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Fair Play Game: a group contingency strategy to increase students' active behaviours in physical education

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A dependent group contingency strategy called Fair Play Game was applied to promote increase in number of steps during physical education classes for sixth-grade students. Results from a multiple baseline design across three classes showed that the mean number of steps for baseline vs. intervention were: Class 1: 43 vs. 64 steps/minute; Class 2: 49 vs. 81 steps/minute; Class 3: 50 vs. 87 steps/minute. Visual inspection of the graphs showed that Class 1 had an upward trend of number of steps (baseline vs. intervention) without a change in level. Classes 2 and 3 demonstrated clearer change in level of number of steps between these two phases. Social validity data showed that students increased their engagement in class and Fair Play Game is a feasible and acceptable strategy. Therefore, it can be concluded that Fair Play Game appeared to be associated with students' increase in active behaviours in physical education lessons.

Keywords: group contingency; physical education; Fair Play Game; pedometers; physical activity; goal-setting

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Introduction

Group contingencies are behavioural strategies that have been used in general, special and physical education to promote students' opportunities to work together towards the accomplishment of a common goal (Popkin & Skinner, 2003; Tingstrom, Sterling-Turner, & Wilczynski, 2006; Vidoni & Ward, 2006). Examples of students' behaviours intervening with the use of group contingencies in general and special education have been: (a) reduction in disruptive behaviours, (b) increase in task accomplishments and (c) increase in performances of social behaviours (Heering & Wilder, 2006; Lohrmann & Talerico, 2004; Nevin, Johnson, & Johnson, 1982).

In the field of physical education, the initial interventions of group contingencies aimed to decrease disruptive behaviours of students with disabilities and to increase appropriate ones (Jetma & Vogler, 1985; Paese, 1982; Vogler & French, 1983). In 1985, Giebink and McKenzie introduced group contingencies to general physical education classes, targeting improvement of performance of fair play behaviours (i.e. sportsmanship) and reduction of negative social interactions during softball lessons. Subsequent physical education studies assessed the effects of group contingencies on students' fair play (Patrick, Ward, & Crouch, 1998; Vidoni & Ward, 2006) and

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physical-activity behaviours (Vidoni, Azevedo, & Eberline, 2012; Ward & Dunway, 1995).

The literature addresses three types of group contingencies: independent, interdependent and dependent (Cooper, Heron, & Heward, 2007; Litow & Pumroy, 1975). Under the independent group contingency, the consequence (usually a reward) is available to all individuals of a group, but only the ones who meet an established criterion receive the contingency. An interdependent group contingency rewards the whole group contingent upon each individual member meeting the established criterion. Finally, dependent group contingency rewards the whole group contingent upon the performance (i.e. meeting a certain criterion) of a particular individual(s) of a group.

The most popular application of interdependent group contingencies is the Good Behaviour Game (Barrish, Saunders, & Wolf, 1969). Since 1969 this strategy and its variations have been implemented in special and general education with successful results in decreasing class disruptions and increasing on-task behaviours (Darveaux, 1984; Fishbien & Wasik, 1981; Gresham & Gresham, 1982; Harris & Sherman, 1973; Lohrmann & Talerico, 2004; Medland & Stachnik, 1972; Saigh & Umar, 1983; Tingstrom et al., 2006; Vogler & French, 1983). The Good Behaviour Game (Barrish et al., 1969) is an interdependent group contingency that aims to reduce inappropriate behaviours such as being out-of-seat and talking. Its procedure consists of: (a) dividing the class into at least two teams, (b) the teams have to follow certain rules (e.g. no one is supposed to be out of her/his seat without permission), (c) teams' names are written on the chalkboard, (d) when the rules are broken by any member of the team, the team gets a mark on the chalkboard, (e) the teams that have marks at or less than established criterion win the game and (f) the teams that win the game are rewarded with certain privileges (i.e. reinforcers).

