

Research Articles

Pediatric Exercise Science, 1998, 10, 97-109
© 1998 Human Kinetics Publishers, Inc.

Can Conceptual Physical Education Promote Physically Active Lifestyles?

Darren Dale, Charles B. Corbin, and Thomas F. Cuddihy

This study examined the physical activity participation of students in a large southwestern high school 1–3 years after they had been exposed to a 9th-grade conceptual physical education program. Comparisons were made to students exposed to traditional physical education. Students were assessed using physical activity questions from the 1995 Youth Risk Behavior Survey. Students from the conceptual program met adolescent guidelines for physical activity, especially those who participated in the program in its first year of operation. Females were significantly less likely to report sedentary behaviors if they had been exposed to the conceptual, rather than traditional, high school physical education program.

The recent Surgeon General's Report, *Physical Activity and Health*, documents the importance of regular physical activity to reduce risk of disease and enhance the health-related quality of life (28). While the report focuses on adults, it does highlight the fact that "participation in all types of physical activities declines strikingly as age or grade in school increases" (28, p. 8). This decline is most evident among teenage girls, where more females than males choose to become inactive (18). The proportion of older adolescents who report minimal levels of physical activity is of special concern, because evidence indicates inactive teenagers are likely to become inactive adults.

In addition to decreasing physical activity participation during the teen years, recent reports (8, 19) highlight two concerns with respect to school physical education. First, the proportion of teens participating in daily school physical education classes is declining, and second, the amount of time spent being physically active during class time is disturbingly low. Focusing on high school physical education, various experts have offered possible methods of increasing the number of teens who are physically active. These methods include (a) more required physical education classes (19); (b) more time spent in actual activity within physical education classes (21); and (c) changing physical education class content to emphasize lifetime physical activity promotion (6, 25).

Each of the three methods may have an effect on the activity levels of teens. However, the first method (more physical education) is difficult to implement. In

D. Dale and C.B. Corbin are with the Department of Exercise Science and Physical Education at Arizona State University, Tempe, AZ 85287. T.F. Cuddihy is with the School of Human Movement Studies at Queensland University of Technology, Brisbane, Queensland, Australia.

many cases, physical education requirements in secondary schools have decreased in recent years because of budget constraints or increased pressure for students to take additional required courses in other subject matters (19). Research has shown that interventions with teachers can increase the amount of time within physical education classes spent in physical activity (23). This may be an effective method of increasing activity levels but it has yet to be shown that such programs promote lifetime participation in physical activity.

The third method (changing physical education program content) has been advocated by experts in the field in recent years (6, 17, 25, 27), and by the Centers for Disease Control and Prevention (CDC) in its recent guidelines for school and community programs to promote lifelong physical activity among young people (5). In an attempt to change physical education into a public health medium for promotion of lifelong physical activity, special programs have been implemented in many schools. Five states (Florida, Georgia, Texas, Tennessee, and South Carolina) as well as all high schools in the Department of Defense Dependent School System have mandated requirements, commonly referred to as “conceptual physical education” or “personal fitness classes,” for secondary school students (27). Typically, a one-semester requirement, these courses are designed to help students learn to be lifelong physical activity consumers. Such classes were originally developed at the college level, and research has found them to be effective in promoting lifelong activity involvement (1, 3, 26). One study has shown that high school teachers and parents approve of conceptual physical education classes and their goals (11), but research has not been conducted to verify their effectiveness in promoting physically active behaviors (20).

The purpose of this study was to determine if the proportion of students meeting national physical activity goals (21, 24) among those exposed to a conceptual high school physical education program, differed from the proportion of students meeting national goals among those exposed to a traditional physical education program. Of particular importance was reducing the proportion of teens who are sedentary both because sedentary lifestyles track to adulthood (22) and because evidence now indicates that reducing sedentary behavior would be especially effective in reducing disease risk in the American population (2, 28).

