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AEROBIC EXERCISE AS A TOOL TO IMPROVE PROBLEMATIC
STUDENT BEHAVIOR IN THE CLASSROOM

by
Joseph F. Mufferi

A Thesis

Submitted in partial fulfillment of the requirement of the
Master of Arts Degree
of
The Graduate School
at
Rowan University
May 2004

Approved by _____
Professor

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ABSTRACT

Joseph F. Mufferi

AEROBIC EXERCISE AS A TOOL TO IMPROVE PROBLEMATIC STUDENT BEHAVIOR IN THE CLASSROOM

2003/04

Dr. Ronald Capasso

Master of Arts in Educational Administration

The purpose of this study was to research the effect aerobic exercise on the behavior of problematic students. The time period of exercise in this study was between 15 and 18 minutes, two days per week. Two types of aerobic exercise were used, running and progressive resistive exercise, in the form of circuit training. The subjects of study were special education students who had been evaluated to have behavioral problems. These students were then classified as Intensive Learner Centered or ILC and placed in self-contained classrooms. Each student received behavior and academic evaluations in each subject area daily. Evaluations were made using a Student Behavior Modification Card, which was also used as the instrumentation for the study. The same card scores were tabulated prior to aerobic exercise in each class period and then again after exercise for every class for the remainder of the student's day. The study found that exercise improved student behavior by 7.2791 percent in all class after aerobic exercise. It was also discovered that in a three-month period of time, student's behavior before participating in exercise also improved by 4 percent. Certainly these percentages of behavioral improvements will manifest in improved student learning.

Acknowledgements

I would like to thank my future wife Linda Joseph for her patience and being “the wind beneath my wings.” Thank you to my daughter Jennifer Mufferi for her company and support. I would also like to thank Mrs. Sherry Geesaman for being my much-needed editor.

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Chapter 1

Introduction

Focus of the Study

The study focused on the use of aerobic exercise as a means to changes problematic student behavior. The research was administered in a setting where students have a history of classroom misbehavior and have been removed from class on a regular basis. More scientifically, the research focused on the use of exercise to release endorphins and effect positive behavioral changes.

Purpose of the Study

The objective of the research was to improve student's behavior in the classroom and, as a result, improve their ability to learn. Improved behavior should reduce the number of students who have to be removed from the classroom for misbehavior. With the Federal Mandate of Not Child Left Behind, school leaders must look for alternative methods for the success of all students.

Definitions

For the purpose of this research the following terms were used:

Disruptive students will be defined as students who disrupt the learning process and have to be removed from the normal classroom setting.

Attitude Adjustment (AA) is used in some schools in the Brandywine School District, in Wilmington, Delaware. Disruptive students are removed from the classroom and sent to a separate room for an attitude adjustment.

Aerobic exercise is continuous exercise where the use of oxygen is necessary.

Intensive Learning Center, (ILC) describes the setting where the students who were involved in the research go to school. ILC students are special education students who have severe behavior problems and cannot function in a regular school setting.

Endorphins are hormones produced by the pituitary gland as a result of aerobic exercise that lasts 15 or more minutes. Endorphins block pain, decrease appetite, reduce tension and anxiety, and create feelings of euphoria or the “exercise high.”

Circuit training in this study will include muscular exercise equipment used for a prescribed time period and at a prescribed intensity as a second form of aerobic exercise.

Limitations of the Study

The target population for this study was seventh and eighth grade ILC students attending Springer Middle School in the Brandywine School District in Wilmington, Delaware. There were five female students and thirty male students who participated in this study. Students participated in the study for two days per week for a period of three months, which included December 2003, and January and February of 2004. These students were all in self-contained classrooms except for art, music, health and physical education.

It is important to note that the students who were part of the research may have refused to participate in the aerobic exercise. Also on many occasions ILC students received in-school suspensions prior to taking part in the research and, in turn, received no benefit.

Setting of the Study

The setting of the study was the Brandywine School District, in New Castle County, Delaware. In 1976, the bussing of students was federally mandated by Judge Murray Swartz in order to facilitate equality in education and to rectify racial imbalances between the schools located in the city and the schools located in the suburbs. The City of Wilmington

and its surrounding suburbs went from twenty-one separate school districts to four desegregated school districts.

The Brandywine School District's student population was 10,400. The school district consists of three high schools grades 9-12, three middle schools grades 7 and 8, three intermediate schools grades 4-6 and nine elementary schools grades K-3. Most schools are located in residential neighborhoods. Twenty percent of students in the Brandywine District attend private schools.

