HOW WE TEACH | K-12 Outreach

Elementary school classroom physical activity breaks: student, teacher, and facilitator perspectives

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Submitted 7 January 2019; accepted in final form 18 February 2019

Mullins NM, Michaliszyn SF, Kelly-Miller N, Groll L. Elementary school classroom physical activity breaks: student, teacher, and facilitator perspectives. Adv Physiol Educ 43: 140–148, 2019; doi: 10.1152/advan.00002.2019.—Current physical activity (PA) guidelines recommend that children accumulate at least 60 min of PA each day, and that adults should collaborate across sectors to increase opportunities for PA. Implementing brief classroom PA breaks (CPABs) is one way to help increase daily PA. The primary purpose of this study was to determine perceptions of a 14-wk CPAB program among elementary school children, in the first through fourth grades (n = 254), at a suburban elementary school, and their teachers (n = 18). The CPAB program was implemented by university exercise science students, and student and teacher perceptions were assessed through surveys. The children reported that the CPABs were very fun (86%), provided them with a nice break during the school day (88%), were very good for their health (94%), helped them feel more ready to learn (71%), and learn better (50%). The teachers reported that the students really enjoyed the CPABs (100%), that encouraging students to be physically active was either very important (83%) or important (17%), and that they were either very confident (72%) or confident (28%) that they themselves could lead the CPABs. No teacher reported that the CPABs hindered classroom learning. CPABs appear to be enjoyable to both students and teachers, easy to administer, and supportive of learning. Recommendations for improvements within the present collaboration were minimal and could be easily addressed with firmer entrenchment of the program. This collaboration was beneficial and fun for the vast majority involved, and others are urged to implement similar programs.

INTRODUCTION

More than 200 yr ago, Thomas Jefferson provided an array of life advice, with a heavy focus on education and exercise, in a letter to his 15-yr-old nephew. Along with urging diligent studying, Jefferson specifically addressed the necessity of taking breaks from academic efforts to exercise.

In order to assure a certain progress in this reading, consider what hours you have free from the school and the exercises of the school. Give about two of them, every day, to exercise; for health must not be sacrificed to learning. A strong body makes the mind strong (28).

Innumerable others have long advocated regular physical activity (PA) as vital to learning, yet school days in America generally involve prolonged periods of sitting, with relatively few movement opportunities. A majority of states, but not all, require physical education (PE), and those that do allow tremendous variability with regard to time requirements, teacher qualifications, assessment practices, and acceptable substitutions (54). At the elementary, middle, and high school levels, respectively, only 78, 74, and 88% require PE, and only 38, 30, and 12% mandate a specific number of minutes per week for student participation. At those same grade levels, 30, 14, and 4% of schools do not require PE to be taught by teachers who are licensed in the discipline. Forty-four percent of school districts nationwide do not require student assessment in PE, and 38% allow students to substitute other activities for PE. In addition, although recess can provide other important opportunities for school PA, only two states in the nation require it; 26% of states encourage it (27).

The statistics above manifest a reduction in support for school PA that occurred, in part, due to unintended consequences of the No Child Left Behind Act (NCLB) of 2001 (41) (see https://www.congress.gov/107/plaws/publ110/PLAW-107publ110.pdf for a copy of the law). NCLB initiated a sweeping overhaul of elementary and secondary education in the United States, by imposing strategies aimed at improving school performance in “core” academic subjects, like English, math, and science. For core subjects, the federal government mandated numerous accountability measures, including annual assessment of student performance, provision of highly qualified teachers, and remedial actions for poor school performance. For noncore subjects, however, including physical and health education, a deemphasis on their importance led to widespread reductions in allocated time and resources. The Center on Education Policy reported that, by year 5 of NCLB, 44% of school districts had reduced time from noncore subjects and recess, by an average of 30 min/day, to provide more instructional time for core subjects (38).

NCLB’s successor, the Every Student Succeeds Act of 2015 (15a) (see https://www.govinfo.gov/content/pkg/PLAW-114publ95/pdf/PLAW-114publ95.pdf for a copy of the law), has been touted as a “game changer” (https://www.shapeamerica.org/advocacy/upload/ESSA-fact-sheet-SHAPE-America-temp.pdf), through its specification that PE is to be part of a “well-rounded education” (Ref. 15a, see 129 STAT. 2099). The law, however, is still nowhere near full implementation, and true “game changing” will be the work of state governments and local agencies. Under this law, each state is to receive a federal block grant and then to allocate funds to local school districts. Each...
district, in turn, ultimately determines how to use the funds “to develop, implement, and evaluate comprehensive programs and activities,” which “support safe and healthy students” (Ref. 15a, see 129 STAT. 1978). At the local level, those who want funding for their programs will have to advocate for them.