Project Active Teens: An Overview

Project Active Teens was organized as a joint longitudinal university-public school project designed to promote physical activity among teens. An agreement was reached between a large southwestern public university and a public high school district to implement a special ninth-grade physical education curriculum in a new high school. Two years prior to the opening of the new high school, university and school district administrators met and outlined project goals that centered around Healthy People 2000 objectives: 1.3, moderate activity; 1.4, vigorous activity; 1.5, sedentary lifestyles; and 1.6, flexibility and muscle fitness (21).

The high school principal, and subsequently the physical education department head and faculty members, were hired in the year prior to the school opening with the understanding that they would commit themselves to the project and its goals. During this time period a program planning committee consisting of faculty members from the university and teachers from the high school was established. The physical activity promotion course, referred to as conceptual physical educa-

tion (CPE), was initially planned as a one-semester offering. This class and another one-semester sports-based offering were designed to fulfill the school district's one year requirement, which was formerly fulfilled by a traditional sports-based physical education requirement.

Lesson plans were developed for the proposed one-semester CPE class with 2 days per week spent in the classroom and 3 days per week spent in the gym. Classroom sessions were designed to teach students important concepts and facts about physical activity and fitness as well as behavioral skills, such as activity logging, goal setting, and program planning. Physical activity sessions in the gym were designed to teach fitness self-assessment, personal program-building skills, and methods for performing a variety of lifelong physical activities designed to meet national health goals.

The curriculum was then presented to the teachers and revisions were made. The teachers preferred to implement CPE one day per week in the classroom and one day per week in the gym for the full year. Of the remaining 3 days per week, students participated in sports-based activities. Once the plan was approved, lesson plan notebooks were revised. A fitness text was approved for use in the classroom sessions. University faculty conducted one-hour in-service seminars once every 2 weeks for the first semester of course implementation, and detailed content and course objectives were listed in the teacher's edition of the text (7). Human subject approval for Project Active Teens was obtained prior to its implementation.

In the first year of the school's operation, only 9th- and 10th-grade students were admitted. Those ninth-grade students who lived within the school boundaries were required to attend the new school. Tenth-grade students were given the option of attending the new school or the school they attended as ninth-graders. In each of the following 2 years, a new class was added so that by the 3rd year of the school's operation, the school enrolled students in Grades 9 through 12. Every student who attended this school in Grade 9 was required to be enrolled in the specially integrated physical education class that included CPE.

Method

Treatment Group and Control Group

As stated, all Grade 9 students enrolled in the Project Active Teens school completed the CPE program and served as the treatment group for this study. Special plans were made to provide a control group for comparisons. Pre- and post-measures of activity (before and after exposure to CPE) were considered and rejected for several reasons. First, pre- and post-measures would likely be influenced by seasonal circumstances. That is, teens would be on summer vacation before school (pre-) and in school for post-testing, resulting in different activity patterns. Second, the proportion of teens who are active declines with age and with each passing grade level. Third, it can logically be expected that teens are more active as 9th-graders than as 10th-graders (and beyond) because all ninth-grade students are enrolled in mandatory, daily physical education classes. (By the 10th grade, students have fulfilled their physical education requirement.) Comparisons of students taking CPE to students enrolled in other high schools was also considered and rejected because of the differing demographics of other schools in the district.

For the purposes of this study, a control group of transfer students was selected. The control group consisted of students who transferred to the Project Active Teens high school after completing their ninth-grade physical education requirement at another school and were therefore not exposed to CPE. These control students were enrolled in traditional physical education (TPE) programs. A similar method of choosing control students has been used in longitudinal studies with college age subjects (1, 3). See Table 1 for a summary of the number of CPE students and TPE students within respective treatment and control groups.

