JOURNAL OF SCHOOL HEALTH
American School Health Association

RESEARCH ARTICLE

A Structured, Interactive Method for Youth Participation in a School District-University Partnership to Prevent Obesity

JANET C. MEININGER, PhD, RN, FAAN[a]
LISA R. REYES, PhD, FNP[b]
BEATRICE J. SELWYN, ScD[c]
SANDRA L. UPCHURCH, PhD, RN[d]
CHRISTINE A. BROSNAN, DrPH, RN[e]
WENDELL C. TAYLOR, PhD, MPH[f]
EVANGELINA VILLAGOMEZ, PhD, RN, CDE[g]
VIANEY QUINTANA, RN, BSN[h]
BRIDGETTE PULLIS, PhD, RN[i]
DENISE CAUDILL, DrPH[j]
SHARON STERCHY, EdD[k]
MELINDA PHILLIPS, BSN, RN[l]

ABSTRACT

BACKGROUND: The involvement of school-age children in participatory research is described in the context of a school district-university partnership to prevent obesity in children. The purpose of this study was to elicit, from children in kindergarten (K) through sixth grade, perceptions of foods and activities that would inform the design of developmentally appropriate interventions to prevent and reduce childhood obesity.

METHODS: Children (N = 218) were selected through a random sample of K through sixth grade classrooms in 3 schools. They participated in structured, interactive, small group exercises focused on perceptions of foods (taste and healthy/unhealthy) and activities (fun and active/sedentary). High school students in the same school district were trained to facilitate the children's groups in collaboration with university faculty and students.

RESULTS: Qualitative data analysis was used to discern patterns across grade levels. There were grade-level differences in perceptions of the taste and healthfulness of foods. Younger children (K-1) equated foods that tasted good with foods that were "good for you." Older children were more discriminating and gave reasons for their perceptions. For activities, fun was positively associated with the number of people involved and the amount of movement. There were fewer differences across grade levels in preferences for types of sedentary activities, compared with sports and other activities that "make you move."

CONCLUSIONS: The findings have implications for developmentally appropriate health promotion interventions to prevent obesity. These structured but highly interactive methods could be used by school personnel to assess the unique needs of a school population.

Keywords: participatory research; school-age children; foods; activities; health.

Citation: Meininger JC, Reyes LR, Selwyn BJ, Upchurch SL, Brosnan CA, Taylor WC, Villagomez E, Quintana, V, Pullis B, Caudill D, Sterchy S, Phillips M. A structured, interactive method for youth participation in a school district-university partnership to prevent obesity. J Sch Health. 2010; 80: 493-500.

Received on March 25, 2009
Accepted on May 11, 2010

The epidemic of obesity in the United States is disabling, deadly, and costly. National estimates for 2003 to 2004 indicate that 17.1% of children and adolescents were overweight (±95th percentile) with an increasing trend over time for both male and female children and dramatic increases among children in racial and ethnic minority groups in the United States.[1]

These trends in youth obesity have led to increased interest in interventions based in schools, where the vast majority of children spend large portions of most weekdays. A recent review and meta-analysis concluded that school-based interventions have had modest, but significant effects on children's weight. Some evidence exists for effectiveness of a large number of program components, although an optimal combination has not been identified.[2] Different combinations may be needed for specific populations.[3] Effectiveness and sustainability of changes may be enhanced by engaging community stakeholders in the program design process.[4]

The University of Texas Health Science Center at Houston (UTHSC-H) has worked in partnership with the Aldine Independent School District (AISD) since 2001.[5,6] In the current project, the partnership is developing approaches to prevention and reduction of obesity in kindergarten (K) through sixth grade children. In order to tailor program components to this target population, participatory research methods were used to elicit perceptions of stakeholder groups regarding factors that influence children's eating patterns and activities. Stakeholder groups included school children in K-sixth grades, parents, and school personnel. This article focuses on the children with regard to their perceptions of foods and activities.

The purpose of this study was to elicit, from children in K through sixth grade, perceptions of foods and activities that would inform the design of developmentally appropriate interventions to prevent and reduce childhood obesity. Children were viewed as experts in their likes and dislikes of particular foods and activities, their perceptions of foods as good for them or not good for them, and their perceptions of activities that are physical as opposed to sedentary.

