The Evaluation of the *Media-Smart Youth* Curriculum

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Attachments

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Executive Summary

Program: ***Media-Smart Youth: Eat, Think, and Be Active!*** is an after-school curriculum that seeks to empower young people aged 11 to 13 years to make healthful choices about nutrition and physical activity by helping them understand how media can influence their lives. This is a unique intervention for young people in that it addresses four key areas of learning: nutrition, physical activity, media awareness, and media analysis skills. The curriculum integrates these subjects and encourages youth to learn by engaging in fun activities that enable them to become media savvy. *Media-Smart Youth* consists of ten 90-minute lessons delivered by an adult facilitator. It culminates with "The Big Production," a media project conceived and created by the young participants, intended to promote healthy nutrition and physical activity in their peers.

Purpose of Evaluation: The *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) wanted to examine how the *Media-Smart Youth* curriculum can be implemented in an after-school program environment and to measure the program outcomes among the youth who participated.

Methods: The success of implementing the *Media-Smart Youth* curriculum was measured using several instruments to record the facilitators' experience and to observe them as they introduced and completed one of the lessons. In order to evaluate the curriculum objectively, a group-randomized experimental design was used, which consisted of treatment and control groups. The treatment groups comprised youth enrolled at after-school sites offering the *Media-Smart Youth* program. The control groups consisted of youth at comparable after-school sites that did not offer the program. The sites were matched on urban/suburban location, socioeconomic status, and race/ethnicity composition. The knowledge, skills, and intended behavior of participants in both the treatment and control groups were assessed twice, first just before starting the curriculum in the treatment groups and secondly just after completion of the 10 lessons. The intervention effect of the curriculum was assessed using a statistical model developed for group-randomized experiments.

Implementation Findings: The facilitators reported that their greatest challenge was keeping the students interested and engaged across the wide range of *Media-Smart Youth* activities, while also competing with other after-school programs. They sometimes modified the curriculum, especially when faced with not having enough time to complete all the tasks for each lesson. The majority of lesson activities were not completed by all sites because they contained too much material to be handled in the allotted time frame. However, as reported by their logs and the *Media-Smart Youth* observation team, the facilitators followed the general intent of the curriculum. The facilitators also shared anecdotal evidence of the kinds of knowledge gained by the youth. Feedback from the youth was positive. They especially enjoyed the different healthy snacks.

Program Outcome Findings: The pretest sample (N = 191) of eight matched group pairs included 105 treatment youth and 86 controls. The sample for the posttest analysis comprised 146 youth (72 treatment and 74 control youth). The retention rate was 68.6% for the treatment group and 86% for the control group. The *Media-Smart Youth* program outcome consisted of

scores for individual participants who completed pre- and posttest surveys of their knowledge on 63 items covering topics on nutrition, physical activity, media awareness, and media analysis skills. A total score was calculated as the percentage correct out of the total number of items on the survey, and this served as the overall outcome variable.

The statistical tests computed for the group-randomized design showed that the groups exposed to the *Media-Smart Youth* curriculum had positive score gains from pretest to posttest on the overall outcome measure of knowledge whereas the control groups showed only small random differences. The treatment group gains, however, were also small. In addition, these statistical estimates were based on data that did not include subjects with missing scores on the posttest, which would contribute to an overestimation of the statistical significance. The best estimate of an effect size for the curriculum as an intervention was 1.79, with a 95% confidence interval of 0.75 and 2.71. This estimate, however, was based on the original sample of 191 participants and thus included those subjects with missing data on the posttest. This evaluation and its problem of missing data illustrate the difficulties of estimating the effect size of an intervention and determining the generalizability of the results for future evaluations of the curriculum.

Data on the behavioral intention survey items, however, showed an interesting pattern. For example, one item, *"intent to engage in more weight-bearing activities in the next month,"* increased more in the treatment than in the control youth, as did behavioral intent on a second item, "*intent to eat less high-fat snacks and to eat or drink more foods with calcium in the next month."*

Discussion: The first big challenge for implementing the *Media-Smart Youth* curriculum was recruiting and securing sites to participate, followed by obtaining the consent of the youth and parents. Next was the task of retaining participants in the experiment. Of the original 10 matched pairs of groups, 2 pairs were removed from the evaluation when the treatment sites could not maintain youth attendance over the course of the curriculum implementation. Losing these two pairs of matched sites took away some of the statistical power needed to test for differences in outcomes between the treatment and control groups. Last was the challenge of trying to keep the students interested and engaged across the wide range of *Media-Smart Youth* activities. The facilitators did not have enough time to use all the different features designed for a particular lesson.

Further developing the internal and construct validity and the reliability of the knowledge test scales in the *Media-Smart Youth* Survey is also critical for evaluating this program. Future evaluations of the *Media-Smart Youth* curriculum should include an effort to improve the content and format of the survey instrument, followed by more testing in a diverse sample of potential participants and analyses to demonstrate improved subscale concept validity and reliability. The application of the group-randomized design and statistical model was a success, but the 95% confidence intervals obtained in the least square means analysis indicate that the treatment versus control differences were weak. The loss of the two matched pairs in the sample due to poor retention resulted in a reduction of the discriminating power of the statistical tests. Future evaluations of the *Media-Smart Youth* curriculum have the potential to be more robust if better retention of participants is achieved and if more matched groups or clusters are recruited to serve as treatment and control groups.

The Evaluation of the *Media-Smart Youth* Curriculum

Introduction

In 2001, the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) launched a now 7-year-old program-development and -dissemination effort and awarded contracts valued at more than $4 million to the Academy for Educational Development (AED)—a nonprofit, social marketing organization—to research, design, develop using evidence-based methods, pilot-test, revise, produce, disseminate, and evaluate *Media-Smart Youth: Eat, Think, and Be Active!* This after-school curriculum combines recognized youth development principles and practices with the most current research findings and federal recommendations about nutrition and physical activity to teach young people how to analyze, evaluate, and create media messages. Comprising 15 to 20 hours of instruction, the program is intended to influence knowledge and behavioral intention. As indicated in a summary of social science theories and models, individuals' attitudes are important predecessors to behavior change (U.S. Department of Health and Human Services, 2001).

Media-Smart Youth seeks to empower young people aged 11 to 13 years to make healthful choices about nutrition and physical activity by helping them understand how media can influence their lives. The program is unique among curricula for young people in that it includes instruction in four key areas: nutrition, physical activity, media awareness, and media production. The *Media-Smart Youth* curriculum integrates these areas and encourages participants to learn by engaging in fun activities that enable them to become media savvy. The program is a formal component of the U.S. Department of Health and Human Services' Youth Media Campaign, funded by Congress in 2000 to reach young people aged 9 to 13 years with positive health messages and to complement the *Healthy People 2010* goals of fighting obesity and increasing physical activity.

This curriculum became available to the public in April 2006, and since its launch, more than 13,000 program kits have been distributed nationally to youth-serving and after-school program providers. In the second half of 2006, the program was implemented in eight youth-serving organizations across the United States (including the Girl Scouts, 4-H, and the YWCA) through the "Building Organizational Support Project," which was designed to promote *Media-Smart Youth*, integrate it into the regular program offerings of organizations, and infuse it into their fabric. *Media-Smart Youth* is also disseminated to after-school programs and youth-serving organizations across the country through ***We Can!*** This National Institutes of Health education program (http://www.wecan.org) was designed for parents and caregivers to help children aged 8 to 13 years maintain a healthy weight, and it is currently running in more than 850 community sites in all 50 states and several countries around the world.

This evaluation was designed to determine the impact of the *Media-Smart Youth* curriculum on adolescent knowledge, skills, and behavioral intent in the areas of media analysis, nutrition, and physical activity.

Media-Smart Youth Program Goals

The *Media-Smart Youth* curriculum goals are a) to increase knowledge and behavioral intention in the areas of nutrition and physical activity, and b) to increase knowledge and skills in the area of media analysis. The curriculum consists of ten 90-minute lessons and culminates with a youth-led media project called "The Big Production." Each lesson consists of a series of activities, as outlined in Figure 1. In addition, the curriculum contains special snack breaks and action breaks for each lesson. (For a complete listing of the lessons, activities, and breaks, see Attachment A.)

Figure 1. *Media-Smart Youth* Lessons and Activities

Lesson	Activities
1. Welcome to *Media-Smart Youth*	**Getting Started** **A. What Is the *Media-Smart Youth* (MSY) Workshop?** **B. Working Agreement** **C. Focus on Fruits and Vegetables**
2. Thinking About Media	**A. What Are Media?** **B. Media and Health—What's the Connection?** **C. Mini-Production**
3. Asking Questions	**A. More Than One Kind of Kid** **B. The 6 Media Questions** **C. Mini-Production**
4. Nutrition Know-How… Eat It Up!	**A. Hurray for Whole Grains!** **B. Cutting Back on Fat and Added Sugar** **C. Mini-Production**
5. Motion Commotion— What Is Being Active?	**A. What Is Physical Activity?** **B. Activities Fit To Be Tried** **C. Mini-Production**
6. Visiting a Grocery Store	**Option 1: Going to the Grocery Store (field trip)** **Option 2: Bringing the Grocery Store to You** **A. What's on the Label?** **B. Mini-Production (optional)**
7. The Power of Advertising	**A. What Is Advertising?** **B. Thinking About Body Image** **C. Mini-Production**
8. Super Snacks and Better Bones	**A. Foods in the Media and Thinking About Packaging** **B. Building Better Bones** **C. Mini-Production**
9. Making Smart Choices Fun and Easy	**A. Being Active: What Makes It Easy?** **B. Get in the Action!** **C. Mini-Production**
10. Getting Into the Production Mode	**A. This Message Brought to You By…** **B. 6 Media Questions from the Production Point of View** **C. Three Ps in Production**

The *Media-Smart Youth* program is designed to include up to 15 youth participants per cohort and may be implemented in one of a number of different configurations, e.g., sessions twice a week, once a month, or camp style (daily sessions over a 2-week period). The curriculum is delivered by an adult facilitator. The Big Production, the culminating project at the program's end, allows youth to plan, write, and produce their own media projects. The curriculum allows flexibility for the facilitators to partner with local media experts (e.g., local newspapers or cable TV stations) to co-facilitate these production lessons.

Literature Review

Childhood Obesity and the Media

Since the 1970s, the number of overweight school-aged children has nearly tripled (Centers for Disease Control and Prevention, 2006). According to National Health and Nutrition Examination Survey (NHANES) data, the prevalence of overweight children aged 6 to 11 years increased from 4.0% in the early 1970s to 18.8% in 2004. Likewise, the prevalence of overweight children aged 12 to 19 years grew from 6.1% to 17.4% over this same time period.

Media play an increasing role in influencing young people's nutrition and physical activity choices. For example, it has been estimated that children are bombarded by as many as 40,000 commercial messages a year, many of which encourage them to eat unhealthy snack foods (Henry J. Kaiser Family Foundation, 2004). In addition, opportunities for physical activity continue to decline in urban schools (Halpern, 2003). What is more, a recent Institute of Medicine report (Committee on Food Marketing and the Diets of Children and Youth, 2006) suggests that although television still predominates as the medium for most advertising to children, other strategies are gaining momentum, including product placements, character licensing, and Internet-based approaches. Indeed, there is money to be made in marketing food to children. Evidence suggests that food advertising to children affects their preferences, purchase behaviors, and consumption habits (Committee on Food Marketing and the Diets of Children and Youth). This may be reflected in the finding that, of the $200 billion spent annually by children, the top four items purchased by those 8 to 12 years old are high-calorie, low-nutrient foods and beverages (Committee on Food Marketing and the Diets of Children and Youth).

Several interventions have been undertaken to slow or halt the trend toward increased prevalence of overweight among children; these vary in content, focus, and location. For example, some focus heavily on nutrition education, whereas other programs include greater emphasis on physical activity or other areas such as media literacy. Additionally, programs may take place in the course of the regular school day or be extracurricular.

