

THE EFFECTS OF DIET AND EXERCISE ON ELEMENTARY
CLASSROOM BEHAVIOR AND PERFORMANCE

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Abstract

The Effects of Diet and Exercise on Elementary Classroom Behavior and Performance

This paper reports the findings of a mixed-method case study concerning the role that diet and exercise have in the academic lives of elementary students. The research explored the daily diet and exercise habits of eighteen fourth grade students. The students recorded their habits on individual daily tracker charts for a two-week period. During this same time frame, observations were made throughout the school day to note the student's behavior and performance in the classroom. Following the two-week tracking period, six students and their parents were interviewed in order to provide further insight into the effects of the diet and exercise habits of the selected students. In this study I found that fourth grade students are still too young to have much knowledge of the effects that diet and exercise have on their ability to focus and perform in the classroom. In general, fourth-graders who are athletic and good eaters are able to remain focused and attentive in the classroom, which in turn leads to academic success. Most parents are aware of the fact that their children's diet and exercise habits influence their academic lives; however, this knowledge is not always applied when they prepare meals for their children. The paper concludes with recommendations for parents, teachers, and students about ways to support healthy diet and exercise habits in elementary students, in order to promote academic excellence at a young age.

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Introduction

Ben sat in the back row of his fourth grade classroom and struggled to focus his attention on the whiteboard at the front of the room. His eyes kept closing and all he wanted to do was lay his head down on his desk for one minute. Mrs. Conroy was teaching a math lesson – Ben’s favorite subject – and yet he could not find the energy and motivation that he needed in order to be an active learner this morning. Finally, Ben allowed his head to come down on his desk and he dozed off.

Health and nutrition are a growing concern in the United States, and the classroom is one domain of society where these issues are made apparent and often need to be addressed. Researcher Janet Currie suggests that there is a direct connection between health conditions and student performance and behavior in class (2005, p.117). Students – especially at the elementary level – cannot be expected to understand the full effects of proper diet and exercise; they need to be educated. The National Coordinating Committee on School Health and Safety (NCCSHS) has worked “to enhance awareness of evidence linking child health and school performance” (Taras, 2005, p.199). There is a need for both educators and students to be more aware of this connection.

Educators are important role models in the lives of their students, and therefore have the opportunity to be instigators of positive change in areas such as health and nutrition. I think there is more that the education system could be doing to address these issues. In this project, I focused my attention on the importance of the health and nutrition of students; the aim was to raise the awareness of the effect that these issues have on classroom dynamics as well as academic performance.

Literature Review

The academic performance of students is important in a nation that emphasizes competition in the education system as well as in the workforce. The overall health and fitness of students is one factor that research has shown to impact academic performance. There have been many different studies conducted, and each one looks at the topic from slightly different angles. Some researchers have focused more on the nutrition aspect, while others have looked into the effect that physical activity has on student performance in the classroom. This review of the literature is divided into the following themes: nutrition and academic performance; education and obesity; exercise and academic performance.

Nutrition and Academic Performance

Florence, Asbridge, and Veugelers, in their study entitled, *Diet Quality and Academic Performance*, provide insight into the direct link between the quality of a student's diet and his/her academic performance. This particular study used a survey to analyze the diet quality –taking into account family background, gender, etc. – of more than 5,000 fifth grade students in Canada (2008, p.209). Their findings indicate that those students with a poor quality diet are less likely to have high academic performances. Further, the results highlight that,

Variety and adequacy rather than moderation and balance were the DQI-I components most significantly associated with academic performance. Students with an increased fruit and vegetable intake and lower caloric intake of fat were significantly less likely to fail the assessment (Florence et al., 2008, p.212).

The conclusions drawn by Florence et al. emphasize the need for schools to educate students on the importance of diet quality. Schools that employ nutrition programs, “have the potential to improve student’s diet quality, academic performance, and, over the long term, their health” (2008, p.214).

Samantha Wong takes a slightly different approach by looking at the effects that nutrition has on the body’s stress level. In her research, she finds that “it has been deduced that proper nutrition plays a vital role in moderating both mental and physical stress levels” (2011, p.14). Wong conducts a study using competitive and non-competitive swimmers as her participants. She tracks their diets, blood pressures, heart rates, and temperatures in order to determine the impact that nutrition had on their levels of stress (2011, p.14). Wong discovers that for some of her participants, “the minimum daily percentage intake of the three macronutrients was not met; these occurrences could lead to an increase in blood pressure and stress on the body’s system” (2011, p.19). Although Wong’s study proved some level of correlation between nutrition and stress, she determines that further research is needed in order to come to any concrete conclusions.