Variations of the Good Behaviour Game in physical education

Variations of the Good Behaviour Game have been implemented in physical education (Patrick et al., 1998; Vidoni et al., 2012; Vidoni & Ward, 2006). Patrick et al. (1998), for example, used a variation of the Good Behaviour Game during physical education classes to: (a) improve positive social interactions such as supporting teammates, (b) decrease negative behaviours such as cursing, pushing and shoving and (c) improve correct trials of volleyball forearm and overhead passes. The results of this study showed that the strategy was effective in increasing students' appropriate social interactions and reducing inappropriate behaviours, but no effect was found on the students' volleyball skills. Although the intervention did not have any effect on students' volleyball skills, this study was beneficial to the field of physical education, supporting the fact that students' participation in games and sports in physical education does not translate directly to positive social behaviours. In order to observe development students' of positive social behaviours, teachers need to implement strategies to teach, reinforce and hold students accountable to perform these behaviours during instruction (Patrick et al., 1998; Vidoni & Ward, 2009).

More recently, Vidoni and Ulman (2012) suggested a variation of the Good Behaviour Game, called Fair Play Game, to improve students' performances of behaviours related to physical education. The term 'Fair Play' was inspired by Siedentop, Hastie, and van der Mars' (2011) sport education code of conduct, which consisted of contextual behaviours to be performed in physical education classes such as showing responsibility, effort, respect, appreciation of opponents, teammates, judges

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and referees, playing by the rules, and being helpful, not harmful. Fair Play Game is a dependent group contingency strategy that consists of setting daily goals to teams and awarding points to the ones that accomplish the established goals. The goals set are related to behaviours that need more frequency or intensity during class, such as supporting teammates, respecting peers and giving the best effort during the lesson (Vidoni & Ulman, 2012).

As a variation from the original Good Behaviour Game (see Barrish et al., 1969), which aimed at reduction of innappropriate behaviours, the Fair Play Game strategy involves a goal-setting chart that aims to increase behaviours related to physical education. It also involves teachers' prompts in the beginning of each task as reminders and positive pinpointing of performance of specific behaviours at the end of the class. Moreover, instead of utilising an interdependent group contingency, which requires physical education teachers to monitor behaviours of every individual student in class, Fair Play Game is a dependent group contingency, which allows monitoring behaviours of pre-existing groups of students (i.e. teams) without losing focus of students' performances of skills and tactics that are being taught (e.g. performance of accurate passes to moving teammates in team handball).

Vidoni et al. (2012) implemented Fair Play Game during eighth-grade physical education on students to assess students' increase in heart rates during basketball lessons. The independent variable was the intervention package suggested by Vidoni and Ulman (2012). Data were collected through Polar-600 heart rate monitors and downloaded in the computer. The intervention produced positive outcomes as the heart rate zone of the participants increased during the treatment lessons, surpassing the recommendations of national health and physical activity initiatives (U.S. Department of Health and Human Services, 2009) that at least 50% of the lesson time be spent at moderate to vigorous physical activity. Based on students' heart rate and social validity questionnaires, Fair Play Game proved to be an effective strategy that physical education teachers can use to increase students' active behaviours during lessons. However, heart rate monitors can be expensive and not a practical method to use in day-to-day practice. A more affordable method such as pedometers might be more appropriate to use at school. Furthermore, in a previous study (Vidoni et al., 2012), Fair Play Game was applied in one class with 18 students and it was suggested that the same intervention could be replicated in several classes with larger sample sizes. Finally, Vidoni et al. (2012) suggested that there is a need for more evidence of whether the intervention will be effective at different grade levels and units of instruction.

Therefore, the purpose this study was to systematically replicate the Fair Play Game intervention package in three sixth-grade and investigate its effects on children's activity based on the number of steps taken during a team handball unit.

Method

Participants and setting

Participants were 70 sixth-grade students, 41 girls and 29 boys (10–12 years of age) enrolled in three physical education classes and their physical education teacher in a urban public middle school in the USA. The teacher was male, with 15 years of teaching experience, and 3 years teaching in this particular school. The human subjects

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Institutional Review Board approved the study. Informed consent from the school teacher, parents or guardian and child assent were obtained prior to the study.

