing them to eat in the absence of hunger. It also seems to aid in limiting consumption in those children who do eat, as it creates a calm, stress-free environment and makes children more likely to monitor their own consumption; eating in loud, stressful environments and with a large number of other people has been shown to increase consumption (Hetherington, 2007; Krebs, Macht, Weyers, Weijers, and Janke, 1996; Lumeng and Hillman, 2007). Researchers may want to evaluate the impact of changing a school’s meal system to the Westville plan to see whether it is effective in promoting healthy behaviors.
References.
Hendy H.M. & Raudenbush, B. (200) Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite, 34*: 61-76.


