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SCHOOL-BASED PROMOTION OF FRUIT AND VEGETABLE CONSUMPTION IN MULTICULTURALLY DIVERSE, URBAN SCHOOLS

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Abstract

Rates of childhood overweight¹ have reached epidemic proportions (U.S. Department of Health and Human Services, 2001), and schools have been called on to play a role in the prevention of this medical condition. This article describes a multiyear health promotion effort—the Athletes in Service fruit and vegetable (F&V) promotion program—which is based on social learning theory for urban, elementary school children in kindergarten through third grade. Children participate in the program for a period of 3 years. The goals of the program are to increase opportunities for children to be more physically active during the school day and to help students increase their F&V consumption. This article describes the F&V promotion components of the program that were implemented in year 1, including implementation integrity and treatment acceptability data. Year 1 evaluation data demonstrated that the program is acceptable from the perspective of school staff and was implemented by school staff with high levels of integrity. Hallmarks of the program's successful implementation and high acceptability include (a) having a school-based program champion; (b) designing the program to include low-cost, attractive, interactive materials; (c) including many school staff members to facilitate a culture of healthy eating in the school; and (d) spreading out implementation responsibilities among the multiple staff members so that each individual's involvement is time efficient.

Rates of childhood overweight have reached epidemic proportions (U.S. Department of Health and Human Services, 2001). National data indicate that 19% of children and 17% of adolescents are overweight (Centers for Disease Control and Prevention, 2007b). These rates have tripled since 1980. Children who are poor and from certain minority groups, such as African Americans, American Indians, and Hispanics, are at even greater risk (U.S. Department of Health and Human Services, 2001). More recently, school districts have begun surveillance efforts to track rates of overweight. These efforts in New York City (Thorpe et al., 2004) and Boston (Boston Public Schools, unpublished data), where 24% and 27% of students had a body mass index (BMI) above the 95th percentile,¹ highlight the disproportionate rates among poor, minority students living in urban environments. For many students, being overweight has physical (U.S. Department of Health and Human Services, 2001), psychological (Vila et al.,

¹The term *childhood overweight* as opposed to *childhood obesity* is used in this article. This term is consistent with the Centers for Disease Control and Prevention's (2007a) nomenclature for describing children's weight status. For children, weight status is determined by a BMI percentile using age- and gender-specific normative data. *Underweight* is defined as a child being below the 5th percentile based on the age- and gender-specific norms, *Normal Weight* is defined as being between the 5th and the 84th percentile, *At Risk for Overweight* is defined as being between the 85th and the 94th percentile, and *Overweight* is defined as at or above the 95th percentile. For more information, go to www.cdc.gov/nccdphp/dnpa/bmi/childrens_BMI/about_childrens_BMI.htm.

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2004), and social implications (Davison & Birch, 2001; Erickson, Robinson, Haydel, & Killen, 2000; Janssen, Craig, Boyce, & Pickett, 2004; Strauss, 2000) that negatively impact quality of life (Schwimmer, Burwinkle, & Varni, 2003; Williams, Wake, Hesketh, Maher, & Waters, 2005).

Many complex and interacting factors contribute to the obesity epidemic (Ebbeling, Pawlak, & Ludwig, 2002). Clearly, genetics play a role in determining body size; however, human genetics have not changed dramatically enough in the past few decades to account for the increasing trajectory. What has changed is the environment, which has been termed *toxic* (Brownell, 2004). Factors such as large portion sizes; consumption of food and drinks that are high in fat and sugar; increases in sedentary activities, such as television viewing and Internet and video game use; and school district budgetary cuts to physical education are just some of the factors that have been attributed to the energy imbalance (i.e., more energy consumed than burned), contributing to overweight and obesity. Therefore, it is a combination of environment, behavior, and genetics that underlies this problem.

