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# An Analysis of an Urban Elementary School's Morning Exercise Program on Overweight/Obese Children's Academic Ability

Rebecca Lu Beyerlein  
*The College at Brockport*

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An Analysis of an Urban Elementary School's Morning Exercise  
Program on Overweight/Obese Children's Academic Ability

by

Rebecca Lu Beyerlein

August 2008

A thesis submitted to the

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An Analysis of an Urban Elementary School's Morning Exercise Program on  
Overweight/Obese Children's Academic Ability

by

Rebecca Lu Beyerlein

APPROVED BY:

Rebecca Lu Beyerlein  
Advisor

8/15/08  
Date

Linda Kramer Schlosser  
2<sup>nd</sup> Reader

8/15/08  
Date

[Signature]  
Director, Graduate Programs

8/15/08  
Date

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## Chapter One

### Introduction

Today's children are growing up in a fast paced world that is different from the world even 10 years ago. Many boys and girls participate in a variety of different activities ranging from ballroom dancing to competitive travel league soccer. While this may be the case for many children, other boys and girls live in poverty and do not have these opportunities (Pratt, Manmohan, and Joseph, 2008). With or without these opportunities, children have different exposure to physical activity and nutrition.

One health problem that children face today is being overweight or obese. According to the Department of Health and Human Services' Centers for Disease Control and Prevention or CDC (2007), the number of overweight and obese children is increasing. Through data collection, the CDC recorded the prevalence of overweight children age six to 11 to total almost 9 million – an increase from 6.5% in the 1980s to 18.8% in 2004 (CDC, 2007).

Because the number of overweight and obese children is on the rise, it is important to address the problem head on. School is the one organization that the majority of children have in common. It is also the place in which children spend most of their waking hours. The educators that compose a

school's staff are responsible for helping children in all aspects of their lives. This means that children who are overweight and obese can and should be assisted by the school. Children who already fall into the two categories, overweight or obese, should be encouraged, educated, and assisted in how to develop better health practices. By improving their health practices and then their health, the boys and girls should be able to maintain better eating and exercising habits as they grow up, have a better self image, and perform tasks in the classroom and their lives more productively (Baranowski, 2002).

### ***Significance of the Problem***

This research was conducted in an urban school where many children come from families considered to be living in poverty. Due to the high cost of living and raising a family, many students do not get the proper nutrition. These children live in an environment that is not friendly for physical activity. The boys and girls do not have the opportunity to go outside, to run around the block, or to play in their yard. Parents are not comfortable leaving their children alone to play outside, so instead many turn to sedentary games inside. With this in mind, children who already have problems with their weight lack opportunities to address this issue, and need to learn strategies that will enable them to lead healthier lives.

By analyzing the school's morning exercise program for overweight children, the researcher hoped to discover whether an in-school exercise program impacts weight loss and improves energy levels, and whether morning exercise is perceived by teachers as beneficial to students' levels of arousal and focus in the classes following the exercise program.

***Purpose (Rationale)***

The researcher was an intern in a fourth grade classroom in an urban elementary school in upstate New York. In this school district most children come from poverty and do not have the means to exercise regularly or to eat properly. With support from the principal and vice principal, the school nurse developed a morning exercise program for overweight and obese children. The purpose of this research was to analyze the impact of this morning exercise program on the students' attentiveness and academic performance.

The program served 22 students in the first, second, third, fourth, fifth, and sixth grades. The boys and girls in the program met Monday, Wednesday, and Friday morning for a half hour at the beginning of the school day. The goal of the program was to teach the students exercises and nutritional practices that are practical for their lives. By teaching the



exercises that can be done at home and nutritional decisions that they have control over, the nurse hoped to decrease the students' BMI and increase their general health. The nurse was the only regular leader at the morning exercise program. The principal, vice principal, and researcher also helped when available. During the research period, the program did not receive any funds; however, the nurse sought support from community groups that may provide funding for the morning exercise program students and their parents. If funding is found it could help provide additional equipment for the program, information presentations and material for the parents, and other such resources.

As an educator, the researcher knew that we have to look at children as a whole being, not just a vessel into which knowledge is fed. In fact, in the past year the researcher had a long term substitute position as a physical education teacher. Through this experience she learned about the many physical needs of a student that impact academic performance as well as overall health: coordination, life-skills, health, and nutrition. With this experience and prior knowledge, the researcher knew that the health and nutrition of a child is important. The researcher chose to analyze this program as she thought it was an excellent starting point to look at the

overlying health and nutrition of the students in her classroom, in her current school and have this knowledge to apply to her future classrooms.

### ***Research Question***

To what extent does a morning exercise program for overweight and obese elementary school students impact their academic ability?

- What are student perceptions about the impact of exercise on their attentiveness in the classroom and ability to perform academic tasks?
- What are teacher perceptions about the effect of exercise on their student's attentiveness and ability to perform academic tasks in the classroom?

### ***Limitations***

This study is limited to one school's morning exercise program in an urban setting. The participants included 22 students that ranged from first to sixth grade that were selected on a predetermined BMI. In addition the nurse and researcher were also active participants. Data was only collected from ten students and ten teachers. Variables that may have affected the outcome of the study include the time in the exercise program that the student surveys

were given, the exercises performed on the day of student data collection, and the time of year that the teacher surveys were given.

The results of this study are specific to this particular school and can not be generalized for all urban elementary schools with overweight and obese children.

### ***Definition of Terms***

For the purpose of the study the following definitions of terms will be used throughout the study.

*Health:* to classify students as “unhealthy” for the program, student’s BMI was used; throughout the remainder of the research health is referring to the student’s general physical wellness – participation in the exercise program, eating habits, and general appearance

*Body Mass Index (BMI):* a measure of weight in relation to height that is used to determine a person’s weight status. BMI measurements are highly correlated with body fatness. Expected BMI measures of children are classified by both age and gender (CDC, 2007).

*Overweight & Obese:* Children at risk of being overweight have a BMI measurement that is in the 85<sup>th</sup> to less than 95<sup>th</sup> percentile for their age and gender. *Overweight* children have a BMI measurement that is

equal to or greater than 95<sup>th</sup> percentile for their age and gender (CDC, 2007). For this research children with *obesity* are those classified with a BMI of 28 or above (as determined by the nurse).

*Academic Achievement*: ability to perform on academic tasks that are expected on a daily basis

*Attentiveness*: student's ability to focus on lessons and school work

*Motivation*: student's ability to influence his/her own behavior and attitude

## Chapter Two

### Literature Review

#### ***Introduction***

In chapter two, the following questions will be explored by analyzing the literature:

- What is the obesity epidemic?
- How is obesity measured?
- How is obesity and being overweight affecting children?
- Who is impacted by obesity?
- What is causing children to be overweight and obese?
- What measures can be taken to prevent and decrease obesity in the school setting? How does exercise affect overweight and obese children's health?
- What connections are there between the exercise and the brain?
- Does exercise impact overweight or average student's academic ability and achievement?

#### ***What is the obesity epidemic?***

Obesity has been creeping into the lives of Americans, regardless of age, gender, socioeconomic status, and ethnicity in recent years. According to a survey conducted by the Department of Health and Human Services' Centers for Disease Control and Prevention (CDC, 2007), more than one third of American adults, over 20 years old, were obese; this totaled over 72 million Americans. Like adults, the number of overweight and obese children in the United States has increased drastically over the years. The CDC (2007) reports childhood overweight and obesity problems have been on the rise

over the past three decades. In fact, it was shown that in the time between two surveys given by the CDC during 1976-1980 and 2003-2004, the percentage of overweight children ages 6 to 11 years old increased from 6.5% to 18.8%. To put a number on this epidemic, in 2002, the CDC recorded almost nine million children between the ages of six and nineteen were overweight in the United States. These percentages and numbers are mainly determined by a child's body mass index (BMI).

#### ***How is obesity measured?***

The Body Mass Index, or BMI, is determined by a child's height and weight. A doctor will calculate the BMI, a single number, using a standard formula (Appendix A). The BMI is then classified using the child's age and gender. This is due to the fact that boys and girls of different ages have a different set of accepted data. An example of a BMI table can be found in Appendix B. Furthermore, the CDC takes the single BMI number and creates percentiles based on age and gender for children. To be classified as *at risk of overweight*, the BMI must fall between the eighty-fifth and less than ninety-fifth percentile; a student is classified as *overweight* when his/her BMI is at or above the ninety-fifth percentile.

Less common measurements that are included in research to detect and classify overweight and obesity include skinfold, bioelectric impedance, and dual energy x-rays (Eneli & Davies, 2008). The skinfold uses fat beneath the skin to estimate body fat. The drawbacks of the skin fold are that it is difficult to do with overweight people, technicians measure differently, and different ethnicities hold their fat in different places (Eneli and Davies, 2008). Bioelectric impedance uses tiny amounts of electrical current to measure the composition of the body places (Eneli and Davies, 2008). Lastly, dual energy X-rays are weak x-rays that systematically differentiate the body composition into bone, lean mass, and fat mass. Bioelectric impedance and dual energy x-rays both utilize expensive equipment and specific training; therefore both are less common (Eneli and Davies, 2008).

### ***How is obesity and being overweight affecting children?***

When children develop problems with their weight, there are other related consequences. The consequences include psychosocial risks, cardiovascular risks, and additional health risks (CDC, 2007). Cardiovascular diseases (CVD) include high cholesterol, high blood pressure, and abnormal glucose tolerance. Each of these CVDs is a serious health concern and involves medical treatment. The treatment can be time consuming and costly.

Beyond the risk of CVD, overweight children, like overweight adults, are associated with other health conditions including asthma, hepatic steatosis, sleep apnea, and Type 2 diabetes (CDC, 2007). If not treated, health conditions such as asthma and Type 2 diabetes can be deadly. Unfortunately, like the CVDs, treatments can take an overwhelming amount of time and money.

The last type of risk that can affect overweight children fall into the psychosocial category. Psychosocial risks can include both social discrimination and poor self esteem. For example, overweight children can be both victims and perpetrators of bullying, teasing, and physical fighting (Pratt, Manmohan, and Joseph, 2008). Children that are often overweight or obese get picked on for their appearance; on the other hand these "big" kids can also intimidate other children and partake in bullying behavior. Overweight children can also be victims of social discrimination and exclusion. These children are not included on the playground, in free time, or may be the last student chosen in partner work. Due to the aforementioned psychosocial issues, or standing alone, many overweight children have negative self images. By the time children are six to ten years old and in school, they become aware of what others think of them and are able to self-evaluate (Gable, Krull, and Srikanta, 2008). Children detect the social stigma



and internalize it by generating negative self assessments. Unfortunately peers and media both endorse the concept that a “big” body is negative. By self assessing and internalizing outside perceptions of obesity, can put themselves in a “self fulfilling prophecy” (Gable, Krull, and Srikanta, 2008). This prophecy and image can also allow overweight children to have behavioral and learning problems (Pratt, Manmohan, and Joseph, 2008). Over time stress of fulfilling the stigma and stereotype can actually interfere with intellectual performance and not be an intentional act (Steele and Aronson, 1995 as found in Gable, Krull, and Srikanta, 2008).