School-Based Obesity Prevention Programs

Schools are in a unique position to intervene in the trend toward increased prevalence of overweight and obesity among young people because of their extensive reach into the target population. For example, schools generally provide at least one meal to students and are a natural forum for learning. Additionally, they may provide several outlets for physical activity. The American Dietetic Association (ADA, 2006) recently completed a comprehensive review of school-based obesity prevention programs for evidence of effectiveness. The ADA looked specifically at programs whose intended outcome was decreased adiposity (body fat composition), generally measured as body mass index (BMI). Overall, significant decreases in adiposity were observed in only 12 of the 28 school-based primary prevention studies identified. This mixed success is similar to the findings of other recent literature reviews in this area (Budd & Volpe, 2006; Sharma, 2006; Stice, Shaw, & Marti, 2006). Examining the data further, however, led the ADA to conclude that these interventions appear to be far more effective among

older students than among those in primary school, also consistent with the findings of other recent reviews (Budd & Volpe; Stice et al.). The ADA found this age effect to be particularly notable among "multi-component" interventions, which include multiple coordinated units with both nutrition and physical activity components. Stice et al. and Budd and Volpe consider this finding logical because older students are more capable of understanding and piecing together the various components of a multi-faceted intervention.

After-School Obesity Prevention Programs

With the increasing competition for valuable classroom time that exists today in U.S. schools, some researchers are examining after-school programs as a forum for obesity prevention interventions with young people. In the past several years, the number of after-school programs offered across the United States has rapidly increased, with a parallel growth in the demand for evidence that these programs and activities can directly affect student learning (Hobbs & Frost, 2003). A growing number of these programs stress good nutrition and increased physical activity, and several have shown promise at effecting positive changes in children's attitudes and behaviors in those areas.

Girlfriends for KEEPS (Keys to Eating, Exercising, Playing, and Sharing) is an after-school obesity prevention program for low-income African American girls (aged 8 to 10 years). The program aims to increase physical activity levels and to improve dietary habits (Story, 2005). It consists of fun games and physical activities in addition to preparing healthy snacks to demonstrate positive messages about nutrition. The results of a pilot of the program indicated that girls in the intervention group scored significantly higher on measures of healthy behavioral intentions, diet knowledge, and preferences for physical activity (Story).

Another after-school program for girls *(Go Grrrls)* did not specifically focus on nutrition and physical activity, but rather on bolstering healthy psychosocial development among adolescent girls (LeCroy, 2003). This program consisted of 12 after-school sessions of group learning and fun interactive activities for young teens. At the conclusion of the program, which exhibited an 80% retention rate, the intervention group demonstrated significantly greater increases than the control group on measures of body image, assertiveness, positive attitudes about attractiveness, self-efficacy, self-liking, and confidence. LeCroy believes these are important precursors to positive psychosocial development among adolescent girls.

The Dairy Council of California recently evaluated *Deal Me In,* its after-school nutrition program for elementary school children (Takada, 2005). *Deal Me In* aims to increase children's ability to choose healthy food options, identify appropriate portion sizes, and choose positive physical activities. Led by an adult facilitator, the program is based on a workbook that includes fun educational activities. The curriculum is organized according to two age groups—kindergarten through second grade, and third through sixth grades. Overall, children in the younger group showed more significant improvements in post-intervention measures than their older counterparts. Specifically, participants in the kindergarten to second grade group significantly increased their ability to correctly identify food groups, to choose healthy snacks and breakfast items, and to identify healthy portion sizes. Children in the third to sixth grade showed significant improvement only in their ability to correctly identify food groups. The

evaluators note, however, that older children scored higher on the pre-intervention test, so there was less room for improvement. Changes in physical activity were not significant for either age group.

Media Effects on Nutrition and Physical Activity

One notable segment of research on obesity prevention in young people concerns media effects on nutrition and physical activity. Researchers have demonstrated that media consumption is an important variable that affects the health of children and adolescents because of the barrage of messages promoting unhealthy food products, messages about body image, and the sedentary nature of media consumption (White, Pitman, & Denny, 2003). In a comprehensive review, Brown and Witherspoon (2002) examined the influence of the media on obesity, nutrition, and other health-related areas and recommended strategies for using media as a positive force for adolescents' health. Among these strategies was the integration of media literacy modules into school curricula in an effort to curtail the negative health impacts of media messages. "Media literacy" is defined as the ability to access, analyze, evaluate, and produce communication in a variety of forms (Aufderheide, 1993).

Recent work by Hobbs has demonstrated the effectiveness of media literacy training on critical thinking and analysis skills, such as an adolescent's ability to identify main ideas in media messages (Hobbs, 2004; Hobbs & Frost, 2003). Tennis (2003) examined the efficacy of a nutrition-focused media literacy unit on children's comprehension of food commercials and found that children who received media literacy training made more accurate assessments of some foods and made better and more balanced food choices.

Similarly, Carter et al. (2005) described the "Healthy Children Healthy Futures" (HCHF) program, which was developed to promote healthful eating and physical activity among urban youth. HCHF was designed to be used by after-school programs and consisted of several modules for children aged 9 to 12 years. In addition to sections on healthful eating and physical activity, the program included a media literacy component that was intended to help children develop an awareness of the ways advertisers and the media attempt to influence the purchasing behavior of children and their parents. In the latter portion of the HCHF program, children developed and animated their own positive messages about nutrition and physical activity, which were shown to peers, to parents, and at various venues in the community. Initial evaluation of the program showed significant improvements in knowledge related to physical activity, fruits and vegetables, television viewing, and portion sizes.

Although these examples show promise, given the overall paucity of literature in the area of media effects on nutrition and physical activity among young people, the ADA (2006) has identified such effects as needing further exploration.

Development of the *Media-Smart Youth* Curriculum

In 2000, Congress funded the U.S. Department of Health and Human Services Youth Media Campaign, which provided funding to the Centers for Disease Control and Prevention (CDC), the Health Resources and Services Administration (HRSA), the Substance Abuse and Mental Health Services Administration (SAMHSA), and NICHD to develop a series of programs to help young people between 9 and 13 years of age make healthy choices and reinforce healthy behaviors. NICHD's program was to focus on media literacy, nutrition, and fitness.

With this background, AED assembled a team to begin program development, which occurred in two stages. The first involved a thorough literature review to identify curricula developed for young people that focused on four key content areas—nutrition, physical activity, media awareness, and media production. A substantial number of curricula exist for young people in both in- and out-of-school settings. But even though many of these curricula included one or two of the content areas of interest, none focused on all four in an integrated manner. The literature review thus indicated the need to develop a curriculum that integrated these four content areas and that was also developmentally appropriate for children aged 11 to 13 years and compatible with the after-school environment and logistical realities. This review also informed decisions about the most salient content to include in the curriculum and the nature and flow of curriculum activities.

The second stage of development involved synthesizing the program team's research and current thinking to design the actual curriculum. This phase was heavily guided by Everett M. Rogers's (1995) theory that innovation diffusion is a process occurring in five stages: knowledge, persuasion, decision, implementation, and confirmation. This theory emphasizes the importance of early adopters in helping to diffuse an innovation, as well as the importance of the perceived attributes of an innovation in influencing its rate of adoption. To ensure that the curriculum was relevant for and would be adopted by the after-school community, the program team engaged experts in the field to guide the program's development. The National Collaboration for Youth, a coalition of more than 40 nonprofit organizations, helped the program team identify organizations that would be early adopters of the new media literacy curriculum. These organizations were invited to submit proposals to express their interest in helping to create and pilot the new curriculum. As a result of using innovators to identify adept local organizations for the pilot-testing phase, *Media-Smart Youth* was exposed to early adopters who are also connectors to other schools or youth-serving organizations in communities across the country.

Media-Smart Youth was rigorously pilot-tested with these early adopters to ensure that the curriculum was compatible with the intended audiences, particularly in the areas of program implementation, appeal, and logistics. Formative research was used to develop first and second drafts of the curriculum activities in order to ensure that they were engaging for youth and pertinent to the learning objectives. Both facilitators and youth at the pilot sites provided valuable feedback that shaped each revision of the curriculum. Simultaneously, experts in nutrition, physical activity, media literacy, and youth development reviewed the curriculum to validate its content as accurate and reflecting the most current science in each area. Each

iteration led to another round of pilot-testing and feedback from facilitators and youth, until the final set of revisions was complete.

Specifically, from October to December 2001, AED conducted a needs assessment and reviewed existing curricula that focused on media literacy, nutrition, and/or physical activity for young people aged 9 to 13 years. From January to August 2003, following the development of an initial draft of the *Media-Smart Youth* curriculum, the program was pilot-tested in a variety of settings by youth-serving organizations in seven sites around the country to determine if it was feasible to adopt the curriculum in an after-school setting. The sites and participants were diverse with regard to urban and rural settings, race and ethnicity of the youth, and socioeconomic status of the communities. Facilitators at each pilot site submitted online forms after each lesson to provide detailed feedback about the activities. In addition, curriculum developers observed lessons in all seven sites and solicited written and oral feedback from participating youth and their parents. These various types of feedback allowed facilitators, youth, and parents to comment on lesson content and flow, timing of activities, directions to facilitators, facilitator preparation, and the curriculum's overall appeal and success. Experts in nutrition, physical activity, media literacy, and youth development also reviewed the initial draft of *Media-Smart Youth* during this same time.

In May 2003, program staff from all the pilot sites met to discuss their experiences and to suggest ways to improve the curriculum. From July through December 2003, the curriculum was extensively revised and reviewed again by the subject matter experts. The revised curriculum was restructured to more fully integrate the nutrition, physical activity, and media content into the lessons, and the program was modified to include clearer directions to facilitators, snack and action breaks in each lesson, fewer youth handouts, and more interactive discussion and games in the youth activities. From January through April 2004, the revised curriculum was pilot-tested again at three sites and further revised and refined. The program became available to the public in April 2006.

The *Media-Smart Youth* Evaluation

The purpose of this evaluation was to determine if the *Media-Smart Youth* curriculum and program increased adolescent knowledge, intention, and skills when it was fully implemented at after-school sites. The study provided the first opportunity to assess the 10-lesson curriculum when executed by after-school program providers using trained facilitators. Due to time constraints, the evaluation did not include a longitudinal component to measure long-term behavioral change. Documenting implementation of the *Media-Smart Youth* program curriculum and measuring intermediate outcomes, such as youth participants' knowledge and intent to make healthful choices, were considered more important.

Evaluation Questions

Both program implementation and youth outcome questions were equally important to the evaluation of the *Media-Smart Youth* program.

Program Implementation Questions

- Could after-school program providers in various locations recruit up to 15 youth (aged 11 to 13 years) and retain a minimum of 9, including youth of diverse racial and ethnic backgrounds?
- How many youth participants completed all sessions of the curriculum? What program factors contributed to their retention or loss?
- What problems or barriers did the facilitators experience in implementing the complete curriculum?
- Was the *Media-Smart Youth* curriculum used as intended by each after-school program site included in the experimental group?

Youth Outcome Questions

- Do youth (aged 11 to 13 years) who participate in the *Media-Smart Youth* curriculum increase their knowledge of the basic principles of healthful and nutritious snacking and increase their behavioral intention to make healthful snack choices in real-life settings?
- Do youth (aged 11 to 13 years) who participate in the *Media-Smart Youth* curriculum increase their knowledge of the importance of daily physical activity in promoting health and increase their behavioral intention to be more active in their daily lives?
- Do youth (aged 11 to 13 years) who participate in the *Media-Smart Youth* curriculum increase their knowledge of the connections between media and health and increase their skills in analyzing media messages?