In the State of Delaware, the State is responsible for 70% of the total cost of education and each individual district makes up the remaining 30%. Increases in funding for the district portion are controlled by a referendum. The fact that the median age of Delaware's population is 33.4 contributes to a 95% pass rate of all school referendums. Brandywine School District has a budget of 105 million dollars.

In the year 2000, Federal Judge Susan Robinson rescinded the bussing mandate and children were again allowed to attend neighborhood schools. To the district's surprise, the demographics of student school choices have remained the same, as they were when mandatory bussing was in effect. The district leadership feels that the reason for this is that parents are happy with their children success in the schools that they are presently attending.

Organization of the Study

The remainder of the study was organized in the following sequence and provided the following information: Chapter Two was the literature review, Chapter Three design of the study, Chapter Four the presentation of research and Chapter Five Conclusions, Implications and Further Study.

Chapter 2

Review of Literature

Introduction

The literature review focused on finding a connection between physical exercise and behavioral improvements. Was the physiology of exercise creating positive psychological benefits? Examples of disruptive student behavior, which will be the focus of this study, are as follows: speaking out in class, refusing to pay attention, outbursts, aggressive behavior, attention seeking, or any other form of maladaptive behavior that interferes with the learning process.

Aerobic Exercise Improves Behavior

The psychological benefit of physical activity is increasingly becoming supported by research. Dr. Peter Neiman, MD presented research in *The Journal of Canadian Pediatric Society* to support the connection between improved children's behavior and aerobic physical activity. Dr. Neiman's research documented the following psychological benefits as a result of aerobic physical activity:

Stress management and reduced anxiety

Reduced depression

Improved attention of attention deficit hyperactivity disorder (ADHD)

Improved academic performance

Reduced juvenile delinquency

Improved character development

Dr. Neiman believes that more studies of exercise intensity and duration are needed to achieve more consistent behavior changes (Neiman, 2003).

Recently the American College of Sports Medicine presented more facts that support the use of exercise to improve student behavior. Positive behavior changes noted in the study were as follows:

Improved self-esteem

Improved sense of self-reliance, self-confidence and self-efficiency

Improved mental alertness, perception and information processing

Increased perceptions of acceptance by others

Decreased overall feelings of stress and tension

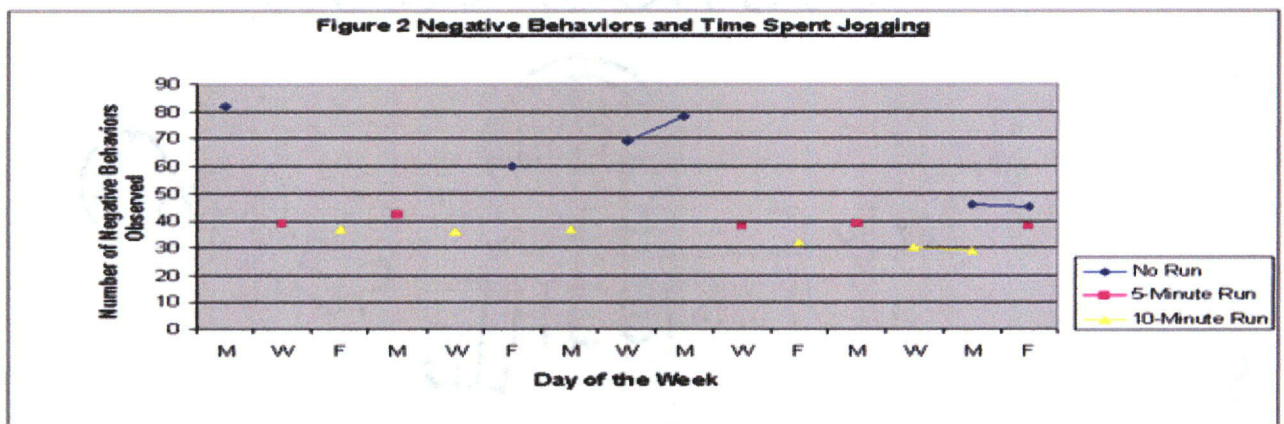
Reduced frustration and daily "hassles"

More constructive responses to disappointments and failures

The American College of Sports Medicine concluded their research by calling exercise an important adjunct to medication therapy in treatment of most mood disorders. (AACSM, 2003).

