The effects of breakfast on the school-aged child

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THE EFFECTS OF BREAKFAST ON THE SCHOOL-AGED CHILD

by

Alicea J. Davis

A Thesis

Submitted in partial fulfillment of the requirements of the Master of Arts Degree of The Graduate School at Rowan University

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Approved by

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ABSTRACT

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THE EFFECTS OF BREAKFAST ON THE SCHOOL-AGED CHILD
2001/02
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Master of Arts in School Psychology

The purpose of this study was to examine the relationship between eating a nutritious breakfast and academic performance. The sample consisted of 20 Second Grade Students, 12 males and 8 females, attending an elementary school in an urban school district. The subjects ranged in age from 7 to 9. Five males and two females were of Hispanic descent. Seven males and six females were of African American descent. The participants were given the Kaufman Test of Educational Achievement to determine if the children were on grade level. A daily log of what each child ate for breakfast and a daily log was kept identifying their academic performance for the morning. The Spearman Rank Order Correlation Coefficient was used to determine significance. It was concluded from the nineteen-day study that on fourteen of those days there was no significance in eating a nutritious breakfast and displaying good academic performance. However, on five of the days there was significance in the relationship between eating nutritious breakfast and positive academic performance.
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# Table of Contents

Acknowledgements ........................................................................................................ iii

Chapter 1: The Problem
- Need ......................................................................................................................... 1
- Purpose ...................................................................................................................... 2
- Hypothesis ................................................................................................................ 2
- Theory ....................................................................................................................... 3
- Definitions ................................................................................................................ 5
- Assumptions .............................................................................................................. 7
- Limitations ................................................................................................................ 7
- Overview ................................................................................................................... 7

Chapter 2: Review of Research
- Introduction .............................................................................................................. 9
- Nutrition as it Relates to Children ........................................................................... 9
- Nutrition as it Relates to Adults ................................................................................ 13
- Nutrition as it Relates to Socioeconomic Status ..................................................... 14
- Nutrition as it Relates to the Media ......................................................................... 16
- Summary of Research ............................................................................................. 18

Chapter 3: Design of the Study
- Sample ...................................................................................................................... 19
- Measures ................................................................................................................... 19
- Design ....................................................................................................................... 20
- Method ...................................................................................................................... 20
- Testable Hypothesis ................................................................................................. 21
- Analysis ..................................................................................................................... 21
- Summary .................................................................................................................. 22

Chapter 4: Analysis of Data
- Overview ................................................................................................................... 23
- Sample Characteristics ............................................................................................ 23
- Testable Hypothesis ................................................................................................. 25
- Summary .................................................................................................................. 29

Chapter 5: Summary and Conclusions
- Summary ................................................................................................................... 30
- Conclusions .............................................................................................................. 30
- Discussion ................................................................................................................ 31
- Implications for Further Research ........................................................................... 32
- References ............................................................................................................... 33

Appendix A: Informed Consent Form ........................................................................ 35
Appendix B: Personal Data Sheet .............................................................................. 36
Appendix C: Daily Breakfast/Academic Log .............................................................. 37
List of Tables and Charts

Table 4.1: Characteristics of the Sample .................................................... 23

Figure 4.1: Distribution of Sexes Within Ethnicity ......................................... 24

Figure 4.2: Distribution of Mean Scores on the KTEA Within Ethnicity ............... 25

Table 4.2: Spearman’s Correlation Coefficient of the Fourteen Non-Significant Days ............................................................. 26

Table 4.3: Spearman’s Correlation Coefficient of the Five Significant Days ............ 27

Figure 4.3: Number of Times Each Breakfast Category Was Chosen .................... 28

Figure 4.4: Number of Times Each Academic Category Was Chosen .................. 29
Chapter 1

Need

A consistently growing number of children come to school facing a variety of adverse circumstances. They possibly show up unclean, mentally troubled, scared, sleepy, and/or academically immature. However, they are still expected to achieve. Amongst the several diversities is the lack of a good breakfast. More and more children are showing up to school without eating a nutritious breakfast. The lack of a nutritious breakfast can profoundly affect a child in several ways. In fact, a variety of research has shown that a lack of good nutrition can affect school attendance and tardiness, cognitive development, academic achievement, concentration, test scores, behavior, and hand-eye coordination.

The American Dietetic Association reports that skipping breakfast has an adverse effect on the problem-solving ability of children, particularly, their ability to recall and make use of newly acquired information. If that be the case, then the children who come to school hungry, must struggle in many subjects, as well as everyday life situations because problem solving encompasses all.
**Purpose**

If a child doesn’t eat a nutritious breakfast, will it affect the child’s ability to achieve in school? An educators’ adeptness to understand the relationship of a good breakfast and the academic potential of a child can be astounding. Educators can begin to understand why a child who appears to be able, isn’t reaching his or her full potential. Educators can assist by encouraging the parent to see that their child does not come to school hungry. Parents can achieve this goal by providing the child with a nutritious breakfast. The purpose of this research is to examine effects of a good breakfast on the school-aged child.

