The Impact that Daily Exercise Has on a Student with Behavioral Issues in the Classroom

By

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November 28, 2009

A thesis submitted to the

Department of Education and Human Development of the

State University of New York College at Brockport

In partial fulfillment of the requirements for the degree of

Master of Science in Education

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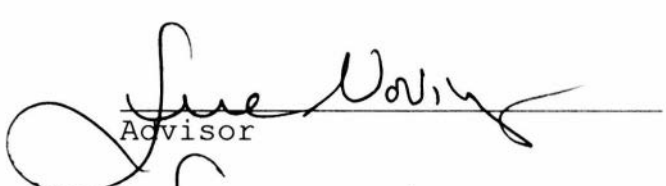

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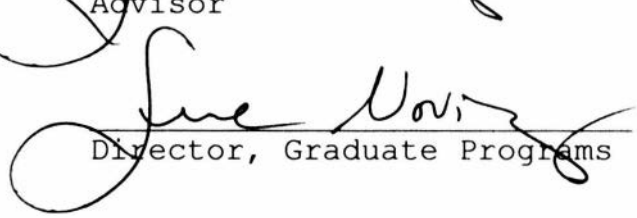

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Chapter One: Introduction

Background

Developing effective interventions for children with disruptive behaviors is an important goal for educators everywhere. All of us have experienced working with students who exhibit disruptive behaviors in our own classrooms. For a classroom to be productive, we as educators must try and help those students to work to their full potential. *ADHD is defined as a "persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development" (American Psychiatric Association, 2000, pg. 85).* It is estimated that between 3 and 5 percent of children have ADHD, or approximately 2 million children in the United States alone (NIMH, 2008). This means that in a classroom of 25 to 30 children, it is likely that at least one child will have ADHD (NIMH, 2008). We as educators need to be aware of the social, behavioral, and medical issues that our students with ADD/ADHD are dealing with, as well as the fact that each student can be treated differently for this disorder and that each could react differently to the determined treatment.

Treatments for ADD/ADHD can be as open-ended as the disorder itself. Medication is the most common form of treatment, but with that comes a great deal of responsibility on

both the part of the parent and the student. Timeliness, correct dosage, and consistent administration are all factors that come into play. Sadly, unless all aspects of medication are considered, it can prove to be ineffective for the child. Much of the success of medication relies on the parents, and their consistency concerning their child's medication. Other treatments that are often used include behavior modification plans, as well as cognitive behavioral treatments (Abramowitz & O'Leary, 1991). Behavioral modification interventions often contain contingency contracting and response cost. These interventions have been shown to be effective; however, they are also relatively time-consuming and require considerable resources for proper implementation (Abramowitz & O'Leary, 1991).

My district, like most others, has a growing number of students being diagnosed with ADD/ADHD. Helping these students perform more productively in the classroom has become a district-wide goal. Since medication is something that we as educators have little to no control over, and behavioral modifications are marginally effective, we decided to look for other alternatives to help these students. Surprisingly, we stumbled upon the use of exercise as a possible treatment.

Rationale

Consideration of daily exercise programs is warranted as an important potential tool for improving student performance. This is substantiated by research evidence that implies that implementing exercise activities throughout the day can actually improve academic performance and lessen disruptive behaviors (Barkly, 2004; Majoreck, Techelmann, & Heusser, 2004). Research into the functioning of the human brain has greatly enhanced our understanding of cognitive behaviors, which are fundamental to education (McCracken, 2002). These behaviors include learning, memory, intelligence, and emotion (Geake & Cooper, 2003). Educators have successfully incorporated specific kinesthetic exercises, using movement, into the classroom to facilitate crossover between brain hemispheres in an effort to improve competency in learning tasks and to reduce student restlessness (Weinbrenner, 2003). Extending these useful techniques into a more formal fitness program within a school may encourage better behaviors from those children dealing with ADD/ADHD. Exercising just 30 min a day, 3 days a week has been known to have its advantages (Jambor, 1999).

Research Question

This study explored what impact daily exercise has on a student with behavioral issues in the classroom.

Definition of Terms

Variables considered include: What does "exercise" mean? What heart rate needs to be reached? What does appropriate behavior mean?

The definition of exercise is: bodily exertion for the sake of developing and maintaining physical fitness (Merriam-Webster, 2008). We decided that the students needed to be exercising for at least 30 minutes, 5 days a week, and at exertion levels that would result in the student achieving their individual target heart rate. We chose two forms of exercise that we found to be effective: The Sony Playstation exercise bikes and Dance Dance Revolution Pads.

As stated above, for the program to be successful, the students need to be exercising at their pre-determined target heart rate. To determine the correct heart rates for each child, "Several researchers have noted the importance of athletic participation, finding that improvements in self-esteem, self-confidence, and social skills were demonstrated as a result of successful experiences with such activities" (Lopez-Williams, 2005, pg.174). We used the following formula: (220 -

Age = Maximum Heart Rate. Max Heart Rate - Rest Heart Rate x Intensity + Rest Heart Rate = Training Heart Rate). Each student's individual heart rate was established at the beginning of the exercise session and then was monitored every 3-5 minutes throughout the exercise period.

The last variable that needed to be determined was my own definition of productive behavior in the classroom. I defined productive behavior as:

- Working cohesively with other students/teachers in the classroom.
- Absence of being disruptive to the other students in the classroom.
- Showing appropriate levels of respect to their fellow students, as well as teachers.
- Creating work that shows that they are putting forth good effort in understanding the content.
- Asking to be able to leave the classroom at any un-predetermined times (music lessons, counseling, etc…)

Those expectations were given to the students on the first day of school and were reinforced throughout the year. Certain alterations could have been made depending on the student, but ultimately every child was trying to abide by those expectations to the best of their abilities.

Study Approach

My plan of action was to research the impact that 30 minutes of vigorous exercise had on a student's behavior in the classroom. This study was designed around a six week program,

which required the participants to exercise five days a week for thirty minutes each day. Three fifth-grade students, having obtained their individual and parental consent, took part in the study. At the beginning of the program, I filled out a pre-intensity survey for each participant. The participants also began the program by completing a pre-intensity questionnaire. As the program took place, I was consistently circulating around the students, delivering positive reinforcement to keep them going. I also monitored each student's individual heart rate every 3-5 minutes, to make sure they were at the appropriate level. I would take daily field notes and at the conclusion of the program, I filled out a Post-Intensity survey and the participants also filled out a Post-Intensity questionnaire. These three forms of data would then be used to substantiate whether exercise did have an impact on the participants' behavior in the classroom.

