

Fitness

Evaluation of a Community-based Intervention to Promote Physical Activity in Youth: Lessons From Active Winners

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Abstract

Purpose. To test the effects of a community-based physical activity intervention designed to increase physical activity and to conduct an extensive process evaluation of the intervention.

Design. Quasi-experimental.

Setting. Two rural communities in South Carolina. One community received the intervention, and the other served as the comparison.

Subjects. Public school students who were in fifth grade at the start of the study (558 at baseline) were eligible to participate. A total of 436 students participated over the course of the study.

Intervention. The intervention included after-school and summer physical activity programs and home, school, and community components designed to increase physical activity in youth. The intervention took place over an 18-month period.

Measures. Students reported after-school physical activity at three data collection points (prior to, during, and following the intervention) using the Previous Day Physical Activity Recall (PDPAR). They also completed a questionnaire designed to measure hypothesized psychosocial and environmental determinants of physical activity behavior. The process evaluation used meeting records, documentation of program activities, interviews, focus groups, and heart rate monitoring to evaluate the planning and implementation of the intervention.

Results. There were no significant differences in the physical activity variables and few significant differences in the psychosocial variables between the intervention and comparison groups. The process evaluation indicated that the after-school and summer physical activity component of the intervention was implemented as planned, but because of resource and time limitations, the home, school, and community components were not implemented as planned.

Conclusions. The intervention did not have a significant effect on physical activity in the target population of children in the intervention community. This outcome is similar to that reported in other studies of community-based physical activity intervention. (*Am J Health Promot* 2003;17[3]:171-182.)

Key Words: Rural Health, Exercise, Physical Fitness, Health Behaviors, Prevention Research

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INTRODUCTION

Regular physical activity enhances overall health status and improves risk factors for chronic disease in children and adolescents.¹⁻⁴ However, only about 50% of young people (ages 12-21) in the United States participate regularly in vigorous physical activity, and 25% report no participation in vigorous physical activity.⁵ Physical activity decreases dramatically with age, and girls are significantly less active than boys at all ages.⁵⁻⁷ The age-related decline in regular vigorous physical activity is most notable for African American and Hispanic girls.^{5,6} Because physical activity patterns might track from childhood and adolescence into adulthood,⁸⁻¹⁰ these trends can affect long-term risk of cardiovascular and other chronic diseases.

In an effort to increase physical activity among children and youth, researchers have developed and tested various interventions, the majority of which have been implemented in schools. These school-based programs have improved students' physical activity knowledge and attitudes,^{11,12} increased the intensity and duration of physical activity during physical education classes,^{13,14} and improved physical fitness.^{12,15} Much of our current knowledge about promoting physical activity in children is derived from these school-based programs. However, children and youth spend a majority of their time outside of school, and previous studies have shown that most of a child's physical activity is performed in com-

munity and home settings. To date, however, few studies of physical activity interventions have focused on these settings and little is known about the efficacy of promoting children's physical activity through community-based efforts.¹⁶

One reason that our knowledge is so limited is that few of the relevant intervention studies have included process evaluation as a central element in the study plan. Process evaluation is an important source of information that can elucidate the strengths, limitations, and complexities of interventions.^{17,18} It provides an immediate on-going record of intervention activities, feedback for corrective action, and guidance for designing and implementing future studies.^{17,19} Moreover, process evaluation can provide important information about why interventions sometimes fail to have a measurable effect on health outcomes. With community interventions, the reasons for failure could include limitations of the theories guiding the intervention, limited effects of the intervention on the mediating variables,²⁰⁻²² or inadequate attention paid to the social context in which the intervention takes place.^{17,23} Although process evaluation has the potential to enhance our understanding of community interventions, previous physical activity interventions have devoted little attention to process evaluation. This gap limits the ability of investigators to learn from one another's successes and problems, and to design next-generation interventions that avoid the problems of previous work.

The Active Winners study tested the effects of a community-based physical activity intervention designed to increase physical activity and to improve the hypothesized psychosocial determinants of physical activity in a cohort of rural, predominantly African American, fifth grade children. The purposes of this paper are to illustrate how process evaluation can be used to enhance our understanding of how interventions effect change in mediating variables and (1) to report the procedures and findings of the Active Winners study, (2) to describe the extensive

process evaluation that was implemented in association with the study, and (3) to provide recommendations for future community interventions aimed at promoting physical activity in youth.

METHODS

Design

The study was implemented in two rural communities in South Carolina and used a quasi-experimental design, with one community receiving the intervention and the other serving as the comparison. To avoid seasonal variations in physical activity, all data were collected in the spring; baseline data were collected during the spring of the students' fifth grade year. The intervention, known as Active Winners, began in the summer following their fifth grade year. The primary intervention ended after the summer following their sixth grade year, although several follow-up activities took place during the first semester of seventh grade; the entire intervention, including the follow-up period, lasted approximately 18 months. Follow-up measures were administered during the sixth grade (midintervention) and seventh grade (postintervention) years (Figure 1).

Social cognitive theory²⁴ and Pender's health promotion model²⁵ provided the conceptual framework for the intervention and associated elements of the measurement protocol. The intervention was designed to influence cognitive-perceptual factors (physical activity self-efficacy, perceived benefits of physical activity, and perceived barriers to being physically active), physical and social environmental factors (school-community environment, social influences, and cues to action), and behavioral capabilities (physical activity skills). Other variables, including demographics and physiological outcomes, also were measured.