Perceptions of taste and liking of foods are major determinants of food choices and these perceptions are modifiable.[7] Beliefs about foods, such as their perceived healthfulness, also influence behavior,[8] but little is known about changes in perceptions that occur with development. Such knowledge would help to discern critical targets and opportunities for interventions to modify perceptions that would lead to healthier food choices. Children's preferences for physical activity and perceived enjoyment have been associated with their physical activity,[9] and these perceptions are amenable to change through intervention.[10-12] Body movement has been identified as a primary criterion older children use to judge activities,[13] but little is known about perceptions of younger children.

The following research questions were addressed:

1. Which foods do K-sixth grade children like/dislike and how are their likes/dislikes related to their perceptions of foods as healthy or unhealthy?
2. Which activities do K-sixth grade children like/dislike and how are their likes/dislikes related to their perceptions of activities as physical or sedentary?

K-sixth grade students participated in structured, small group exercises to discuss their perceptions of foods and activities. High school students enrolled in the same school district were trained to facilitate the children's groups as members of the research team. This approach was selected not only to engage members of the community in the research process but also to promote an open and expressive dialogue with elementary school children by balancing the power of facilitators relative to participants.[14,15] High school students were the facilitators of choice because children are more likely to confide in older children they

[a]Lee and Joseph D. Jamail Distinguished Professor, (Janet.C.Meininger@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 712, Houston, TX 77030.

[b]Assistant Professor of Clinical Nursing, (Lisa.R.Reyes@uth.tmc.edu) University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Houston, TX 77030.

[c]Associate Professor, (Beatrice.J.Selwyn@uth.tmc.edu), University of Texas Health Science Center at Houston, 1200 H. Pressler Drive, Houston, TX 77225.

[d]Associate Professor, (Sandra.L.Upchurch@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 711, Houston, TX 77030.

[e]Associate Professor, (Christine.A.Brosnan@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 844, Houston, TX 77030.

[f]Associate Professor, (Wendell.C.Taylor@uth.tmc.edu), University of Texas Health Science Center at Houston, 7000 Fannin Street, Suite 2670, Houston, TX 77030.

[g]Assistant Professor, (Evangelina.T.Villagomez@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 665, Houston, TX 77030.

[h]Staff Nurse, (vxquinta@texaschildrens.org), Texas Children's Hospital, Cardiovascular Intensive Care Unit, 6621 Fannin Street, Houston, TX 77030.

[i]Assistant Professor of Clinical Nursing, (Bridgette.R.Pullis@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 729, Houston, TX 77030.

[j]Evaluation Consultant, (denisecaudill@cox.net), The Outcome Zone, 2200 Dublin Road, Oklahoma City, OK 73120.

[k]Director of Physical Education/Wellness, (ssterchy@aldine.k12.tx.us), Aldine Independent School District, 14909 Aldine Westfield Road, Houston, TX 77032.

[l]Director of Health Services, (mphillips2@aldine.k12.tx.us), Aldine Independent School District, 14909 Aldine Westfield Road, Houston, TX 77032.

Address correspondence to: Janet C. Meininger, Lee and Joseph D. Jamail Distinguished Professor, (Janet.C.Meininger@uth.tmc.edu), University of Texas Health Science Center at Houston, 6901 Bertner Avenue, Suite 712, Houston, TX 77030.

see as ''more like themselves'' rather than adults who seem more like authority figures.[14]

Community-based participatory research (CBPR) methods are used to gain an understanding of what the community believes the health problem to be and to engage the community in creating and implementing solutions.[16,17] Recent studies related to childhood obesity that used the CBPR model restricted the role of the children to that of being subjects for anthropometric data collection,[18-21] or involved adolescents.[22] One previous study explored children's experiences and perceptions of physical activity and their environments.[23] The current study builds on the growing efforts for more extensive participation of children in all aspects of the research process by involving K-sixth grade children as active stakeholders in the partnership. By viewing children as experts in their food and activity choices, the children became another voice for their community.

METHODS

Participants

Collaborators in the partnership included UTHSC-H faculty and students (medicine, nursing, and public health) and AISD administrators, faculty, school nurses, physical education teachers, and students. A consultant in participatory action research (D.C.) worked with the partnership in clarifying aims, designing data collection methods, training and supervising facilitators and recorders, and analyzing data.