**Hypothesis**

It is hypothesize that the lack of a good breakfast will adversely affect a child’s academic ability. The study will consist of four weeks and it will be conducted on a Second Grade class in an urban school district. During the four weeks, a log will be kept of the food(s) that each individual child eats for breakfast. Also log will be kept of each individual child’s academics. In the end, the intention is to investigate and show that the lack of a nutritious breakfast has a profound negative affect on a child’s academic achievement.
Theory

Much of the research that has been done demonstrates that a child must have good health for optimal educational achievement. Jacobson et al. (1959) states that inadequate nutrition is an obstacle to learning. A child that does not receive good nutrition cannot do well in school because they are not alert and they have poor posture. The children who are severely malnourished have unusual skin conditions, dark circles under eyes, tend to be irritable, and have extremely dull skin (Jacobson et al., 1959). According to Cameron (1970), extreme and prolonged, as well as short and lesser degree of nutritional deficiencies can affect the central nervous system, which in turn will interfere with learning and performance.

The lack of specific nutrients can have a negative effect on a child’s health. The lack of thiamine causes anxiety, irritability, and depression. Insufficient iron results in lowered hemoglobin, thereby reducing oxygen carried to the brain by blood flow. Even very mild forms of under-nutrition are accompanied by an increase in motor restlessness (Cameron, 1970). A child is less responsive to his environment when he is malnourished. According to Hatwood-Futrell et al. (1989), under nourished children are less physically active, less attentive, and less independent and curious. They are more anxious and they cannot concentrate well. As a result, their reading ability, verbal skills, and motor skills suffer. Iron deficiency anemia is a specific kind of under nutrition and is one of the most prevalent nutritional problems in the U.S., especially among children. Even mild cases lead to shortened attention span, irritability, fatigue, and decreased ability to concentrate. Anemic children do poorly on vocabulary, reading, mathematics, problem-solving, and
psychological tests (Hatwood-Futrell, 1989). According to Reed (1973), teachers report that hungry children are apathetic, inattentive, or disruptive in school.

According to Conners (1989), breakfast is very important for both behavior and learning. He believes that food doesn’t just impair performance, but it can also enhance it. Sometimes clinicians seldom consider how diet may be affecting the child’s ability to maintain a steady flexible level of performance. Paying attention is a very complex process. A child’s ability to pay attention is affected when they are hungry or malnourished. It is believed that the first meal of the day could drastically alter learning, brain function, and behavior. Some of the things that children eat for breakfast can be harmful to their moods and optimal success. Certain vitamins and nutrients are vital for providing the child with the building blocks needed for good health.

Powers et al. (1978) states that there are a number of signs that may tip you off that a child is not receiving proper nutrients. Irritability is usually caused by a B-complex deficiency. Inattention, poor concentration, loss of interest in schoolwork and failing grades is also associated with a B-complex deficiency. Protein deficiency is highly present among affluent and less fortunate families. If a child does not receive the proper amounts of protein, you can rest assure that they aren’t receiving essential amino acids. In some cases, and over load of carbohydrates can lead to an imbalance of serotonin in the brain. Serotonin is a neurotransmitter. Neurotransmitters are chemical substances in nerve tissue that is responsible for communicating from the neurons to other cells in the brain, muscle, or other parts of the body. Large amounts of serotonin can cause mental upsets (Powers et al., 1978).
Time and time again, the recurring theme associated with nutrition is the importance of eating a nutritious breakfast. The theories, as well as the research, have had an astounding effect on the reasons why children don’t do well in school. Inadequate nutrition has affected a child’s mental health as well as their physical health. Making sure a child is provided with a nutritional breakfast is a start to seeing that the child has the best possible chance to succeed in school.

Definitions

Throughout this paper, there are words that you will come across that may have a different connotation than expected. I have provided a series of words with their definitions as they are used for this context.

Amino Acids are organic acids containing one or more amino groups, especially any of a group that make up proteins and are important to living cells. Some can be synthesized by the body’s non-essential amino acids and others must be obtained through the diet.

Anemic is a term derived from the word anemia. Anemia is a blood condition in which there are too few red blood cells or the red blood cells are deficient in hemoglobin, resulting in poor health.

Carbohydrates are sugars, starches, and cellulose. They are an important source of energy for humans and animals. Some examples are bread, pasta, or potatoes.