Methods

Experimental Design

Although experimental studies and, more specifically, group-randomized experiments have the greatest likelihood of producing unbiased findings, there is a paucity of rigorous evaluations of programs in out-of-school and after-school settings (Cook, 2002). Randomized trials provide sound evidence for building the knowledge base on effective programming and support the case for additional (or continued) funding and resources. Typically, whole programs or groups are assigned to study conditions but outcome-evaluation data are collected from individual students or youth. In seeking to establish a scientific outcome base for the *Media-Smart Youth* program, this evaluation selected the group-randomized experimental design as the most appropriate for this after-school experimental setting. The treatment condition was defined as groups of youth enrolled at comparable after-school sites offering the *Media-Smart Youth* program. The control condition was groups of youth at after-school sites similar to those in the treatment condition but that did not offer the *Media-Smart Youth* program. The knowledge, skills, and intended behavior of both the treatment and control groups were assessed twice (pre- and post-curriculum) using a survey instrument designed especially for that purpose. The fidelity of curriculum implementation was also measured using several qualitative instruments, such as facilitator lesson logs, observation logs and checklists, and post-treatment facilitator sessions.

Several characteristics distinguish the group-randomized trial. Foremost, the units of assignment are identifiable groups, not individuals. Each unit of assignment (group) is randomly allocated to one study condition (treatment or control, as in this case). The units of observation are the members of these groups. The units of observation are thus nested in the unit of assignment, resulting in a hierarchy with the study condition as the highest aggregate level, followed by the units of assignment and then the units of observation. Randomization of the units of assignment to the study conditions "provides a statistical basis for the assumption of independence of errors at the level of the unit of assignment and serves to distribute potential sources of bias evenly across the study conditions" (Murray, 1998, p. 12). Group-randomized trials often have fewer than 15 assignment units per condition, with sometimes fewer than 10.

Random assignment of after-school sites rather than random assignment of individuals to the groups presents a design limitation on statistical power. The calculation of minimum detectable effects at the individual level is affected by the correlation of outcomes within the groups of individuals assigned to the same condition. The degree of power loss depends on the intra-class correlation of the outcomes, a measure of the homogeneity of the members of the sample, and the size of the groups randomly assigned. "In cases in which random assignment of groups is the only feasible approach, it is critical to estimate the minimum detectable effects attainable with the proposed sample size and design, taking cluster [group] effects into account, to ensure that the design will yield estimates of sufficient power to be worthwhile" (Orr, 1999, p. 134).

Small-scale experimental program evaluation can be improved by power analysis, stratification and randomization of the groups, and supplemental information on program implementation (Wimer, 2006). To ensure a rigorous evaluation, the William T. Grant Foundation Consulting

Service on Group-Randomized Studies (http://www.wtgrantfoundation.org/newsletter3039/newsletter_show.htm?doc_id=227401) reviewed the study design and conducted a power analysis to determine the sample size needed for producing the minimum detectable standardized effect or "the smallest true impact found to be statistically significantly different from zero at a specified level of significance with specified power" (Orr, 1999, p. 112). For a power level of 0.80 and an intra-class correlation of 0.10, a sample of 18 groups with 10 youth per group would result in a minimum detectable effect size of 0.61. The William T. Grant Foundation Consulting Service (2006) also suggested that if we wanted to detect a smaller standardized effect size by means of increasing the sample size, it was advisable to increase the number of groups in the program rather than the number of youth per group. Based on this recommendation, our initial goal was to secure 10 matched group pairs (20 total).

Potential Bias in Group-Randomized Trials

Because group-randomized trials often include fewer than 15 groups as units of assignment, the likelihood of randomization effectively distributing potential sources of bias equally among the conditions is limited. In this sense, the potential for bias in group-randomized trials is the norm, not the exception. "For group-randomized trials, the four sources of bias that are particularly problematic are selection, differential history, differential maturation, and contamination" (Murray, 1998, p. 23). Selection bias refers to differences between participants pre-existing the intervention that might explain the differences observed among the study conditions after the treatment occurs. History or differential history is especially pertinent to group-randomized trials because the conditions occur in real time. For example, the implementation of a new health programming policy for middle school youth in the schools or districts in which groups had been selected for participation in the *Media-Smart Youth* evaluation could potentially affect its results. Differential history, on the other hand, refers to any external influence that affects only one of the conditions and causes a change consistent (or consistently inconsistent) with the treatment effect. This threat to internal validity creates a result difficult to separate from the treatment effect. Maturation and differential maturation refer to the natural growth or development of subjects within or across groups in a group-randomized study. The fourth potential bias—that with the greatest likelihood in a group-randomized study—is contamination. This occurs when the groups assigned to the control condition are actively or passively exposed to the treatment or intervention.

To reduce potential bias, the treatment and control groups in this evaluation were matched on key variables such as urban/suburban, site-based socioeconomic status, and race/ethnicity. Three other steps were also taken to ensure a rigorous design. First, we organized a youth activity at the control sites to minimize attrition and to make the experience for these youth more than merely completing the two knowledge-assessment surveys (pre- and post-curriculum for the treatment groups). Second, we trained all facilitators together to enhance implementation fidelity. And finally, we collected qualitative information on the site providers, facilitators, and youth.

Selection of After-School Sites Using Matching Variables

Although randomized assignment of groups to study conditions ensures that the probability of being in one condition or the other is equal, it does not ensure that all sources of bias will be equally distributed. "Where the number of groups are limited [*sic*], and especially when the groups are heterogeneous, matching or stratification prior to randomization can make randomization much more effective" (Murray, 1998, p. 33). Several categories of variables describe differences among the members of the target population (youth aged 11 to 13 years) that may be related to program success. These include demographic characteristics, individual-level factors, and family-level factors. Demographic characteristics of the target population that might affect program success include age, gender, socioeconomic status or income and educational backgrounds of the adolescents' primary caregivers, race and ethnicity, and family structure (e.g., two biological married parents, single parent). Relevant individual-level factors may include a young person's prior level of physical activity, health status, involvement in other related out-of-school-time programs or exposure to other relevant curricula, and exposure to and consumption of media (e.g., hours of television viewing, computer use). Relevant family-level factors might include the amount of parental involvement in making choices about food (e.g., purchased and prepared), physical activity (e.g., amount and type), and parents' ability to ensure that the adolescents attend the program.

Because existing groups of youth were the units of assignment for this group-randomized study, the after-school sites were matched by their general demographic characteristics, e.g., range of race, ethnicity, and socioeconomic status of the youth at the site, based on the general perception of the site contact. These site-level demographics for race, ethnicity, and gender, as well as socioeconomic status, were inferred from information available to the site contact on the general student population. The groups themselves were then randomly assigned to the treatment and control conditions.

To minimize attrition effects, the multi-site aggregate of treatment and control groups each included 9 after-school sites (18 total). To increase the likelihood of a sufficient sample at the posttest, 10 rather than 9 pairs of sites were solicited, with 15 youth per pre-established after-school program, for a total of 150 treatment youth and 150 controls. Assuming the loss of at least one treatment/control group pair, as well as individual attrition due to treatment or control youth dropping out of the program, the projected number remaining for inclusion in the posttest data set at the close of the project was 9–12 youth per site, with a goal of 80 total in each study condition, treatment and control.

Site Recruitment

Because youth in both the treatment and control groups were to be selected from pre-existing after-school programs, identifying specific after-school program sites was the first stage in the selection process. Youth-serving agencies already running structured after-school programs in the Washington, D.C., metropolitan area were solicited for participation in the evaluation. Originally, the plan was to select two program sites from the same agency. Each pair of after-school sites was to be matched on demographics, including race, ethnicity, and socioeconomic status of the youth at the site. This proved unviable, and efforts shifted to identify two sites from

different agencies or schools that were closely matched on factors identified in the evaluation design as affecting program outcomes. Each of the sites in the matched pair was then randomly assigned either to receive the treatment or to serve as the control group. (See Attachment B for the matched pairs with their demographic information.)

After-school sites were recruited from urban and suburban communities through outreach to community-based organizations and public schools. A document outlining the goals of the evaluation, the role of the after-school organizations, and a list of the requirements for the study was used to inform potential sites of the study (Attachment C). To be included as participants, sites had to be willing to serve as a treatment or a control site and agree to the requirements of either study condition. The main requirements were to recruit the youth participants, assist in obtaining parental consent, and provide space and one staff member for the sessions. Interested sites were asked to fill out a form identifying the demographics of the youth at their sites and confirming that they were able to meet the requirements of the study. This information was used in identifying the matched pairs. To minimize cross-contamination, sites were matched so as not to be close geographically. In addition, community-based organizations were not matched with any of the feeder schools they served. To check for the potential effect of health programming extraneous to *Media-Smart Youth*, sites were asked to report whether they had engaged in any programming related to media, nutrition, and physical activity. Although many sites offered physical activity programming and some offered nutrition and media activities, none of the sites selected had programming in place that linked these three topic areas or was implementing the *Media-Smart Youth* curriculum specifically.

Several challenges arose during the recruitment of potential sites. First, information on the study did not always reach key after-school coordinators at the sites recruited. Among them, several sites decided not to participate because they either were not willing to be a control group (i.e., they intended to begin programming in the areas targeted by *Media-Smart Youth* as soon as possible) or were unwilling to be a treatment group (i.e., they could not meet the time requirements of a biweekly 90-minute session for 6 weeks). In addition, several sites were unwilling to be randomly assigned to either study condition. For instance, some were interested in serving as a control site but could not commit to the treatment group requirements due to the need to provide academic support or other activities during the after-school time. Several could not provide an hour and a half twice a week for the *Media-Smart Youth* program to take place. In contrast, one site dropped out of the study because administrators at the site wanted to begin implementing a physical activity and nutrition program right away and planned to do so regardless of the group to which the site was assigned.

Youth Recruitment

To recruit youth as study participants, both treatment and control group site liaisons used a variety of strategies, including posting and handing out flyers, outreach and presentations to students, and approaching students individually (see Attachment D for the document on recruiting youth to the program provided to participating sites). Only two sites, one treatment and one control, recruited youth through outreach to parents. The total site populations from which youth were recruited varied from 18 to 1,400 students, and initial recruitment numbers ranged from 15 to 45. Of these, between 6 and 19 at each site returned parental consent forms to

participate in the study. The *Media-Smart Youth* curriculum is aimed at youth aged 11 to 13 years; however, youth younger than 11 or older than 13 were allowed to participate in the program but were not included in the data collection and analysis.

Youth recruitment also presented many challenges, differing for the treatment and control groups, because many opportunities are offered during the after-school time and the treatment groups required a significant time commitment. The *Media-Smart Youth* program competed with many other activities, including spring sports. In the control groups, the time gap between the two sessions decreased the gift card's effectiveness as an incentive for participation.

Consent and Assent Processes

At each after-school site selected for inclusion in the study, the adult/parent consent forms with the accompanying youth assent forms were distributed in person at the time of the child's enrollment in the youth program, sent home to the parent/guardian with the child, or mailed. If both parent and child were present at enrollment, the forms were given to the parent and child and collected. Otherwise, the consent and assent forms were sent home with the child with a self-addressed stamped envelope. (See Attachments E1–E7 for the Treatment Group and Control Group Consent Forms in English and Spanish, the cover letters, and the Youth Assent Form.) Reminders were sent to all parents/guardians who failed to return the forms before the first day of *Media-Smart Youth* implementation. Strategies used by the sites to secure parental/guardian consent included phone calls, notices sent home with the youth, and actual door-to-door solicitation by at least one of the programs. Collecting consent forms was challenging for both treatment and control groups. Program coordinators described the length and format of the consent form (three pages long, following U.S. Office of Management and Budget [OMB] structure and language guidelines) as inhibiting participant recruitment. Students and parents had to be reminded repeatedly and forms were sometimes not received until the first day of implementation.