Sample

Subjects were public school students in fifth grade at the start of the study. All 558 fifth-grade public school students in two rural counties (six schools, 23 classrooms) were invited to participate in the study. In

the intervention community, 88% of these students were African American and 67% were eligible for the free or reduced-price lunch program. In the comparison community, 64% of students were African American and 65% were eligible for the school lunch program. Study staff visited each participating school and classroom to explain the study and encourage students to participate. Information was also sent home to parents. More than 75% of eligible students (436) participated in the study, 175 in the intervention county and 261 in the comparison county. Demographic characteristics of the students who completed the study's measurement protocol are shown in Table 1. The sample was representative of the racial makeup of the participating schools. The study was approved by the University of South Carolina Institutional Review Board, and both students and their parents or guardians gave written informed consent prior to the child's participation in the measurement protocol.

Measures

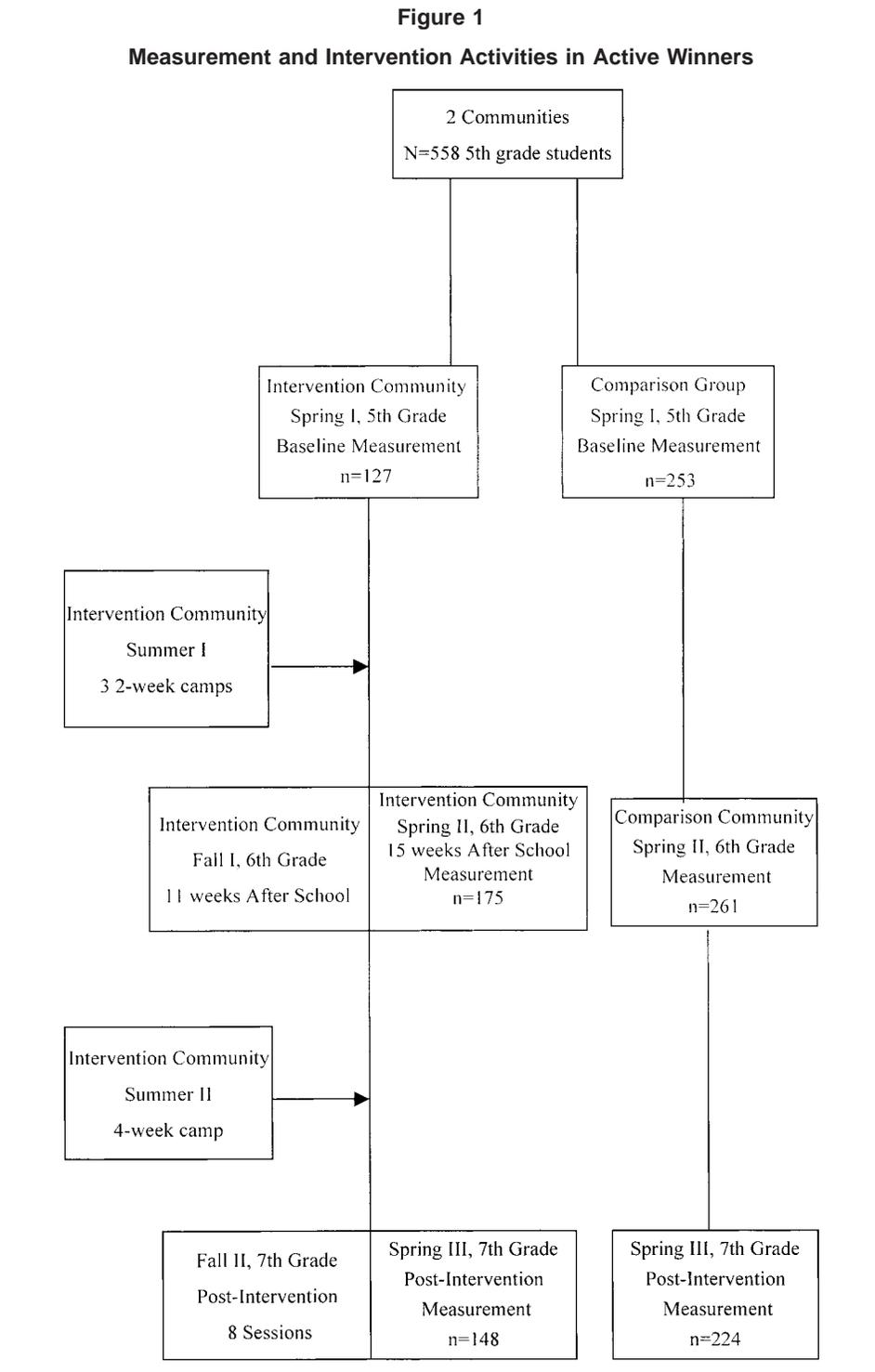
Measures of Physical Activity

Variables. The major outcome variables were physical activity during the after-school hours and the hypothesized psychosocial determinants of physical activity, which included physical activity self-efficacy, beliefs regarding physical activity outcomes, and social influences related to physical activity. At all three data collection points, students reported after-school physical activity using the Previous Day Physical Activity Recall (PDPAR). This self-report instrument uses a form divided into seventeen 30-minute blocks, beginning at 3:00 p.m. and continuing through 11:30 p.m. The form lists 35 common activities and describes four intensity levels (very light, light, medium, and hard). Students record their main activity for each 30-minute block and rate its intensity. The PDPAR has been shown to be a valid and reliable instrument in children and youth.^{26,27} At each data collection point, students completed the PDPAR on three consecutive days in a classroom

under the supervision of two trained staff members. Each administration of the PDPAR requires 15–20 minutes to complete. Data were reduced to the average daily number of 30-minute blocks in which the main activity was ≥ 6 METs (vigorous physical activity, VPA) and ≥ 3 METs (moderate to vigorous physical activity, MVPA). One MET is defined as the ratio of the activity metabolic rate to the resting metabolic rate.

