Curriculum Diversity and Young Adult Physical Activity: Reflections from High School Physical Education

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Abstract

This study was to evaluate if exposure to a diverse curriculum in high school physical education had an impact on young adult physical activity. Students from two universities were surveyed concerning high school physical education content exposure and physical activity in four areas. By investigating relationships between content exposure and adult physical activity, documentation could be provided to assist in curriculum planning for high school physical education. Results indicated that individuals who completed courses with a diverse curriculum, containing activities from three or more of the content areas investigated, reported significantly higher levels of cardiovascular endurance and flexibility activities than individuals who completed courses containing fewer content areas. Results indicate that providing a diverse curriculum in high school physical education may contribute to greater levels of physical activity in young adults.

In 1992, the National Association of Sport and Physical Education (NASPE) published content standards calling for physical education programs to develop the "physically educated person" (NASPE, 1992, 2004). These standards defined this person as someone who achieved and maintained a health-enhancing level of physical activity, thus establishing the promotion of lifetime physical activity as the primary outcome of physical education. NASPE standards have shaped the physical education programs of today, resulting in considerable research and fueling attempts to define the role of physical education in public health. Studies have consistently indicated that this role is providing experiences that will lead to increased adult physical activity, an outcome reinforced by multiple researchers and organizations (Sallis & McKinzie, 1991).

The Centers for Disease Control and Prevention (CDC) in reports from the United States Surgeon General (CDC, 1996), and the Task Force on Community Preventative Services (CDC, 2001) recommended school-based physical education as a preferred method and key intervention for promoting adult physical activity. However, data concerning the prevalence of obesity and sedentary behavior indicates that achieving the outcome of producing physically active adults is complex and multi-faceted. Even though the benefits of physical activity on reducing health risk for chronic disease are well documented, more than 50% of adults in the United States do not participate in recommended levels of physical activity (Blair, Cheng & Holder, 2001; CDC, 2005a). According to the National College Health Risk Behavior Survey, only 38% of young adults between the ages of 18 and 24 engage in activity meeting recommended guidelines (CDC, 1997). Rates of adolescents activity meeting guidelines have also decreased during the past ten years by 3.2% with 11.5% currently reporting sedentary lifestyles (CDC, 1995, 2004a, 2004b). These results clearly indicate that the link between public school physical education and adult physical activity has yet to be clearly delineated.

Over the past thirty years studies have attempted to determine the impact of content exposure on physical activity. These investigations were largely based on Social Learning

Theory tenets. This theory, when applied to physical education, would indicate that individuals who were exposed to a variety of activities in physical education would later find activities in which they experienced success and continue to perform them as adults (Crosbie-Brunett & Lewis, 1993; Jones, 1989; Perry, Baranowski & Parcel, 1990; Woodward, 1982; Thomas, 1990). Early investigations however, have indicated that certain types of activities are de-emphasized or omitted from physical education courses limiting student exposure (Dodds, 1985).

A consistent observation has been that curricular offerings tend to focus on skill-related over health-related activities and the majority of instructional units taught emphasize team sports (McKenzie, Alcaraz & Sallas, 1994; Napper-Owen, Kovar, Ermler & Mehrhof, 1999). Sallis and McKenzie (1991) suggested a curriculum focused on team sports would not influence adult physical activity and curriculum offerings should consist of activities that would carry over into adult life. This position has been reinforced by both the American Academy of Pediatrics (AAP, 1987) and the National Association of State School Boards of Education (NASBE, 1997) indicating that the primary focus of secondary physical education is team and competitive sports, despite national recommendations to stress lifetime activities. Recently, the National School Health Policies and Programs Study re-examined curricular trends in physical education. Findings indicated that the highest median hours of content presented to students was in four team activities (basketball, baseball, soccer and volleyball). These four team sports were reported to be taught in over 90% of the programs evaluated (Burgeson, Wechsler, Brener, Young & Spain, 2003). Student interest studies have consistently reported that a variety activity is desired by students. Rice (1988) found that 81% of students surveyed enjoyed a variety of activities in courses and Hill and Cleven (2005) found student preferences for activities from multiple curricular strands including team sports, aquatics, rhythmic movements, physical conditioning and individual activities.