A study conducted of an adolescent population years earlier in 1979 by John Allen also illustrated the benefit of aerobic exercise in modification of negative student behavior. He also found that exercise reduced stress and anxiety in students. Mr. Allen's research illustrated the behavioral benefits related short periods of aerobic exercise. See table A and Figure 2 below, (Allen, 1979)

Jogging Minutes	Total # Behaviors	Mean	Jogging Minutes	Total # Behaviors	Mean	Jogging Minutes	Total # Behaviors	Mean
0	77	12.8	0	184	30.7	0	117	19.5
5	76	12.7	5	94	14.5	5	61	10.2
10	40	6.7	10	68	11.3	10	83	13.8



Endorphins are the Hormones that Change Behavior

All of the psychological effects of exercise presented thus far are documented to be the result of increased endorphins. Endorphins were first discovered in 1975. They are (“endogenous morphine”) produced in the brain, which block pain, decrease appetite, create feelings of euphoria (exercise high), and reduce tension and anxiety. The human body produces at least 20 different endorphins with possible benefits to human behavior. Beta-endorphins appear to have the strongest effect on the mind and body during and after exercise (Altman, 2002). Blood levels of endorphins increase five times that of resting levels

when moderate aerobic exercise such as, running, cycling, rowing, intervals or circuit training. After several months of exercise endorphins create a higher high that lasts longer with the same level of exercise (Landry, 2002).

Aerobic Exercise as and Effective Treatment for Mental Disorders

Research illustrates that aerobic exercise has positive effects on individuals with mental disorders. It also has shown specifically, that depressed individuals experienced significant improvements when involved in a five-week aerobic exercise program. These programs consisted of an aerobic exercise form for 20-60 minutes in duration. (Doyne et al., 1987).

Anxiety disorders were drastically reduced using 10-week running programs that took place 3 days per week. Forty-six outpatients took part in this study. The results proved running (aerobic exercise) to be an extremely effective tool for anxiety reduction (Brooks et al, 1998).

Aerobic exercise has also been used to treat other forms of mental disorders with significant results, examples of which are: Somatoform disorders (American Psychiatric Association, 1994), Schizophrenia (Skrinar, Unger, Hutchinson & Faigenbaum, 1992) and Substance abuse disorders (Martin et al., 1997).

Positive Thought Patterns Obtained form Being Involved in an Exercise Programs

Exercise participation, as a means to create positive thinking and internal change behavior is a new research phenomenon. Individuals who are engaged in exercise programs must have self-disciplines and self-motivation to remain in engaged in a program. The study interviewed 100 people who were involved in some form of continuous exercise or fitness program. The researcher found that individuals who exercised use two types of strategies to

cope with negative and positive thinking strategies, as well as with positive-behavior strategies. The study showed that individuals who followed a planned exercise program for extended periods of time used positive thinking and positive behavior successfully. The length of and exercise program in this study represented a time frame of 3 months or longer. The study also showed that individual participants developed coping skills, self efficiency, overcame negative thoughts, developed positive thoughts about their person, and had increased decision making skills and self confidence. (Lifestyle Company, 2003)

Thomas G. Plante, a Professor at Stanford University, Department of Psychiatry and Behavioral Sciences believes there is a link between the perception of being fit and mental health benefits. Professor Plante noted that there is professional confidence among researchers that there is a connection between exercise and physical health, as well as mental health. He also pointed out that research showed a connection between physiological and psychological benefits that researchers and clinicians have not yet been able to explain. Professor Plante completed a study in 1998 using 60 college students. He discovered more positive personalities and mood changes than actual fitness improvement based on VOW max, which measures heart rate and gas exchange. Of the 60 students involved in this study those individuals those who achieved the lowest fitness improvements scored, lower on depression and interpersonal sensitive and higher on self esteem coping skills relationship satisfaction than those who had achieved a higher fitness level on psychological questioners. These findings point out that perceived fitness may account for more psychological improvements than actually achieving a high fitness level. Other researchers have previously investigated the hypothesis that exercise might act as the placebo in psychological benefits derived from just taking part in an exercise program. (Abadies 1988:

Desharnais 1993). In both bodies of research the perception of being fit had a higher psychological impact than actually becoming fit. Desharnais concluded that, "It is possible to induce psychological improvements among nonclinical exercise if, via an expectancy modification they are explicitly led to believe the program is designed to produce such benefits".

Clearly the research presented supports the fact that aerobic exercise can make positive behavior changes. The fact that aerobic exercise has been used successfully to treat individuals with more severe mental disorders further supports the psychological benefits of exercise. More research is needed to focus exercise intensity and duration. New research also supports the fact that merely being involved in an exercise program also has profound effects on behavior and character. The use of exercise by school systems to improve student behavior faces many problems such as students refusing to participate, objection by parents and even litigation. The use of aerobic exercise to improve fitness poor levels of student fitness might be the best way for schools to benefit from the psychological benefits. The possibility of educating parents and the community as to behavioral benefits of exercise may also provide support for exercise programs.

Chapter 3

Design of the Study

Introduction

This study focused on the use of aerobic exercise as a means to improve at risk student behavior. By improving negative student behavior the result should be improved academic performance.

