Physical Activity Participation of High School Graduates Following Exposure to Conceptual or Traditional Physical Education

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Over the last two decades considerable evidence has accumulated concerning the importance of physical activity to good health. *The Surgeon General's Report on Physical Activity and Health* (U.S. Department of Health and Human Services, 1996) documents the decline in physical activity during the teen years and targets promoting activity among youth as an important national concern. Because all youth must attend school, experts have recommended school-based programs as the preferred method for promoting lifelong activity in the teen population (Centers for Disease Control and Prevention, 1997; Sallis & McKenzie, 1991). Consequently, some school physical education programs have assumed responsibility for promoting public health as evidenced by the innovative curricula being implemented. For example, within the United States, at least seven states, as well as all schools in the Department of Defense Dependent School System, have mandated requirements commonly referred to as "conceptual physical education" (CPE) or "personal fitness classes" for high school students. The objective of CPE programs is to promote among each student competence and a positive attitude toward activity and exercise that will encourage students to adopt a physically active way of life. Ideally, a CPE curriculum includes classroom lessons that teach concepts of health and fitness, as well as laboratories or activity sessions that focus on personalized fitness programs, self-monitoring, and a noncompetitive environment for fitness assessment.

CPE programs were initially developed for college-age students. Research investigating the outcomes of college CPE programs is limited but suggests that such programs can be effective in promoting positive attitudes toward activity and positive changes in physical activity behaviors (Adams & Brynteson, 1992; Brynteson & Adams, 1993; Slava, Laurie, & Corbin, 1984). At the high school level, research investigating the outcomes of conceptual type programs is also limited. The few studies that have been conducted are, nevertheless, encouraging. CPE programs increased levels of physical activity and attitudes toward engaging in physical activity (Killen et al., 1988; Goldfine & Nahas, 1993), and parental and administrator attitudes toward CPE programs are positive (Johnson & Harageones, 1994).

This current study examines data collected as part of *Project Active Teens*, a longitudinal investigation of a CPE program in operation at a large urban high school. Previous research from *Project Active Teens* (Dale, Corbin, & Cuddihy, 1998) was conducted when participants were still in high school. Findings showed that 2–3 years after taking ninth grade physical education, significantly fewer CPE students reported sedentary behaviors in compari-

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son to students who had taken a more traditional sports-based physical education program. This current study is unique because participants from CPE and traditional physical education (TPE) programs were surveyed after graduating from high school. To our knowledge, there are no published studies of this type. The specific purpose of this study was to examine the physical activity participation of individuals several years after completing their high school physical education program (12 months or more beyond their high school graduation).

Method

Participants

The participants for this study were from the graduating classes of 1995 and 1996 at the Project Active Teens high school. Specifically, within each graduating year participants were classified into two groups on the basis of their ninth-grade physical education program. Graduates who had taken the CPE program at the Project Active Teens high school were classified as CPE participants. Graduates who transferred to the Project Active Teens high school in Grade 10 or higher and had thus taken physical education at a different high school were classified as TPE participants.

Procedures

A physical activity questionnaire (see Questionnaire section) was mailed to graduates from the Project Active Teens school. All participants had been surveyed on two previous occasions (12 months apart) while in school. The 1995 graduating class consisted of individuals who had taken a new ninth-grade CPE program when the school first opened in 1991 and transfer students (TPE participants) who began their education at the new school in Grade 10 or higher. From the 1995 graduating class, 144 questionnaires were returned (36% response rate), with 138 usable for data analysis (CPE: n = 99; TPE: n = 39). The 1996 graduating class consisted of individuals who had taken ninth-grade CPE during the school's second year of operation, as well as students who had transferred into the school in Grade 10 or higher. From the 1996 graduating class, 208 questionnaires were returned (38% response rate), with 196 usable for data analysis (CPE: n = 151; TPE: n = 44). School officials indicated that a high proportion of questionnaires sent to graduates does not reach them because of address changes or parents' failure to forward nonpersonal mail. Response rates from a previous study using physical activity questionnaires sent to alumni from different colleges ranged between 52 and 67% (Adams & Brynteson, 1992), a return rate consistent with the true response rate (returned questionnaires from those who actually received questionnaires) in this study. Additionally, the proportion of CPE to TPE students with respect to the ratio among returned questionnaires was consistent with the proportion of students who took either CPE or a TPE program in the ninth grade.