Some research has shown that children from less privileged upbringings are likely to have poorer nutrition, which in turn negatively impacts early development. In a study that focuses on the poor nutrition of social work children, Ron Shor looks closely at the need for social workers to put more emphasis on the health of at-risk youth (2010, p.646-647). Shor explains that, “the social work profession is at the forefront of identifying and working with children-at-risk for inadequate development. Therefore, social workers have unique opportunities to assess, intervene, and prevent situations of poor nutrition in

children” (2010, p.647). Social workers too often focus their attention primarily on the psychosocial context of children, rather than on addressing biological (including nutritional) concerns. Shor stresses the need for social workers to find more of a balance between these two aspects, because there is significant evidence that poor nutrition has a great impact on childhood development. In some cases, poor nutrition is simply the result of insufficient knowledge that social workers could provide (2010, p.647, 657).

In her 2005 article, *Health Disparities and Gaps in School Readiness*, Janet Currie takes a close look at some of the major health issues among American students. Currie looks at a variety of health issues, including asthma, ADHD, allergies, ear infections, obesity, anemia, and others. Her research on the iron deficiency in children proposes that, “if iron deficiency impairs cognitive functioning it could well be responsible for part of the test score disparities between blacks and whites and between poor and nonpoor children” (2005, p.126). Currie’s study also looks at the connection between some of these health problems and the academic abilities of children. One piece of information she finds is the importance of the implementation of quality health services for children:

Using data from Head Start budgets and from the National Longitudinal Survey of Youth, Matthew Niedell and I found that Head Start programs that spend a larger share of their budgets on health and education raise future child test scores more than do programs that spend higher shares on other types of programming, such as programs for parents (Currie, 2005, p.131).

Although there are many intervention programs across the country that are intended

to help improve the academic performance of students who are disadvantaged because of socioeconomic health disparities, Currie points out that there are many improvements that can still be made (2005, p.131).

A survey written by Howard Taras looks closely at a collection of research that provides further evidence of this connection between the nutrition of students and their academic performance in the classroom. Similar to Currie, Taras looks at iron deficiency as one of the major nutritional concerns among students. He points out that, “knowledge regarding the link between iron deficiency and school achievement or cognitive ability is derived primarily from observations and interventions of youth who live outside the United States” (2005, p.206). Taras acknowledges that most of the studies conducted include participants who are from undernourished societies, and therefore are not easily generalized (2005, p.213). Of three major U.S. studies that focus on this topic, Taras finds that:

In 2 of the 3 studies conducted in the United States, food insufficiency was associated with significantly poorer cognitive functioning, decreased school attendance, or diminished academic achievement...modest evidence in this small body of literature should be sufficient to raise concern that food insufficiency exists among school-aged children and that the issue must be addressed (2005, p.213).

Although the research-to-date is minimal, Taras points out that the poor and/or insufficient nutrition of students deserves attention because it often has a negative effect on the students’ ability to learn and succeed (2005, p.213). In their article entitled,

The Sweat and Slow: The Relationship Between Nutrition and Reading Disability, Charlton-Seifert and O describe the academic struggles that arise when children are undernourished. Even if children have enough to eat, it is the quality of their diet that matters. Inadequate diets contribute to poor attention spans, lack of motivation, fatigue, and delayed learning (Charlton-Seifert & O., 1979). In other researcher, Jane David, sees the need for healthy, federally subsidized school meals. His argument is based on the idea that inadequate nutrition has been linked to poor social and academic development (2009, p.88, 89). David supports his research with information from a study, in which researchers collected data before and after the implementation of a breakfast program in a low-income school. In his study, David found that,

Before the breakfast program, one-third of the students were at nutritional risk and had a history of lower attendance, tardiness, anxiety, and aggression. After six months, students who decreased their nutritional risk showed improvements in all these areas. (2009, p.89)

The results of the breakfast program demonstrate that proper nutrition can impact students in areas that are essential to their academic success.