The program team complied with Paperwork Reduction Act and Privacy Act requirements. The clearance package (Attachment F) was submitted to the OMB. In addition, because the Privacy Act applies to the proposed evaluation, all potential participants (in this case, parents or legal guardians who provide informed consent) were given a *Privacy Act Notification Statement.* Informed consent from parents or legal guardians was obtained prior to the start of the program and to data collection. Though we anticipated minimal or no risk to the adolescents, the NICHD Institutional Review Board reviewed and approved the evaluation design and method for obtaining informed consent, and the research review committees of two of the local school districts in which the *Media-Smart Youth* evaluation was conducted also approved the overall evaluation design and instruments.

Site and Youth Incentives

Each treatment site was awarded $1,000 at the completion of the project and each control site received $100. After evaluation activities were complete at all treatment sites, those organizations or schools in the control group received training by AED on use of the *Media-Smart Youth* curriculum to assist them in providing the program to their youth. (See Attachment

G for the Facilitator Training Agenda.) All sites, treatment and control, received a copy of the *Media-Smart Youth* curriculum and the Facilitator's Guide. Also, all youth (treatment and control) who participated in the evaluation received a $25 gift card for a local book or athletic store after they completed the second administration of the *Media-Smart Youth* Survey. Although not initially identified as such, the snacks proved to be another form of incentive, and participants often mentioned them as something that kept them coming back to the various lessons.

Implementing the *Media-Smart Youth* Curriculum

Group-randomized trials are susceptible to a reduction in the reliability of an intervention's implementation because standardizing its delivery to identifiable groups can be more difficult than to individual participants (Murray, 1998). This reduction in reliability often results in increased variance and limits the overall precision of the group-randomized statistical model. Both the planning for and the implementation of the *Media-Smart Youth* curriculum reflected the discipline needed to ensure a reliable implementation across treatment groups. To minimize any perception by the youth that they were engaging in an academic program or evaluation exercise, the first administration of the *Media-Smart Youth* Survey was incorporated into a pre-lesson designed to introduce participants to the program and to each other and provide a snack. The *Media-Smart Youth* Survey administration was then presented as one activity of this first session.

As outlined in Figure 1, except Lesson 6, each lesson of the *Media-Smart Youth* curriculum contains three activities, A, B, and C, as well as a snack break and an action break (see Attachment A for a complete list of the snack and action breaks for each lesson). The activities build upon each other across the lessons and the snack and action breaks reaffirm concepts discussed in the related activities. Although times may vary for the individual activities, a full lesson is 90 minutes, with the snack and action breaks intended to be 10 minutes each. The facilitators were explicitly instructed not to adapt or change any lesson in such a way that an entire activity was ever skipped or carried over to the next session. All content and activities needed to be addressed in the day's lesson, even if abbreviated. For example, facilitators were allowed and encouraged to swap activity A and the snack break so that youth could eat first, thereby having more attention and focus. The *Media-Smart Youth* curriculum for this evaluation excluded the Big Production because the treatment sites were not provided with the necessary resources, nor was there sufficient time within the evaluation time frame to secure a Big Production partner. However, the *Media-Smart Youth* curriculum incorporated mini-production activities, so the youth were afforded the opportunity to directly apply the knowledge and skills they were gaining through the lessons.

Description of Control Site Activities

Control site activities were developed to maximize youth participation on the days they completed the *Media-Smart Youth* Survey. In recruiting control site youth to the evaluation, these two sessions were presented as a program on career development. Both were designed to parallel the structured activities implemented at the treatment sites on the days of the pre– and post–*Media-Smart Youth* Survey administration—the presentation of a lesson, a snack, and completion of the survey (see Attachments H1 and H2 for the two control site activities).

Facilitator Selection and Training on *Media-Smart Youth* Curriculum

Several months prior to implementing the *Media-Smart Youth* curriculum, experienced youth program facilitators were recruited, interviewed, and hired to conduct the *Media-Smart Youth* program for this evaluation. Hiring these outside consultants was necessary because the number of facilitators needed to run the program concurrently at so many sites exceeded AED's staff capacity. A job description detailing the tasks, duration of project, and minimum qualifications was written and placed with several youth-serving organizations and online networks for dissemination. More than 30 applications were received. AED staff screened these and scheduled in-person interviews with 15 applicants. At least two staff members interviewed each applicant using a standard set of questions. These included what the applicants liked about working with 11- to 13-year-old children, what challenges they anticipated when working with this age group, and how they liked to prepare for implementing new programs and activities with youth. In addition, AED asked that each applicant prepare and facilitate a 5-minute training to engage the interviewers, providing a showcase for the facilitator's skills. Ten facilitators were selected and hired, contingent upon allowing AED to conduct a background check. In addition, most facilitators were fingerprinted to comply with county standards, and a few had to be immunized against TB before they were allowed to begin interacting with youth.

Prior to the *Media-Smart Youth* curriculum implementation, the facilitators participated in a one-half-day training facilitated by the program team. This covered several topics, first focusing on the role of the facilitator, including logistical information about the program locations. Secondly, key facilitator tasks were discussed, including the importance of presenting each complete lesson with fidelity. Next, the training focused on managing time and keeping an attendance log. A detailed overview of the program was also provided during this training. The program team gave the new facilitators a copy of the *Media-Smart Youth* Facilitator's Guide for review prior to the training and presented additional information about the four key content areas of the curriculum and how youth are engaged in activities to learn about that content. The facilitator training also gave a short overview of evaluation activities and covered the purpose of the evaluation, the data collection process, and the very limited degree to which the facilitator would be involved in any of the evaluation activities, which were presented last to minimize any apprehension about the evaluation. (See Attachment I for the Facilitator Training Detailed Agenda.)

Evaluators' Training on Data Collection

An evaluation team of AED staff with background and expertise in research and evaluation was trained on the *Media-Smart Youth* Survey administration and on the control site activities. This team was separate and discrete from the program team. (See Attachments J1 and J2 for the Treatment and Control Survey Administration Instructions.)

Data Collection

Data Sources

Information was collected specifically for the evaluation. Primary data sources included program recruitment records, program attendance logs, lesson log implementation checklists for recording the degree of fidelity with which each lesson was implemented, the Lesson 4 Observation Checklist, and pre- and post-intervention self-administered surveys for the treatment and control groups.

1. *Media-Smart Youth* Survey. A survey instrument was developed for the purpose of this evaluation to assess change in adolescents' knowledge of and intended behaviors for nutrition and physical activity and in their knowledge and skills in media analysis. The behavioral intention items were drawn from the University of Minnesota's *Teens Eating for Energy and Nutrition at School* study (Birnbaum et al., 2002), for which validity and reliability had been established. (See Attachment F [OMB clearance package] for the *Media-Smart Youth* Survey, "*Tell Us What You Think*.")

2. Facilitator Lesson Logs. Each facilitator was required to submit a lesson log within 48 hours of completing each lesson. The log was structured to follow the principal components of the *Media-Smart Youth* lesson—for example, the activities and the snack break and the action break. Facilitators were asked to record the time to complete each component, if and how they modified an activity, and any challenges they faced in implementing the lesson with fidelity.

3. Lesson 4 Observation Log and Observation Checklist. In addition to capturing information about lesson implementation via the facilitator logs, one or two members of the *Media-Smart Youth* evaluation team observed each *Media-Smart Youth* facilitator in the process of conducting Lesson 4 of the program. This lesson was chosen for observation across sites because it included the most varied content and exercises. Either one or two observers watched the lesson discreetly and captured observations on the same *Media-Smart Youth* facilitator implementation log that the facilitator filled out upon completion of the lesson. This allowed the evaluation team to compare facilitator self-reported data with observed occurrences. In addition, the observer completed the Observation Checklist, a structured observation protocol with a 4-point scale that rated the facilitator as a person, as a classroom manager and organizer, and as an instructor.

The observers were not engaged in the lesson. Prior to the beginning of the implementation, facilitators were informed that they would be observed, but not told exactly when. The observers gave the facilitators 1 day's notice so that necessary arrangements could be made for travel and access to the school and/or classroom. Observers did not share with facilitators either before or after the lesson implementation the types of data being collected. Four AED staff members participated as observers across the sites.

4. Post-Treatment Facilitator Feedback. After completion of all *Media-Smart Youth* programs at the treatment and control sites, the facilitators were convened to get their feedback on the program and the challenges they faced in its implementation.

Background on *Media-Smart Youth* Survey Development

The *Media-Smart Youth* Survey was based on an instrument with fewer questions, developed as part of the original *Media-Smart Youth* curriculum package for use by after-school programs. AED designed and pretested this original instrument, which included both existing questions adapted from other measures and new questions developed by AED. Both this brief instrument and a revised version were used during the pretesting of the curriculum. In addition, young people who did not receive the curriculum completed the instrument and provided feedback to AED on usability, clarity, and format.

Pretesting of the *Media-Smart Youth* Survey

The *Media-Smart Youth* Survey was piloted with a sample of nine youth aged 11 to 13 years who would not be participating in the evaluation; however, they were recruited from an organization similar to those involved in the evaluation. These youth provided feedback on their general understanding of item content, response method, readability, and general level of difficulty. Items and item scales were revised based on this feedback. (See Attachment K, Item Analysis of the Survey Using the Pre-Treatment Data.)

Administration of the *Media-Smart Youth* Survey

To ensure standard collection of youth outcome data, the treatment sites were each surveyed before the first lesson and after the final lesson. Each control site was surveyed within the same week as its matched treatment counterpart to control for the effect of any prospective external health-related events in the communities that might be related in some way to the objectives of the *Media-Smart Youth* curriculum.

The pre-treatment *Media-Smart Youth* Survey administration was incorporated into the first session, a pre-lesson that included introduction of the youth to the *Media-Smart Youth* program objectives, introductions of the youth to each other, the survey administration, and a snack. The post-treatment survey was administered at the beginning of the first Big Production session following the final lesson in the curriculum. The instrument was designed to be completed in approximately 15 to 20 minutes, based on feedback from youth in the piloting of the survey, who suggested they would not stay engaged if it took more than 20 minutes to complete. Trained evaluators administered the survey to both the treatment and control groups. A set of standard, detailed administrative instructions was provided to all trained evaluators. Quality control was a primary concern throughout survey administration, with special attention given to the seriousness with which the youth responded to the survey because the assessment was being presented within a non-academic setting.

Especially because the participants were minors, steps were taken to ensure that they were comfortable completing the questionnaire, that they understood it was not a test, and that they could refuse to answer any question they were uncomfortable with. To accommodate slow readers, the youth were allowed to work on the survey until they completed it; no time constraints were imposed. To minimize bias, the facilitators did not administer the surveys, and

those who did were trained to provide a safe, comfortable, and enjoyable experience for the youth. In addition, to minimize "teaching to the test," the survey was not shared with any of the facilitators until after its post-treatment administration.

Upon collection of the completed questionnaires on-site, the trained evaluators scanned them for any incomplete sections. They then pointed out incomplete items to the respondents and provided them with an opportunity to complete those items.

Data Preparation

An identification number was randomly assigned to each respondent so that the pre- and post-treatment instruments could be matched upon completion of data collection. This number, rather than a personal identifier such as first and/or last name, was used to identify the data.

The data were prepared for analysis using standard procedures for data entry, coding, and cleaning, with the survey data entered and verified by trained data entry personnel. A random sample of the surveys was entered twice to check for data entry errors, including omissions and mistakes. In addition, SPSS frequency runs were used to identify out-of-field responses for each survey item.

Data Analysis and Findings

Program Implementation Analysis and Findings

***Media-Smart Youth* Facilitator Implementation Logs.** The *Media-Smart Youth* facilitator implementation logs were analyzed to identify major themes related to program barriers as well as any modifications made to the intended curriculum implementation. The range of adherence to program implementation dimensions, such as time spent on the lesson activities, completion of lesson subtask activities, and adaptations to lessons, was examined.