Prevention and intervention efforts directed toward minority children living in poor environments are particularly important. Three keystone target behaviors for the prevention of childhood overweight include (a) increasing physical activity to at least 60 minutes per day, (b) decreasing screen time to no more than 2 hours per day, and (c) increasing fruit and vegetable (F&V) consumption to at least five servings per day (Stevens-Edouard & Cavallaro, 2005). Schools are identified as excellent environments for these prevention efforts to occur (Blom-Hoffman & DuPaul, 2003). Although the primary responsibility of schools is to educate students in academic areas such as reading, language arts, math, and science, schools should participate in the promotion of healthy life skills, such as physical activity and eating behaviors. Indeed, the Child Nutrition and WIC Reauthorization Act of 2004 (PL 108–265) created a federal mandate for public and private schools that participate in federal food service programs, such as the National School Lunch Program and School Breakfast Program, to establish a local wellness policy by the first day of the 2006–2007 school year. Some of the required aspects of the wellness policy include goals for nutrition education and physical activity and specifications related to the types of foods served on school grounds throughout the school day. Additional, although not required, components of local wellness policies can address the mental, social, and emotional needs of students. The Connecticut State Department of Education (2006) published an exemplary *Action Guide* to assist school districts in establishing their local wellness policies. Once the wellness policies are developed, individual school buildings need to develop implementation and monitoring plans for their district's wellness policy. This is coordinated by a building-based health advisory council, and school psychologists should take an active role on these councils because they have important knowledge and skills to share related to mental health promotion and services and program evaluation.

The obesity prevention literature is extensive and several reviews summarizing school-based prevention efforts have been conducted (e.g., Blom-Hoffman, George, & Franko, 2006; Centers for Disease Control and Prevention, 2005; Ritchie, Crawford, Hoelscher, & Sothorn, 2006; Stice, Shaw, & Marti, 2006). More recently, Stice et al. conducted a meta-analysis of obesity prevention programs for children and adolescents. They demonstrated that nearly 80% of prevention programs did not result in statistically significant effects related to weight gain. Of the 13 programs that did have positive prevention effects, almost all of them failed to produce *long-term* effects on preventing weight gain, and the effects of only one of these programs has been replicated. Therefore, there is a significant amount of work to be done to develop empirically validated obesity prevention programs for children and adolescents.

Since the launch of the national 5 A Day Campaign in the early 1990s, which promoted consumption of at least five servings of F&Vs per day, there has been an increase in school-based F&V promotion initiatives. Increasing F&V consumption is one important objective in the effort to halt the increasing obesity trajectory because these foods are generally low in calories and high in nutrients and fiber. Despite the importance of high levels of F&V consumption, 80% of respondents to the 2005 Youth Risk Behavior Survey reported that they ate less than five F&V servings in the past week (Eaton et al., 2006). Children tend to enjoy eating fruits; however, it is common for children to dislike vegetables (Cooke & Wardle, 2005). Preferences for many foods, including vegetables, tend to remain stable from early childhood through early adolescence; however, preferences for vegetables increase with age (Nicklaus, Boggio, Chabanet, & Issanchou, 2004). One way to increase preference for nonpreferred foods, such as vegetables, is to increase children's familiarity with these foods through repeated exposure (Wardle, Herrera, Cooke, & Gibson, 2003). Therefore, efforts to increase vegetable preferences in young children are very important.

Recently, Knai, Pomerleau, Lock, and McKee (2006) conducted a systematic review of the F&V promotion literature targeting children. All 15 reviewed studies included behavior change as an outcome variable and a follow-up period of at least 3 months. Of these 15 studies, 11 targeted elementary school children, only 3 included children younger than third grade, and almost all were conducted in the United States within school settings. Of the 11 studies targeting elementary school children, 9 had significant positive effects on children's F&V consumption, with increases in consumption that ranged from 0.3 to 0.99 servings/day. Although the majority of published prevention efforts at the elementary level have demonstrated significant, positive increases in F&V consumption, at the secondary level, only one of the four studies demonstrated positive results (i.e., *Planet Health*; Gortmaker et al., 1999), and this effect was only for girls. Important intervention components derived from this review included (a) a specific focus on F&V consumption as opposed to general nutrition, (b) active student engagement to increase exposure to F&V as opposed to didactic teaching, (c) social modeling by peers or cartoon characters, (d) encouragement from school food service staff, (e) active parental involvement, (f) establishment of a school nutrition policy, and (g) community involvement (i.e., local producers and markets).