Measures of Psychosocial Variables. Students completed a questionnaire designed to measure hypothesized psychosocial and environmental determinants of physical activity behavior. The questionnaire was pilot tested prior to the study to ensure that all items were appropriate for the age and ethnic composition of the study population. The questionnaire was administered in the classroom by a trained staff member who read the questionnaire to students using a standard script while another staff member moved around the room answering questions.

Psychosocial variables included measures of social influences regarding physical activity, which was modeled on the instrument developed by Reynolds et al.²⁸ The social influences scale was composed of eight items (range of scores, 0–8), and the within-week test-retest reliability was 0.78.²⁹ Intention to be physically active was measured by asking students to select one of five sentences to describe their intention to be physically active on most days. The responses ranged from 1 (“sure I will not be active”) to 5 (“sure I will be active”).³⁰ The test-retest reliability of the intention item was adequate ($r = 0.63$). The scale that measured beliefs about the consequences of physical activity was developed by the investigators and included 11 items (range 0–11; test-retest reliability was 0.51). Items for physical activity self-efficacy were based on the scale developed by Reynolds et al.²⁸ and a list of barriers to physical activity in children and adolescents.³¹ The self-efficacy scale had three dimensions, including support seeking (seven items; range 0–7; $r = 0.76$), overcoming barriers (four items; range 0–4; $r =$



0.71), and competing activities (six items, range 0–6; $r = 0.61$). Complete psychometric properties and factor structure of these scales have been reported elsewhere.^{29,32} For all of the psychosocial variables, higher

values denote a more favorable direction.

Intervention. The Active Winners intervention included four components: Active Kids (after-school and

Table 1
Characteristics of Subjects in Intervention and Comparison Communities

	Comparison (n = 261)		Intervention (n = 175)	
	n	%	n	%
Gender				
Male	129	49.4	86	49.1
Female	132	50.6	89	50.9
Race				
African American	155	59.4	153	87.4
White	87	33.3	20	11.4
Other/unknown	19	7.3	2	1.1
	n	Mean ± SD	n	Mean ± SD
Age				
Baseline	253	10.8 ± 0.7	127	10.9 ± 0.6
Midintervention	261	11.7 ± 0.7	175	11.9 ± 0.7
Postintervention	224	12.7 ± 0.7	148	12.8 ± 0.6

summer program), Active Home, Active School, and Active Community. Active Kids emphasized providing physical activity and increasing physical activity self-efficacy. Active Home, Active School, and Active Community were designed to positively influence the social and physical environment and to provide external cues for physical activity (Table 2).

Active Kids, the after-school and summer physical activity program, was designed to engage students in noncompetitive, confidence-building physical activity and to create an environment in which physical activity was enjoyable and socially oriented. The program was housed in a centrally located intermediate school (grades 4–6), and students were transported to the program by bus from their elementary schools (after-school program) or their homes (summer program). Students entered the program the summer after fifth grade (Summer I) and continued through the summer after sixth grade (Fall I–Summer II). A transition program was offered in the fall of the students' seventh grade year (Fall II).

Active Kids consisted of four components: Fit for Life (fitness activities), Be a Sport (physical activity skills), Social Rap (social skills), and Brain Games (academic skills). The amount of time devoted to each

component varied over the course of the intervention. The Summer I program consisted of three 2-week sessions which met for 5 hours per day, 4 days per week. Each of the 2-week sessions served a different geographic area of the county. The after-school program met for 2 hours at the end of the school day, 5 days per week (Fall I for 11 weeks and Spring II for 15 weeks). Summer II was a 4-week day camp which students attended 4 days per week, 5 hours per day. The transition program (Fall II) met eight times for approximately 2 hours each time, although some special events were of longer duration.

All sessions emphasized Fit for Life and Be a Sport. During the Summer I session, the staff devoted equal time to all four activity areas. During the 2-hour after-school program, however, they alternated Social Rap and Brain Games activities on different days of the week. Staff members documented lesson plans, including objectives and description of the activities, in the intervention manual. Sessions early in the program emphasized social skills and learning to get along with others. The emphasis on fitness activities increased over time. Over the course of the intervention about half of the program time was spent in fitness activities. The program evolved as students moved from fifth to seventh

grade, with more choices among activities allowed.

The Active Home component included a regular newsletter with program information and tips about being active, take-home assignments designed to get family members involved in physical activity with the students, and family activity nights. Active School included activities designed to make physical activity more accessible and attractive to students, teachers, and staff in the participating schools. The Active Community component included regular features on physical activity in the local newspaper and incorporation of physical activity into existing community events.

