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The impact of a physical activity session on Year Two students' subsequent classroom behaviour

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Abstract

The purpose of this study was to examine the impact of a 30-minute physical activity (PA) session on Year Two students' subsequent classroom behaviour. Forty-eight students from three Year Two classes at a NSW private school participated in the study. The number of disciplinary comments directed by the class teacher to individual students (Individual Disciplinary Corrections, IDC) and the class as a whole (General Disciplinary Corrections, GDC) were recorded during a 30-minute lesson with and without previous PA. Subsequent to PA, there were 40% fewer IDCs ($p=0.008$) and 59% fewer GDCs ($p=0.003$), amounting to a 49% overall reduction in disciplinary corrections ($p=0.012$). The PA session had a positive effect on the Year Two students' classroom on-task behaviour, as measured by a reduction in disciplinary corrections directed by the class teacher. These findings highlight the potential value of physical activity as a strategy for increasing student classroom on-task behaviour.

Introduction

There are many benefits of regular physical activity (PA) for children, most noteworthy being improvements in health and physical development. However, regular physical activity may also confer cognitive benefits (Heyn, Abreu, & Ottenbacher, 2004). Studies suggest that participating in

physical activity can improve short-term cognitive functioning and academic achievement (Bates, 2006; Tomporowski, 2003). Castelli, Hillman, Buck, and Erwin (2007) found that physically fitter students achieved better outcomes in tests of numeracy and literacy.

More recently, there has been an increasing interest in the role of PA on children's behaviour. Many teachers perceive that PA improves children's subsequent classroom behaviour and that excluding PA from a regular school day results in more behavioural problems (Morgan & Hansen, 2008). Studies suggest that by incorporating a PA session either prior to or during an academic lesson, students display increased levels of on-task behaviour in class (Grieco, Jowers, & Bartholomew, 2009; Mahar et al., 2006). Indeed, Mahar et al. (2006) found that including 10-minute low-intensity PA breaks into the classroom improved student on-task behaviour by eight percent. Further, work by Morgan & Hansen (2008) suggests if students are involved in PA on a daily basis they are more receptive to learn, more able to concentrate and produce higher quality work.

While these studies show a link between PA and increased attentiveness and on-task behaviour, more research is required. Specifically, a greater understanding of the optimal type and timing of PA to enhance classroom behaviour is needed. The purpose of this study was therefore to examine the influence of a 30-minute block PA session on subsequent classroom on-task behaviour. The findings of the study may inform the use of PA as a strategy to facilitate classroom management.

“There are many benefits of regular physical activity for children, however, regular physical activity may also confer cognitive benefits”

Methods

Study participants

Consent to participate in the study was achieved for 48 students, 20 girls (41%) and 28 boys (59%), from three Year Two classes at a NSW private school. All three teachers were female and had a minimum of seven years teaching experience.

Study design and protocols

The study was of a comparative design. In each of the three classrooms, the researchers observed eight 30-minute lessons: four lessons with no previous PA (No-PA) and four lessons immediately following a PA class (Post-PA). To reduce confounders, all observed lessons were similar in content and structure, occurred at the same time of day and did not directly follow recess or lunch during which the participants may have engaged in physical activity. To familiarise the researchers with the setting and the procedures incorporated in observing and recording the observations, several class periods were used as practice sessions.

The PA classes in which students participated for the Post-PA trials were 30 minutes in duration and involved various physical activities of a moderate-intensity.

During the in-class observations the researchers positioned themselves in an inconspicuous place in the classroom so as to avoid interference with the regular management and operation of the classroom. Throughout the lesson, the researcher(s) recorded all disciplinary corrective words or actions from the teacher that were directed at individual students (Individual Disciplinary Correction, IDC) or the class as a whole (General Disciplinary Correction, GDC). IDC referred to any comment made to a specific student by the teacher with the intent of correcting the student's behaviour. GDC described any comment made to the class collectively by the teacher with the intent of correcting the class' behaviour.

At the end of the lesson the total number of IDCs and GDCs were quantified. The data were then pooled for the three classes to compare the difference between the No-PA and Post-PA lessons.

Statistical analyses

The data were analysed using Microsoft Office Excel (2003) and are presented using descriptive statistics and figures. A paired T test was used to assess differences in the number of disciplinary corrections (GDC and IDC) between the No-PA and Post-PA trials. The 0.05 level of significance was adopted.