The relative inattention to PA in schools is incongruous with the expansive evidence as to its benefits. Researchers have repeatedly demonstrated higher academic achievement (5, 7, 15, 32, 49, 59) and better school attendance (5, 68) among children who are more physically active and more fit. The current PA guidelines for Americans recommend that children and adolescents accumulate at least 60 min of PA each day, composed of activities that stimulate both the cardiovascular and musculoskeletal systems, at both moderate and vigorous intensities (62). To increase the likelihood that young people meet these recommendations, the guidelines urge adults to collaborate across sectors to increase opportunities for PA both during and outside of school. PE can importantly contribute to youth PA and fitness, but many more contributors are needed. Even in the best case scenarios, PE classes “are likely to provide only 10–20 minutes of vigorous- or moderate-intensity physical activity per session” (Ref. 27, see p. 1-5). Moreover, many students who are not athletically skilled may have negative feelings toward PE and can benefit from engaging in other types of PA, during which they can associate movement with fun, learning, inclusion, and health. Accordingly, a number of organizations, including the National Association of State Boards of Education (40), the Institute of Medicine (IOM) (27), the Centers for Disease Control and Prevention (9), and Shape America (54), all recommend a more expansive approach to creating “a culture of physical activity that is integrated throughout the school environment and reaches beyond the school and into the community” (Ref. 9, see p. 16). The IOM urges all people involved in the functioning of schools to “operate in a coordinated and dynamic manner to provide access, encouragement, and programs that enable all students to engage in vigorous- or moderate-intensity physical activity 60 minutes or more each day” (Ref. 27, see p. 1-12). It advocates the provision of multiple opportunities for movement throughout the school day, “including travel to and from school, school-sponsored before- and after-school activities, recess and lunchtime breaks, physical education classes, and classroom instructional time.”

Integrating PA into academic lessons is not a new concept, as it has long been known that movement can enhance learning (17, 23, 47). Nevertheless, the term “movement integration” has become more prominent in recent years, with increased study of the benefits and barriers associated with integrating PA into classroom lessons (20, 44, 66, 67). Despite the high benefit-to-barrier ratio, movement integration remains a greatly underutilized pedagogical strategy, perhaps because many people still consider the primary places for movement at school to be PE classes and recess, and perhaps because many are inactive themselves. To promote improvements in health and learning, it is essential for more people to recognize movement as assistive to teaching cognitive and social skills, and, accordingly, the IOM specifically encourages classroom teachers to use lesson plans that incorporate movement as a means of providing an “experiential approach to instruction” (Ref. 27, see p. 8-3).

Ten- to fifteen-minute school-day PA breaks not only increase daily PA (3, 21, 32, 36, 57), but are also associated with higher academic achievement (3a, 15, 32), greater on-task behavior (3a, 6, 32, 36, 56), and positive affect (26, 56, 63). For children, classroom movement breaks provide opportunities to increase energy expenditure, enhance physical competency, diversify social interactions, and ingrain habits of daily PA. For teachers, they provide opportunities to enhance academic learning with movement integration, to change classroom dynamics when student attention begins to wane (19), and to demonstrate the importance of daily PA. Classroom teachers of all ages and ability levels can lead simple movement activities within their classrooms, negating the need for additional personnel or space. Previous studies implementing classroom PA breaks (CPABs) have reported that both students and teachers enjoyed participating (3, 19), that students became more excited about school because of the activities (3), and that teachers increased their own activity levels because of their involvement (19). In addition, teachers have reported no adverse effects on academic performance (3, 10).

Still, very few schools ensure the systematic implementation of CPAB programs. It is possible that increased dissemination of supportive, qualitative data among broader audiences could help enhance incentives. Countless articles, published over decades, have appeared in journals for PE and education professionals, but, in a sense, they “preach to the choir.” Greater publicity of successful CPAB program implementation among professors and students in the exercise sciences, as well as in the local media, could motivate the implementation of similar collaborative efforts toward school and community health.

The primary purpose of this study was to generate quantitative and qualitative data on student and teacher perceptions of an elementary school CPAB program, implemented through collaborative efforts between faculty and students from a university exercise science department and a local elementary school. A secondary purpose was to present a model of effective program implementation and positive collaboration, which provided elementary school students with fun and daily PA; undergraduate students with opportunities to develop skills in PA advocacy, teaching, youth mentoring, program administration, interprofessional communication, and research; and elementary school leaders with a means of implementing nationally recommended strategies for increasing PA.

METHODS

Procedures. Student and teacher perceptions of a CPAB program were assessed in 16 first- through fourth-grade classrooms at a suburban elementary school in northeastern Ohio. With a 20:1 student-to-teacher ratio, the school serves ~450 students in kindergarten through grade 4, who placed in the top 5% of Ohio schools for overall test scores and who are predominantly white (https://www.public-schoolreview.com/hilltop-elementary-school-profile/44406). A total of 272 surveys were collected from students (n = 254) and teachers (n = 18), with overall participation rates of 83.6% from the students and 100% from the teachers. Youngstown State University’s Institutional Review Board approved the study, and all participants provided written, informed consent or assent before participation. All data were collected during the Spring semester after 14 consecutive weeks of CPAB implementation.

Classroom physical activity breaks. An exercise science student led daily, 10-min PA sessions, within all 16 classrooms, over the course of the 5-day school week, for 14 consecutive weeks. The program was established over the course of three semesters, with a different exercise science intern administering the program each term. Data were collected
during the third term. The first intern, in conjunction with the classroom teachers, established the daily schedule and began to amassed a collection of in-class PAs. This intern shared the collection with her successors, who then added to the collection. The interns designed movement activities using ideas from previously established programs, such as Katz (29) and North Carolina Healthy Schools (42), as well as using their own creativity to integrate movement with lessons on anatomy (e.g., muscle names and actions), physiology (e.g., heart rate responses), general exercise science (e.g., benefits of regular PA), and classroom teachers’ current subject matter. There are now numerous free online resources available to help establish a repertoire of CPAB activities. Materials used throughout the program were inexpensive and easy to obtain and included such items as popsicle sticks, balloons, paper plates, poster board, markers, and playing cards.