The central nervous system, excluding the peripheral nerves consists of the brain and spinal cord. It controls and coordinates most functions of the body and mind.
Impulses from sense organs travel to the central nervous system and impulses to muscles and glands travel from it.

A good breakfast consists of a fluid serving of whole or low fat milk served as a beverage or on cereal or used in part for each purpose, a serving of fruit or vegetable or both, or undiluted fruit or vegetable juice, and two servings from the bread and/or the meat group.

Hemoglobin is an iron-containing protein in red blood cells that combines reversibly with oxygen and transports it from the lungs to body tissues.

Hunger is a physiological and psychological state resulting when immediate food needs are not met.

Malnutrition is a lack of healthy foods in the diet or an excessive intake of unhealthy foods, leading to physical harm.

Neurons are nerve cells, typically consisting of a cell body, axon, and dendrites, which transmits nerve impulses and is the basic functional unit in the nervous system.

Nutrients are any substance that provides nourishment and keeps a human body healthy and helps it to grow.

A psychological test is a standard measure use to assess behavior.

Serotonin is a neurotransmitter, which is a chemical derived from the amino acid tryptophan, which is widely distributed in tissues. It constricts blood vessels at injury sites, and may affect emotional states. LSD and certain anti-depressants work by interfering with serotonin in the brain.

Thiamine is a B vitamin, found in grains, meat, and yeast. It metabolizes carbohydrates and has been found to prevent beriberi and diseases of the nervous system.
Under-nutrition is the result of prolonged lack of food.

Vitamin B-complex is a group of water-soluble vitamins found in yeast, seed germs, eggs, liver, and vegetables.

Assumptions

Throughout this study, it is assumed that the sample size is a random sample of second grade students from H. B. Wilson Elementary School in Camden, NJ. It is also assumed that the subjects are accurately and honestly identifying what they ate during the four-week study. Each test of achievement was given in a standardized fashion.

Limitations

As with any study, there are limitations to the research being conducted. A major limitation is the time in which one has to conduct a study for a master thesis. Another limitation is the sample size and the fact that it is much smaller than expected. This is a result of the time constraints and lack of available of funds. Also, this study was conducted using one, second grade class, from one school district. The sample size didn’t consist of equal amounts of males and females, nor did it include a variety of ethnic backgrounds. These limitations make it difficult to generalize the findings.

Overview

In Chapter 2, there will be an analysis on the intensive review of research relating to breakfast as it correlates to learning and achievement in children. Chapter 3 will follow chapter 2, where the research design or methodology will be described in detail.
The sample population, sample size, measures used, and the design of the study will be illustrated in detail. In Chapter 4, the findings that were developed during the study will be examined and presented. Chapter 5 is the last chapter and it will contain a summary and conclusion of the study as a whole. It will also indicate recommendations and implications for further research.
Chapter 2

Introduction

There have been a significant number of studies on the value of good nutrition and its relationship to the cycle of life. In this chapter, previous research will be analyzed and presented in order to the relevance to the current study. The organization of the chapter will be divided by sub-headings, which will flow from greatest to least in relevance. Last, but not least, a summary of the review of relevant studies will conclude the chapter.

Nutrition as it Relates to Children

According to the American School Board Journal (1998), The Center for Applied Research and Educational Improvement at the University of Minnesota conducted a study whereby they offered free breakfast to all students at six elementary schools in Minnesota. The study showed when all students are involved in school breakfast there is a general increase in learning and achievement. The schools reported a 40 to 50 percent drop in discipline referrals and improvement in test scores, attendance, and other measures of educational achievement. When the project funding ran out, and breakfast was no longer available, teachers reported problems in learning readiness increased again.

Also, according to the American School Board Journal (1997), pediatrician Nachum Vaisman of Kaplan Hospital in Rehovot and his co-workers conducted a study
showing that children who ate breakfast at school did better on test of memory and learning than children who ate breakfast at home or didn’t eat breakfast at all. The study consisted of 569 children age 11 to 13. After giving the children a series of test, the researchers assigned two-thirds of them to a breakfast of sugar cornflakes and milk at school for two weeks. At the end of the study, they retested the children, administering the test just 30 minutes after the school-fed children had completed their meals. On each ten different measures of memory and learning, the children who ate at school performed better then those who had eaten at home or not at all. The team suspected that the school fed children did better because of the increase in blood sugar.

Stein et al. (1994) examined the effects of improved breakfast nutrition on students’ academic achievement. One hundred forty two intermediate school children were given breakfast. The Gates-MacGinitie Reading Test Form 1, Levels A-D were given to the children and they were ranked according to their total reading scores. The experimental group had a different menu each day. The menu consisted of a variety of high-density carbohydrates and protein. A standard breakfast of fruit or juice, milk, and a packaged cereal were given to the control groups. At the conclusion of the experimental period, all children were tested on an alternate form of the Gates-MacGinitie Tests and results were compared. The two groups switched roles during the second semester of school. Again, the children were tested with the alternate form. The results showed that the experimental group showed an average gain of seven months, while the control group gained 5.25 months.

