Effects of 'Fair Play Game' strategy on Moderate to Vigorous Physical Activity in Physical Education

Azevedo, L.B.[1*], Vidoni, C.[2] & Dinsdale S.L.[3]

[1]*Corresponding Author: Liane Beretta Azevedo, PhD, Teesside University, School of Health and Social Care, Middlesbrough, Tees Valley, TS1 3BA UK.
Email: l.azevedo@tees.ac.uk; Phone: +44 - 0 - 1642 342988

[2]Carla Vidoni, PhD, Department of Health & Sport Sciences, University of Louisville, Louisville, KY, 40292, USA.
Email: carla.vidoni@louisville.edu, Phone: +1 - 502 - 852-8844

[3]Sarah-Louise Dinsdale, Teesside University, School of Health and Social Care, Middlesbrough, Tees Valley, TS1 3BA UK,
Email: s.dinsdale@tees.ac.uk, Phone:+44 - 0 - 1642 342967

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Abstract

Less than 50% of a physical education (PE) lessons are usually spent in moderate to vigorous physical activity (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 undeserved 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 non-overlapping on % MVPA data. The intervention was not effective to change MVPA for the other students. The 'Fair Play Game' might be effective in increasing physical activity 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.

Keywords: Fair Play Game; Single subject; Visual analysis; Accelerometer; Physical education

Introduction

Only one-third of children meet the current recommendation of 60 minutes 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 the year 2000, Healthy People 2010 (U.S. Deparment of Health and Human Services, 2000) recommended that at least 50% of PE lesson time should be spent on MVPA, which has been supported further by the Centre for Disease and Control (U.S. Deparment of Health and Human Services, 2010). However, a review study concluded that middle and high school students spent only 40% of the PE lesson in MVPA (Fairclough & Stratton, 2005).

More recently, an analytical review by 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, whilst also focussing on developing low-cost and feasible methods for teachers to accurately assess this in classes (Sallis et al., 2012).

Some studies have implemented interventions designed to increase MVPA levels during PE lessons. Results from systematic reviews revealed 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 shown to be effective in increasing PE students' levels of physical activity is the 'Fair Play Game'. The term 'Fair Play Game' was 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 that can 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 provides 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 relating 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 'Fair Play Game' (Vidoni, Azevedo & Eberline, 2012; Vidoni, Lee & Azevedo, 2014) on middle school students' active behaviors in PE lessons, measured by heart rate monitors and pedometers, respectively. However, despite the 'Fair Play Game' strategy showing positive results in American middle to high socio-economic class students, there is still a need to examine its effectiveness in a more undeserved community, where lower levels of physical activity are evident (Brodersen et ., 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 physical activity than 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 UK, with different levels of physical activity, during PE lessons.

Methods

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 free-school meals is considered another proxy measure of deprivation. This particular school recruited for this study was located in an area of IMD of 5,376,

133 therefore in lowest quintile of deprivation in England. Furthermore 48% of the students were
134 entitled to free school meals compared to an average of 16.3% in the country (Department for
135 Education, 2013).

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

146 The school provided two, one hour PE lessons per week. Due to a previously
147 established curriculum, one of the PE lessons was allocated to gymnastics, delivered indoors,
148 and the other day to soccer, delivered outdoors. The 'Fair Play Game' study was conducted
149 during 15 soccer lessons taught by the same teacher. Although the lesson content was chosen
150 by the teacher, the option of soccer was appropriate for this intervention, due to it being an
151 'invasion game'. Previous 'Fair Play Game' studies (Vidoni et al., 2012; Vidoni et al., 2014)
152 were also conducted using invasion games (e.g. basketball and handball) as a unit of
153 instruction.

154 The school PE teacher was also formally invited to participate and signed an informed
155 consent. The PE teacher received training regarding the daily procedures of the intervention
156 and a booklet including major components of the intervention, followed by a questions and

157 answers segment. The PE teacher had 8 years of teaching experience in PE including 5.5
158 years in this particular school.

159 **Research design**

160 This study used a single-subject multiple baseline design across two classes (Cooper
161 et al., 2007) to assess the effects of a dependent-group contingency strategy: 'Fair Play
162 Game', on students' physical activity levels during PE lessons. This design was chosen to
163 examine the impact of the intervention among individual students, and in two different
164 classes. Baseline data were collected in two classes in a staggered fashion to verify if the
165 change on students' number of steps (used for goal setting), and percentage of lesson spent
166 on MVPA were effected by the intervention. An extended baseline for Year 9 enabled
167 repeated measures of students' levels of MVPA during baseline (i.e., typical teaching) and
168 intervention phase. This design has been used in general and adapted physical education, and
169 in sport and physical activity interventions (Holt, Kinchin, & Clarke, 2012; Jull & Mirenda,
170 2016; Lieberman, Dunn, van der Mars, & McCubbin, 2000; Patrick, Ward, & Crouch, 1998;
171 Samalot-Rivera & Porretta, 2013; Todd, Reid, & Kisber, 2010; Vidoni et al., 2014). Students
172 in Year 8 started the intervention in their fifth soccer lesson, whilst those in Year 9 began the
173 intervention in their eleventh soccer lesson.