Overweight and obese children have many potential risks that can occur in their lives. Not all children will have the negative risks included in their lives, but many will. The risks not only encompass their health, but also their psychosocial lives.

### ***Who is impacted by obesity?***

Children in all parts of the country, in different age ranges, throughout different living environments, and with different cultural problems are all impacted by obesity. Due to the dominance of obesity in adults and children Lewis, Meyer, Lehman, Trowbridge, Bason, Yurman and Yin (2006) conducted research to look at the frequency of childhood obesity in Georgia.

Not only did the researchers look at the frequency of childhood obesity in the state of Georgia, but they broke the state down into rural growth, rural decline, urban, and suburban settings to see if obesity affected a certain living environment more. The researchers wanted to compare obesity in Georgia to that of the nation and discover if obesity was more prominent in certain living environments. To do so, the researchers classified each county into one of the aforementioned categories based on its population and amount of growth over the past two decades. From each county two elementary, two middle, and two high schools were chosen from the public school system and the fourth, eighth, and eleventh grade students were used for data collection. Each student had his/her BMI calculated and then had it analyzed using the Center for Disease Control and Prevention (CDC) BMI charts so that each student could be determined as risk of overweight, overweight, or normal according to their age, gender and BMI. Lewis et al. found that 20.2% of children were at risk of being overweight and 36.2% were overweight. The percentages in Georgia exceeded the national average, showing that students in this state do have a weight problem.

Lewis et al. (2006) analyzed their data further. When broken down more males, black, rural, and poor students had higher rates of overweight students than their counter parts: female, white, urban/suburban, middle

class. Lewis et al. (2006) point out that the student's economic status can play a factor in a child being overweight because across the different sections of the state, the higher economic areas had a lower prevalence of overweight students. Lewis et al. (2006) point to a correlation between student's socioeconomic status and overweight status; the lower your socioeconomic status, the more likely you were to have a poorer weight status. The U.S. Department of Health and Human Services (2005) also found the same correlation, children living with families considered to be in a low socioeconomic status were more likely to be overweight than the students from a high socioeconomic status (Eneli and Davies, 2008)

In addition to socioeconomic status, Lewis et al. (2006) also found the commonness of obesity to be prominent in the Black subpopulation. Pratt, Manmohan, and Joseph (2008) had similar findings. They note two studies in which the likelihood of African American girls being overweight increases 150% when compared to Euro-American girls (Troiano, Flegal, Kuemarsk, Campbell, and Johnson, 1995; Neff, Sargent, McKeown, Jackson, and Valois, 1997). While the studies do not suggest causation between being African American and overweight, there is a correlation. Similar to that of African Americans, the probability of Latino American being overweight in comparison to Caucasians is also increased. Pratt, Manmohan, and Joseph

(2008) reference a study in which 3,176 Latino Americans and 1,841 non-Hispanic Caucasians were given questionnaires. From these tools, it was found that Latino Americans were more likely to be overweight than the Caucasians (Stern et al., 2001).

Increasing amounts of children are at risk of being overweight and obese throughout the United States. Students of all populations are being affected; however, poor and minority students are more likely to be impacted. According to the U.S. Department of Health and Human Services (2005), there is even a trend amongst different family patterns with the highest prevalence of obesity rates in single mother household. Rising numbers of overweight and obese children have also been measured in countries such as England, Canada, Australia, Italy and France (Eberstadt, 2003 & Ahamed, Y., MacDonald, H., Reed, K., Naylor, P., Liu-Ambrose, T., and McKay, H. 2007). Regardless of race, socioeconomics, family make-up, and location, the number of obese and overweight children are increasing.

### ***What is causing children to be overweight and obese?***

Many different researchers have tried to identify factors that could be contributing to the overweight and obesity problem among American and other youth. While some of the reasons are more researched, Eberstadt (2003)

brings to the forefront some of the popularly proposed causes. These causes include: individual differences, maternal heaviness, genetic programming, metabolizing rates, working mothers, watching television while eating, lack of breast feeding, and lack of exercise (Eberstadt, 2003). Additional causes as put forth by Gahagan (2008) are parent and child nutrient intake, portion size, parental physical activity habits, and sleep patterns.

The most important factors that contribute to childhood obesity are highlighted by the CDC: genetic, behavioral, and environmental (CDC, 2007). Genetic or biological factors are one proposed cause of obesity in children. One theory behind that of biological causes deals with motor development. Gable, Krull, and Srikanta (2008) state that a major theory behind motor development in infancy and early childhood is that the early development sets the stage for later perceptual and cognitive development. When young children are put in positions in which their consumption is increased and their movement is decreased, there is less exploration of the world. With less exploration, there is less learning and more weight gain.

Some children are born with genetic predisposition to being overweight (CDC, 2007); however, genetic factors alone very rarely cause childhood obesity (CDC, 2007). Instead genetic predispositions usually coincide with environmental or behavioral factors (CDC, 2007). As Eberstadt

(2003) alludes to, if obesity really was solely a genetic issue, then it would have started to develop much earlier in history and the sudden growth in prevalence would not be so great.

Two additional factors impacting childhood obesity and overweight problems are children's behavior and environment. Behaviors and environmental issues usually interact. Behaviors that would affect a student's physical well being include energy intake, physical activity, and sedentary behavior (CDC, 2007). To begin with, food in today's American society is energy dense and beverages have sugar added to them (CDC, 2007). When children eat today, they are much more likely to consume sugary food and beverages or foods high in fat when compared to children of earlier time periods.

Beyond unhealthy food choices, physical activity has lessened inside of school at physical education classes and outside of school as well (CDC, 2007). With less physical activity, children are also involved with much more sedentary behavior. A positive association has been found between television viewing and overweight children (CDC, 2007). On a typical day for a six to twelve month old, the very young child will spend 49 minutes with screen media; fourteen percent in this age group will spend more than two hours a day (Gable, Krull, and Srikanta, 2008). Looking at an age closer to that of a

child in school, forty-three percent of four to six year olds spend two hours in front of television (Gable, Krull, and Srikanta, 2008). Not only are children less active in front of the television, but this inaction can also lead to other factors such as eating more unhealthy food and lowering the child's metabolic rate (CDC, 2007).

Environmental factors also contribute to children that are overweight and obese. Environment issues include parent-child interactions, home life, child care, school, and community influences (CDC, 2007). The majority of elementary aged children spend most of their days in school and many children go to childcare providers before and after school. Both of these environments, common to so many boys and girls, need to work together to provide opportunities for physical activity and healthy eating for children (CDC, 2007). Schools, for example, are slowly starting to provide innovative programs, but they are still developing and in need of improvement (CDC, 2007).

Biological, environmental, and behavioral factors are the major reasons that have been put forth regarding a cause for overweight and obese children. No research has found a single or multi-faceted cause for obesity in children as researchers can only gather evidence to find correlations and connections between different factors that interact with a student's weight. In looking at

the two main behaviors in relationship to one another, energy intake and sedentary behavior, along with biological and environmental conditions, we can see that there has been an increase in the negative factors and decrease in the positive prevention of physical activity and healthy eating choices. Because the various interactions between the risks, children do not burn calories, move around less, and instead gain weight.

***What measures can be taken to prevent and decrease obesity in the school setting? How does exercise affect overweight and obese children's health?***

Due to the amount of time that children spend in school, the best place to start prevention and decreasing numbers of overweight characteristics is in the educational system.

A team of researchers, Baranowski, Cullen, Nicklas, Thompson, and Baranowski (2002) set out to review literature of twenty different school-based obesity prevention programs. In analyzing the 20 programs, Baranowski et al. (2002) looked at studies that reported dietary or physical activity changes and used BMI as part of the evaluations. Out of the 20 programs, the researchers found that seven programs showed "desirable changes" (Baranowski et al., 2002). After analyzing the 20 programs the researchers provided eight recommendations to provide a blueprint for



helping obese children (Baranowski et al., 2002). The suggestions can be condensed into six points as summarized below:

1. Identify effective behavior – what are the causes leading to the overweight?
2. Develop a program ahead of time -- Can you predict with relative accuracy what your program changes will do for subjects?
3. Determine how the testing procedures will affect the behavior.
4. In a school setting, determine if you are setting up a school efficacy intervention or an effectiveness study.
5. Establish stability of implementation over time.
6. Name what type of schools could implement the intervention.

Because obesity can be associated with children's development and therefore children's academic achievement, Gable, Krull, and Srikanta (2008) tried to find different influences in overweight children's lives, how children are impacted in the classroom, and how to employ future research on exercise. They looked at the impact through research previously done by others. Gable, Krull, and Srikanta (2008) point out limitations in the research base for exercise programs. The limitations include various methods employed, overweight and academic achievement being measured and defined differently, and gender not considered. The general idea of whether being overweight precedes academic problems or vice versa also is not considered in the research. Like Gable, Krull, and Srikanta (2008), Siegel (2006) found that higher socioeconomic status was associated with better

general health. This factor could impact improving fitness and achievement in an educational setting.

One program that has been created to prevent and decrease the prominence of overweight children is an after-school program called Kids Living Fit (KLF). KLF was an after-school fitness program whose goal was to assist children's healthy living. KLF was developed for students in grades two through five by Speroni, Earley, and Atherton (2007). The study was voluntary and some of the students had to pay. The program determined ahead of time that it wanted to aid students in decreasing their BMI if the student was considered to be overweight or at risk of being overweight and to maintain their BMI if the students were of normal weight. In the after school health program, the researchers taught healthy lifestyle choices related to food consumption and activity participation. Four elementary schools were chosen and students could volunteer to join the fitness program; half of the students joined the study and fitness program for a cost of \$100, the other half were used as a control group and were not charged. The students in the KLF program were involved for 24 weeks. Four dietary education presentations by professionals were done, physical fitness trainers led various type of fitness activities, questionnaires and diaries were kept, and BMI was measured. The control group completed the questionnaires and had BMI

measured. The results were quite clear that the KLF group in all four schools experienced a decrease in BMI and an increase in the number of children in the normal BMI category (Speroni, Earley, and Atherton, 2007). This study does have limitations as Gable, Krull, and Srikanta (2008) suggest most will; however, it also fulfills many of the goals set forth by Baranowski, et al. (2002).