AISD, one of the largest school districts in Texas, has over 62,000 students enrolled in 72 schools. The student population is 67% Hispanic and 28% African American, with 72% economically disadvantaged. For this study AISD chose 3 schools that were geographically accessible to the university and demographically similar to the district as a whole: 2 elementary schools (K-4) and 1 intermediate school (5-6). The schools' multiethnic population was 62% Hispanic and 31% African American, with 83% economically disadvantaged. In the 3 schools, 28.7% of the children had a body mass index at or above the 95th percentile, with an additional 17.9% between the 85th and 95th percentile of US norms.[24]

One high school in the district was also a partner in the research. High school students, who were interested in health careers and enrolled in a health professions class, were trained to facilitate groups of elementary school students. Among 25 participating high school students, there were 19 seniors, 6 juniors, 21 females, 8 African Americans, 4 Asian Americans, 2 European Americans, and 11 Hispanic Americans.

Children in grades K-6 were selected by a random sample of classrooms. Parents were sent a letter explaining the study with a return postcard to indicate refusal of their child's participation. On the days of data collection, children who had parental permission were given an opportunity to assent or decline participation. There was a 95.4% positive response; approximately half of nonresponse was due to parental refusal, and the remainder resulted from failure to deliver the letter, withdrawal from school, or absence on the day of data collection. Thirty-six groups of children participated with approximately 6 children of the same grade in each group.

Boys and girls were together in the same groups for K through second grade children; for third through sixth grades, there were separate groups for boys and girls; mixed-gender groups of older children could inhibit free expression of ideas.[25] There were 218 children, with approximately equal numbers of male (n = 108) and female (n = 110) participants.

Procedure

The K-sixth grade participatory groups, called Group Information Gathering Sessions (GIGS), were grounded in participatory research methods, specifically those developed by Chambers.[26,27] Visual methods and a relaxed atmosphere were created so that children felt open and free to tell us their perceptions. Each GIG included 2 topics: (1) foods the children liked/disliked (words used were ''yummy'' and ''yucky''), why they liked/disliked them, and if the foods were good/not good for them; and (2) activities the children thought were fun/not fun, why they thought that, and if they moved a little/a lot when performing them. These exercises were based on previous research on correlates and predictors of children's food and activity choices[7-13] and longer term plans for designing health promotion programs. The same visual prompts were used for all GIGs with both pictures and words to convey the meaning of categories (Figures 1 and 2). Six of the 36 randomly selected classroom groups were bilingual (English and Spanish). These GIGs were conducted in Spanish with all cards and notes written in Spanish.

Each GIG session was designed to take a 40-minute class period. We began with a card or pile sort exercise[27] in which children brainstormed foods or

Figure 1. **Template of Matrix Used for Children to Categorize Foods**

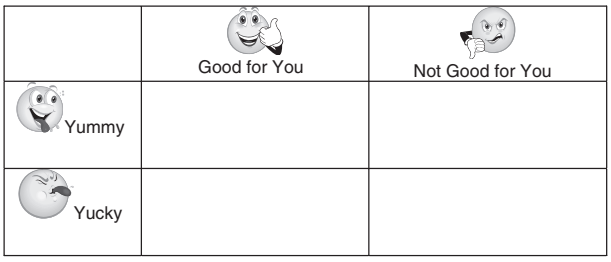
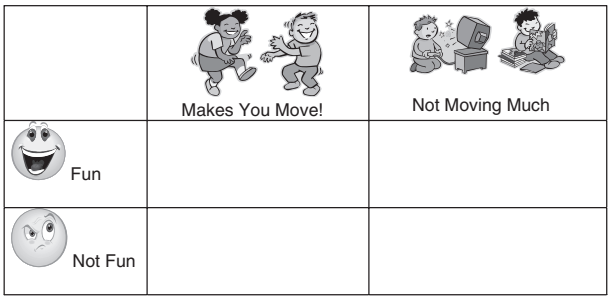


Figure 2. **Template of Matrix Used for Children to Categorize Physical Activities**



activities to generate the set of information cards for the rest of the exercise. Everyone sat in a circle on the floor with visual prompts and cards placed in the center. Facilitators encouraged children to move around during the exercises and to move the cards as they categorized their responses. The process began with the visual prompt for ''yummy'' and asking what foods children thought were yummy—going around the circle so each child had a turn to respond and then allowing them to call out names of other foods as they thought of them. Facilitators rapidly wrote each response on a separate card and placed them on the floor under the correct prompt. Next, facilitators asked the group why they thought the foods were yummy with responses recorded by the note taker in a notebook. Then, children were asked what foods they thought were yucky. Cards with their responses were created, followed by eliciting their reasons and a record made of the responses. Visual prompts were added for ''good for you and not good for you.'' Children were asked food by food to categorize each as ''good or not good for you.''