Figure 1: Comparison of IDCs, GDCs and total disciplinary corrections between the No-PA and Post-PA trials

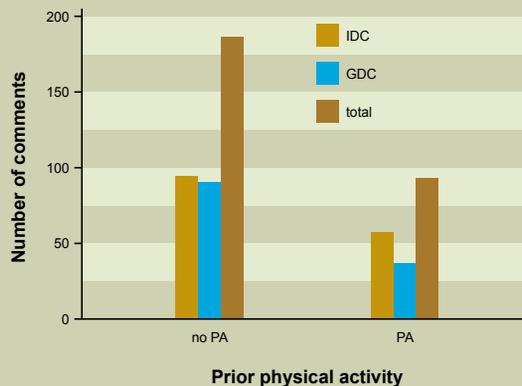
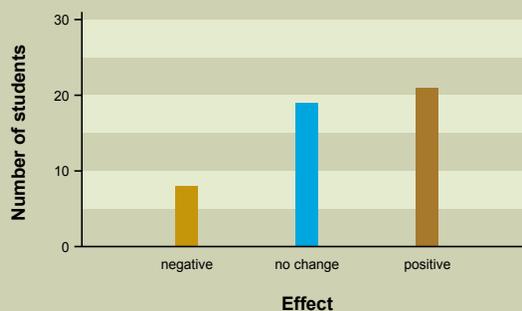


Figure 2: The number of students who recorded a positive, negative or no change in the number of IDCs in the Post-PA lessons as compared to the No-PA lessons



Results

As shown in Figure 1, there was a 40% decrease ($p = 0.008$) in the number of IDCs Post-PA compared to No-PA, and a 59% decrease in GDCs ($p = 0.003$). This represented a 49% difference ($p = 0.012$) in the total number of disciplinary corrections between the No-PA and Post-PA trials.

The effect of PA on class behaviour is further illustrated in Figure 2, which shows the number of students for whom PA had a positive, negative or no change in the number of IDCs in the Post-PA compared to the No-PA. While no difference in the number of IDCs were recorded for 40% of students,

Figure 3: The number of disciplinary corrections for the three classes presented separately

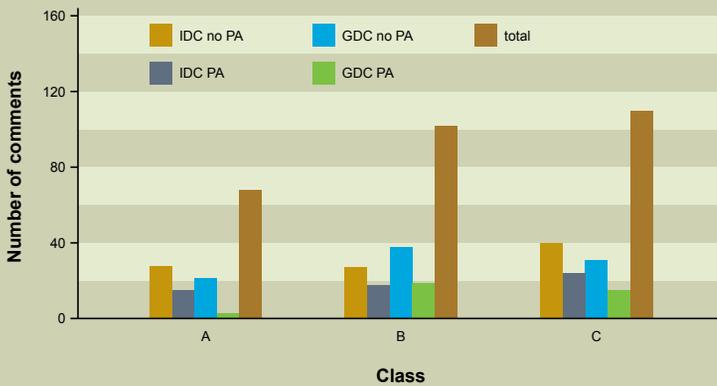
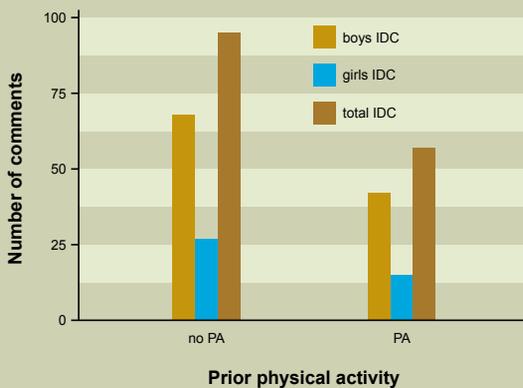


Figure 4: The number of IDCs directed to boys and girls



44% of students received less IDCs as compared to only 16% who recorded more.

While there were differences between the three classes in the number of disciplinary corrections, Post-PA recorded fewer disciplinary corrections ($p < 0.05$) than No-PA for all classes (Figure 3).

The number of IDCs directed to boys was greater than girls in both No-PA and Post-PA lessons (Figure 4). However, both boys and girls had similarly fewer (boys—38%, girls—44%) IDCs in the Post-PA as compared to the No-PA.

Discussion

The results of this study indicate that a 30-minute PA lesson involving moderate-intensity physical

activities results in fewer disciplinary corrections and actions from the teacher during a subsequent classroom-based lesson. Noteworthy, the total number of disciplinary corrections following PA was approximately half that recorded during a classroom lesson that was not preceded by PA. Assuming disciplinary corrections to be a surrogate for general classroom behaviour, the results of this study suggest that PA is an important classroom management consideration.

It was anticipated that fewer disciplinary corrections would be recorded following the PA session, however, the extent of the difference between the No-PA and Post-PA condition was higher than expected. Mahar et al. (2006) only observed an eight percent improvement in classroom on-task behaviour following a PA session, as compared to the almost 50% observed in this study. The disparity between the findings of the present study and those of Mahar and associates may be explained by the duration and/or intensity of the PA prescribed in the studies.