In the United States, the emphasis on teaching literacy and mathematics and the emergence of high-stakes testing has left little time in the school day and resources in the school budget to devote to health education and to help students develop health-promoting and risk-reducing behaviors that may improve the quality and length of their lives. Therefore, any health promotion program implemented in a school setting needs to be time efficient and sensitive to these competing demands. One way of addressing school-based barriers to health promotion is to integrate health topics into other curricular areas (e.g., language arts, math, science; Gortmaker et al., 1999). An alternative is to promote healthy eating and physical activity behaviors during nonacademic time in the most natural school environments (i.e., school snacks and meals, recess).

This article describes a multiyear, school-based primary prevention F&V promotion effort for children in kindergarten through third grade. The program is being implemented in time-efficient ways throughout the school day by school staff. The pilot program is based in four elementary, urban schools. The F&V promotion components of the program are grounded in social learning theory (Bandura, 1977; Table 1). To evaluate the effects of the program components on increasing children's nutrition knowledge, preference for F&V, actual eating behaviors during school lunch, availability and accessibility of F&V in the home, and children's weight status, a comprehensive program evaluation is being conducted. The design, implementation, and outcome evaluation are funded by a 5-year grant from the National

Institutes of Health. The program, as well as how to present implementation integrity and acceptability data from year 1, are described here.

METHOD

Participants and Setting

Four public elementary schools in Boston are participating in a program evaluation of Athletes in Service (AIS) F&V program. Participating schools were selected because they were already hosting the AIS program, which contained only the physical activity component during the previous year. The schools were randomly assigned to receive either AIS physical activity only ($N = 2$) or AIS physical activity plus F&V promotion components ($N = 2$). Kindergarten and first-grade students, whose parents provided written consent for them to participate in the outcome evaluation in the spring or fall of 2005 ($N = 297$; 56% participation rate), comprised the program evaluation cohort. However, all students in these classrooms receive the program. In both groups, half of the children were boys (51%), and the mean age was 6.2 years old at the start of the study. According to parent report ($N = 196$; 65%), the majority of participating children receive free or reduced price lunch (experimental group = 94%, control group = 88%), and were members of racial and ethnic minority groups (experimental group = 97%, control group = 96%). At baseline, nearly half of the children in the study were either at risk for overweight or overweight (experimental group = 40%, control group = 45%).

Program Description: Athletes in Service Fruit and Vegetable Promotion Program

AIS was a school-based program that was structured around a former college athlete (i.e., an *Athlete in Service*), who worked full time in a school as a champion of health promotion. The original AIS program included structured recess that was based on the Sports4Kids curriculum (www.sports4kids.org). In addition, the Athlete in Service worked with the school's physical education (PE) teacher to provide assistance during PE class time. Beginning in the 2005–2006 school year, F&V promotion components were integrated into the AIS program. Table 1 describes the F&V promotion program activities, the materials that were required to implement these activities, the school staff who were involved in implementing these aspects of the program, and the program's links with social learning theory. The F&V promotion program components included whole school, classroom, lunchroom, and family activities. These program components were designed with the following seven elements in mind:

1. *Saturating the school environment with health promotion messages.* The program components were designed to saturate the school environment with the 5 A Day message and to carry this message into the home setting. Consistent messaging, using the Dole animated F&V characters (<http://dole5aday.com>), was present across multiple school settings (Table 1).
2. *Involving as many individuals as possible with time-efficient responsibilities.* Responsibility for program implementation was relegated to multiple individuals in the school (Table 1), and each responsibility was designed to require little staff time and effort. For example, the delivery of nutrition knowledge was provided through the Dole 5 A Day Adventures CD-ROM program, which was introduced to most students in their computer class. The CD-ROM program required almost no teacher training, and, when used, had the benefit of invariant levels of implementation integrity. Program implementers included AIS members, classroom and computer specialist teachers, lunch aides, and principals.
3. *Programming for behavior change with theoretically sound strategies.* In health promotion, the provision of knowledge is important, yet not sufficient to yield behavior change (Blom-Hoffman & DuPaul, 2003). Therefore, behavior change