An Executive Committee, chaired by the Principal Investigator, set policy and reviewed all project activities. An Advisory Panel, composed of parents and teachers and other school personnel, advised the Executive Committee on community issues. The Project Coordinator managed the activities of the project staff on a day-to-day basis, supervised intervention and measurement activities, and ensured that data were collected for the process evaluation. The Project Coordinator also served on the Intervention and Measurement Teams, which were composed of the project's investigators (university faculty). The Intervention Team guided the activities of the Intervention Coordinator, who provided on-site management of the intervention staff and activities. The Measurement Team guided the activities of the measurement staff, who collected outcome data for the project. Staff included a half-time Project Coordinator, full-time Intervention Coordinator, and part-time staff who worked during the Active Kids summer and after-school sessions (eight part-time staff during the summer sessions and five part-time staff during the fall and spring after-school sessions). Peer leaders, who were 2 to 3 years older than the participants, assisted the adult staff and modeled the desired behaviors.³³ Eight peer leaders worked during the summer programs and four during the after-school sessions.

Data Analysis

Statistical Analysis. The effects of the intervention on physical activity and the hypothesized determinants of physical activity were examined using a mixed model repeated measures of analysis of variance (ANOVA). In each linear model, students nested within experimental condition was treated as a random effect, whereas time was treated as a fixed effect. When a significant treatment by time interaction was detected, the least squares means procedure was used to determine the location of significant pairwise differences. Mixed model analyses were performed using the PROC MIXED procedure in SAS 6.10, which allows analysis of all available data.³⁴ To test whether changes in the outcome variables were related to the frequency of participation in the after-school and summer program, differences between low (0–10 days), moderate (11–25 days), and high (26–121 days) program attendees were assessed using a 2×3 (group \times time) repeated measures ANOVA. Analyses were conducted separately for boys and girls because determinants of physical activity have previously been shown to be different for boys and girls.³⁵ To minimize Type I error, alpha was set at .004 (.05/14).

Process Evaluation. The process evaluation documented the processes involved in planning, developing, and implementing the intervention. It was designed to answer three fundamental questions: Was the program implemented as planned? To what extent were participants exposed to the intervention? Did the program adhere to the theoretical model and to the underlying philosophy that physical activity experiences should be fun, inclusive, and confidence-building? The FORECAST model served as the guiding framework for developing the process evaluation,¹⁹ which included both qualitative and quantitative assessments. Process evaluation was built into the study design from the outset and began in the planning phase. Methods used in the process evaluation included recording participant attendance at pro-

gram sessions, surveys of participants and staff, key informant interviews, focus groups, record reviews, and heart rate monitoring during program sessions.

RESULTS

Outcomes

Table 3 shows means and standard errors for the physical activity outcome variables. There were no significant differences in number of blocks of moderate to vigorous physical activity or vigorous physical activity between the intervention and comparison groups.

Table 4 presents the means and standard errors for the psychosocial determinants. No significant interactions were observed for the psychosocial determinants for boys or girls. Significant group differences were noted for social influences and beliefs about physical activity; girls in the intervention group scored significantly lower than girls in the comparison group on each of those variables.

Analysis of physical activity and psychosocial variables by attendance groups (low, moderate, and high program attendance) revealed no differences between low, moderate, and high program attendees, indicating no dose-response relationship between program attendance and the outcome variables.

Process Evaluation

Was the Program Implemented as Planned? Meeting records, documentation of program activities, and interviews with staff were used to determine the extent to which the project team established a program infrastructure, developed program procedures, and implemented the program components.

Infrastructure. The evaluation showed significant strengths in the program infrastructure. The investigator team was experienced in community-based physical activity interventions with children, and many of the investigators had worked together before. The investigators hired a diverse staff, which included both university-based and community-

based employees and individuals with significant experience in physical activity programs, and provided extensive staff training. The staff quickly established a supportive environment at the intervention site, which enabled them to complete logistical and facilities tasks with minimal difficulty.

The evaluation also revealed a number of infrastructure challenges. First, intervention staff, including the intervention director, were not hired quickly enough, which led to delays in developing detailed program activities. Second, the process of arranging transportation to the intervention site and to participants' homes was extremely cumbersome and time-consuming. Third, the time and energy required to select, train, and supervise the peer leaders who assisted the intervention staff was significantly greater than expected. The use of peer leaders also led to some role confusion and conflict among staff members. Fourth, efforts to integrate community-based intervention staff into the program were not entirely successful, primarily because the priorities and schedules of these part-time staff members often did not correspond with the needs of the program. And finally, community "ownership" of the program was not achieved, in large part because the day-to-day operation of the program required virtually all of the time and energy of project staff.

The majority of infrastructure challenges took place early in the program and were resolved quickly. The one that continued, however, and was the most difficult to resolve involved defining the roles of adult staff and peer leaders. Early focus groups revealed that adult staff wanted clarification regarding their job descriptions, the role of the Intervention Coordinator and peer leaders, and the organizational hierarchy (e.g., who reported to whom). Adult staff also wanted more interaction with the research team. These issues were addressed in subsequent staff meetings, and the investigators increased their visits to the intervention site.