Instrument

A questionnaire containing physical activity questions from the Youth Risk Behavior Survey (9) was used to assess physical activity. This is the same questionnaire that was used to establish physical activity levels for teens reported in the Surgeon General's Report on Physical Activity and Health (28). The questionnaire was developed by the CDC specifically for use with adolescents and is used to track the physical activity behaviors of teens (12). Consultations with CDC officials deemed acceptable the segmentation of questions from the instrument, in this case physical activity questions. The questionnaire was recently included among those in a collection of recommended physical activity questionnaires for health-related research (13).

Four questions were used that assessed moderate and vigorous aerobic activity participation as well as strength and flexibility participation. The questions required students to report on how many days of the preceding week they had been physically active (0–7 days). To allow comparisons to national data (4), and in accordance with national objectives (21) and adolescent guidelines for physical activity (24), students from Project Active Teens were sufficiently active if they performed during the preceding week: moderate activity (e.g., walking, bicycling; ≥ 5 days, ≥ 30 min per day); vigorous activity (≥ 3 days, ≥ 20 min per day); muscle fitness activities (≥ 3 days); and flexibility exercises (≥ 3 days). Students who

Table 1 The Number of Students Involved in Each Data Collection Period

Subjects	First data collection	Second data collection
First year		
CPE boys	105 ^b	65 ^c
TPE boys	45 ^b	23 ^c
CPE girls	108 ^b	56 ^c
TPE girls	59 ^b	27 ^c
Second year		
CPE boys	156 ^a	68 ^b
TPE boys	41 ^a	27 ^b
CPE girls	132 ^a	86 ^b
TPE girls	53 ^a	23 ^b

^aGrade 10; ^bGrade 11; ^cGrade 12.

reported 0–2 days of moderate activity *and* 0–2 days of vigorous activity during the preceding week were considered sedentary.

Data Collections

Collecting data several years after exposure to ninth-grade CPE made it possible to assemble a control group of adequate size and to test differences in groups several years after the physical education requirement had been fulfilled. Data were collected twice. For the first data collection (spring of the school's 3rd year of operation), questionnaires were administered to students in Grades 10 and 11. For the second data collection (spring of the school's 4th year of operation), questionnaires were administered to students in Grades 11 and 12. This allowed CPE to TPE comparisons for similar graduating classes. The 11th-graders in the first data collection and the 12th-graders in the second data collection were all 9th-graders the same year (the school's first year of operation). Likewise, the 10th-graders in the first data collection and the 11th-graders in the second data collection were all 9th-graders in the same year (the school's second year of operation). Of course, CPE (treatment) subjects learned physical education at the Project Active Teens High School, and the TPE (control) subjects learned physical education at a different school.

Part of the agreement between the school district and the university research team at the outset of this longitudinal study was that there would be a minimal demand on student time. Accordingly, all testing was done during homeroom periods at the beginning of the day, and students were able to complete the questionnaire in a short amount of time. Though all students were assigned to a homeroom, not all homerooms met each week (because of group testing, field trips, etc.), and on some days, homerooms had other planned activities. For the second data collection, data were collected for fewer homerooms, thus the numbers of subjects tested was smaller. There was no reason to believe that the homerooms that met were any different from those who did not meet on this data collection day. Of the questionnaires distributed, more than 70% from both data collections were usable. Reasons for not using a questionnaire included: failure to complete all questions in the allotted time, illegible responses, and questionnaires answered in disingenuous ways. Data on moderate activity, vigorous activity, sedentary living, and flexibility and muscle fitness, were obtained from the first data collection. In the second data collection, only moderate and vigorous activity questions were asked, allowing data analysis for moderate activity, vigorous activity, and sedentary living.

Results

CPE: The First Year of Operation

Were students exposed to CPE in the first year of Project Active Teens more likely to meet national guidelines for moderate and vigorous physical activity in comparison with students exposed to TPE?