The prescription of exercise has been given to obese and overweight children in many different educational settings: whole-school exercise initiatives, before school programs, after school programs and more. Siegel and Grisson both point to research that suggest that physical fitness does have an impact on academic achievement; however both are quick to point out that correlation does not mean there is a causation nor is the relationship the only one that exists in the data. Researchers Castelli et al. (2007) also believe a relationship exists between physical fitness and academic results. They suggest that educational institutions are the best place in which a child should participate in physical activity as it is one place that children have in common. With these different types of programs and measurement in place, the impact of the exercise can then be measured to see if the program is helping or hindering its participants. In looking at prior research, the limitations, and examples such as KFL, future exercise programs can be developed.

***What connections are there between the exercise and the brain?***

In the past century, researchers have been doing a lot of research on the human brain and its intricacies. Medical doctors, psychologists, educators, and others are all interested in the brain and how it impacts a person's life. Discovery of brain functions have been developing in the field of education. Research on cognitive development, motor skills, physical exercise, and academic performance is also on the rise. Tremarche, Robinson, and Graham (2007) cite literature which links both cognitive and physical benefits with physical exercise and academic performance. Tremarche, Robinson, and Graham (2007) also point out the connection that exercise has with increasing oxygen-rich blood, affecting the brain's neurotransmitters and endorphins. Similarly, Hendy (2000) has brought to the forefront that physical education and exercise programs are being cut from schools, leading to less active and fit boys and girls. In her argument she states that Dr. Mary McCabe has found more than 80 brain research studies that suggest that motor skill development and physical movement help to prepare students for academic readiness and learning (Hendy, 2000). Tremarche, Robinson, Graham, Hendy, and McCabe all suggest the connection between physical movement and brain performance.

In exploring the connection between the body and the brain, brain structure and function should be thought through. The brain is a small part of the whole body weighing in at approximately three pounds; however when the brain is in an environment, it is very much an internal map to the interactions with the outside world (Franklin, 2004). Hannaford (1995) writes in her book's introduction that the body plays an integral part in all our intellectual processes; learning occurs as we interact with the world. The introduction also states that all muscles must be utilized in order to aid neuro-connections (Hannaford, 1995). Beyond taking in information about the outside worlds, the brain connects with the body. According to the Franklin Institute, brain chemistry reveals a unity of the mind and body (Franklin, 2004). Researchers explain this unity through the internal structures of the brain that are found throughout the body. Cells in the brain, called neurons, not only form connections with other neurons, but they also connect to neuromuscular junctions – parts of the body's muscle (Franklin, 2004). Neurotransmitters such as acetylcholine, a chemical found in the brain, target memory and attention. Though memory and attention are acetylcholine's main function, it is also used to communicate with the body's muscles. These physical features of the brain reveal the basic connection that the brain and body have to each other.

With the knowledge of brain and body connections for a functioning human, exploring exercises that target this connection is important. With the help of medical doctors, Lawrence (2007) advocates the brain and body connection through exercise. She argues that exercise can be a way to train the brain, in a physical, mental, and emotional way (Lawrence, 2007).

According to the Franklin Institute (2004), walking is good for your brain. Walking causes the body's blood circulation to increase. With an increase in circulation more oxygen and glucose reach the body's brain. Walking is not too strenuous which is good because if the activity is too strenuous then the leg muscles (or other very active muscles) would take up the extra oxygen and glucose, instead of sending it to the brain (Franklin, 2004). Furthermore, Hinkle (1997) suggests that aerobic exercise, specifically running, has many benefits to the student: psychological, behavioral, and physical. Because learning can be a stressful event for students, running would lead to lower levels of tension and a positive attitude (Hinkle, 1997)

Other exercises have also been explored to help with the brain and body connection. With research and information regarding brain and body connections, Dennison and Dennison created a program called Brain Gym in 1989. Brain Gym is based on the premises that the brain is three-dimensional and task specific. The brain works laterally, by centering, and with focus.

While a student is trying to learn, the student's brain can come up against learning blocks which leave the student incapable of moving through the stress and uncertainty of a new task. According to Dennison and Dennison (1989), everyone is "learning blocked" to the extent that we have learned not to move. With Brain Gym, students are taught to build these mental skills with physical movements. (Dennison and Dennison, 1989) Dennison and Dennison have created specific movements to target specific academic skills. An example of Brain Gym exercise is the cross crawl (Dennison and Dennison, 1989). Essentially the cross crawl is walking in place with the hands touching the opposite knee. The cross crawl is meant to target different academic skills in reading such as oral reading, speed reading, and creative thinking (Dennison and Dennison, 1989). The cross crawl is specifically a midline movement exercise. Dennison and Dennison (1989) also have activities for lengthening, energy, and deepening attitude exercises. As students do specific physical activities and exercises, the students' brain is activated to perform better academically. Dennison and Dennison's research and development of Brain Gym support the concept of a brain and body connection.

***Does exercise impact overweight or average student's academic ability and achievement?***

The ties between student exercise and student academic ability and achievement have been explored by many different researchers. Hendy (2000) reviews Dr. Mary McCabe's summary of more than 80 brain research studies; the studies suggest that motor skill development and physical movement help to prepare students for academic readiness and learning (Hendy, 2000). This means that if overweight and obese students participate in more physical activity it could help their physical well being as well as their academic performance. With this in mind, many other researchers have looked for a relationship between the student's exercise pattern and the student's academic achievement. Both short and long term research has been conducted. Overall, longitudinal studies find a negative relationship between academic ability and overweight (Gable, Krull, and Srikanta, 2008). Short term studies reveal similar finding; however the negative correlation with students' academic ability and weight status are not always found.

Tremarche, Robinsong, and Graham (2007), Ahamed, MacDonald, Reed, Naylor, Liu-Ambrose, and McKay (2007), Siegel (2006), and Castelli, Hillman, Buck, and Erwin (2007) are all researchers that have investigated the impact of exercise on academic ability and achievement.



An example of research connecting academic ability with exercise was conducted by Ahamed et al. (2007). The researchers implemented a cluster randomized controlled trial to explore two objectives. The main objective was to compare the total academic performance of children who participated in an organized, school-wide physical activity program, Action Schools! British Columbia (AS! BC model) with those children who did not (Ahamed et al., 2007). In order to investigate these objectives, Ahamed et al., (2007) recruited eight elementary schools with ethnic diversity that reflected the area and that had lower student and parent satisfaction regarding the physical education programs as determined by a survey. In order to measure the relationship between the amount of exercise participation and academic performance, each school was placed into one of 3 categories. The first category was given training and equipment to implement the AS! BC model. Schools in the second category were also given training and equipment, but less than the first group. The last category did not receive specialized training; however, like the other groups, they were shown how to complete teacher logs on student activity and were expected to implement further physical activity with their students without the training or equipment (Ahamed et al., 2007).

With the different support systems in place for exercise, data was then collected from the fourth and fifth grade students. In order to measure health and exercise, students had height, body mass, and physical activity measured both as baseline data and at the end. Height and mass were measured with medical equipment whereas physical activity in children's leisure time was measured through a survey completed by the actual students. The teachers also kept a log to record the physical activity delivered and the amount of time spent on each session. Students' academic achievement needed to be measured at the start of the study and again at the end of the study a year later by using a standardized test, the Canadian Achievement Test (CAT-3). CAT-3 is grade specific, and measures knowledge and skills related to mathematics, reading, and language. The appropriate grade level CAT-3 tests were given (Ahamed et al., 2007).

After statistical analysis, and needing to exclude two of the eight schools, several conclusions were made. First it was found that the schools with the model in place reported an average of 183 minutes of additional physical activity per week, whereas the schools without the program reported only 140 minutes. After analyzing the physical activity, the academic achievement measurements were compared. The schools with both the activity model and without showed no difference between the baseline

and the end of the study. While this study does show a positive correlation between exercise and academics, it did show that there was not a decrease in academic performance when exercise increases (Ahamed et al., 2007).

Tremarche, Robinson, and Graham (2007) researched a similar relationship, the effect participation in physical education has on standardized test scores. In order to explore this effect, the researchers chose to statistically analyze the mean of the Massachusetts Comprehensive Assessment System (MCAS) standardized test scores and the amount of physical exercise students received (Tremarche, Robinson and Graham, 2007). Fourth graders in two different schools in two separate districts were the participants. As previously stated, academic achievement was measured with the MCAS. A student survey was given to measure the student's physical activity inside versus outside of school in order to collect data on the amount of physical exercise students received inside and outside of school (Tremarche, Robinson and Graham, 2007).

School 1 provided its students with 28 hours of physical education annually. School 2 provided students with double the amount of physical education at 56 hours annually. The schools not only differed in physical education hours, but also in population, minority student percentages, per

student spending, and drop out rates. Of these differences School 1's district had a lower total enrollment than School 2; however, in all other aforementioned characteristics, School 1 had greater numbers than School 2. The physical education teachers' years of experience and the types of physical education curriculum that each school was using were equal (Tremarche, Robinson and Graham, 2007).

Similar to Ahamed et al. (2007), this team of researchers compared the data collected from the two schools, the (MCAS) standardized scores were collected to analyze. Tremarche, Robinson, and Graham (2007) determined that the students' extracurricular activities such as sports and tutoring were very similar in the two school samples. With this information an outsider can know that the two groups have similar outside influences. Next, Tremarche, Robinson, and Graham (2007) found that in comparing the mean ELA scores of School 1 and School 2, a statistically significant difference was found. School 1, with fewer physical education hours, had a lower mean ELA score than School 2. On the other hand, the math scores did not show a statistically significant difference; this part is similar to Ahamed et al. (2007) findings. As the researchers state, as the amount of physical education and student activity increases, the ELA scores increase. Unlike Ahamed et al.'s (2007) research,

this study shows a correlation between student's physical activity, or exercise, and their academic achievement.