With regards to duration, Mahar et al. (2006) trialled a 10-minute episode of PA incorporated into the classroom whereas the present study involved a more formal 30-minute PA session. The current National Physical Activity Guidelines recommend children engage in 60 minutes of moderate to vigorous-intensity PA each day, although this can be achieved in 10 minute “chunks” (Department of Health and Ageing (DoHA), 2007). While it seems that the longer duration PA may achieve better subsequent behavioural outcomes, the advantage of using 10-minute “brain break” chunks is that they may be more easily interspersed into the school day. Further, as they are less time consuming, they may be used on several occasions throughout the day, such that the benefits of PA breaks can be utilised repetitively. The advantage of using a more formal PA session of longer duration is that it helps students achieve their daily PA requirements. Indeed, it has been stated, “physical inactivity is one of the most important health problems of the 21st Century, and may even be the most important” (Blair, 2009, p.1). It is estimated that physical activity levels have decreased by approximately 60–70 percent in the past 30–40 years, which equates to walking about 15 km less every day (Vogels, Egger, Plasqui, & Westerterp, 2004). Children are often spending more than 7 hours a day using televisions, computers, phones and electronic devices for entertainment (American Academy of Paediatrics, 2010), which is greatly contributing to sedentary behaviours. For this reason, peak bodies are encouraging parents to limit their children’s “screen time” to not more than two hours per day

(Heart Foundation, n.d.). Schools need to be part of a solution to the inactivity crisis that is infiltrating children, and incorporating more PA into the school day is an important step towards achieving this.

With regard to PA intensity, the study by Mahar and colleagues (2006) only involved light-intensity activities as compared to the present study that involved more moderate-intensity PA. By definition, light-intensity PA is described as that which would be rated as only a 1–2 out of 10 in effort (Norton, Norton, & Sadgrove, 2010). For comparison, moderate-intensity PA is deemed as a 3–4 out of 10 in effort, producing a noticeable increase in breathing rate. While the National Physical Activity Guidelines recommend children engage in daily moderate-intensity, or even vigorous-intensity (5–6 out of 10 in effort), physical activity for good health, the results of the study by Mahar and colleagues suggest that even lower intensity activities are beneficial from a behavioural perspective. The advantage of lighter-intensity activities is that they can more readily be performed in the classroom, which may be more pragmatic.

In summary, while the longer duration and higher intensity of PA employed in the present study appeared to be associated with better behavioural outcomes than the shorter duration and lower intensity PA used by Mahar et al. (2006), it is acknowledged that performing regular 30-minute PA sessions might not be feasible in the current educational context. Further research is needed to determine the most efficacious quantity, intensity and timing of PA to affect optimal behavioural outcomes. However, one important conclusion is that regardless of the mode or structure, incorporating PA into the classroom is likely to improve classroom on-task behaviour that may translate to enhanced learning outcomes. Consequentially, teachers should give careful consideration to the inclusion and scheduling of PA in their programs. This may require curriculum-planning administrators to offer teachers a flexible curriculum that allows them to incorporate PA sessions on a daily basis. Furthermore, teachers should not exclude students from PA as a form of behavioural punishment as it may indeed exacerbate disruptive behaviours.

It is unremarkable that the students in the study appeared to respond differently to a previous PA session, as reflected in the number of IDCs directed to them in the subsequent classroom lesson (Figure 4). Clearly, different students respond uniquely to the same stimuli. However, since a far greater proportion of students (44%) responded positively to the PA than those who responded negatively (16%), including PA into the classroom is warranted.

It is also interesting that there appeared to be no difference between the boys and girls in their responsiveness to the PA. Boys have been reported to misbehave more in the classroom than girls (Rollin, 2003; Gilbert, 2002) so it was not surprising that the boys received more IDCs than the girls in this study, both with and without previous PA. However, it is somewhat surprising that the difference made by previous PA was similar for both genders. This suggests that applying PA into the classroom environment is a worthwhile strategy for both genders.

It is acknowledged that there are several limitations of this study. Firstly, the study sample was small. Secondly, while effort was made to create consistency between the lessons observed with and without previous PA by ensuring they occurred at the same time of day and were similar in terms of content and structure, there are other factors that may have affected the students' behaviour on a given day. For example, changes in weather may affect students' behaviour. Also, the varying circumstances of the children's life, and indeed that of the teacher, may have affected the number of disciplinary corrections that occurred in the classroom.

In conclusion, the deleterious consequences of physical inactivity from a health perspective are well-established and have led to the development of National Physical Activity Guidelines for children. This study contributes to the growing literature suggesting that PA is also important for cognitive and behavioural reasons. Teachers and school administrators should give consideration to intentionally harnessing the benefits of PA as a classroom management strategy. Further research is needed to investigate the optimal duration, intensity and timing of PA into the school day to achieve optimal learning outcomes. **TEACH**

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