Healthy People 2000 objectives 1.3 and 1.4 call for regular participation in moderate activity and vigorous activity, respectively (21). These two objectives are consistent with the recommendations from a national consensus conference

that established guidelines for adolescent physical activity (24). The first recommendation was quantified as moderate activity at least 5 days a week for 30 min per day. In this study, the proportion of boys who took CPE in Grade 9 during the school's first year of operation (see Table 2) reported greater participation in moderate activity compared to TPE boys for the first data collection (in Grade 11, $p = .41$) and the second data collection (in Grade 12, $X^2(2, N = 88) = 4.01, p < .05$). Among girls, the nonsignificant difference of 10% favoring the CPE group in Grade 11 was no longer present by Grade 12.

The second recommendation for teens is quantified as vigorous activity at least 3 days a week for at least 20 min per day (24). There were no significant differences among boys for vigorous physical activity, although a 10% nonsignificant difference in favor of the CPE group was partially reversed by the time the boys reached Grade 12. No significant differences existed between CPE and TPE groups for girls, though the trend was in favor of the CPE group at both Grades 11 and 12.

Were students exposed to CPE in the first year of Project Active Teens more likely than TPE students to perform muscle fitness and flexibility activities on a regular basis?

Though the national consensus conference did not recommend specific activity guidelines for muscle fitness and flexibility exercises, Healthy People 2000 objective 1.6 focuses on increasing the numbers of people performing these types of activities. Data for these variables were only collected in the first data collection, thus data were available only for Grade 11 students. Results indicate that a significantly higher proportion of girls in the CPE group (58%) did muscle fitness exercises on at least 3 days of the preceding week, in comparison with those in the

Table 2 Differences in the Proportion of Teenagers Engaging in Physical Activity Behaviors: Year One Conceptual Physical Education Students Versus Traditional Physical Education Students

Activity	Grade	Boys (%)			Girls (%)		
		CPE	TPE	<i>p</i>	CPE	TPE	<i>p</i>
Moderate (≥ 5 days/week)	11	33	27	.41	31	21	.17
	12	34	13	.04*	27	30	.79
Vigorous (≥ 3 days/week)	11	86	76	.13	70	62	.33
	12	66	70	.76	59	41	.12
Muscle fitness (≥ 3 days/week)	11	71	65	.46	58	41	.03*
	12	—	—	—	—	—	—
Flexibility (≥ 3 days/week)	11	59	60	.91	67	60	.41
	12	—	—	—	—	—	—

Note. Students were surveyed in Grade 11 and one year later in Grade 12. Dashes indicate where data was not collected.

* $p < .05$.

TPE group (41%), $X^2(2, N = 166) = 4.53, p < .05$). Though not significant, the direction of the difference for boys for muscle fitness favored the CPE group. Differences between CPE and TPE groups in flexibility exercises at Grade 11 were not significant for either boys or girls.

Were students exposed to CPE in the first year of Project Active Teens less likely to be sedentary in comparison with students exposed to TPE?

Healthy People 2000 objective 1.5 outlines the need to reduce sedentary lifestyles for people age 6 and older (24). The CPE curriculum was designed to promote active lifestyles but more importantly, to emphasize the need to avoid sedentary living, because sedentary living tracks to adulthood (22), and because totally sedentary living greatly increases risks for various diseases (2, 28). For this study, students who reported 0–2 days of moderate activity and 0–2 days of vigorous activity over the preceding 7 days were considered sedentary. Data in Table 3 indicate that for all comparisons, a lesser proportion of CPE boys and girls were sedentary compared to TPE boys and girls respectively. Statistically significant differences were found in favor of CPE girls for both data collection periods.

CPE: The Second Year of Operation

Were students exposed to CPE in the second year of Project Active Teens more likely to meet national recommendations for moderate activity, vigorous activity, muscle fitness, and flexibility and less likely to be sedentary compared to students exposed to TPE?