General Description of the Research

The individuals who took part in the research were asked to run aerobically two days per week for a continuous period of 6 to 8 minutes. The running took place indoors in a gymnasium or outdoors on a track, weather permitting. Students were instructed that their running pace should allow them to talk to a classmate while running. This is a technique to keep students running aerobically with oxygen. Once a student became out of breath the exercise became anaerobic. If this occurred students were asked to slow down even walk if necessary and then to begin running again at a slower pace. The aerobic running was immediately followed by 6 to 8 minutes of progressive resistive exercise in the form of circuit training. Circuit training also represents a non-stop aerobic form of exercise, which included muscular exercise for a continuous period of time. The exercise equipment that was used consisted of 11 individual exercise machines. The exercise machines provided resistance in the form of hydraulics. The resistance setting on each exercise machine was easily adjusted by the turn of a button. Students are complete between 12 to 15 repetitions in the 20-second time period allotted for each specific exercise. Students were shown how to move to the next machine and make the necessary adjustments in less than 4 seconds. The

machines were located in a separate weight room and setup in a tight oval to facilitate quick movement between each machine. Each student completed two rotations on each exercise machine. It is important to note that students were instructed as to the importance of using full range of motion with each exercise to strengthen the origin and insertion of each muscle, as well as to maintain flexibility. The total time period for this part of aerobic exercise was approximately 8 minutes. The exercise equipment was used as follows.

<u>Exercise Machines</u>	<u>Muscles Exercised</u>
Bench Press	Pectorals Major (chest)
Chest Fly	Pectorals Major, Anterior Deltoid (chest-shoulder)
Military Press	Deltoid (upper shoulder)
Abdominal Curls	Rectos Abdominal (stomach)
Leg Extension	Quadriceps (front upper leg)
Leg Press	Quadriceps, Hamstrings (front and rear upper leg)
Leg Adduction	Abductors (inside the leg)
Stationary Bicycle	Entire Leg
Bicep Curls	Biceps (upper front of arm)
Stair Stepper	Quadriceps, Hamstrings
Lat Pull	Latissimus Dorsi (side of torso)

Each class that participated in the research study contained 12 students or less allowing for each student to have a machine to begin the circuit. Jump rope stations were added to facilitate additional students who might be added to classes taking part in the research.

The length of time taken to complete both running and the circuit-training phase of the research was 15 to 16 minutes in total. At the conclusion of this time period students continued in their regular physical education unit.

Development and Design of the Research Instrumentation

Each 7th and 8th grade ILC student attending Spring Middle School, including those taking part in the research project carry a Behavior Modification Card (point card) to and from (including homeroom) every class each school day. The point cards were used as the instrumentation for this research. Student point cards provide academic and behavioral evaluations during each class period for the entire school year. Students actually choose their two behavioral goals to be evaluated from the following criteria each school day:

Respect Staff and Others (RS)

Proper Attitude (PA)

Cooperative Classroom Behavior (CCB)

Ignore Negative Behavior (INB)

Compliance (CO)

Appropriate Peer Interaction (API)

Use of Appropriate Language (UAL)

Academics and the two behavioral criteria are the 3 criteria that are evaluated on each student's point card. The point system, in the form of a Likert scale, and criteria are as follows:

- | | |
|---|------------------|
| 3 | All of the time |
| 2 | Most of the time |
| 1 | Some of the time |
| 0 | One time |

At the conclusion of each school day, each child's point card was totaled. The students could receive the following levels of performance daily: Bronze (0 to 65 points) Silver (66 to 85 points) Gold (86 or more points). There was also space on the reverse side of the point card for teachers in each class period to make more detailed comments if necessary. (See Appendix A-1)

Description of the Sampling and Sampling Techniques

The research sampling consisted of all ILC students in both 7th and 8th grade, which represents 30 male students, and five female students totaling 35. The students all attend Springer Middle School, one of nineteen schools in the Brandywine School District, in Wilmington, Delaware. The research included a preparation period from October and November 2003. This allowed for the improvement of students' fitness levels, which would enable them to take part in the research two days per week. The actual research began on December 1, 2003 and continued through January and February of 2004. Students who participated in the research completed the research criteria two days per week for the entire three months of the study. The program took place on every Tuesday and Friday, which allowed for student muscle recovery. This was a necessity because of the use progressive resistive exercise.

At the conclusion of the next to last period of each school day all ILC teachers tabulate student point cards. If students have accumulated 86 or more points they are permitted to attend a 30-minute recreation period in the school gymnasium. During this time period the researcher will have access to evaluate all ILC student point cards.