Program procedures. The process evaluation revealed a number of

Table 2
Description of Intervention Components

Major Component	Subcomponent	Theoretical Basis	Intervention Objectives	Description
Active Kids	Fit for Fun (fitness)	Designed to affect perceptual-cognitive factors, specifically to enhance physical activity (PA) self-efficacy and perception of the benefits of PA and to reduce perceived barrier to PA.	Learn knowledge and skills needed to be physically active. Engage in activities that build cardiorespiratory endurance and muscular strength.	Students participated in noncompetitive, success-oriented, inclusive, participatory, nonthreatening and fun physical activities that were designed to build endurance and strength. Examples of Fit for Fun activities included dance, walking on a fitness trail, aerobic games, and large group games. Games included Catch the Dragon's Tail, Octopus, Prui, and Triangle Tag.*
	Be A Sport (sport)		Learn skills for noncompetitive games and sports. Increase psychomotor skills and level of interest in PA.	Students learned to play noncompetitive games and sports and learned skills for physical activities that they could do on their own or with friends or family. Examples of Be a Sport activities included "regular" sports (e.g., basketball), modified sports, and combo sports. Examples of the latter two included Footbasket, Spaketball, Siamese Soccer, and Infinite Volleyball.*
	Social Rap (social)		Understand social influences on perception of physical self and of physical activity. Understand barriers to physical activity. Learn social skills that promote physical activity. Practice respect for others and learn decision-making skills.	Students participated in noncompetitive games and sports that emphasized learning and using social skills. The skills emphasized included solving problems, making decisions, communicating, developing trust and empathy, and resolving conflicts. Examples of games in which students learned and practiced these skills included Human Knot, Traffic Jam, and Minefield.*
	Brain games† (enrichment)			Students participated in a supervised study component designed to promote achievement in school.
Active Home	Newsletter	Designed to affect the social and physical environment by providing positive social influences, cues to action, and increased opportunities to be active.	Keep parents informed about program activities and provide information that helps families be active.	Students received and were asked to take home a regular newsletter that was designed to inform parents about program activities, provide health information, and encourage the family to become and stay active.
	At-home work		Encourage students and family members to engage in physical activity together. Provide participants with opportunities to practice physical activity skills.	Students took home occasional "assignments" and activities that they were asked to do with their families. For example, Weekend Challenge encouraged students to be active and to record their physical activity over the weekend, with parents signing off on the Weekend Challenge form.
	Family participation nights		Provide students with opportunities to demonstrate, and parents with opportunities to observe, skills they had learned.	Students and family members participated in evening programs in which they engaged in fun physical activities together, and students were encouraged to "show and tell" what they had learned.
Active School	School Health Team/Wellness Committee	Designed to affect the social and physical environment by providing positive social influences, cues to action, and increased opportunities to be active.	Form a committee in each intervention school to improve the health environment of the school and to make physical activity more accessible to everyone in the school.	Strategies included forming a Wellness Committee of school teachers and staff, providing training and support to the Wellness Committee in its efforts to implement health promotion activities for faculty and staff, and working to change the school environment to promote physical activity.

Table 2
Continued

Major Component	Subcomponent	Theoretical Basis	Intervention Objectives	Description
Active Community	Media activity		Keep the community informed about Active Winners.	Active Winners staff wrote articles about the program for local newspapers.
	Local events		Encourage community members to become more physically active	Incorporated physical activity into community events.

* Sources for games and activities included *The New Games Book*, *Fitness Fun*, *Everybody Wins*, *Silver Bullets*, *More New Games*, *Innovative Games*, and *Islands of Healing*.⁴¹⁻⁴⁷

† This component was added at the request of the school district in the intervention community and was not specifically designed to promote physical activity.

Table 3

Average Daily Blocks of Vigorous and Moderate to Vigorous Physical Activity in Subjects of Intervention and Comparison Communities Before, During, and After the Intervention Period

Variable	Comparison			Intervention			p Values		
	Baseline	Mid-intervention	Post-intervention	Baseline	Mid-intervention	Post-intervention	Group	Time	Group × Time
Boys									
Physical Activity									
VPA*									
Mean (SE)	2.4 (0.2)	2.7 (0.2)	2.4 (0.2)	2.1 (0.2)	2.6 (0.2)	1.8 (0.2)	0.08	0.001	0.31
n	122	116	94	54	80	62			
MVPA†									
Mean (SE)	3.4 (0.2)	3.7 (0.2)	3.2 (0.2)	2.9 (0.2)	3.3 (0.2)	2.3 (0.2)	0.01	<0.001	0.19
n	122	116	94	54	80	62			
Girls									
Physical Activity									
VPA*									
Mean (SE)	1.4 (0.1)	1.4 (0.1)	1.1 (0.1)	1.1 (0.2)	1.4 (0.2)	1.1 (0.2)	0.31	0.03	0.43
n	125	130	105	70	82	72			
MVPA†									
Mean (SE)	2.4 (0.2)	2.4 (0.2)	2.1 (0.2)	2.0 (0.2)	2.1 (0.2)	1.8 (0.2)	0.04	0.08	0.74
n	125	130	105	70	82	72			

* VPA, vigorous physical activity; average number of 30-minute blocks with activity ≥ 6 METs.

† MVPA, moderate to vigorous physical activity; average number of 30-minute blocks with activity of ≥ 3 METs.

strengths in the way that program procedures were developed and implemented. First, the investigators and senior staff developed a detailed intervention manual, with a clearly articulated philosophy, clear discipline policies, and detailed descriptions of program activities, which the intervention staff used to guide the program. Second, staff conducted extensive participant recruitment activi-

ties, including visits to classes, appeals to teachers, and letters mailed home to parents, which resulted in a response rate of approximately 65% of all fifth grade students. Third, the peer leader selection process was thorough, and training for adult staff and peer leaders was comprehensive, covering the theory of the intervention, child and adolescent development, and physical activity skills.