Observation Log and Observation Checklist. The facilitator and observer logs for Lesson 4 were compared on reporting of activity completion and time on activity. Observer responses to the open-ended questions in the lesson log were analyzed for major themes. Adherence to program implementation was assessed. The Observation Checklist items were also analyzed to provide additional information on the perceived effectiveness of the facilitator in engaging youth in the curriculum.

Post-Treatment Facilitator Feedback. After the completion of all the *Media-Smart Youth* programs at the treatment and the control sites, the facilitators were convened to obtain their feedback on the curriculum and information on the challenges they faced in implementation. Both group discussion and individual written feedback were analyzed for themes.

Facilitator Demographics and Background. The *Media-Smart Youth* facilitators were selected prior to the evaluation. The majority were white women, although one was male, and two identified themselves as African American. Except for one female facilitator who was a member of the AED team that had worked with *Media-Smart Youth* site facilitators in the pilot phase, all facilitators were selected from the pool of applicants specifically hired for the *Media-Smart Youth* evaluation. They represented a variety of age levels, with several in their twenties, some in their thirties, and others in their forties or fifties. All had college degrees, with five reporting graduate-level degrees. Areas of study included marketing, psychology, divinity studies, international development, and classics. One-third of the facilitators reported teaching experience in a school setting. Of these, two had 2 years of experience or less and one had taught for 7 years.

Facilitators' previous experience working in after-school or out-of-school programming ranged from 3 months to 25 years. Nearly all reported having worked with multiple organizations on after-school or out-of-school programming, with a wide variety of faith-based and community-based organizations. Several also mentioned experience working with public and privately operated youth-serving programs, such as the D.C. Youth Employment Program in Washington and the Near North Health Center in Chicago.

Nearly all the facilitators mentioned health-related work experience or training. This ranged from informal on-the-job experience to formal instruction and training on topics including HIV counseling and testing, obesity, tobacco prevention, and health communications. The majority also reported work experience or training on media-related topics, which included developing

documentaries, educational videos, media literacy curricula, and a variety of Web and print media experience.

Facilitator Lesson Logs. *Media-Smart Youth* facilitators were required to submit their lesson logs within 24 hours of each lesson's completion. The lesson logs were designed to capture information on individual tasks and activities as well as to record the facilitators' overall impressions of the lessons. Starting with Pre-Lesson 1 and continuing through Lesson 10 (totaling 11 lesson logs per site), the facilitators at the nine sites answered a set of seven questions. The core questions asked for general feedback on how facilitators and youth felt about each lesson and if the resources and directions provided were adequate.

Facilitator Feedback on Attendance and Lesson Completion. Each facilitator took attendance and completed a log for each lesson that included a checklist and open-ended questions about the *Media-Smart Youth* implementation. (See Attachment L for the Lesson Attendance Table for the 9 Original MSY Treatment Sites.) These data were used to identify youth who had participated in six or more *Media-Smart Youth* lessons for the survey analysis. The number of youth attending each lesson ranged from 3 to 16, with the site average ranging from 4.2 to 13.7. (Treatment site #9 was removed from the quantitative analysis because only one youth took the post–*Media-Smart Youth* survey.) Lesson logs were designed to capture information on the completion of individual activities and activity subtasks for each of the 10 *Media-Smart Youth* lessons. With the exception of Lesson 6, which includes only two activities (A and B), all lessons involve three activities (A, B, and C). See Table 1 for detail on the number of activities and subtasks for each lesson.

Table 1. *Media-Smart Youth* Lesson Activities with Number of Subtasks

	Activity A	**Activity B**	**Activity C**	
	No. of Subtasks	No. of Subtasks	No. of Subtasks	Total Subtasks
Lesson 1	3	2	3	8
Lesson 2	6	3	2	11
Lesson 3	3	5	4	12
Lesson 4	7	8	2	17
Lesson 5	6	5	4	15
Lesson 6	6	2	n/a	8
Lesson 7	9	3	5	17
Lesson 8	7	7	5	19
Lesson 9	4	6	4	14
Lesson 10	4	8	5	17

Activity Completion. According to the facilitators' lesson logs, no single lesson had all three activities completed in their entirety across all sites. However, for every lesson, at least one of the activities was completed in its entirety by all the sites. Of the 10 lessons, only 4 (Lessons 2, 3, 5, and 8) were completed within the time allotted for all three activities. For the other six lessons across the sites, at least one activity took more than the time allotted. (See Attachments M and N for the time allotted, mean time spent, and range of time spent on each activity for all

10 lessons, with details of time spent on snack and action breaks.) The activity most often completed by all sites was activity A (for Lessons 3–6 and 8–10). For Lessons 1 and 7, activity B was completed by all sites, and for Lesson 2, activity C. Facilitators reported that they often ran out of time before the end of the lesson, and thus activities B and C were completed less frequently.

Each of the lesson activities was allotted a period of time within which the activity was to be completed. This ranged from 12 minutes (Lesson 1, activity B) to 40 minutes (Lesson 6, activity A). Facilitators reported how much time they spent on each activity. Of the 29 total activities that were part of the curriculum, facilitators averaged less time spent than allotted on 20. This ranged from 0.22 minutes less (Lesson 9, activity A) to 8.75 minutes less (Lesson 7, activity C). The facilitators spent, on average, more time than allotted on nine activities; this ranged from 1.56 minutes more (Lesson 4, activity B) to 3.89 minutes more (Lesson 10, activity A).

Activity Non-Completion. Facilitators and lesson observers noted several variations occurring across sites over the course of the program implementation. Some participants had to leave the lesson early for sports or band practice. Sometimes the lesson came to an early close with the arrival of the after-school program bus. Other times the lessons were interrupted by other teachers coming into the room, announcements from the school public address system, or general school hallway traffic of students traveling to and from snack machines after school. When participants came to class late, their school bus schedules did not allow for making up time by staying later and completing the lessons.

Unfortunately, the majority of lesson activities were not completed by all sites. The number of subtasks not undertaken for any single activity ranged from 1 at one site to 13 across six sites. In 16 of the 29 activities in the 10 lessons, at least one of the nine *Media-Smart Youth* sites was unable to do at least one subtask. The two lesson activities with the most subtasks left undone across the nine sites and the least saturation of lesson content were activity C of Lesson 7 (“The Power of Advertising,” mini-production) and activity C of Lesson 10 (“Getting Into the Production Mode, Three Ps in Production”). In Lesson 10, activity C had 5 subtasks as well, and again, 13 were omitted across eight sites. The reason for the number of incomplete subtasks in this activity may be related to the lesson content and its applicability. Most subtasks in lesson 10 involved preparation for the Big Production. Because some sites did not plan to complete such a project, the facilitators may have omitted from Lesson 10 what was not applicable to the youth at their site.

In their effort to cover the curriculum content, facilitators often omitted the action break. From Lesson 1 to Lesson 3, the action break was completed at most sites. At times, however, the facilitators felt they needed to modify or shorten activities to fit everything into the schedule and not leave out any of the content. One example of such a curriculum modification took place in Lesson 4, in which one facilitator explained the main ways that fat is found in food instead of allowing the youth to identify them through brainstorming. (For more detail, see Attachment O for adaptations that the facilitators made to the *Media-Smart Youth* lessons.)

Overall Lesson Impressions. The facilitators’ most commonly reported impression was the feeling of being pressured to cover the curriculum material in the time allotted. This was

especially apparent in Lessons 2 ("Thinking About Media"), 4 ("Nutrition Know-How… Eat It Up!"), and 7 ("The Power of Advertising"). Lessons highlighted as interesting to the youth were 3 ("Asking Questions"), 5 ("Motion Commotion—What Is Being Active?"), and 8 ("Super Snacks and Better Bones"), whereas Lessons 6 ("Visiting a Grocery Store"), 9 ("Making Smart Choices Fun and Easy"), and 10 ("Getting Into the Production Mode") were reported as more challenging for maintaining youth engagement. Some reasons given for participants' lack of interest in these lessons were fatigue toward the end of the curriculum (which coincided with the beginning of spring) and eagerness to work on the Big Production instead of other lesson activities. During the final sessions of the *Media-Smart Youth* curriculum, keeping youth engaged was especially difficult at the sites not doing a Big Production.

Resources. At the majority of sites and for the majority of lessons, the resources were reported as being adequate. In some instances, however, facilitators felt they needed to supplement the resources provided with the curriculum by purchasing additional props. For example, in Lesson 8 ("Super Snacks and Better Bones"), three site facilitators bought candy (for the discussion on high-sugar foods and packaging as a form of advertisement) because they felt they needed more empty packages of high-sugar/high-fat foods for the lesson demonstration. Rarely (mentioned only six times throughout all lesson logs from all sites), facilitators had to buy more supplies (e.g., Post-it notes, streamers, magazines, billboard paper).

Understanding the Lesson. The concepts presented in Pre-Lesson 1 and Lessons 1 and 2 were not difficult for the participants, but other concepts in the remaining lessons posed difficulties in comprehension, which affected activity execution. Starting with Lesson 3 ("Asking Questions"), facilitators reported some concepts in the curriculum to be difficult for the youth to understand. These included the difference between "message" and "purpose," what grains are, the concept of "Daily Values," the terms "omission" and "product placement," specific versus general messages, and lastly, in Lesson 10 ("Getting Into the Production Mode"), distinguishing "action" from "message." Despite the challenging material, youth were able to grasp the concepts and understand their importance. One facilitator wrote in her log for Lesson 7 ("The Power of Advertising") that "during the mission omission activity, I was surprised to hear how many youth felt they, as well as their parents, would not purchase a product if they knew the missing fact."

The *Media-Smart Youth* curriculum included a wealth of activities to give participants the opportunity to engage in active consideration of the material. Some proved to be more challenging than others. In Lesson 5 ("Motion Commotion—What Is Being Active?"), two activities were difficult for youth to follow, the jingle composition and the activity of locating a pulse after various types of physical movement. Other challenging activities included identifying fiber on the nutrition labels and understanding the concept of "% Daily Value" of calcium.

Positive Feedback. The majority of the positive feedback received from youth concerned their evaluations of the food they enjoyed during the snack breaks, such as the low-fat ranch dip and vegetables, frozen yogurt, tortilla wraps, and fruit. Beyond providing much-needed fuel for the youth after a long day in school, the snacks exposed them to foods they might otherwise have been reluctant to try. From the outset of the curriculum implementation, the majority of these youth seemed open to trying new things. In Lesson 1 ("Welcome to *Media-Smart Youth"*), one

participant said "my mom always tries to get me to eat veggies; she'd die if she saw me eating broccoli." Youth also especially enjoyed some of the activities that were part of the *Media-Smart Youth* curriculum. They specifically expressed how much fun they found in engaging in physical activities such as the "Milling Process," "Fit to be Tried," "Duck, Duck, Goose," "A Cool Wind Blows," and yoga. For Lesson 5 ("Motion Commotion—What Is Being Active?"), one facilitator said: "After we finished the jingles, the kids [begged] to do more of the 'Fit to be Tried' activity, so I put it on for another 2 minutes." Non-physical activities that the youth enjoyed were the "Food Label Scavenger Hunt," the "Collage Project," and the "Role Game."

Negative Feedback. Negative feedback came from how the youth behaved rather than in their direct negative comments (although those occasionally arose). In Lessons 1 ("Welcome to *Media-Smart Youth"*), 4 ("Nutrition Know-How… Eat It Up!"), and 8 ("Super Snacks and Better Bones"), facilitators felt that the youth seemed to have expectations different from the intended *Media-Smart Youth* curriculum. Facilitators also mentioned that sometimes the youth did not enjoy activities they were asked to participate in (e.g., the jingles/songs activity). The youth expressed dissatisfaction with two snacks—cottage cheese and the bean dip. Facilitators also reported on activities that were particularly challenging for the youth, such as the "Action Hero" and "Milling Process" activities.