strategies grounded in social learning theory (Bandura, 1977) underlie many elements of the program (Table 1). Social learning theory includes the concept of reciprocal determinism, which emphasizes the bidirectional influence that individuals and their environments have on each other. Other elements of the program that were based on social learning theory included (a) the use of live (i.e., athletes, teachers, principals) and symbolic (i.e., animated F&V characters) role models; (b) factors to promote observational learning, such as strategies to increase attention to the target behavior with attractive materials, opportunities to retain new information through repeated presentations across multiple settings, and daily opportunities to rehearse the target behaviors during school lunch with actual and vicarious reinforcement of these target behaviors; (c) goal setting; and (d) self-monitoring.

4. *Making realistic changes given the context.* Although there was a behaviorally based cafeteria component to the program that was developed from earlier pilot work (Blom-Hoffman, Kelleher, Power, & Leff, 2004), it is important to emphasize that there were no school food service changes that occurred. In other words, the foods served to the children during school breakfast and lunch remained the same.
5. *Using attractive, interactive, and fun materials.* Materials used were designed to be attractive, interactive, and fun. Most of the materials can be obtained at low cost from Dole, which is important for program sustainability purposes.
6. *Having a school-based champion to increase program visibility.* To prevent the program from getting lost in competing school priorities and to address implementation barriers, a school-based champion was assigned to promote the importance of the program. The champion was a former college athlete, who was hired by the author's university to promote physical activity in the four schools. Beginning in the fall of 2006, this individual was no longer funded through the university, but instead was funded by the building principal's operating budget as part of the Sports4Kids program that replaced the AIS program. In the fall of 2006, the Sports4Kids coaches, who replaced the AIS, took on the same roles and functions associated with the F&V promotion activities in a seamless transition.
7. *Developing a family component that would engage caregivers and children.* Given that family variables contribute to children's health and weight, the importance of a family component, specifically one that includes take-home activities, has been emphasized (Perry, Luepker, Murray, & Hearn, 1989). A series of five take-home children's activity books was designed by the author (Blom-Hoffman, 2006) to serve as the family component in the AIS program. The books were designed to (a) communicate simple messages to parents that were consistent with information the children were learning in school, and (b) create a context for children and parents to discuss the information through shared book reading. The activity books were assigned to the students as homework by the classroom teachers and required a parent signature. Three interactive books, plus the *Dole 5 A Day Kids Cookbook* (Myrdal et al., 2004), were distributed during the 2005–2006 school year; the remaining two interactive books were distributed in the 2006–2007 school year. In addition, to celebrate the culinary diversity of the families, school cookbooks comprised of favorite family F&V recipes and illustrated by the children are being developed, and will be used as a fund-raising activity for students.

Implementation Integrity

The AIS program was launched in the winter of 2006 and will continue to serve the same children through the spring of 2008. Both process and outcome data are being collected as part of the AIS program evaluation. Implementation integrity was assessed via unannounced

observations, athlete and teacher logs, and permanent products. For the lunchtime observations, doctoral students in school psychology observed the degree to which lunch aides gave stickers to students, contingent on F&V consumption during school lunch, and whether the cafeteria poster reflected the fruit and/or vegetable of the day. For the daily fruit and/or vegetable-of-the-day announcements, daily logs completed by the AIS were examined. Implementation integrity of CD-ROM usage was recorded on a checklist by computer teachers. Computer teachers were asked to check off the sections of the modules that the children were exposed to and to report their observations of the children's reactions to the CD-ROM.

Implementation integrity procedures were developed to assess multiple features of the program, including program delivery and child engagement (Power et al., 2005).