Numerous investigations have focused on student learning and teaching methodology within the context of physical education courses; however, few studies have evaluated whether such programs resulted in higher levels of adult activity (Powell & Dysinger, 1987). According to Trudeau and Shephard (2005) only one longitudinal study has evaluated the long term benefits of physical education. In this study subjects were evaluated for physical activity and health risk factors 20 years after an elementary physical education intervention. Results indicated that females demonstrated higher levels of activity than control groups and males demonstrated lower cardiovascular risk factors (Trudeau, Laurencelle, Tremblay, Rajic & Shephard, 1999; Trudeau, Espindola, Laurencelle, Dulac, Rajic & Shephard, 1998; Trudeau, Laurencelle & Shephard, 2004; Trudeau & Shephard, 2005). In an analysis of high school physical education, Dale and Corbin's (2000) follow up to Dale, Corbin and Cuddihy's (1998) investigation focused on evaluating the impact of a conceptual physical education program model on post graduate physical activity. The conceptual program consisted of the performance a variety of lifetime physical activities with classroom sessions, self-assessments and program planning. Results indicated that men and women who were exposed to the program demonstrated lower levels of sedentary behavior than national samples 18 months post graduation.

Since it has been well established that team sports dominate physical education at the high school level, an investigation of exposure to diverse offerings may provide insight into determining if such diversity facilitates higher levels of adult activity. Multiple investigations have investigated specialized models and evaluation of content mastery within courses, with few examining the links between these interventions and adult activity (Allison & Thorpe, 1997; Bennett & Hastie, 1997; Dale & Corbin, 2000; Dale, Corbin & Cuddihy, 1998; Ennis, Solomon,

Satina, Loftus, Mensch & McCauley, 1999; Hastie, 1997; 1998b, 2000; Rink, 1996; Rink, French & Graham, 1996; Silverman, Tyson & Morford, 1988). If relationships could be identified between curriculum exposure and adult activity, documentation could be provided to assist in program planning, thus improving the effectiveness of physical education in promoting activity beyond the school setting. Therefore, the purpose of this study was to determine if young adults who completed physical education courses that contained a diverse curriculum currently participate in greater levels of physical activity than individuals who completed courses that contained fewer curricular areas. A secondary purpose was to investigate trends in curricular emphasis and evaluate young adult activity in relation to recommended levels.

Method

Sample and Instrumentation

Participants in this study consisted of 1,920 undergraduate students enrolled in general studies courses on two university campuses. Potential respondents were administered a survey containing questions concerning demographics, high school physical education courses completed, the content of those courses and current levels of physical activity. Internal Review Board procedures were followed at both institutions and instructor consent was obtained before survey administration. Prospective respondents were provided a description of the study, risks, benefits, participation guidelines, confidentiality procedures and rights to withdraw before choosing whether to complete the survey.

The survey was distributed to two pilot samples to assess instrument reliability. The initial pilot study (N=174) evaluated measurement scales and resulted in modifications from five point scales to scales more specific to item content. Response items concerning high school physical education courses completed (measured in semesters) were modified from 0-5 to 0-8 scales to allow documentation of courses completed out of a possible eight semesters. The initial survey gave a score of "five or more" to any respondent completing more than five semesters of high school physical education courses. This modification allowed greater accuracy in recording the number of courses an individual completed. Similar adjustments were made to physical activity items (measured in days per week) changing scales from 0-5 to 0-7 to allow the respondent to indicate all possible days per week of activity. The second pilot study (N = 29) was to assess validity and reliability of questions about high school physical education. Respondents were administered the survey and results compared to high school transcripts to determine reliability for items evaluating course completion. The same group of respondents was re-administered the survey two months later to evaluate test-re-test reliability of other variables. Results demonstrated high internal reliability (r = .89) as well as test-re-test reliability (r = .96) for survey items.

The first series of questions addressed high school physical education experiences. This section asked respondents to indicate the number of courses completed and whether athletic waivers were granted as a substitution for physical education coursework. The curriculum content section asked respondents to identify activities taught in their high school physical education classes in six content areas; aquatics, individual, physical conditioning, outdoor adventure, rhythmic and team activities. Response items were based upon student interest surveys published by Darst and Pangrazi (2006). Each question provided examples of activities within the each area and respondents were informed that listings were not all inclusive. An additional question asked respondents to rank content areas on a one to six scale based upon perceived emphasis. A one ranking indicated the area in which the greatest amount of instructional time was spent and a six the area of least emphasis. Respondents were also informed to rank only content areas that were part of courses.

