The Physical Educator Vol. 73 • pp. 757–776 • 2016
https://doi.org/10.18666/TPE-2016-V73-I4-7115

PHYSICAL ACTIVITY

Effects of "Fair Play Game" Strategy on Moderate to Vigorous Physical Activity in Physical Education

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Abstract

Less than 50% of a PE lesson is usually spent in MVPA. A dependent-group contingency strategy, "Fair Play Game," has shown effectiveness in increasing MVPA during PE lessons among students from affluent schools. The purpose of this study was to determine the effectiveness of this strategy on MVPA among students from an underserved community. The Fair Play Game strategy consisted of goal setting, prompts, feedback, and rewards. A single-subject multiple baseline design was applied across two classes of students, throughout 15 soccer lessons. Three students from each class (N = 6) were selected for an individual analysis according to their MVPA level at baseline (low, medium, and high). Students wore a waist-mounted accelerometer during lessons. Students with a low level of MVPA at baseline from Year 8 presented a positive change in trend, level, and percentage of nonoverlapping MVPA data. The intervention was not effective to change MVPA for the other students. The Fair Play Game might be effective in increasing PA levels in students with low levels of activity from undeserved areas. However, the intervention needs to be tailored for each population and applied regularly for the benefits to be expanded to the whole class.

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Only one third of children meet the current recommendation of 60 min of moderate to vigorous physical activity (MVPA) per day in England (Health Survey for England, 2008). Likewise, children from lower socioeconomic status groups tend to engage in lower levels of physical activity (PA; Carlson, Mignano, Norman, McKenzie, & Kerr, 2014) and higher levels of sedentary behavior (Brodersen, Steptoe, Boniface, & Wardle, 2007). Schools are seen as the main setting to encourage PA in children (De Bourdeaudhuij et al., 2011; van Sluijs, McMinn, & Griffin, 2008), and physical education (PE) is considered an ideal opportunity for promotion of regular PA (Sallis & McKenzie, 1991).

In 2000, Healthy People 2010 (U.S. Department of Health and Human Services, 2000) recommended that at least 50% of PE lesson time be spent on MVPA, which has been supported further by the Centers for Disease Control and Prevention (U.S. Department of Health and Human Services, 2010). However, it was found in one review study that middle and high school students spend only 40% of the PE lesson in MVPA (Fairclough & Stratton, 2005).

More recently in an analytical review, Sallis et al. (2012) described new goals for achieving Health Optimizing Physical Education (HOPE), defined as physical education that encompasses curriculum and lessons focused on health-related physical activity and fitness. The authors stated the importance of emphasizing high levels of MVPA during PE lessons. Furthermore, they suggested goals for the next 20 years, including the need for studies on PE to incorporate objective measures to assess MVPA levels and focus on developing low-cost and feasible methods for teachers to assess this accurately in classes (Sallis et al., 2012).

Some researchers have implemented interventions designed to increase MVPA levels during PE lessons. Results from systematic reviews reveal that interventions tend to promote a net increase of 10% in the amount of time spent in MVPA during lesson time (Kahn et al., 2002; Lonsdale et al., 2013). Several strategies have been used successfully to increase MVPA levels during PE lessons including professional learning focused on teacher pedagogy, management and instruction, and adding high-intensity activity to the usual PE lessons (Lonsdale et al., 2013).

One approach that has been shown to be effective in increasing PE students' levels of PA is the "Fair Play Game." The term *Fair Play*

Game is based on the Sport Education Fair Play Code of Conduct (Siedentop, Hastie, & van der Mars, 2011), which addresses students' participation, responsibility, effort, respect, and being a good sport that is helpful and not harmful to others. The development of the strategy was inspired by The Good Behavior Game (Barrish, Saunders, & Wolf, 1969), which aimed to decrease disruptive classroom behaviors in an elementary school. The Fair Play Game is a dependent group contingency strategy to help PE teachers to set goals for social or active behaviors and hold students accountable when working in teams. More specifically, the strategy consists of setting daily goals to teams and awarding points to when teams accomplish them. This is not done to produce competition between teams, but instead to provide a challenge within teams to overcome previous goals. It also includes public posting (i.e., a chart on the wall) of daily goals, teacher's prompts, and feedback about the desired behaviors to be accomplished by the teams. As a dependent group contingency strategy (Cooper, Heron, & Heward, 2007), the Fair Play Game requires the teacher to track one unidentified member of each team's performance against the goal-setting chart related to that particular team. If the unidentified team member accomplishes the daily goal, the team is awarded with a point, a mark, or a smiley face (Vidoni & Ulman, 2012). Every day a different unidentified member is randomly selected. As the selected individual is not identified, this typically results in the whole team making the effort to achieve the daily goal.