Education and Obesity

Childhood obesity, which is often the result of poor nutritional habits, is currently a major concern in the United States. In an article entitled, “Obesity Prevention in Early Adolescence: Student, Parent, and Teacher Views”, researchers find that in general, “early adolescents had a good understanding of the relationship between their behavior and their health, although they had limited understanding of what constitutes healthy eating” (Power & Bindler & Goetz & Daratha, 2010, p.13). The researchers analyze a

study that worked with middle school focus groups in order to look more closely at how the prevention of adolescent obesity is addressed. Although there have been many programs created in an effort to address obesity concerns, the authors found a consistent flaw:

Most are school-based, focusing on influencing physical activity and/or dietary habits. Such interventions have had limited success. They may demonstrate short-term effects on the targeted behavior(s), but rarely demonstrate sustained behavioral change or positive impacts on youth weight (Power et al., 2010, p.14).

This discovery led the focus groups to look for better methods to provide students with more knowledge of the long-term consequences that their habits have on their wellbeing. Adolescents should have consistent reinforcement both at school – healthy lunches offered and education provided – and at home – parental influence and guidance – in order to maintain a healthy lifestyle for the long-term (Implications). In her article, *Math, science, and web-based activities to raise awareness about nutrition and obesity*, Zuercher further supports this concept, arguing that “Teachers and parents are in key positions to support the health education standards by providing children and adolescents with vital health facts and decision-making skills” (2011, p.43). Zuercher points out one particular approach that teachers can use to educate students about their health; she describes sugar mathematics as a concrete way for students to learn facts about obesity. This approach enables students to learn about their own caloric intake and eating habits through math lessons (2011, p.44-46).

One study uses a survey called the “Youth Physical Activity and Nutrition Survey (YPANS)” (Zapata & Bryant & McDermott & Hefelfinger, 2008, p.10) in order to take a

closer look at the obesity epidemic in the United States. The YPANS posed questions about dietary habits; physical exercise; knowledge of the importance of nutrition and exercise; etc. Among other dietary issues that were revealed by the survey results, it was found that,

Skipping breakfast contributes to the development of overweight and obesity.

Youth who skip breakfast have been shown to eat more food later in the day than those who eat breakfast. In addition, they may also consume more high-fat snacks throughout the day. (Zapata et al., 2008, p.15)

The YPANS points out many important nutritional and physical habits among youth that are contributing to the increase in the number of obese Americans. Chmelynski's research, further supports the positive impact that school breakfast programs have on student achievement. Schools that provide free breakfasts for their students have shown increases in overall school performance (2007, p.59,60).

Exercise and Academic Performance

Prosser and Jiang, in their article, *Relationship Between School Physical Activity and Academic Performance of Children*, contend that,

There is evidence that physical activity and increased physical education will enhance learning abilities in literacy and numeracy, although the evidence has not been of sufficient strength to strongly influence politicians and school administrators; in fact a popular perception would be that the two abilities are almost entirely independent. (Prosser et al., 2008, p.12)

Prosser et al.'s research highlights the positive correlation between physical activity and academic performance. The authors aim to generate more awareness about a topic that is

not being addressed, primarily because people do not have the information they need. One study, conducted in France, replaced two hours of each school day with physical activities. The participants showed an increase in attendance as well as improvements in academics. Studies-to-date have not provided unanimous evidence about the positive correlation between physical activity and academic performance however, the research continues today. Tomporowski, Davis, Miller, and Naglieri, in their study entitled, *Exercise and Children's Intelligence, Cognition, and Academic Achievement*, share that,

The present review of research findings suggest that systematic exercise programs may actually enhance the development of specific types of mental processing known to be important for meeting challenges encountered both in academics and throughout the lifespan. (Tomporowski et al., 2008, p.127)

This article presents the idea that exercise is beneficial to the mental functioning and cognitive development of children. The importance of the role of exercise in the classroom is further supported by the article, *Mind and Body*, which explains how regular physical activity helps to boost self-esteem and reduce stress among students (Vail, 2006, p.31). In another article about the impact that exercise has on academic performance, Vail writes,

It turns out that the old stereotype of the “dumb jock” and the “smart nerd” don't exactly hold true. Probably the best known recent research on the link between physical fitness is a 2004 study by the California Department of Education, which found that the students who do better on academic achievement tests are also more physically fit than their peers who do not score as well. (Vail, 2006, p.14-15)

This research shows that there is a correlation between physical fitness and the ability of students to be successful in the classroom. Vail points out that physical activity helps students to concentrate, which in turn enables them to be more productive and successful (2008, p.13).

