

Introduction

With youth overweight and obesity rates at about 40% in South Carolina, strategies to combat childhood obesity are a pressing need.¹ One impactful strategy for combating childhood obesity is to increase children's accumulation of moderate-to-vigorous physical activity (MVPA). Schools play a vital role in doing just that because schools have tremendous reach, with 98% of children attending school over six and a half hours a day for about nine months out of a calendar year. Additionally, schools have the infrastructure and staffing to provide students with opportunities to be physically active. School-based physical activity promotion programs are one of the most promising avenues for promoting children's MVPA, and targeting multiple segments (e.g., physical education in addition to classroom lessons) throughout the school day has been shown to be the most effective.



Activity monitor worn on wrist

Professional Development Trainings

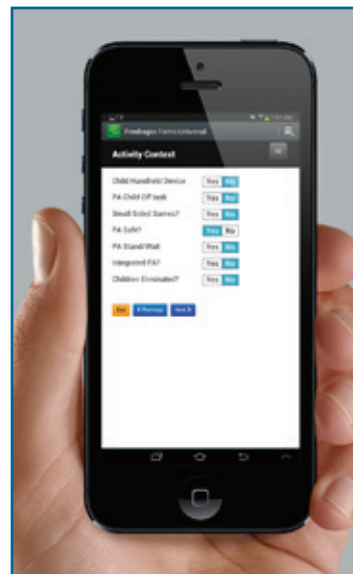
Recognizing the need to combat childhood obesity in South Carolina, the University of South Carolina's (USC) Arnold School of Public Health and College of Education and the South Carolina Department of Health and Environmental Control (DHEC) partnered with elementary schools in one local school district to provide professional development opportunities for classroom and physical education teachers in an effort to increase children's physical activity throughout the school day. The partnership is to last from January 2016 to May 2018. During this partnership, the Arnold School of Public Health and College of Education will

work collaboratively with the school district to develop, deliver and evaluate the professional development opportunities. DHEC is providing technical support and serving in an advisory role. The professional development opportunities are to be integrated into regularly scheduled trainings and are guided by a teacher-driven professional development approach that ensures trainings and ongoing support is authentic, timely and relevant. Should this program prove effective, DHEC is committed to providing similar trainings across South Carolina.

Program Evaluation

Our collaborative team has also undertaken an extensive evaluation to determine children's physical activity and teachers' implementation of the physical activity promotion strategies during classroom and physical education time. This was accomplished using two evaluation techniques. First, children attending elementary schools wore accelerometers for up to three days in the fall and spring of the 2015-2016 school year (a total of six days). Accelerometers measured the amount of physical activity children accumulated during regular school hours.

The collected physical activity data is compared to the Institute of Medicine Report "Educating the Student



Example SOFIT+/SOSMART
Mobile Screen

Body, Taking Physical Activity and Physical Education to School," which calls for children to accumulate a minimum of 30 minutes of MVPA during each school day and for children to spend 50% of physical education lesson time in MVPA. Second, trained observers completed systematic observation scans using the System for Observing Fitness Instruction Time (SOFIT)+ during physical education and the System for Observing Student Movement in Academic

Routines and Transitions (SOSMART) during general classroom time. These instruments capture physical education and classroom teachers' promotion of physical activity, respectively.

Partnership Accomplishments

Physical Education Professional Development Training

During the 2015-16 school year, our collaborative team developed and delivered a physical education professional development training for physical education teachers. The professional development training was developed in conjunction with three physical education teachers in the local school district in the fall semester of 2015. The training revolved around the LET US Play physical education principles of removing Lines; eliminating Elimination; reducing Team size; and getting Uninvolved students involved; by modifying Space, equipment and rules. These are no-cost strategies that align with state physical education standards and can be integrated into daily physical education lessons. Then, during the spring semester of 2016, USC delivered a 90-minute professional development training, along with two follow-up booster trainings to all elementary physical education teachers in the local school district.

Children's Activity Levels During Physical Education Lessons

A total of 271 children's activity levels were measured during physical education.

In the fall of 2015, boys spent an average of 41.6% of lesson time moving and 14.5% of physical education lessons engaged in MVPA (MVPA: moving at a speed/intensity that is faster than walking). Following the professional development training in the spring of 2016, boys spent an average of 53.1% of lesson time moving and 21.2% of physical education lessons engaged in MVPA.

In the fall of 2015, girls spent an average of 36.0% of lesson time moving and 10.9% of physical education lessons engaged in MVPA). Following the professional development training in the spring of 2016, girls spent an average of 45.0% of lesson time moving and 14.7% of physical education lessons engaged in MVPA.