During any given term, one intern managed the entire program and led all CPABs within a given day. Although this task made for very full days, all three interns handled it, largely alone, throughout their respective terms of service. The CPAB activities were brief and easy to lead, which made the program feasible. On three to four occasions throughout the term, the intern’s supervising professor and one or two current exercise science students observed and assisted. This provided a means of sparking interest in the program among future interns, which is important for continuity. Table 1 provides a sample daily CPAB schedule, which can be modified to suit a given school’s hours of operation and number of classrooms. Although daily CPABs are desirable, 1 day could be cycled out of each classroom’s rotation to make the program more feasible, within larger schools.

**Measurement instruments.** Students and teachers completed 16- and 18-item questionnaires, respectively, at the end of the academic semester. The questionnaires were designed using ideas from Hernández-Garbanzo (25), Patton et al. (46), Prusak et al. (48), and Smith (56), but adapted to include questions specific to the objectives of the current investigation.

The children’s questionnaire was written at a 1.0 grade level, as assessed using the Flesch-Kincaid readability test. Children were informed that the questionnaire was not a test and that there were no right or wrong answers. Each question and response choice were read aloud to the children, with the direction that they should circle only one response for each question and answer honestly, based on how they felt, not on how their friends or anyone else felt. The response options were limited to three, with small accompanying emojis to help characterize them. The use of emojis may help young children better understand and express their feelings, with limited adult input, compared with the use of words alone (16). Among the students in attendance, with completed consent forms on the day of survey administration, the participation rate was 100%, with a completion rate of 90.3%.

The teachers’ questionnaire consisted of 13 multiple-choice questions and five open-ended questions aimed at assessing perceptions of the benefits and disadvantages of the CPAB program, student reactions to it, and recommendations for improving it. The teachers’ participation rate was 100%, with completion rates of 89 and 94%, for the multiple-choice and open-ended question sections, respectively.

Perceptions of the interns and supervising exercise science professor (N.M.M.), considered the facilitators in this collaboration, were documented in the interns’ required internship logs and through the recommendations in this paper.

**RESULTS**

Tables 2 and 3 summarize responses from the Likert portions of the student and teacher questionnaires. Among the 254 children responding, 86% felt that the CPAB program was very fun, and 94% felt that it was very good for their health. Most students indicated that the activities gave them a nice break during the school day (88%), that they felt more ready to learn other subjects after the CPABs (71%), and that the breaks helped them learn better (50%). Most students (77%) felt that they could be physically active for at least 60 min/day on most days of the week, and that the CPAB could help them achieve that goal (74%). Eighty percent reported liking the CPABs very much, with 69% reporting that they always had fun, even if they were not good at an activity. Moreover, 88% knew that activities at which they did not excel could still be good for them. A majority of children (46%) perceived that all of their classmates could perform the classroom movement activities, but 40% indicated that they did not know about others’ abilities. Notably, 67% of the children reported having done some of the activities from the CPAB program outside of class.

Among the participating teachers, 100% reported that students really enjoyed the CPABs and that they gave the students a good break in the day. Most teachers reported that they also enjoyed the movement activities (94%) and the breaks that they provided (82%). The students seemed to be aware of their teachers’ behaviors, because 69% indicated that their teachers really enjoyed the activities, and 59% that their teachers made PA seem important. A majority of the teachers reported that students seemed more ready to learn other subjects after the CPABs (67%) and that the activities helped students learn better (56%). None of the teachers indicated that the classroom PAs hindered the students’ learning, and only one teacher (6%) indicated that she did not want to continue the CPAB program. This teacher voluntarily disclosed her response and clarified that she did not want to continue the program “as is,” as she thought that it should have “more structure.” All of the teachers agreed that encouraging students to be physically active was either very important (83%) or important.
Table 2. Student perceptions of a classroom physical activity break program

| Questions                                                                 | Sample Size, n | Very   | A Little | Not At All |
|---------------------------------------------------------------------------|----------------|--------|----------|------------|
| 1. Being physically active is fun.                                         | 254            | 86.2   | 12.2     | 1.6        |
| 2. Being physically active is good for my health.                         | 254            | 94.1   | 5.1      | 0.8        |
| 3. I like different kinds of physical activities that we do in class.      | 254            | 79.5   | 18.5     | 2.0        |
| 4. Even if I am not good at an activity, I have fun in our classroom physical activities. | 253            | 69.2   | 27.6     | 3.2        |