Teacher and Lunch Aide Acceptability

Adapted versions of the Intervention Rating Profile (Martens & Witt, 1982) were used to assess program acceptability. Teacher and lunch aide perceptions of the appropriateness of the program and the procedures, the importance of outcomes, and unintentional side effects were assessed (Witt & Elliott, 1985). Respondents anonymously rated acceptability items on a 6-point Likert-type scale (1 = *Strongly Disagree* to; = *Strongly Agree*) at the end of year 1.

RESULTS

Implementation Integrity

Integrity checks for the lunchtime components of the program were conducted on 24% of program implementation days. Overall, integrity for the lunchtime procedures was high (ranging from 75% to 100% compliance), with the exception of one school's compliance with the correct display of the fruit and/or vegetable-of-the-day poster in the cafeteria. This discrepancy occurred because the F&Vs that were served at the second lunch period, when the kindergarten and first-grade children ate lunch, differed from what was printed on the menu, from what the cafeteria manager indicated would be served, and from what the children in the first lunch ate, usually because the original fruit or vegetable had run out and an alternative was substituted. Across the two schools monitored for implementation integrity, morning announcements occurred on most school days ($M = 91\%$ of monitored days). With regard to teacher-reported CD-ROM usage, on average, students were exposed to three songs, six F&V characters, and three cooking videos during year 1. Following each class session, teachers were asked to report (a) how much students paid attention to the activity and (b) how much students seemed to enjoy the activity. Teachers were asked to report this information using a 3-point scale that ranged from 0 (*did not pay attention, did not enjoy*) to 2 (*paid good attention, enjoyed a lot*). Teachers reported that students paid very good attention to (range = 1.67–1.89) and seemed to enjoy using (range = 1.43–2.0) the CD-ROM program. Anecdotally, many teachers reported children singing and dancing along with the program, and some reported observing children singing the F&V songs at other times during the school day.

Teacher and Lunch Aide Acceptability

All kindergarten, first-grade, and computer teachers ($N = 15$) completed the teacher version of the questionnaire ($\alpha = 0.89$; Table 2). More than 80% of the teachers had been teaching for 10 or more years. More than half of them had been teaching this age group of children for 10 or more years. The teachers were all women. Overall, the teachers were enthusiastic about the program, with average ratings above 5.0 (on a 1–6 Likert scale) for every item ($M = 5.51$; $SD = 0.38$). Only one teacher reported a negative side effect from the program. She was concerned that the programs' emphases on increasing consumption of F&V in the school lunch communicated to the children that the other foods served were less important. She reported observing her students in the cafeteria eating F&V before the other foods served (e.g., milk,

sandwiches). This potential concern regarding the displacement of other foods by F&V actually provides qualitative support for the effectiveness of the behavior change strategies designed to promote F&V consumption during school lunch. In addition, this trend will be examined further in future analyses of lunchtime plate waste data. Interestingly, several teachers reported that the program made them more aware of their own F&V consumption ($M = 4.85$; $SD = 1.63$) and helped them eat more F&V ($M = 4.69$; $SD = 1.60$).

All lunch aides at the two intervention schools ($N = 12$) completed the lunch aide version of the acceptability questionnaire ($\alpha = 0.85$; Table 3). Overall, lunch aides reported that the lunchtime component of the program was highly acceptable ($M = 5.62$; $SD = 0.65$). Moreover, 100% of the lunch aides said they “strongly agreed” that giving stickers helped the children eat more F&V in the school lunch. These observations will be further examined in an analysis of F&V plate waste data from the school lunches.