The data were collected for the second group of ninth-graders entering the Project Active Teens school when students were in Grade 10 and one year later when students were in Grade 11. Results for the various activity categories indicate no significant differences for moderate or vigorous activity, muscle fitness, or flexibility. Results were mixed with 7 of the 12 differences in favor of the CPE group and 5 in favor of the TPE group (see Table 4). Regarding sedentary behavior, three out of four comparisons indicated a lesser proportion of CPE students were sedentary compared to those completing TPE, although none of the differences were statistically significant (see Table 3).

Table 3 Differences in the Proportion of Teenagers Engaging in Sedentary Living: Year One and Two Conceptual Physical Education Students Versus Traditional Physical Education Students

Year of CPE implementation	Grade	Boys (%)			Girls (%)		
		CPE	TPE	<i>p</i>	CPE	TPE	<i>p</i>
First year	11	9	16	.28	19	32	.04*
	12	8	13	.45	20	41	.04*
Second year	10	16	22	.34	22	28	.46
	11	15	19	.64	22	13	.32

* $p < .05$.

Table 4 Differences in the Proportion of Teenagers Engaging in Physical Activity Behaviors: Year Two Conceptual Physical Education Students Versus Traditional Physical Education Students

Activity	Grade	Boys (%)			Girls (%)		
		CPE	TPE	<i>p</i>	CPE	TPE	<i>p</i>
Moderate (≥ 5 days/week)	10	30	28	.34	24	34	.14
	11	30	26	.73	30	22	.41
Vigorous (≥ 3 days/week)	10	74	70	.59	67	59	.29
	11	66	74	.45	50	65	.19
Muscle fitness (≥ 3 days/week)	10	66	65	.92	48	45	.76
	11	—	—	—	—	—	—
Flexibility (≥ 3 days/week)	10	52	50	.79	56	51	.52
	11	—	—	—	—	—	—

Note. Students were surveyed in Grade 10 and one year later in Grade 11. Dashes indicate where data was not collected.

Project Active Teens and National Health Objectives

Healthy People 2000 objectives require a certain proportion of the population to meet specific health goals by the end of the decade. Do students from the Project Active Teens school meet the goals for moderate, vigorous, muscle fitness, and flexibility activities?

The Healthy People 2000 goal for moderate activity requires that 30% of people aged 6 and older be regularly active on 5 or more days a week. For each data collection period, among first year and second year CPE students, the moderate activity goal was met by all CPE groups except two. Only Grade 12 girls exposed to CPE in the first year of the program (27% moderately active) and Grade 10 girls exposed to CPE in the second year (24% active) were below the standard. In comparison, TPE groups met the 30% standard in only four out of eight observations, with three of these observations below the lowest CPE group.

The Healthy People 2000 goal for vigorous activity requires 75% of adolescents to be active on 3 or more days a week, for 20 min or more per day. Among boys, two of four CPE groups achieved or were very close to achieving the national goal (86% and 74% active; see Tables 2 and 3). Likewise, two of the TPE groups were above or near the standard (76% and 74% active). Among girls, neither CPE students nor TPE students met the vigorous goal. Grade 11 girls from the first year of the CPE program reported the highest proportion of vigorously active females (70% active).

For flexibility and muscle fitness, the goal is to have 40% of all people aged 6 years or older regularly perform these types of activity (3 or more days per week). All boys and girls in both the CPE and TPE groups met the 40% national standard for muscle fitness and flexibility activity. In fact only three groups reported less

than 50% of teens inactive in these categories, two TPE groups and one CPE group (see Tables 2 and 4).

National health objectives aim to decrease the proportion of people who are inactive. How many students from Project Active Teens reported sedentary living?