Furman et al. (1983) investigated attitudes, behavior, and mathematics achievement of 200 second through fifth grade children who received a midmorning
snack of nuts and raisins. It was hypothesized that a nutritious snack would counter low blood sugar in children who consumed a high sugar breakfast or had no breakfast at all. Experimental subjects were randomly chosen from 2,000 students who received a snack and were compared with 200 chosen controls who did not. The teacher rated the experimental control and control groups on behavior in October and May. The California Test of Basic Skills for Mathematics and the U.C.L.A. Test of Student Attitude were also administered. The experimental group showed more growth in mathematics scores over the year and somewhat less distracted and disruptive behavior, but these results were not statistically significant. However, there was a statistical difference between experimental and control groups on the attitude scale for the second and third grade students. It was concluded that a nutritious snack is a worthwhile intervention.

Pollitt et al. (1984) conducted a study that focused on the nature of the physical growth-behavioral development as it is associated in well nourished and is compared with undernourished populations. Calculations were developed for multiple regression analyses to determine the magnitude of IQ. Physical variables and socioeconomic status indicators were assessed in a group of 3 to 6 year old children from Cambridge, Massachusetts. There wasn’t a noticeable prevalence of malnutrition in this study. Weight and height percentiles were the only physical growth measure that explained a significant portion of the IQ variance. In the undernourished population, height was a reflection of nutritional history. Physiological maturation was a result of weight for height in well-nourished populations.

Swensson (1990) participated in a 12-week practicum intervention, designed to improve classroom performance of 17 elementary school children who experienced
difficulties in learning and behavior. The children were offered nutrition instruction in hopes of improving nutritional practices in the home. The students had to agree to eat a nutritious breakfast each morning, limit sugar intake, eat nutritious snacks, eat more vegetables and whole grains or protein rich foods, and attend nutrition education classes two or three times a week. Observations of classroom behaviors were conducted. The Wide Range Achievement Test (pre and post) and the Nutrition Quiz (pre and post) were used to determine the effectiveness of the intervention design. Classroom observations revealed that 50 percent of the students had improved in behavior and were enjoying increased academic success. Most of the children who altered their eating habits scored higher on the posttest of the WRAT than those who had not.

Iron deficiency is a very prominent form of nutritional deficiency. Iron deficiency is deadly for children ages one to three years of age. It can cause a child to be clumsy, hyperactive, and lack concentration. Behavior disorders is also prominent among iron deficient children. Driva et al. (1985) conducted a study at the Matera Baby Centre in Athens, Greece. The study was designed to show that the administration of iron treatments would have a favorable effect on psychomotor development. The sample consisted of 48 children, ages 3 – 25 months, suffering from iron deficiency. The children were divided into three groups (A, B, and C). The children were given the Motor Development Test of the Bayley’s Scale for Infants and the Mental Development Test of the Bailey’s Developmental Scales for infants before and after iron treatments. Each child’s Hemoglobin, Hematocrit, and Ferittin levels were recorded both before and after the iron treatments. For the psychomotor portion, there was no significant
difference. However, for the mental portion, there was a significant difference after the iron treatments were administered.

Espinosa et al. (1992) conducted a study assessing the food intake of school-aged children in relation to playground behaviors. The study consisted of 111 children in the Embu District of Eastern Province, Kenya. Preliminary testing revealed that the children did not have auditory, visual, mental, or motor handicaps. The average age of the children was 7.4 years old. Food intake, height, weight, family characteristics, duration of schooling and attendance, and playground behaviors were the areas that were assessed. The food intake surveys indicated that these children were mildly malnourished. The results showed that the children who consumed more food tended to show a more positive effect. They showed more leadership behavior. The children who were less fed were more anxious.

Nutrition as it Relates to Adults

Even adulthood nutrition is equally important. The food habits of adults can greatly influence optimal health, body functioning, and chronic diseases. Adults who are well nourished feel better and healthier, have more energy, and are better able to withstand psychological and physiological stress than people who do not receive adequate nutrition. There have not been a lot of studies with adults linking good nutrition and adulthood. In this section two studies will be discussed associating nutrition with various variables.
Sobel et al. (1986) conducted a study involving nutritional supplements and the elderly in a retirement home. They hypothesized that the people who don’t use nutritional supplements would have poorer health. Two hundred eighty six ambulatory residents completed a questionnaire. The questionnaire probed for prevalence, frequency, duration, and type of supplement. Reportedly, the supplement users reported less health related problems. The non-supplement users reported more health related problems.