DISCUSSION

The systematic review of F&V promotion programs for children conducted by Knai et al. (2006) identified seven factors that were associated with effective programs. Six of the seven factors were present in the design of the AIS F&V promotion program. First, in the AIS program, there was a specific focus on increasing F&V consumption, as opposed to other areas of healthy eating. Second, students were actively engaged in nutrition education in the classroom and family components. The classroom component involved an interactive CD-ROM that was developed in a gamelike format, and the family component was developed so that children and caregivers engaged in interactive shared book reading. Activities in the storybooks involved coloring, drawing, circling, and self-monitoring. Third, the program was based on social learning theory. Social modeling by peers, viewing children in videos on the CD-ROM, and the cartoon characters were central to the program design. Fourth, the lunchtime component with lunch aides “catching students eating F&Vs” was designed so that students could receive social encouragement from school food service staff contingent on eating these foods. Fifth, the interactive children’s books described previously were designed to increase the likelihood that parents would attend to the information presented and would discuss it with their children. Sixth, the program is being implemented in a supportive school context because the Boston Public Schools have adopted a district wellness policy, and individual schools are responsible for developing an implementation plan for the policy. One factor that was not present in the AIS program is community involvement. This involves working with local producers and markets to develop a supportive community. Community support is particularly important in the urban neighborhoods surrounding these schools because affordable access to high-quality heart healthy foods, including F&Vs, is limited (Johnson, Wilson, Fulp, Schuetz, & Orton, n.d.; Neault, Cook, Morris, & Frank, 2005).

In addition to the important program components identified by Knai et al. (2006), the following characteristics were also present in the design of the AIS F&V promotion program. First, the program was designed to saturate the school environment with consistent health messages and to carry these messages into the home environment. Although the program saturates the school environment, program elements were designed to fit within the school structure with minimal interruptions and to require little time and effort on the part of school staff. Second, the inclusion of a health promotion champion, who keeps the program on the “radar screen,” and the use of visually attractive, fun, and engaging program materials to keep the program visible and maintain the interest of students, are other important components in the program design.

Currently, a cohort of nearly 300 students is being followed to evaluate the effects of the multiyear AIS F&V promotion program on children’s nutrition knowledge, F&V preferences, eating behaviors, and physical indicators of overweight. Although data analysis of the outcome

variables from year 1 is ongoing, analysis of process variables revealed high levels of integrity and acceptability. Prior research on intervention acceptability has shown that the amount of time, effort, and resources required to implement an intervention are related to acceptability (Witt & Elliott, 1985). The fact that the goals of the program were important and, at the same time, the program was intentionally designed to require little staff time and effort and no monetary cost likely contributed to the high acceptability levels.

The following lessons learned during the past year may be helpful for schools that are interested in using some or all components in the AIS F&V promotion program. First, when using the Dole CD-ROM with kindergarten children, teachers reported that it was better to present the information to a group of students rather than having the students work independently on the computer. When using the CD-ROM with older students, it is important to have headphones for each computer. Second, it is important to give the person making the F&V-of-the-day announcements a long list of facts to avoid repetition and to support implementation. The individual making the announcements should be an adult who is widely respected in the school (i.e., the principal), or various students can take turns making the announcements. For this program, daily F&V facts were developed based on what was served in the school lunch menu. Many interesting facts can be developed from the information on the Dole CD-ROM or at the Dole 5 A Day Web site (<http://dole5aday.com>). Facts can also be obtained from the author. Third, it is important to ensure that lunch aides are amply supplied with stickers. Stickers should be attractive and can be printed on mailing labels. Lunch aides participating in this program reported that occasionally students would try to “steal” the box of stickers, which indicated that they were perceived as valuable by students; however, it also meant that they needed to be stored in a safe location.

Although the AIS program includes a full-time staff member hired to specifically promote physical activity and healthy eating, schools without this added resource can incorporate many elements of the program. Having a school-based champion who is a regular member of the staff to oversee, coordinate, and elevate the importance of nutrition promotion efforts is important. The members of the school’s health advisory council can help coordinate these efforts and help the nutrition promotion efforts maintain visibility in the school. Nutrition promotion champions should be individuals who are well regarded by school staff, understand the school ecology, and have good communication and organizational skills. These could be grade-level teachers with an interest in health; physical education or health teachers; school nurses or school psychologists; and members from food service. Many of the materials used in this program can be obtained at a low cost from the Dole 5 A Day Web site (<http://dole5aday.com>). The program champion can order or download and distribute these materials, can assist with any technological problems related to use of the CD-ROM, and can work with lunch aides to use the “caught eating” F&Vs intervention. In addition, the program champion can make sure materials, such as the *5 A Day Kids Cookbook*, are ordered and sent home to families, given the importance of family–school collaboration in the promotion of healthy eating behaviors for children.