Current physical activity was assessed using items based upon questions from the National College Health Risk Survey (CDC, 1997) and guidelines published by the American College of Sports Medicine (ACSM) (Pollock et al., 1998). The National College Health Risk Survey used a series of four items to evaluate performance of physical activity. In this study university students between the ages of 18-24 responded to prompts asking them the number of times during the past seven days they performed activities that made them sweat or breathe hard for at least 20 minutes or greater; walked or bicycled for at least 30 minutes; performed stretching exercises; and/or performed strengthening exercises. Guidelines indicate that individuals should participate in moderate physical activity a minimum of five days per week and flexibility and/or strengthening exercises a minimum of three times per week (CDC, 1997). ACSM guidelines recommend that individuals perform cardiovascular fitness activities 3-5 days per week for 20-60 minutes and perform muscular strength and endurance activities and flexibility exercise 2-3 times per week. Participation in game activities was classified by ACSM as a mode of activity for development of cardio respiratory fitness (Pollock et al., 1998). In the current study, respondents were asked to respond to four questions concerning physical activity by indicating the number of days within the past week they performed activity meeting guidelines established by the prompt. Prompts included: a) approximately how many times during the last seven days did you engage in moderate exercise such as brisk walking, jogging or swimming for 30 or more minutes; b) approximately how many times during the past seven days did you engage in exercises to develop muscular strength and endurance (e.g.: weight training, aerobics); c) approximately how many times during the past seven days did you engage in individual or team activities (e.g.: bowling, softball, intramural sports); and d) approximately how many times during the past seven days did you engage in flexibility training activities (e.g.: yoga, Pilates)? A final question asked respondents if they participate in intercollegiate athletics at their university of attendance.

To increase the reliability of survey results, responses from individuals that were above the age of 24 were omitted from the statistical analysis. This age criterion was used based upon data indicating that 57% of the college population is between the ages of 18-24 (CDC, 1997). Responses from individuals who graduated from high schools outside the United States were also eliminated during the analysis phase. This criterion was to ensure that responses evaluated were from individuals educated in schools within the United States that would presumably follow NASPE curriculum guidelines. Survey responses from individuals who indicated that they were allowed to substitute athletic participation for high school physical education were also eliminated based on the assumption that these individuals did not have exposure to the curriculum at their school of attendance. The final screening criterion entailed the removal of surveys completed by individuals with undergraduate majors in physical education or other exercise-related fields, or reported they were collegiate athletes. This criterion was based on the assumption that individuals who chose majors in physical education or were collegiate athletes demonstrate greater levels of physical activity than the general sample. Surveys that were incomplete or incorrectly filled out in any section were also eliminated leaving 1,318 for the analysis phase. To evaluate specific curriculum variables and their impact on physical activity, 452 responses were selected for analysis. Selection was based on obtaining a group of participants who completed two semesters of high school physical education. This criterion was utilized to ensure comparisons of physical activity would be made on individuals with equivalent course exposure.

It is important to note the following limitations to data collected in this study. All data was self-reported which should be considered in evaluating

the strength of findings and conclusions. Questions concerning high school physical education were also answered in retrospect and response items for physical activity did not evaluate exercise intensity, merely duration. It should also be noted that study participants were limited to individuals between the ages of 18-24 enrolled in university courses, excluding individuals of similar age not attending university.

Data Analysis Procedures

Results of the survey were analyzed using frequency distributions, descriptive statistics, and one way Analysis of Variance to evaluate differences between groups and the percentage of individuals meeting minimal physical activity levels outlined by ACSM (Pollock et al., 1998). Responses were divided into two groups and compared on reported levels of physical activity. Group assignment was based on the number of content areas, of the six investigated, individuals reported being taught in their high school physical education classes. The low diversity group (n = 161) contained responses from individuals who reported exposure to activities from one to two areas and the high diversity group contained responses indicating exposure to three or more areas (n = 291). Current levels of activity were compared between groups in four areas; cardiovascular endurance, muscular strength and endurance, sport participation and flexibility. Additional analyses were performed to evaluate curriculum emphasis based on rankings of the perceived amount of instructional time devoted to various content areas.

