

# Elementary Students Activity Levels within an after School Program Focused on Emotional Recovery

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**Abstract** The purpose of this study was to determine the physical activity levels of children participating in an after school program designed to integrate stress reducing techniques with physical activity. Forty-five (22 boys and 23 girls) elementary aged children who were enrolled in the after school program served as the participants in this study. The System for Observing Fitness Instruction Time (SOFIT) was utilized to describe the lesson context and youth's activity levels during each session. The children spent an average of 47.5% engaged in moderate to vigorous physical activity while instructors spent an average of 13.4% in management, 12.9% in knowledge, 32.9% in skill practice, 9.5% in gameplay and 31.3% in other (stress reducing techniques). The children spent an average of 31.3% of lesson time learning stress-reducing techniques. The results suggest that children can still obtain appropriate levels of physical activity while simultaneously acquiring stress reducing techniques in an after school program.

**Keywords:** *physical activity, children, SOFIT, CSPAP, physical education, stress reducing techniques*

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## 1. Introduction

More frequently than ever before, children are experiencing increased levels of anxiety, and stress. Researchers posit that more than 40% of children between the ages of 8-17 have reported anxiety due to grades, getting into good colleges, family finances, and issues with friends. Researchers suggest that small levels of stress in children can easily escalate into more severe emotional responses such as depression, anxiety and anger [1] due to an inability to cope with any levels of stress [2,3]. There are numerous practices aimed to reduce these symptoms in children; including deep breathing [4] positive self-talk [5], art therapy [6] and physical activity [8]. While these are strategies are rarely taught there have been numerous connections linking these techniques, and lower levels of anxiety in children.

The Department of Health and Human Services has recently called for school aged youth to participate in 60 minutes or more of moderate to vigorous physical activity (MVPA) every day [8]. With rapid increases in obesity rates worldwide, children's participation in daily physical activity is extremely critical as it contributes to their personal physical wellbeing [9]. Conventionally, physical education classes have been the main catalyst for children to accumulate the daily requirement of physical activity, however lately, programs have been unsuccessful at meeting this standard [10]. To alleviate such issues, scholars have suggested incorporating physical activity into a variety of other settings [11,12,13], including sport

clubs and extracurricular athletic programs to provide children with additional opportunities to be active.

The system for observing fitness instruction time (SOFIT) is an observation tool widely used to assess physical activity levels in various settings [14,15,16,17], and has been used by researchers to assess physical activity levels in over 800 elementary schools in the United States [18]. In this iteration among others, results postulate that students spend less than the recommended 50% of lesson time engaged in MVPA [20,21] giving credence to recent calls providing additional opportunities for youth to participate in physical activity.

Recently, with the steady decline in physical education requirements nationwide [22] researchers have begun to shift their focus to other contexts in order to increase activity levels in children. The Comprehensive School Physical Activity Program (CSPAP) has been developed to provide supplemental opportunities for children to participate in physical activity before, during, and after every school day [22].

CSPAP includes five main components, which cooperatively attempt to raise children's physical activity levels. These areas include physical education, physical activity during school, before and after school programs, increased staff involvement, and family/community engagement. CSPAP's top priority is to increase physical activity opportunities by providing a whole school approach to wellness [23]. Specifically, the before/after school component aims to deliver additional opportunities for physical activity by offering physical activity clubs, intramural sports, or fitness incentives [22]. To date, research has focused primarily on promoting physical activity [24],

increasing such activity levels in youth [25], and the perspectives of student participants [26]. While research has clearly demonstrated the ability of after school programs to increase activity levels in children [25,27], the impact of programs that do not focus exclusively on physical activity has yet to be discussed extensively in the literature.

Physical activity has long been identified as a primary objective of physical education [28], however it is also recommended as an effective approach for reducing stress in children [7]. Due to the necessity to provide children with additional outlets to be active, and an increasing quantity of children confronting heightened levels of stress [29], it appears beneficial to explore an after school program designed to promote stress reducing techniques while simultaneously integrating physical activity. While, previous examinations suggested that the stress reducing techniques were applicable, practical, simple to use, and transferable to other contexts [30], little research exists examining if this type of program is effective at increasing student activity levels. Therefore, the purpose of this study was to determine physical activity levels of children participating in an after school program designed to integrate stress reducing techniques with physical activity. The three sub-questions that focused this study are as follows: (a) How much time was allocated to teaching the stress reducing techniques? (b) What percentage of time were the children active throughout the program? (c) Did the stress reducing techniques interfere with the objective of providing students with high levels of physical activity during the program?