Description of Data Collection Analysis Plan

All students who physically participated in the aerobic exercise will be used in the research daily. Monthly tabulations of each of three classes will provide the researcher with a percentage score that will be used to evaluate student behavior changes. At the conclusion of the study, the scores for all three classes for the three months were used to make a final evaluation as to the effectiveness of behavioral changes, which was the purpose of the study. Each ILC student carries a Student Point or as it was called Behavior Modification Card, to each class daily. (Appendix A) Students must receive a teacher's evaluation of their academic performance and two behavioral areas. If a student receives a perfect score in both academics and the two behavior criteria he or she receives the score of ten. For the purpose of the study each class score will be multiplied by ten, which makes 100 percent a perfect score. Student scores will be evaluated and tabulated prior to taking part in the aerobic exercise and then after their participation. For the purpose of the study academic as well as behavior categories will be calculated together. The reason for this was the cause and effect relationship between behavior and academic performance. Cards for each of the three classes taking part in the study were retrieved from each teacher at the conclusion of each month. In all three classes there is class time prior to the aerobic exercise period to facilitate student evaluation and tabulated pre and post exercise. Examples of this are period 2 has two class periods before the study and each other class has 3 and 4 class periods respectively before taking part in the study.

Chapter 4

Research Findings

The research findings have been collected over a three-month time period. The months of collection were December 2003 and January and February of 2004. The totals for each month will include data collect from three different groups participating in the same aerobic exercise format. It is important to note the research findings will present data related to student behavior and academic performance both before and after the exercise period. Each student who took part in the study was exposed to two, three or for class periods prior to exercise. The same students also were exposed to five, six and seven periods of class time after their participation in the exercise program. Student's classroom behavior in every class both before and after exercise was compiled as part of the data collection criteria.

The data that was collect for each month of the study provided the frequency of score both before and after aerobic exercise. The letter N represented number students who took part in the study prior to and after exercise. Each month findings were concluded with total scores for student behavior prior to exercise and after taking part in aerobic exercise. At the conclusion all three months of the research, data will be tabulated and a final before and after exercise student behavior score will illustrate the final results of the study.

In December 179 student classroom behaviors were evaluated before exercise, the scores totaled 79.400%. The frequency of student behavior scores before exercise was as illustrated below. (See figure 1)

Figure 1

Dec. Before Exercise	Score	Frequency	Percent
	.0	10	5.6
	48.5	3	1.7
	50.0	17	9.5
	52.8	1	.6
	56.0	1	.6
	60.0	16	8.9
	72.8	14	7.8
	75.1	1	.6
	78.5	1	.6
	85.0	15	8.4
	88.5	19	10.6
	88.5	1	.6
	94.2	3	1.7
	97.1	18	10.1
	100.	59	33.0
	Total	179	100.0

In December 2003, 179 student classroom behaviors were studied after their participation in aerobic exercise. Their behavior score in all remaining class were 86.634. The score frequencies of student behavior after exerciser were as illustrated below. (See figure 2).

Figure 2

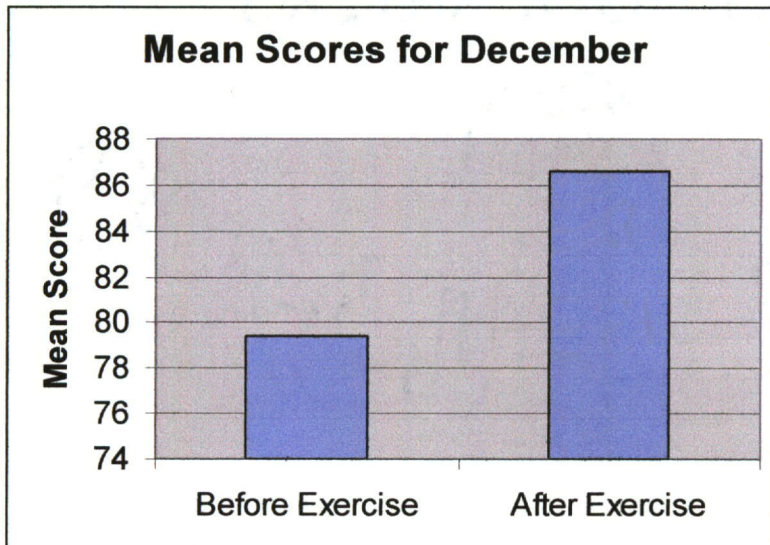
Dec. After Exercise	Score	Frequency	Percent
	.0	4	2.2
	7.4	1	.6
	48.5	1	.6
	50.0	5	2.8
	52.8	6	3.4
	60.0	8	4.5
	72.8	11	6.1
	80.0	1	.6
	81.4	1	.6
	85.0	16	8.9
	88.5	22	12.3
	91.4	2	1.1
	92.8	4	2.2
	94.1	1	.6
	94.2	2	1.1
	97.1	21	11.7
	100.0	70	39.1
	Total	176	98.3
Missing System		3	1.7
Total		179	100.0

In December 2003, the student behavior scores before and after exercise illustrated that exercise improved student classroom behavior by 7.234% (See figures 3 and 4).