Results

Physical Activity Results

Physical activity responses indicated that university students who completed high school physical education courses containing activities from three or more content areas reported higher levels of cardiovascular endurance, muscular strength/endurance, sport participation and flexibility exercise. Significant differences were reported between groups for cardiovascular endurance and flexibility activities (F = 3.904; 5.159; p<.05, .02; d = .19; .23). In comparison to ACSM guidelines, the high diversity group reported a greater percentage of individuals meeting minimal guidelines for cardiovascular endurance activity (62% versus 52%), defined as performing activities a minimum of three times per week for 20-60 minutes (Pollock et al., 1998). A greater percentage of individuals in the high diversity group also reported flexibility exercise meeting minimal guidelines (23% versus 17%), defined as performing activity a minimum of two times per week (Pollock et al., 1998). No significant differences were found between groups for sport participation or muscular strength/endurance activities. Results of these comparisons are listed in Tables 1 and 2.

Reported participation rates indicated that cardiovascular endurance activities were performed most frequently by young adults in this study (2.9 days per week). Muscular strength/endurance participation was reported an average of 1.6 days per week and the lowest participation rates were for sport participation (1.1 days per week) and flexibility activities (.8 days per week). Results of these comparisons are listed in Table 3.

Curriculum Results

Curriculum content responses were evaluated to determine exposure and curricular emphasis. The majority of content experiences were reported in two areas: team sports (426) and physical conditioning (335). Aquatics was reported to be a component of physical education courses by 89 respondents and rhythmic activities by 66 respondents. The area with the lowest reported level of content experience was outdoor adventure activities with only 34 of 452 respondents identifying this type of activity as part of their high school physical education experience. Emphasis rankings demonstrated that the majority

Table 1

ANOVA comparisons for curriculum diversity on reported current levels of physical activity (N = 452).

Comparison	*SS*	*df*	*MS*	*F*	*p*	*d*
Cardiovascular Endurance (CV)						
Between Groups	9.86	1	9.86	3.90	0.49*	0.19
Within Groups	1136.66	450	2.53			
Total	1146.52	451				
Muscular Strength and Endurance (MS)						
Between Groups	0.15	1	0.15	0.64	0.80	0.03
Within Groups	1064.14	450	2.37			
Total	1064.29	451				
Sport Participation (RS)						
Between Groups	2.14	1	2.14	1.17	0.28	0.11
Within Groups	819.47	450	1.82			
Total	821.62	451				
Flexibility (FX)						
Between Groups	8.57	1	8.57	5.15	0.02*	0.23
Within Groups	749.04	450	1.66			
Total	757.61	451				

*Significant at the $p<.05$ level of significance.

Table 2

Percentage of individuals meeting minimal physical activity guidelines: Low and high curriculum diversity groups (N=452)

Area/Group	*N*	*N Met*	%
Cardiovascular Endurance (CV)			
Low Curriculum Diversity	161	84	52%
High Curriculum Diversity	291	181	62%
Muscular Strength/Endurance (MS)			
Low Curriculum Diversity	161	73	45%
High Curriculum Diversity	291	131	45%
Sport Participation (RS)			
Low Curriculum Diversity	161	22	14%
High Curriculum Diversity	291	40	14%
Flexibility Exercise (FX)			
Low Curriculum Diversity	161	27	17%
High Curriculum Diversity	291	67	23%

Note: Percentage meeting minimal recommended guidelines for physical activity as established by ACSM (Pollock, et al., 1998).

Table 3

Means and standard deviations for reported physical activity: High and low curriculum diversity groups (N=452).

Activity Area	*N*	*M*	*SD*
Cardiovascular Endurance (CV)			
Low Curriculum Diversity	161	2.70	1.64
High Curriculum Diversity	291	3.01	1.56
Muscular Strength/Endurance (MS)			
Low Curriculum Diversity	161	1.55	1.59
High Curriculum Diversity	291	1.59	1.51
Sport Participation (RS)			
Low Curriculum Diversity	161	0.96	1.27
High Curriculum Diversity	291	1.06	1.39
Flexibility Exercise (FX)			
Low Curriculum Diversity	161	0.06	1.07
High Curriculum Diversity	291	0.89	1.40

Note: Measured in days per week reporting activity meeting recommended guidelines for physical activity as established by ACSM (Pollock, et al., 1998).

of instructional time was spent on team sports units with 312 respondents identifying this area as the primary emphasis of high school physical education curriculum. Physical conditioning was reported as the primary emphasis by 79 respondents and 53 respondents reported individual activities as the primary focus. Aquatics (12), outdoor adventure (5) and rhythmic activities (3) were reported to be the lowest emphasized areas by respondents. A summary of curriculum emphasis results is listed in Table 4.