## 2. Method

In April, of 2011 a chain of tornadoes devastated the southeastern portion of the United States. This series of storms caused over 300 deaths, more than a billion dollars worth of damage, and countless people were directly and indirectly affected by this natural disaster [31]. In one county specifically, there were over 50 deaths, 2000 injured, and well over 200 million dollars worth of damage [32]. As a result of these storms, a number of

schools were either partially or completely destroyed. One elementary school (Lakeview Elementary<sup>1</sup>) was fully demolished causing the 365 students enrolled to relocate and share a nearby elementary school. In addition to the physical devastation caused by these tornadoes, there were immense levels of emotional devastation in children who lived in the community. As a result, the idea of a physical activity and emotional recovery program came to fruition in the form of an after school program.

### 2.1. Participants and Settings

This study transpired during an after school program at the neighboring elementary school where the Lakeview students relocated, located in the southeastern United States. At the time of the study, Lakeview Elementary had a total of 365 students, primarily African American (89%), Hispanic (6%), Caucasian (3%), and Asian (2%), with 86.6% receiving free and reduced school lunch.

The participants in this study were 45 children from Lakeview Elementary who were enrolled in the specific after school program aimed at teaching developmentally appropriate soccer with the integration of an educational component focused on stress reducing techniques. This program was separated into two groups by age. Group one (K-2) included 28 participants (16 boys, 12 girls), and group two (3<sup>rd</sup>-5<sup>th</sup> grade) was comprised of 17 participants (6 boys, 11 girls) who were primarily African American. All participants were selected to take part in this study due to their enrollment in the after school program. Informed consent was successfully received from each participant and their parents/guardians before beginning the data collection. The authors University's institutional review board approved this research protocol before commencing.

The instructors of each group were experienced physical education teachers enrolled in a doctoral program in a large public research institution in the southeast United States. Each instructor had taught elementary physical education for five years and had two years' experience coaching youth soccer. Both instructors were provided with sample lesson outlines and had the independence to modify these plans.

Table 1. Outline of Program Content per day

	Physical Activity	Art Therapy	Deep Breathing	Positive Self-Talk	Group Sharing Sessions
Day 1	X				
Day 2	X				
Day 3	X	X	X		
Day 4	X		X		
Day 5	X	X	X	X	
Day 6	X		X	X	X
Day 7	X	X	X	X	
Day 8	X		X	X	X
Day 9	X	X	X	X	
Day 10	X		X	X	X
Day 11	X	X	X	X	
Day 12	X		X	X	X
Day 13	X	X	X	X	
Day 14	X		X	X	X
Day 15	X	X	X	X	
Day 16	X		X	X	

The after school program consisted of 16 lessons focused on improving physical activity, and soccer skills. While these were the main psychomotor objectives, art therapy, deep breathing, positive self-talk, and group sharing sessions were all intertwined throughout the majority of lessons (Table 1). All lessons lasted 50 minutes on average (shortest = 33 minutes; longest = 65 minutes), and incorporated an initial segment of physical activity, a group sharing or art therapy session, and concluded with additional physical activity time (Wahl-Alexander & Sinelnikov, 2013).

## 2.2. Data Collection

### 2.2.1. SOFIT Instrument

SOFIT is a direct observation instrument primarily used to record student activity levels and lesson context. The SOFIT protocols have been countlessly developed and described in studies, with all activity codes validated with elementary aged youth by utilizing heart rate monitoring [33]. In SOFIT coding, the activity levels of four randomly selected children are categorized using momentary time sampling (10-seconds observe, 10-seconds record). The activity codes 1-4 define the student's body position (i.e., lying down, sitting, standing, walking), with code 5 (vigorous) designated to identify a student expending more energy than standard walking [15]. Simultaneously, the lesson context is coded every 20 seconds reporting how the lesson was being taught. These teacher behaviors include management, knowledge, fitness, skill practice, gameplay and other. In this study, whenever the instructor was implementing the stress reducing techniques "other" was coded. Basic guidelines for observer training and data collection were based off of McKenzie's [34] SOFIT training manual.

### 2.3. Observer Training and Reliability

Two observers were trained by the second author who has extensive coding experience using the SOFIT observation instrument. Each coder participated in 15

hours of training, which consisted of an initial presentation describing the instrument, followed by coding videotaped assessments, and live practice sessions in the elementary schools. The actual data collection commenced following van der Mars [35] recommendation of the inter-observer agreement, IOA =  $[\#agreements / (\#agreements + \#disagreements) \times 100]$ , exceeding 85% on each of the major categories. To ensure ongoing reliability, subsequent checks (every two weeks) consisted of the second author and each observer coding additional videotaped assessments and checking for reliability to counteract observer shifting from taking place. Overall, IOAs were 95% (lesson context), 92% (student behavior), and 95% (teacher behavior) correspondingly.