| 5. Everyone in my class can do the physical activities that we do in class. | 250            | 46.2   | 13.4     | 40.3       |
| 6. Even if I am not good at an activity, it can be good for me.            | 244            | 88.1   | 3.7      | 8.2        |
| 7. I feel safe doing physical activities in class.                         | 243            | 86.0   | 3.7      | 10.3       |
| 8. I think I can be physically active for at least 60 min per day on most days of the week. | 248            | 77.4   | 4.8      | 17.7       |
| 9. I think that the physical activities that we do in class can help me get at least 60 min per day. | 218            | 73.9   | 6.9      | 19.3       |
| 10. I have done some of the physical activities that we have done in class, outside of class. | 214            | 67.3   | 24.8     | 7.9        |
| 11. The physical activities that we do in class give me a good break during the school day. | 202            | 88.1   | 6.4      | 5.4        |
| 12. After we do physical activities in class, I feel more ready to learn other subjects. | 202            | 70.8   | 19.8     | 9.4        |
| 13. I think that the physical activities that we do in class help me learn other subjects. | 203            | 49.8   | 28.1     | 22.2       |
| 14. I think the physical activities that we do in class, get in the way of learning other subjects. | 202            | 25.7   | 57.9     | 16.3       |
| 15. My teacher seems to enjoy the physical activities that we do in class.  | 213            | 68.5   | 1.9      | 29.6       |
| 16. My teacher makes physical activity feel important.                      | 215            | 59.1   | 11.6     | 29.3       |

Values are in percent; n, no. of students.

(17%), and all were either very confident (72%) or confident (28%) that they could lead the CPABs. Over one-half of the teachers (56%) indicated that the CPAB program made them more aware of their own PA levels, with 33% agreeing that it could help them accumulate daily PA time. Most (72%) felt that it could help the students accumulate the recommended minimum of 60 min of PA per day.

Qualitative responses. Table 4 summarizes representative responses from the open-ended questions on the teacher questionnaire. The teachers supported their unanimous agreement that the children enjoyed the classroom PAs and that the PAs gave the children a good break during the school day, with statements like: “The children really look forward to the instructors coming in and being active,” and “Kids love the break from the everyday work.” They supported their majority view that students seemed more focused and/or involved in learning after the CPABs with responses like: “It energizes the kids and helps them focus on their work again.” The major disadvantage, implementing the CPAB program under time constraints, was consistent with that reported in other studies (1, 14, 18, 58, 67). Other factors identified as disadvantageous were possible injury and difficulty calming students after PA. Although there were no open-ended questions on the children’s questionnaire, several students reported their favorite activities. Figure 1 shows some of their responses.

DISCUSSION

While there is now substantial evidence demonstrating a high return on investment from CPAB programs (1, 3, 3a, 4, 6, 8, 13–15, 18, 20–22, 26, 32, 34–36, 51, 57, 58, 63, 67), their implementation is sporadic, rather than systematic, throughout the United States. Laissez-faire policies regarding PA in schools are ill-suited to stemming the tide of inactivity-asso-

Table 3. Teacher perceptions of a classroom physical activity break program

| Questions                                                                 | Sample Size, n | Very Important | Important | Not Important |
|---------------------------------------------------------------------------|----------------|----------------|-----------|--------------|
| 1. How important is it for you, as a classroom teacher, to encourage students to be physically active? | 18             | 83.3           | 16.7      | 0.0          |

| 2. How confident are you to lead classroom physical activity breaks?      | 18             | 72.2           | 27.8      | 0.0          |

| 3. The classroom physical activities give the students a good break during the school day. | 18             | 100.0          | 0.0       | 0.0          |
| 4. The classroom physical activities give me a good break during the school day.            | 17             | 82.4           | 11.8      | 5.9          |
| 5. After the classroom physical activities, the children usually seem more ready to learn other subjects. | 18             | 66.7           | 33.3      | 0.0          |
| 6. The classroom physical activities help students learn other subjects.                   | 18             | 55.6           | 44.4      | 0.0          |
| 7. The classroom physical activities hinder the students’ learning other subjects.         | 17             | 0.0            | 17.6      | 82.4         |
| 8. For the most part, the children enjoy the classroom physical activities.                | 18             | 100.0          | 0.0       | 0.0          |
| 9. For the most part, I enjoy the classroom physical activities.                           | 18             | 94.4           | 5.6       | 0.0          |
| 10. The classroom physical activities help the students get at least 60 min of physical activities a day. | 18             | 72.2           | 22.2      | 5.6          |
| 11. The classroom physical activities help me get ~60 min of physical activities a day.  | 18             | 33.3           | 33.3      | 33.3         |
| 12. The classroom physical activity program has made me more aware of my own levels of physical activity. | 18             | 55.6           | 16.7      | 27.8         |
| 13. I would like to continue implementing the classroom physical activity program.        | 18             | 94.4           | 5.6       | 0.0          |

Values are in percent; n, no. of teachers.
associated chronic disease, which continues to swell, despite ongoing educational efforts.