Figure 3

December	Number of student exercise periods	Minimum	Maximum	Mean	Std. Deviation
Before Exercise	179	.0	100.0	79.400	26.177
After Exercise	179	.0	100.0	86.634	20.630

Figure 4



In January 2004, 190 student classroom behaviors were evaluated before exercise, their scores totaled 80.816 percent. The frequency of student classroom behavioral scores before exercise was as illustrated below. (See figure 5)

Figure 5

Jan. Before Exercise	Score	Frequency	Percent
	.0	8	4.0
	40.0	1	.5
	42.8	1	.5
	48.0	1	.5
	48.5	3	1.5
	50.0	18	9.0
	52.8	7	3.5
	57.1	1	.5
	60.0	9	4.5
	71.4	1	.5
	71.8	1	.5
	72.1	1	.5
	72.8	7	3.5
	75.1	4	2.0
	77.1	2	1.0
	81.4	1	.5
	85.0	5	2.5
	85.4	1	.5
	85.7	1	.5
	87.1	1	.5
	87.2	1	.5
	88.5	18	9.0
	91.4	2	1.0
	92.8	3	1.5
	94.2	2	1.0
	95.7	1	.5

	97.1	19	9.5
	97.5	1	.5
	100.0	69	34.3
	Total	190	94.5
Missing System		11	5.5
Total		201	100.0

In January 2004, 201 student classroom behaviors were studied after their participations in exercise; their scores totaled in all remaining class were 88.759. The score frequencies of student behavior after exerciser were as illustrated below. (See figure 6)

Figure 6

Jan. After Exercise	Score	Frequency	Percent
	.0	2	1.0
	10.0	2	1.0
	17.0	1	.5
	40.0	2	1.0
	48.5	1	.5
	50.0	8	4.0
	52.8	2	1.0
	57.1	1	.5
	60.0	5	2.5
	71.4	2	1.0
	72.8	7	3.5
	75.7	1	.5
	77.1	1	.5
	78.5	2	1.0
	80.0	1	.5
	81.4	2	1.0

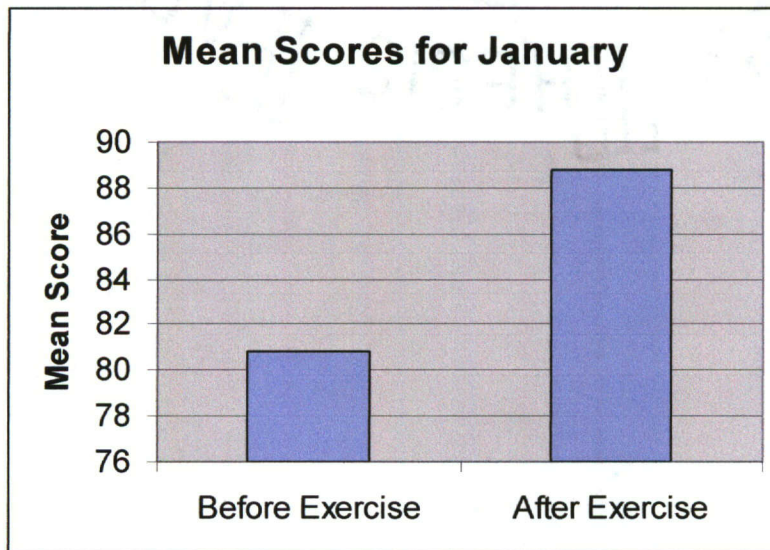
85.0	3	1.5
85.7	3	1.5
87.1	1	.5
88.5	18	9.0
90.0	3	1.5
91.4	2	1.0
92.8	3	1.5
94.2	9	4.5
95.7	1	.5
97.1	20	10.0
98.5	1	.5
100.0	97	48.3
Total	201	100.0

In January 2004, the student classroom behavior scores before and after exercise illustrated that exercise improved student classroom behavior by 7.943 percent (See figures 7 and 8)

Figure 7

January	Number of student exercise periods	Minimum	Maximum	Mean	Std. Deviation
Before Exercise	198	.0	100.0	80.816	25.270
After Exercise	198	.0	100.0	88.759	19.585