Johnston et al. (1991) investigated caloric levels and its effect on ruminating (chronic regurgitation, chewing, and/or swallowing). The sample size consisted of three mentally retarded people residing at a state institute. The participants were fed the high calorie diets and were monitored. They were also fed normal meals and were monitored. Each participant’s mean score of ruminating was lower when they consumed high calorie meals. However, any increase in the amount of calories, comes increased weight, unless an exercise regimen is incorporated.

**Nutrition as it Relates to Socioeconomic Status**

There are many contributors to the lack of good nutrition. Research has shown that less affluent families often do receive proper nutrition. In this section, several studies will be discussed in relation to nutrition and socioeconomic status.

Cook et al. (1995) conducted a study by comparing nutritional intakes of non-poor vs. poor children ages 1 – 5. The data was collected via the United States Department of Agriculture Nationwide Food Consumption Survey. The recommended daily intake allowance had to be above 70% in order to be considered adequate.
Household income had to be above 130% of the poverty threshold to be considered non-poor. It was reported that poor children lacked 10 out of 16 nutrients. Dietary inadequacy was related to iron deficiency and anemia, stunting, and wasting.

Bhargava (1998) identifies socioeconomic status as one of the key contributors in low cognitive scores. He surveyed 292 households with children ages 6 to 9. Three times during the academic year children completed cognitive tests. School attendance was also recorded. The dietary intake was recorded and calculated for each of the three surveys. An index of the socioeconomic status of the families was designed. It was concluded that the families’ socioeconomic status negatively affected cognitive test scores.

Wilton et al. (1983) conducted a study assessing socioeconomic status as it relates to dietary intake of mentally retarded children, non-retarded children of low socioeconomic status, and non-retarded children of average socioeconomic status. Ten children were assigned to each status group. During a visit to the subject’s homes, all the nutritional data were gathered using a structured interview form. Information was also collected concerning the families’ income, budget, and food preparation routines. The researcher concluded that the mean family income for the average SES group was higher than those for the low SES group and the retarded groups.

When Richter et al. (1986) conducted surveys, it was discovered that one of major differences between 135 hospitalized infants and 296 adequately nourished infants was socioeconomic status. The infants were between the ages of 2 and 26 months. The parent’s educational and occupational levels were used to represent the socioeconomic status. It was reported that the mothers of malnourished children achieved significantly
lower levels than the mothers of adequately nourished children on both measures. The mothers of the malnourished children worked manual jobs and received a lesser amount of education.

**Nutrition as it Relates to the Media**

There are several media outlets such as: radio, TV, newspapers, magazines, billboard displays, the Internet, and even food labeling. The question is, what role does these types of media play in nutrition? In this section, it is intended to discuss three articles that gives us a heads up on the role that the media plays in relation to nutrition and/or nutrition awareness.

Reece et al. (1989) argues that may shoppers don’t understand the meaning of certain key descriptive terms (low calorie, reduced-calorie, and diet) used in brand name food products, which in turn leads to nutritional deficits. The selection of the products under study were retrieve from the 12 most recently editions of the Better Homes and Gardens. Advertisements were collected with a title of low calorie, diet, or low fat, lean, lite, lo-sugar, sugar free, trim, natural, plus, and had a brand name attachment. In the end, 52 advertisements were part of the study. Of the 52 ads, 22 provided a complete explanation of the key word (i.e. lo-fat), 10 gave a partial explanation and 20 gave no explanation. As a result, the consumer has to infer the meaning of the key terms. This is often referred to as “claim belief interaction”, which means that advertisement interacts with the accumulated beliefs of the consumer, that is, it deceives them. In this case, the consumer is being fooled into thinking that they are eating a healthful product.
Larson (1989) conducted a study analyzing the effects of television on family nutrition and eating habits. The aim of this study was to describe the eating habits of popular shows and link them to the nutritional messages they send. The researcher examined The Cosby Show, Growing Pains, and Family Ties. Nine episodes of each show were reviewed. The shows were analyzed by what was eaten or drank, who was eating it or drinking it, and whether it was eaten or drank as a snack or a meal. Two hundred servings were recorded at the end of the study. Sixty percent of them were deemed healthy. Fifty percent of them were deemed snack items. In reviewing the shows, it seems that the children ate more healthful than the adults. It can be concluded that pre-adolescent and adolescent viewers can develop good nutritional habits.