More recently, two studies showed positive effects of the implementation of the Fair Play Game (Vidoni, Azevedo, & Eberline, 2012; Vidoni, Lee, & Azevedo, 2014) on middle school students' active behaviors in PE lessons, measured with heart rate monitors and pedometers, respectively. However, despite the Fair Play Game strategy showing positive results in American middle to high socioeconomic class students, there is still a need to examine its effectiveness in a more underserved community, in which lower levels of PA are evident (Brodersen et al., 2007; Stalsberg & Pedersen, 2010).

In addition, the Fair Play Game has not yet been assessed using accelerometers, which provide an objective and more accurate measure of PA than do the previously used monitors (Trost, 2001; Trost, Loprinzi, Moore, & Pfeiffer, 2011). Therefore, the purpose of

this study was to investigate the effects of the Fair Play Game on objectively measured MVPA levels among secondary school students from an underserved area in the United Kingdom with different levels of PA, during PE lessons.

Method

Participants and Setting

Participants were from two classes: Year 8 (12–13 years old) and Year 9 (13–14 years old). They were boys from a secondary school in an underserved area of England, based on the index of multiple deprivation (IMD) and eligibility for free school meals (FSM). IMD is a small-area-based marker of deprivation based on measures of income, employment, health and disability, education, skills and training, barriers to housing and services, crime, and the living environment. Small areas, across England, are ranked from 1 to 32,482, with a rating of 1 indicating the most underserved and 32,482 being the least underserved (Noble et al., 2004). Eligibility for FSM is considered another proxy measure of deprivation. The school recruited for this study is located in an area of IMD of 5,376, therefore in the lowest quintile of deprivation in England. Furthermore, 48% of the students are entitled to FSM compared to an average of 16.3% in the country (Department for Education, 2013).

This study received ethical approval from the School of Health and Social Care at Teesside University (Study No 174/11). Prior to the study, the head teacher of the school received written information and provided informed consent. Twenty-one boys from each class then received an information pack containing a letter to their parent or guardian, an information sheet, a written informed consent form for their parent or guardian, and an assent form for the child. Students who were injured or presented any condition affecting their ability to undertake exercise were ineligible to participate. Eligible students who signed the assent form and returned a completed parental/guardian informed consent form were included in the study. In total, 12 students from Year 8 and nine students from Year 9 agreed to participate.

The school provided two 1-hr PE lessons per week. Because of a previously established curriculum, one PE lesson was allocated to gymnastics, delivered indoors, and the other to soccer, delivered

outdoors. The Fair Play Game study was conducted during 15 soccer lessons taught by the same teacher. Although the lesson content was chosen by the teacher, the option of soccer was appropriate for this intervention because it is an "invasion game." Previous Fair Play Game studies (Vidoni et al., 2012; Vidoni et al., 2014) were also conducted using invasion games (e.g., basketball and handball) as a unit of instruction.

The school PE teacher was also formally invited to participate and signed an informed consent. The PE teacher received training regarding the daily procedures of the intervention and a booklet including major components of the intervention, followed by a question and answer segment. The PE teacher had 8 years of teaching experience in PE including 5.5 years in this school.

Research Design

This study used a single-subject multiple baseline design across two classes (Cooper et al., 2007) to assess the effects of a dependent group contingency strategy, Fair Play Game, on students' PA levels during PE lessons. This design was chosen to examine the effect of the intervention among individual students and in two classes. Baseline data were collected in two classes in a staggered fashion to verify if the change on students' number of steps (used for goal setting) and percentage of lesson spent in MVPA were effected by the intervention. An extended baseline for Year 9 enabled repeated measures of students' levels of MVPA during the baseline (i.e., typical teaching) and intervention phases. This design has been used in general and adapted PE and in sport and PA interventions (Holt, Kinchin, & Clarke, 2012; Jull & Mirenda, 2016; Lieberman, Dunn, van der Mars, & McCubbin, 2000; Patrick, Ward, & Crouch, 1998; Samalot-Rivera & Porretta, 2013; Todd, Reid, & Butler-Kisber, 2010; Vidoni et al., 2014). Students in Year 8 started the intervention in their fifth soccer lesson, and those in Year 9 began the intervention in their 11th soccer lesson.

Procedures

The same PE teacher taught soccer lessons to both classes once a week for 15 weeks. The PE lesson lasted for 1 hr, but the active part of the lesson lasted for approximately 40 min. The lessons took place on an outdoor soccer field (approximately size: 100 m length and 60 m

width), during the end of autumn and throughout the winter season, and consisted of approximately: (a) 10 min of warm-up, (b) 15 min of drills, (c) 10 min of game, and (d) 5 min of closure.

In the first day of the soccer unit of instruction, the PE teacher divided the students from each class into four teams with five students on each team. Each team had a minimum of two and a maximum of three students who were participating in the study. The teacher explained that the participants would wear an accelerometer, which would measure their PA and steps during the lesson. The students were instructed to wear the accelerometer around the hip during the PE lesson. One accelerometer was assigned for each student, and they used the same accelerometer throughout the 15 lessons.