## 2.4. Data Analysis

Data analyses were conducted using Statistical Package for the Social Sciences, 18.0 (SPSS Inc., Chicago, IL). Percentages for student activity, lesson context, and stress reducing techniques were entered to determine the descriptive statistics for lessons taught by both instructors. The study focused on research questions that were interested in between subject differences and total combined. Observations of instructors one and two included 16 lessons respectively.

## 3. Results

The initial physical activity levels outcome of SOFIT is the amount of time engaged in moderate to vigorous physical activity during each lesson. The results from this study (Table 2) indicated that the participants engaged in an average of 47.5% (group 1: 47.9%, group 2: 47.1%) of the lesson time in MVPA. The instructors spent an average of 13.4% of lesson time devoted to management, 12.9% (knowledge), 32.9% (skill practice), 9.5% (gameplay), and 31.3% (other). Other (31.3%) was used to indicate when participants were engaged in learning the stress reducing techniques.

**Table 2. Mean percentage of class time and mean minutes spent in each category of the SOFIT protocol for instructor one, instructor two, and both instructors combined**

Category	Group 1 (K-2)		Group 2 (3-5)		Total (Both Groups)	
	% of Time	Minutes	% of Time	Minutes	% of Time	Minutes
Student activity	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Lying down	1.7 (4.0)	0.91(1.3)	6.7 (11.9)	3.5 (3.9)	4.3 (7.9)	2.2 (2.6)
Sitting	23.4 (16.5)	12.1 (5.5)	30.9 (27.2)	15.9 (9.1)	27.2 (21.8)	14 (7.3)
Standing	26.9 (8.9)	14.1 (2.9)	15.1 (9.3)	7.7 (3.1)	20.9 (9.1)	10.9 (6)
Walking	26.3 (9.7)	13.6 (3.2)	9.2 (11.3)	4.7 (3.7)	17.7 (10.5)	9.1 (3.4)
Vigorous	21.7 (10.3)	11.2 (3.4)	38.1 (15.9)	19.6 (5.3)	29.9 (13.1)	15.4 (4.3)
MVPA	47.9 (17.0)	24.9 (5.6)	47.1 (16.0)	24.4 (5.4)	47.5 (16.5)	24.6 (5.5)
Lesson context						
Management	14.4 (5.6)	7.4 (1.9)	12.3 (8.8)	6.3 (2.9)	13.4 (7.2)	6.8 (2.4)
Knowledge	15.9 (6.2)	8.2 (2.0)	10.2 (10.9)	5.2 (3.6)	12.9 (8.5)	6.7 (2.8)
Skill practice	33.5 (13.6)	17.5 (4.2)	32.4 (16.0)	16.9 (5.5)	32.9 (14.8)	17.2 (4.8)
Gameplay	10.6 (30.9)	5.6 (5.2)	8.3 (13.0)	4.4 (4.4)	9.5 (21.9)	5.0 (4.8)
Other	25.6 (19.9)	13.2 (6.3)	36.8 (27.4)	18.7 (8.9)	31.3 (23.6)	15.9 (7.6)

**Table 3. Mean percentage of class time and mean minutes spent for Group Therapy Sessions for instructor one, and instructor two**

Category	Group 1 (K-2)		Group 2 (3-5)		Total (Both Groups)	
	% of Time	Minutes	% of Time	Minutes	% of Time	Minutes
	Mean	Total (min/ lesson)	Mean	Total (min/lesson)	Mean	Total (min/lesson)
Student activity						
Positive self-talk	4	32.6 (2.0)	6.5	52.6 (3.3)	5.2	42.6 (2.6)
Deep breathing	6.6	54.3 (3.4)	7.5	60.3 (3.7)	7.0	57.3 (3.5)
Art therapy	5.8	49 (3)	10.7	88 (5.5)	8.2	68.5 (4.2)
Group sharing Sessions	9.4	77 (4.8)	12.1	98.3 (6.1)	10.7	87.6 (5.5)
Total	25.6	212.9 (13.2)	36.8	299.2 (18.6)	31.3	256.0 (15.9)

As indicated in Table 3, the stress reducing techniques were integrated into a total of 31.3% of the lesson. On average, participants were engaged in positive self-talk (5.2%), deep breathing (7.0%), art therapy (8.2%), and group sharing sessions (10.7%) on average throughout the program. A more detailed indication of which techniques were taught during which lessons are shown in Table 1.