Ahamed et al. (2007) and Tremarche, Robinson, and Graham (2007) address the topic of physical education and exercise hours and its connection with academic achievement on standardized tests. Other researchers such as Siegel (2006), Grisson (2005) and Castelli, Hillman, Buck, and Erwin (2007) take a different look. These researchers analyzed a student's physical well being in a targeted ability and compared that to his/her academic ability through standardized tests. For example Siegel (2006) summarizes research done by Grisson (2005) in California. The research took place in California and attempted to determine the relationship between standardized physical fitness measurements with standardized tests of reading and mathematic achievement. Physical fitness was measured using the Fitnessgram. The Fitnessgram is a test in which several fitness standards including aerobic capacity, body composition, curl-ups, trunk lifts, upper body strength, and flexibility are measured. For math and reading measurements, the Stanford Achievement Test was given. Fifth, seventh, and ninth graders across various socioeconomic status were participants in the study. After data collection, the findings revealed that reading and math scores improved with statistical significance as the physical fitness levels increased.

Castelli, Hillman, Buck, and Erwin (2007) were interested in finding the connection between academic achievement and physical fitness. In order to analyze the relationships between these two factors the researchers set up a study with four elementary schools: two were considered to be academically effective while the other two were considered to be performing low academically. Likewise two schools were considered to be from a higher socioeconomic status and the other two from a lower socioeconomic status. At each school the third and fifth graders participated in the data collection. Like Grisson (2005), Castelli et al. (2007) measured fitness by utilizing the Fitnessgram. Student's academic achievement was measured using the ISAT, a standardized achievement test, given to all Illinois public school students, and primarily looking at reading and math achievement.

After data collection, Castelli et al. (2007) analyzed the data to see the relationship between each Fitnessgram exercise and each component of the ISAT. The overlying conclusions included mainly positive correlations between the specific Fitnessgram measurements and the specific ISAT scores with the exception of the negative correlation between the body mass index (BMI) and ISAT. In this case as the child's BMI decreased, their test scores increased. This means the students with a better body composition were performing better on the academic tests.

## ***Conclusion***

Based on the literature, obesity can be seen as an epidemic. Children throughout the United States and other countries are affected by obesity. While all children can be affected by obesity, those that are from low socioeconomic status or identify with a minority background are more at risk to become obese. Obesity has physical, emotional, social, and academic consequences. In order to prevent and treat obesity, tapping into the brain and body is imperative. Increasing physical fitness through exercise has been found to sometimes help with both the body and mind. Because students spend such a large amount of their time at school, the education system is one group that can help students to fight the obesity epidemic.

## Chapter Three

### Methodology

#### *Introduction*

This study was designed to investigate what impact a morning exercise program for obese and overweight children had on their academic ability. In order to delve into this topic, student and teacher perspectives on exercise and its impact on academic ability were explored.

#### *Purpose*

This research explores whether a morning exercise program has an impact on obese and overweight children's academic ability. Due to the rise in percentage of children who are overweight and obese in the United States and other developed countries, schools have begun taking action to prevent obesity and promote children's health. Educators and administrators are researching and implementing exercise and healthy decision programs. Many programs have shown a positive impact on students' health; however, there is limited research regarding the impact of exercise on these students' academic ability. The researcher explored the morning exercise program that was implemented at her school to measure the program's impact on the student participants' academic ability.



**Statement of Question** To what extent does a morning exercise program for overweight and obese elementary school students impact their academic ability?

- What are student perceptions about the impact of exercise on their attentiveness in the classroom and ability to perform academic tasks?
- What are teacher perceptions about the effect of exercise on their student's attentiveness and ability to perform academic tasks in the classroom?

### ***Participants***

The participants in the morning exercise program are students at an urban elementary school in Western New York. The district in which the students are schooled is comprised of 64% African American, 20% Hispanic, 14% Caucasian, and 2% other backgrounds. The students in the exercise program in this research are comprised of 86% African American, 10% Caucasian, and 4% Hispanic. Eighty percent of students in the district qualify for reduced or free lunch; 93% of the participants in the exercise program in this research qualify for reduced or free lunch. The participants in the exercise program in this research are in first, second, third, fourth, fifth, and sixth grade. Each

participant was chosen by the nurse as a result of the student's BMI (body mass index). The students needed to have a BMI of 28 or higher to be included in the program.

### *Research Design*

The researcher began by observing the existing morning exercise program in the school. The school sought and obtained approval from parents in the fall of 2007 for 22 students in grades first through sixth to participate in the year-long exercise program. Permission had been obtained to collect data on BMI and weight and data from informal interviews with students regarding individual goals and attitude toward exercising. After this information was acquired, the researcher sought permission from the school administration to collect data from the participating students and teachers in the morning exercise program. [Appendix C] Following IRB approval, the researcher obtained parental informed consent for each participant. [Appendix D] The researcher also attained consent from each participant. [Appendix E] All students enrolled in the program were included in data collection; however only students with parental and student consent will be used in data analysis. After attaining permission from the school administration, IRB, participants, and participants' parents, the researcher

informed each teacher of the 22 students participating in the exercise program of her research through a letter. The letter asked the teachers to complete a survey about the students in their classes that participate in the exercise class.

[Appendix F]

After receiving approval from all parties, the researcher collected data for eight weeks. The first source of data collection took the form of observation. The researcher observed and exercised along with the students, nurse, administrators, and other volunteer teachers in the morning exercise program. This allowed the researcher to informally observe and assist the nurse in the activities and nutrition education. As she observed, the researcher kept anecdotal notes about the exercise program. [Appendix G] The researcher took note of different pieces of information while observing, including the participants who attended and the exercises used for that session.




With the attendance and exercise as a constant in the researcher's anecdotal notes, there was variation in the other data collected. For at least half of the observations, the researcher recorded in her anecdotal notes the amount of time the participants actually joined in with the exercise. During observation and participation the researcher was able to converse with the students, building relationships and seeking out the students' opinions.

Students shared their ideas about the exercise, the resources being used, how they felt during the days they exercised, and other insights about the exercise program that reflected their perceptions of the program and their academic ability. The researcher recorded this information in her anecdotal notes.

The research observed the morning exercise program weekly and took notes in order to get a first hand account of the students' exercise routine. The researcher was able to experience the general atmosphere of the program, gauge its tone, explore the thoughts of the students, try the actual exercises, and encounter the program from several perspectives.

The second form of data collection was a survey completed by the students. [Appendix H] After observing the program, the researcher developed a survey to measure the students' attitudes about the morning exercise program and their perceptions of the impact it had on their academic ability. The six questions on the survey were:

1. Do you like the morning exercise program?
2. Does the morning exercise program make you feel better?
3. Do you pay attention to your classroom teacher **more** after morning exercise than when you do not exercise?
4. Are you **too tired** to do work for your classroom teacher after morning exercise?
5. Do you think the morning exercise program helps you do **better work** in your classroom?
6. Do you feel **less motivated** to do work when you exercise in the morning?

For each of the six questions, the students responded by circling  yes,  sometimes, or  no. Thumbs were used instead of smiley faces as children can associate a frown face with “being bad” rather than disagreeing with a statement. Each question targets a different aspect of the students’ perceptions on the morning exercise program. Questions three through six specifically target the students’ academic ability. Following the six questions was an additional space with lines for students to offer suggestions, opinions, or any other information that they thought was important for the researcher to know.

In order to administer the survey, the students were given permission to stay at the morning exercise program for five additional minutes. Students took their places on the gymnasium floor and the researcher explained her purpose again. Students were then given the survey and a pencil. The researcher read each question aloud to the students and they circled the answer of their choice. Students were then given time to write in the comment section. Two students with writing difficulties were given assistance in recording their ideas in the comment section. At the completion, the surveys, pencils were collected and participants were dismissed.

The goal of the survey was to assess student perceptions about the impact of exercise on their attentiveness in the classroom and ability to

perform academic tasks. The data were analyzed to answer this question and to give the school information regarding the students' opinion on the morning exercise program.

Data collection also included the teacher survey. [Appendix I] The purpose of the survey was to solicit data for the secondary research question assessing teacher perceptions on the effect of exercise on their students' attentiveness and performance on academic tasks in the classroom. The survey consisted of nine questions and an additional comments section. Each question targeted the teacher's opinion on one of his/her students in the morning exercise program. Attentiveness, health, and academic performance were all covered in the survey. Each of the nine questions on the survey consisted of two parts. The first part of the question included a statement and a scale. The teachers had to circle where their opinion fell on the scale. The second part of each question solicited a description or explanation of his/her choice on the scale. At the end of the survey there was a section that asked the teacher to write any other information that they thought was important.

The following nine questions were asked on the survey:

1. Your student's general health and physical well being before the morning exercise program:
2. Your student's attention and motivation before the morning exercise program started:
3. Your student's academic performance before the morning exercise program started:

4. After the first four months of the morning exercise program have you seen any observable changes in the student's health or physical well-being?
5. After the first four months of the morning exercise program have you seen any change in the student's attention and motivation?
6. There is a connection between your student's health and motivation:
7. There is a connection between your student's health and motivation:
8. There is a connection between your student's health and academic performance:
9. Do you attribute any changes you have seen to the morning exercise program?

Questions one through three had a five level range starting at "very good" and ending with "poor". Questions four, five, and nine had "yes" or "no" as their answer options. Questions six through eight had a five level range starting at "strongly agree" and ending with "strongly disagree." As stated earlier, following the answer spectrums, the teachers were asked to describe or explain their answers.

The researcher made the survey questions two-fold so that she could tap teachers' perceptions in multiple ways. The spectrum allowed the researcher to compare one teacher's answer with other teachers who completed the survey. It also provided quantitative data. The researcher also solicited a description or explanation so that the teacher's thought process was known. The open explanation and description section allowed the teacher to clarify why they ranked the student on the range and how the question may apply in some circumstances and not in others. A combination

of quantitative and qualitative data allowed for clearer understanding of the secondary research question.

In order to administer the survey, the researcher hand-delivered the survey to each teacher. Upon delivery, she verbally reminded the teacher that the survey was assisting her collection of data for her research project and that at the end of the week she would return to collect the survey from them. This same information was also stated in a letter attached to the survey.

The researcher used the teacher survey as an instrument as she thought it would clarify her findings on the primary research question. While the student surveys gave the students' thoughts, the teachers are responsible for sending the students to the morning exercise program and receiving them back from the program at its completion for the day. Teachers can easily sway a student's opinion one way or another. If a teacher thinks that the morning exercise program is beneficial, then his/her enthusiasm can influence the student's perceptions. Teachers are also a daily constant in a student's life. For each day that the student participates in the morning exercise program, the teacher sees that student for the remainder of the school day. The teacher observes the immediate and long term impact of the program.



