International Journal for Innovation Education and Research

ONLINE ISSN: 2411-2933 PRINT - ISSN: 2411-3123

Physical Activity, Lesson Context and Teacher Behavior in Large Physical Education Classes

Michael K. Gross

Abstract

With the advent of national and international concern about children's decreasing activity levels, a number of interventions have been put in place that aim to promote cardiovascular health. These include national trials such as CATCH (Perry, Sellers, & Johnson, 1997) and SPARK (Sallis, McKenzie, Alcaraz, Kolody, Faucette, & Hovell, 1997). At a more programmatic level, there has been increasing attention towards the expansion of school physical education, dissuading children from pursuing sedentary activities, providing suitable role models for physical activity, and making activity-promoting changes in the environment (Council on Sports Medicine and Fitness, 2006).

Keyword: Physical Activity, Lesson Context, Teacher Behavior

Published Date: 12/31/2018 **Page.84-90** **Vol 6 No 12 2018**

DOI: https://doi.org/10.31686/ijier.Vol6.Iss12.1253

Physical Activity, Lesson Context and Teacher Behavior in Large Physical Education Classes

Michael K. Gross
Associate Clinical Professor, Department of Kinesiology
Auburn University Montgomery, USA

Abstract

With the advent of national and international concern about children's decreasing activity levels, a number of interventions have been put in place that aim to promote cardiovascular health. These include national trials such as CATCH (Perry, Sellers, & Johnson, 1997) and SPARK (Sallis, McKenzie, Alcaraz, Kolody, Faucette, & Hovell, 1997). At a more programmatic level, there has been increasing attention towards the expansion of school physical education, dissuading children from pursuing sedentary activities, providing suitable role models for physical activity, and making activity-promoting changes in the environment (Council on Sports Medicine and Fitness, 2006).

While most children in the United States receive a modest weekly allocation of physical education, (with the USDHHS, 1996 reporting that at any time, approximately 40% of American students are not enrolled in PE), some states do have required daily physical education. The downside of this initiative is that physical education specialists receive two (and sometimes three) classes simultaneously.

Research on large classes in physical education is not widespread, but the collective consensus is that size matters. First, class size has been found to be negatively correlated with physical activity (McKenzie, Marshall, Sallis, & Conway, 2000). Second, students in larger classes are particularly negatively affected when equipment is limited (Hastie & Saunders, 1991), and third, smaller class size has been positively associated with intrinsic motivation (Li, Duncan, Duncan, Harmer, & Adcock, 1997). From a teachers' perspective, physical educators in Texas report that the top-ranked barrier to quality physical education was large class size (Barroso, McCullum-Gomez, Hoelscher, Kelder, & Murray, 2005). Further, California teachers suggest that class size was an important profession-related variable to consider regarding their attitudes toward the Fitnessgram (Ferguson, Keating, Bridges, Guan, & Li, 2007). As a general synopsis, teaching large classes in physical education can lead to feelings of marginalization and powerlessness over students, thereby constraining implementation of quality program (Fraser-Thomas & Beaudoin, 2002; Hastie, Sanders, & Rowland, 1999).

The purpose of this study is to provide additional data on the impact of large class size on various indicators of students' engagement in physical activity. These indicators included (i) accumulated physical activity, (ii) lesson context (how physical education subject matter is delivered), and (iii) teacher behavior (indicated as specific teacher verbal and nonverbal interactions regarding the promotion of physical activity and fitness).