CHAPTER 2: Literature Review

Introduction

Issues with inattentive students in our classrooms occur on various levels. They can start from the mildest form, the occasional "daydreamer", and advance to the most severe form. Those students with severe issues often end up with a diagnosis of Attention Deficit Hyperactivity Disorder-Inattentive Type (ADHD). The number of students suffering from ADD/ADHD in our classrooms is constantly growing. It is estimated that between 3 and 5 percent of children have ADHD, or approximately 2 million children in the United States (NIMH, 2008). This means that in a classroom of 25 to 30 children, it is likely that at least one will have ADHD (NIMH, 2008). It is our job as educators to make sure that all of the students in our classrooms are receiving the most rewarding educational experience that we can deliver. However, when it comes to our students with ADD/ADHD, this delivery can become more challenging. We need to recognize that those students suffering from ADD/ADHD have a medical condition, and they need to receive as much extra support as possible to help them achieve academic success.

In the following review, I will look at how ADHD affects the brain, and explore some of the more common ADHD characteristics portrayed in these children. I will explore the more common treatments that are used to help these children

function in the classroom. I will then look at exercise and it's affect on the body and brain. This will lead us to some studies that explain how exercise has positively influenced students in the classroom, which is precisely why I am performing this research.

ADHD and the Brain

Our bodies are very complex machines. They rely on us to provide them with the appropriate amount of nutrition, exercise, and sleep to keep them functioning. Our brain, however, differs from the rest of our bodies in that it relies totally on blood flow for its daily operations and growth (Wendt, 2001). As such, if blood does not flow through the brain in sufficient amounts, it will not receive the correct amounts of nutrients and oxygen it needs to perform on a daily basis (NIMH, 2008). Furthermore, this lack of blood may also result in less desirable brain chemistry, which may affect both behavior and learning (Wendt, 2001).

Our brain chemistry is pivotal to our daily mental functioning. "Neurotransmitters of the brain are necessary for good communication between neurons. Neurons are the connections for cell to cell communications. Neurotransmitters are the substances that run between neurons to make them communicate" (Wendt, 2001, pg.13). It is believed that in students with ADHD there is a breakdown in these neurotransmissions, without the

appropriate neurotransmissions, students with ADD/ADHD "often fail to complete assignments, are easily distracted, have difficulty listening to directions, concentrating, and organizing their work" (Dawson, 1995, pg. 415).

Characteristics of ADHD Children

It's no wonder, with the malfunctions occurring inside the brain of a child with ADD/ADHD, they struggle to adequately function in school. In most cases, children with ADD/ADHD are inattentive and struggle with impulsivity. They have difficulty sustaining their focus well enough, or for long enough to learn. Students with ADHD of display poor study skills and are generally disorganized in their daily actives. They also can have social problems, due to their inability to pay attention (Slavin, 2003).

"Typical behaviors include inattentiveness during work or play, not completing assigned tasks, not listing to or following directions, losing materials, inattention to details resulting in mistakes and difficulty awaiting turns (Prater, 2007, pg. 16)

Possible Treatments

There are several interventions that can be used to help children that suffer from ADD/ADHD. The most common form of treatment is the use of prescription medications.

"Some medicines used to treat attention-deficit and hyperactivity disorder (ADHD) are called psychostimulants. Some of these drugs are methylphenidate (brand names: Concerta, Ritalin), dextroamphetamine (brand names: Dexedrine, Dextrostat), d- and l-amphetamin racemic mixture (brand name: Adderall), and pemoline (brand name: Cylert). Although these medicines have a stimulating effect in most people, they have a calming effect in children and adults who have ADHD" (American Academy of Family Physicians, 2006).

These stimulants have been found to have a positive effect on classroom behavior, social interactions, and academic performance (DuPaul, Stoner, Tilly, & Putman, 1991). However, the use of these drugs can have negative side-effects on certain children such as insomnia, loss of appetite, obsessive-compulsive symptoms, and growth suppression (Baizer, 2001). Research has also found that the effects of some of these stimulants may not be as short term as once believed. Results suggest that there may be long-lasting changes in the brain's cell structure and function (Baizer, 2001). Because of such possibilities, parents often seek an alternative form of treatment.

The second largest form of intervention occurs in the classroom itself. This intervention includes the use of

behavior modifications and cognitive behavioral treatments. The most common forms of such modifications are contingency contracts (behavioral contracts) and response cost. These interventions have been shown to be effective; however, they are also relatively time consuming and require considerable resources for proper implementation (Abramowitz & O'Leary, 1991). The effects to such programs may also be short-term. Since these types of programs rely on the distribution of a reward, once the reward is no longer given, many times the negative behavior can often return.

Exercise and the Brain

More recently, researchers have taken a closer look at how exercise affects the brain and children's learning. They often describe the parts of the brain in children with ADD/ADHD that are lacking the correct amount of neurotransmissions as sleepy or lazy and believe that the use of exercise could wake-up these areas of the brain and possibly begin to trigger new neurotransmissions (Wendt, 2001).

Physical activity can also trigger positive changes in the child's body. One major change is the increase of the production of endorphins. These endorphins help the body relax and can also produce a feeling of happiness in the participant (Hyman, 1996). Another chemical that is released during exercise is serotonin. Serotonin helps rebuild the neurons,

which then enlarges the number of possible neurotransmissions, which then can lead to a change in behavior (Wendt, 2001).

Exercise also causes the body to create more oxygen/nutrient rich blood, and since the brain feeds off of this heartier mixture, it causes the brain to function better, and can even impact the presence of beneficial neurotransmitters (Wendt, 2001). These effects are not instant and require time and effort, but the rewards of exercise are practically endless, and therefore are being strongly considered as a possible intervention for children with ADD/ADHD.

Exercise and Academics

With all the recent positive findings linking exercise and brain, the old stereotypes of "dumb jock" and "smart nerd" no longer fit. In a recent study done by the California Department of Education, they found that students who do better on achievement tests are also more physically active than their peers that don't do as well (Vail, 2006). Therefore, the "dumb jocks" are actually performing better than some of their "nerd" friends.

A study was also performed linking athletic performance to positive social behaviors and academic performance. "Several researchers have noted the importance of athletic participation, finding that improvements in self-esteem, self-confidence, and social skills were demonstrated as a result of successful

experiences with such activities" (Lopez-Williams, 2005, pg.174). These students gained confidence, and therefore saw positive results with their peers and in their grades.

Exercise has also been linked to an increase in reading abilities among students. The added exercise causes an increase in production of serotonin and endorphins, which allows the struggling students to focus better during reading. "There were significant improvements for the intervention group in postural stability, dexterity, and phonological skill, and for naming fluency and semantic fluency. Reading fluency showed a highly significant improvement for the intervention group" (Reynolds, 2003, pg. 48). As a result, these students' reading levels increased as did their grades.

Summary

Research has shown that exercise produces nothing but positive effects. Through exercise, our brains are able to regenerate neurons, which can lead to better functioning aspects in life.

