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## Exploring the use of Storybooks to Reach Mothers of Preschoolers with Nutrition and Physical Activity Messages

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### Abstract

**Objectives**—To assess perceptions stay-at-home mothers have about their preschoolers' eating and physical activity behaviors and to explore the feasibility of utilizing storybooks in home-based nutrition and activity programming.

**Methods**—Focus groups were conducted with 24 mothers; intercept interviews with 30 parents; and a storybook prototype was developed and pretested in 8 preschool classrooms.

**Results**—Mothers acknowledged picky eating as an issue and were less likely to identify issues with physical activity but were interested in information on gross motor development. Mothers strongly supported storybooks as a modality to convey and reinforce health messages at home. The storybook prototype was well liked by parents, teachers and preschoolers.

**Conclusions and Implications**—Storybooks are a practical method to reach mothers and preschoolers and have the potential to elicit changes in eating and activity behaviors. Understanding mothers' perceptions of healthy eating and physical activity is essential to ensure that storybook messages resonate with this audience.

### Keywords

Nutrition; Children, Preschool; Storybooks; Focus Groups; Picky Eating; Physical Activity

## INTRODUCTION

It is important to establish healthful habits early in life as children begin to form eating and physical activity patterns at a young age.<sup>1–3</sup> The preschool years, ages 3 to 5, present an opportune time for nutrition education as children are eager to learn and possess a great potential for change.<sup>1</sup> In order to reach preschool-aged children it is essential to target secondary influencers, particularly parents.

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### SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version.

Parents are critical in the development of a child's food environment and influence the relationship the child develops with food later in life.<sup>4-6</sup> Parents have an impact on children's eating practices by controlling availability and accessibility of foods, establishing meal structure, modeling eating practices, influencing food socialization practices, and utilizing feeding styles and practices.<sup>4,6</sup>

Additionally, parents directly and indirectly impact physical activity behaviors of their child. Factors facilitating physical activity include parental modeling, access to safe environments for activity, and organized activities.<sup>7</sup> Parental modeling through increased physical activity level has been positively correlated with an increase in preschool-aged children's activity level.<sup>8</sup>

Storybooks are a practical method to reach parents through child-driven health education in the home. Many storybooks already depict food, yet are often not depicting healthful foods or food-related behaviors.<sup>9</sup> Developing storybooks with targeted health messages can increase preschool-aged children's willingness to taste novel foods<sup>10</sup> and expose children to new foods through pictures.<sup>11</sup> Furthermore, storybooks can be utilized to promote healthful behaviors among parents.<sup>12</sup>

The *Food Friends®* programs – *Fun with New Foods®* and *Get Movin' with Mighty Moves®* - are two classroom-based curricula with the objective of establishing healthful eating habits and physical activity patterns in early childhood.<sup>13-16</sup> These programs, based on Social Cognitive Theory and tenets of social marketing, have demonstrated increases in children's willingness to try new foods and enhanced gross motor abilities.<sup>13,15</sup> Program concepts include eight superhero food characters, who live in the town of Healthadelphia® where they encourage their friends (participating children) to become Super Tasters and Mighty Movers. The messages, strategies, and materials were developed with target audience input (parents, teachers, and preschoolers) over a 12 year time frame. In addition to classroom-based materials, child-centered 'Home Connection' materials have been developed to encourage and provide strategies for families to offer new foods and engage in age-appropriate physical activity, including gross motor skill development, with their child(ren).<sup>17,18</sup> Parents have expressed a strong desire for materials which stimulate children's imaginations and support dramatic play.<sup>14</sup> Storybooks have been repeatedly mentioned as one such way to engage young children's imaginations as well as serve as a vehicle to communicate program concepts and messages with parents.