The literature highlights some key concepts pertaining to the effects of diet and exercise on the behavior and performance of students. One factor that is apparent throughout the literature is that improper nutrition can negatively impact that success of students. In some cases, improvements made to school meal programs were shown to have a positive impact on student attendance as well as performance. Another aspect that can be drawn from the literature is that correlation between physical activity and academic performance. Not only does exercise play a significant role in certain types of mental processing, but it also reduces stress and helps to boost self-esteem in young people.

Research Questions

In light of this research, I am left considering what the correlation is between the nutritional and exercise habits of children and their ability to focus and learn in class. The primary research question at the heart of this project is: What is the connection between a student's diet and level of physical activity to his/her ability to focus and succeed in the classroom? Secondary research questions include: How can teachers and parents be more active participants in improving the health of students? What can students do to be more active participants as well?

Methodology

Method/Rationale

This project employed a mixed-method approach, using both quantitative and qualitative methods. A quantitative study allows the researcher to test a hypothesis. If the sample of participants used for the experiment is randomly selected – and large enough – then the results can be generalized beyond the experimental group. One specific type of quantitative research is to determine co-variance, which uses data to understand a relationship. This method was an appropriate way to answer my research questions because I used behavioral analysis and charts to track the diets and exercise habits of the participants in order to look for a connection to classroom performance.

A qualitative study aims to first understand and then interpret things as they naturally occur. This type of study can involve observations, interviews, the studying of artifacts, etc. These pieces of data can all be used to gain insight into the topic of research in light of its complex natural surroundings. This method was also an appropriate way to answer my research questions because I needed data beyond the quantitative information that came from charts. I interviewed students and parents, as well as observed the students in the classroom, in order to obtain information about behavior and energy levels, etc.

Sample

Data was collected from a fourth grade class at a school in the Seattle area. This was my own classroom of students. Like any class, my students were all part of the same school community, but they did come from different family communities, which helped to diversify the data that I collected. During my data collection (participant observation, interviews, etc.), it was essential for me to keep in mind the effects that the varied lifestyles had on the sample. Although this sample did not provide an entirely

randomized selection of participants, it still allowed me to collect useful data for my research questions. Since my questions were aimed at understanding more about the dietary and exercise habits among young students, the age group of this sample was a good fit for my project. Also, elementary students are still at an impressionable age, which makes them good targets for research that could ultimately lead to creating positive change.

Instrumentation

I observed the classroom behavior and performance of the students in a fourth grade class. The aim was to see if either of them are connected to the students' dietary and exercise habits. Data collection came from a combination of measuring instruments. One instrument was text containing my own – the researcher – observations and notes of student behaviors. The second instrument was the text collected from verbal interviews with the participating students and parents. The third measuring instrument included the data collected from the logs that students used to track their diet and exercise habits over a specified period of time. Student interview questions included:

- (1) Do you usually eat a healthy breakfast in the morning before school?
- (2) How do you feel at the beginning of the school day, if you have not had breakfast?
- (3) Do you feel like you have more energy and are ready to learn after lunch?
- (4) Do you bring a lunch from home or do you have lunch provided by the school?
- (5) Do you enjoy playing sports and being active?
- (6) Do you feel that you can focus more or less in class, when you are playing a sport after school?

(7) Is there a point during the school day when you find it hard to focus? Maybe feel tired?

Parent Interview Questions:

(1) Do you notice anything different about your child's energy levels when he/she is participating in a sport?

(2) Have you ever noticed a positive change in your child's academic performance when he/she is participating in a sport?

(3) Do you make a conscious effort to prepare food for your child that will provide he/she with sustainable energy during the school day?

(4) Do you ever notice changes in your child's energy levels based on their eating habits?

I conducted individual interviews in the classroom before and after school and then transcribed the information. (All recordings will be permanently deleted by July 31, 2012.) Behavior and performance observations were made in class during the school day; I then analyzed it in reference to the other data collected to look for possible connections between diet/exercise habits and classroom behavior/performance. Similarly, the tracking charts of the students were used in collaboration with the other two measuring instruments in order to look for possible relationships. To ensure the protection and anonymity of all participants, I replaced names with letters, when making reference to specific students.