For those people who suffer from ADD/ADHD, this regeneration of neurons and the formation of mind altering chemicals (endophenins and serotonin) can possibly lead to better attention. Exercise can "wake-up" parts of the brain that might be "lazy or sleeping" in those who suffer from

ADD/ADHD and therefore they may gain a new found ability to focus.

With all the positive outcomes that result from exercise, one might question why we've waited so long to study it's affects on education. Hopefully through more studies like those described above and this specific project, people will see the positive effects on children, and exercise will be used more readily in the classroom. Out of all the treatments available for ADD/ADHD, exercise is the more accessible, entertaining, and healthy of the available options.

CHAPTER 3: Applications and Evaluations

Introduction

This study was designed to explore the impact that daily exercise had on students with behavioral issues in the classroom. The participants in the study participated in a 6 week long exercise program, in order to determine the impact it had on their behavior.

Research Question

What impact does daily exercise have on a student with behavioral issues in the classroom?

Participants

Teachers in grades 3-5 were asked to provide a list of candidates who might have been interested in participating in a daily exercise program. These participants ranged in age from 8-11yrs and were to be students that had attention issues that disrupted their individual day and / or the class ("on the go", blurted out answers, talked excessively, etc…). From that list, invitations and permission slips were sent home to parents. The first 9-12 children to respond were to be enrolled as participants. The groups were to be assigned based on grade level: "A" Group would consist of 4th graders and "B" Group would consist of 3rd and 5th graders. Both groups began the program on the same day. However, A group exercised in school during "Enrichment Time." That group would only contain 4th graders, as

their schedule allowed them to workout during the day from 12:30-1:10. B group would consist of 3rd and 5th graders, and would meet everyday after school from 2:30-3:10.

A mandatory meeting was held on the first exercise day for all participants in A group and B group. The meeting would explain the purpose of the program, the rules that needed to be followed, and the participants also answered a pre-program questionnaire. The questionnaires were collected and used as points of data to be compared with the post-program questionnaires, which were filled out on the last day of the program. The day immediately following this meeting was the first day in which the subjects in both groups would have engaged in the exercise activities. Due to a smaller number of participants than anticipated, one group was needed.

Instruments of Study

In order to conduct the study, it was necessary to get approval from the Institutional Review Board, as well as formal permission to conduct the research from the school principal, the participant, and his/her legal guardian. A permission letter was provided to all legal guardians of the participants. The letter explained the research and requested permission to use the data collected from his/her child's participation in the study.

After all of the necessary consent was received, baseline data was collected from the participant's teacher. This involved the teacher answering a group of questions on a pre-program survey (Please refer to appendix A). The survey questions were based on different behavioral attributes that could have been witnessed in the classroom. These surveys were kept until the end of the study, at which time the same participating teacher filled out a post-program survey. I was able to compare the two surveys to see if there was any change in the participant's behavior.

Along with the use of surveys, ongoing observations of the participating students were made. I observed the students from my own classroom for 30 minutes each day. During these observation periods, I took field notes that described the behaviors I was seeing. I also added any additional comments I had.

Lastly, I used a pre and post questionnaire that the participating students themselves filled out. The pre-questionnaire allowed me to identify any general concerns the student had with his/her behavior in the classroom. Through this questionnaire, the students were able to ask any questions that they might have had about the upcoming program. The post-survey asked the participants to describe any changes that they had

seen in themselves, as well as any suggestions they'd like to make for upcoming sessions of the program.

The use of all three forms of data collection allowed me to determine whether exercise had any effect on the participating student's behavior in the classroom.

Exercise Sessions

Each day the program began with the students performing a heart rate warm-up activity. Lists of acceptable activities were provided on the board and one student was in charge of selecting the activity for the day. It is important to the success of any exercise program that students gradually buildup their heart rate to its appropriate level. Some examples of the warm-up exercises are: jumping rope, jogging, and "jumping jacks."

The group of 5 students was then broken down into two smaller groups. Two students would exercise on the Dance Dance Revolution pads and three students would work on the PlayStation bikes. The groups would then rotate on the machines every other day. The students worked on machines that had predetermined exercise programs already loaded in. These programs had been found to provide the highest levels of student activity for the 30 minutes they were on the machinery.

Throughout the time period, the following things were taking place: A faculty member was consistently circulating

around the students, delivering positive reinforcement to keep them going. They were also monitoring the student's heart rates every 3-5 minutes, to make sure they were at the appropriate level. Lastly they regulated the atmosphere to make sure it remained positive.

Following the completion of the 30 minutes of exercise, the students then performed a "cool down" activity. This required them to perform stretching exercises and receive hydration. After the students were done, the faculty member then wrote down field notes which described the general performance of the child and the heart rate they maintained.

On the last day of the A/B Groups exercise sessions, students were asked to complete the post-program questionnaire. They also received a small token of appreciation for all their hard work and dedication.

Justification

The methods for this study were specifically chosen as a way to concretely show physical changes in the participants' behavior. By using a pre/post survey that required the teacher to "rate" the child's behavior before and after the study, I was able to see any possible changes that occurred, simply by comparing the numbers.

The purpose of the observations was to note the gradual changes that occurred over the course of the study. The observations and field notes allowed me to document daily what I was seeing in the participants in the classroom atmosphere. I hoped that the notes would model the positive progression of the students' behavior as it changed over the 6 weeks.

Lastly, I chose to use pre/post questionnaires because they were a reliable way to get a true understanding of what the participants thought and felt about the program itself, as well as what their outlooks were on their classroom behavior. Again, like the surveys, the pre/post questionnaire comparison would allow me to see any changes in the participants' feelings toward their behavior and the program.

Limitations of the Study

Sample Sizes: The research was limited to no more than 6 students from grade levels 3-5, in a suburban school district in upstate New York. There was a 12 student maximum because of the lack of exercise equipment. Given the small number of participants in the study, the data can not be generalized to other 3-5 grade students, classrooms, or schools.

Additional Exercise Activity: The students spent only a limited portion of their days in school. Therefore, we understood that

we could not control the amount of exercise students were participating in outside of school.

Unrepresentative Results: The selected students might have also been receiving further treatments on different levels, such as medication, behavioral modifications, etc.

Data Analysis

All three forms of data were then brought together for analysis. I began by looking at each individual's pre-intensity survey done by the teacher. I planned to take those surveys and compare them to the post-surveys that were completed at the end of the program. I would first look at those surveys by participants, noting what impact the program had on each individual student. I then looked at the data from these surveys as a whole. I would be able to see if there were any similarities between the participants, noting any patterns I saw and also and anomalies.

I then moved on to look at the pre-Intensity and post-Intensity surveys that were filled out by the participants. Similar to the above surveys, I began by looking at what each participant said and then I looked at the group as a whole.