Younger age groups easily categorized foods into good/not good, while the older age groups debated such concerns as whether fried chicken was good for you or not. Reasons for whether or not a food was good for you were elicited. The ''yummy'' and ''yucky'' signs were reintroduced and the cards were moved into a matrix (Figure 1). With the food matrix created, children were asked to observe which parts of the matrix had the most or least cards, to notice which foods were in the different parts of the matrix (older children) and to comment about characteristics of foods that clustered together.

A similar process was followed for activity starting with cards for activities that were fun, then not fun; students sorted the cards into ''makes you move'' or ''not moving much.'' Once the activity matrix (Figure 2) was created, children were asked to observe the parts of the matrix that had the most/least cards and to comment on characteristics of activities in the 4 quadrants. Note takers recorded all comments.

If children thought that a food or an activity could be categorized in 2 places, an additional card was made and placed in both areas. When group members differed about where a food or activity belonged, a mixed or undecided category was created, and the number of children favoring each option was recorded along with the surrounding discussion. During GIGs children stood, lay down, danced around, or sat as they gave their responses. In all GIGs, as children warmed to the exercises, they began crowding around the matrix and facilitators. In GIGs with fifth and sixth graders, children spontaneously moved the cards around into groups and made observations and comparisons.

All facilitators were educated and certified in the protection of human research participants. A manual was developed with the step-by-step protocols, responsibilities, and instructions for the GIGs and for data processing. Training sessions included didactic material as well as role playing and practice sessions. Before data collection began, a pilot test was conducted with 96 children in 16 groups.

Facilitators, who worked in pairs, were responsible for setting the atmosphere for the GIGs, encouraging participation, keeping track of time and conducting the exercises. High school students were the facilitators of choice, but university students and faculty facilitated groups (12 of 36) when high school students were not available. Note takers (university faculty members, nursing, or public health students) recorded the number and gender of participants, and wrote down opinions expressed by children that were not written on cards. Note takers sat outside the circle, behind participants, observing the process in an unobtrusive manner.

On each data collection day, the participatory research consultant assigned team members (2 facilitators and a note taker) for each GIG and reviewed key points for group facilitation. University faculty members obtained the assent of K-sixth grade children and escorted them to a classroom for the GIG. After the GIG was finished, team members immediately entered the data into a computerized template. All data were entered in English. GIGs that had been conducted in Spanish had facilitators and note takers who were bilingual. Working together they translated words and comments into English. In all groups, the note taker double checked that information was recorded accurately.

Data Analysis

Different sets of research team members analyzed food data and activity data using a process of cutting and sorting.[28] First, lists of cards and statements of opinions and comparisons from the data file of each GIG were printed on color-coded paper. Data segments were manually cut into individual words, sentences,

or paragraphs. Data across all groups at each grade level were compiled on a poster board. Color coding of data at each grade level allowed analysts to recognize the source of data (by school or gender), while looking for common themes across all groups at that grade level. Comparisons across posters were made to analyze similarities and differences across grade levels.

The goal was to identify patterns in the data and possible reasons for those patterns. First, team members independently used the following procedure: (1) read over all the material; (2) referred to the questions that guided the GIGs and used them as a framework; (3) grouped the information and kept track of the decision rules used to delineate patterns; and (4) considered where group patterns emerged and reflected on personal ideas and reactions to the data. Second, team members discussed their individual analyses with each other and achieved consensus regarding their description of the patterns. Preference was given to use of words that came from the data, in order to stay consistent with the community's information and categories whenever possible. Third, the analysis teams for foods and activities met together to discuss all of the results, to achieve consensus validity, to create understandability, and to look for commonalities and contrasts across grade levels and between genders. Finally, findings were synthesized into tables. A specific food or activity was included in the final synthesis table only if it had been identified by a majority of groups at a given grade level. These final tables were compiled by one team member and then independently validated by a second team member. Discrepancies were identified and discussed, returning to earlier stages of the analysis as necessary to resolve any differences.

Throughout data collection and analysis phases of the project, all of the researchers reminded themselves and each other to be critically self-aware and reflect on whether personal biases may have affected interpretations of data. We worked to ensure trustworthiness that the data reflected the reality of the children rather than our own realities.[29]

RESULTS

Table 1 synthesizes and emphasizes reasons children gave for their perceptions of foods, by grade level. Younger children equated foods that tasted good with foods that were ''good for you,'' but beginning with second grade, children expressed the belief that foods that were ''yummy'' were ''not good for you,'' and those that were ''yucky'' were ''good for you.'' Older children produced longer lists of foods that were ''not good for you,'' compared with younger children.