In order to collect both students' and teachers' perceptions, the researcher used informal interviews. The purpose of informally interviewing both the students and teachers was to further understand the information they gave on the survey and to solicit any further information to answer the sub questions. Appendix J includes examples of questions that the researcher used to interview both students and teachers. The researcher chose to use informal interviews because she knew that there would be qualitative information from students and teachers that would not be collected through the surveys. Informal interviews can be done quickly and at the convenience of the interviewee. Interviews also allowed the researcher to pursue specific ideas with specific participants.

The last form of data collection was the researcher's journal. The researcher's journal kept track of any miscellaneous information that the researcher discovered over the course of the study.

### *Data Matrix*

	What are student perceptions about the impact of exercise on their attentiveness in the classroom and ability to perform academic tasks?	What are teacher perceptions about the effect of exercise on their student's attentiveness and ability to perform academic tasks in the classroom?
Student Survey	X	
Teacher Survey		X
Observation Anecdotal Notes	X	
Informal Interview	X	X
Researcher's Journal	X	X

### *Data Analysis*

All of the data collected by the researcher was reviewed and analyzed by the researcher. The data collected from both student surveys was put into tables in order to draw comparison. The tables could be used to compare

- o An individual participant's answer at the beginning and the end of the study

- An individual participant's number of positive answer to the number of negative answers
- An individual participant's answers to that of the whole group

Similarly the data collected from the teacher surveys was put into tables.

The teacher survey data was also grouped by question. Each question was analyzed by the teachers' answers on the scale and their comments. Answers to each scaled questions were graphed.

Both surveys were compared to the information collected in the researcher's journal, anecdotal notes, and informal interviews. Consistencies and inconsistencies were thoroughly explored between individual participant's surveys, interviews, and behavior directly recorded in the anecdotal notes.

All students in the program were observed, surveyed, and interviewed; however only students with parental and student consent were used in the data analysis.

After analysis was conducted by the researcher, generalizations were created. The generalizations made for this group of participants may or may not be similar for another group of overweight elementary students in a morning exercise program. The data presented and analyzed are reliable and valid for the researcher's school's morning exercise program which has taken

place in an urban elementary school in upstate New York. The findings, however, can not be generalized to all elementary morning exercise programs targeting overweight students.

## Chapter Four

### Findings

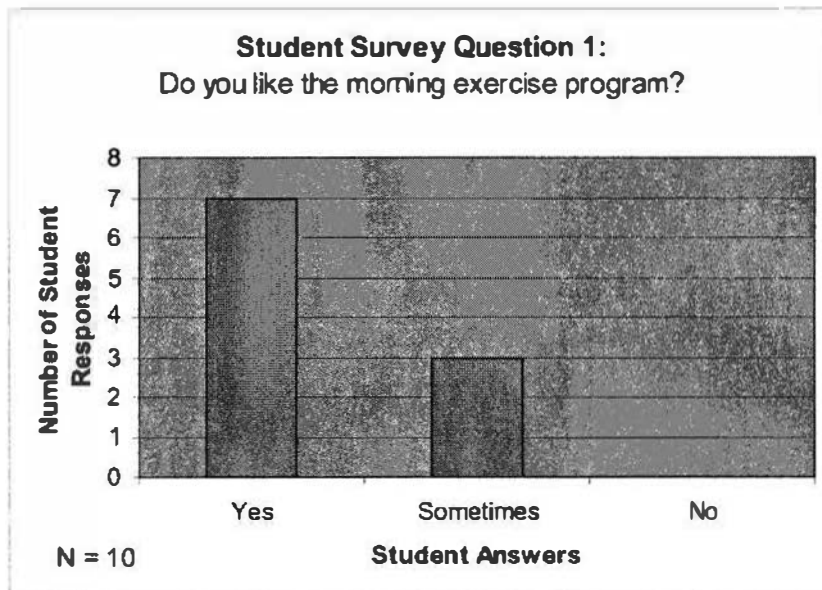
#### ***Introduction***

This study was designed to investigate the impact that a school's morning exercise program for overweight children had on academic ability. In order to look at this impact, the researcher explored two subtopics: student perceptions and teacher perceptions regarding the relationship of exercise and academic ability. In order to collect data, the researcher used a variety of tools including student surveys, teacher surveys, informal interviews, anecdotal notes, and field notes. After collection, the researcher analyzed her data both qualitatively and quantitatively. The following generalizations were derived from the findings.

***Generalization One:*** *Students in this study thought that the morning exercise program helped them to perform better and be more attentive in the classroom.*

Due to the fact that students in this study were observed, surveyed, and interviewed. All three forms of data collection support generalization one. First, the researcher found that all of the participating students really enjoyed the morning exercise program. On the student survey, students were given the chance to tell whether they liked the exercise program. Figure 1

illustrates that all ten students answered “yes” or “sometimes” on the survey when answer the question “Do you like the morning exercise program?”



**Figure 1**

Students also expressed their desire to participate in the morning exercise as evidenced in the researcher’s observation anecdotal notes, field notes, and interviews. When one student was asked during an interview about the program they excitedly responded “I like the program a lot!” In the researcher’s observation anecdotal notes for January 23 and June 4, it was noted that the students were so excited to exercise using the Dance Dance Revolution (DDR) game on the PlayStation2 that the researcher and nurse had to regulate the use of the electronic pads with the use of the practice pads.

Beyond liking the morning exercise program, students expressed that the morning exercise program helped them with their academic performance

in the classroom. The student survey question five asked students if they thought that the morning exercise program helped them to do better work in the classroom. As seen in Figure 2 below, 40 percent of students thought that the program indeed helped and another 40 percent thought that sometimes it helped them to perform better. This totals 80 percent of the students altogether felt the program benefited their academic ability.

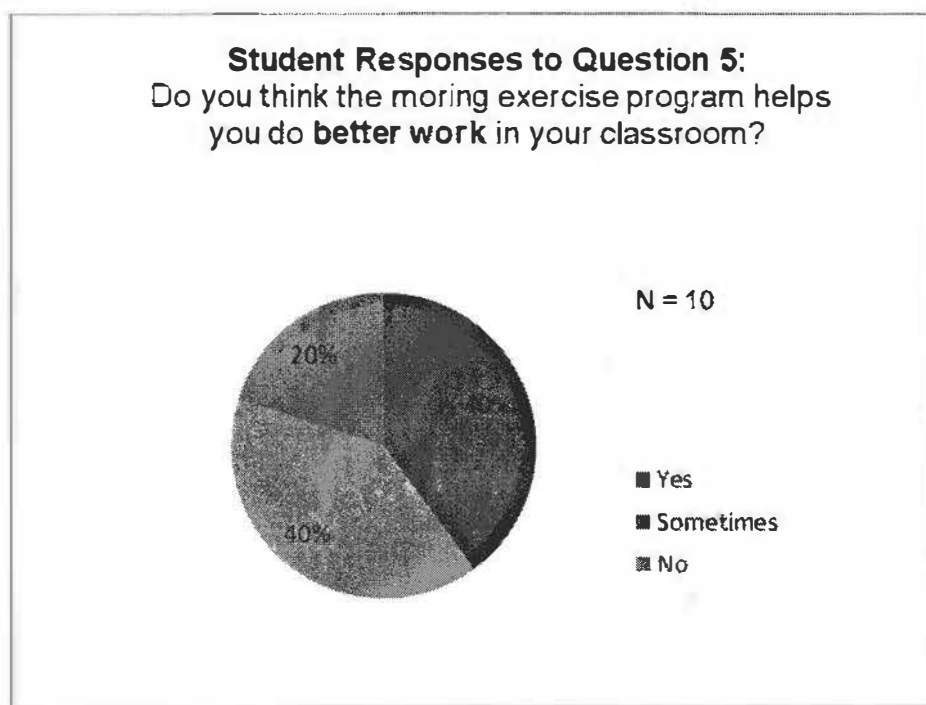


Figure 2

Furthermore, student survey responses showed that students believed the morning exercise program was helpful for their academic performance by aiding classroom skills such as motivation and paying attention. Figures 3 and 4 illustrate students' perceptions regarding motivation and attention respectively.