The surveys were then compared to my field notes, first looking at each individual and then at the group. I planned to analyze my field notes to see if they correspond with the

surveys from both the teacher and the students. Making sure to utilize all of the data I had collected in a way that looked at both the individual participant, as well as the group as a whole.

Concluding the Study

The "Intensity" program was held for a total of 6 weeks. Upon conclusion of the 6 week program, a post-program survey was given to the participant's teacher. Also, a post-program questionnaire was distributed to the participants themselves.

Chapter Four: Results

Introduction

This study was designed to explore the impact daily exercise has on students with behavioral issues in the classroom. The participants in this study participated in a 6 week long exercise program, which was designed to keep them vigorously exercising for 30 minutes, five days a week. The research was conducted at an urban public elementary school in Western New York. The participants in the study were three fifth-grade students. All three participants portrayed some type of behavioral issue and were in my own fifth-grade classroom.

This study was intended to investigate how consistent and vigorous exercise could impact the behaviors of the participants and then those results would help me reflect on the necessity for a program such as this and its importance in our school.

Participants

The three participants in my study were three fifth-grade students from my own classroom. All three participants, like many students with ADD/ADHD, portrayed many of the typical behaviors, which included inattentiveness during work or play, not completing assigned tasks, not listing to or following

directions, losing materials, inattention to details resulting in mistakes and difficulty awaiting turns (Prater, 2007).

Each of the three participants had a distinct behavior, among the other behaviors, that I chose to monitor more closely. On a usual day, Student Red was out of his seat an excess of thirteen times. He was out of his seat when he was supposed to be working and this meant that he was walking around the room and often disrupting the other students from doing their work. Student Yellow was constantly playing with different items in his desk. His head would be down and he would have something in his hands that he would be playing with. It could have been a pencil, eraser, or a small toy that he had brought in, a folder, anything that he could get his hands on. Student Brown would chat with other students excessively. This behavior would often distract the other students who were around him, because he would be talking to them and therefore they wouldn't be doing their work.

All of these behaviors affected the three participants socially and academically. My goal was to find a way to help them focus more in the classroom and therefore help them behavior more appropriately.

Research Question:

- What impact does daily exercise have on students with behavioral issues in the classroom?

Themes

The following are the themes that I discovered during my study. These themes were common among the three participants.

Theme #1 - The type of exercise matters to the participants and most likely to the success of the program.

The students who were enrolled in this study were boys who ranged in age from 10-11 years. Upon starting the program, it quickly became evident that the PlayStation bikes were the equipment of choice. All of the participants would run to try to be the first one on the bikes and seemed disappointed to find that I had placed them on the Dance Dance Revolution pads or the other exercise equipment. The games for the PlayStation bikes were ones that work on an effort basis, which means the harder the boys pedaled, the faster their corresponding game character moved. Usually they chose to play racing type games and they would be different types of vehicles and would have to race each other. The game of choice for this group was *Moto Cross 3*, which was a game in which dirt bikes raced each other around a variety of tracks. Needless to say, all wanted to be the "big winner" and therefore they rarely stopped pedaling.

For fairness purposes, I had to come up with a rotation for the equipment use, since I had 5 students participating in the program and only 4 bikes to use. I was able to come up with a

schedule and that allowed each student to get his fair share of time on the bikes. This schedule worked on an every-other-day basis. I still heard comments like, "can I trade and be on the bikes today?" or "why can't it be my day to be on the bikes…I hate this machine."

I quickly began to notice that the boys' amount of interest in the exercise method they were using was completely linked to the amount of effort they put into their exercise session. Student Red seemed to be the most affected by the difference in machines. When it was not a bike day for him, he would often say, "I'm not doing this today! I'm leaving!" When he realized that his options truly were to stay and use the other equipment or go home, he would eventually comply. However, it would often take several prompts and reminders to keep Student Red on task. I would have to remind him that, "Tomorrow is your day on the bike." This would often get him back in motion, but it also meant that his workout really wasn't keeping a steady pace. A key component to this program is keeping the child's heart rate working a consistently higher level and a steady pace is pivotal for this. Therefore I feared that this lack of effort would affect overall success of the program.

Student Yellow and Student Brown showed similar signs of disapproval to the other machines, but in a less vocal way. I

noted that both participants would move very slowly as they used those machines, exerting little to no effort. They also would constantly switch from one machine to another. During one exercise session, I tallied that Student Yellow moved from one machine to another 12 times. I also noted that all three participants visibly looked less affected by the exercise they were doing. After thirty minutes on the bikes, all three of the participants were very sweaty and usually winded. However, when they used the other equipment they barely showed any signs that they had done any physical activity. There was no sweating and little to no panting. Also, on "bike days" they would quickly get off the equipment at the end of the session and run to the drinking fountain. After they got done using the other machines, they usually just gathered their belongings and headed for home.

As I began to look back at my field notes from the first week of the program, I became concerned. There was not much of a change in any of the students. Student Red was still getting out of his seat an average of 7 times a day. Student Yellow was still playing with items from his desk and average of 12 times a day and Student brown was caught chatting with other students an average of 9 times a day. I was beginning to wonder if it was because of the inconsistency in the exercises or just because I hadn't given the program enough time to take effect.

However, after only the first week, one of the "non-study" students had to leave. This allowed all four boys to be on the bikes for the remainder of the program and therefore they were getting the consistency I feel the program needs. I do believe this issue could have been a very large potential problem to the success of the program and that should be something that is considered in future trials.

Theme # 2 - Students who consistently used their medication and exercised showed more positive results in their behaviors than those students who were un-medicated.

Since the most common form of treatment for children and adults with ADD/ADHD is medication (American Academy of Family Physicians, 2006). It was no surprise that two out of the three participants who were in my study were taking some sort of prescription drug to help them better cope with their ADD/ADHD. Both Student Red and Student Yellow were on medication to treat the symptoms of ADD/ADHD. The purpose of such a drug is to have a calming effect on the child and therefore to allow the child or adult to concentrate better (American Academy of Family Physicians, 2006) and be less disruptive. However, like many medications, over time children can become less affected by the medication for several reasons. Most ADD/ADHD medications are prescribed based on a child's age and weight and because

children grow so rapidly through their early years, the correct potency is often changing (American Academy of Family Physicians, 2006). That is why this method of treatment can often be inconsistent and therefore can require other methods to help the child in the classroom (Baizer, 2001).