Across increasing grade levels, children began mentioning food components such as proteins, carbohydrates, fats, and vitamins that contribute to healthfulness of foods. Beginning with third grade, children were more discriminating in their knowledge of foods perceived as being either good or not good for them. Children in fourth grade were aware that sugar added to a healthy food such as cereal can make it unhealthy. Children in higher grades had more ''mixed'' decisions about whether foods were healthy or unhealthy and gave reasons for their perceptions. For instance, chicken could be good for you or not good for you depending how it was prepared.

Children of all ages liked sweet foods and those that made them feel good in some way (ie, ''gave them energy,'' ''got their tummy full,'' or ''reminded them of the country they were from''). On the other hand, foods with a bad appearance (gooey, slimy), bad smell (onions), or bad taste (broccoli) were disliked. Children were consistent in that foods that were ''green'' or ''from the sea'' were good for them and foods that contained excess amounts of bones, sugar, cheese, grease, fat, and salt were not good for them.

Table 2 presents a synthesis of fun activities, by grade level, with 2 classifications: fun activities/make you move and fun activities/not move much. For the first classification, from grades K-4 the predominant theme was ''playing'' with others. Examples included racing, jumping rope, swimming, bike riding, and tag. Also, this group listed basketball, football, soccer, and baseball as organized sports. For fifth and sixth graders, the most frequently mentioned fun activities that make you move were swimming, volleyball, and soccer. In grades 3-6, gender-specific preferences were cited: for girls, dancing, cheerleading, shopping, and going places; for boys, wrestling, football, and dodge ball.

For fun activities/not move much, preferences for grades K-6 were similar including ''video games'' and ''playing'' with cards, toys and action figures. In addition, girls in grades 3-6 specifically mentioned listening to music and singing.

Across all grade levels, children reported they were more likely to move a lot while outdoors, and level of ''fun'' was positively related to the amount of movement and the number of people involved. Some ''not moving much'' activities were considered boring by most children and for this reason they did not like to spend much time performing these (ie, reading, doing chores, and watching younger siblings).

DISCUSSION

Grade-level differences were evident in the perceptions of foods that were healthy or unhealthy. As a whole, children were very knowledgeable about foods, and their understanding of specific nutrients and methods of preparation increased with age. It is notable that a transition occurred at the second grade level with children disliking foods that were perceived as ''good for you''; in contrast, younger children equated foods that ''tasted good'' with foods that were