The process evaluation also revealed problems in program procedures. The primary problem was discipline issues, including student fights and disruption of program activities. Factors contributing to these problems included lack of planning for the transitions between intervention activities, lulls in structured activity before and after the formal program activities ("down time"),

Table 4

Measures of Psychosocial* Variables in Intervention and Comparison Communities Before, During, and After the Intervention

Variable	Comparison			Intervention			p Values		
	Baseline	Mid-intervention	Post-intervention	Baseline	Mid-intervention	Post-intervention	Group	Time	Group × Time
Boys									
Social influences									
Mean (SE)	4.7 (0.2)	5.0 (0.2)	5.0 (0.2)	4.6 (0.3)	4.7 (0.3)	5.2 (0.3)	0.80	0.20	0.50
n	120	120	90	44	83	45			
Intentions									
Mean (SE)	4.2 (0.1)	4.3 (0.1)	4.3 (0.1)	4.1 (0.2)	4.1 (0.1)	4.4 (0.1)	0.69	0.22	0.26
n	119	118	86	41	82	43			
Beliefs—physical									
Mean (SE)	9.3 (0.2)	9.5 (0.2)	9.4 (0.2)	9.1 (0.3)	9.1 (0.2)	8.6 (0.3)	0.01	0.25	0.23
n	120	120	90	44	83	45			
Beliefs—social									
Mean (SE)	3.1 (0.1)	3.3 (0.1)	3.4 (0.2)	2.9 (0.2)	3.1 (0.2)	3.4 (0.2)	0.41	0.03	0.86
n	120	120	90	44	83	45			
Support seeking									
Mean (SE)	6.1 (0.1)	6.2 (0.1)	6.4 (0.1)	6.1 (0.2)	6.0 (0.1)	6.1 (0.2)	0.31	0.29	0.72
n	120	120	90	44	83	45			
Overcoming barriers									
Mean (SE)	2.7 (0.1)	2.8 (0.1)	3.2 (0.1)	2.6 (0.2)	2.4 (0.1)	2.5 (0.2)	0.01	0.13	0.23
n	120	120	90	44	83	45			
Positive alternatives									
Mean (SE)	4.8 (0.1)	5.0 (0.1)	5.1 (0.1)	4.9 (0.2)	4.8 (0.1)	4.8 (0.2)	0.38	0.51	0.23
n	120	120	90	44	83	45			
Girls									
Social influences									
Mean (SE)	5.0 (0.2)	5.1 (0.2)	4.5 (0.2)	3.7 (0.3)	4.1 (0.3)	3.6 (0.3)	<0.001	0.03	0.50
n	121	120	90	62	83	45			
Intentions									
Mean (SE)	4.3 (0.1)	4.1 (0.1)	3.9 (0.1)	4.0 (0.1)	4.0 (0.1)	3.5 (0.1)	0.01	<0.001	.019
n	120	118	93	61	86	60			
Beliefs—physical									
Mean (SE)	9.9 (0.2)	10.0 (0.2)	9.7 (0.2)	9.1 (0.2)	9.4 (0.2)	9.3 (0.2)	0.003	0.24	0.24
n	121	121	96	62	87	61			
Beliefs—social									
Mean (SE)	2.9 (0.1)	3.0 (0.1)	3.2 (0.2)	2.6 (0.2)	2.5 (0.2)	3.1 (0.2)	0.08	0.02	0.42
n	121	121	96	62	87	61			
Support seeking									
Mean (SE)	6.3 (0.1)	6.1 (0.1)	6.2 (0.1)	6.1 (0.2)	6.0 (0.2)	5.9 (0.2)	0.22	0.50	0.87
n	121	121	96	62	87	61			
Overcoming barriers									
Mean (SE)	2.4 (0.1)	2.4 (0.1)	2.4 (0.1)	2.2 (0.2)	2.2 (0.2)	2.2 (0.2)	0.21	0.78	0.79
n	121	121	121	62	87	61			
Positive alternatives									
Mean (SE)	4.7 (0.1)	4.8 (0.1)	5.1 (0.1)	4.7 (0.2)	4.6 (0.2)	4.6 (0.2)	0.12	0.63	0.11
n	121	121	96	62	87	61			

* Higher values of the psychosocial variables denote a more favorable direction.

and long-standing rivalries between students from different areas of the county. Once these problems were identified, the transitions between activities were improved by stationing adult staff in key "traffic" areas and using peer leader staff to get activities going. In addition, structured activities were added for students who arrived early or stayed late, reducing "down time."

The long-standing rivalries among students were more challenging. Providing the additional structure described above helped greatly, as did increasing activities designed to help students learn cooperation and teamwork skills. The staff was unprepared, however, to deal with a few very disruptive students. In addition to carefully monitoring behavior and engaging students in activities to minimize the opportunity for disruption and fighting, staff members implemented "time out" for disruptive students and suspension from the program for chronically disruptive students.

Another procedure problem was staff tardiness and absenteeism, primarily in the first few months of the program. The staff was large and diverse and consisted primarily of part-time employees, which made scheduling difficult. Because staffing was crucial to the success of the intervention, university-based staff (professional staff and graduate assistants) were assigned to key intervention positions and community-based staff were assigned to important support (e.g., assisting with discipline) and advisory positions.