It has been said that “It takes a village” to promote physical activity (Ref. 24, see p. 23) and that, even where individuals recognize the benefits associated with increased activity, their behaviors can still be strongly influenced by community opportunities and public policies. Due to needs for greater systematic promotion of PA, several major health organizations are now advocating Comprehensive School Physical Activity Program initiatives, wherein all constituents of school districts

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### Table 4. Teacher perceptions of a classroom physical activity break program, expressed in response to open-ended questions

| Themes and Supporting Quotes |
|-------------------------------|
| **Perceptions of benefits** |
| “I enjoy having the students up and moving. They focus better afterwards.” |
| “The kids loved having movement time. When they missed a day, they really missed it.” |
| “The program gives students the opportunity for a ‘brain break’ and get physical activity.” |
| “It energizes the kids and helps them focus on their work again.” |
| “I really enjoy energizers. It really has improved kids learning/focus.” |
| “The children really look forward to the instructors coming in and being active.” |
| “Students are more activity involved in their learning of other subjects after moving around.” |
| “The kids love it!” |
| “I think it has heightened awareness of how important it is to get the children up and moving.” |
| “Kids love the break from the everyday work.” |
| **Perceptions of disadvantages** |
| “Nothing.” |
| “Some students think it is ‘uncool’ to do some of the activities.” |
| “None.” (4 responses) |
| “Limited classroom space.” (2 responses) |
| “I don’t see many disadvantages other than possible injury due to space limitations.” |
| “Only that on a weekly basis, it takes up a lot of class time.” |
| “The time taken away from class is always a difficult thing.” |
| “Sometimes it’s hard to calm the kids back down.” |
| “Sometimes hard for students to refocus.” |
| **Perceptions of changes in students’ reactions over time** |
| “The kids look forward to the teacher coming.” |
| “The really look forward to it. When we don’t have the scheduled activities with a YSU student, we do Go Noodle on the web. They enjoy being active.” |
| “They have enjoyed it from the beginning.” |
| “Much more apt to participate.” |
| “They are always looking forward to the ‘energizer’ coming to our room.” |
| “Increased focus. Better behavior.” |
| “At first, they were unsure. Then, they started asking when we were doing it again.” |
| “They have always looked forward to it.” |
| “They have become more engaged with the program. They look forward to this time.” |
| “They have loved it since day 1.” |
| “They really like all of the activities and learning new ones.” |
| “Some are more willing to try. Others have withdrawn.” |
| “The kids that need it the most participate the least.” |
| **Changes in teachers’ perceptions over time** |
| “Nothing. I think it’s great.” |
| “The students benefit from this program. I would like to see them get active every day.” |
| “None.” |
| “I think it is a very valuable and worthwhile program.” |
| “At first, I didn’t want to give up 10 minutes of academic time to do it. The kids love/need it though, so I’m willing now.” |
| “We can be physically active and not disturb the other classrooms. We can be physically active and not get hurt.” |
| “None, always thought it was great.” |
| “The energizers have had simple, but great ideas. The kids have really enjoyed it. Love seeing them move.” |
| “N/A” |
| “Very well-received.” |
| “I have liked it since the beginning.” |
| “I have been very impressed with the program. It has helped make me more aware of their physical activity levels, as well as my own.” |
| “I really enjoyed watching them get fit.” |
| **Recommendations** |
| “None.” |
| “Nothing. It was great!” |
| “The YSU students have been very good. I would suggest talking about/thinking about safety concerns when doing physical activity in small space. We had several students cry last semester, due to minor incidents.” |
| “Perhaps incorporate more academics into the movements.” |
| “Any way to tie it in academically would be awesome!” |
| “Nice job! Thanks!” |
| “None—Perfect—Keep up the great work!” |
| “Keep up the good work!” |
| “I would love to have a list of the activities that were implemented that I can follow through on.” |
| “Great job—Activities and enthusiastic, patient instructors.” |
| “It is part of an everyday routine, best done at natural breaks in lessons, not at a particular scheduled time.” |
autonomy; the conduct of movement activities that involved the classroom PAs outside of school may be evidence of a large proportion of students who reported engaging in some of this study, CPABs programs could enhance each factor. The autonomy, relatedness, and competence were not measured in a sense of connectedness to others while participating. While the choice to participate is theirs, or if they experience intrinsically motivated to be physically active if they feel as factors. Where competence is lacking, individuals may still feel motivation, but that autonomy and relatedness are also key

tion theory (11) makes clear that competence is important to crucial to supporting lifetime PA. Research on self-determina-
work synergistically to aid students in meeting minimum PA requirements and developing the knowledge, skills, and confidence to engage in lifelong PA (9, 27, 53, 62).

Within the collaborative program presented here, the students’, the teachers’, and the facilitators’ perceptions of the CPABs were predominantly positive. Large majorities of the students thought that the CPABs were very fun and good for their health, provided a nice break during the school day, and enhanced readiness and ability to learn. Students were informed of the recommendation for youth to accumulate a minimum of 60 min of PA per day, and most felt that the CPABs could help them meet the recommendation. Most of the children reported knowing that PA was good for them and that CPABs were predominantly positive. Large majorities of the students thought that the CPABs were very fun and good for their health, provided a nice break during the school day, and enhanced readiness and ability to learn. Students were informed of the recommendation for youth to accumulate a minimum of 60 min of PA per day, and most felt that the CPABs could help them meet the recommendation. Most of the

Fig. 1. Unsolicited children’s responses, added to the students’ questionnaires.

every child in the classroom may support relatedness; and increased engagement in movement activities in and outside of school could enhance competence.