Analysis/Validity

I used thematic analysis to look for relationships among the different measuring instruments previously mentioned. In addition, I used numerical analysis when analyzing the charts that the participants used to track their dietary and exercise behaviors. For

each student, I looked for patterns within the chart, as well as possible connections to their classroom behavior and performance.

I triangulated by collecting data in a variety of ways, including observation, interviews, and charts. In addition, I collected my data for an extended period of time. I collected data from a number of sources, to ensure that personal observations were not the only data being analyzed. Finally, to extend validity, I make my own biases in this project clear. When thinking of biases, as a health-conscious athlete, nutrition and exercise have always played a central role in my life. I kept in mind that this is my personal mindset and that other individuals do not necessarily stress the importance of diet and nutrition in the same way.

Data

The chart below is a summary of the quantitative and qualitative data that was collected during the two-week tracking period. Eighteen fourth graders volunteered to participate in the study. Five of the participants were boys and the remaining thirteen participants were girls. Students one through six correlate with the six students who were interviewed at the close of this study. The selection of student participants was somewhat random, since there were twenty-five students in the class that was asked to participate. The performance and focus portion of the data is the result of my own observations of the student participants. The remainder of the data is a compilation of the information that the students recorded on their personal tracking charts.

Student	Overall quality of diet	Exercises daily	Generally focused and attentive in class	At least 1 fruit/vegetable per day
1	+	+	+	+

2	/	+	/	+
3	/	/	-	-
4	-	/	/	-
5	+	/	+	+
6	/	+	/	-
7	-	-	-	-
8	/	-	-	-
9	+	+	/	+
10	+	+	+	+
11	/	+	/	+
12	/	/	/	-
13	/	/	/	-
14	/	/	/	+
15	+	/	+	-
16	/	/	/	-
17	-	+	/	+
18	/	-	-	+

Chart Key:

+	good; yes; very
/	okay, sometimes
-	bad; no; never;

The excerpts below are from student and parent interviews, following the two-week tracking period. Six student participants were interviewed, along with one of their parents.

Student Question 1: Do you usually eat a healthy breakfast in the morning before school?

Student 1: Yes, some examples are homemade pancakes, French toast, and fried rice.

Student 2: Yes, toasted bagels and cereal.

Student 3: I always eat breakfast, usually cereal or toast.

Student 4: Sometimes I eat in the car since I wake up late. I eat toast or chicken strips.

Student 5: I always eat breakfast. I have smoothies, yogurt with granola, or waffles on the weekends.

Student 6: I normally have toast with peanut butter.

Student Question 2: How do you feel at the beginning of the school day, if you have not had breakfast?

Student 1: I feel unfocused without anything in my stomach.

Student 2: I always eat!

Student 3: I always eat breakfast.

Student 4: Sometimes I feel less energy if I don't eat breakfast. Sometimes I don't have time to eat.

Student 5: I always eat breakfast.

Student 6: I really don't know because I always have breakfast, but I think I would feel tired because I would not have my brain working.

Student Question 6: Do you feel that you can focus more or less in class, when you are playing a sport after school?

Student 1: I'm focused because I need to have less homework so I don't have a lot to do.

Student 2: I am more happy and energized than on the days that I don't have a sport after school.

Student 3: I feel more energized and ready to focus.

Student 4: I focus more in class. It feels more alert when I'm playing a sport and I get to get my energy out.

Student 5: I have more focus on days when I have practice for a sport.

Student 6: More, because I know that I can get all my energy out in a little bit so it's easier to pay attention in class.

Parent Question 2: Have you ever noticed a positive change in your child's academic performance when he/she is participating in a sport?

Parent 1: Yes, sports give him confidence and teach him how to be a team player – works well and tolerates different personalities in school settings.

Parent 2: He is such a consistently active kid, that there is no fluctuation. Sports give him the chance to get out aggression and anger, which helps him focus.

Parent 3: No.

Parent 4: No.

Parent 5: She is typically in a sport at any given time. Her school performance is continually strong.

Parent 6: No.

Parent Question 4: Do you ever notice changes in your child's energy levels based on their eating habits?

Parent 1: No, not at this time since he eats almost all homemade meals. 90% of the time are all homemade meals from scratch. Ready-made snacks are selected and moderation is always emphasized at home.