Questionnaire

The questionnaire used in this study was the same one used to collect data on participants while they were attending high school. The reader is cautioned to keep in mind the limitations of self-report data when making conclusions as to the strength of our findings. Three physical activity questions from the Youth Risk Behavior Survey (YRBS; Heath, Pate, & Pratt, 1993) were included in the questionnaire, as well as questions seeking demographic information and the type of ninth-grade physical education program taken. One condition placed on the research project by the school when Project Active Teens was initiated was that school time dedicated to data collection must be limited to homeroom periods that typically lasted 10–15 min. Actual time made available after roll call, school announcements, etc. was typically ~5 min. The task was to select an instrument that (a) was capable of being administered within a short time at school or home, (b) has demonstrated reliability, and (c) would provide data that could be compared to recommendations outlined in Healthy People 2000 (U.S. Public Health Service, 1991). The questionnaire used met the criteria outlined. Using the activity questions from the YRBS also allowed participants in Project Active Teens to be compared with a nationwide sample of youth who participated in the 1992 National Health Interview Survey—Youth Risk Behavior Survey (NHIS-YRBS; U.S. Department of Health and Human Services, 1993).

Implementation of Conceptual Physical Education

The initial proposal by university faculty to the school board advocated teaching a one-semester class offering of CPE. Lesson plans were created for the proposed one-semester 5-day-a-week CPE class, allocating 2 days per week in the classroom and 3 days per week in the gym. The content of the classroom sessions focused on concepts of physical activity and fitness as well as behavioral skills such as activity logging, goal setting, and program planning. In the gymnasiun, laboratory sessions were planned to include teaching fitness self-assessment, personal program-building skills, and methods of performing a variety of lifetime physical activities designed to meet national health goals. Project Active Teens was, however, a cooperative venture between the university and the public school. Thus, changes were made to the proposed program after consulting with the high school physical education department. A final decision
was made to implement the CPE curriculum 1 day per week in the classroom and 1 day per week in the gym for the full year. On the remaining 3 days of the week, students participated in more traditional sports-based activities. In other words, the ninth-grade physical education class became a curriculum that included a conceptual component. A further description of the CPE intervention and methods used to collect data is available in an earlier paper (Dale et al., 1998).

Several steps were taken to verify implementation of the CPE program. First, the school board, the school district administration, the school principal, and the physical education department head made a commitment to effectively implement the program prior to introducing it. Faculty met with the school principal, the department head, and the conceptual physical education coordinator prior to program implementation, and there was unanimous agreement to support it.

Second, a committee of teachers and university faculty prepared lesson plan notebooks with specific weekly and daily plans for the full school year. Each teacher was supplied with a lesson plan notebook. In addition, 1-hr in-service seminars were conducted every 2 weeks during the first semester of the CPE implementation. During these seminars, lesson plans for the classroom and gymnasium sessions were reviewed. Sample lessons were presented and activities demonstrated. Attendance was required for all teachers in the program, and no teacher missed more than one in-service session, with most attending all sessions.

Third, the principal, department head, CPE program coordinator, and representatives from the university visited classes during the first year of program implementation. Both the department head and the CPE coordinator taught sections of the class. Monitoring indicated that teachers were teaching the lessons as outlined in the lesson plan notebooks. During the second year of the program implementation, there were no in-service seminars, but visits by the principal, department head, CPE coordinator, and university representatives continued. During the second year, only four of the six teachers implementing the CPE program were visited by university representatives, but all were visited by one or more of the administrators noted above. The second year visits were deemed important, because, as time passes, teachers may be less likely to comply with lesson plans than in the early stages of implementation. Instructors were given the opportunity to modify lesson plans as long as the changes were consistent with program goals.

In this study, no systematic observation tool was used to assess teachers as they implemented the program. However, the teachers did make a commitment to implement the program, had good lesson plans, attended regular in-services, and had classroom visits from program administrators. Teacher compliance during the first year of the study was considered to be very good for the reasons previously discussed. Teacher observations indicated that CPE was being implemented 2 days a week, classroom laboratory books were graded regularly, and students were participating in the activities outlined in the lesson plans and the class textbook. However, differences between teachers in CPE program implementation were noted in the second year. Classroom visitation indicated that one teacher was spending less than adequate time on the planned curriculum. Communication with the CPE program coordinator indicated that he was aware of differences in CPE implementation among instructors, and steps were taken to correct problems as they became apparent. The coordinator indicated that the majority of the staff was implementing the program effectively. To summarize, attempts were made to assure program implementation but at the same time avoid actions that might result in feelings of loss of teacher autonomy and subsequent loss of teacher commitment to the program.