The school demographic was predominately white (70%) and students came from middle to high socio-economic status. The three classes consisted of 25, 20 and 29 students from Classes 1, 2 and 3, respectively. All 25 students in Class 1 returned the signed consent forms to participate in the study. Eighteen students returned signed consent forms for Class 2, and 27 for Class 3. The physical education teacher designed the team handball unit and lesson plans in his typical way, and implemented the same plans in all three classes. The students who chose not to participate in the study engaged in all lesson activities planned by the teacher except in Fair Play Game. Although these students were part of the teams, they did not wear pedometers and consequently were not involved in the goal-setting chart. Team handball is an invasion type of game in which the offence team's purpose is to invade the opponents' court and score a point in the opponents' goal defended by a goalkeeper. The game has similar strategies and tactics as soccer, but it is played through hand throws, and none of the players are allowed to step in the goal box, with the exception of the goalkeeper.

The same physical education teacher in the school gymnasium taught all three classes. All classes had strictly five minutes allocated for changing uniforms in the locker room before and five minutes after the lesson. The physical education lessons' allocated time varied among classes. Classes 1 and 2 lessons were approximately 45 minutes long and consisted of: (a) 5 minutes of warm-up, (b) 15 minutes of practice drills, (c) 20 minutes of game and (d) 5 minutes for closure. Due to predetermined school schedules, Class 3 lessons were 50 minutes long and consisted of (a) 5 minutes warm-up, (b) 20 minutes of practice drills, (c) 20 minutes of game and (d) 5 minutes for closure. To account for the variation in durations of the classes between the three classes and from day to day, values are expressed as steps per minute. The lessons were taught during 17 days. In the first day of classes, the teacher divided students into teams with six to eight members in each team.

Dependent variable and data collection

Dependent measures were assessed through number of steps taken by the articipants per minute during each physical education class measured by pedometers. Data were collected every lesson throughout 17 days of a team handball unit. Data were collected during students' participation in physical education tasks (i.e. engagement time); therefore total time was lower than the allocated time for the whole sessions.

Each participant wore the CW-300 Digi-Walker Pedometer which has been previously validated to measure free-living physical activity in children (Schneider, Crouter, & Bassett, 2004). Pedometers are small and lightweight electronic devices which students clip on their waist to record the number of steps they take. Previous studies indicate that pedometers are acceptable direct observation devices that can provide moderate correlation with measurements of energy expenditure (Bassett, 2000; Tudor-Locke, Williams, Reis, & Pluto, 2002).

One week prior to baseline, the researchers were present during all three classes and practiced the use of pedometers with students to ensure that they were being used properly and to reduce the Hawthorne effect (Maag, 2004). Students were assigned with numbers that matched their pedometers. Each student used the same pedometer every lesson. Students learned the pedometer pick-up and return routines and how to clip it on their waist. These procedures facilitated class management and data

collection. The students were told that shaking the pedometer would fake their actual performance and would not result any health benefit. Students were informed that if they were caught shaking the pedometer, their record of the daily number of steps would be zero, which could negatively affect their team's performance in Fair Play Game.

In the week before the actual study, students practiced the pedometers' start and end routine. Everyday, prior to warm-up the researchers reset all pedometers and delivered them to the students. When all students were positioned behind the basketball end line and facing the teacher, the teacher asked them to reset the pedometers again and keep their case closed throughout the lesson. When the practice and game activities were over, students routinely went to assigned squads; they sat and left the pedometers on the ground with the case opened. While the teacher was providing final comments about the lesson, the researchers collected and immediately recorded the results in an Excel spreadsheet.

Research design

A multiple baseline across three classes (Cooper et al., 2007) was used to assess the effects of the intervention on the dependent variable. Baseline data were collected in all three classes in a staggered fashion to verify whether the change in students' number of steps was a result of the intervention. Class 1 was subjected to reversal design on the last five days of the study to obtain comparisons between treatment and non-treatment conditions. Class 2 had treatment withdrawn on the last day. Class 3 had 14 days of baseline and three treatment days.