Parent 2: No, he is a consistently good eater.

Parent 3: Yes, too much sugary food makes her hyper. When she eats well-balanced meals she has more energy and better demeanor.

Parent 4: Yes, her energy levels are directly related to what she eats. In addition, because of the difficulty she has with many foods, she reacts very differently to different foods.

Parent 5: She is a pretty good eater. She eats 3 meals a day and can gauge when she is hungry for a snack.

Parent 6: No.

During the two-week tracking period, observation notes were made throughout the school day. I observed the participating students first thing in the morning, before and after recess, and before and after lunchtime. Participants were observed during lunch: how much was eaten; what was eaten; how well student focused on eating. Notes were recorded periodically throughout the school day, in order to keep track of student behavior and ability to focus on schoolwork.

Overall, I noticed that those students who were focused and respectful in class were also the students who took the time to eat good, healthy lunches. These same students were also the ones who were active during their recess times. Taking a closer look at the six focus students, who were interviewed, I observed that Student 1 consistently ate a good, balanced lunch and was always on-task and ready to learn immediately following lunchtime. Every day at recess, this student usually played soccer

or basketball, both of which provided a good amount of exercise. Student 2 was most focused in the morning. This student entered the room each day with an eagerness to learn. One day, I noted that Student 2 was, “very focused first thing in the morning during seatwork time. He completed his seatwork promptly, carefully, and quietly”. Although this student was respectful and generally focused throughout the school day, he was typically too distracted to finish his lunch, which sometimes proved to negatively impact his attention during the afternoon. Student 2 came back from every recess sweating profusely and in need of water, which was a clear indication of the physical activity that he was getting. Student 5 demonstrated a very consistently strong work ethic and focus throughout each school day. This student was not a big eater, however her meals were generally balanced and healthy. Although Student 5 did not always engage in extreme physical activity at lunchtime, she clearly enjoyed talking about her after-school athletic events with classmates. Student 6 usually took the time to sit down and eat the contents of her lunch, which only lacked in the fruits and vegetables category. She chose to engage in some form of activity during most recesses and returned to the classroom to grab her water bottle before finding her seat. One day, I recorded that, “At lunch recess, I watched her play really hard; she was especially focused and attentive during the afternoon lessons”.

On the other hand, the students who struggled to focus on their schoolwork and/or were disrespectful during lessons, were the ones who either did not take the time to sit down and eat a solid meal at lunchtime, or were inactive during recess times. Student 3 typically started the school day with a lack of focus. One day, I noted that she “was not completing work on time and was not focused during instruction or during her

lunchtime”. Student 3 frequently distracted the students sitting around her, which required me to constantly remind her to stay on task. Student 4 was generally focused during class and regularly returned from recess hot and sweaty. However, her poor eating habits seemed to negatively affect her energy levels and attention during lessons. Once, during lunch, I noted that, “For the third time, she is having fried chicken and French fries that her mom dropped off”.

Analysis

The student participants did a good job of recording the required data in their charts. Some students provided more detail than others, but all eighteen participants completed the process. Overall, there was a lack of fruits and vegetables in the student’s diets. A few students consistently recorded one fruit and/or vegetable serving per day; however, most students recorded eating none. Most participants consumed a large amount of carbohydrates, according to the tracking charts. More often than not, the carbohydrates were coming from fast food meals or other quick and easy foods. The majority of the participants reported eating breakfast, even if it was just a bowl of cereal or an unhealthy meal. This was an encouraging piece of data, since breakfast is such an important energizing meal for the school day. Lunch was consistently the meal that students recorded to be their healthiest and most balanced meal of the day. However, their lunches were still primarily made up of carbohydrates and snack foods. As noted in the data chart above, about nine of the participants recorded daily fruits and vegetables in their diets. Of those nine students, only a select few recorded eating both fruits and vegetables. Overall, the male participants recorded more balanced and complete meals than the female participants.

Slightly more than half of the participants were able to record some form of physical activity for each day during the two-week period. This activity ranged from P.E. and recess exercise to team sports and independent athletic endeavors. Three of the eighteen participants did not record any organized or team sports. Only seven of the fifteen that did record playing on teams practiced at least five times per week. The remaining eight students recorded that they participated in a team sport some days after school.