#### 4. Discussion

According to research, children should participate in a minimum of 60 minutes of physical activity every day [8], however, a recent inability to provide elementary students with sufficient levels of physical activity [10] have led to other contexts with which to provide youth opportunities to move. Although there has been much attention drawn to rising obesity rates in the United States, children are becoming prone to higher levels of stress for various reasons including divorce, academic progress, college choice, natural disasters and relationships [29]. To date there has been an absence of research focused on programs that address both of these problematic concerns, therefore the purpose of this study was to determine the lesson context and physical activity levels of children participating in an after school program designed to integrate stress reducing techniques with physical activity.

The after school program in this study had binary objectives of providing developmentally appropriate physical activity while simultaneously teaching students how to effectively deal with stress [30]. Student activity levels and lesson context in this study were evaluated through systematic observation with the use of SOFIT. Throughout the duration of the program, each child spent on average 5.2% (2.6 minutes) engaged in learning positive self-talk, group sharing sessions 10.7% (5.5 minutes), art therapy 8.2% (4.2 minutes) and 7.0% (3.5 minutes) in deep breathing techniques per lesson with a total of 31.3% (15.9) of time spent devoted to teaching these strategies.

Both groups spent on average 47.5% (24.6 minutes) of the lesson time engaged in MVPA with group 2 (3<sup>rd</sup>-5<sup>th</sup> grade) spending significantly longer performing vigorous activities. Although the total MVPA did not exceed the recommended 50% [19], these findings are substantially higher than many other elementary contexts [15], even with 31.3% allocated to the stress reducing techniques in each lesson. Although a large allotment of time was dedicated to teaching these strategies, the instructors did an adequate job integrating them into activities that promoted movement. For example, students were prompted to repeat positive self-talk phrases immediately

before trying new soccer skills, and deep breathing was utilized as a cool down following more vigorous activities. On the contrary, the art therapy and group sharing techniques predominantly had the children seated, which significantly impacted their ability to move. While the benefits and capability of amalgamating these stress reducing techniques are documented [30] in this study, such strategies impeded the ability to reach the recommended 50% MVPA. Future studies further examining the ability of teachers to integrate such academic components into physical activity programs may prove beneficial.

The instructors facilitating this program spent an average of 13.4% (6.8 minutes) engaged in management with considerable time consumed preparing and organizing the stress reducing technique component. The average time in management during this iteration is similar to other elementary contexts [14,15,36], however, the overall lesson duration in this program is longer than many in other studies. In this program, this longer length is a possible explanation for the ability to obtain high levels of physical activity while devoting time to stress reducing techniques. The instructors had sufficient time throughout each session to allow for extended bouts of physical activity that neutralized lengthy periods of "laying down", or "sitting" during the art therapy and sharing sessions. Future examinations are needed to explore MVPA levels and lesson context of varying lengths to determine if longer lessons increase the likelihood of obtaining the elusive 50% MVPA criteria.

The findings from this study suggest that children who participated in the after school program were able to obtain appropriate levels of physical activity while simultaneously acquiring significant stress reducing techniques. The instructors use of soccer content which researchers have previously postulated garner higher levels of MVPA in elementary youth [36] is another possible explanation for their success. Additionally, both instructors had access to considerable amounts of equipment ensuring the ability to provide consistent high quality instruction primarily comprised of individual skill work and small sided modified tasks. This may have led to the high activity levels even with an average of 31.3% of each lesson dedicated to academic purposes. Another possible explanation for these findings may have resulted in the children's voluntary participation in the program. Future studies examining the differences in student activity levels between mandatory and voluntary programs would help provide more clarity.

This study presents several limitations that can provide some potential directions for future explorations of

activity levels in before/after school programs. One potential constraint was the experience levels of the instructors leading both groups. The instructors ability to provide continuous developmentally appropriate soccer may have positively affected the activity levels of the students enrolled in the after school program. In the seminal work evaluating before school components of CSPAP, pre-service teachers (PTs) have led instruction in lieu of experienced teachers. It is important to note that PT's lack pedagogical dearth, which might prohibit their ability to keep children similarly active with copious time devoted to academic components. It appears beneficial for future studies to examine children's activity levels in before/after school programs facilitated by PTs that contain an academic component.

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