Other Lesson Comments. Other feedback from the facilitators ranged from a recommendation to have an assistant co-teach the class in future implementations of *Media-Smart Youth* to problems with the physical environment's suitability for the activities. Several facilitators commented on the need for more time to cover the curriculum content. Time appeared to be a factor especially for those sites with less than the full 90 minutes to cover the material, but was often mentioned even at sites that had the full 90 minutes allotted for their classes. Facilitators were also excited to share the changes the youth were making in their food choices, especially because these became more evident toward the end of the curriculum. In her Lesson 9 ("Making Smart Choices Fun and Easy") log, one facilitator shared how "one youth mentioned that after the calcium lesson, he realized that he was drinking whole milk. He encouraged his mom to purchase skim milk. For a few days he mixed the whole milk and skim milk and eventually made the transition to only skim milk." Another facilitator noted how "many students said that they replaced soda at dinner time with water." Overall, facilitator comments painted the picture of an after-school program curriculum that was engaging, informative, and fun for the youth.

Lesson 4 Observation Log and Checklist. One of four observers watched each *Media-Smart Youth* facilitator during presentation of Lesson 4 ("Nutrition Know-How… Eat It Up!") at the treatment sites. The facilitator and observer logs for Lesson 4 were then compared to determine the level of agreement (yes or no response) between observers and facilitators on whether the activity had been completed.

Echoing the comments made by facilitators, observers at most sites noted that the youth liked the snacks. In addition, observers at a majority of the sites commented on the engagement of the youth, indicating good participation, and that they liked the activities and were focused and engaged during the lesson. Observers at six sites also commented on the specific content activities, reporting that the youth enjoyed brainstorming, doing report-outs, working in small groups, and making posters. Negative youth feedback mirrored facilitators' comments: students

were bored with the facilitator talking during the activity, were hesitant to participate in one activity that involved a silly physical component, or were demonstrating bad behavior.

Using the Lesson 4 Observation Checklist, the observers rated the facilitators as individuals, classroom managers, and instructors (see Attachment P for comments made by the observers). Although the observations were limited to one lesson, the facilitators were reported as being respectful, having good rapport with the students, and helping them relate the material to their world for better understanding. The facilitators used subtle techniques to attract the children's attention and to flow from one activity to the next while maintaining control. In the ratings for *"Facilitator as Person,"* all were evaluated as being "exceptional" or "above average" at creating a supportive and warm climate. The majority were also considered "above average" at preventing situations in which a student loses peer respect. As *"Classroom Manager and Organizer,"* the majority of facilitators were observed to be "above average" leaders and "above average" at engaging all youth. All facilitators were evaluated as "above average" or "exceptional" at managing behavior. In the ratings on *"Facilitator as Instructor,"* all were evaluated as "above average" or "exceptional" at giving clear examples to the students, providing positive reinforcement and meaningful feedback, and using questioning as a teaching strategy.

Post-Treatment Facilitator Feedback. After the *Media-Smart Youth* program had been implemented and the post-intervention surveys were collected, facilitators were invited to share their experiences with the program and evaluation teams (see Attachment Q for the meeting agenda). Facilitators were asked to respond to three questions that related to the implementation and modification of the curriculum and to provide anecdotal evidence of youth behavior changes that they had witnessed and felt to be attributable to the program. Themes that emerged in the discussion on the challenges of the curriculum implementation were similar to what the facilitators had documented in their lesson logs (e.g., needing more time to cover content). The comments shared in the discussion provided valuable additional information not evident in the lesson logs (e.g., at some sites, the environment in which the lessons took place was not conducive to carrying out the activities, or the youth had expectations that the curriculum was more about media). Facilitators also reiterated from the logs some of the modifications they made in their lessons (e.g., cutting back on brainstorming activities or group activities and omitting the action break to save time).

Implementation Challenges. Feedback on challenges that were encountered in implementing the *Media-Smart Youth* curriculum focused on time, site facilities, the lesson scripts, and the youth. Nearly all facilitators discussed feeling challenged to cover the material within the planned time frame. A few said the time allotted for snacks was inadequate, and others felt they did not have enough time to set up materials or review previous lessons. Still others were faced with compressing the 90-minute lessons into 70 or 75 minutes due to external factors. Several facilitators commented that the room used for the program was uncomfortable due to a lack of air conditioning or was in a location where students were easily distracted. A few said the script did not work with students as written, because it was "sometimes too stiff and sometimes ran long," whereas others thought some lessons and activities seemed better suited for younger students. Finally, some youth were pulled out of other programs that were popular with their peers in the

school or had different expectations as to the content of the program (e.g., that it would be mostly on media).

Modifications Made to the *Media-Smart Youth* Curriculum. The facilitators made modifications to the curriculum in the action breaks, the snack breaks, and the group activities. They sometimes had to eliminate the action breaks to save time, combining them with snack breaks or incorporating physical activity into other activities such as group work. Several facilitators commented that they gave snacks to students at the beginning of the session, rather than at the designated time, sometimes to allow the students to "filter in" without missing content or simply because students were hungry. Sometimes the facilitators altered the structure of group activities. For example, facilitators may have used one large group instead of competing teams. Sometimes they had students complete work individually rather than in groups, or they cut down on brainstorming activities by explaining things in order to cover the content in time.

Anecdotes of Learning. The facilitators shared anecdotal evidence that the youth learned from the *Media-Smart Youth* curriculum. For example, participating in the program made students more aware of the nutrition information contained on labels, and several facilitators commented that students enjoyed checking the labels. One facilitator also mentioned that youth learned about calcium—calcium-rich foods and how much calcium they needed—and its effect on bones and height. Several facilitators heard from students about trying new foods at home, changing eating patterns, or influencing the diets of family members. Common examples were replacing soda with water and switching to low-fat versions of foods such as milk, yogurt, or cheese. Many students also reported trying new fruits and vegetables as a result of the program.

> *"[One] boy said he was at the store looking at microwave popcorn and was surprised at [how much fat] the 'movie popcorn' flavor had…I asked if he ever looked at labels and he said, 'not before this.'"*
>
> *"One kid told me he made…a salad every night, in addition to what [his mother] made for dinner."*
>
> *"One [student] said she tried a vegetable she thought she didn't like, and found she did like it."*
>
> *"One [student] had his mom buy whole-grain cereal."*

Sample of *Media-Smart Youth* Mini-Productions. A review of a small sample of the *Media-Smart Youth* mini-productions completed by the youth yielded a variety of products (see Attachment R for the detailed list). Overall, the look and focus of these media productions were quite varied, with the mini-productions highlighting several behaviors, including making healthy choices when snacking, eating fruits and vegetables, doing weight-bearing activities, and ingesting foods and beverages high in calcium. For these activities, youth frequently constructed posters from brown craft paper, white poster board, and colorful construction paper. To help communicate their main health-promotion messages, youth often used markers, glitter, and sequins to decorate the posters and make them stand out. A common element across the reviewed posters was including images of healthy foods and beverages, such as a variety of fruits and

vegetables, dairy products, and water. One production shared the imagery of exercise weights and muscular figures/characters. Some of the media productions, however, took a different approach. One group constructed a large clock from poster board and included bubble letters with the text "Smoothie Time." Another group promoted calcium by producing a tee shirt with cow spots, udders, and the text "Got Calcium."

Program Outcomes Analysis and Findings

The Group-Randomized Trial. Ten matched pairs of sites were initially recruited for the evaluation. However, a treatment site of one matched pair was unable to effectively maintain attendance and dropped out of the evaluation, and the treatment site of a second matched pair had only one youth take the post-curriculum test. Therefore, both of these matched pairs (treatment and control sites) were dropped from the study, leaving eight matched pairs in the evaluation for the final analysis. The loss of these two matched pairs limited the statistical power of the final analysis.

A total of 105 treatment and 86 control youth began participation in the trial at these eight matched pairs of sites (16 total). Both groups had slightly more females (58% in the treatment and 53.5% in the control group), with the majority in both groups in grades 6 through 8 and aged 11 to 14 years. Children aged 14 years made up 18% of the treatment group and 26.7% of the control group. Because participants often reported more than one race or ethnicity, it was difficult to provide a clear profile of each group. The treatment group as a whole had a higher percentage of Hispanics (29.1%) than the control group (11.8%), whereas the control group had a larger proportion of African American youth (41.9%) than the treatment group (23.9%). Asian Americans made up 13.3% of the treatment and 11.6% of the control group, and white youth (37.1% of the treatment and 38.4% of the control group) were fairly evenly represented in both groups. All control group sites were school-based, but 86.7% of treatment group sites were school-based and the remainder community-based.

Demographic data were analyzed for the total sample and for the treatment and control groups separately. Descriptive variables included gender, age, socioeconomic status, race, and ethnicity. Means and standard deviations by treatment and control groups were calculated, and a *t* test was used to determine if the groups were comparable on the pretest administration of the *Media-Smart Youth* Survey. Retention rates were calculated for the treatment and control groups.

Table 2 shows the number of youth who were included in the pre- and posttest administrations of the *Media-Smart Youth* Survey for the eight matched treatment and control sites.

Table 2. Number of Youth Taking the *Media-Smart Youth* Pre- and Post-Survey

Matched Pairs	Location	T = Treatment C = Control	Number of Youth Taking the Survey	
			Pre (N = 191)	Post (n = 146)
Match 1	Montgomery County	T1	12	7
	Montgomery County	C1	13	12
Match 2	Montgomery County	T2	11	7
	Montgomery County	C2	18	13
Match 3	Montgomery County	T3	12	12
	Montgomery County	C3	12	12
Match 4	Montgomery County	T4	14	12
	District of Columbia	C4	7	7
Match 5	Fairfax County	T5	18	10
	Fairfax County	C5	16	15
Match 6	Fairfax County	T6	13	9
	Fairfax County	C6	6	5
Match 7	Fairfax County	T7	11	3
	Fairfax County	C7	5	4
Match 8	Fairfax County	T8	14	12
	District of Columbia	C8	9	6

As mentioned, the pretest sample (N = 191) comprised 105 treatment youth and 86 controls. The posttest sample (n = 146) included 72 treatment and 74 control youth. We anticipated that the retention rates of the treatment and control groups would vary from site to site depending on external factors such as the mobility of the youth and the degree of structure in the program for non-participating youth. To be included in the posttest treatment sample, any youth in the treatment group had to have attended at least 6 of the 10 lessons. The posttest survey was administered to all youth present at the session; however, survey data from only those who had attended at least six lessons were included in the treatment data set for analyzing overall program effect. We anticipated that the posttest response rates would range from 75% to 80%. For all eight matched pairs, the actual retention rate was 68.6% for the treatment group and 86% for the control group.

The *Media-Smart Youth* Program Outcome Measure. To measure the overall outcome of knowledge gained between pretest and posttest by exposure to the *Media-Smart Youth* curriculum, we first conducted a pre-survey item analysis (see Attachment K). The purpose of this analysis was to compare each item in the survey with the percentage of youth who answered the item correctly. Next, we computed a total score for each participant as a percentage of the 63 possible points and computed the correlation of each item with the total score. The average total score was 75.44%, ranging from 34.9% to 93.75%. The majority of the items (77.8%) were significantly positively correlated with the total score. We were thus satisfied that the scores based on the 63 items in the survey were sufficient to measure the knowledge gained and to evaluate the overall effect of the *Media-Smart Youth* curriculum. Reported later in this section is our factor analysis of the pre-survey items scores to confirm and validate the four subscales of

the survey instrument: nutrition knowledge, physical activity knowledge, media knowledge, and media skills.