The part of the tracking chart that the participants struggled with the most, was the “feelings/energy levels” column. Some students attempted to provide a thoughtful response, but most answers were general, repetitive, one-word answers. As a result, this column did not provide any insightful feedback to use as data.

As mentioned at the conclusion of the literature review, the aim of this research was to explore the possibility of a connection between the diet and exercise habits of fourth grade students and their ability to focus and perform in the classroom. Although it proved challenging to come to any concrete conclusions with the data that was collected, there are a few noticeable trends that became apparent. The observation notes produced two particular trends among the participating fourth graders. The first was that many of the students were either easily distracted by their peers during lunchtime, or they were simply picky eaters. As a result, those students did not focus on eating enough to refuel their bodies for the remainder of the school day. Interestingly, I noted that many of the poor eaters were also the ones who chose to be more sedentary during recess time. The second trend was that those students who consistently ate well and exercised during recess, were the ones who focused and succeeded in the classroom.

The students who were chosen to be interviewed represent the different trends of the participant population. The interview data shows that both students and parents are at least somewhat aware of the connection between diet and exercise and the ability of students to focus and perform in the classroom. The focus students who demonstrate the second trend are Students 1, 2, 5, and 6, with Students 1 and 5 being the strongest representatives. Student 1 is a very strong student, who is always on-task and focused during the school day. This student's regular exercise and healthy diet support this performance. During the interview process, in response to a question about how sports affected his ability to focus in school, Student 1 said, "I'm focused because I need to have less homework so I don't have a lot to do". This statement shows a strong awareness for how his commitment to sports motivates him to be successful in the classroom. Student 5 is another strong student. Although this student does not exercise daily, she is active and typically participating in a sport. Similar to Student 1, the diet and exercise habits of Student 5 are directly related to her performance in the classroom. The parent of Student 1 shared that her daughter, "is typically in a sport at any given time. Her school performance is continually strong". As mentioned in the data section, I observed that although Student 5 did not always engage in athletics during recess, she spoke passionately about her after school sports. Student's 2 and 6 do not have perfect dietary habits, however their regular exercise contributes to their generally on-task behavior in class. Parent 2 shared that her son, "is such a consistently active kid, that there is no fluctuation. Sports give him the chance to get out aggression and anger, which helps him focus". This coincides with my own observations of Student 2 returning from recess hot and sweaty and in need of water. Student 6 may not have a perfect diet, but at least she

understands the importance of nurturing her body. My observation notes indicated that she typically took the time to eat the contents of her lunch. Further, Student 6 shared some important data when asked about how she would feel if she did not eat breakfast before school. She said, "I really don't know because I always have breakfast, but I think I would feel tired because I would not have my brain working". This shows that Student 6 is aware of the connection between diet and the ability to function in school.

Student's 3 and 4 clearly represent the first trend of the participant population. These two student's are lacking in both the diet and exercise categories. Student 3 does not play any organized sports after school and has an average to poor diet. In addition to the fact that the chart data for Student 3 indicates a lack of exercise and poor eating habits, my observations note that she "was not completing work on time and was not focused during instruction or during her lunchtime". By connecting these two pieces of data, it is apparent that this student's poor eating and exercise habits are reflected in her academics and classroom behavior. Student 4 participates in a sport a couple of days a week and has very poor eating habits. In my interview with this student, she reported, "Sometimes I eat in the car since I wake up late. I eat toast or chicken strips." This statement is consistent with my observation notes, when I recorded that, "For the third time, she is having fried chicken and French fries that her mom dropped off". These kinds of meals do not provide Student 4 with the nutritional value that is needed in order to be alert and successful in the classroom. These two students struggle in different ways throughout the school day. Student 3 has a difficult time paying attention and is easily distracted, whereas Student 4 appears to be on-task but struggles to be successful academically. The data from these six focus participants show a strong correlation

between dietary and exercise habits and the ability of students to focus and perform in the classroom.

Recommendations

The trends suggested by this study demonstrate the importance of regular exercise and healthy diets in the lives of elementary students. Students need healthy and sufficient nutrients in their bodies as well as frequent exercise because both factors play significant roles in the ability of students to focus and perform in the classroom. Students should be encouraged to participate in sports. Parents should take the time to ensure that their children are getting proper nutrients in their diets. Teachers need to make certain that students use their lunchtime to refuel their bodies, rather than to socialize with their peers. These simple recommendations could lead to positive changes in the ability of young students to focus and perform in the classroom.