Traditional Physical Education

Those students considered to have completed TPE for the purposes of this study fulfilled their physical education requirement at a school other than the Project Active Teens school. It is possible that some of these students had been exposed to a conceptual component if they transferred from out of the school district. However, to our knowledge few if any high school physical education programs in 1991–92 featured a conceptual component, and, for this reason, we believe most if not all of these TPE participants had no exposure to a conceptual program. Those students who transferred from within the district did not have a conceptual component. Their programs featured a sports-based curricula, similar to the many other "traditional" high school programs taught in the majority of U.S. high schools.

Data Analysis

Comparisons between CPE and TPE graduates were made in reference to adolescent physical activity guidelines (Sallis & Patrick, 1994). In accordance with these guidelines and national health objectives (U.S. Public Health Service, 1991), graduates were considered to be active if they performed: moderate activity (i.e., walking or bicycling 3 5 days, 3 30 min per day); vigorous activity (3 3 days, 3 20 min per day); muscle fitness activities (3 3 days). "Sedentary behavior" was defined as 0 days of moderate and vigorous activity. All data were analyzed using a nonparametric test. Chi-square analysis was used to examine whether differences existed among the proportion of CPE, TPE, and national participants reporting moderate, vigorous, strengthening, and sedentary behavior. Significant was set at $p < .05$. 

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Results

Did Differences Exist Between CPE and TPE Participants for Moderate, Vigorous, and Strength Activity?

The data for the 1995 and 1996 cohorts over the three data collection periods are shown in Table 1. For moderate activity participation, previously reported findings from Project Active Teens showed that CPE men at Grade 12 were significantly more active than TPE men (1995 cohort). The postgraduation results from this study revealed no significant differences within either cohort group for either gender on moderate activity participation.

For vigorous activity participation, no differences were observed between CPE and TPE participants within each cohort for either gender, when participants were surveyed in school. Findings among participants following graduation showed more CPE men (65%) than TPE men (29%) in the 1996 cohort reported being vigorously active (p < .01, effect size = .74). For strength activity, within the 1996 cohort significantly fewer TPE women (41%) were active compared to CPE women (58%) when participants were surveyed in school (Grade 11; p < .05). No statistically significant findings were found on strength activity following graduation, the largest observed difference noted among men in the 1995 cohort, CPE men (55% active) versus TPE men (33% active), p = .12, effect size = .54.

Table 1. The proportion of men and women from both cohorts, who met national physical activity recommendations for youth, 2, 3, and 4 years after exposure to conceptual or traditional physical education

<table>
<thead>
<tr>
<th>Type of activity</th>
<th>Participants surveyed in:</th>
<th>CPE Men (%)</th>
<th>TPE Men (%)</th>
<th>p</th>
<th>CPE Women (%)</th>
<th>TPE Women (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate (≥ 5 days/week)</td>
<td>1995 cohort</td>
<td>33</td>
<td>27</td>
<td>.41</td>
<td>31</td>
<td>21</td>
<td>.17</td>
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<td>34</td>
<td>13</td>
<td>.04*</td>
<td>27</td>
<td>30</td>
<td>.79</td>
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<td></td>
<td>Post graduation*</td>
<td>20</td>
<td>21</td>
<td>.91</td>
<td>23</td>
<td>17</td>
<td>.51</td>
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<td></td>
<td>1996 cohort</td>
<td>30</td>
<td>28</td>
<td>.34</td>
<td>24</td>
<td>34</td>
<td>.14</td>
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<tr>
<td></td>
<td>Grade 10</td>
<td>30</td>
<td>26</td>
<td>.73</td>
<td>30</td>
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<td></td>
<td>Grade 11</td>
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<td>07</td>
<td>.52</td>
<td>18</td>
<td>23</td>
<td>.58</td>
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<td>Vigorous (≥ 3 days/week)</td>
<td>1995 cohort</td>
<td>86</td>
<td>76</td>
<td>.13</td>
<td>70</td>
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<td>Post graduation*</td>
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<td>53</td>
<td>.72</td>
<td>42</td>
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<td>.88</td>
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<td></td>
<td>1996 cohort</td>
<td>74</td>
<td>70</td>
<td>.59</td>
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<td>Grade 10</td>
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<td>29</td>
<td>.01*</td>
<td>53</td>
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<tr>
<td>Strength (≥ 3 days/week)</td>
<td>1995 cohort</td>
<td>71</td>
<td>65</td>
<td>.46</td>
<td>58</td>
<td>41</td>
<td>.03*</td>
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<td></td>
<td>Post graduation*</td>
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<td>Post graduation*</td>
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<td>.95</td>
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</tbody>
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Note. CPE = conceptual physical education; TPE = traditional physical education; em dash (—) = data not collected.