Method

Instrument

The System for Observing Fitness Instruction Time (SOFIT) instrument (McKenzie, Sallis, & Nader, 1991) was used in this study. It is a momentary time sampling and interval (every 20 sec) recording system designed to quantify physical activity levels and the opportunities children and youth have for physical activity in physical education classes. Several studies have shown that the SOFIT instrument produces reliable and valid scores in the populations in which it has been used (McKenzie et al., 1991; McKenzie, Strikmiller, et al., 1994; Rowe, Schuldheisz, & van der Mars, 1997; Rowe, van der Mars, Schuldheisz, & Fox, 1997). The SOFIT instrument also has been used in numerous studies related to physical activity participation (e.g., McKenzie et al., 1995; McKenzie et al., 1996; McKenzie, Sallis, Faucette, Roby, & Kolody, 1993; McKenzie, Strikmiller, et al., 1994). The SOFIT is conceptualized as a 3-phase decision system: (a) the first phase of the decision sequence involves coding student physical activity levels, (b) the second phase of the decision sequence involves coding for the curricular lesson context, and (c) the third phase of the decision sequence involves coding the teacher's interactions of promoting physical activity (McKenzie, 2006). Student activity levels were coded into 1 of 5 categories: (1) lying, (2) sitting, (3) standing, (4) walking, and (5) very active. Lesson context was categorized into 6 areas in reference to how physical education subject was being delivered. Management (M), referred to lesson time when students were not intended to be involved in physical education content. This included transition, management and break times. Knowledge (K) was related to lesson time when the primary focus was on student knowledge acquisition related to physical education, not activity engagement. Fitness (F), was time allocated to activities whose major purpose was to alter the physical state of the individual in terms of cardiovascular endurance, strength, and flexibility. Skill Practice (P), was time devoted to practice of skills with the primary goal of skill development. Game Play (G), was time devoted to the application of skills in a game or competitive setting. Free Play (O) referred to free playtime where physical education instruction was not intended. Teacher Interaction focused on the verbal and nonverbal interactions of the teacher during the lesson and fell into 3 categories: (a) promotes in-class (I) physical activity, promotes out-of-class (O) physical activity, or no (N) promotion of physical activity during class.

Participants

Participants in this study were 9 physical education pedagogy teachers and over 1280 children from 9 elementary schools in a southeastern United States school system, where physical education is mandated five days per week. To avoid a possible violation of the independence of observations, the unit of analysis in this study was the class (see Silverman & Solmon, 1998). The children were in either third (14), fourth (11) or fifth grades (5), and were in classes as large as 78 or as small as 26 (average = 42.7). Classes were stratified into five categories based on the number of students in the physical education period: less than 29 (6 classes), 30-39 (six classes), 40-49 (nine classes), 50-59 (five classes) greater than or equal to 60 (three classes).

Data collection

Data was collected in two time segments. Five schools were observed during the latter part of the Fall semester and 5 schools were observed in the latter part of the Spring semester of a calendar school year. Three classes at each school were observed per visit and data collection was anonymous and non-invasive (names were not recorded and the observer did not interact with the students at any point during the data collection). To ensure observer accuracy, a trial was performed on two classes at a school that was not part of the data collection. A digital watch, programmed to 20 second intervals, was used to ensure proper time segments. The 20 second segment consisted of 10 seconds of beeps from the digital watch followed by 10 seconds of silence. During the 10 seconds of beeps, the observer observed student behavior and recorded the student behavior during the 10 seconds of silence. To prevent the observer from skipping a 20 second interval during the observation, the SOFIT Recording Form was coded with the starting and ending time of each class (e.g. 9:05 – 9:35) and each 4-minute observation window was coded with the time (e.g. 9:09, 9:13, 9:17, 9:21, 9:25, 9:29, 9:33). A separate digital watch was used to ensure observer was on appropriate time segment.

Five students were selected at the beginning of class as they entered the gymnasium or classroom using a sampling order of 5^{th}, 10^{th}, 15^{th}, 20^{th}, and 25^{th} student to enter. An alternative sampling order was used for smaller classes (4^{th}, 8^{th}, 12^{th}, 16^{th}, and 20^{th}). The 5^{th} student was selected as an alternative in the event a student had to leave the lesson. The sampling order was manipulated; by plus or minus one placement in the entrance order, if necessary, to ensure that 2 boys and 2 girls were selected for observation. Each student was observed for 4 minutes (12 observational intervals) in a rotational pattern throughout the physical education class period. Observation ceased when the students were dismissed from the physical education specialist or class time expired. Data was collected from 3 classes at each school.

Data Analysis

Descriptive statistics are reported for each class size stratification. A one-way ANOVA was used to determine differences in SOFIT variables between the five class stratifications. The five class stratifications served as the independent variable and classes' physical activity level (percentage of time spent in MVPA), lying, sitting, standing, walking and active), lesson context [percentage of time spent in management, knowledge content and motor content (fitness, skill play, practice and other)], the number of times a teacher promoted in class activity and out of class activity and class length served as the dependent variables. Tukey-HSD for multiple comparisons was the post-hoc analysis. Alpha level was set at .05 a priori. Data was analyzed with SPSS version 16.