The primary aim of this study was to assess perceptions and expectations mothers have about eating and physical activity behaviors of preschool-aged children and to explore the use of storybooks to reach mothers of preschoolers with nutrition and physical activity messages as either a part of the existing *Food Friends®* programs or as stand-alone home-based programming. The secondary aim was to determine storybook format, messages, concepts, and potential use by parents. The third aim was for teachers to evaluate the age appropriateness and acceptance of the storybook for preschoolers.

## METHODS

Focus groups were conducted with stay-at-home mothers whose children did not attend preschool full-time, and had not participated in the *Food Friends®* programs. Emergent themes identified in focus groups regarding the storybook were then tested with parents whose children were enrolled in preschools participating in the *Food Friends®* programs, and thus were familiar with the program. This step provided additional insight into the dissemination of the *Food Friends®* characters, messages and themes in a storybook format. Lastly, the storybook prototype was tested in the classroom environment with teachers and

preschoolers familiar with the *Food Friends*® Program. This study was approved by the Institutional Review Board at Colorado State University.

### Focus Groups

A purposive sampling technique was used to recruit stay-at-home mothers of preschool-aged children from existing parenting groups, such as Mothers of Preschoolers (MOPS) and other organized parent groups. The focus group was conducted where these groups regularly met - a YMCA, two community centers, and a church. A moderator trained in focus group facilitation led each 90 minute session. Prior to the start, participants completed a short questionnaire ascertaining demographic information, such as age, education level, and household income. Participants received a \$20 cash stipend.

A structured script of open-ended, probing questions was developed to assess mothers' perceptions of nutrition and physical activity behaviors of their preschool-aged child; interest in a home-based nutrition and/or physical activity program; and the proposed storybook concept (Supplementary Data 1). Questions were designed to assess the behavioral capability construct of the Social Cognitive Theory and were tested for face and content validity by eight experts in the fields of nutrition, human development, early childhood education, and marketing. Modifications were made until concurrence was obtained between all experts. Focus group sessions were audiotaped and handwritten notes were taken by the co-moderator. Three reviewers independently coded focus group transcripts; categorized participants' responses; and cross-verified one another's categorization. Disagreements in coding were discussed until consensus was reached. Common ideas and themes were identified, based on the number of responses per category, as well as descriptive quotations.<sup>19</sup>

### Interviews

To confirm emergent themes identified in focus groups, brief intercept interviews, 5–10 minutes in length, were conducted with parents as they waited to pick up their children from one of three preschools participating in the *Food Friends*® programs.<sup>20</sup> Interviews were conducted 2 to 3 months after the completion of focus groups and in a different community to eliminate the potential for participants to be included in multiple phases of the project. A semi-structured interview protocol was developed to confirm parent perceptions on the proposed storybook format and content. Similar to focus groups, questions were tested for face and content validity and interview results were analyzed for new themes and to confirm focus group findings.

### Storybook Prototype

The storybook prototype was based on program concepts, messages, and graphics utilized in the *Food Friends*® programs: *Fun with New Foods*® and *Get Movin' with Mighty Moves*®.<sup>14,20</sup> Several activities were developed to amplify messages from the storyline and to develop specific school readiness skills. The format included a program introduction page, storyline, and a parent page with activities. The introductory page was designed to introduce the *Food Friends*®, the town they live in (Healthadelphia); and the individual *Food Friends*® characters depicted in the story. The prototype description included Ollie Orange and his Mighty Moves (gross motor skills), superpower (lightening quick), and favorite place in Healthadelphia (Chef Charlie's restaurant). The storyline portrayed the children trying new foods with the *Food Friends*®, and two preschool-aged children, Zack and Zoe, at Chef Charlie's restaurant. Following the story was a 'Parent Page' with one simple message ('Be a good role model') and activity suggestions that parents could do with their child(ren). Activities covered language, cognitive, social and physical development, while reinforcing story messages and behavioral concepts (try new foods and be active).