Most of the teachers volunteered very enthusiastic responses regarding the benefits of the CPAB program. Most reported that their students loved the PA breaks, looked forward to their time with the “exercise lady,” and benefited from movement integration and enhanced focus after activity. When asked about the disadvantages of the program, most teachers reported “nothing” or “none,” although a few listed the loss of traditional instructional time as a challenge. Time constraints have been cited by teachers as the major barrier within several other studies assessing CPAB programs (1, 14, 18, 58, 67), and they have long been used to rationalize reduced requirements for PE and recess (7, 38, 50). It is, therefore, essential to emphasize that both students and teachers reported an enhancement of readiness to learn after the CPABs. Time allotted to CPAB programs must be viewed as an investment, rather than a barrier.

It is important to recognize that, if kids are unhealthy, they will lose more class time than is required for brief CPABs. The following quote takes this point to the extreme of ill health, but it does importantly convey that good health is essential to benefitting from education:

As politicians, school administrators, teachers and parents debate over which areas are more valuable and what will be funded, the controversy is driven by improvement on ACT and SAT scores. The goal of educational excellence is certainly understandable, however, if tomorrow’s scholars die prematurely from hypokinetic disease their greatest contributions to society will never materialize (Ref. 33, see p. 30).

As in most research assessing individual perceptions, there was variability. The majority of teachers reported improved student focus after the CPABs, but two reported that it was sometimes difficult to “calm the kids back down” and sometimes hard for students to re-focus.” In addition, although most teachers reported high levels of student enjoyment throughout the program (e.g., “They have enjoyed it from the beginning.” “They have always looked forward to it.” “At first, they were unsure. Then, they started asking when we were doing it again.”), one reported that some students became more withdrawn, and another noted that the students who participated the least were those who needed PA the most. Overall, however, the reported benefits of the CPAB program outweighed the reported challenges. One teacher, who was initially reluctant to incorporate the program, became eager to extend it, saying, “At first, I didn’t want to give up 10 minutes of academic time to do it. The kids love/need it though, so I’m willing now.”

CPAB programs have the potential to benefit large numbers of people, from children participating in them, to university students and classroom teachers administering them, to society as a whole. Students benefit physically, emotionally, and academically. College interns amass substantial professional experience in planning, leading, and advocating PA, and their faculty mentors gain a means of enhancing the leadership training of their students. Classroom teachers expand opportunities to demonstrate the importance of daily PA, to serve as active role models, and to heighten awareness of their own activity levels. Society benefits whenever people, of any age, are regularly active. However, despite the broad-spectrum benefits to be realized, and despite that some teachers have
always supported classroom PA (e.g., “This is something I have always done as a teacher.” “I have always been a supporter of physical activity in the classroom and this program reaffirms that.”), implementation of programs nationwide is a formidable task. Barriers must be addressed and benefits stressed.

Recommendations for improvements within the present collaboration were minimal and could be easily addressed with firmer entrenchment of the CPAB program. Leaders could better address safety concerns presented by small spaces and share activity ideas among each other. Webster et al. (67) suggested that teachers undergo implementation training to share strategies for creating developmentally appropriate, movement-integrated lessons, stimulating the undermotivated, and refocusing students after movement activities. If classroom PA were a part of every day, led by every teacher, it might be implemented more effectively than in the present collaboration. For instance, one teacher stated that movement is best incorporated at “natural breaks in lessons, not at a particular scheduled time.” If all classroom teachers were expected to implement classroom PA, then they could be granted the academic freedom to lead activities when they deemed them most beneficial.

It should be noted that important health initiatives include both increasing PA and reducing sedentariness, which are not the same. Sedentary behaviors are defined as waking behaviors, performed in a sitting or reclined posture, requiring a level of energy expenditure of ≤1.5 metabolic equivalents (52). While people who spend large portions of their days in sedentary activity often have a low likelihood of engaging in regular PA, people can be largely sedentary and still meet PA recommendations (30, 43, 69). Nevertheless, both adults and children in the United States spend the majority of their time awake in sedentary behaviors, with children 6–11 yr of age spending more than 6 h/day sitting, reclining, or lying down (37). Recently, a large, prospective study of adults showed that sitting more than 6 h/day was associated with a 19% higher all-cause mortality rate than sitting fewer than 3 h/day (45). On the 2016 United States Report Card on Physical Activity for Children and Youth, children earned grades of D– in both Overall Physical Activity and in Sedentary Behaviors (31). Since children spend a large portion of many days at school, it is a premier venue for increasing PA nationwide.

Since the success of CPAB programs arguably relies not only on teachers’ accommodation of them, but on their enthusiasm for them, positive teacher perceptions may be even more important than positive student perceptions. The social climate generated by adults has been identified as an important mediator of the movement experiences of children (64), and, in this collaboration, some teachers displayed more involvement with CPABs than others. While the college intern led the movement activities, some teachers eagerly participated, and some teachers sat at their computers when I came. All teachers did stop what the students were working on and directed their attention to me, which was nice, but it made a huge difference when the teachers actively participated with the students. Those classrooms were definitely more fun for me and I think for the students as well.

Each intern, over the course of her respective terms, was highly invested and showed great enthusiasm. Early in the term during which these data were collected, the intern wrote:

I think this program is wonderful. The kids know me as the “exercise lady” or “our energizer.” When they see me in the halls, ask if we are exercising today, and I say “yes,” their faces light up.