Procedure

Baseline condition

During baseline, all three classes were taught in the conventional way. Although students were wearing pedometers; the teacher did not implement any strategy to reinforce or increase students' number of steps taken.

Treatment condition

The treatment condition was a replication of the intervention package called Fair Play Game (Vidoni et al., 2012). The components of Fair Play Game consisted of:

(1) A chart posted on the wall with teams' names written horizontally with enough rows to insert the criterion for each intervention day (Vidoni et al., 2012). Under each team's names there were two columns: one column had 'goal set' stated on the top and the other column had the 'goal achieved'. The first goal was based on the class average number of steps taken under the baseline condition.
(2) In the beginning of the lesson the teacher explicitly told students that their goal was to 'give the best effort' to increase the number of steps taken during the class. The teacher spent a longer time explaining the strategy on the first lesson of treatment compared to subsequent lessons for demonstrations and explanations of the active behaviours such as passing the ball and moving

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down the field, getting engaged with your team, passing the ball to all teammates and avoiding standing still. The teacher also asked students to provide examples of how they could be more active and show effort during the lesson.

(3) The teacher explained that the number of steps of one unidentified student from each team would be tracked. If this unidentified student accomplished the goal, the whole team would be awarded with a 'YES!!!' mark on the chart, and the following day's goal would be higher than the previous one. If the unidentified student did not achieve the goal set, a 'NO' would be marked on the poster, and the goal would remain the same until it was achieved. Each member of a team could be randomly selected once. When all members were already selected, then a new round of selection would start. Students were told they would receive a trinket with the University logo if they achieve most of the goals during the Fair Play Game intervention. The researchers did not specify to students how many goals they had to achieve to receive the reward; hence they would show their best effort in all sessions. However, researchers and the teacher set an arbitrary objective in which teams that missed the goals up to two times for Classes 1 and 2 and up to one time for Class 3 would still receive the reward. The type of reward was discussed with the teacher prior to the study. The teacher suggested that any University trinket would please all three classes, because the University college teams had a strong influence on the school in general. Therefore, the University lapel pins were the reward to the students. These particular trinkets were chosen because they looked like medals and as soon as students received them, they put them on their t-shirts or backpacks. All teams were awarded at the end of the intervention.
(4) The teacher prompted students before the start of each task to remind them to keep moving and reach their daily goal.
(5) At the end of the lesson the teacher pinpointed some examples of students' active behaviours that he observed during the lesson, such as passing and moving, getting the ball quickly when it goes out of bounds, moving quickly to protect the goal box and moving quickly for attacking the opponent's court.
(6) On the following physical education lesson, the teacher reviewed the chart with the previous day's results, new goals were set and he reminded students briefly about what to do to be more active during the lesson.

Non-treatment condition

Under the treatment condition students learned how to track their steps during the lessons. This monitoring behaviour could not be 'unlearned'. The non-treatment condition consisted of lessons in which the goal-setting chart was not posted on the wall, and the teacher did not provide prompts, praise or any kind of reminders to give best effort during the lesson. The researchers intended to verify whether students changed their pattern of number of steps with the absence of Fair Play Game or whether the learned behaviour would be maintained. During non-treatment days, students were told that no team member was going to be tracked for that lesson; they did not have to worry about goals to be achieved. Not all classes were exposed to non-treatment conditions. After seven consecutive days of treatment in Class 1, treatment was removed during lessons 13 and 14, re-established during lessons 15 and 16, and removed again on lesson 17. Class 2 had only lesson 17 (last lesson) under non-treatment

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condition. Class 3 did not have any lesson under non-treatment condition. Because Class 3 was the third tier of the multiple baseline design, and only three lessons were part of the intervention, the non-treatment phase could not be applied.