Two activity examples included: letter recognition of different fruits and vegetables mentioned in the story (language development) and pretending to skate with Ollie Orange at different speeds and directions (motor skills and concepts). In addition to the activities, a child-friendly recipe was also included. The activities and recipe aimed to enhance the behavioral capability of parents introducing and offering new foods and being active with their child. The storyline, messages, and activities were adapted from the *Food Friends®* classroom curricula and home connection materials, are based on Social Cognitive Theory constructs, and have previously been tested with the target audiences for comprehension and behavior change outcomes.<sup>13–18,21</sup>

The storybook prototype, developed by nutrition and physical activity experts and a marketing firm, was read to preschoolers by their classroom teacher. An eleven question survey was conducted with teachers to ascertain appropriateness of story length, language, and format as well as perceived acceptability by children.

## RESULTS

### Focus Groups

Thirty-three mothers were recruited from parent groups, but only twenty-four mothers participated, a 73% response rate. Four focus groups ( $n_1=7$ ;  $n_2=4$ ,  $n_3=5$ ,  $n_4=8$ ) were held in 3 small Colorado cities, achieving theoretical saturation. The majority of mothers (92%) had at least one child between the ages of 3–5 years, 2 mothers (8%) had a child aged 2 years, and 83% of households consisted of 2 parents. The mothers were mostly white (96%), aged 35–44 years (54%), with college degrees (75%).

Participants expressed that food and eating practices as well as physical activity were important contributors to their child(ren)'s overall health and wellness. When specifically probed as to whether childhood obesity was a concern, mothers strongly agreed it was not a concern at this stage in their child's life. Although not concerned about childhood obesity, mothers agreed they are doing things to prevent it such as limiting their child's sugar intake and providing a balanced diet. There was no mention of physical activity behaviors when the topic of obesity was discussed.

Mothers indicated a range of frustration levels with their child's eating habits. Challenges they encountered included 'food jags', child's unwillingness to try foods, child not wanting different foods to touch each other, control issues, and table manners (e.g. sitting at table, engaging child in mealtime conversation). Mealtime was often described as a 'power struggle' and mothers indicated children often rejected food. Several mothers reported handling food rejections with bite rules.

We've just started the, you're four, you have to have four bites of everything before mommy will make you something else.

Other mothers indicated they tried offering a variety of foods in hopes their child would eat something from what they offered.

When asked about methods of introducing new foods, overall mothers agreed, that involving children in the process of preparing, cooking, buying, and growing food helps as does utilizing storybooks.

He loves to cook and he's definitely more willing to taste it if he has cooked it. We talked about Green Eggs and Ham and that helped a little bit.

Further, parent and sibling modeling has helped to increase children's willingness to try new foods. When looking for ways to improve children's pickiness mothers agreed they looked

to people with previous experience (e.g. other moms, friends, family members), information online, online networks and support groups, books for parents, cookbooks, activities for children, recipes for parents and children, and their pediatrician.

Several mothers agreed there were no barriers to accessing materials to help improve their child's pickiness, while others identified barriers such as, time, cost, lack of skills to cook new dishes, challenge of trying new recipes that meet family's preferences, and lack of desire to cook.

I love eating but I hate cooking and I feel like that's a huge barrier for me because I'm not willing to try new recipes.

In order to decrease barriers, mothers identified new recipes, cooking classes, and preparing meals ahead of time as helpful.

Mothers indicated interest in home-based nutrition programming. Mothers who stated their child was a picky eater indicated they would seek out a nutrition program targeting picky eating, whereas mothers without picky eaters in general would not. Others felt that preschool teachers or other adults would be more effective at influencing their child's eating behaviors rather than themselves. Mothers were most interested in a structured, organized, flexible program provided as a kit with supporting material; including parent education (e.g. book, DVD), placemat, stickers, storybooks, recipes, cookbooks, DVD for children (e.g. movie, exercise video), puppets, and posters. Mothers overwhelmingly agreed that they look to other moms for ideas and support and expressed a desire for a DVD, blog, or web-based message board that would serve as a support group.