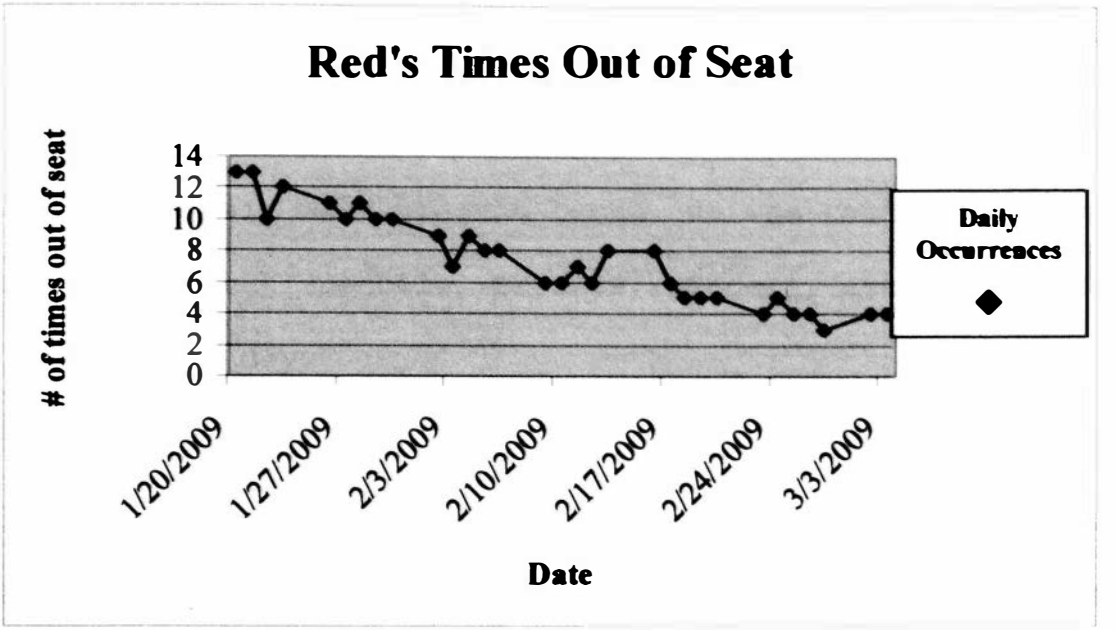
Student Red had been taking medication for his ADHD for the past three years. The medication he was taking seemed to help him in years past, as long as he was taking it regularly. However, this year he began showing some difficulty in being able to control his behaviors. On a usual day, he was out of his seat an excess of thirteen times. Student Red was out of his seat when he was supposed to be working and this meant that he was walking around the room and often disrupting the other students from doing their work. I suspect that he was either no longer taking his medication or it wasn't helping him as much as it had done in years past. I had noticed that his size hadn't changed much over the past year, but I did know that it was a prescription that he had been taking for some time. The nurse did a routine check to make sure he was in fact taking them and after receiving confirmation, I could only deduce that he may have begun to build a tolerance up to the medication. I also spoke with the mother about what I was noticing and she too confirmed with me that he was taking his medication regularly at home. She did say that she would talk to his physician to see

if a medication change was in order. However, I checked back with her over the next several weeks and was unable to get a confirmed answer about any upcoming appointment. I was simply told that she was going to take him in.

Dealing with his actions in the classroom and knowing this about his medication, prompted me to enroll him in the program. Suspecting that his medication was no longer fully helping him to control his behavior appropriately in the classroom, I wanted to see if paired with exercise what the impact could be. The graph below tracks Student Red's times out of his seat from the beginning of the program to the end. Though all three students showed positive results, his was definitely one of the more drastic. He had begun the program, exiting his seat an average of thirteen times a day and ended the six week session, only getting up roughly four times a day. To my knowledge there were no changes in his medication throughout the program. I myself called the mother to inquire about medication changes and received no confirmation. Also, those types of changes are to be reported to the nurse and then conveyed to the classroom teacher, and no such report was made.

The graph below charts Student Red's progress over the six week program. The x-axis (date) charts Student Red's progress by week intervals. However, each diamond that appears on the

line is the number of times he was out of his seat on a specific day. The y-axis is the number of times Student Red was out of his seat.



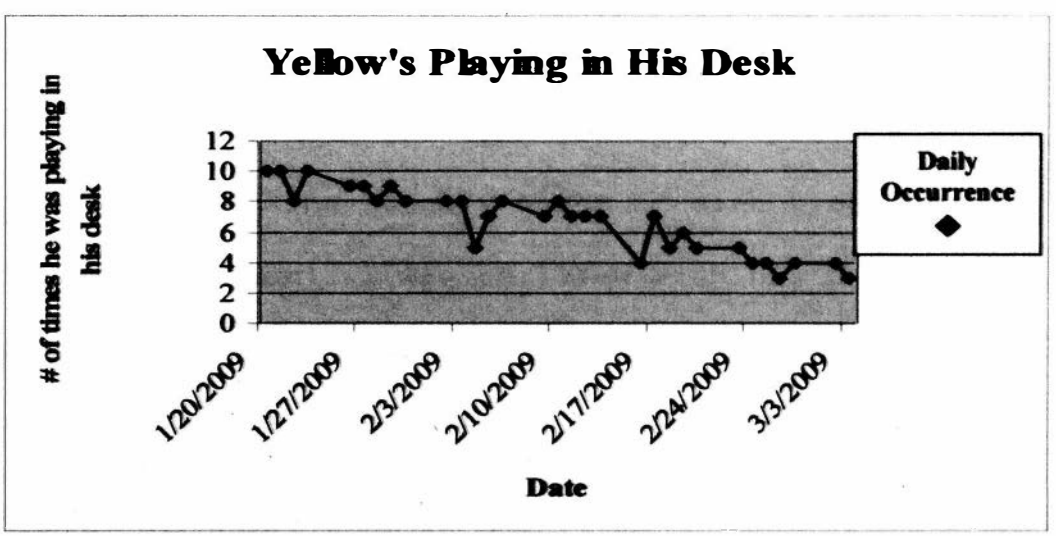
(Figure 1)

Student Yellow had only begun taking his medication the year before. He however, had grown considerably over the summer, as fifth grade boys often do. I again inquired with our nurse to see if there had been any medication changes and asked if he had possibly been taken off them. The nurse again told me that she wasn't aware of any changes and that I should keep her posted. I also spoke with Student Yellow's mother and she too confirmed that nothing had been altered. I explained to her that Student Yellow seemed very unfocused and told her that he was constantly playing with items in his desk. Because of his

change in size, I discussed with his mother the possibility that maybe his medication was not being as affective as it could have been. She was very receptive to the suggestion and was able to get him into his doctor immediately. The physician was able to make the correct medication adjustments within the first few weeks of the program.

When the six week program began, he was caught playing with items in his desk (pencils, erasers, binders, etc…) an average of ten times a day.

Student Yellow came to the program every day and worked extremely hard at his exercise. After his medication was changed by his physician, I began to see more consistent changes in his behavior. This happened around week two. He had stopped playing in his desk two to three less times a week. As shown on the graph below.