Results

Descriptive statistics are shown in Table 1. The out of class activity prompt only occurred once and in a class with 30-39 students. The ANOVA results showed that the percentage of time spent in management was statistically different between the class size stratifications (p = .001). Post-hoc analysis showed that there were significant differences between classes with less than 29 students and classes with 40-49 (p=.040), 50-59 (p=.003) and greater than 60 students (.006). Meaning classes with 29 students or

less spent significantly less time in management activity than classes with more than 40 students. There was also a significant difference in class length. Post-hoc analysis showed that classes with <29 students had a shorter physical education period than classes of 40-49 (p = 000), 50-59 (p = .001) and >60 (p = .000) and classes with 30-39 students had a shorter physical education period than classes of 0-49 (p = .027), 50-59 (p = .034) and >60 (p = .014). There were no other significant differences. ANOVA results are shown in Table 2.

Practical Implications

Looking at the results, the three areas of significance are: time spent sitting increases as class size increases, MVPA decreases as class size increases and management time increases as class size increases. Other areas of note: physical education classes > 60 students spends a lot of time in games and class physical activity length increases with class size. The purpose of this study is to provide additional data on the impact of large class size on various indicators of students' engagement in physical activity and as it might be assumed, larger classes do have an adverse impact on quality physical education. These areas of significance provide a measure of understanding for present pedagogy professionals and pedagogy majors in providing quality physical education lessons.

If time spent sitting increases as class size increases, it is important that pedagogy professionals remains cognizant of this problem and makes appropriate adjustments relevant to each class period. As no two physical education class periods are the same,

References

American Alliance for Health, Physical Education, Recreation and Dance. 2001. National Association for Sport and Physical Education, Status of Physical Education in the USA: Shape of the Nation Report: Reston, VA.

Barroso, C. S., McCullum-Gomez, C., Hoelscher, D. M., Kelder, S. H., & Murray, N. G. 2005. Self-reported barriers to quality physical education by physical education specialists in Texas. *Journal of School Health, 75*, 313-319.

Council on Sports Medicine and Fitness and Council on School Health. 2006. Active healthy living: Prevention of childhood obesity through increased physical activity. *Pediatrics, 117* (5), 1834-1842.

Ferguson, R. H., Keating, X. D., Bridges, D. M., Guan, J., & Li, C. 2007. California secondary school physical education teachers' attitudes toward the mandated use of the Fitnessgram. *Journal of Teaching in Physical Education, 26*, 161-176.

Fraser-Thomas, J. L., & Beaudoin, C. 2002. Implementing a physical education curriculum: Two teachers' experiences. *Canadian Journal of Education, 27*, 249-268.

Hastie, P. A., Sanders, S. W., & Rowland, R. S. 1999. Where good intentions meet harsh realities: Teaching large classes in physical education. *Journal of Teaching in Physical Education, 18*, 277-289.

Hastie, P. A., & Saunders, J. E. 1991. Effects of class size and equipment availability on student involvement in physical education. *Journal of Experimental Education, 59*, 212-224.

Keating, X.D., Kulinna, P.H., & Silverman, S. 1999. Measuring teaching behaviors, lesson context, and physical activity in school physical education programs: comparing the SOFIT and the C-SOFIT instruments. *Measurement in Physical Education & Exercise Science, 3*(4), 207-220.

Li, F., Duncan, T. E., Duncan, S. C., Harmer, P., & Acock, A. 1997. Latent variable modeling of multilevel intrinsic motivation data. *Measurement in Physical Education & Exercise Science, 1,* 223-244.

Luepker, R.V., Perry, C. L, & McKinlay, S. M. 1996. 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*(10), 768-776.

McKenzie, T. L. 2006. SOFIT: (System for Observing Fitness Instruction Time) Generic description and procedures manual. San Diego, CA: Department of Exercise and Nutritional Sciences, San Diego State University.

McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. 2000. Student activity levels, lesson context, and teacher behavior during middle school physical education. *Research Quarterly for Exercise and Sport, 71*, 249-259.