Although the data collected in this study does suggest that diet and exercise are important factors in the academic lives of fourth graders, the most important recommendation that I have is to continue research on this topic. The collection of further data will strengthen the concept that there is a correlation between diet and exercise and the ability of students to focus and succeed in the classroom.

Conclusion

This project looked further into the relationship between students' diet and exercise habits and their ability to focus and be successful in the classroom. Through this work, I hoped to increase the awareness – for educators, students, and parents – of this connection in order to benefit the health and success of students. Elementary students are young enough to make important life changes; however, they depend on the help and

support of parents, teachers, and other positive role models in their lives. The development of healthy diet and exercise habits at a young age creates a strong foundation for the success of students.

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Appendix 1:

My Exercise and Meal Tracking Chart

**It can be exciting and interesting to look closely at how active we are and to pay attention to what we eat! During these next 2 weeks, think about how you feel during the day. Do you have more energy in the morning or at night? Do you feel most focused in school right after you eat a meal? Do you feel better after getting exercise?*

What do I need to do?

Meals: You do not need to change anything that you normally do. For 2 weeks, you will write down everything that you eat for breakfast, lunch, and dinner. Also, write down any snacks that you have throughout the day. Remember to include everything! That means what you drink with your meals too!

Time: You will notice that under each meal, there is a place to record the “time”. This can just be an approximate time that you normally eat these meals.

Exercise: You will write down any exercise that you do each day. This can include 30 min. of playing tag during recess at school or 30 min. of P.E. Remember to include any sports that you play! Maybe you have 1 hour of practice each day and a game on the weekend.

***For this category, please try to record:** what activity you did
how long it lasted
what time it started at

Feelings: This category is for you to make a few notes about your energy levels during the day. For example, you may feel that you had a lot of energy on Monday and therefore, you were able to get a lot of exercise and pay attention in class. Or maybe, on Thursday, you had a hard time focusing in the morning because you didn’t eat breakfast.

**Please let me know if you have any questions!*

Appendix 2:

	Breakfast	Lunch	Dinner	Snacks	Exercise	Feelings/Energy Levels
Approximate Time of Meal						
Wednesday May 9						
Thursday May 10						
Friday May 11						
Saturday May 12						
Sunday May 13						
Monday May 14						
Tuesday May 15						

Appendix 3:

Sample Student Interview Questions

Do you usually eat a healthy breakfast in the morning before school?

How do you feel at the beginning of the school day, if you have not had breakfast?

Do you bring a lunch from home or do you have lunch provided by the school?

Do you feel that you have more energy and are ready to learn after lunch?

Do you enjoy playing sports and being active?

Do you feel that you can focus more or less in class, when you are playing a sport after school?

Is there a point during the school day when you find it hard to focus/feel tired?

Sample Parent Interview Questions

Do you notice anything different about your child's energy levels when he/she is participating in a sport?

Have you ever noticed a positive change in your child's academic performance when he/she is participating in a sport?

Do you make a conscious effort to prepare food for your child that will provide him/her with sustainable energy during the school day?

Do you ever notice changes in your child's energy levels based on their eating habits?

Appendix 4:

Consent form: The Effects of Diet and Exercise on
Elementary Classroom Behavior and Performance

I am conducting research on the relationship between student diet and exercise and their performance in class. If you decide to participate in this study you will track your eating and exercise habits for a few weeks. This study will last approximately 2-3 weeks.

This study involves minimal risk. All of your responses will be represented by a letter, instead of your real name. If you choose to take part in this study you will benefit by gaining a better understanding of how your eating and exercise habits might affect your ability to pay attention and perform well in class. Taking part in this study is up to you, and you will not be penalized in any way if you choose not to participate. If you do take part, you may stop at any time. This project has been approved by the Human Subjects Review Board at Northwest University.

If you have any questions or comments about this study please contact me at (707/227-5387) or the Chair of the Human Subjects Review Board at (425/889-5248).

You will receive a copy of the form.

Sincerely,

Elizabeth Phelps
MIT Student

I agree to take part in this project. I know what I will have to do and that I can stop at any time.

Signature

Date

Parent/Guardian Signature

Date