Baseline condition. The teacher taught typical soccer lessons during the first four days for the Year 8 class and 10 days for the Year 9 class. Participants were asked to wear the accelerometers, but goals were not established and there was no reinforcement in relation to effort.

Intervention. During the intervention, students were exposed to the Fair Play Game intervention package. The package consisted of the following:

- Goal setting: A chart was posted on the wall with information about goals set and goals achieved. The first goal was based on the average number of steps (measured by accelerometers) that the class took during the baseline condition.
- Prompts: The teacher prompted the students at the beginning of the lesson to "give their best effort" to increase the number of steps taken during the lesson. Examples of prompts used are "Let's go, let's go!," "Keep moving!," and "Pass and run!" During lesson closure, the teacher asked students to provide examples of how they could demonstrate effort during lessons, and students came up with the following ideas: moving on the field, passing the ball, engaging with their team, and avoiding staying still. Specifically, prompts were delivered at the beginning of each lesson segment (warm-up, practice and game, and closure). There was no control of how many prompts were delivered because the lesson was not videotaped, but at least one prompt was provided as a reminder at the beginning of each segment.

- Unidentified student: The teacher explained that one unidentified student per team would be monitored, and if this student accomplished the goal, the whole team would be awarded with a "YES" mark on the chart.
- Reinforcement: At the end of the lesson, the teacher pinpointed good examples of the students' active behaviors that were observed during the lesson, for example, staying active around the field, fast passes, getting the ball quickly when it went out of the field, and rapid transitions for defense or attack.
- Feedback: At the following PE lesson, the teacher then reviewed progress against the goal set on the chart. If the team achieved the goal, this was further increased by 200 steps for the current lesson, otherwise it remained the same.
- Reward: By the end of the 15-week observation period, each child from the teams that achieved 80% of the goals was rewarded with a Teesside University indoor soccer ball.

Social Validity

At the end of the intervention, all participants in the study, including the teacher, were invited to complete a social validity questionnaire (Vidoni et al., 2014). This was used to assess participants' acceptability of the behaviors that were reinforced, the procedures used, and social importance (Cooper et al., 2007).

The teacher was asked five questions related to the Fair Play Game strategy implementation: (a) if it was effective in increasing students' engagement in PE, (b) if it was complicated to implement, (c) if it impinged on the time needed for their usual PE instruction, (d) if it was an acceptable strategy to be used in all types of PE classes, and (e) if he would use the strategy in future classes. Responses to these questions were open-ended written comments.

The student questionnaire was anonymous and had four open-ended questions: (a) if they liked participating in the Fair Play Game and why, (b) if it was important to give the best effort during PE and why, (c) if their teammates showed their best effort during the lessons and why, and (d) what they did to show their best effort during the lessons.

Treatment Integrity

During the intervention, a checklist was used to verify the treatment integrity. The checklist for the first lesson included (a) if the teacher talked about best effort in the lesson, (b) if the teacher asked the students about examples of effort in the lesson, (c) if the teacher explained the chart on the wall, and (d) if the teacher explained that only one unidentified student per team would be targeted.

During the remaining lessons the checklist consisted of (a) reminding the students that one team member would be tracked, (b) prompting students to show their best effort during lessons, (c) giving feedback about good examples of effort during lessons, and (d) adding the result of the previous lesson to the chart. The checklist was completed by one of the researchers in all the sessions, and reliability was checked by a second researcher during 40% of the lessons.

Data Recording, Measures of the Dependent Variables and Analysis

Number of steps and MVPA were recorded using Actigraph GT1M accelerometers (Pensacola, FL, USA) during all lessons. Actigraph GT1M has been shown to provide a reliable measurement of counts and steps (Silva, Mota, Esliger, & Welk, 2010). Accelerometer data were recorded in every lesson at 15-s epochs, and accelerometers were set to initiate at the beginning of the PE lesson and stop at the end of the lesson. The exact start and finish times of the lessons were recorded manually by the researcher. Data were processed after each lesson, and the number of steps was checked for the selected participant in each team to establish if the goal was achieved.

Data were processed with Actilife (6.5.4) software (Actigraph, LLC, Pensacola, FL) and filtered to the period of each lesson. Evenson cut points (Evenson, Catellier, Gill, Ondrak, & McMurray, 2008) were applied to estimate MVPA during the lessons. These cut points are considered the most accurate to estimate time spent at different exercise intensities in children and adolescents from 5 to 15 years old (Trost et al., 2011). To account for variation in lesson time, results are presented as a percentage of lesson time in MVPA. The lesson time was recorded for each session. This consisted of the time between the beginning of warm-up to the end of the game, before the teacher provided the feedback for the students.