174 **Procedures**

175 The same PE teacher taught soccer lessons to both classes once a week for 15 weeks.
176 The PE lesson lasted for one hour, but the active part of the lesson lasted for approximately
177 40 minutes. The lessons took place on an outdoor soccer field (approximately size: 100 m
178 length and 60 m width), during the end of autumn, and throughout the winter season, and
179 consisted of approximately: (a) 10 minutes warm-up, (b) 15 minutes drills, (c) 10 minutes
180 game, and (d) 5 minutes 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 in each team. Each team had a minimum of two and a maximum of three students who were taking part on the study. The teacher explained that the participants would wear an accelerometer, which would measure their physical activity 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 ten 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:

1. 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 has taken during the baseline condition.
2. 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!", "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.

3. 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.
4. Reinforcement: At the end of the lesson the teacher pinpointed some good examples of students' active behaviors that were observed during lesson, for example: staying active around the field, fast passes, getting the ball quickly when it goes out of the field, and rapid transitions for defence or attack.
5. 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 this current lesson, otherwise it remained the same.
6. Reward: By the end of the 15 weeks observation period, each child from the teams which achieved 80% of the goals were 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 assessed participants' acceptability of the behaviors that were reinforced, the procedures used and social importance (Cooper et al., 2007).

The teacher was asked five questions relating 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 just 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 shown to provide a reliable measurement of counts and steps (Silva , Mota, Esliger & Welk, 2010). Accelerometer data were recorded in every lesson at 15 seconds 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

time of the lessons were recorded manually by the researcher. Data were processed after each lesson, and the number of steps checked for the selected participant in each team to establish if the goal was achieved.

Data were processed with Actilife version 6.5.4 software (Actigraph, LLC, Pensacola, FL) and filtered to the period of each lesson. Evenson cutpoints (Evenson, Catellier, Gill,Ondrak & Mc Murray, 2008) were applied to estimate MVPA during lesson. These cutpoints are considered the most accurate to estimate time spent at different exercise intensities in children and adolescents from 5 and 15 years old (Trost at 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 period 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 (SD) of the mean: 1. Low MVPA: < 0.3 SD; 2. Medium MVPA: $\pm$ 0.3 SD and; 3. 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 analysed as within and between conditions (baseline and intervention) for the three selected individuals in each class. Analysis 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. Inter-observer 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 the % MVPA from baseline to intervention from 41.7 % to 49.1% (7.4% difference). Likewise, Year 9 participants (N= 7) increased the % MVPA from 49.7% at baseline to 58.3% at intervention (8.7% difference).

The Year 8 class had the set target of 1800 steps for the first lesson. After the 11 lessons, the target went up to 3600 steps for one team (met the goal in 10 of 11 lessons, 91% of the goals accomplished), two teams reached 3400 steps (met the goal in 9 of 11 lessons, 82% of the goals accomplished) and one team reached 3200 steps (met the goal in 8 of 11 lessons, 72% of the goals accomplished). For the Year 9 class the first target was set as 2700 steps, after 5 lessons the target raised to 3100 steps for three teams (met the goal in 4 of 5 lessons, 80% of goals accomplished) and 2900 steps for one of the teams (met the goal in 3 of 5 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 methods 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 & Gast, 2014 show that the participant with low MVPA from Year 8, presented a variable, but a 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 non-overlapping data (PND =100%).