The Healthy People 2000 goal for sedentary living is to have fewer than 15% of the population aged 6 years or older engaging in no leisure-time activity. Results in Table 3 indicate boys from the first year CPE program and the second year CPE program achieved or were near achieving (16% sedentary) this goal for both data collection periods, and all were below the current rate of sedentary living for adults (24%) (21). Two the four groups of TPE boys achieved or were close to achieving this goal. All of the groups of CPE girls were sedentary at rates near 20%, all below the proportion of adults who are sedentary, but still some distance from the national goal. In three out of four observations, the proportion of sedentary TPE girls was *higher* than the proportion of adults reporting inactive lifestyles. The fourth group of TPE girls was below both the national rate for adults and the national health goal of 15%.

How did teens in the Project Active Teens school compare to teens surveyed in a national sample?

Using data from the 1995 Youth Risk Behavior Survey (4), a nationwide sample of teens was compared to all teens involved in this study (CPE and TPE combined), for categories of moderate activity, vigorous activity, muscle fitness, and flexibility. The national data were collected in years similar to those years for this study. For students in the first entering class (ninth-graders when the school opened), results for all four types of activity indicate that a greater proportion of these students were physically active compared to teens from the national sample. This was true for both boys and girls in both data collections. For the second entering class (ninth-graders in the school's second year), boys in both data collections exceeded the national sample in moderate activity and flexibility participation. In both data collections, girls in the second graduation class exceeded the national sample for moderate and vigorous activity.

Discussion

Several studies of physical education interventions at the elementary school level (10, 14, 16) have been reported in the literature. Studies at the collegiate level have investigated programs designed to promote lifelong activity (1, 3, 26). In spite of the fact that many high schools have implemented programs designed to promote physical activity, there has been little if any published research regarding the secondary school level. This is most likely due to the problems posed in attempting to implement and investigate curriculum interventions.

The most common problems with school-based research are the effective measurement of physical activity and the establishment of sound control groups. Questionnaires are often the instrument of choice in conducting research in educational settings despite being a less than objective measure. The questionnaire used in this study was developed to establish national physical activity norms, and whatever its limitations, they were the same for both control and treatment groups.

The type of control group (transfer students) used in this study has been successfully used with college populations (26), and all indications are that controls were similar in socioeconomic status and a mix of coeducational versus gender-segregated classes. One of the study's limitations is that control subjects were exposed to the Project Active Teens school for one year less than CPE students, although they were in the school environment for one or more years before data collection.

All factors related to research methodology considered, several conclusions seem warranted. *The CPE program in its initial year discouraged sedentary lifestyles.* For girls taking the original CPE program, significant differences occurred at Grades 11 and 12. At a time when girls are about to begin their adult lives, more than twice as many of those not exposed to CPE were inactive compared to those who were exposed. Though not significant, the trend was similar for 10th-grade girls who took CPE the second year of the school's operation. For Grade 11 girls in that year, the trend favored the TPE group. Though no significant differences existed for boys for either grade or either group of students, all four differences were in favor of the CPE groups.

The recent mid-decade review of national health goals indicated that in spite of national efforts to change sedentary lifestyles, there was no change in the proportion of those who were totally inactive over the first 5 years of the 1990s (15). In this study, CPE boys had achieved the national health goal (15%) for sedentary living in all cases except for 10th-grade boys from the first data collection (slightly above that goal, 16% being sedentary). TPE boys on the other hand, met the national health goal only as 12th-graders in the first graduation class. The relatively low incidence of sedentary lifestyles among 11th- and 12th-grade girls exposed to CPE in the first year of the program suggests that this type of program may be especially useful for girls, if the program is implemented properly.

Generally, the results of this study did not show differences between the proportion of CPE students and TPE students meeting goals for moderate and (especially) vigorous activity. This may, in part, be a result of the already high level of physical activity among the students in the school among *both* conceptual and traditional physical education groups. Students at the Project Active Teens school were more active than national teens and met Healthy People 2000 goals in many cases. No doubt this result was due in large measure to an extensive involvement in school related sports activities (varsity, junior varsity, and clubs), good weather, and relatively higher socioeconomic status of the school. However, it should be noted that there are other possible reasons for the activity patterns at the school.