Only participants who attended a minimum of 80% of the lessons were included in the analysis. Three subjects from each class were selected for a single-subject analysis. The participants were selected according to their mean time spent in MVPA per lesson at baseline. The groups were subdivided as low, medium, and high MVPA, defined by the standard deviation of the mean: Low MVPA, < 0.3 *SD*; Medium MVPA, $\pm$ 0.3 *SD;* and High MVPA, > 0.3 *SD*. Participants from each category with the highest number of attendance were selected. A line graph was produced in which percentage of lesson time in MVPA in each session was plotted as a single datum point and connected to subsequent points throughout lessons. Results were analyzed as within and between conditions (baseline and intervention) for the three selected individuals in each class. Analyses of trend, level, and stability of the graphical data were based on the guidelines suggested by Lane and Gast (2014).

Results

The intervention was applied as planned in all the lessons. Interobserver reliability of treatment integrity showed 100% agreement across 40% of lessons.

Nine (out of 12 participating) students from Year 8 and seven (out of 9 participating) students from Year 9 attended 80% of the lessons and were included in the study. On average, the Year 8 participants ($n = 9$) increased MVPA from baseline to intervention from 41.7% to 49.1% (7.4% difference). Likewise, Year 9 participants ($n = 7$) increased MVPA from 49.7% at baseline to 58.3% at intervention (8.7% difference).

The Year 8 class had the set target of 1,800 steps for the first lesson. After 11 lessons, the target went up to 3,600 steps for one team (met the goal in 10 of 11 lessons, 91% of the goals accomplished). Two teams reached 3,400 steps (met the goal in nine of 11 lessons, 82% of the goals accomplished), and one team reached 3,200 steps (met the goal in eight of 11 lessons, 72% of the goals accomplished). For the Year 9 class, the first target was set as 2,700 steps. After five lessons, the target was raised to 3,100 steps for three teams (met the goal in four of five lessons, 80% of goals accomplished) and 2,900 steps for one of the teams (met the goal in three of five lessons, 60% of goals accomplished).

Figures 1 shows the percentage of lesson at MPVA of six participants with low, medium, and high MVPA at baseline from Years 8 and 9. As explained in the Method section, the selection of participants in each category was defined by standard deviation from the mean and based on highest attendance.

Low MVPA

Results from the visual analysis using the method suggested by Lane and Gast (2014) show that the participant with low MVPA from Year 8 presented a variable but positive change in trend (decelerating–deteriorating to accelerating–improving) and improvement in level between baseline and intervention. Likewise, there was a large magnitude of change confirmed by the percentage of nonoverlapping data (PND = 100%).

The participant with low MVPA from Year 9 showed a continuous positive pattern of trend direction (accelerating–improving), which did not change between the baseline and intervention periods, and there was a low PND (40%) between conditions. However, data appeared to improve in stability during the intervention (within stability envelope: baseline = 55.5% and intervention = 80%).

Functional relation is demonstrated when a controlled experiment shows that the change in the dependent variable is a reliable outcome of the specific manipulations of the intervention, rather than confounding variables (Cooper et al., 2007). Results from Figure 1 and visual analysis interpretation show that despite the positive change between the baseline and intervention phases for the low MVPA Year 8 student, a weak functional relation is demonstrated for low MVPA students given the lack of consistency during the replication with the low MVPA Year 9 student.

Medium MVPA

Results from the visual analysis (Lane & Gast, 2014) suggest that the participant with medium MVPA from Year 8 showed a positive pattern of change in trend (decelerating–deteriorating to accelerating–improving) and level. However, there was a low magnitude of change (Medium PND = 27.3%). In contrast to the Year 8 student, the participant with medium MVPA from Year 9 showed a negative trend, moving from accelerating–improving to decelerating–deteriorating and minimum or negative change in

level and PND. Therefore, based on Figure 1 and the visual analysis interpretation, a functional relation was not demonstrated for the medium MVPA students.