Peterson et al. (1981) choose four kindergarten classes and divided them equally into two groups. One group was the control group and the other was the experimental group. There were 28 children per group. Children in the experimental group watched 5 pro-nutritional videotapes that stressed healthy eating habits. The control group did not view any tapes at all. The researcher used the Behavioral Eating Test, the Pretend Eating Test, and the Nutritional Information Test. The children in both groups were given a pre- and post-test on each measure. At the conclusion, the researcher identified that there was no significant difference in the experimental group’s scores after viewing the nutritional tapes. However, it was mentioned that there was a nine-week interruption in the study due to a volcano eruption.
Summary of Research

Previous research was discussed and reviewed at length in this chapter. Most of the research supported that methodological problems are associated with nutrition deficits. Nutritional problems have been directly related to the lack of breakfast, better yet, the lack of a nutritious breakfast. Increased blood sugar levels have been associated with a child’s ability to thrive academically in school. Attitudes, behavior, and mathematics scores have change for the better as a result of providing children with nutritious mid morning snacks while they’re in school. The weight and height of a child in relation to maturation plays a significant role in the process of developing a well-nourished child. Iron deficiency has been associated with poor motor skills and a under developed mental capacity.

Good nutrition in adulthood must not go unnoticed. Adults need good nutrition for optimal health. It enables them to feel better and healthy. Nutritional supplements can assure that one is receiving the daily allowances of vitamins and minerals. Good nutrition is also helpful for special populations, such as the mentally retarded.

There are other variables linked to under-nutrition. Socioeconomic status is another. The nutritional intake of people with a low socioeconomic status is astounding. They almost never meet or exceed vitamin and mineral intakes. Also, the media is a guilty culprit in the process of socializing good nutritional practices. Society can pick negative nutritional values through radio, TV, magazines, and billboards. In retrospect, these same media tools can teach and enhance nutritional principles.
Chapter 3

Sample

The sample consisted of 20 Second Grade students, 12 males and 8 females, attending an elementary school (Grades K-4) in an urban school district. The subjects ranged in age from 7 to 9 with the mean age of 8. Five males and two females were of Hispanic descent. Seven males and six females were of African American descent.

Measures

Because of the time constraints of the study, the Kaufman Test of Educational Achievement Brief Form (Mathematics and Reading subtests) was picked as the instrument to measure if any of the students had pre-existing learning abilities and to determine if each child was on the proper grade level. The K-TEA Brief Form is an individually administered achievement test that offers reliable test scores in the global areas of Reading, Mathematics, and Spelling for grades 1 to 12. In this study, the subtests of Reading and Mathematics were administered. The Reading Subtest has 52 items and it assesses both decoding printed words and reading comprehension. The first 23 items test for letter identification and correct pronunciation of a relatively steeply graded list of words. Items 24 – 52 are the more difficult items and they assess comprehension by having the student respond orally or gesturally to commands given in printed statements. The Mathematics Subtest consists of 52 items as well. This subtest measures basic arithmetic concepts, applications of mathematical principles, to lifelike situations, numerical reasoning, and simple and advanced computational skills.
Design

A correlation design was utilized in this study. Correlational studies help to identify relationships among variables. In this study, the relationship between eating a nutritious breakfast and positive academic ability was examined.

Method

After obtaining permission from the school board of the participating district, permission of the participating classroom teacher, and receiving clearance from the Institutional Review Board, the investigator went to the Second Grade class and asked for volunteers to participate in a study. Any student who volunteered, were given a letter of consent describing the study in detail. The children were asked to return the form with their parent’s/guardian’s signature the next day. After all the consent forms were signed and returned, each student was given a personal data sheet which determined their age, sex, and ethnicity. Once all the personal data was collected, the Kaufman Test of Educational Achievement Brief Form (Reading and Mathematics) was administered to the students to determine any pre-existing learning disabilities. The daily-breakfast log questionnaire was distributed to the students for them to review. A practice run was completed just to be sure that the students would be able to follow the directions for the four-week study. The questionnaire probed for whether or not a breakfast was eaten and if it was a nutritious one. The questionnaire was also used to identify whether or not the student ate breakfast at home or at school. The investigator followed the American Dietetic Associations recommendations for a nutritious breakfast (1 serving starch, 1 serving...
dairy, and 1 serving fruit). A daily log of the pupil’s academic progress was also kept during the four-week study.

**Testable Hypothesis**

The Null Hypothesis states that there will be no relationship between eating a nutritious breakfast and having positive academic ability. In other words, the children who eat a nutritious breakfast will not have positive academic abilities. Hence, not eating a nutritious breakfast will have no impact on positive academic abilities.

The Alternate Hypothesis suggests that there is a positive relationship between eating a nutritious breakfast and good academic abilities. The students who report that they had a nutritious breakfast will have better academics. Furthermore, the children who report not eating breakfast or a nutritious breakfast will have negative academic ability.