Table 1. **Synthesis of Children's Perceptions of Foods by Grade Level**

Grade	Good for You	Not Good for You
Kindergarten	At this grade level children perceived food to be "good" if it "made you strong," if they were "healthy," had "no sugar." Cereal, tacos, milk, and eggs were liked, "good for you" foods. Bananas and soup were disliked foods that were categorized by most groups as "good for you."	Children perceived things that tasted "nasty" or did not help them grow as "not good" for them. They made the point that sugar was not good for them. If things smelled or looked bad they were not going to eat them because they were "yucky." There was little consistency across groups in rating disliked foods as "good" or "not good for you."
First grade	Children categorized food groups and food ingredients to determine whether they were good for them. The theme of "made you strong" was interpreted as good for them again at this grade level. The food was "yummy" if it was spicy, had a good smell, good appearance, and made them feel full. Soup, apples, fish, and eggs were liked foods that were rated by most groups as "good for you."	Children perceived things that "made them fat," gave them a toothache, were "greasy," did not make them strong, or had "not healthy contents" such as salt, cheese, sugar, as not good for them. For example, a cheeseburger was not good for them, whereas the hamburger was. There was little consistency across groups in specific foods that were perceived as not good for them.
Second grade	Things that helped their "bones grow" or "made them strong" were good such as tuna, eggs, or vegetables. Tomatoes, one of the few disliked foods, were ranked by all groups as "good for you." "Meats" and "starches" were mentioned to identify groups that were good for them or not.	"Junk food," "greasy foods," food that hurt their stomachs, were too sweet, made them fat, and/or food hard to chew were considered "not good" for them, like pizza, hot dogs. They mentioned large portion sizes as not good for them as well.
Third grade	Girls perceived foods that made "them grow, be strong, healthy, gave energy, circulated blood and made bones healthy" as good for them. Girls perceived that all the foods that are good for them taste bad and the "good for you foods" could be identified by food groups such as vegetables and meats. Boys believed that "foods that made them grow" or "preventing them from getting sick" were good for them, like "healthy meat, vegetables." Girls liked foods that were "refreshing," whereas boys liked foods that had protein, cheese, or were easy to eat. Boys associated the terms of "good for you" with the term of "wellness" and mentioned that some foods would be good for when you have cold.	Girls noted that food that made them fat, was not good for their heart, gave them heartburn, slowed them down, made them sleepy, or did not give them energy as not good for them. The girls added that increasing portion sizes of food was not good for them. Foods that were nasty, too spicy, were raw, had a bad smell, or texture were perceived by the girls as not good for them, like fish, tuna, and cheese. Boys listed food not being good for them if the food smelled bad (like girls), was greasy, too sweet (boys listed cereal) or salty, may cause acne like chocolate, or gave them gas as not good. Both boys and girls disliked vegetables.
Fourth grade	Girls perceived foods that made you strong as good for them, such as milk and vegetables. Yet in contrast, girls named foods they liked such chocolate, foods that were fried, salty, and crunchy, had different flavors, and foods that were hot and spicy. Boys liked foods that reminded them of their parent country or state, helped them lose weight, and, like girls, if they made them strong.	Girls did not like candy because the dentist would have to pull your teeth. They did not believe that food that was greasy or fat, was unwashed, had bones, eyes, teeth, turned your teeth yellow, made your breath smell were good for you. Boys perceived foods to not be good for them if they made you nauseous, fat, lazy, had no vitamins, were greasy.
Fifth grade	Foods they considered as good for them were foods that came from "the ground," were plants, and had chicken in them. Unlike girls, boys mentioned tomatoes, lettuce, oranges, and seafood as both "yummy" and "good for them."	Both boys and girls noted that foods that were too spicy, had caffeine, had sugar, or too much grease were considered not good for them, like pig meat, pudding, and cake. Things that were "yucky" to them were foods that "had no seasoning, had a smell, were nasty, and made them want to throw up."
Sixth grade	Children mentioned that if the teachers told them the food was good for them, then they thought it was good for them, like fruits and vegetables, meat, and diary products. They were thinking in terms of food groups and meal plans at this grade level. Children believed that items that were grilled were "good for you," noting preparation as a way to make food healthier or "good for you." Boys noted that they thought foods they liked, for example, chicken and pasta were "good for you."	They believed that foods that constipated them like cheese were not good for them. Foods that increased their cavities, made their breath smell, made them fat, were greasy were not good for them like, soda, pork, and lots of cheese. Girls focused on ingredients of entrees and their preparation to consider whether they were unhealthy for them. Boys categorized foods as unhealthy if they contained sugar or fat in them like french fries, chips, candy, and cake.

''good for you.'' The children had positive attitudes toward activities that ''make you move'' and had fun with a wide range of sports and games. On the other hand, video games and other sedentary activities were favored across all grade levels, revealing the influence of technology on activities and preferences of children.

Strengths of the study include the innovative ways of involving school-age children as partners in research, rigorous methods for training, data collection and analysis, involvement of a consultant with extensive experience in participatory research methods, random selection of a diverse group of children,