Social validity

At the end of the intervention condition, 65 students from three classes and the teacher responded to a social validity questionnaire (Vidoni et al., 2012). The social validity assessed participants' acceptability of the behaviours reinforced, procedures used and social importance (Cooper et al., 2007). The student questionnaire was anonymous and questions included: (a) whether the participants liked to participate in Fair Play Game and why, (b) whether it was important to give the best effort during physical education and why, (c) whether they noticed improvement in their own active behaviour after seeing the goal-setting chart and receiving the teacher's reinforcement during classes, (d) whether they thought they helped their team to achieve the daily goal of number of steps and (e) what they did to help their team to achieve the daily goal. The teacher was asked: (a) whether he thought that Fair Play Game helped students to be more active in the classes and why, (b) whether he felt comfortable implementing Fair Play Game in his classes and why, (c) whether Fair Play Game took too much time from the instruction and why, (d) whether Fair Play Game was an acceptable strategy for teachers and why and (e) whether he thought the students enjoyed the participation in the Fair Play Game study and why.

Treatment integrity and interobserver agreement

Treatment integrity was assessed every day to verify whether the intervention was implemented as it was planned. The checklist included the components of the intervention package: (a) chart with daily goals posted in the gym, (b) review of the active behaviours by the teacher at the beginning of the lesson, (c) explanation or review about the unidentified students from each team, (d) teacher's prompts before tasks and (d) positive pinpointing during closure. Two researchers were present during all intervention sessions. Interobserver agreement of the treatment integrity of all items listed above were recorded during 100% of the treatment sessions.

Pedometers are accurate electronic devices (Tudor-Locke et al., 2002) used to objectively measure number of steps taken (i.e. dependent variable). Therefore, interobserver agreement for measurements were not taken. However, in order to be certain of the measurement accuracy, researchers were constantly checking participants to be sure that pedometers were placed correctly and not shaken to avoid measurement errors.

Data analysis

The number of steps recorded for each student in every lesson was divided by the duration of the lesson to provide the steps per minute per participant. Steps per minute mean, standard deviation and range from each experimental phase (baseline, treatment and non-treatment) were calculated for each class. Data were plotted on three graphs for visual inspection.

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Results

The teacher implemented the components of the treatment 100% of the time in all treatment sessions. Interobserver agreement of the treatment integrity was 100%. The first goals set for all three classes were: 1800 steps for Class 1, 2000 for Class 2 and 2700 for Class 3.

All teams were awarded at the end of the intervention. Class 1 had three teams; one team achieved the goals throughout the intervention phase. Two teams missed only one goal. Class 2 had three teams; only one team missed only one goal. Class 3 had four teams; all teams achieved all goals.

Figure 1 provides visual inspection of average and range of steps per minute taken during 17 lessons of team handball for all three classes.

Class 1

Baseline condition

Figure 1 shows that Class 1 mean data had a decrease from lesson 1 to lesson 2, followed by an increasing trend throughout lesson 5. The average number of steps for all days was 43 ± 10 steps per minute, ranging from 25 to 69 between participants across the different days.

Treatment condition

Figure 1 shows that lesson 6 followed an ascending trend that started during baseline. Lesson 7 had a decrease followed by a significant ascending trend until lesson 12 (last day of intervention). Under the treatment condition between lessons 6 and 12, Class 1 presented with an average of 64 ± 14 steps per minute ranging from 38 to 98. Treatment was then interrupted for two lessons 13 and 14 and re-established in lessons 15 and 16. Data points from these two lessons were higher than the last two lessons under the non-treatment condition (explained below), and similar to the last lesson of treatment (lesson 12). The mean was 83 ± 6 steps per minute, ranging from 69 to 98.

Non-treatment condition

Treatment was removed in lessons 13, 14 and 17. Figure 1 shows that although data presented in lessons 13 and 14 were higher than the baseline condition, there was a significant change in the pattern established under the treatment condition. Lesson 17 also showed a decrease compared with two previous treatment lessons. Under non-treatment conditions (lessons 13 and 14), the mean was 69 ± 11 steps per minute, ranging from 47 to 89. During lesson 17, during which treatment was withdrawn, the mean was 76 ± 9 steps per minute, ranging from 60 to 90.