Since not all classroom teachers were as enthusiastic as the college interns, it is possible that, without the intern’s leadership, the success of CPAB programs could be less certain.

Teacher enthusiasm is important for student learning and may be conveyed through many means, which may include displaying smiles and upbeat body language, communicating with excited speech and paralanguage, demonstrating genuine interest in content, and modeling of behaviors consistent with the content (39). Even where teachers recognize their importance as role models in shaping children’s behaviors, many fail to model healthy PA and eating behaviors (13, 55). The failure of all adults to demonstrate enthusiasm for PA may be a real limiting factor in children’s development of positive attitudes toward it, as well as in the widespread, successful implementation of CPAB programs. Since attitudes toward PA among school leaders will likely continue to vary, the implementation of programs like this one, which employ young kinesiology students with a zest for PA, is highly recommended. Where such liaisons are yet to be established, it will be important to assess the attitudes of classroom teachers for daily PA, and to strategize to improve attitudes among any evidencing resistance. Previous research has identified a number of personal factors among classroom teachers that may affect their motivation for CPAB programs, including personal experience, perceived self-efficacy, awareness of school-related PA legislation, and perceptions of benefits, barriers, and school, colleague, and parent support (14, 44, 65, 67).

Limitations. There are two major limitations to the present study. First, the subjects consisted of students and teachers from only one elementary school in the midwestern United States, with small percentages of low-proficiency, low-income, minority students. Second, while completion of the survey during class time likely enhanced overall completion rates, any students who were absent on the day of administration could have provided different answers than those present, and detailed information on attendance was not collected.

Conclusions. The importance of fun to learning cannot be overemphasized. People tend to fill their leisure time with what they find to be fun. If we want children to read in their leisure time, be physically active, or both, we need to help them learn to enjoy those activities. In his Claude Bernard Distinguished Lecture, physiology professor Stephen DiCarlo (12) highlighted the essentiality of fun to inspiring and engaging students. In the paper documenting this prestigious lecture, DiCarlo laments that too many teachers focus on covering content, rather than on inspiring students to want to learn more. He urges educators to focus less on presenting expansive amounts of factual information, and more on creating “a joy, an excitement, and a love for learning” (see p. 263). He explains that, “We must make learning fun, because if we are successful, our students will be impatient to run home, study, and contemplate—to really learn.” Making PA fun is extremely important, as enjoyment has been identified as a primary

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reason that children participate in PA (2, 70). This collaboration was fun for the vast majority involved, and we urge others to implement similar models in their communities.

While CPABs can easily be led by most classroom teachers, partnerships like this one, between a university exercise science program and local elementary school, provide valuable means of helping establish CPAB programs. They place most of the planning and implementation work in the hands of enthusiastic, young, health fitness professionals-to-be, under the guidance of their faculty mentors, who can help ensure the conduct of activities that are low risk, age appropriate, feasible, and beneficial. As in any relationship, each collaborative program will present unique characteristics and complexities, which will need to be uniquely addressed. A good place to start is by establishing a written memorandum of understanding, which outlines the roles and responsibilities of involved parties, key objectives, plans for program implementation and evaluation, and grounds for dissolution. Once CPAB programs are established, school personnel could continue them, with or without the direct leadership of interns. We, however, in the spirit of creating more active, more connected communities, advocated the maintenance of partnerships.

ACKNOWLEDGMENTS

We thank all of the faculty members and administrators at Hilltop Elementary School (Canfield, OH) for supporting and facilitating this collaborative endeavor.

DISCLOSURES

No conflicts of interest, financial or otherwise, are declared by the authors.

AUTHOR CONTRIBUTIONS

N.M.M. and L.G. conceived and designed research; N.M.M. and N.K.-M. performed experiments; N.M.M., S.M., and N.K.-M. analyzed data; N.M.M. and S.M. interpreted results of experiments; N.M.M. and S.M. prepared figures; N.M.M. drafted manuscript; N.M.M., S.M., N.K.-M., and L.G. edited and revised manuscript; N.M.M., S.M., N.K.-M., and L.G. approved final version of manuscript.

REFERENCES

1. Abi Nader P, Hilberg E, Schuma JM, John DH, Gunter KB. Teacher-level factors, classroom physical activity opportunities, and children’s physical activity levels. J Phys Act Health 15: 637–643, 2018. doi: 10.1123/jpah.2017-0218.

2. Allender S, Cowburn G, Foster C. Understanding participation in sport and physical activity among children and adults: a review of qualitative studies. Health Educ Res 21: 826–835, 2006. doi: 10.1093/her/cy1063.

3. Bailey CG, DiPerna J. Effects of classroom-based energizers on primary grade students’ physical activity levels. Phys Educator 72: 480–495, 2015.

4. Barr-Anderson DJ, AuYoung M, Whitt-Glover MC, Glenn BA, Yancey AK. Integration of short bouts of physical activity into organizational routine a systematic review of the literature. Am J Prev Med 40: 76–93, 2011. doi: 10.1016/j.amepre.2010.09.033.

5. Bartholomew JB, Jowers EM. Physically active academic lessons in elementary children. Prev Med 52, Suppl 1: S51–S54, 2011. doi: 10.1016/j.ypmed.2011.01.017.