Implementation of program components. The primary strengths of the implementation were that the project employed a diverse and well-trained staff and that the senior staff developed detailed plans for the activities in Active Kids, the summer and after-school component. Once the early problems with a few disruptive students were resolved, this component was implemented as planned, with children engaging in fun, noncompetitive physical activity during the summer and after school. The major shortcoming of the implementation was that virtually all of the time and effort of the staff were required to implement the summer and after-

school component. Therefore, the Active Home, Active School, and Active Community components of the intervention were not fully implemented.

To What Extent Were Participants Exposed to the Intervention? The target group consisted of 255 students (fifth grade enrollment). Eighty-two percent of these students (209) had at least one exposure to the program. Only 5% (13), however, attended half of the total sessions offered (65 days). A key finding of the process evaluation was that social factors, such as friends not attending and the presence of "problem" students, significantly affected participation. Although most students had some exposure to the intervention, the level of exposure was insufficient to affect determinants of physical activity or physical activity behavior.

Did the Program Adhere to the Theoretical Model and Underlying Philosophy?

The process evaluation used focus groups, surveys of staff and participants, and heart rate monitoring of participants to assess adherence to the theoretical model and philosophy. The key strength was that staff understood the program goals of changing patterns of behavior and increasing physical activity. A shortcoming in adherence to the model, however, was that most staff did not fully understand the concept of physical activity self-efficacy and that most peer leaders did not understand the emphasis on noncompetitive physical activity. Heart rate monitoring revealed that students engaged in vigorous physical activity 30–34% of program time, a level that is considered excellent for structured physical activity programs.

To What Extent Were the Program Components Implemented? Active Kids was implemented essentially as planned. Active Home was intended to include regular newsletters, take-home activities, and family nights. Document review revealed that there were periodic newsletters and occasional take-home activities and that a family night was scheduled at the end of each major session. This component

was implemented, but not as intensively as was needed. The primary goal of the Active School component was to create a health promotion committee in each participating school and to send a team of teachers and school staff from the community to the State Department of Education's school health promotion conference. However, no committees were formed and project staff were not able to recruit teachers and school staff to attend the conference. Active Community was intended to include regular local media coverage, participation in community events, and coordination with community activities. Active Winners students participated in a "Jump Rope for Heart" event and in the local Christmas parade. A local Advisory Committee also met several times to provide feedback to project investigators and staff. In general, however, the project did not have a strong presence in the community.

DISCUSSION

The results indicate that Active Winners did not have a significant effect on physical activity in the target population of children in the intervention community. This finding is consistent with the results of previous studies which used community-based strategies to increase physical activity in children or youth.¹⁶ Nader and colleagues conducted a cardiovascular risk reduction program, designed to decrease salt and fat intake and increase physical activity, with the families of Mexican American and white fifth and sixth grade students. Although intervention families reported some improved dietary behaviors, there were no changes in physical activity or cardiovascular fitness in intervention families compared to comparison families.³⁶ Baranowski and colleagues found that a program based in a community center was not effective in promoting increased physical activity among African American families.³⁷ The Class of 1989 Study, a component of the Minnesota Heart Health Program, a long-term, comprehensive effort to reduce cardiovascular disease in three communities, was somewhat successful at in-

creasing physical activity in youth. At most grade levels, female students (but not male students) in the intervention community reported higher levels of physical activity than did students in the comparison community.³³ However, it should be noted that this community-based intervention also included some school-based activities.

When community interventions fail to achieve the desired outcome, the question that is always asked, but seldom can be answered, is “Why?” The strong process evaluation component of Active Winners provides some answers to that question. Judgments on the effectiveness of an intervention require two assumptions: that the program was implemented as designed and that it reached the intended target audience. It is not uncommon for an intervention to be judged ineffective when, in fact, the intervention did not take place as designed, was not delivered to the target group, or both; this is known as a “Type III error.”³⁸ Process evaluation data indicate that Active Winners was not fully implemented and that it reached a very small proportion of the intended group. Thus, a true “test” of the Active Winners intervention was not possible. In addition, as the study progressed, the investigators and staff realized that the participating intermediate school in the comparison community already had a fairly strong physical activity program in place, which may have affected the outcome of the study.

Two dimensions address whether the intervention was implemented as designed: fidelity and completeness. Fidelity indicates that the program was implemented with its intended methods and strategies intact; completeness refers to the proportion of activities and components that were delivered.³⁹ Active Kids, the after-school and summer program, was fully implemented. Fidelity for this component was also high. While there were subtle indicators that staff did not fully internalize the concept of “physical activity self-efficacy,” process evaluation data indicate that the program was consistent with the underlying theory (e.g., it was fun, inclusive, and used noncompetitive ac-

tivities). Process evaluation data also indicate, however, that the remaining components—Active School, Active Home, and Active Community—were only partially implemented. These comprised the environmental support components, which are central to Social Cognitive Theory. Thus, the Active Winners intervention did not address key social and environmental influences on physical activity behavior (e.g., it was not implemented with completeness).