*1995 cohort surveyed 18 months beyond graduation.

| 1996 cohort surveyed 12 months beyond graduation

*p < .05.
Did Differences Exist Between CPE and TPE Participants for Sedentary Behavior?

In a previous paper (Dale et al., 1998) significantly fewer CPE women reported sedentary living in comparison with TPE women. Specifically, within the 1995 cohort, differences in favor of CPE participants were observed in Grade 11, and again in Grade 12. Figure 1 displays the proportion of sedentary CPE and TPE women surveyed 18 months (1995 cohort) and 12 months (1996 cohort) beyond graduation. Within both cohorts, there were no significant differences between CPE and TPE female graduates, although observations from both cohorts favored CPE participants. When comparisons were made to women surveyed in the national sample (1992 NHIS-YRBS), CPE women (9% sedentary) from the 1996 cohort were significantly less sedentary than women nationwide (21% sedentary), $X^2 (1, N=583) = 8.25, p < .01$, effect size = .34. Differences between CPE women in the 1995 cohort (10% sedentary) and women nationwide (22% sedentary) approached significance ($p = .08$).

Figure 2 displays the proportion of sedentary CPE and TPE men reporting sedentary behavior. Among men for both graduating years, no significant differences were found between CPE and TPE participants on sedentary behavior. Comparison of CPE and TPE participants to national data indicated that for 1995 graduates, fewer CPE men (4%) reported sedentary behavior than did men (21%) surveyed in the 1992 NHIS-YRBS, $X^2 (1, N= 556) = 8.13, p < .01$, effect size = .55.

Discussion

There is an absence of published studies documenting the outcomes of CPE programs on student behavior.
during their school years, and no studies of which we are aware document activity behavior following graduation. Reasons for this absence are varied, pertaining to issues with the CPE intervention (the inability to get school and teacher cooperation in altering programs), data collection (difficulties in locating students following graduation), and measurement of activity (the need to use practical yet subjective measures). In Project Active Teens steps were taken to overcome some of these problems. School board officials were contacted to gain access to the schools. Bridges were built to gain the confidence of teachers to aid in program implementation. In-service education was provided to help teachers gain confidence in their abilities to carry out the planned changes. Finally, steps were taken to verify the program was being taught appropriately.

As part of Project Active Teens, this study builds on earlier findings (Dale et al., 1998) showing that 1–3 years after exposure to ninth-grade physical education, CPE participants were significantly less likely to be sedentary in comparison to non-CPE participants. In this study, between both graduating cohorts CPE women met the Healthy People 2000 objective that less than 15% of the population should be inactive. Females exposed to TPE did not meet this goal. Further, the proportion of sedentary CPE women from both graduating years (~10%) were well below the proportion of 19-year-old women (22%) nationwide reporting sedentary behavior.