**Analysis**

The Spearman Rank Order Correlation Coefficient (SROC) was the principle statistical method used in this study. It is similar to the Person Product Moment Correlation (PPMC). The PPMC is a parametric test of correlation applied to studies that are looking to determine a relationship among variables. The SROC is a non-parametric test that measures the relationship between variables that are evaluated on an ordinal scale. The SROC is interested in obtaining a measure of consistency between variables. In this study, the dependent variable was the child’s daily academic score. The independent variable was whether or not a nutritious breakfast was eaten.
Summary

In the current study, a daily breakfast log and a daily academic log was maintained to investigate the relationship between proper nutrition and positive academic abilities. The results will be compared between the children who eat a nutritious breakfast and those who don’t using the aforementioned statistical procedure. The relationship, if any, will be determined.
Chapter 4

Overview

Two hypothesis governed the analysis of the data and produced comparisons involving eating a nutritious breakfast or not and academic performance. The Spearmen Rank Order Correlation Coefficient method was used to tabulate significance.

Sample Characteristics

Table 4.1 identifies the characteristics of the sample. Hence, you’ll find information related to age, sex, ethnicity, and score on the Kaufman Test of Educational Achievement (KTEA). The table shows the participants ranged in age from 7 to 9, with a mean age of 8. It also shows that the KTEA score for all the children were between 90 and 109. The mean score was 98. In order to be considered average, the student’s scores must fall between 90 and 109.

Table 4.1 – Characteristics of the Sample

<table>
<thead>
<tr>
<th>Participant #</th>
<th>Age</th>
<th>Sex</th>
<th>Ethnicity</th>
<th>Test Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>m</td>
<td>Hispanic</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>f</td>
<td>Hispanic</td>
<td>94</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>m</td>
<td>Hispanic</td>
<td>107</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>f</td>
<td>African American</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>m</td>
<td>Hispanic</td>
<td>97</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>m</td>
<td>Hispanic</td>
<td>109</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>f</td>
<td>African American</td>
<td>97</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>m</td>
<td>African American</td>
<td>96</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>m</td>
<td>African American</td>
<td>94</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>f</td>
<td>African American</td>
<td>93</td>
</tr>
</tbody>
</table>
Figure 4.1 illustrates the distribution of females and males within the two ethnicities. It shows that five males and two females were of Hispanic descent and seven males and six females were of African American descent.

Figure 4.1 – Distribution of Sexes Within Ethnicity

![Figure 4.1](image)

Figure 4.2 identifies the distribution of the mean scores on the Kaufman Test of Educational Achievement (KTEA) within ethnicity. This test was used to identify any pre-existing learning disabilities and to make sure that each child was on a second grade
level. It displays that the African American males mean score was 99. The Hispanic males mean score was 101. The figure also shows that the African American females mean score was 98 and the Hispanic females mean score was 96. Each child’s score fell within average ranged.

**Figure 4.2 – Distribution of Mean Scores on the KTEA Within Ethnicity**

![Distribution of Mean Scores on the KTEA Within Ethnicity](image)

**Testable Hypothesis**

The Null Hypothesis stated that there would be no relationship between eating a nutritious breakfast and having positive academic ability. In other words, across the nineteen-day study, the children who eat a poor breakfast or no breakfast at all would still do well academically.

The Alternate Hypothesis suggested that there would be a relationship between eating a nutritious breakfast and positive academic ability. Hence, across the nineteen-
day study, the students who eat a nutritious breakfast would do well academically. The students who don’t eat a nutritious breakfast will have poor academic ability across the nineteen-day study.

The Spearman Rank Order Correlation Coefficient was used to analyze the results. Out of the nineteen days of the study, it was determined that on fourteen of those days the null hypothesis failed to be rejected. Table 4.2 shows the results of the data analyzed. It displays that there was no significant relationship between eating a nutritious breakfast and positive academic ability on fourteen of the nineteen days. For example, the table shows that on day 5 the correlation coefficient was determined to be .236 with a significance level of .316, which is above the vital significance level of .01. In viewing the table, it is clearly represented that there was no significance on the aforementioned fourteen days.

Table 4.2 – Spearman’s Correlation Coefficient of The Fourteen Non-Significant Days