First, administrators and teachers at the Project Active Teens school made a conscious effort to provide school programs involving activity for a large number of students. We believe that these programs, including CPE, established a social norm that reinforced involvement in physical activity. Though we did not collect data specifically to test the presence of a "social norm" favoring involvement in physical activity, we believe that one was established. This being the case, the school social norm may have influenced the control as well as the treatment subjects to be active. The hypothesis that a physically active social norm can be altered by school programs is deserving of future research.

Of concern is the lesser effectiveness of the CPE program in its second year, especially for girls. Although among boys, the second year of the CPE program

produced similar results as the first year, the same was not true for girls. Grade 11 girls exposed to CPE in its second year of operation had a *higher* proportion of sedentary students in comparison with TPE. We believe a difference in the way the two CPE programs (first year vs. second year) were implemented explains this unexpected result.

Interviews with the program coordinator and school principal provided information that might explain differences between the quality of the programs in the first and second years. Possible reasons included: the absence of in-service programs for established teachers in the second year, and a high turnover among female teachers resulting in fewer in-service programs for female teachers who started in the second year of the program. Based on interviews, it is clear that both program continuity and the degree to which teacher were oriented to the philosophy and instructional method of the CPE program was greater for male than female teachers. For greatest effectiveness, it would seem that all teachers, but especially new teachers, take part in regular in-service programs.

All things considered, we conclude that integrating CPE into a one-year physical education program can promote physically active living among teens. From a research standpoint, it would be intriguing to consider the results of a program that was implemented 5 days a week for one semester, as has been done in many of the states where physical activity promotion classes are required.

References

1. Adams, T.M., II, and P. Brynteson. A comparison of attitudes and exercise behaviors of alumni from universities with varying degrees of physical education activity programs. *Res. Q. Exerc. Sport.* 63:148-152, 1992.
2. Bouchard, C., R.J. Shephard, and T. Stephens. (Eds.). *Physical Activity, Fitness, and Health: International Proceedings and Consensus Statement.* Champaign, IL: Human Kinetics, 1994.
3. Brynteson, P., and T.M. Adams. The effects of conceptually based physical education programs on attitudes and exercise habits of college alumni after 2 to 11 years of follow-up. *Res. Q. Exerc. Sport.* 64:208-212, 1993.
4. Centers for Disease Control and Prevention. CDC Surveillance Summaries, *MMWR.* 45(no. SS-4):78, 1996.
5. Centers for Disease Control and Prevention. Guidelines for school and community programs to promote lifelong physical activity among young people. *MMWR.* 46(no. RR-6):1-33, 1997.
6. Corbin, C.B. The fitness curriculum—Climbing the stairway to lifetime fitness. In: *Health and Fitness Through Physical Education*, R.R. Pate and R.C. Hohn (Eds.). Champaign, IL: Human Kinetics, 1994, pp. 59-66.
7. Corbin, C.B., and R. Lindsey. *Fitness for Life, Teachers Edition* (3rd ed.). Glenview, IL: Scott Foresman, 1990.
8. Heath, G.W., M. Pratt, and C.W. Warren. Physical activity patterns in American high school students. *Arch. Pediatr. Adolesc. Med.* 148:1121-1136, 1994.
9. Heath, G.W., R.R. Pate, and M. Pratt. Measuring physical activity among adolescents. *Public Health Rep.* 108:42-46, 1993.
10. Hopper, C.A., M.B. Gruber, K.D. Munoz, and S. MacConnie. School-based cardiovascular exercise and nutrition programs with parent participation. *J. Health Educ.* 27:S32-S39, 1996.