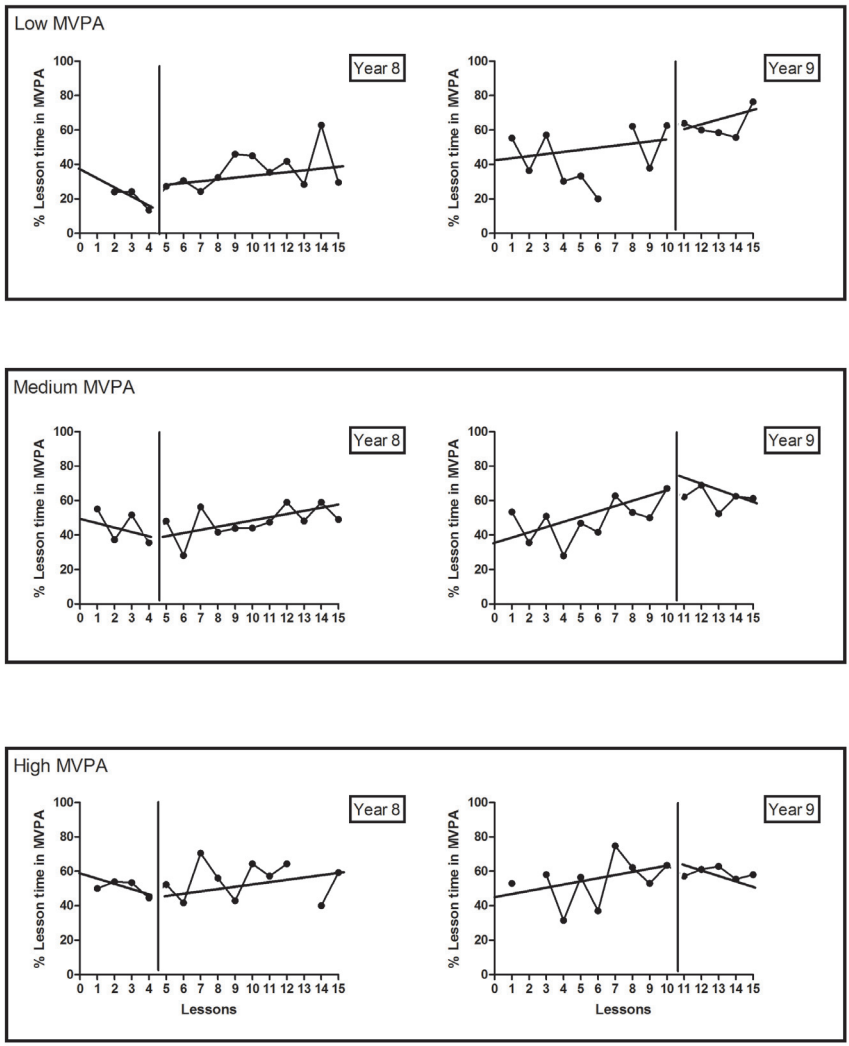

Figure 1. Percentage of lesson time in MVPA in children with low, medium, and high MVPA at baseline based on attendance. Missing points indicate absence in lesson.

High MVPA

The participant with high MVPA from Year 8 showed nearly the same positive pattern of change in trend (decelerating–deteriorating to accelerating–improving) compared to the low and medium MVPA participants. However, there was a relatively low magnitude of change (High PND = 60%). In contrast to the Year 8 student, the participant with high MVPA from Year 9 showed a negative trend, moving from accelerating–improving to decelerating–deteriorating and a negative change in level and 0% PND. Therefore, the results from Figure 1 and visual analysis interpretation (Lane & Gast, 2014) show that a functional relation cannot be confirmed for the high MVPA students.

Social Validity Questionnaires

Teacher's responses. The acceptability of the strategy was verified by the social validity questionnaire. The teacher responded that the Fair Play Game helped students to extend their levels of engagement in the lessons. He reported that the strategy was not complicated; however, PE teachers might have other learning targets rather than fitness. The teacher felt that the Fair Play Game strategy took time away from learning soccer technique and knowledge. He reported that the use of accelerometers as a strategy would not be effective if the focus of the lesson was on teaching skill, development, and tactics. However, the teacher responded that he would use Fair Play Game strategy again to help some students to increase their engagement in the lesson.

Students' responses. Twenty students responded to the questionnaire (12 students from Year 8 and eight students from Year 9). All students responded that they liked participating in the study. The majority of the students responded that Fair Play Game was fun and challenging. Other students responded that they liked knowing the number of steps taken and that they got to play more soccer.

The majority of students responded that being told to "give your best effort" in PE class is important because it helped them to be fit and move more. The majority of students reported that their teammates showed their best effort in the PE classes. Other students responded that some teammates did not give their best effort because they were not participating in the study. Students responded that to

show their effort they did not stop jogging or running during the lesson, they tried harder, and they also accomplished the tasks proposed by the teacher.

Discussion

The purpose of this study was to investigate the effect of a group contingency strategy, Fair Play Game, using accelerometers. The researchers also examined for the first time the effects of the Fair Play Game strategy on PE students from an underserved area outside the United States. Single-subject analysis revealed that the Fair Play Game intervention showed a positive but weak treatment effect on low active participants. Students with medium and high MVPA did not show positive changes between baseline and intervention phases.

The results from this study do not support the findings of previous studies in which the Fair Play Game strategy has been applied in PE classes (Vidoni et al., 2012; Vidoni et al., 2014). Several reasons might explain these differences in results. One possible reason is that the intervention was only delivered on 1 day/week. Therefore, the intervention took 3 months to complete because of several school breaks. In previous studies (Vidoni et al., 2012; Vidoni et al., 2014), students were exposed to daily PE lessons; therefore, the intervention was delivered continually. It is known that dose (intensity, frequency, and duration) of delivering school-based PA is an important determinant of practice efficiency (Sun et al., 2013). Although the duration of the actual intervention was similar to that in other interventions (14 to 17 days, 35 to 45 min long), the frequency at which it was delivered (weekly) was considerably lower in this study compared to previous studies.