Table 4

Summary of rankings of curriculum emphasis in high school physical education (N=452).

Content Area	*N*	Emphasis Ranking* 1	2	3	4	5	6
Aquatics	89	0	12	24	43	7	3
Individual Activities	334	53	154	445	9	3	0
Physical Conditioning	335	79	142	102	10	1	1
Outdoor Adventure Activities	34	5	6	10	10	3	0
Rhythmic Activities	66	3	9	11	33	8	2
Team Activities	426	312	82	30	2	0	0

Note: *Rankings on 1 to 6 scale with 1 indicating primary emphasis.

Discussion

Participants in this study who completed high school physical education courses with a diverse curriculum reported higher levels of physical activity in cardiovascular endurance, muscular strength/endurance, flexibility and sports participation than individuals who completed courses with less curricular diversity. Significant differences were found between groups for performance of cardiovascular endurance and flexibility exercise. Therefore, based on the results of this study, providing more diverse curriculum experiences to high school students in physical education may lead to higher levels of young adult physical activity. However, it should be noted that analysis of variables resulting in significance revealed small effect sizes (*d=.19, .23)*. This could indicate that differences would be

too small to be meaningful and would not demonstrate a significant impact. It is difficult to evaluate these effects since so few studies have measured similar variables. Trudeau and Shephard (2005) in a review of literature concerning the impact of physical education programs on adult activity reported only one longitudinal study examining similar variables. Glass, McGaw and Smith (1981) also indicated that effectiveness may only be interpreted in relation to other interventions that seek to produce the same effect and that practical significance may depend upon relative costs and benefits. Therefore, based upon the limited literature available, it is difficult to interpret the strength of findings of this study.

Results do provide a clear justification for the re-examination of curriculum content in high school physical education. Increasing the diversity of activities offered to students is associated with minimal costs, as additional staffing is not required but merely a broadening of the curriculum. As noted in previous research, curriculums have consistently been devoid of certain types of activities which could be of interest to students (Dodds, 1985). In this study the lack of exposure to aquatics, outdoor adventure and rhythmic activities was evident with only 8-20% of students having any exposure to these types of activities. The addition of some units may involve additional costs for equipment or transportation, but in exchange for the potential benefits of increasing physical activity in adults, the costs may be minimal in comparison to benefits. The health care costs for the treatment of conditions related to inadequate amounts of physical activity are currently estimated to be over 117 billion dollars per year (CDC, 2005). If providing a more diverse curriculum in high school physical education can produce even a small effect on increasing adult physical activity, a significant impact on decreasing these costs could be the result.

Findings also reinforce a trend noted by multiple researchers in evaluations of high school physical education, the dominance of team sport (AAP, 1987; Burgeson et al, 2003; McKenzie, Alcaraz & Sallas, 1994; Napper-Owen, Kovar, Ermler & Mehrhof, 1999; NASBE, 1997; Sallis & McKenzie, 1991). In this study 94% of respondents indicated that team sports were a component of high school physical education classes with 69% indicating this content area as the primary focus. The examination of current activity levels, however, demonstrated that young adults only engage in this type of activity an average of one day per week. This trend is despite the availability of extensive intramural sports programs on both campuses investigated. These findings indicate that curricular relevance may be missing from high school physical education. Research on student learning indicates that if the content of curricular interventions is irrelevant, it is unlikely that connections will be made (Jensen, 1998). By expanding the curriculum diversity of high school physical education, students may discover types of physical activity that will facilitate motivation to continue participation beyond the school setting.

It should also be noted that curriculum diversity is only one potential determinant of adult physical activity. The complexity of factors related to adult physical activity is multi-faceted and considerable research is needed. The development of instrumentation to evaluate physical activity using objective measures could provide much needed validity to activity measurements. Additional research into instructional methodology, teacher-student interaction and gender differences may also provide insight into motivational factors effecting adult activity. Follow up studies to investigate the impact of state mandates may also provide insight for investigators and educators to truly evaluate the impact that high school physical education has on the development of the physically educated person.

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