11. Johnson, D.J., and E.G. Harageones. A health fitness course in secondary physical education: The Florida experience. In: *Health and Fitness Through Physical Education*, R.R. Pate and R.C. Hohn (Eds.). Champaign, IL: Human Kinetics, 1994, pp. 165-172.
12. Kolbe, L.J., L. Kann, and J.L. Collins. Overview of the youth risk behavior surveillance system. *Public Health Rep.* 108:S2-S10, 1993.
13. Kriska, A.M., and C.J. Caspersen (Eds.). A collection of physical activity questionnaires for health-related research. *Med. Sci. Sports Exerc.* 29:S201-S205, 1997.
14. Luepker, R.V., C.L. Perry, S.M. McKinlay, P.R. Nader, G.S. Parcel, E.J. Stone, L.S. Weber, J.P. Elder, H.A. Feldman, C.C. Johnson, S.H. Kelder, and M. Wu. Outcomes of a field trial to improve children's dietary patterns and physical activity: The Child and Adolescent Trial for Cardiovascular Health (CATCH). *JAMA.* 275:768-776, 1996.
15. McGinnis, J.M., and P.R. Lee. Healthy People 2000 at mid-decade. *JAMA.* 273:1123-1129, 1995.
16. Myers, L., P.K. Strikmiller, L.S. Webber, and G.S. Berenson. Physical and sedentary activity in school children Grades 5-8: The Bogalusa Heart Study. *Med. Sci. Sports Exerc.* 28:852-859, 1996.
17. National Association for Sport and Physical Education. *Moving into the future: National standards for physical education. A guide to content and assessment.* Reston, VA: Mosby, 1995.
18. Pate, R.R., B.J. Long, and G. Heath. Descriptive epidemiology of physical activity in adolescents. *Pediatr. Exerc. Sci.* 6:434-447, 1994.
19. Pate, R.R., M.L. Small, J.G. Ross, J.C. Young, K.H. Flint, and C.W. Warren. School Physical Education. *J. School Health.* 65:312-318, 1995.
20. Pate, R.R., and R.C. Hohn. A contemporary mission for physical education. In: *Health and Fitness Through Physical Education*, R.R. Pate and R.C. Hohn (Eds.). Champaign, IL: Human Kinetics, 1994, pp. 1-8.
21. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (DHHS publication no. PHS 91-50212). Washington, D.C.: U.S. Government Printing Office, 1991.
22. Raitakari, O.T., K.V.K. Porkka, S. Taimela, R. Telama, L. Rasanen, and J.S. Vikan. Effects of persistent physical activity and inactivity on coronary risk factors in children and young adults. *Am. J. Epidemiol.* 140:195-205, 1994.
23. Sallis, J.F., B.G. Simons-Morton, E.J. Stone, C.B. Corbin, and L.H. Epstein, N. Faucette, R. Iannotti, J.D. Killen, R.C. Klesges, C.K. Petray, T.W. Rowland, and W.C. Taylor. Determinants of physical activity and interventions in youth. *Med. Sci. Sports Exerc.* 24:S248-S257, 1992.
24. Sallis, J.F., and K. Patrick. Physical activity guidelines for adolescents: Consensus statement. *Pediatr. Exerc. Sci.* 6:302-314, 1994.
25. Sallis, J.F., and T. McKenzie. Physical education's role in public health. *Res. Q. Exerc. Sport.* 62:124-137, 1991.
26. Slava, S., D. Laurie, and C.B. Corbin. Long-term effects of a conceptual physical education program. *Res. Q. Exerc. Sport.* 55:161-168, 1984.
27. Watson, E.R., A. Sherrill, and B. Weigand. Curriculum development in a worldwide school system. *J. Phys. Educ. Rec. Dance.* 65:17-20, 1994.
28. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.

Acknowledgements

The authors would like to acknowledge the administrators of the Tempe Union High School District for their help with this longitudinal project. Without their help and the help of principal Harold Slemmer, department head Karl Kiefer, program coordinator Phil Abbadessa, and the other teachers of the Project Active Teens High School, this research would not have been possible. The authors would also like to acknowledge the Motor Development Research Fund at Arizona State University for its support of this research.