Statistical Analysis of the Randomized Groups and the *Media-Smart Youth* Survey. To measure the intervention effect of the *Media-Smart Youth* curriculum on the pre- and post-treatment survey results, we followed the analytical approach of David Murray (1998) for assessing group-randomized designs. In this case, the most appropriate statistical model developed by Murray is the nested cohort pretest-posttest control design (Murray, chapters 6 and 7). The strength of the nested cohort design is that repeated observations are available for both the members of the groups as well as the groups themselves. In Murray's words, "This design allows the analyst to remove variation attributable to the members from the variance of the intervention effect. When there is a sufficient number of groups randomized to each condition, it can be a very strong design" (Murray, pp. 179–180).

In this analysis, TIME is defined as the repeated measures of the program outcome variables (pre- and posttest). CONDITION is defined as the *Media-Smart Youth* intervention and control conditions. Murray's statistical model is based on the analysis of variance (ANOVA) *F* statistic. This statistic is used to assess the variation among the means of the TIME, by the CONDITION, compared with the variation among the TIME by group means. The null hypothesis is that the variation due to CONDITION over TIME is zero, or not significant. The research hypothesis is that a significant difference exists in the outcomes by CONDITION (intervention versus control groups).

Table 3 presents the tests of fixed effects of the two main effects of CONDITION and TIME and for the interaction of CONDITION by TIME, which, as the test of the intervention effect, is the first of statistical interest. When there are only two CONDITIONS and two TIMES, the *F* statistic assesses the variation among the TIME by CONDITION means against the variation among the TIME by the group means. As shown in Table 4 for the fixed effects, the youth are getting better scores over TIME due to maturation effects ($p = .024$), but the TIME and CONDITION interaction is also significant ($p = .0059$). This implies that the effect of the treatment vs. that of the control condition on youth scores depends on TIME, or the difference between the pretest and the posttest. In this case, treatment and control groups were not significantly different at the beginning of the intervention (pretest) but were significantly different at the end of the experiment (posttest).

Table 3. Tests of Fixed Effects from the Unadjusted TIME × CONDITION Analysis of MSY in the Pretest-Posttest Control Group Design

Source	*NDF**	*DDF*	*Type III F*	*p*
CONDITION	1	14	0.89	.3604
TIME	1	14	6.40	.0240
COND*TIME	1	14	10.53	.0059

* The nominator degrees of freedom (*NDF*) is the number of conditions minus one, and the denominator degrees of freedom (*DDF*) is the number of groups minus one for each condition (total groups for treatment minus one = 7 and controls minus one = 7, for a total of 14).

The least square means (*LSMEAN*) for the analysis are the differences in the mean estimates for the pre- and posttests between the treatment and control conditions. These are reported in the fourth column of the upper portion of Table 4. In the first three columns in the table, COND*TIME 1 1 refers to the intervention condition (or treatment) at time 1 (or pretest) and COND*TIME 2 1 refers to the control condition at pretest time. The values of the least square means show that at pretest, the two conditions were nearly equal. In contrast, COND*TIME 1 2 refers to the intervention condition (or treatment) at time 2 (or posttest) and COND*TIME 2 2 refers to the control condition at the posttest. Here, a difference is seen, with an increase for the groups that received the intervention. This pattern can be interpreted to mean that the groups that received the *Media-Smart Youth* curriculum showed greater gains in overall knowledge related to the domains of nutrition, physical activity, and media knowledge.

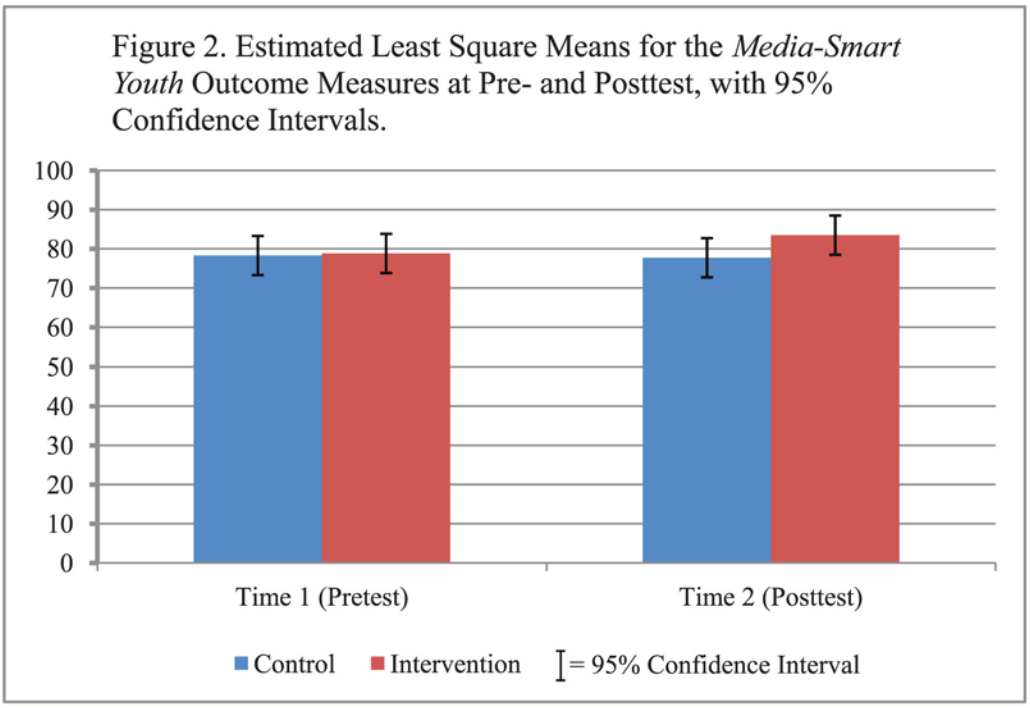
Table 4. Least Square Means from the Unadjusted TIME × CONDITION Analysis of MSY in the Pretest-Posttest Control Group Design

Effect	*Condition*	*Time*	*LSMEAN*	*SE*	*DDF*	*t*	*p*
COND*TIME	1	1	78.8441	2.4181	14	32.61	.0001
COND*TIME	1	2	83.5101	2.4181	14	34.54	.0001
COND*TIME	2	1	78.3244	2.4179	14	32.39	.0001
COND*TIME	2	2	77.7467	2.4179	14	32.15	.0001

Effect	*Condition*	*Time*	*Lower*	*Upper*
COND*TIME	1	1	73.6579	84.0304
COND*TIME	1	2	78.3239	88.6964
COND*TIME	2	1	73.1385	83.5103
COND*TIME	2	2	72.5608	82.9325

The lower half of Table 4 shows the lower and upper limits for the 95% confidence interval for these estimated least square means. For COND*TIME 1 2, the intervention effect (*LSMEAN* = 83.5101), the lower limit of the 95% confidence interval (78.3239) is less than the *LSMEAN* for COND*TIME 1 1, the treatment groups at pretest (*LSMEAN* = 78.8441). Thus, the gains in the various scales of knowledge and skills achieved by the intervention groups are small enough to suggest the existence of only a weak statistical association.

The differences in the least square means in Table 4 are also presented graphically in Figure 2, including the confidence intervals for each estimate in the bracketed bars. The confidence interval bracket for the intervention effect at posttest (time 2) nearly overlaps with the estimated *LSMEAN* for the intervention groups at the pretest. Thus, we need to be cautious when generalizing the results to the target population.



As Murray (1998) points out in his discussion of the nested cohort designs, one can compute the estimate of the intervention effect, defined as [(PostTreatment – PreTreatment) – (PostControl – PreControl)]. For this estimate, the *t* test is used because it is the square root of the *F* test for the COND*TIME interaction presented in Table 3. Table 5 shows an overall statistically significant difference ($p = .0059$) between the treatment and control groups from pre- to posttest. The negative values of the estimate (–5.2437) and of both the upper (–1.7780) and lower (–8.7094) values of the 95% confidence interval all show that the statistical association of changes in knowledge levels is going in the desired direction (increasing rather than decreasing knowledge levels). The variations of TIME and CONDITIONS are being subtracted from the total variation such that any remaining variation can be attributed only to the intervention. In summary, the changes in the knowledge levels of the groups were in the expected direction according to the research or evaluation hypothesis.

Table 5. Estimate for [(Treat2 – Treat1) – (Cont2 – Cont1)] from the Unadjusted TIME × CONDITION Analysis of MSY in the Pretest-Posttest Control Group Design

Parameter	*Estimate*	*Standard*	*DDF*	*t*	*p*
[(Treat2 – Treat1) – (Cont2 – Cont1)]	–5.2437	1.6159	14	–3.25	.0059

Parameter	*Lower*	*Upper*
[(Treat2 – Treat1) – (Cont2 – Cont1)]	–8.7094	–1.7780

Effect Size of the *Media-Smart Youth* Curriculum. Determining the "effect size" of a particular evaluation of a program is an important calculation that can be used by others in replicating the experimental evaluation or to compare the results of this evaluation with similar evaluations, sometimes called "meta-analyses." To calculate the best estimate of the effect size of the *Media-Smart Youth* curriculum, we followed the suggestions of both Murray (1998) and Hedges (2007). First, we computed the Intraclass Correlation Coefficient (ICC). The ICC calculated for this study was 0.0048, indicating that only a minimal proportion of the variance was explained at the group level (Murray, 1998, p. 301). In general, larger ICC values make standardized effect sizes harder to detect. Effect sizes used in educational and psychological research are "standardized mean differences, defined as the ratio of a difference between treatment and control group means to a standard deviation" (Hedges, 2007, p. 344). Unlike the effect size for single-site designs or designs with no statistical clustering (or grouping), the effect size of interest for cluster-randomized trials is determined by the standard deviation. "Clustering can have a substantial effect on the variance of effect size estimates in cluster-randomized designs" (Hedges, p. 359).

Although the *Media-Smart Youth* evaluation design suggests that the effect size should be calculated taking into account unequal cluster sample sizes, Hedges (2007, p. 359) argues that the effect size formulas for equal cluster sample sizes provide a good approximation, or "very close to the exact values." This avoids the complexity of the unequal cluster sample size formula, which in turn may increase the likelihood of misleading results. "The use of cluster means as the unit of analysis is a common approach" (Hedges, p. 352). The cluster means are a suitable approximation that can then be used in the effect size formula for unequal cluster sample sizes. With cluster sizes ranging from 3 to 12, the average cluster size for the treatment group was 9. The average cluster size for the comparison group was 9.25 with cluster sizes ranging from 4 to 15. The average cluster size for the eight matched pairs was 9.125. Based on Hedges' modified Cohen's *d* for equal cluster sample sizes (Hedges, 2007, equation 11), the effect size is 3.67. With a variance of 17.32, the 95% confidence interval for the effect size is –4.49, 11.82. The wide range of this confidence interval reflects the inconsistency in gains across the discrete pairs as reported in Table 6. The positive effect size of 3.67 indicates improvement, or that the results are in the right predicted direction. According to the confidence interval, however, a negative effect size is also possible, which would indicate possible deterioration, or results opposite to the predicted direction.

Table 6. Treatment and Comparison Paired Clusters (*M, SD*)

Treatment				Control			
Match	***n***	***M***	***SD***	**Match**	***n***	***M***	***SD***
1	7	76.54	15.97	1	12	75.88	13.67
2	7	83.29	11.80	2	13	87.40	6.28
3	12	81.19	9.69	3	12	79.70	10.61
4	12	85.60	7.99	4	7	78.67	13.67
5	10	93.96	4.25	5	15	76.24	11.75
6	9	90.57	4.52	6	5	86.79	4.99
7	3	78.99	17.71	7	4	76.56	0.81
8	12	76.50	9.15	8	6	56.58	17.40

Intent-to-Treat Analysis and Recomputation of the Effect Size. Only those youth for whom both pre- and posttest survey data were available and who attended 6 or more of the 10 lessons were included in the analyses of the intervention effect to ensure that treatment participants had been adequately exposed to the *Media-Smart Youth* curriculum. However, because youth who participated in more lessons might be more engaged in the curriculum, including only these participants creates a bias toward a positive effect. This is also evident in the extraordinarily large effect size of 3.67, reported above. We conclude that the removal of the missing data in the calculations of Murray's model (1998) and Hedges' (2007) effect size formula significantly overestimates not only the generalizability of the results but also the magnitude of the effect size for purposes of future meta-analysis.