Class 2

Baseline condition

Figure 1 shows that Class 2 mean of steps taken per minute had a decrease from lesson 1 to 2, as did Classes 1 and 3. An increasing trend was demonstrated from lesson 2 to 4. Data decreased gradually in lessons 5 and 6, followed by an increase in lesson 7, and

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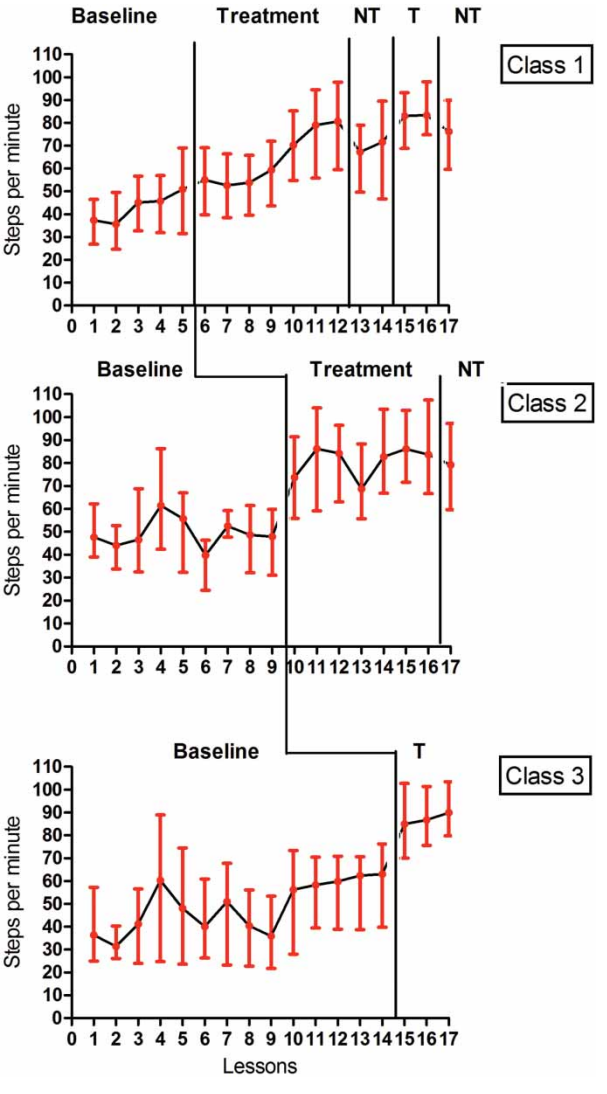

Figure 1. Average and range of number of steps taken per minute daily during 17 lessons for Classes 1, 2 and 3. Note: T = treatment and NT = non-treatment.

a slight decrease in lessons 8 and 9. The mean was 49 ± 10, ranging from 24 to 86 between participants across different classes.

Treatment condition

Figure 1 shows that Class 2 mean number of steps per minute had an increase immediately after treatment, followed by a decrease in lessons 12 and 13, and gradually increased in lessons 14 and 15. Lesson 16 had a slight decrease compared with the previous lesson. All treatment condition data points were significantly higher than the baseline condition. The mean was 81 ± 12 steps per minute, ranging from 56 to 107.

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Non-treatment condition

Figure 1 shows that Class 2 had only lesson 17 under the non-treatment condition. The mean of steps per minute was lower than the last two lessons (treatment), but higher than baseline. The mean was 74 ± 11, ranging from 60 to 97.

Class 3

Baseline condition

Figure 1 shows that Class 3 mean number of steps per minute followed the same pattern as Classes 1 and 2 by showing a decrease in data points between lessons 1 and 2. Similar to Class 2, Class 3 showed an increasing trend from lesson 2 to 4, followed by a decrease in lessons 5 and 6, and an increase in lesson 7. Lessons 8 and 9 gradually decreased. Lesson 10 had a significant increase followed by a slight ascending trend until lesson 14. The mean was 50 ± 14 steps per minute, ranging from 22 to 90 between participants across the different days.

Treatment condition

Figure 1 shows that Class 3 mean of steps per minute had an ascending trend and change of level immediately after intervention. The mean was 87 ± 7 steps per minute, ranging from 70 to 103.