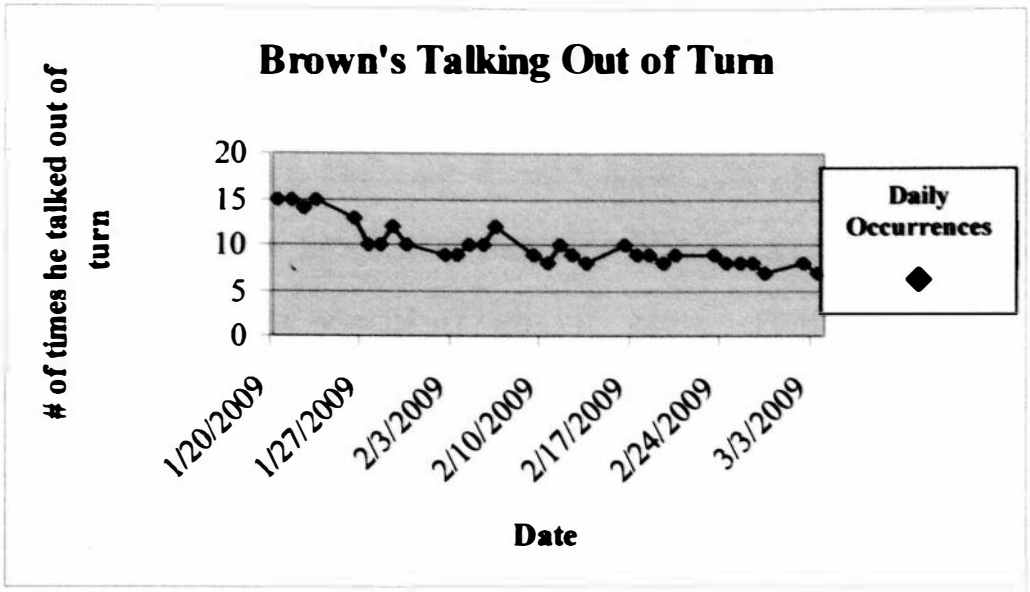
(Figure 2)

As did Student Red, Student Yellow made gradual improvements through the entire 6 weeks and by the end of program he was only in his desk an average of three times per day.

Both of the students who were on medication and who were enrolled in the program seemed to have had more of a change in their behavior during the 6 weeks.

The third student, Student Brown was not on any medication. He too struggled with his ability to focus and often needed several reminders to pay attention. He also had a tendency to talk excessively to the students who were sitting around him, whether it was an appropriate time or not. This behavior proved to be very disruptive to the rest of the group, especially during quiet work times. Therefore, he too was enrolled in the program to help him better control his behaviors.

Brown's behavior didn't seem to change as drastically over the six week period. He went from talking an average of fifteen times per day to talking roughly eight or nine times per day by the end of the program. I was thrilled with his progress over the six weeks and any amount of change to lessen his disruptions was a positive change. As shown in the graph below:



(Figure 3)

After reviewing the data from my three subjects; and knowing that two of the three were on medication for their ADD/ADHD, I wonder if the combination of the program and medication helped Student Red and Student Yellow show more of a rapid change in their behaviors. In regards to Student Brown, who was not medicated, the change was more gradual. However, I do feel that all three students made positive progress over the 6 week program.

Theme # 3 - Exercise seems to impact the child's overall disposition toward school.

Two out of the three participants began the program with what seemed like negative feelings toward school. According to my field notes, both Student Red and Student Yellow would walk

into the classroom each morning and would rarely say hello to me or any of the other teachers who greeted them at the door. Student Red rarely talked to the other students throughout the day and it seemed clear that he didn't have any close friends in the room. He liked to have his desk by itself and when it came time for group work, he would often get upset or act out inappropriately. I asked him why he didn't like group work and he said, "I don't like working in groups, it's stupid." Sometimes, I would ask him to sit in with a group and he would just sit and watch them work. He never offered any information or talked to the other members.

Student Yellow also kept to himself. He very rarely raised his hand with an answer and during group work he never shared his ideas. He often waited to be told what to do and then would quietly get his task done, usually taking longer than most. Student Yellow did have one close friend, but he seemed to struggle when his friend wanted to include others. When this happened, he would head back to his desk and would sit alone.

Physical activity can trigger positive changes in a child's body. One major change is the increase of the production of endorphins. These endorphins help the body relax and can also produce a feeling of happiness in the participant (Hyman, 1996). As the program began to get moving, around week 3, I began to

see changes in the two participants. Student Red began to talk to some of the other students. He began to show that he had great athleticism in P.E. and everyone began to want him on their team. These friendships began to carry over into the classroom and by the fifth week, he actually wanted his desk moved into a group. These friendships also made group work times much more pleasant for him. There were a few times that he didn't want to join in, but definitely he joined more often than not.

Student Yellow also began to show positive signs of improvement in regards to his attitude toward school. He began to say hello to me and the fellow teachers in the morning. He also became more relaxed around the other students. When his close friend wanted to incorporate others, many times he stayed along with them. I also noted that Student Yellow was raising his hand much more during class. He was actively participating in lessons and because of this he was getting called on much more for positive reasons, instead of reminders to be paying attention.

Both students smiled more and even their body language changed. I noted that their posture seemed to get better. Instead of sitting at their desks with their head's down, they were often sitting up and looking attentive. These positive

changes were often rewarded verbally by me or the other teachers, which seemed to prompt the boys to keep up the good work.

Theme # 4 - Participants' academic achievements improved over the course of the program.

At the beginning of the program all three participants struggled with their academics, in one area or another. The only two subjects that we in fifth grade use number grades for are mathematics and spelling. The rest of report card is a 1 thru 4 scale based on the child's effort and ability, as seen in the key below:

4	Exceeds grade level standards	
3	Meets grade level expectations	
2	Approaches grade level expectations	
1	Far below grade level expectations	
N/A	Not required at this time	

(Figure 4)

Student Red began the program with a spelling average of 88 and a math average of 75. Out a possible 25 boxes, which scored his ability and effort in subjects such as reading, writing, social studies, science, and communication, Student Red received eight 1's, twelve 2's, and five 3's.

Over the six week program I began to see several changes in his study habits. He was out of his seat much less, which meant he was working on his work much more. He began getting much higher scores on his spelling tests. I asked him why he thought he was doing so well and he said, "Because I study my words more." During whole-group lessons, he was able to stay seated and focus longer. He was making eye-contact with me more and looking in my direction as I taught. His math skills were improving as well. He began to show growth in knowing his multiplication facts and again I asked him what had changed and he said, "I study them." He also did very well on his math chapter test and I noticed that he was able to stay in his seat the entire 30 minutes to take the test.