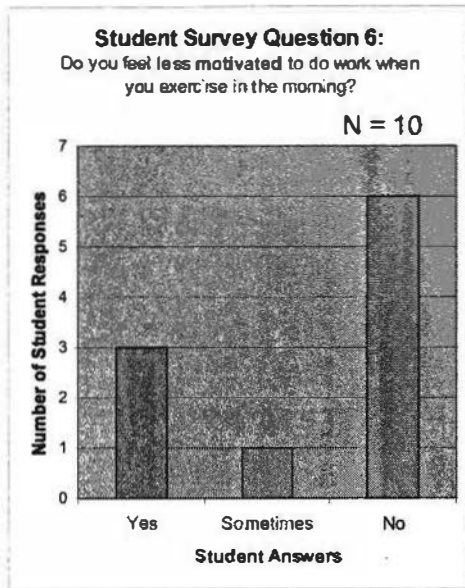


Figure 3

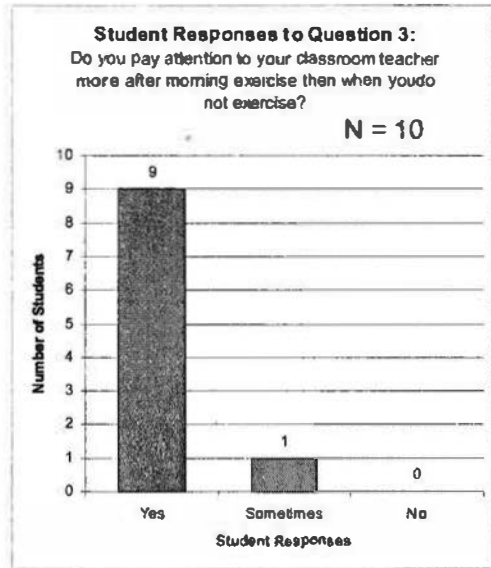
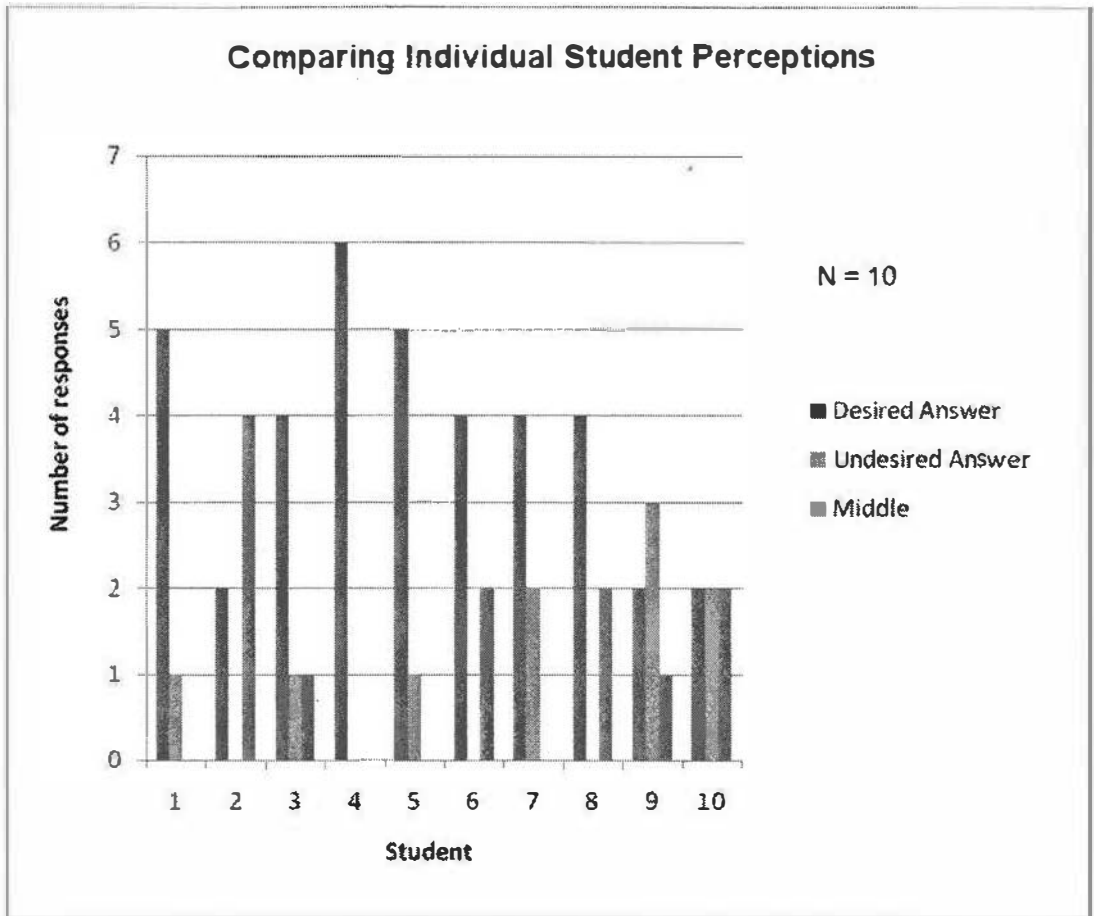


Figure 4

Lastly, the researcher analyzed each individual student's surveys. The researcher classified the answers as "desirable" "undesirable" or "middle." A student's survey response was "desirable" if the answer meant that the program was beneficial to the student. The classification of "undesirable" if the student did not think the program was beneficial to his/her academics. "Middle" meant that the student responded with "sometimes"; therefore the exercise program was sometimes beneficial in the area and sometimes not. The total of each individual's responses can be seen in Figure 5 below.



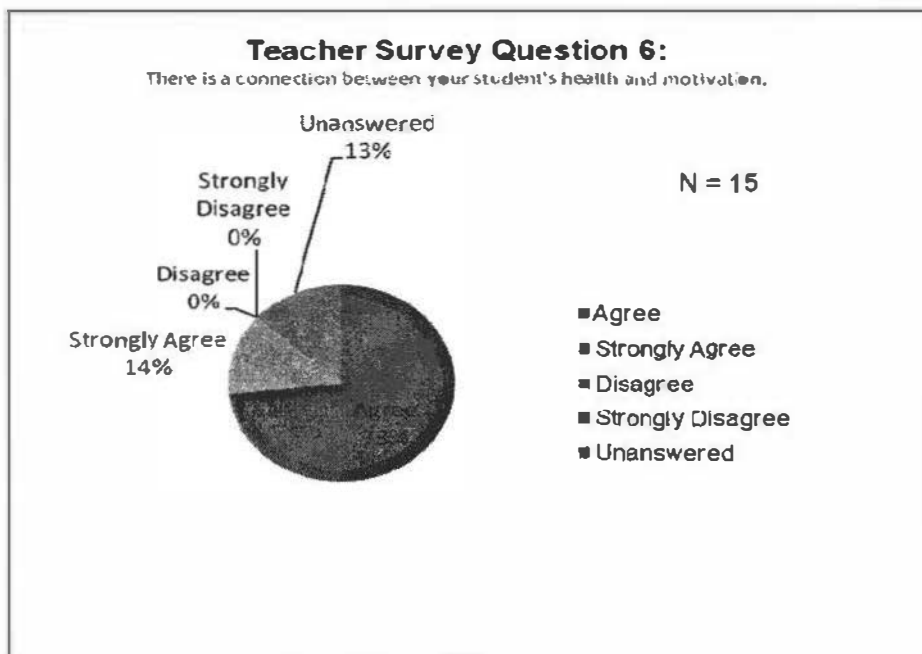


**Figure 5**

In many of the students' surveys the desired answers far exceeded those that were undesired or middle ground answer. If the desired answers were not larger in total, most students total of the desired and middle answers were larger than the undesired answers. This reiterates that students' perceptions were that the morning exercise program helped their academic performance in the classroom.

**Generalization Two:** Teachers surveyed in this study think there is a strong connection between overall student health and motivation and academics.

The researcher found through the data analysis that teachers thought that there was a connection between student's overall health and student's ability to be motivated and perform academically. Figure 6 illustrates the answers to question six on the teacher survey in which the statement "There is a connection between your student's health and motivation." was given and teachers answered on a scale.



**Figure 6**

Figure 6 exemplifies that 87 percent of teachers agreed or strongly agreed that there was a connection between student's health and motivation.

Furthermore, statements made by the teachers on the survey and during interviews express the same views. Examples of these statements are:

"I see an increase in student motivation with all students who are really 'into' the program." –Teacher being interviewed about participating student's motivation

"Healthier - more motivation. Better attention." –Teacher's added response on survey

While the connection with motivation and health was made by teachers in this study, teachers also found a connection between student's health and academic performance. Question eight on the teacher survey asked teacher's to rate their opinion on a scale based on the statement "There is a connection between your student's health and academic performance." Figure 7 illustrates that 66 percent of teacher's agreed or strongly agreed that there was a connection with health and academics.

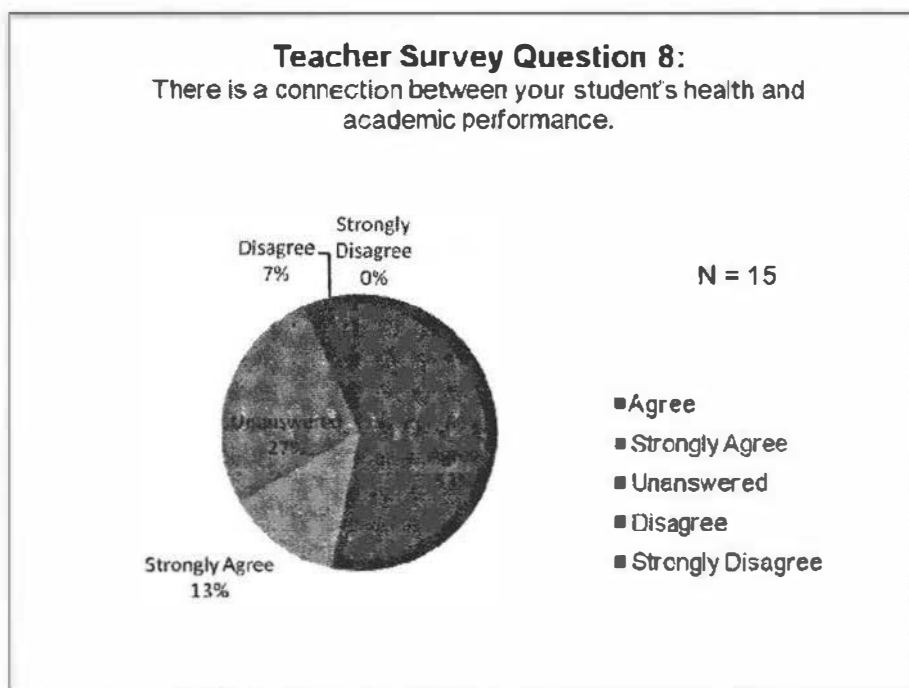


Figure 7

Figure 7 also shows that only seven percent of teachers disagreed with the statement; the remaining teachers left the rating unanswered. Following the question on the teacher survey, many teachers commented on the connection between health and academics. The teacher's statements are seen below:

"Students are better prepared (physically, emotionally and academically) for the day."

"Healthier - more motivation. Better attention."

"I have always believed in the Brain-Body connection."

"I believe when she is feeling energized she works at her academics."

In conclusion, the generalization that teachers in this study perceive a connection between health, motivation, and academic ability is supported by the teachers' survey questions, survey free responses, and the interviews conducted with the researcher.

*Generalization Three: Teachers surveyed in this study are less sure about the impact of the morning exercises program on student's health and academic performance. Teachers also were not actually looking for this connection.*

When the morning exercise program started at the beginning of the year, students were identified as being obese or overweight and then asked to be in the program. The teachers were notified that their students would be arriving late to class on Monday, Wednesday, and Friday for an exercise class to help improve the student's health; however further information was not

given to the teachers regarding exactly what the students would be doing nor was the request to monitor the student's attentiveness, motivation, and academic ability made. Due to this several teachers expressed through the survey or interview that giving their opinion about a change over the time of the morning exercise program was difficult. One teacher commented on the teacher survey:

"I would have liked to have known about this survey ahead of time. I may have devised a way to record changes more accurately. That way, I could be more objective."

While teachers found an overall connection between student's health and motivation as found in generalization two, teachers were not sure if the morning exercise program impacted the participating students' health and academic performance. Figure 8 illustrates that just over one half of the teachers thought that the program had an impact on students where as 47 percent thought that it did not or had a mixed impact on the student.