6. Blom LC, Alvarez J, Lei Z, Kolbo J. Associations between health-related physical fitness, academic achievement and selected academic behaviors of elementary and middle school students in the state of Mississippi. ICHPER-SD 6: 13–19, 2011.

7. Burns RD, Brusseau TA, Fu Y, Myrer RS, Hannon JC. Comprehensive school physical activity programming and classroom behavior. Am J Health Behav 40: 100–107, 2016. doi: 10.5993/AJHB.40.1.11.

8. Castelli DM, Centeo EE, Hwang J, Barcelona JM, Glowacki EM, Calvert HG, Nicksic HM. The history of physical activity and academic performance research: informing the future. Monogr Soc Res Child Dev 79: 119–148, 2014. doi: 10.1111/mono.12133.

9. Centers for Disease Control and Prevention (CDC). School health guidelines to promote healthy eating and physical activity. MMWR Recomm Rep 60, RR-5: 1–76, 2011.

10. Centers for Disease Control and Prevention. Comprehensive School Physical Activity Programs: A Guide for Schools (Online). U.S. Department of Health and Human Services. https://www.cdc.gov/healthyschools/physicalactivity/pdf/13_242620-A_CSPAphysActivityPrograms_Final_508_12192013.pdf [19 June 2017].

11. Coe DP, Pivarnik JM, Womack CJ, Reeves MJ, Malina RM. Effect of physical education and activity levels on academic achievement in children. Med Sci Sports Exerc 38: 1515–1519, 2006. doi: 10.1249/01.mss.0000227537.13175.1b.

12. Deci EL, Ryan RM. The ‘what’ and ‘why’ of goal pursuits: human needs and the self-determination of behavior. Psychol Inq 11: 227–268, 2000. doi: 10.1207/S15327965PLI1104_01.

13. DiCarlo SE. Too much content, not enough thinking, and too little fun! Adv Physiol Educ 33: 257–264, 2009. doi: 10.1123/advan.2016.12.020.

14. Dinkel DM, Lee J-M, Schaffer C. Examining the knowledge and capacity of elementary teachers to implement classroom physical activity breaks. Int J Electron J Educ 9: 182–196, 2016.

15. Dinkel D, Schaffer C, Snyder K, Lee J-M. They just need to move: teachers’ perception of classroom physical activity breaks. Teach Teach Educ: 63: 186–195, 2017. doi: 10.1016/j.tate.2016.12.020.

16. Donnelly JE, Lambourne K. Classroom-based physical activity, cognition, and academic achievement. Prev Med 52, Suppl 1: S36–S42, 2011. doi: 10.1016/j.ypmed.2011.01.021.

17. Gardner H. Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books, 1983.

18. Gately P, Curtis C, Hardaker R. An evaluation in UK schools of a classroom-based physical activity programme—TAKE 10!: a qualitative analysis of the teachers’ perspective. Educ Health 31: 72–78, 2013.

19. Gibson CA, Smith BK, Dubose KD, Greene JL, Bailey BW, Williams SL, Ryan JJ, Schmelze KH, Washburn RA, Sullivan DK, Mayos MS, Donnelly JE. Physical activity across the curriculum: year one process evaluation results. Int J Behav Nutr Phys Act 5: 36, 2008. doi: 10.1186/1479-5868-5-36.

20. Goh TL, Hannon JC, Newton M, Webster C, Podlog L, Pillow W. “I’ll squeeze it in”: transforming preservice classroom teachers’ perceptions toward movement integration in schools. Action Teach Educ 35: 286–300, 2013. doi: 10.1007/s12220-2013-027600.

21. Goh TL, Hannon J, Webster CA, Podlog LW, Brusseau T, Newton M. Effects of a classroom-based physical activity program on children’s physical activity levels. J Teach Phys Educ 33: 558–572, 2014. doi: 10.1123/jpte.2014-0068.

22. Goh TL, Hannon J, Webster C, Podlog L, Newton M. Effects of a TAKE 10!: classroom-based physical activity intervention on third- to fifth-grade children’s on-task behavior. J Phys Act Health 13: 712–718, 2016. doi: 10.1123/aph.2015-0238.

23. Hannaford C. Smart Moves: Why Learning Is Not All in Your Head. Arlington, VA: Great Ocean, 1995.

24. Henderson KA, Neff LJ, Sharpe PA, Greaney ML, Royce SW, Ainsworth BE. “It takes a village” to promote physical activity: the potential for public park and recreation departments. J Park Recreat Adm 19: 23–41, 2001.

25. Hernandez-Garbanzo YM. Measuring the Impact of Youth EFNEP: Questionnaire Development and Validation (PhD thesis). Clemson, SC: Clemson University, 2011.

26. Howie EK, Newman-Norlund RD, Pate RR. Smiles count but minutes matter: responses to classroom exercise breaks. Am J Health Behav 38: 681–689, 2014. doi: 10.5993/AJHB.38.5.5.

27. Institute of Medicine (IOM). Educating the Student Body: Taking Physical Activity and Physical Education to School. Washington, DC: The National Academies Press, 2013.

28. Jefferson T, Thomas Jefferson to Peter Carr, August 19, 1785 (Online). Library of Congress. https://www.loc.gov/resource/mtj1.004_0167_0171/?p=3 [28 Oct 2018].

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