Another possible reason was that the soccer lessons were delivered on an outdoor soccer field during the winter season, whereas in previous studies similar interventions were delivered in a gymnasia (Vidoni et al., 2012; Vidoni et al., 2014). Although prompts, feedback, and goal settings were provided in the same manner as in previous studies, the varied weather conditions might have affected students' participation in the classes. It has been stated that environmental variables in specific weather need to be considered when developing PA interventions (Tucker & Gilliland, 2007), and poor weather has been identified as a barrier to being physically active (Belanger, Gray-Donald, O'Loughlin, Paradis, & Hanley, 2009). Furthermore,

despite the researchers' efforts to provide prompts in a consistent manner, they did not recorded the number of prompts provided. The lack of information concerning the number of prompts delivered during the lesson is a limitation of this study. Vidoni and Ward (2009) found that when the teacher did not deliver prompts, the occurrence of target behaviors decreased compared to when the teacher frequently delivered prompts. In addition, in previous studies the participants were from schools located in middle to high socioeconomic areas in the United States, whereas in this study the school was located in an underserved area of England. Previous studies performed in America show that children attending schools in high socioeconomic areas have 4.4 min/day more of MVPA compared to children who attend schools in low socioeconomic areas (Carlson et al., 2014). Similarly, British adolescents (11–12 years old) from low socioeconomic areas present higher levels of sedentary behavior compared to children from affluent areas (Brodersen et al., 2007). Therefore, the unsuccessful results seen in this study might be partly associated with a population that is potentially more physically inactive and therefore might require different triggers to change their behaviors.

The number of students involved in this study was low compared to that in previous studies (Vidoni et al., 2012; Vidoni et al., 2014). Less than 60% of the students from the Year 8 class and 40% of students from the Year 9 class agreed to participate in the study. Although researchers explained the importance of the study and mentioned the incentive at the end, few students provided the signed parental/guardian informed consent. Considering that goals were set to individuals within a team and that not all students in the team were participating in the intervention, this might have prevented individuals who were participating in the study from showing their best effort. Perhaps if all participants were placed within the same groups it would encourage their team affiliation and would affect the results.

Similarly, it is important to note that only one teacher responded to the social validity questionnaire, and his views might not be representative of most teachers' opinions. The PE teacher emphasized that "not all PE lessons are about fitness." It is known that the goals of PE are wider than fitness and include improvement of motor competen-

cies, knowledge of principles and concepts, and development of personal and social skills (National Association for Sport and Physical Education & American Heart Association, 2012). However, this intervention was limited to target MVPA in PE classes. Although the intervention package was implemented as planned (fidelity of treatment), it could be suggested that the teachers' prompts or feedback to students was not enough to increase students' levels of participation. As mentioned before, it is also possible that this particular group of children requires more frequent and/or varied stimuli to change their behavior in class.

One limitation of this study was the use of a multiple baseline across two classes. Although it involved three replications across students (low, medium, and high MVPA), it demonstrated a relatively weak experimental control. Perhaps a third tier in the multiple baseline design would provide a better representation of replications, predictions, and verifications of the experiment.

This study has some strengths including a more accurate measure of PA (i.e., accelerometers) compared to other studies in which the the same intervention was applied (i.e., heart rate monitors and pedometers; Vidoni et al., 2012; Vidoni et al., 2014). Accelerometers are considered the most valid objective measure of PA (Eston, Rowlands, & Ingledew, 1998). However, the use of accelerometers in everyday practice might be unfeasible because of the cost of equipment and skills necessary for data processing. The use of pedometers might be more appropriate for everyday use. However, the limitations of using pedometers to measure PA should be considered, such as inability to measure nonambulatory activities (McNamara, Hudson, & Taylor, 2010).

It is also important to understand the contribution of PE toward helping children to meet the minimum guidelines for PA. Accelerometry data from Health Survey England 2008 indicate that only 7% of the boys aged 11 to 15 meet the current recommendation of at least 60 min/day of MVPA (Health Survey for England, 2008). Schools, in particular PE classes, are seen as important settings for PA promotion (Bailey, 2006). Fair Play Game might be an important strategy to support children to increase MVPA during PE lessons (U.S. Department of Health and Human Services, 2010). However, it is important to note that the frequency at which the intervention is

delivered and the number of students in class who are participating in the intervention are important for the intervention to be effective.

In summary, Fair Play Game might be an important strategy to increase MVPA in low active children during PE lessons. The use of this strategy might support the objective stated by Sallis et al. (2012) that PE classes should focus on health-related PA and fitness and that students should be active for at least 50% of the lesson time.