When asked what role physical activity plays in the overall health and wellness of their child, the majority of mothers strongly agreed that it plays a large role and is equally as important as nutrition. Mothers in one group agreed with the comment,

I think I have to take more initiative with the eating part because it seems like the physical part is very natural.

Mothers also acknowledged that personality and gender play a role in the physical activity level of children. Therefore, with some children it is necessary to instigate physical activity whereas for other children it comes natural:

It's absolutely important and with my 7 year old it's not a problem. It's hard to keep him indoors but my 5 year old; she's more of an indoor gal.

Mothers strongly agreed that the amount of physical activity their child receives is adequate. Inclement weather was identified as the primary barrier to physical activity.

I think it's a challenge in the winter and you can only do so much in the confines of your home.

Moreover, mothers have not worked on specific gross motor skills and as one parent illustrated with this quote,

I don't think I've put a huge amount of importance on that [gross motor development]. I think that on their own they [children] balance it out pretty well.

There was little interest in structured home-based physical activity programming targeting physical activity level or obesity. Mothers agreed a physical activity program would be more effective in the preschool setting. However, mothers were more receptive to the term 'gross motor development' and indicated interest in information on this topic. Mothers expressed interest in an evidence-based parent guide, rather than a program targeting their child.

I would like, because I'm not trained in this in any way, a book that would explain, you know when a child is bouncing something off a wall, how that helps with their motor planning...I don't need a rope, I don't need a ball, I don't need anything, just a quick book to explain the development portion.

However, other mothers expressed interest in supporting materials they don't already have at home (e.g. jump ropes, activity mats, scarves, DVD with music) to accompany parent information.

After hearing a brief overview of the concept of the *Food Friends*® storybook, mothers strongly agreed they liked the concept of including a parent page, storyline, and activities. For creative concepts, mothers strongly agreed they needed to be believable, appealing to kids, creative, and clever, without forcing messages.

The story has to be solid. I think engaging illustrations. No preachiness. If it rhymes it shouldn't feel forced and dorky but with whimsical elements that appeal to young children, the repetition and the silliness.

After being shown various storybook options (sizes and binding), the majority of mothers preferred an 8.5" by 11" book that is durable and softbound to reduce cost. Overall mothers liked the idea of having supporting material(s) accompany the storybooks, but agreed they would avoid it if it significantly increased cost. They preferred materials such as a small figurine, finger puppet, or placemat. They also liked the idea of going to the *Food Friends*® website to purchase additional materials

## Interviews

Intercept interviews were conducted with 30 parents of children attending preschool programs. Interviews further confirmed acceptability of the proposed storybook concept, including recipes, physical activities and activities reinforcing school readiness skills. Additionally, parents confirmed the desired format as a softbound book that they could keep, and interest in additional information via the *Food Friends*® website.

## Storybook Prototype

The resulting storybook prototype, titled *Yummy in My Tummy*, was 8.5 by 10 inches in size, contained 501 words in 24 pages plus a front and back cover. To gauge comprehension and appropriateness of the story for preschoolers, eight prototype pretesting readings were conducted (n=94 children). Eleven teachers and teacher assistants completed a survey immediately after the reading took place. A high percentage of teachers agreed or strongly agreed with the appropriateness of the story's length (81.9%) and language (90.9%); liked the format (introductory page, storyline, and activities) (66.6%) and the activities (100%). All teachers (100%) felt the students' attention during the reading was normal or better than normal when compared to usual story time readings.

## DISCUSSION

The purpose of this study was to explore perceptions and expectations that mothers have about eating and physical activity behaviors of preschool-aged children and interest or need for storybooks to encourage healthy eating and physical activity at home. Results from this study show mothers positively perceived storybooks as a modality to convey and reinforce health messages for their preschool-aged children. Storybooks can be a creative, practical, child-driven method to reach parents with nutrition and physical activity messages in the home.