Process evaluation data clearly indicate that the target audience did not receive sufficient exposure to the after-school and summer programs (only 5% attended at least half of the total sessions offered). Extensive recruiting efforts resulted in getting students to the program at least once (82% had at least one exposure), but not on a regular basis. Process evaluation identified social barriers as the primary barriers to continued participation. In surveys, students reported liking the activities and having fun; they did not like the other students, however, and reported that their friends were not there. This reflects the larger problem for the Active Winners intervention—failure to consider and deal with the complex social and cultural context of the intervention.

Effective interventions in community settings view behavior within the social and cultural context in which it occurs.⁴⁰ Historically, there were strong rivalries among students from different communities within the county. In the day-to-day operation of the intervention, this resulted in discipline problems and contributed to “not liking” the other students. The disruption from discipline problems was addressed fairly quickly, but successful recruiting efforts resulted in very high initial attendance and, therefore, many students had a negative experience early on. The rivalries were a reflection of the strong sense of local identity of residents in the county. The rural county in which this intervention took place consists of numerous small communities, which are not readily identifiable to people from outside that area.

Initially, we identified and worked with key school and community peo-

ple in the central town in which the Active Winners programs were housed. However, we did not engage people from other communities around the county from which the students came. It is not realistic to expect a single intervention to change long-standing social and cultural norms. However, more advance knowledge and planning likely could have prevented some of the immediate effects on program activities. Furthermore, implementing the home and community components, designed to involve people from multiple communities, would likely have addressed this problem even more.

Implementation of all components of the Active Winners intervention with completeness and fidelity was not realistic with the resources available. All of the resources were required to conduct the after-school and summer programs and to arrange transportation to and from the programs. Community interventions require time and substantial effort. We were well aware of this need as the program unfolded, but lacked the staff and funds to address it. This is an issue that must be dealt with in the planning phase of the program, not during program implementation. Another challenge was the relatively short time frame for the project. It took a lot of time to establish the infrastructure needed to implement the program, including hiring, training, and supervising new staff and working out and maintaining transportation for the students. Given the time needed to develop adequate infrastructure for community programs, time pressure can be a limiting factor in fully implementing a multicomponent project.¹⁷ In an ideal situation, 1 year should be allocated for laying the groundwork in the community and 3 years for implementing the intervention.

Given the above challenges, an alternative to the approach used in Active Winners is to provide multiple, small after-school programs in several communities, rather than one centralized program. Such an approach could reduce the transportation burden and much of the conflict among students and increase the level of community involvement. This would

require a different approach to staffing and would probably reduce the number of days the program could be offered at a given site. Overall, however, it would likely increase the target group's exposure to the intervention.

Conclusions and Recommendations

A process evaluation framework could be crucial to the success of physical activity interventions in community settings. It can help investigators answer important questions that affect the outcome of the intervention: Has the intervention been fully implemented? Are the activities taking place? Are they taking place in a timely manner? Are they consistent with the theoretical framework of the study? Are sufficient numbers of participants being exposed to the intervention for sufficient periods of time? Timely answers to these questions will enable investigators and program staff to take early corrective action.

The following recommendations for school-community physical activity interventions are based on our experiences with fifth through seventh grade students in a rural community. They are prioritized in terms of potential effect.

1. Ensure that there are sufficient resources to carry out the scope of the program, recognizing that community-based interventions require more time and effort than other interventions.
2. Identify and address community environment issues (social, cultural and political) that could directly affect the program and student participation prior to initiation of a program model.
3. Allow sufficient start-up time to develop the essential infrastructure for the program, and plan an intervention with sufficient length to have an effect.
4. Develop an extensive process evaluation framework and ensure that there are sufficient resources to conduct a thorough process evaluation.
5. Train staff in the philosophy of the program and include experiential training to enable staff to

verbally and nonverbally convey the philosophy. Follow up with frequent visits to ensure fidelity to the conceptual model.

6. Hire full-time staff when possible to ensure consistency and commitment to the program; part-time staff should work every day to maintain consistency and to facilitate communication among staff.
7. Clearly define the organizational structure and roles and responsibilities of staff, and roles and responsibilities of collaborating organizations, and review them on a regular basis.
8. Provide young teen staff with structure and guidance throughout the program; carefully consider the age and developmental differences between peers and peer leaders to ascertain that it will not be problematic.

SO WHAT? Implications for Health Promotion Practitioners and Researchers

The findings of this study seem to indicate that it is important to ensure that sufficient resources are available to implement multi-component programs in complex social contexts and that it is important to include a comprehensive process evaluation as part of the planning, implementation, and evaluation of community-based physical activity interventions. The results of this study are consistent with other community-based interventions that resulted in little or no effect on the outcome of interest. However, because this study included a comprehensive process evaluation, the researchers were able to identify specific problems that contributed to the negative outcome and to develop specific recommendations for future programs. The findings of this study suggest that practitioners and researchers should consider the social and cultural contexts of an intervention and ensure that sufficient resources are available to develop an effective program within those contexts. They should also allocate sufficient resources to conduct a comprehensive process evaluation.

9. Promote programs with differing formats and time frames as different programs with different purposes; that is, a 5-hour summer program with a lot of variety in activities is quite different from a 2-hour after-school program with less variety in activities, and participants should have different expectations for them.
10. Consider noncentralized programs to reduce transportation costs and complications and to take advantage of community identity and create local ownership.

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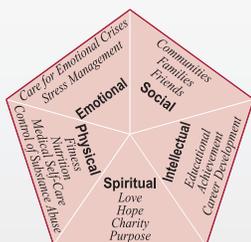
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