References

Bailey, R. (2006). Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health, 76,* 397–401. https://doi.org/10.1111/j.1746-1561.2006.00132.x

Barrish, H. H., Saunders, M., & Wolf, M. (1969). Good behavior game: Effects of individual contingencies for group consequences on disruptive behavior in a classroom. *Journal of Applied Behavior Analysis, 2,* 119–124. https://doi.org/10.1901/jaba.1969.2-119

Belanger, M., Gray-Donald, K., O'Loughlin, J., Paradis, G., & Hanley, J. (2009). Influence of weather conditions and season on physical activity in adolescents. *Annals of Epidemiology, 19*, 180–186. https://doi.org/10.1016/j.annepidem.2008.12.008

Brodersen, N. H., Steptoe, A., Boniface, D. R., & Wardle, J. (2007). Trends in physical activity and sedentary behaviour in adolescence: Ethnic and socioeconomic differences. *British Journal Sports Medicine, 41,* 140–144. https://doi.org/10.1136/bjsm.2006.031138

Carlson, J. A., Mignano, A. M., Norman, G. J., McKenzie, T. L., & Kerr, J. (2014). Socioeconomic disparities in elementary school practices and children's physical activity during school. *American Journal of Health Promotion, 28,* S47–S53. https://doi.org/10.4278/ajhp.130430-QUAN-206

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis.* Upper Saddle River, NJ: Merrill/Prentice Hall.

De Bourdeaudhuij, I., Van, C. E., Spittaels, H., Oppert, J. M., Rostami, C., Brug, J., & Maes, L. (2011). School-based interventions promoting both physical activity and healthy eating in Europe: A systematic review within the HOPE project. *Obesity Reviews, 12,* 205–216. https://doi.org/10.1111/j.1467-789X.2009.00711.x

Department for Education. (2013). *Schools, pupils, and their characteritics: January 2013.* Retrieved from https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2013

Eston, R. G., Rowlands, A. V., & Ingledew, D. K. (1998). Validity of heart rate, pedometry, and accelerometry for predicting the energy cost of children's activities. *Journal of Applied Physiology, 84,* 362–371.

Evenson, K. R., Catellier, D. J., Gill, K., Ondrak, K. S., & McMurray, R. G. (2008). Calibration of two objective measures of physical activity for children. *Journal of Sports Sciences, 26,* 1557–1565. https://doi.org/10.1080/02640410802334196

Fairclough, S., & Stratton, G. (2005). Physical activity levels in middle and high school physical education: A review. *Pediatric Exercise Science, 17,* 217–236. https://doi.org/10.1123/pes.17.3.217

Health Survey for England. (2008). *Health survey for England 2008: Physical activity and fitness*: *Volume 1.* Leeds, England: NHS Information Centre for Health and Social Care.

Holt, J. E., Kinchin, G., & Clarke, G. (2012). Effects of peer-assessed feedback, goal setting, and a group contingency on a performance and learning by 10–12-year-old academy soccer players. *Physical Education and Sport Pedagogy, 17,* 231–250. https://doi.org/10.1080/17408989.2012.690568

Jull, S., & Mirenda, P. (2016). Effects of a staff training program on community instructors' ability to teach swimming skills to children with autism. *Journal of Positive Behavior Interventions, 18*(1), 29–40. https://doi.org/10.1177/1098300715576797

Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., & Corso, P. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine, 22,* 73–107. https://doi.org/10.1016/S0749-3797(02)00434-8

Lane, J. D., & Gast, D. L. (2014). Visual analysis in single case experimental design studies: Brief review and guidelines. *Neuropsychological Rehabilitation, 24,* 445–463. https://doi.org/10.1080/09602011.2013.815636

Lieberman, L. J., Dunn, J. M., van der Mars, H., & McCubbin, J. (2000). Peer tutors' effects on activity levels of deaf students in inclusive elementary physical education. *Adapted Physical Activity Quarterly, 17,* 20–38. https://doi.org/10.1123/apaq.17.1.20

Lonsdale, C., Rosenkranz, R. R., Peralta, L. R., Bennie, A., Fahey, P., & Luban, D. R. (2013). A systematic review and meta-analysis of interventions designed to increase moderate-to-vigorous physical activity in school physical education lessons. *Preventive Medicine, 56,* 152–161. https://doi.org/10.1016/j.ypmed.2012.12.004

McNamara, E., Hudson, Z., & Taylor, S.J. (2010). Measuring activity levels of young people: The validity of pedometers. *British Medical Bulletin, 95,* 121–137. https://doi.org/10.1093/bmb/ldq016

National Association for Sport and Physical Education & American Heart Association. (2012). *2012 Shape of the nation report: Status of physical education in the USA.* Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance.