McKenzie, T. L., Sallis, J. F., Elder, J. P., Berry, C. C., Hoy, P. L., Nader, P. R., Zive, M. M., & Broyles, S. L. 1997. Physical activity levels and prompts in young children at recess: A two-year study of a bi-ethnic sample. *Research* Quarterly *for Exercise and Sport, 68,* 195-202.

McKenzie, T. L., Sallis, J. F., & Nader, P. R. 1991. The SOFIT instrument: System for observing fitness instruction time. Journal of Teaching in Physical Education, 11, 195-205.

Perry C. L., Sellers, D. E., & Johnson, C. 1997. The child and adolescent trial for cardiovascular health (CATCH): Intervention, implementation and feasibility for elementary schools in the United States. *Health Education Behavior. 24*, 716-735.

Richardson, V. 2001. Handbook of research on teaching, (4th ed.), Educational Research Association: Washington, D.C., 491-519.

Rowe, P.J.; Schuldheisz, J.M.; van der Mars, H. 1997. Validation of SOFIT for measuring physical activity of first- to eighth-grade students. Pediatric Exercise Science, *9*, 136-149.

Sallis, J. F., McKenzie, T. L., Alcaraz, J. E., Kolody, B., Faucette, N., & Hovell, M. F. 1997. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. Sports, Play and Active Recreation for Kids. *American Journal of Public Health, 87*, 1328-1334.

Sammann, P. 1998. *Active Youth: Ideas For Implementing CDC Physical Activity Promotion Guidelines.* Champaign, IL: Human Kinetics

Silverman, S., & Solmon, M. 1998. The unit of analysis in field research: issues and approaches to design and data analysis. *Journal of Teaching in Physical Education, 17*, 270-284.

Sproule, J., McMorris, T., & Lockwood, A. 2000. Size matters. *British Journal of Teaching Physical Education, 31*(4), 24-25.

Table 1. Descriptive Results						
	Class Size					
	<29	30-39	40-49	50-59	>60	Total
Class Length	28.71±1.61	33.33±2.58	41.33±5.77	42.26±4.20	45.00±8.87	37.60±7.35
Lying	1.50±2.34	0	.11±.33	.40±.89	1.33±1.15	.55±1.27
Sitting	15.50±23.27	20.66±21.05	31.67±19.38	26.00±24.97	52.67±15.01	27.24±22.42
Standing	28.33±15.80	46.83±22.23	44.44±18.08	58.80±26.38	36.00±15.58	43.20±21.04
Walking	24.17±15.16	17.00±7.53	34.44±2429	28.40±16.31	33.33±24.34	27.55±18.58
Active	16.67±4.17	12.50±12.50	13.33±9.46	13.20±6.61	11.67±7.77	13.65±7.35
MVPA	46.92±15.73	33.10±25.03	36.48±21.27	31.94±12.19	30.95±19.05	36.58±19.11
Management	14.83±1.60	24.33±10.40	30.44±9.01	39.60±10.21	41.33±17.89	28.65±12.85
Knowledge	8.16±5.87	18.00±14.46	12.33±14.51	9.60±7.23	9.0±6.24	11.82±11.26
Fitness	21.33±27.68	28.33±19.53	19.77±6.53	24.20±9.81	20.67±10.69	22.72±15.81
Skill	7.50±13.08	0	25.00±15.09	11.20±21.84	17.33±30.02	13.03±17.88
Game	34.33±27.90	24.00±30.60	22.56±24.17	15.20±22.21	46.67±43.11	26.51±29.66
Other	0	2.33±5.71	13.89±18.82	27.00±39.21	0	9.44±20.67
In of class activity prompt	33.83±11.58	40.00±14.75	31.7±22.00	29.00±21.50	35.00±18.33	33.76±17.47
Out of class activity prompt	0	.16±.40	0	0	0	0

Table 2. ANOVA results		
	F	*p*
Class Length	11.04	.000*
Lying	.591	.672
Sitting	1.771	.168
Standing	1.744	.173
Walking	.906	.476
Active	.243	.911
MVPA	.591	.672
Management	6.281	.001*
Knowledge	.677	.615
Fitness	.271	.894
Skill	2.408	.077
Game	.649	.633

Other	1.853	.152
In of class activity prompt	.285	.885
Out of class activity prompt	.952	.452
Note: * denotes significant result		