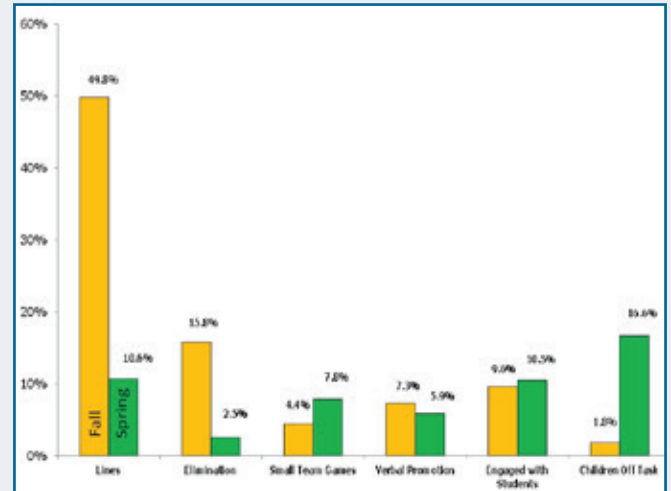


Figure 1. Changes in PE Class Context from Fall 2015 to Spring 2016

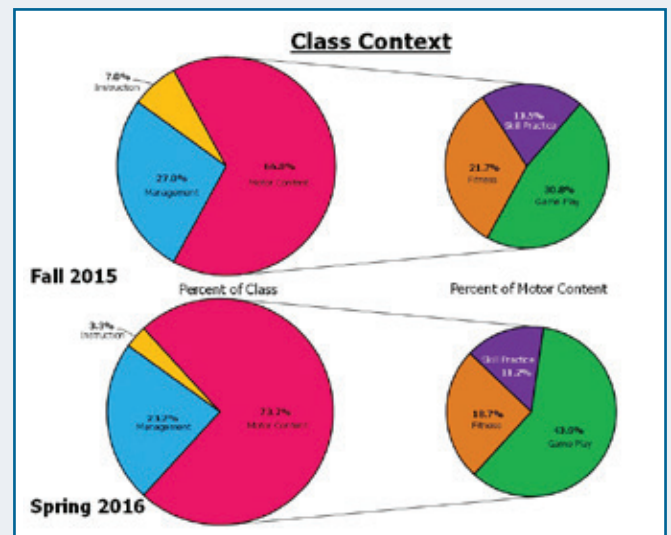


Figure 2. Changes in Teacher Behaviors and Activity Structure from Fall 2015 to Spring 2016

Environment

Findings from the System for Observing Fitness Instruction Time+ observations are presented in Figures 1. and 2. Overall, five of seven teacher behavior and activity structure variables moved in the desired direction following delivery of the professional development training. The largest change was in removing lines (45.3% vs. 12.6% of lesson time). Activities that included elimination also were reduced from the fall to spring (9.3% vs. 2.9% of lesson time). Conversely, small-team games increased from 2.5% to 5.8% of lesson time while teachers took their physical education classes outdoors much more often in the spring than in the fall (17.0% vs. 41.0%). Teachers' verbal promotion of physical activity and teachers' engagement with children remained stable from fall to spring. Further, children were off task more often in the spring than in the fall (2.0% vs. 14.0% of lesson time).

It is unclear why students were off task more often in the spring. However, this may be because increased motor content allowed children more opportunities to engage in off task behavior. Another possibility is that increasing the number of lessons taught outdoors led to an increase in distractions, and in turn, more students were off task. Regardless of the reason, strategies to increase verbal encouragement of physical activity and reduce children's off task behavior will be emphasized in the physical education professional development training delivered this coming fall (2016).

Classroom Teacher Professional Development Training

During the spring 2016 semester, we also collaborated with 10 elementary classroom teachers to develop professional development training for integrating movement into general education classrooms. Movement integration has been shown to increase academic test scores, time on task and children's physical activity. This training will be ready for delivery to all elementary classroom teachers in the local school district prior to the fall 2016 academic semester. All findings related to children's activity levels during general education classroom lessons and the physical activity environment of general education classroom lessons represent baseline findings as no professional development has been delivered to classroom teachers.

Children's Activity Levels During General Education Classroom Lessons

While our team is still developing the General Education Classroom Teacher Physical Activity Promotion training, the data on children's physical activity levels during classroom lessons can provide information on where the local school district currently stands. During general education classroom lessons, boys accumulated an average of 14.3 minutes of MVPA, while girls accumulated an average of 12.6 minutes. For boys this represents approximately half and for girls one-third of the Institute of Medicine's recommended 30 minutes of MVPA per day during school hours.