The largest limitation of both studies is that data are in the form of self-report. As stated, a questionnaire was used, because it was the most feasible way in which to collect data. Limited time was available to collect data while participants were in school, and after graduation many participants had moved away from the geographical region. How accurate were our questions from the YRBS in terms of measuring activity? Pate, Long, and Heath (1994) attempted to cross-validate the results from survey studies—in particular, the National Children and Youth Fitness Study, Phase I (NYCFS-I)—to smaller studies that have used objective measures of activity. They concluded that surveys such as NYCFS-I and the YRBS (the only two large population-based studies conducted with U.S. adolescents) might overestimate time spent in physical activity by ~40 min. Thus it is possible that participants in this study may have overreported activity. However if both CPE and TPE participants overestimated activity to the same degree, then observed trends in favor of a less sedentary CPE group should remain valid. Another limitation with self-report instruments is that they are open to the possibility of response bias. It is possible that CPE participants exaggerated the extent of their participation in physical activity because they had a greater understanding of the relationship between activity and health. Interestingly, if this were the case it is an argument that the program (at the least) successfully teaches useful information about physical activity and health. Either way, the CPE participants benefited. Response bias can also arise as the result of completing a questionnaire several times. Participants from the Project Active Teens high school completed the questionnaire on three occasions, whereas participants in the NHIS-YRBS completed questions only once. Although this fact also opens up the possibility of response bias, it is worth noting that only CPE participants differed significantly from the national sample on activity behaviors, yet both CPE and TPE participants completed the survey multiple times. Even so, when making comparisons between CPE and national data, readers must be aware that our participants went to a middle-class high school in a warm weather climate, whereas the national sample included a wide range of geographical and socioeconomic regions. These facts could account for differences between local and national participants. Unfortunately, stratified data from the YRBS that would have allowed comparisons to a national group of similar age, geographical, and socioeconomic region were not available.

Another issue deserving discussion is the implementation and strength of the CPE intervention. We believe it is fair to speculate that a more intensive intervention may have resulted in statistically significant differences between CPE and TPE. The high school made the final decision to implement CPE 2 days per week for the entire year, as opposed to the 5-day-per-week one-semester program originally intended by university faculty. More positive outcomes from the CPE program may have been attenuated for this reason. Nevertheless, the CPE intervention in this study was as an ecologically valid approach that schools are likely to replicate in the future.

We hope our findings, with a less than optimal intervention, will provide impetus among other researchers to implement programs that aim to improve physical education in the nation’s high schools. Recommendations for future research on physical activity interventions for youth have recently been published (Stone, McKenzie, Welk, & Booth, 1998) to help strengthen study design. Included in the recommendations is the need to develop more reliable and valid self-report measures for different developmental age groups and the need to use objective measures in conjunction with self-report. Fortunately, research reporting on different aspects of physical activity, such as intensity (heart rate), movement (accelerometry), and energy expenditure (doubly-labeled water), are becoming more common in the research literature, specifically in smaller studies. Although the feasibility and financial costs of using such measures in larger studies remain prohibitive, objective assessment on subsamples of the study population seem imperative and will allow more definitive answers to the research question being posed.

In summary, there is extensive evidence documenting the importance of a physically active lifestyle to positive health outcomes. There is widespread concern that
physical activity participation is very low among adults, and evidence indicates that the steepest decline in activity participation occurs during the high school years. Public health experts have identified school physical education as a critical area where interventions can be employed to (a) halt the decline in activity and (b) promote lifetime activity beyond the high school years (Pate & Hohn, 1994). Conceptual physical education programs that teach self-management, personalized fitness testing, and health-related concepts of fitness have yielded positive outcomes among college-age students and are being implemented into secondary school curricula. Presently, however, research on the outcomes of school CPE is sparse.

This current paper is the first of its kind to report on the outcomes of a ninth-grade CPE program among individuals who have since graduated from high school. Significantly more men exposed to a CPE program reported vigorous activity participation 12 months beyond graduation. For both men and women from both graduating years, fewer CPE participants reported sedentary behavior in comparison to TPE participants. Although these differences did not reach statistical significance, we believe our findings are encouraging, particularly among women. The proportion of sedentary CPE women was approximately half the proportion of the TPE women reporting sedentary behavior. Overall, while few significant findings were observed, there is no evidence of the program being detrimental, and some benefits do occur. With all the limitations, including the self-report measure of activity, the use of a quasiexperimental design, and the potential problem with teacher compliance, this study represents an important step forward. Future investigations, especially if they can overcome the limitations in our study, will provide greater understanding as to the extent to which innovative physical education programs may make a difference in promoting physical activity beyond the high school years.

References


Note

1. The data showing activity patterns of participants while they were in school are from a previously published study (Dale, Corbin, & Cuddihy, 1998). These data are included in this paper to allow comparison to postschool activity patterns.
Authors' Notes

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