Figure 8



In February 2004, 190 student classroom behaviors were evaluated before exercise; their scores totaled 83.186 percent. The frequency of student behavioral scores before exercise was as illustrated below. (See figure 9)

Figure 9

Feb. Before Exercise	Score	Frequency	Percent
	.0	5	2.5
	48.5	3	1.5
	50.0	18	9.0
	52.8	6	3.0
	57.1	1	.5
	60.0	17	8.5
	71.4	2	1.0
	71.5	1	.5
	72.1	3	1.5
	72.8	2	1.0
	75.1	3	1.5
	78.5	1	.5
	81.4	1	.5
	85.0	6	3.0
	85.5	1	.5
	88.5	19	9.5
	91.4	4	2.0
	91.7	1	.5
	92.8	1	.5
	95.7	1	.5
	97.1	24	12.1
	100.0	79	39.7
	Total	199	100.0

In February 2004, 199 student classroom behaviors were studied after their participation in exercise; their scores totaled in all remaining class were 89.819. The score frequencies of student behavior after exerciser were as illustrated below. (See figure 10)

Figure 10

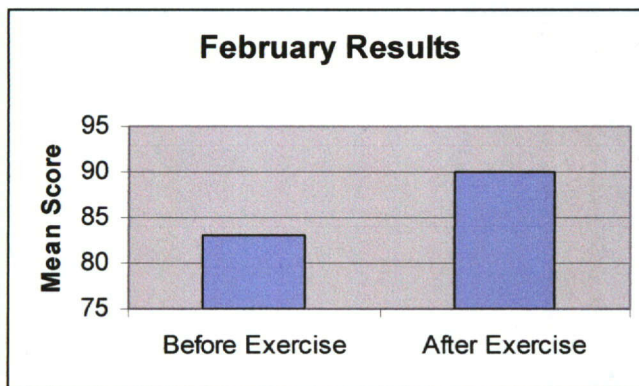
Feb. After Exercise	Score	Frequency	Percent
	.0	4	2.0
	5.0	1	.5
	40.0	1	.5
	48.5	3	1.5
	50.0	4	2.0
	52.8	2	1.0
	60.0	7	3.5
	72.1	5	2.5
	85.0	10	5.0
	85.8	1	.5
	88.0	1	.5
	88.5	28	14.1
	94.2	3	1.5
	97.1	30	15.1
	100.0	99	49.7
	Total	199	100.0

In February 2004, the student classroom behavior scores before and after exercise illustrated that exercise improved student classroom behavior by 6.633 percent (See figures 11 and 12)

Figure 11

February Results	Number of student exercise periods	Minimum	Maximum	Mean	Std. Deviation
Before Exercise	199	.0	100.0	83.186	22.780
After Exercise	199	.0	100.0	89.819	19.612

Figure 12



From the onset of the aerobic exercise program in December the respective before exercise behavior scores were shown continued improvement each month that followed. The importance of this data was that student behavior prior to exercise after the infusion of the exercise program also improved. (See figure 13)

Figure 13

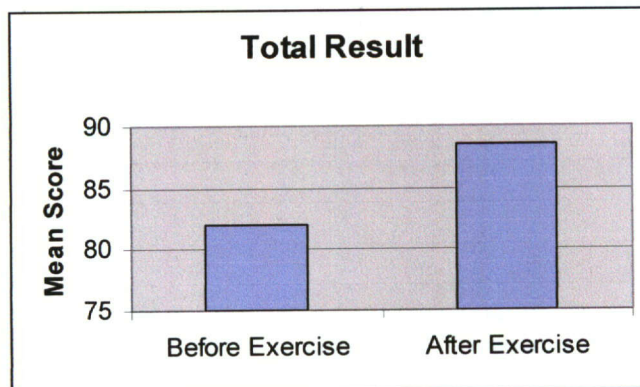
December	179	Classroom behavior score before
student		exercise
exercise		79.400%
periods		
January	198	Classroom behavior score before
student		exercise
exercise		80.186%
periods		
February	199	Classroom behavior score before
student		exercise
exercise		83.186%
periods		
	576	Improvement totals form December
Total		to February in student behavior
number of		before exercise
exercise		3.786%
periods		

The three-month totals for classroom behavior in which data was collected prior to exercise, 576 students behavior scores were 81.1998 %. After the same 576 periods of student exercise student behavior improved to 88.4759. Exercise improved student classroom behavior 7.2761 percent. (See figures 14 and 15)

Figure 14

Totals	N	Minimum	Maximum	Mean	Std. Deviation
Before Exercise	576	.00	100.00	81.1998	24.7315
After Exercise	576	.00	100.00	88.4759	19.9269