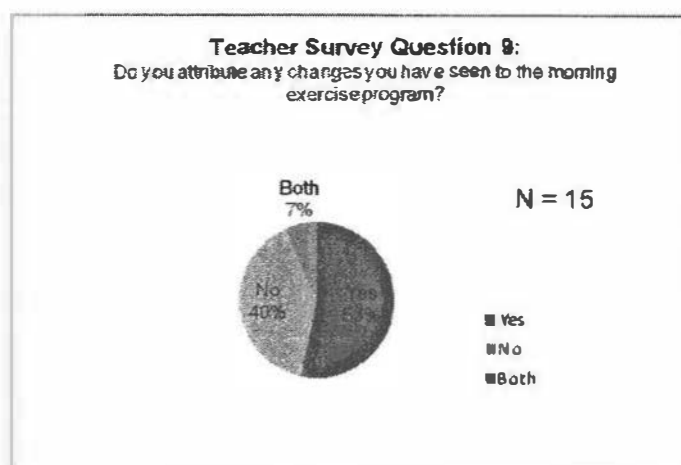


Figure 8

Teachers also commented on the same question asked in Figure 8. A variety of these comments illustrating the mixed feelings from the surveyed teachers are:

"This is a mixed bag. Student lets social issues effect her day. I really can't comment on whether it has helped due to this."

"Not really, student is unmotivated generally and puts little effort into his academics."

"I see an increase in student motivation with all students who are really 'into' the program."

"Appears to be more confident; Increased classroom participation."

Further prodding was done through interviews. The researcher realized the mixed perceptions about the morning exercise program's impact on the students' health and academics continued. One teacher interview said "I am truly 100% for the program." however the same teacher said regarding one of his students in the program "<student> was losing academic time and is not so motivated in general. For him, I do not think the program was beneficial."

### ***Conclusion***

The morning exercise program developed for obese and overweight students is successful according to the students. Teachers also support the

theory and ideas that the morning exercise program is based. The teachers truly think that a student's health impacts his/her motivation and academic ability. Teachers, however, were not as sure of the impact that the morning exercise program had on the student's health and performance. These generalizations were created and supported using data gathered from a small group in the morning exercise program at the researcher's school. These findings apply specifically to these students and cannot be generalized to all students, schools, or situations. Recreation of this study may lead to differing results.

## Chapter Five

### Implications

#### *Introduction*

Over the course of eight weeks, the researcher volunteered and collected data at a morning exercise program for obese and overweight children. Through observations, surveys, field notes, and interviews, the researcher collected student's and teacher's perceptions on the impact of the exercise on student's ability to do academic work in the classroom. In the following section are the implications and questions for further research the researcher has developed based on her data collection and the generalizations found in Chapter Four.

#### *Implication One*

**Students enjoy exercising and learning easy ways to stay healthy.**

Throughout the morning exercise program, the researcher noted that the students in the program seemed to really enjoy exercising and learning fun and exciting ways to stay healthy. When asked if they like the exercise program through the survey or interview, students mostly answered "yes" or "most of the time." The nurse in charge of the exercise program noted that when she met individually with a few of the participants to show them their



BMI on the age and gender graphs, that each was interested in improving.

The students realized that their bodies were important and it was important to care of them. When given the opportunity, children do like to exercise and take care of their bodies.

### *Implication Two*

**Students should be taught practical ways to exercise and given the opportunity to do it. Likewise, teachers should teach practical exercises to students and give students the opportunity to practice.**

Exercise and brain-based research has been conducted throughout the years and is now on the rise as overweight and obese children and adults increase. Throughout literature, researchers have found that exercise can have a positive role on a person's physical health and academic performance. Because exercise has a positive impact and students spend much of their time in the school setting, students should be taught by their teachers' ways to exercise. By exercising throughout the day, students feel better about themselves and their academic abilities. When teachers educate students about exercises and set a positive role model, students are more likely perceive exercise as beneficial.

### *Questions for further research*

- What impact would a morning exercise program have on the academic ability of a random selection of students?
- What impact would a morning exercise program have on the academic ability of a selection of students with varying BMIs?
- What impact would exercise within the school day have on a student's academic performance?
- If measured with numeric scores, does academic performance change when exercise is used in the classroom?
- Do Brain Gym exercises used during the school day impact student's attentiveness or academic performance?
- How does a morning exercise program for obese and overweight children impact their academic ability in reading? Math?
- 

### *Summary*

This research was a small study which took place in an urban school district in Western New York with students that were considered to be overweight or obese according to their BMI. The results of this study are solely presented from a small group of ten students and ten teachers; the data cannot be generalized to all students. When conducted with another group of students in another school, the same results may or may not occur.

There is an not accurate way to determine whether a morning exercise program impacts obese and overweight children's attentiveness and academic ability in the classroom. Each student participant in the school's program experienced a different teacher, different schedule, and different home life while participating in the morning exercise program. To truly

determine how effective a morning exercise program in on student attentiveness and academic ability, this study should be conducted with a much larger populations of students, over a longer period of time under more controlled conditions.

Though the research has numerous limitations, this study has shown that a morning exercise program for obese and overweight children does have a limited impact on student's attentiveness and academic ability according to the student's and teacher's perceptions.

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# APPENDICES

# APPENDIX A

## Appendix A – BMI Formula

The standard formula for calculating a BMI is:

Measurement Units	Formula and Calculation
<b>Kilograms and meters (or centimeters)</b>	<p>Formula: <math>\text{weight (kg)} / [\text{height (m)}]^2</math></p> <p>With the metric system, the formula for BMI is weight in kilograms divided by height in meters squared. Since height is commonly measured in centimeters, divide height in centimeters by 100 to obtain height in meters.</p> <p>Example: Weight = 68 kg, Height = 165 cm (1.65 m)            Calculation: <math>68 \div (1.65)^2 = 24.98</math></p>
<b>Pounds and inches</b>	<p>Formula: <math>\text{weight (lb)} / [\text{height (in)}]^2 \times 703</math></p> <p>Calculate BMI by dividing weight in pounds (lbs) by height in inches (in) squared and multiplying by a conversion factor of 703.</p> <p>Example: Weight = 150 lbs, Height = 5'5" (65")            Calculation: <math>[150 \div (65)^2] \times 703 = 24.96</math></p>

(CDC, 2007)

## APPENDIX B

## Appendix B – Sample BMI Table

Body Mass Index Table																																				
	Normal					Overweight					Obese					Extreme Obesity																				
BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Height (inches)	Body Weight (pounds)																																			
58	91	96	100	105	110	115	119	124	129	134	139	143	148	153	158	162	167	172	177	181	186	191	196	201	206	210	215	220	224	229	234	239	244	248	253	258
59	94	99	104	109	114	119	124	129	133	138	143	148	153	158	163	168	173	178	183	188	193	199	203	209	212	217	222	227	232	237	242	247	252	257	262	267
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	260	265	271	276
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	257	262	267	273	278	284	289	295
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	276	282	287	293	299	304
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	309	314
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324
66	118	124	130	136	142	148	154	160	167	173	179	186	192	198	204	210	216	222	229	235	241	247	253	259	265	272	278	284	291	297	303	309	315	322	328	334
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	275	282	289	295	302	309	315	322	328	335	341	348	354
69	128	135	142	149	156	163	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376
71	136	143	150	157	165	172	179	186	193	200	207	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	336	343	351	358	365	372	379	386
72	140	147	154	162	169	177	184	191	199	206	213	221	228	236	242	250	256	264	272	279	287	294	302	309	316	324	331	338	346	353	361	368	376	383	390	397
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443

Source: Adapted from Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report

(CDC, 2007)

# APPENDIX C

# DR. LOUIS A. CERULLI SCHOOL #34

*Principal: Debra Ramsperger*

*Assistant Principal: Lee Dam*

Rochester City School District

To Whom It May Concern:

I have read the following research proposal and give my permission for the research to be done at School #34 pending approval by the Human Subjects Committee at SUNY Brockport.

Proposal Title: Analysis of School 34 Morning Exercise Program: Does Exercise Improve Overweight/Obese Children's Health and Academic Performance?

Researcher: Rebecca L. Beyerlein

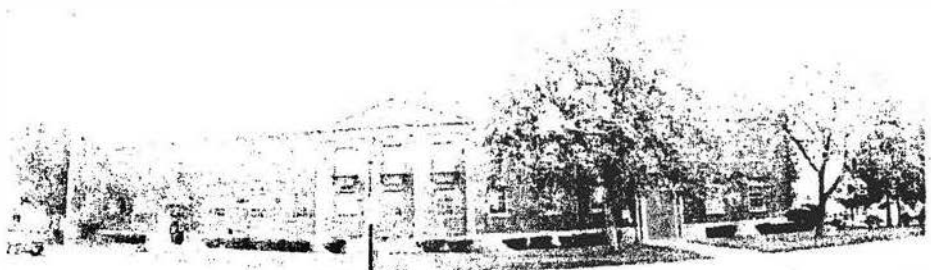
  
Deborah Ramsperger  
School 34 Principal



AMERICAS  
CHOICE

530 Lexington Avenue  
Rochester, New York 14613  
PHONE: (585) 458-3210  
FAX: (585) 277-0106

WEB SITE: <http://www.resdk12.org>





## APPENDIX D

## Appendix D – Parental Consent

Dear Parent or Guardian,

My name is Rebecca Beyerlein and I am a certified teacher working as an intern teacher at your child's school. I work daily with the fourth grade team, teaching reading with Mrs. Knaub. In addition to teaching, I am earning my Master's degree in the Childhood Education Curriculum Specialist program at SUNY College at Brockport. As such, I will be conducting a research study in the school for my Master's Thesis on exercise and its impact on academics. The purpose of this research is to determine whether your child's current participation in the morning exercise program plays an impact on their academic ability.

As part of my teaching at the school, I volunteer every Wednesday with Mrs. Perrello during the morning exercise program. This participation in the program is something that I have been doing since the beginning of January. I am excited to share that I decided to use the morning exercise program that Mrs. Perrello established as a way to research the impact that exercise has on academic ability.

For my study, I will conduct two brief surveys at the beginning of the month and the end of month during the exercise program. The survey will only take about five minutes and will take place during the morning exercise program so that students will not miss academic time with their teachers. Your child will also be interviewed so that I have personal insight regarding his/her ideas about physical exercise and its impact on his/her academic ability. The interviews will be done as the student exercises, again so academic loss does not occur. In addition to the surveys and student interviews, I will be distributing a survey to your child's teacher. The survey will be a way for the teacher to share what impact the morning exercise program has on your child's academic ability.

A possible benefit of the study is that professionals may have a better understanding of ways in which exercise can impact academic ability. There are no anticipated personal risks due to participation in this study.

Any information collected from this study will be completely confidential. Except for this consent form, all other documents will be coded with pseudonyms. Your child's name will not appear on any data I collect. The results of this study will in no way affect your child's grades or school standing.