At the end of the six week program his grades had shown nice improvements. His spelling average had gone up to a 94 and his math had climbed to an 83. His scores for report card items had gone up to five 1's, eight 2's, and twelve 3's. He became more of an active participant in classroom activities and worked more productively in groups. His growth was wonderful to see and I could tell that it made him enjoy coming to school more and more. Most days he would walk in with a smile on his face, ready to go.

Student Yellow had similar study habits as Student Red. Both students were often distracted by an outside source, which

led to their lack of focus on the material. Student Yellow often had to have directions and instructions repeated several times. He would miss pieces of instruction and often need clarification to complete a task. While working in groups, he was very quiet and often said little to nothing. At the beginning of the program, Student Yellow's spelling average was an 87 and his math grade was an 82. Out of the 25 possible boxes, he had three 1's, twenty-one 2's, and one 3.

His changes in behavior were similar to Student Red's in the sense that he was paying more attention to me and my lessons. Without having his hands in is desk and looking down all the time, he was engaged in the lessons. I also noticed him looking in my direction more and his hand was raised more often. He was able to participate in groups better, adding his opinion to a conversation more often. I asked Student Yellow how he thought he was doing and he said, "Good! I like this stuff we're learning." Student Yellow seemed to enjoy the curriculum more because he was able to pay attention to my directions and instruction and therefore he understood what he needed to do.

At the end of the program his spelling average had gone up to an 88 and his math average was also an 88. The scores for his report card ended up being, zero 1's, fifteen 2's, and ten 3's. He too showed more of a desire to be in school with much more of a positive attitude. He began to say hello in the

morning as he walked by, and he had more conversations with his peers.

Student Brown struggled much less with his academics. However, he too showed positive growth at the end of the six week program. Student Brown's spelling average at the beginning of the program was a 95 and his math average was an 88. The report card scored he ended up with were, six 2's, and nineteen 3's.

Student Brown's academic issues stemmed more from his lack of focus during work times. He was very social and was often talking to his neighbors. Because of this, he often struggled to finish certain assignments and not because of ability. During group projects he would often want to talk more about the weekend, instead of getting the task completed. This often led to issues with the other group member that didn't want him working with them.

It was the third week when I started seeing some positive changes with Student Brown. He was showing more self control with his chatting and therefore he was more focused on his work. Once the other students knew that Student Brown would join their group and be an active member without the excess talking, everybody wanted him. I even noticed him becoming more of a leader during group times, delegating different tasks and following up on their completion. His fellow group members

would say, "He's really smart." And, "I hope I'm in his group today." You could tell by the look on Student Brown's face that this made him happy.

Not only did his reputation improve, so did his grades. His spelling average at the end of the six weeks was a 100 and his math average was a 92. His report card scores changed to; four 2's, eighteen 3's, and three 4's. Socially and academically he was doing great!

Summary

Overall I found that by going over the data several times, over a period of time, I was able to find more patterns among the students' behaviors, opposed to anomalies. By triangulating the data from my study I was able to uncover four very distinct themes, which I feel are pivotal to the success of the program. I was also able to answer my main research question. By the end of the six week program, I truly was able to see the impact of exercise on a student with behavioral issues and the outcomes were truly encouraging.

Chapter Five: Conclusions and Recommendations

Conclusions

The purpose of this study was to explore the impact daily exercise had on a student with behavioral issues in the classroom. I wanted to determine if thirty minutes of daily vigorous exercise would result in increased on-task behavior, engagement and motivation during the school day for the fifth grade participants. By analyzing the results of my pre- and post-surveys, my observational data, and answers from the pre- and post-students' questionnaires, I have been able to draw some conclusions about the impact of thirty minutes of vigorous exercise on a student's behavior in the classroom.

Prior to the program, the three participants, like many students with ADD/ADHD portrayed many of the typical behaviors. These behaviors included inattentiveness during work, not completing assigned tasks, not listing to or following directions, losing materials, inattention to details resulting in mistakes and difficulty awaiting turns (Prater, 2007). Researchers often describe the parts of the brain in children with ADD/ADHD that are lacking the correct amount of neurotransmissions as sleepy or lazy and believe that the use of exercise could wake-up these areas of the brain and possibly begin to trigger new neurotransmissions (Wendt, 2001).

After analyzing my data, it was clear that the exercise did

seem to "wake-up" something in the three participants. They became more focused on their daily tasks and were less likely to act impulsively. They each required fewer reminders as to what they should be doing, and they were able to be more productive as they worked independently. These findings were similar to the findings in a study done by Putman, Tette, and Wendt (2004), which revealed that exercise reduced oppositional defiance, improved attention and focus, and decreased hyperactivity and impulsivity in their subjects. One possible reason for these changes is that through exercise the participants began to produce more serotonin. Serotonin helps rebuild the neurons, which then enlarges the number of possible neurotransmissions, which then can lead to a change in behavior (Wendt, 2001). Exercise also causes the body to create more oxygen/nutrient rich blood and since the brain feeds off of this hearty mixture, it causes the brain to function better and can even impact presences of beneficial neurotransmitters (Wendt, 2001). Simply, exercise has a positive effect on a person's body and because of these chemical creations, it is possible that participating in this exercise program had similar effects on the student participants and they began to show positive changes in their classroom behavior.

Another conclusion that I was able to make from my pre- and post-Intensity Questionnaire was that the participants were able

to notice a change in their classroom behavior from the beginning of the program to the end. Both Student Yellow and Student Red rated their ability to follow classroom rules a two out of three at the beginning of the program. By the end of the six weeks, both participants gave themselves a three. I asked both boys why they felt they deserved that change of score and Student Yellow said, "I haven't got yelled at in a special in forever." Student Red said, "I don't get up very much and do my homework." Both participants were able to recognize and acknowledge their positive growth. In a similar study done by Lopez-Williams, they too focused on the importance of athletic participation and its impact on behavior. The findings were similar in my study in that the participants showed improvements in self-esteem, self-confidence, and social skills. This improvement then carried over to their work habit, which could be why their grades showed the positive improvement they did.

From my field notes, and other classroom observations I was also able to conclude that thirty minutes of exercise can also have a positive impact on a student's grades. In a recent study done by the California Department of Education, they found that students who do better on achievement tests are also more physically active than their peers that don't do as well (Vail, 2006). All three participants' grades improved over the six week program. Some of this progress may have to do with the

fact that the body has created more oxygen/nutrient rich blood and since the brain feeds off of this hearty mixture, it causes the brain to function better and can even impact presences of beneficial neurotransmitters (Wendt, 2001).

A study was also done linking athletic performance to positive social behaviors and academic performance. "Several researchers have noted the importance of athletic participation, finding that improvements in self-esteem, self-confidence, and social skills were demonstrated as a result of successful experiences with such activities" (Lopez-Williams, 2005, pg.174). These students gained confidence in themselves and therefore saw positive results with their peer interactions and ultimately in their grades. My three participants, like the ones in the study above slowly gained confidence in themselves socially over the six weeks. I believe that may have happened because each participant gained two new friends from joining the program. These friendships started in the Intensity Program itself but carried over into the classroom, which seemed to give these three participants a new found confidence.