Conclusions and Next Steps

This article describes the first year of a multiyear primary prevention effort designed to promote F&V consumption in children in kindergarten through third grade. The program’s design was based on social learning theory and includes components for in school and at home. The first year of program implementation and initial process evaluation data are presented, including implementation integrity and program acceptability from the perspectives of teachers and lunch aides. These data indicated that most aspects of the program were implemented as intended by school staff and that school staff perceived the program to be highly acceptable. This is important given the multiyear design of the program. Currently, the program is in year 2 of

implementation, and outcome evaluation data continue to be collected. The program will continue to be implemented for these students next year, and the students will be followed in 2008–2009 when they are in third and fourth grades to examine 1-year follow-up effects of the program.

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Table 1
School-Based Components of the Fruit and Vegetable (F&V) Promotion Program

Environmental Domain	Activity (<i>Individuals Involved</i>)	Activity Goals	Program Materials	Link to Social Learning Theory
Schoolwide	Morning announcements highlighting the F&V of the day and an associated fact (<i>school principal and/or Athlete in Service</i>)	Increase visibility of the F&V served in the lunch. The message came from a respected role model in the school.	F&V fact downloaded from the Dole Web site; also available from the Dole CD-ROM.	<ul style="list-style-type: none"> Increase attention to and retention of target information. Influential role models highlight the importance of F&V in school lunch.
Classroom	<ol style="list-style-type: none"> 1 F&V-of-the-day posters (<i>teachers</i>) 2 Dole CD-ROM during computer special or in the classroom as a learning center (<i>computer and grade-level teachers</i>) 3 Assignment and collection of take-home books (<i>classroom teachers</i>) 	<ol style="list-style-type: none"> 1 Teachers reinforced the F&V message of the day. 2 Provide information and role modeling from animated characters. 3 Take simple messages home and create opportunities for children to share what they learned with caregivers. 	<ol style="list-style-type: none"> 1 Bobby Banana poster with laminated F&V served in the school lunch (small version). The F&V characters changed daily, reflecting the menu. 2 Dole 5 A Day Adventures CD-ROM. 3 Six activity books. 	<ul style="list-style-type: none"> Increase attention to and retention of target information. Implement symbolic role modeling.
Lunchroom	<ol style="list-style-type: none"> 1 F&V-of-the-day posters (<i>Athlete in Service</i>) 2 Caught eating F&Vs (<i>lunch aides</i>) 	<ol style="list-style-type: none"> 1 Increase visibility of the F&V served in the lunch at the point of behavioral performance (i.e., near the cafeteria line). The message came from Bobby Banana, a symbolic role model. 2 Provide reinforcement for eating behaviors. 	<ol style="list-style-type: none"> 1 Bobby Banana poster with laminated F&V served in the school lunch (large version). The F&V characters changed daily, reflecting the menu. 2 F&V character stickers. 	<ul style="list-style-type: none"> Increase attention to and retention of target information. Peers perform live modeling. Provide daily opportunities to practice target behavior. Receive reinforcement from lunch aides.
Home	Six take-home activity books (Blom-Hoffman, 2006)	<ol style="list-style-type: none"> 1 Provide parents with simple messages that are consistent with what children have learned. 2 Provide a context for parents and children to discuss information through shared book reading. 	Children's books designed and printed by the author. Books were developed with input from local nutrition professionals and parents.	<ul style="list-style-type: none"> Increase attention to and retention of target information. Set goals. Perform self-monitoring. Implement symbolic role modeling.