The results of this study suggest that a functional relation was demonstrated for all three classes, but in different ways. Due to the long latency of the effects of the intervention, Class 1 shows a weaker functional relation compared with the other two classes. Class 2 showed a strong functional relation because there was a drastic increase in level of numbers of steps after the implementation of the intervention. Class 3 replicates the effects of the intervention in a short latency, but with only few data points and also demonstrates a change in level of number of steps after the implementation of the intervention.

Social validity

The questionnaires for participants were developed with the intent to verify whether Fair Play Game was an acceptable strategy.

Teacher

The teacher responded that Fair Play Game helped the students to become more active because it provided them with opportunities to monitor their activity and learn how to set personal goals to achieve. He stated that the encouragement from the teammates to achieve the daily goal was a factor that helped to increase activity. The teacher felt comfortable to implement Fair Play Game in his class because that gave him more opportunity to give the students feedback. The teacher was not concerned that Fair Play Game took time from instruction, but it made him go more in depth with team handball skills instead. He mentioned that he would like to use Fair Play Game in future units of instruction. Finally, the teacher responded that the students did enjoy the participation in this study because it helped the ones who were not the most athletic types to feel as part of the team. Students liked to be able to monitor their own progress each day and

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they have even asked to keep using the pedometer after the study was completed. The students expressed disappointment when the teacher told them that they no longer needed to participate in the Fair Play Game study.

Students

Twenty-three students from Class 1, 18 students from Class 2 and 24 students from Class 3 responded to the questionnaire. The majority of students responded that Fair Play Game was interesting and it was fun to see the steps taken by the end of the class. Some students liked it because the strategy motivated them to run harder to increase steps on the pedometer. In contrast to the majority of the students, few students from Classes 1 and 2 provided unenthusiastic responses. Three students from Class 1 responded that they did not like to participate because of the uncomfortable feeling with the use of pedometers. They found that sometimes the pedometers provided inaccurate number of steps, and the whole thing about increasing numbers of steps was meaningless for them. One of the students from Class 2 responded that they did not like the goal-setting chart because it was very annoying.

The majority of students responded that giving the best effort in physical education is important because it will make them fit and stronger. Some students added that giving the best effort in the class would bring a healthier and better life. One student responded that they would learn more from the physical education only when giving the best effort. Most of the students responded that they improved by being more active after seeing the goal-setting chart with number of steps set. One student responded that the participation in Fair Play Game was challenging like a competition, and it was fun to be involved. Some students reported that they encouraged each other if they felt their teammate was not giving the best effort.

Discussion

In this current study, a dependent group contingency was used as an intervention package called 'Fair Play Game' to increase sixth-grade students' number of steps taken during physical education lessons. The study started on the same day for all three classes, and the intervention was implemented in a staggered fashion. This study showed that the intervention was clearly effective for Class 2, because of the drastic and immediate change in students' level of number of steps. Class 1 did not show a drastic change after the implementation of the intervention. However, it did demonstrate an upward trend and a significant change between baseline and intervention. The extensive baseline of Class 3 helped to support the fact that the number of steps taken during interventions of Classes 1 and 2 was affected by the intervention. In additon, Class 3 demonstrated a positive change in the level of number of steps taken during the intervention phase.

All three classes showed a similar upward trend during the first four days of baseline. Typically, in any practice of sports, drills played in the first few lessons involved more practice of passes to teammates. When students work on accuracy of specific movement skills, it limits their pace/speed of performance. It seems like the more students practiced to pass the ball to teammates the faster they moved in the field of play. It can be suggested that practice effects accelerated students' patterns of number of steps taken in the first few lessons.

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The social validity questionnaire showed that the Fair Play Game strategy not only helped students to increase their steps during lessons, but also influenced students' engagement within their teams. Students reported they put more effort into moving throughout the lessons, liked the challenge of the daily goals, encouraged their teammates to increase their number of steps and enjoyed monitoring their own active participation.