The six week progression proved to be a positive one for all three of the participants and for me. I was skeptical at the beginning of the six weeks that exercise would truly have an impact on these participants; but it did. I now wonder how this type of program would impact all students. Does age play a role

in any of this? Would a longer time to exercise impact things differently? Maybe physical education or active recess time is something that should be every day, for all students? These types of questions will definitely require more exploration and I will continue to research this for possible future studies.

Recommendations

Developing effective interventions for children with disruptive behaviors is an important goal for educators everywhere. All of us have experienced working with students who exhibit disruptive behaviors in our own classrooms. For a classroom to be productive, we as educators must try to help those students work to their full potential.

I have always felt that students need to be active during the school day and that sitting in a desk for extended period of time isn't good for students of any age. However, I had no idea what impact exercise and activeness can truly have on a student until I witnessed the positive impact with my own eyes. A program such as the Intensity Program is only as successful as its creator's planning. I believe that all of the important pieces have to be there for true success. First and foremost, the vigorous exercise must be done five days a week for a minimum of thirty minutes and should run for the entire school year. Just like reading, writing, and math this program needs consistency for it to work. Putman, Tette, and Micheal Wendt

(2004) noted that when the study ended, the children who did not continue to exercise regressed to their undesirable behaviors.

I also truly believe that the type of exercise matters, both to the participants and most likely to the success of the program. I was lucky enough to have some state-of-the-art equipment for my participants to use and I quickly found that children know what they like. My participants favored the PlayStation Bikes and only gave 100% of their effort when they were on those bikes. I believe that if the type of exercise isn't something the participants are interested in, they won't put forth the effort needed to sustain their heart rate and therefore the program won't be successful.

In another study I read, the organizers of a similar program created something called exercise labs (Wendt, 2001), which were filled with similar exercise machines as our PlayStation Exercise Bikes. I don't believe that it is necessary to spend large sums of money on a program such as this. However, the type of exercise needs to be considered on two measures, both intensity and participants' enjoyment.

Furthermore I feel that the methodology for this type of program/intervention needs to become more known throughout the field of education. I was completely unaware that such an intervention for behavior even existed until I was lucky enough

to sit in on a presentation for the Keep 57 program. This program is one of the first studies done on this topic and the results that were presented to me made it impossible for me not to try it with my own students.

After completing this study, I too have begun to share my findings with my fellow colleagues. I know that as a teacher we only have control over certain aspects of our students, which intervention not only helps the participants with their classroom behavior, it more importantly helps them with their physical health. It's definitely a program that all schools should try to implement. I know they will be pleasantly surprised with the outcome. I certainly was!

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APPENDIX

(Appendix A)

Pre-Intensity Survey

Student: _____ Teacher: _____

Grade: _____ Date: _____

	Never	Sometimes	Often	Very Often
1. Fidgets with hands or feet or squirms in seat	☐	☐	☐	☐
2. Leaves seat in classroom or in other situations when expected to remain seated.	☐	☐	☐	☐
3. Runs about or climbs excessively in situations where it is inappropriate.	☐	☐	☐	☐
4. Has difficulty engaging quietly in leisure activities	☐	☐	☐	☐
5. Is "on the go": or often acts if "driven by a motor."	☐	☐	☐	☐
6. Talks excessively	☐	☐	☐	☐
7. Blurts out answers before questions have been completed.	☐	☐	☐	☐
8. Has difficulty awaiting his/her turn	☐	☐	☐	☐
9. Interrupts or intrudes on others. (During conversations, games, etc…)	☐	☐	☐	☐

10. Which behaviors are most troublesome? Why? _____

_____

_____

11. Have the parents been notified about the above concerns? _____

_____

12. Does this child currently take medication for ADD or ADHD? If possible, list them. _____

_____

13. What form of transportation does this child currently use to get to and from school? _____

_____

(Appendix B)

Post-Intensity Survey

Student: _____ Teacher: _____

Grade: _____ Date: _____

	Never	Sometimes	Often	Very Often
1. Fidgets with hands or feet or squirms in seat	☐	☐	☐	☐
2. Leaves seat in classroom or in other situations when expected to remain seated.	☐	☐	☐	☐
3. Runs about or climbs excessively in situations where it is inappropriate.	☐	☐	☐	☐
4. Has difficulty engaging quietly in leisure activities	☐	☐	☐	☐
5. Is "on the go": or often acts if "driven by a motor."	☐	☐	☐	☐
6. Talks excessively	☐	☐	☐	☐
7. Blurts out answers before questions have been completed.	☐	☐	☐	☐
8. Has difficulty awaiting his/her turn	☐	☐	☐	☐
9. Interrupts or intrudes on others. (During conversations, games, etc…)	☐	☐	☐	☐

10. Describe any positive changes you have seen in this child's behavior? _____

_____

_____

11. Do you feel this child's grades have been affected from their participation in the program? How?

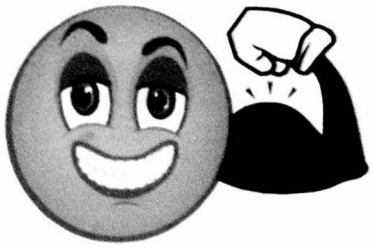
_____

_____

12. Is there anything you feel should change in how the program was run this semester? _____

_____

_____



Intensity Questionnaire

1. What is the Intensity Program? _____

_____

_____

2. Some behaviors I have that might be disruptive to the rest of the class are _____

_____

_____

3. It's hard for me to make good choices when _____

_____

_____

4. It's easy for me to make good choices when _____

_____

_____

5. Most days I would rate my ability to follow the classroom rules a:

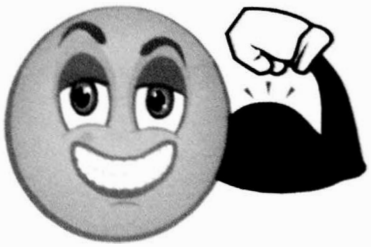
(Circle One)

1 – not so good 2 - pretty good 3 – very good

Questions: _____

_____

_____



Intensity Questionnaire

1. What did you like about the Intensity Program? _____

_____

_____

2. Some behaviors I have that might be disruptive to the rest of the class are _____

_____

_____

3. It's hard for me to make good choices when _____

_____

_____

4. It's easy for me to make good choices when _____

_____

_____

5. Most days I would rate my ability to follow the classroom rules a: (Circle One)

1 – not so good 2 - pretty good 3 – very good

Questions: _____

_____

_____