306 The participant with low MVPA from Year 9 showed a continuous positive pattern of
307 trend direction (accelerating – improving) which did not change between the baseline and
308 intervention period and there was a low PND (40%) between conditions. However, data
309 appeared to improve in stability during the intervention (within stability envelope: baseline =
310 55.5% and intervention = 80%).
311 Functional relation is demonstrated when a controlled experiment shows that the
312 change in the dependent variable was a reliable outcome of the specific manipulations of the
313 intervention rather than confounding variables (Cooper et al., 2007). Results from Figure 1
314 and visual analysis interpretation show that despite the fact that a positive change was seen
315 between the baseline and intervention phase for the low MVPA Year 8 student, it is
316 suggested that a weak functional relation is demonstrated for low MVPA students due to the
317 lack of consistency during the replication with the low MVPA Year 9 student.
318 **Medium MVPA**
319 Results from the visual analysis (Lane & Gast, 2014) suggest that the participant with
320 medium MVPA from Year 8 showed a positive pattern of change in trend (decelerating-
321 deteriorating to accelerating- improving) and level. However, there was a low magnitude of
322 change (Medium PND = 27.3%). In contrast to Year 8, the participant with medium MVPA
323 from Year 9 showed a negative trend, moving from accelerating- improving to decelerating –
324 deteriorating and minimum or negative change in level and PND. Therefore, taking into
325 consideration Figure 1 and the visual analysis interpretation, a functional relation was not
326 demonstrated for the medium MVPA students.
327 **High MVPA**
328 The participant with high MVPA from Year 8 showed nearly the same positive
329 pattern of change in trend (decelerating- deteriorating to accelerating- improving) compared
330 to the low and medium MVPA participants. However, there was a relatively low magnitude

of change (High PND = 60%). In contrast to Year 8, 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, 2013) show that a functional relation can not 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 8 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. This research also examined for the first time the effects of the 'Fair Play Game' strategy on PE students from an underserved area outside the USA. 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, where 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 one day a week. Therefore, the intervention took three 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 physical activity is an important determinant of practice efficiency (Sun et al., 2013). Although the duration of the actual intervention was similar when comparing the interventions (14 to 17 days – 35 to 45 minutes 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 in an outdoor soccer field during the winter season while 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 previous studies, the varied weather conditions might have impacted on students' participation in the classes. It has been stated that environmental variables in specific weather need to be taken into account when developing physical activity 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 our efforts to provide prompts in a consistent manner, we have not recorded the number of prompts provided. The lack of information concerning the number of prompts delivered during the lesson can be considered a limitation of this study. Vidoni & Ward (2009) found that when the teacher did not deliver prompts the occurrence of target behaviors decreased in comparison with those that were frequently prompted. In addition, in previous studies the participants were from schools located in middle to high socio-economic areas in United States, whereas in this study the school was located in an underserved area of England. Previous studies performed in America showed that children attending schools in high SES areas had 4.4 minutes per day more of MVPA compared to children who attended schools in low SES areas (Carlson et al., 2014). Similarly, British adolescents (11-12 years old) from low SES 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 behavior.

The number of students involved in this study was low compared to 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

406 students provided the signed parental/guardian informed consent. Considering that goals were
407 set to individuals within a team, and not all students in the team were participating in the
408 intervention, this might have prevented individuals who were taking part in the study from
409 showing their best effort. Perhaps if all participants were placed within the same groups it
410 would encourage their team affiliation and would impact the results.
411 Similarly, it is important to note that only one teacher responded the social validity
412 questionnaire, and his views might not be representative of most teachers' opinion. The PE
413 teacher emphasized that "not all PE lessons are about fitness" . It is known that the goals of
414 PE are wider than fitness and include improvement of motor competencies, knowledge of
415 principles and concepts, and development of personal and social skills (National Association
416 for Sport and Physical Education & American Heart Association, 2012). However, this
417 intervention was limited to target MVPA in PE classes. Although the intervention package
418 was implemented as planned (fidelity of treatment), it could be suggested that the teachers'
419 prompts or feedback to students were not enough to increase students' levels of participation.
420 As mentioned before, it is also possible that this particular group of children requires more
421 frequent and/or varied stimuli in order to change their behavior in class.
422 One of the limitations of this study was the use of a multiple baseline across two
423 classes. Although it involved three replications across students (low, medium and high
424 MVPA), it demonstrated a relatively weak experimental control. Perhaps a third tier in the
425 multiple baseline design would provide a better representation of replications, predictions and
426 verifications of the experiment.
427 This study has some strengths including a more accurate measure of physical activity
428 (i.e. accelerometers) compared to other studies which applied the same intervention (i.e. heart
429 rate monitors and pedometers) (Vidoni et al., 2012; Vidoni et al., 2014). Accelerometers are
430 considered the most valid objective measure of physical activity (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 physical activity should be taken into account, such as inability to measure non-ambulatory activities (McNamara, Hudson, & Taylor, 2010).

It is also important to understand the contribution of PE towards helping children to meet the minimum guidelines for physical activity. Accelerometry data from Health Survey England 2008 indicates that only 7% of the boys aged 11 to 15 old children meet the current recommendation of at least 60 minutes of MVPA per day (Health Survey for England, 2008). Schools and in particular PE classes are seen as important settings for physical activity 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 that are taking part on 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 in a recent paper by Sallis et al. (2012) that PE classes should focus on health-related physical activity and fitness, and students should be active for at least 50% of the lesson time.

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