Figure 15



Chapter 5

Conclusions, Implications and Further Study

Introduction

The Intensive Learner Centered (ILC) students who took part in the aerobic exercise and the circuit-training program reacted positively to the format of this program. Each day of exercise participants came ready to perform and seemed to be very comfortable with the regimentation of the program. As the weeks and months of the study were completed student intensity in both phases of the aerobic exercise increased. In the running phase of the program by the second month almost every student became self-motivated and self disciplined. The same phenomena were noted in the progressive resistive circuit-training phase of the study, students took pride in their exercise form as well as their repetitions and resistance. The calming effect of endorphins released after continuous aerobic exercise was very evident. Improved self-esteem of the participants was also evident in their interaction peers and instructors. The participating students' classroom teachers periodically wrote notes and makes remarks as to their students positive changes in both attitude and behavior.

Grand Tour Conclusions and Implications

In the final analysis 16 to 18 minutes of continuous aerobic exercise significantly improved problematic students' behavior. The final percentage of improvement at the conclusion of 576 periods of student exercise was 7.2761 %. How much does a seven percent improvement student behavior transfer into improved learning? Improved student behavior had a profound effect on a student's ability to learn. It was also important to consider that classroom teachers experienced an atmosphere more conducive

to learning when behavior was improved. Common sense points to the facts that better behaved student were more focused and attentive and had attitudes more conducive for learning. Self-discipline and self-esteem were also an important factors, a commitment to exercise might transfer to a commitment to learning. Students with improved behavior were not removed from class at the same level of frequency therefore were exposed to more opportunities to learn. Improved student behavior should facilitate progress in the 2000 Federal Proclamation, No Student Left Behind, as well as improved standardized test scores.

The fact that student behavior before exercise improved from the first month to the last month of the study by almost 4 % was also significant. Information discovered in the literature review supported improved behavior based on the perception of fitness or just being committed to an exercise program. If one combined the behavior scores prior to and after exercise the study improved student behavior by a total of 11 percent. An 11 percent improvement could be considered very substantial. Most importantly students who were once dysfunctional had become very functional. Students who were not able to learn because of their behavior could learn.

Implications of Study on Leadership Skills

School leaders can view this study in many different ways. First, they may think that innovation might be the answer to many problems if they have the willingness to be creative. Secondly, research is the key to supporting new programs and is necessary before school leaders can commit both time and money to new programs. Finally, problematic students seem to react to organization and regiment. Problems with this program might arise in receiving commitment from parents and the community.

Although, with 41% of our nation's children facing weight problems and childhood diabetes at epidemic levels, it does not seem that it would be very hard to sell. Facts supporting exercise as a remedy to both problems might be the answer.

It would be interesting to administer the same study for six months and to discover if the 7 percent for three months became 14 percent for six months. It would also be interesting to apply the study to students without behavior problems and see what benefit if any aerobic exercise might have on their academic performance. Further study is needed and may save school systems thousands of dollars spent on alternative schools for students with behavioral problems. If exercising two days per week for 3 months can produce 7.2761% improvements in student behavior, what might an entire school year (36 weeks) produce?

As a future school leader this research has taught me that innovation might be the answer to many problems that seem impossible or that there are not answers for. Many problems facing our nation's schools might be solved by innovative methods. Research is the key to supporting and form of school reform. It was once said that only a few individuals have changed society, maybe only a few school leaders will make changes necessary to improve student learning for everyone.

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Appendix A

Student Point and Behavior Modification Card

The Springer Academy

The Brandywine School District Middle Level Intensive Learning Center

Student Point and Behavior Modification Card

Name: _____ Date: _____

POINTS

- 3 all of the time *Bronze Level* (0 to 65 points)
- 2 most of the time *Silver Level* (66 to 85 points)
- 1 some of the time *Gold Level* (86 or more points)
- 0 none of the time

	Academics	Individual Goal	Individual Goal	Bonus	
Homeroom					
1 st period					
2 nd period					
3 rd period					
4 th period					
Lunch					
SSR					
5 th period					
6 th period					
7 th period					

TOTAL POINTS				
EXTRA BONUS POINTS FOR THE DAY				
TOTAL POINTS REACHED FOR THE DAY				
DAILY LEVEL	<i>BRONZE</i>	<i>SILVER</i>	<i>GOLD</i>	

Students with 72+ points at the end of period 6 will have activity from 1:30 pm to 2:10 pm.

Parent Signature: _____ Date: _____

Parent Comments:

Appendix B
Comments/Daily Progress

Comments/Daily Progress

Arrival/Homeroom	
1st period	
2nd period	
3rd period	
4th period	
Lunch	
5th period	
6th period	
7th period	

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