Due to an extended intervention time, Class 1 had opportunities to reverse treatment conditions. Figure 1 shows that under non-treatment conditions students decreased their number of steps per minute, but maintained their number of steps higher than baseline levels. It can be suggested that students monitored their number of steps and made more effort than under the baseline condition, but since they were not held accountable to achieve specific number of steps, they did not attempt to surpass the goals of previous days. The re-establishment of the treatment demonstrated that the intervention was effective in increasing the number of steps. Class 2 had only one lesson under the non-treatment condition and demonstrated on average a slight decrease in number of steps in relation to the previous treatment lesson.

The results of this study support previous research that used dependent group contingencies in physical education (Vidoni et al., 2012; Vidoni & Ward, 2006) and produced positive results after intervention. Vidoni et al. (2012) used a multi-element design when implementing the Fair Play Game intervention package in one eighth-grade class. The results showed that Fair Play Game was effective under all treatment conditions. This current study systematically replicated the Fair Play Game strategy implemented by Vidoni et al. (2012), but with three sixth-grade classes using pedometers instead of heart rate monitors. This systematic replication was beneficial because besides producing similar findings as the previous study, the intervention in three classes with a multiple baseline design provided verification of baselines and replication of the effects of the treatment.

This study perceived dependent group contingency as an informal accountability system. Although formal evaluation (i.e. grades) was not part of the study and the fair Play Game package such as goal-setting chart, monitoring of the unidentified student, prompts, positive pinpointing and group incentives had an impact on students' active behaviours in the lessons. Since Fair Play Game is an intervention package, it is difficult to attribute the increase in number of steps to one component of the strategy. For example, pedometers per se can be seen as motivators to increase active behaviours (Basett, 2000; Gardner & Campagna, 2011). However, the results of this study showed that although students were wearing pedometers before and after intervention, a significant increase in number of steps occurred after Fair Play Game was implemented in all three classes.

This study makes contributions to existing research in group contingencies and in students' engagement in physical education classes. First, this study provides evidence that a dependent group contingency strategy can be used to increase physical education students' active behaviours during lessons. Second, the study demonstrates that Fair Play Game is a feasible and acceptable strategy to be used with sixth-grade students. Third, the study shows that pedometers are effective instruments to be used in the implementation of Fair Play Game. In fact, pedometers are considerably simple and inexpensive instruments compared with heart rate monitors and can be more affordable for teachers to acquire in school settings. Finally, this study provides evidence that Fair Play Game can be used to hold students accountable in three sixth-grade classes and with a meaningful but inexpensive type of reinforcer.

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This study presented some limitations. First, this study was conducted in three classes during 17 lessons. A longer unit would provide more opportunities to replicate the effects of the intervention in Classes 1 and 2, and also to withdraw the treatment on Class 3. Due to the length of the unit of instruction, opportunities to assess maintenance were limited. Second, students' number of steps was the only dependent variable assessed in this study. Pedometers are considered objective and accurate devices to measure physical activity (Bassett, Cureton, & Ainsworth, 2000). However, they do not distinguish between walking and running patterns (Bassett, 2000). Therefore, this study cannot support that Fair Play Game produced changes in students' moderate to vigorous physical activity. Future research could assess students' physical activity intensity with more sophisticated electronic devices such as accelerometers. In addition, future studies could also assess the effects of Fair Play Game on students' opportunities to respond to and correct trials, during practice and games in different physical education instructional units and grade levels.

Conclusion

Fair Play Game is a pedagogical strategy that aims to improve contextual behaviours in physical education. Although active engagement seems to be a common sense in physical education classes, it has been reported that the time students engage actively in moderate to vigorous physical activity is not enough to meet national recommendations (Scruggs, Mungen, & Oh, 2010). The results of this study show that Fair Play Game was an adequate strategy in addressing this context-specific behaviour. However, contextual behaviours in physical education should not be limited to active behaviours. Teachers can implement the Fair Play Game strategy to increase students' performance of positive social behaviours such as respecting others, accepting victory and loss in competitive activities, and being caring towards others inside and outside the gym.

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