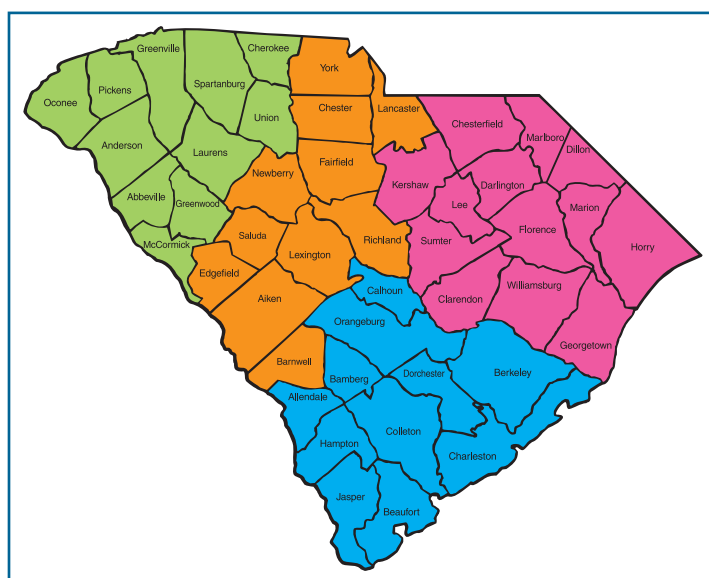
General Education Classroom Physical Activity Environment

On average, teachers incorporated physical activity promotion strategies for 5.1% of the observation time (range 0.0%-22.9%) and 17 of the 44 teachers (39%) never incorporated a physical activity promotion strategy. We expect that our collaborative team's trainings in the fall of 2016 will greatly increase the occurrence of physical activity promotion strategies during general education classroom lessons and the number of teachers that incorporate these strategies.

Next Steps

Our collaborative team will continue to deliver the professional development training to the elementary physical education teachers and begin delivering the professional development training to the elementary classroom teachers in the local school district.

Furthermore, our collaborative team will apply the lessons learned during this project to the rollout of a statewide physical activity promotion training program. Our team has adopted a train-the-trainer model and the rollout will be conducted using a phased-in approach. By the summer of 2017, elementary classroom and physical education teachers from one DHEC public health region will be recruited and trained to deliver trainings to school districts in their region during the 2017-2018 school year. Additional trainers from the remaining three DHEC public health regions will be recruited each following year with the goal of training each school district in South Carolina.



Summary of Findings

Physical Education Lessons

- A total of 176 physical education lessons were observed using the System for Observing Fitness Instruction Time+ and 271 children's activity levels during physical education were measured.
- In the fall of 2015, boys spent an average of 41.6% of lesson time being physically active and 14.5% of the time in MVPA (MVPA – moving at a speed/intensity that is faster than walking). Following the professional development training in the spring of 2016, boys spent an average of 53.1% of lesson time being physically active and 21.2% of the time in MVPA.
- In the fall of 2015, girls spent an average of 36.0% of lesson time being physically active and 10.9% of the time in MVPA. Following the professional development training in the spring of 2016, girls spent an average of 45.0% of lesson time moving and 14.7% of the time in MVPA.
- Overall, five of seven teacher behavior and activity structure variables moved in the desired direction following delivery of the professional development training. However, while there were increases in the percent of children meeting the Institute of Medicine guideline of 50% of time in MVPA during physical education, the overall percent of children meeting this guideline remained low (21.2% of boys and 14.7% of girls). Additional strategies may be necessary to further increase the percent of children engaged in MVPA for 50% of physical education lessons.

Classroom Time*

- A total of 53 general education classroom lessons were observed using the System for Observing Student Movement in Academic Routines and 953 children's activity levels were measured during classroom time.
- Boys accumulated an average of 14.3 minutes of MVPA during classroom time.
- Girls accumulated an average of 12.6 minutes of MVPA during classroom time.
- On average, teachers incorporated physical activity promotion strategies for 5.1% of classroom lesson time (range 0.0%-22.9%). Further, 17 of the 44 teachers (39%) never incorporated a physical activity promotion strategy.

**Professional development training for integrating physical activity into general education classrooms will occur in the fall of 2016 academic semester. Activity levels and teacher integration of physical activity represent baseline measurements only.*

References

1. 2015 South Carolina Statewide Children's Health Assessment Survey Results.