Table 2. **Synthesis of Children's Perceptions of Activities by Grade Level**

Grade	Fun Activities/Make You Move	Fun Activities/Not Move Much
Kindergarten	The predominant theme was "playing" with others including siblings and cousins, friends, and pets. The only organized sport identified by most groups was baseball.	"Playing" was the predominant theme including playing with dolls, toys, action figures, computer, and mom.
First grade	"Playing" continued to be emphasized. Specific activities such as racing, jumping rope, and swimming were identified. Basketball was the only organized sport mentioned by most groups.	"Playing" and "video games" were the leading sedentary activities. Video games were identified by first graders, as a sedentary activity that had not been mentioned by kindergarten children.
Second grade	"Playing" continued as a major theme. These children mentioned many more specific activities such as tag (eg, cut tag, freeze tag), running, bike riding, swimming, jumping rope, and hide and go seek. Organized sports, including basketball, football, and soccer were mentioned by several groups.	"Playing" and "video games" were themes including playing with dolls and card games.
Third grade	Both girls' and boys' groups specifically mentioned "playing" with others, in the back yard, at the park, on a trampoline, and with pets. Many more specific activities were identified. Both boys' and girls' groups mentioned swimming, bike riding, and basketball. Specific sports mentioned by boys were soccer and baseball. For girls, jumping rope and running predominated with dancing and cheering also mentioned by a majority of the girls' groups.	"Playing" was a theme for girls in the context of dress-up and with musical instruments. Girls' groups mentioned listening to music, singing, talking on the phone, and sleeping. For boys, a consistent theme was video games, with many specific game systems mentioned.
Fourth grade	Both boys and girls identified soccer and basketball as fun activities that make you move and "playing" with others and pets. Several boys' groups identified wrestling, riding bikes, and baseball. Unique to girl groups at this level were swimming and "going places" (eg, park, store, gym, and mall).	Video games were mentioned by both boys and girls as fun activities that do not involve much movement. In addition, girls' groups at this level specifically mention playing with computers, play dough, and playing music.
Fifth and sixth grades	Boys' and girls' groups talked about swimming, volley ball, and soccer as fun activities. Those specific to girls were shopping, going places, dancing, jumping rope, and riding bikes. Football and dodge ball were the only additional activities specifically mentioned by several boys' groups.	Video games and talking on the phone were identified as fun sedentary activities by both boys and girls. In addition, girls mentioned listening to music and watching television (eg, movies).

and extensive collaboration among educational and health professionals in the context of an ongoing partnership. Our challenge is to combine the findings from this study with other sources of information to develop effective health promotion programs in collaboration with the school district.

Limitations

The results are based on 1 school district; therefore, appropriate caution is required in generalizing the results to other school districts. The level of knowledge observed among children in this study may not be generalizable to other school districts. Schools volunteered to participate. Other schools, personnel, parents, and children may be less willing and able to actively engage in a similar partnership. We based our decision to use high school students as group facilitators on evidence that this would equalize the perceived power of facilitators and participants, yielding a more open and free discussion. Nevertheless, this was a novel approach in the context of a school-based health study, and further research is necessary to document that the results are equivalent or superior to using adult facilitators. Finally, the data were analyzed to highlight differences across grade levels as a proxy for developmental differences. Other factors such as ethnic/racial group differences or body size may influence children's perceptions of foods and activities, but this study was not designed to discern such influences.

Conclusions

These findings are useful for planning programs at critical time points for school-age children. Interventions for children in the first grade or younger could promote children's healthy food choices through reinforcement of food preferences that are also healthy choices. For children in the second grade and above, efforts could be directed toward modifying perceptions that associate healthy foods with being ''yucky.'' Taken as a whole, these findings contribute to the growing

body of knowledge about children's perceptions of foods and activities and point out the need for further research on interventions to modify perceptions as potential mediators of changes in health behavior.[12]

IMPLICATIONS FOR SCHOOLS

Findings provide a basis for addressing children's false perceptions about healthy foods and activities, while building on their strengths in knowledge and attitudes that are fundamental to improvements in health behaviors. This study utilized a structured but highly interactive method of eliciting perceptions of children in K through sixth grades. School personnel using this method have a better chance of designing a program that is developmentally appropriate and targets the unique needs of their school's population. High school students can be trained to facilitate sessions with their younger peers, offering them opportunities to develop new skills. Finally, this study illustrates the advantages of school district-university partnerships to meet the educational and health needs of students. School districts and universities should seek opportunities to work with one another.

Human Subjects Approval Statement

This study was approved by the University of Texas Health Science Center at Houston institutional review board.