Participation of your child is voluntary; you may choose not to have data collected from your child for the purposes of this study. No penalties will arise if you decide at any time you do not want your child to participate. During the surveys, if your child is not involved in the study, he/she will simply be returned to his/her classroom teacher from the morning exercise program for the day. Regardless of participation status, *all* students in the morning exercise program will continue to have the opportunity to participate in the exercise program.

Please return this form to school if you agree to allow me to gather data on your child. If you have any questions, comments, or concerns about this new addition to your child's morning exercise program, please feel free to contact myself or my research advisor from the Dept. of Education and Human Development at SUNY Brockport:

**Primary Researcher:**

Rebecca Beyerlein

  
rbeyel@brockport.edu

**Faculty Advisor:**

Dr. Betsy Balzano

585-395-5549

bbalzano@brockport.edu

I appreciate your support and look forward to working with your child throughout the rest of the year.

Sincerely,

Rebecca Beyerlein

I am 18 years or older. I understand the information provided on this form and agree to allow confidential data to be collected on my child for research on sight words.

---

*Parent/Guardian Signature*

---

*Date*

---

*Child's Name*

# APPENDIX E

## Appendix E – Student Consent

Dear Student,

As you already know my name is Miss Beyerlein. I am a certified teacher working as an intern with the fourth grade team, teaching reading with Mrs. Knaub. In addition to teaching, I am earning my Master's degree in the Childhood Education Curriculum Specialist program at SUNY College at Brockport. As such, I will be conducting a research study in the school for my Master's Thesis on exercise and its impact on academics. The purpose of this research is to determine whether your current participation in the morning exercise program plays an impact on your academic ability.

As you know part of my teaching at the school is by volunteering every Wednesday with Mrs. Perrello during the morning exercise program. This participation in the program is something that I have been doing since the beginning of January. I am excited to share that I decided to use the morning exercise program that Mrs. Perrello established as a way to research the impact that exercise has on academic ability.

For my study, I need your assistance. I will conduct two surveys, one at the beginning and one at the end of the month. The surveys will be less than 10 questions long, each question asking you to tell me what you think about the morning exercise program and especially if it helps you learn better. The survey should not take more than 5 minutes. I will also be interviewing you. The interviews will take just a few minutes and will take place while you are exercising. You may be interviewed so that I have personal insight regarding your ideas about physical exercise and its impact on your academic ability.

A possible benefit of the study is that teachers may have a better understanding of ways in which exercise can impact academic ability. There are no anticipated personal risks due to participation in this study.

Any information collected from this study will be completely confidential. Except for this consent form, all other documents will be coded with pseudonyms. Your name will not appear on any data I collect. The results of this study will in no way affect your grades or school standing.

Your participation is voluntary; you may choose not to have data collected for the purposes of this study. No penalties will arise if you decide at any time you do not want to participate.

Please return this form to me if you agree to allow me to gather data about you. If you have any questions, comments, or concerns about the survey, interview, or research, please feel free to contact myself or my research advisor from the Dept. of Education and Human Development at SUNY Brockport:

**Primary Researcher:**

Rebecca Beyerlein

rbeyel@brockport.edu

**Faculty Advisor:**

Dr. Betsy Balzano

585-395-5549

bbalzano@brockport.edu

Remember, you are being asked whether or not you want to participate in this study. If you wish to participate, and you agree with the statement below, please sign in the space provided. Remember, you may change your mind at any point and withdraw from the study. You can refuse to participate even if your parent/guardian gives permission for you to participate.

I appreciate your support and look forward to working with you throughout the rest of the year.

Sincerely,

Miss Beyerlein

I understand the information provided in this form and agree to participate in this project.

\_\_\_\_\_  
Signature of participant /Date

\_\_\_\_\_  
Birth date of participant

\_\_\_\_\_  
Signature of a witness 18 years of age or older /Date

# APPENDIX F

## Appendix F – Teacher Consent

Dear Teacher,

My name is Rebecca Beyerlein and as you know I am a certified teacher working as an intern teacher at your child's school. I work daily with the fourth grade team, teaching reading with Mrs. Knaub. In addition to teaching, I am earning my Master's degree in the Childhood Education Curriculum Specialist program at SUNY College at Brockport. As such, I will be conducting a research study in the school for my Master's Thesis on exercise and its impact on academics. The purpose of this research is to determine whether your student's current participation in the morning exercise program plays an impact on their academic ability.

As part of my teaching at the school, I volunteer every Wednesday with Mrs. Perrello during the morning exercise program. This participation in the program is something that I have been doing since the beginning of January. I am excited to share that I decided to use the morning exercise program that Mrs. Perrello established as a way to research the impact that exercise has on academic ability.

For my study, I need your assistance. I will conduct one survey at the end of the month. The survey will be approximately 10 questions long, each question soliciting your perceptions on your student's progress in attentiveness, motivation, health, and ability to perform academically. The survey should not take more than 20 minutes. I will personally deliver the survey and will pick it up myself one week later. The survey will be a way for you, the teacher, to share what impact the morning exercise program has on your child's academic ability. I will also be interviewing several teachers after the surveys have been collected. The interviews will take five to ten minutes and will take place before or after school. You may be interviewed so that I have personal insight regarding your ideas about physical exercise and its impact on your student's academic ability.

A possible benefit of the study is that professionals may have a better understanding of ways in which exercise can impact academic ability. There are no anticipated personal risks due to participation in this study.



Any information collected from this study will be completely confidential. Except for this consent form, all other documents will be coded with pseudonyms. Your name will not appear on any data I collect. The results of this study will in no way affect your job or school standing.

Your participation is voluntary; you may choose not to have data collected from your child for the purposes of this study. No penalties will arise if you decide at any time you do not want to participate.

Please return this form to me or my mailbox if you agree to allow me to gather data on your child. If you have any questions, comments, or concerns about the survey, interview, or research, please feel free to contact myself or my research advisor from the Dept. of Education and Human Development at SUNY Brockport:

**Primary Researcher:**

Rebecca Beyerlein



rbeyel@brockport.edu

**Faculty Advisor:**

Dr. Betsy Balzano

585-395-5549

bbalzano@brockport.edu

I appreciate your support and look forward to working with you throughout the rest of the year.

Sincerely,

Rebecca Beyerlein

I am 18 years or older. I understand the information provided on this form and agree to allow confidential data to be collected on my child for research on sight words.

---

*Teacher Signature*

---

*Date*

# APPENDIX G



# APPENDIX H

## Appendix H – Student Survey

### Student Survey

Student Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

1. Do you like the morning exercise program?



yes



sometimes



no

2. Does the morning exercise program make you feel better?



yes



sometimes



no

3. Do you pay attention to your classroom teacher **more** after morning exercise than when you do not exercise?



yes



sometimes



no

4. Are you **too** tired to do work for your classroom teacher after morning exercise?



yes



sometimes



no

5. Do you think the morning exercise program helps you do **better** work in your classroom?



yes



sometimes



no

6. Do you feel less motivated to do work when you exercise in the morning?



yes



sometimes



no

Is there anything else you would like to tell me about the morning exercise program? Please tell me on the lines below:

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# APPENDIX I

**Appendix I – Teacher Survey**

**Teacher Survey: Morning Exercise Program**

Student Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Your Name: \_\_\_\_\_

1. Your student's general health and physical well being before the morning exercise program:

Very Good      Good      Fair      Unsatisfactory      Poor

Describe:

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2. Your student's attention and motivation before the morning exercise program started:

Very Good      Good      Fair      Unsatisfactory      Poor

Describe (Did your student focus on the lesson? Did the student need frequent reminders? Did the student seem tired?):

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3. Your student's academic performance before the morning exercise program started:

Very Good      Good      Fair      Unsatisfactory      Poor

Describe (Did your student meet the standards? Read at grade level? Know math functions appropriate for his/her age?):

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4. After the first four months of the morning exercise program have you seen any observable changes in the student's health or physical well-being?

- a. Yes.
- b. No.

Describe any positive or negative changes (Thinner? Eating more unhealthy?):

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5. After the first four months of the morning exercise program have you seen any change in the student's attention and motivation?

c. Yes.

d. No.

Describe any positive or negative changes (Less focused? More energized? Etc):

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6. There is a connection between your student's health and motivation:

Strongly Agree

Agree  
Disagree

Disagree  
Poor

Strongly

Describe any connection you think there may be \_\_\_\_\_

---

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7. There is a connection between your student's health and attentiveness:

Strongly Agree      Agree      Disagree      Strongly  
Disagree      Poor

Describe any connection you think there may be:

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8. There is a connection between your student's health and academic performance:

Strongly Agree      Agree      Disagree      Strongly  
Disagree      Poor

Describe any connection you think there may be:

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9. Do you attribute any changes you have seen to the morning exercise program?

a. Yes

b. No

Please explain your answer. (If 'yes' explain why. If 'no', what factors do you think contributed to the student's changes?)

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10. Please share any other information you think would be helpful.

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# APPENDIX J

## Appendix J – Sample Interview Questions

### Informal Student Interview Questions

*Selections from these questions will be asked of various students during the week. Each student will have an opportunity to share his/her thoughts and opinions with the researcher over the course of data collection. The researcher will only ask a few questions a week, but will attempt to have at least 3 different students answer each question.*

What exercise are you doing now?

How do you think *this* exercise helps you?

Have you tried any of the exercises at home?

Do you think doing this exercise is fun?

Why did you stop? Are you tired? Are you bored?

Do you like to exercise to the iPod or DVD more?

What is your favorite thing Mrs. Perrello has done with you?

Are you going back to your room now?

Will you be able to work better now that you've been able to run around?

Does your teacher mind that you are late in the morning?

Are you missing any work when you exercise?

Do you think exercising helps you in the classroom?

### Informal Teacher Interview Questions

*Selections from these questions will be asked of various teachers during the data collection. Each teacher will have an opportunity to share his/her thoughts and opinions with the researcher over the course of data collection. The researcher will only ask a few questions at a time as the work day allows.*

What impact has the exercise program had on your student's classroom performance?

Do you think that the exercise plays a factor on your student's attention in the classroom?

Do you think that the exercise impact your student's academic ability?

Do you think there is a brain and body connection?

If so, do you contribute to the connection in your daily teaching? How?

How many students do you have in the morning exercise program?

Do you think the program impacts one student differently than another?

Does your student act differently on exercise day versus non-exercise day?

Do you think that the exercise program is beneficial for students?

Does your student miss any academic time during morning exercise?

If so, does your student have a chance to catch up on the work?

What other factors contribute to your student's physical well being?