Noble, M., Right, G., Dibben, C., Smith, G., McLennnan, D., Antila, A., & Braswell, S. (2004). *The English indices of deprivation 2004.* London, England: Neighbourhood Renewal Unit, Office of the Deputy Prime Minister.

Patrick, C. A., Ward, P., & Crouch, D. W. (1998). Effects of holding students accountable for social behaviors. *Journal of Teaching in Physical Education, 17,* 143–156. https://doi.org/10.1123/jtpe.17.2.143

Sallis, J. F., & McKenzie, T. L. (1991). Physical education's role in public health. *Research Quarterly for Exercise & Sport, 62,* 124–137. https://doi.org/10.1080/02701367.1991.10608701

Sallis, J. F., McKenzie, T. L., Beets, M. W., Beighle, A., Erwin, H., & Lee, S. (2012). Physical education's role in public health: Steps forward and backward over 20 years and HOPE for the future. *Research Quarterly for Exercise & Sport, 83,* 125–135. https://doi.org/10.1080/02701367.2012.10599842

Samalot-Rivera, A., & Porretta, D. (2013). The influence of social skills instruction on sport and game related behaviours of students with emotional or behavioural disorders. *Physical Education and Sport Pedagogy, 18,* 117–132. https://doi.org/10.1080/17408989.2011.631004

Siedentop, D., Hastie, P., & van der Mars, H. (2011). *Complete guide to Sport Education.* Champaign, IL: Human Kinetics.

Silva, P., Mota, J., Esliger, D., & Welk, G. (2010). Technical reliability assessment of the Actigraph GT1M accelerometer. *Measurement in Physical Education and Exercise Science, 14,* 79–91.https://doi.org/10.1080/10913671003715524

Stalsberg, R., & Pedersen, A. V. (2010). Effects of socioeconomic status on the physical activity in adolescents: A systematic review of the evidence. *Scandinavian Journal of Medicine & Science in Sport, 20,* 368–383. https://doi.org/10.1111/j.1600-0838.2009.01047.x

Sun, C., Pezic, A., Tikellis, G., Ponsonby, A. L., Wake, M., Carlin, J. B., & Dewyer, T. (2013). Effects of school-based interventions for direct delivery of physical activity on fitness and cardiometabolic markers in children and adolescents: A systematic review of randomized controlled trials. *Obesity Reviews, 14,* 818–838. https://doi.org/10.1111/obr.12047

Todd, T., Reid, G., & Butler-Kisber, L. (2010). Cycling for students with ASD: Self-regulation promotes sustained physical activity. *Adapted Physical Activity Quarterly, 27,* 226–241. https://doi.org/10.1123/apaq.27.3.226

Trost, S. G. (2001). Objective measurement of physical activity in youth: Current issues, future directions. *Exercise and Sport Sciences Reviews, 29*, 32–36. https://doi.org/10.1097/00003677-200101000-00007

Trost, S. G., Loprinzi, P. D., Moore, R., & Pfeiffer, K. A. (2011). Comparison of accelerometer cut points for predicting activity intensity in youth. *Medicine & Science in Sports & Exercise, 43,* 1360–1368. https://doi.org/10.1249/MSS.0b013e318206476e

Tucker, P., & Gilliland, J. (2007). The effect of season and weather on physical activity: A systematic review. *Public Health, 121,* 909–922. https://doi.org/10.1016/j.puhe.2007.04.009

U.S. Department of Health and Human Services. (2000). *Healthy People 2010* (Conference ed.). Washington, DC: U.S. Government Printing Office.

U.S. Department of Health and Human Services. (2010). *Strategies to improve the quality of physical education.* Retrieved from https://www.cdc.gov/healthyschools/pecat/quality_pe.pdf

van Sluijs, E. M., McMinn, A. M., & Griffin, S. J. (2008). Effectiveness of interventions to promote physical activity in children and adolescents: Systematic review of controlled trials. *British Journal of Sports Medicine, 42,* 653–657. https://doi.org/10.1136/bmj.39320.843947.BE

Vidoni, C., Azevedo, L. B., & Eberline, A. (2012). Effects of a group contingency strategy on middle school physical education students heart rates. *European Physical Education Review, 18,* 78–96. https://doi.org/10.1177/1356336X11430652

Vidoni, C., Lee, C. H., & Azevedo, L. B. (2014). Fair Play Game: A group contingency strategy to increase students' active behaviours in physical education. *Early Child Development and Care, 184,* 1127–1141. https://doi.org/10.1080/03004430.2013.847834

Vidoni, C., & Ulman, J. (2012). The fair play game: Promoting social skills in physical education. *Strategies, 25,* 26–30. https://doi.org/10.1080/08924562.2012.10592149

Vidoni, C., & Ward, P. (2006). Effects of a dependent group-oriented contingency on middle school physical education students' fair play behaviors. *Journal of Behavioral Education, 15,* 80–91. https://doi.org/10.1007/s10864-006-9012-z