REFERENCES

1. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *J Am Med Assoc.* 2006;295: 1549-1555.
2. Katz DL. School-based interventions for health promotion and weight control: not just waiting on the world to change. *Annu Rev Publ Health.* 2009;30:253-272.
3. DeMattia L, Denney SL. Childhood obesity prevention: successful community-based efforts. *Ann Amer Acad Polit Soc Sci.* 2008;615:83-99.
4. Summerbell CD, Waters E, Edmunds L, Kelly SAM, Brown T, Campbell KJ. Interventions for preventing obesity in children. *Cochrane Database Syst Rev.* 2005; Issue 3. Art. No. CD001871.DOI:10.1002/14651858.CD001971.pub2.
5. Brosnan C, Upchurch S, Meininger J, Hester L, Johnson G, Eissa MA. Student nurses participate in public health research and practice through screening for obesity, diabetes, and hypertension in school-aged children. *Publ Health Nurs.* 2005;22(3):260-266.
6. Brosnan CA, Swint JM, Upchurch SL, et al. The cost of screening adolescents for overweight and hypertension using a community partnership model. *Public Health Nurs.* 2008;25(3):235-243.
7. Brug J, Tak NI, teVelde SJ, Bere E, deBourdeaudhuij I. Taste preferences, liking, and other factors related to fruit and vegetable intakes among school children: results from observational studies. *Br J Nutr.* 2008;99(suppl 1): S7-S14.
8. Story M, Neumark-Sztainer D, French S. Individual and environmental influences on adolescent eating behaviors. *J Am Diet Assoc.* 2002;102(suppl 3):S40-S51.
9. Sallis JF, Prochaska JJ, Taylor WC. A review of correlates of physical activity of children and adolescents. *Med Sci Sports Exerc.* 2000;32:963-975.
10. Ernst MP, Pangrazi RP. Effects of a physical activity program on children's activity levels and attraction to physical activity. *Pediatr Exerc Sci.* 1999;11:393-405.
11. Story M, Sherwood NE, Himes JH, et al. An after-school obesity prevention program for African-American girls: the Minnesota GEMS pilot study. *Ethn Dis.* 2003;13:S54-S64.
12. Salmon J, Brown H, Hume C. Effects of strategies to promote children's physical activity on potential mediators. *Int J Obes.* 2009;33:S66-S73.
13. Pearce PF, Harrell JS, McMurray RG. Middle-school children's understanding of physical activity: ''If you're moving, you're doing physical activity.'' *J Pediatr Nurs.* 2008;23: 169-182.
14. Morgan M, Gibbs S, Maxwell K, Britten N. Hearing children's voices: methodological issues in conducting focus groups with children aged 7-11 years. *Qual Res.* 2002;2(1):5-20.
15. Wilson N, Minkler M, Dasho S, Wallerstein N, Martin AC. Getting to social action: the Youth Empowerment Strategies (YES!) Project. *Health Promot Pract.* 2008;9:395-403.
16. Israel BA, Schulz AJ, Parker EA, Becker AB, Allen AJ, Guzman JR. Critical issues in developing and following community-based participatory research principles. In M Minkler, N Wallerstein, eds. *Community-based Participatory Research for Health.* San Francisco, CA: Jossey-Bass; 2003;53-76.
17. Powers JL, Tiffany JS. Engaging youth in participatory research and evaluation. *J Public Health Manag Pract.* 2006;November(suppl):S79-S87.
18. Bruss MB, Michael TJ, Morris JR, et al. Childhood obesity prevention: an intervention targeting primary caregivers of school children.*Obesity.* 2009;18:99-107. DOI:10.1038/oby.2009.111.
19. Chesser A, Hawley SR, St. Romain T. Community-based participatory research in developing an obesity intervention in a rural county. *J Community Health Nurs.* 2009;26: 35-43.
20. Schetzina KE, Dalton WT, Lowe EF, et al. A coordinated school health approach to obesity prevention among Appalachian youth: the Winning with Wellness Pilot Project. *Fam Community Health.* 2009;32:271-185.
21. Dart L, Frable P, Bradley P. Working with families to prevent obesity: a community-campus partnership. *J Fam Consumer Sci.* 2005;97:20-28.
22. Goh Y, Bogart LM, Sipple-Asher BK, et al. Using community-based participatory research to identify potential interventions to overcome physical barriers to adolescents' healthy eating and physical activity. *J Behav Med.* 2009; 32:491-502. DOI:10.1007/s10865-009-9220-9.
23. Darbyshire P, MacDougall C, Schiller W. Multiple methods in qualitative research with children: more insight or just more? *Qual Res.* 2005;5(4):417-436.
24. Meininger JC, Brosnan CA, Eissa MA, et al. Overweight and central adiposity in school-age children and links with hypertension. *J Pediatr Nurs.* 2010;25:119-125.
25. Leman PF, Ahmed S, Ozarow L. Gender, gender relations, and the social dynamics of children's conversations. *Dev Psychol.* 2005;41(1):64-74.
26. Chambers R. *Whose Reality Counts? Putting the First Last.* London: ITDG Publishing; 1997.
27. Chambers R. *Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities.* Sterling, VA: Earthscan; 2002.
28. Ryan GW, Bernard HR. Techniques to identify themes. *Field Methods.* 2003;15:85-109.
29. Bernard HR. *Research Methods in Anthropology: Qualitative and Quantitative Approaches.* 4th ed. New York: Alta Mira Press; 2006:453.