Table 2

Year 1 Teacher Acceptability (N = 15)

Questionnaire Item	Mean (SD)
1. The fruit and vegetable (F&V)-of-the-day morning announcements are an acceptable way to encourage students to eat more F&Vs.	5.27 (0.59)
2. The classroom F&V-of-the-day board is an acceptable way to encourage students to eat more F&Vs.	5.36 (0.63)
3. The Dole 5 A Day CD-ROM is an acceptable way to encourage students to eat more F&Vs.	5.92 (0.29)
4. The F&V stickers are an acceptable way to encourage students to eat more F&Vs during school lunch.	5.46 (0.97)
5. The 5 A Day take-home books are an acceptable way to encourage students to eat more F&Vs.	5.36 (0.93)
6. These activities (e.g., CD-ROM, AM announcements, lunchtime stickers, take-home books) should prove effective in improving students' knowledge.	5.5 (0.65)
7. These activities (e.g., CD-ROM, AM announcements, lunchtime stickers, take-home books) should prove effective in improving students' eating behaviors.	5.47 (0.52)
8. I would suggest that other teachers use these program materials and activities (e.g., CD-ROM, AM announcements, lunchtime stickers, take-home books) with their students to encourage them to eat more F&Vs.	5.6 (0.51)
9. Students' eating behaviors are poor enough to warrant use of these activities.	5.86 (0.36)
10. I am willing to use these activities in my classroom in the future.	5.6 (0.63)
11. The AIS 5 A Day program activities would be appropriate for most kindergarten and first-grade children.	5.71 (0.47)
12. The AIS 5 A Day program was <i>not</i> disruptive to the classroom.	5.33 (1.05)
13. The Dole 5 A Day CD-ROM was <i>not</i> difficult to implement in a classroom with 20 to 25 students.	5.45 (0.52)
14. Teachers are likely to use the Dole 5 A Day CD-ROM because it requires little technical skill.	5.33 (0.49)
15. Teachers are likely to use the Dole 5 A Day CD-ROM because it requires little training to implement.	5.25 (0.62)
16. The AIS 5 A Day program components did <i>not</i> take away too much time from other important educational priorities in my classroom.	5.2 (0.86)
17. Overall, the AIS 5 A Day program was beneficial for children in my classroom/school.	5.8 (0.41)
18. Overall, the students in my class/school enjoyed participating in the AIS 5 A Day program.	5.8 (0.41)
19. Were there any negative side effects as a result of your students participating in this program?	93% said "No"
20. The AIS 5 A Day program made me more aware of my own F&V consumption.	4.85 (1.63)
21. The AIS 5 A Day program helped me eat more F&Vs.	4.69 (1.60)

Note. Teachers rated items on a 6-point Likert-type scale as follows: 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Slightly Disagree*, 4 = *Slightly Agree*, 5 = *Agree*, 6 = *Strongly Agree*, N/A = *Not Applicable*.

Table 3

Year 1 Lunch Aide Acceptability (N = 12)

Questionnaire Item	Mean (SD)
1. Giving stickers to students when they eat fruits and vegetables (F&Vs) during lunch is a good way to help them eat more F&Vs.	5.75 (0.62)
2. Most students need help eating F&Vs in school.	4.92 (1.56)
3. I want to continue to give students stickers for eating their F&Vs at lunch next year.	5.75 (0.45)
4. Giving children stickers for eating their F&Vs did <i>not</i> cause problems at lunch.	5.58 (0.79)
5. Giving students stickers during lunchtime did <i>not</i> take too much time.	5.58 (0.67)
6. I liked giving kids stickers during lunchtime.	5.67 (0.65)
7. It was <i>not</i> difficult to remember to give students stickers at lunch.	5.5 (1.0)
8. It was <i>not</i> difficult to give students stickers and to complete my other responsibilities.	5.73 (0.65)
9. I think that Lunch Moms at other schools should give students stickers when they eat their F&Vs at lunch.	5.83 (0.39)
10. Giving students stickers helped students eat more F&Vs at lunch.	6.0 (0.00)

Note: Lunch aides rated items on a 6-point Likert-type scale as follows: 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Slightly Disagree*, 4 = *Slightly Agree*, 5 = *Agree*, 6 = *Strongly Agree*.