Research showed that mothers indicated frustration and need for assistance in dealing with picky eating behaviors of their preschool-aged children. These findings are consistent with other studies, indicating many parents of preschool-aged children struggle with this issue.<sup>22–26</sup> In the current study several mothers reported handling their child's picky eating with 'bite rules' and described mealtimes as a 'power struggle'. Research suggests parenting practices dealing with picky eating may be contributing to mealtime struggles and parents should focus less on picky eating and more on modeling.<sup>27</sup> The United States Department of Agriculture's Food and Nutrition Services' core nutrition messages for low-income mothers of preschoolers reinforce the importance of role modeling, cooking and eating together, and division of feeding responsibility to address factors that influence moms and children to make healthier food choices.<sup>26</sup> Strategies to reach mothers across all income levels are needed to improve dietary practices in early childhood, as interventions targeting modeling can increase preschool children's consumption of fruits and vegetables<sup>28</sup> and interventions aimed at parenting practices may help reduce parental use of pressure during mealtime.<sup>26,29</sup>

In the current study, mothers perceived physical activity to be 'natural' while providing adequate nutrition was perceived as more difficult. Similarly, a study by Dwyer *et al* reported parents believe preschoolers are naturally 'programmed' to be active<sup>7</sup> and another study reported parents often perceive nutrition to be their responsibility while assuming less responsibility for levels of physical activity.<sup>30</sup> Mothers in the present study were more receptive to the term 'gross motor development' rather than physical activity. Parents may feel responsible for the gross motor development of their child; yet perceive physical activity as 'natural'. As a result, physical activity messages need to be targeted to resonate with parents.

Understanding the nutrition and physical activity beliefs and practices of mothers with young children was a key first step in the development of the storybook prototype. Focus group findings illuminated the knowledge and skills of this target audience, as well as clarified mothers' expectations of healthy eating and the value they place on overcoming picky eating and incorporating physical activity into their daily lives. The storybook prototype included a parent page containing parenting tips, emphasizing modeling of the targeted nutrition and physical activity behaviors. While the focus group questions focused on behavioral capability, additional Social Cognitive Theory constructs were applied in the development of the storybook prototype, including reciprocal determinism and expectations. A simple message ('Be a good role model') on the parent page established the expectation that if parents eat the same foods they serve their child(ren), it will create a positive environment conducive to encouraging children to try new foods. Moreover, providing activities for parents to do with their children, including a child-friendly recipe, increases ones behavioral capability of being a positive role model. Lastly, by acknowledging the critical interaction between personal beliefs, the home environment and the overall desired behavior (offering new foods to your child/be more active as a family), meaningful messages, such as modeling, were developed blending new information with prior knowledge and expectations.

The current study had several limitations. Focus group participants were all mothers who were educated (75% had a college degree or higher); had annual household incomes greater than \$50,000; and were predominately white. Thus, study results are not generalizable to fathers and populations with lower levels of education or income. Focus group participants ideally should not know each other. However, mothers were recruited from existing parent groups; so many mothers knew each other. Lastly, self-selection bias may have occurred, as focus group participants may have been more interested in their child's health than those who chose not to participate.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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### IMPLICATIONS FOR RESEARCH AND PRACTICE

Mothers acknowledged picky eating as an issue with young children. Although they were less likely to identify physical activity as an issue, mothers expressed interest in information pertaining to gross motor development. This audience conveyed limited knowledge, skills, and self-efficacy to address picky eating and little interest in incorporating additional physical activity into their preschoolers' daily routine. Thus, developing messages and materials which resonate with mothers is critical to enhancing their behavioral capability of establishing healthy eating habits and physical activity patterns in their preschooler. Storybooks are a creative modality which can be utilized to influence parenting practices and promote and facilitate parent modeling. Future interventions utilizing storybooks should consider assessing children's comprehension and cognitive understanding of the story<sup>31</sup>, implementation of suggested activities by parents with children, and changes in feeding behaviors and practices.