The intent-to-treat bias was assessed, with youth who completed only the pretest included in the treatment group. This test was not successful because when the missing cases were included, we could not generate a precise rendering of the group-randomized statistical model defined by Murray (1998). Interestingly enough, when we recomputed the effect size for the clusters including the missing data, we obtained a larger ICC of .025 compared to .0048 reported above, and the effect size computed by Hedges' equation 11 was reduced from 3.67 to 1.73, with a 95% confidence interval of .75, 2.71. In this case, the effect size seems more intuitive and the confidence interval, or margin of error, is in a positive direction. For future meta-analyses, the effect size of 1.73 and the corresponding margin of error would be a better estimate of the effect size in this evaluation. This value can serve as a baseline "effect size" estimate for replications of this evaluation.

We also recommend that other techniques for estimating the values of missing cases should be explored in future evaluations of after-school programs, such as in this case. Overall, the challenge is to develop better management techniques to sustain adequate retention of subjects in difficult field settings—in this case, after-school programs.

***Media-Smart Youth* Survey Behavioral Intention Items.** The *Media-Smart Youth* pre- and posttest surveys also asked youth 10 questions regarding their intention to change their nutritional behavior (7 items) and physical activity (3 items). Youth reported their intentions on a 5-point scale that ranged from "Strongly Disagree" to "Strongly Agree." The principal

components analysis, reported earlier, did not demonstrate that a single good dimension could be constructed for these items. Table 7, however, shows an interesting pattern among the pre- and posttest item means and standard deviations for the treatment and control groups (see bolded items).

Table 7. Treatment and Control Pre/Post Means for Intention Items (based on a 5-point scale)

Intention Item I intend to:	**Group**	**Pretest *M***	**Pretest *SD***	**Posttest *M***	**Posttest *SD***
Be physically active for at least an hour a day during the next month	**Treatment**	3.94	1.09	4.21	1.11
	Control	3.99	1.13	4.14	1.02
Be more physically active during the next month	**Treatment**	4.27	0.99	4.35	0.94
	Control	4.28	0.93	4.26	1.07
Do more weight-bearing activities during the next month*	**Treatment**	**3.45**	1.25	**4.10**	1.02
	Control	**3.92**	1.19	**3.97**	1.09
Eat more vegetables during the next month	**Treatment**	3.86	1.08	4.00	1.10
	Control	3.77	1.21	3.68	1.17
Eat more fruit during the next month	**Treatment**	4.46	0.89	4.46	0.92
	Control	4.22	0.91	4.23	1.00
Eat less high-fat snack foods during the next month†	**Treatment**	**3.57**	1.28	**3.67**	1.09
	Control	**3.85**	1.19	**3.58**	1.29
Eat more whole-grain foods during the next month	**Treatment**	3.78	1.20	4.06	0.99
	Control	3.49	1.27	3.54	1.23
Eat or drink more foods with calcium during the next month†	**Treatment**	**4.13**	1.09	**4.30**	0.93
	Control	**4.01**	0.90	**3.81**	1.17
Read the nutrition facts label	**Treatment**	3.39	1.53	3.63	1.45
	Control	3.30	1.48	3.53	1.30
Eat less snack foods with added sugar during the next month	**Treatment**	3.46	1.36	3.83	1.23
	Control	3.55	1.27	3.58	1.31

* Statistically significant at .05 level.
† Statistically significant at .10 level.

The gain score from pre- to posttest response was calculated for each item. One-way ANOVA was run on the gain scores to compare changes in treatment group participants to the control group participants. The difference between treatment participants and control participants on one of the intention items, *Engaging in weight-bearing activities during the next month*, was statistically significant at the .05 level. The differences between the two groups in two other intention items, *Eating less high-fat snack foods during the next month* and *Eating or drinking more foods with calcium during the next month*, were not statistically significant, although approaching it ($p < .10$), but suggest a trend among intervention participants toward increased intention to positively change behavior.

MSY Survey Subscales. To aid in the future development of the survey, a factor analysis was conducted on the pre–*Media-Smart Youth* knowledge and skill survey items for confirmatory purposes to identify which items loaded onto each subscale. A principal component analysis was used with a varimax rotation method and Kaiser normalization to eliminate those items that loaded negatively. The resulting four subscales based on item content (nutrition knowledge, physical activity knowledge, media knowledge, and media skills) were then analyzed for reliability. In the process, one or two items per subscale were removed to improve the reliability estimates. Table 8 shows the original reliability coefficient and the revised coefficients for each subscale.

Table 8. *Media-Smart Youth* Survey Subscale Reliability Coefficients

MSY Subscale	Original Reliability Coefficient	Number of Items	Revised Reliability Coefficient	Number of Items
Nutrition Knowledge	.509	12	.626	10
Physical Activity Knowledge	.417	8	.522	7
Media Knowledge	.784	21	.800	20
Media Analysis Skills	.746	12	same	same

The subscales for Media Knowledge and Media Analysis Skills demonstrated good reliability. The moderate reliability for the other two subscales (Nutrition Knowledge and Physical Activity Knowledge) point to the need for further development and testing of the *Media-Smart Youth* Survey.

Discussion

The overall purpose of the *Media-Smart Youth* evaluation was to determine whether or not this curriculum and program, when fully implemented at after-school sites with trained facilitators, increased adolescent knowledge, intention, and skills. The evaluation employed a multi-method approach, using process measures to assess how the *Media-Smart Youth* program curriculum was implemented in a variety of settings and using intermediate outcome measures to assess participants' knowledge and intent to make healthful choices with a group-randomized experimental design.

Implementing Programs in After-School Settings

The *Media-Smart Youth* process evaluation focused on recruitment and retention of youth and overall program implementation of the curriculum. Implementation questions were addressed by collecting information from the sites and the facilitators from the onset of site identification through the completion of the program at all sites. Site identification and recruiting youth to participate in the program were both successful. The two biggest challenges to recruitment were securing sites willing to participate and obtaining the consent of the youth and parents. For instance, two potential sites refused to participate once they understood the chance was only 50/50 for being randomly selected as a treatment site compared to a control site. Collecting the consent forms from parents and guardians was an unexpectedly time-consuming activity at a number of the sites. Of the original 10 matched pairs, 2 were removed from the evaluation when the treatment sites could not maintain youth attendance over the course of the curriculum implementation. Losing these two pairs of matched sites took away some of the statistical power needed to test for differences in outcomes between the treatment and control groups. Although the youth incentive ($25 gift card) and, surprisingly, the snacks, helped to keep the youth coming back for each of the 10 sessions, in general, all treatment sites were challenged to retain participants throughout the program. This was largely because of the variety of other after-school programs typically available to them and because of other personal needs during this time period. Replications of this evaluation should consider recruiting sites with the expectation that at least one-quarter of them will not be successful in fully implementing the curriculum.

Coupled with trying to keep the students interested and engaged across the wide range of *Media-Smart Youth* activities, the facilitators were faced with not having enough time to complete all the subtasks outlined in the curriculum for a particular lesson. Because the time allotted for the *Media-Smart Youth* program varied across the sites, completion of all activities within the prescribed time also varied across the sites. In general, facilitators reported that they implemented the activities outlined for each lesson but sometimes modified their order or curtailed discussions with the youth on some concepts because of time constraints. However, as reported by the *Media-Smart Youth* observation team, the facilitators generally followed the intent of the curriculum and were, as a group, exceptional or above average in skill level. This last point is a cautionary tale to others implementing the curriculum: investing resources in the selection and training of the facilitators is critical to measuring successful outcomes in the knowledge and skills gained by the participants.

Program Outcomes Measurement and Analysis

The *Media-Smart Youth* Survey was a critical instrument for understanding the various levels of knowledge, intention, and skills gained by the participants across all areas of the curriculum. The principal component analysis tool was useful for determining which items were important for each of the four subscales so the outcomes of the group-randomized experiment could be measured reliably. In this evaluation, the reliability coefficients were improved by the efforts to remove items that seemed to be measuring something else; however, the results also showed that some participants had difficulty with the response formats. Future evaluations of the *Media-Smart Youth* curriculum should include an effort to improve the content and format of the survey instrument, followed by more inter-item analyses to demonstrate improved subscale concept validity and reliability using a diverse sample of potential participants.

Despite the loss of statistical power from having to exclude two matched pairs of sites from the analysis, the application of Murray's (1998) nested-cohort pretest-posttest control design and statistical model was a success. The special analysis of TIME by CONDITION by group means determined that differences between the treatment youth and their control counterparts in knowledge gained across all subscales were statistically significant. The model demonstrated that the knowledge gained was going in the predicted positive direction. In general, this agrees with Carter et al. (2005), who found significant improvements in knowledge related to physical activity and fruits and vegetables among children engaged in the "Healthy Children Healthy Futures" program.

The 95% confidence intervals obtained in the least square means analysis, however, indicate that the treatment versus control differences were weak. As mentioned, the loss of the two matched pairs in the sample due to poor retention reduced the discriminating power of the test. This might explain the lack of robust findings. Future evaluations of the *Media-Smart Youth* curriculum have the potential to be more robust. The major lesson learned in this case is to start with a larger number of groups or sites for matching with the expectation that a substantial number of matched pairs will be lost for the final analysis. Secondly, it is important to invest in improvements to the survey instrument because it is the primary tool for measuring the program outcomes.

Data on the *Media-Smart Youth* behavioral intention items showed an interesting pattern but were not statistically significant in the group-randomized design. One item, "*intent to engage in more weight-bearing activities in the next month,"* increased significantly in the treatment youth. Behavioral intent on a second item, "*intent to eat less high-fat snacks* and *to eat or drink more foods with calcium in the next month,"* also increased among the intervention youth, with a trend toward significance. As the Committee on Food Marketing and the Diets of Children and Youth (2006) reported, the major items purchased by children aged 8 to 12 years are high-calorie, low-nutrient foods and beverages, making this a potentially important positive outcome. The description of the youth mini-productions also reflected an active engagement in making healthful choices. The "behavioral intent" subscale also needs to be more thoroughly developed and tested as a part of future evaluations of the curriculum.

Challenges and Lessons Learned

The most prominent challenge in both recruitment and program implementation was planning enough time to address local site issues. A considerable block of time must be allotted for site recruitment and to recruit the youth participants at each site. Also, we suggest a more formal process for securing consent based on the reported difficulties at several sites. Some of the *Media-Smart Youth* lessons included too much content for the time allotted, especially if less than 90 minutes had been scheduled for each session—as was the case at some sites. However, even at sites with the prescribed 90-minute period, some of the lessons had to be modified to ensure complete presentation of all curricular materials. On the positive side, the youth consistently voiced an interest in the majority of the curriculum activities and actively engaged in the mini-productions, confirming the appeal of hands-on activities that connect the *Media-Smart Youth* content with critical thinking.

Field experiments such as this evaluation require flexibility in planning and implementation. Securing sites willing to serve as controls was difficult (although all control sites received training on the *Media-Smart Youth* curriculum materials after the evaluation was completed). Also challenging was retaining both treatment and control youth in the study. At some sites, poor retention was due to a casual climate in the overall management of the after-school program. At other sites, the most challenging factor was the competition with other after-school activities available for middle-school youth. The gift card was not effective across all sites for rewarding good participation. It was not equally appealing to participants at all sites because the general socioeconomic status of the youth varied. Sports programs and other after-school activities had a serious impact on attendance at some sites. Finally, the facilitators faced the challenge of modifying the curriculum (i.e., shortening or not completing lessons) due to a lack of time or a change in scheduling at the site.

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