<table>
<thead>
<tr>
<th>Day</th>
<th>Spearman’s rho Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>-.221</td>
<td>.349</td>
<td>20</td>
</tr>
<tr>
<td>Day 2</td>
<td>-.110</td>
<td>.654</td>
<td>19</td>
</tr>
<tr>
<td>Day 3</td>
<td>-.039</td>
<td>.873</td>
<td>19</td>
</tr>
<tr>
<td>Day 4</td>
<td>.199</td>
<td>.444</td>
<td>17</td>
</tr>
<tr>
<td>Day 5</td>
<td>.236</td>
<td>.316</td>
<td>20</td>
</tr>
<tr>
<td>Day 6</td>
<td>-.438</td>
<td>.053</td>
<td>20</td>
</tr>
<tr>
<td>Day 7</td>
<td>-.245</td>
<td>.313</td>
<td>19</td>
</tr>
<tr>
<td>Day 9</td>
<td>-.288</td>
<td>.246</td>
<td>18</td>
</tr>
<tr>
<td>Day 11</td>
<td>-.340</td>
<td>.155</td>
<td>19</td>
</tr>
<tr>
<td>Day 13</td>
<td>-.390</td>
<td>.099</td>
<td>19</td>
</tr>
<tr>
<td>Day 14</td>
<td>-.043</td>
<td>.869</td>
<td>17</td>
</tr>
<tr>
<td>Day 15</td>
<td>-.431</td>
<td>.066</td>
<td>19</td>
</tr>
<tr>
<td>Day 18</td>
<td>-.158</td>
<td>.532</td>
<td>18</td>
</tr>
<tr>
<td>Day 19</td>
<td>.050</td>
<td>.839</td>
<td>19</td>
</tr>
</tbody>
</table>
The Alternate Hypothesis declared that there would be a relationship between eating a nutritious breakfast and positive academic ability. Out of the nineteen days, five of those days were identified as having significance. There was a significant relationship between eating a nutritious breakfast and achieving academic excellence. Table 4.3 shows the results of the five days where significance was reported. The results are as follows: On day 8 the correlation coefficient was -.559 with a significance level of .010. The correlation coefficient was -.632, with a significance level of .004 on day 10. On day 12, the table reports a correlation coefficient of -.508 and a significance level of .026. The correlation coefficient on day 16 was -.473 with a significance level of .041. Lastly, the table indicates that the correlation coefficient of day 17 to be -.490 with a significance level of .039.

Table 4.3 – Spearman’s Correlation Coefficient of The Five Significant Days

<table>
<thead>
<tr>
<th>Day</th>
<th>Spearman’s rho Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 8</td>
<td>-.559</td>
<td>.010</td>
<td>19</td>
</tr>
<tr>
<td>Day 10</td>
<td>-.632</td>
<td>.004</td>
<td>19</td>
</tr>
<tr>
<td>Day 12</td>
<td>-.508</td>
<td>.026</td>
<td>19</td>
</tr>
<tr>
<td>Day 16</td>
<td>-.473</td>
<td>.041</td>
<td>19</td>
</tr>
<tr>
<td>Day 17</td>
<td>-.490</td>
<td>.039</td>
<td>18</td>
</tr>
</tbody>
</table>

The present study sought to examine the relationship between good nutrition and academic performance. It was hypothesized that good nutrition would have a positive effect on academic performance. Figure 4.3 shows the number of times a breakfast category was chosen during the study. The Fairly Nutritious category led the study. It
was chosen 160 times. The No Breakfast category followed. It was chosen 88 times. Then, the Nutritious category was identified as being chosen 65 times during the study. The last category was Non-Nutritious and it was chosen 21 times.

**Figure 4.3 – Number of Times Each Breakfast Category Was Chosen**

![](chart.png)

It was also hypothesized that there would be no relationship between good nutrition and academic performance. Figure 4.4 shows the number of times an academic category was chosen. The category of Good (A or B average) was chosen 249 times. This number was astoundingly higher than any other category. The Fair category (C average) was next. It was chosen 86 times. The last category was Poor (D or F average) and it was chosen 22 times. Although there was a majority in both the Breakfast category and the Academic category, statistically the data showed there to be significance on only five days of nineteen-day study.
Summary

The study tested two hypotheses. One hypothesis was the Alternate Hypothesis and it stated there would be a relationship between good nutrition and academic performance. The results of the analysis showed that there was some significance. That significance appeared five out of nineteen days (please see table 4.3). In other words, the Alternate Hypothesis failed to be rejected five days out of nineteen. The other hypothesis was the Null Hypothesis and it stated that there would be no relationship between good nutrition and positive academic performance. The Null Hypothesis failed to be rejected and the Alternate Hypothesis failed to be accepted fourteen days out of nineteen (please see table 4.2).
Chapter 5

Summary

Understanding the importance of nutrition and eating good breakfast is a key component to understanding one of the important factors that influence academic achievement. Will a child achieve in school with out proper nutrition? Many theorists have shown that the lack of good nutrition has a profound effect on a child’s ability to learn.

The American Diabetic Association reported that when children skip breakfast it has an astounding effect on their ability to solve problems. It also has been reported that skipping breakfast affects school attendance, cognitive development, concentration, test scores, behavior, and motor development. Jacobson feels that if a child doesn’t receive adequate nutrition, then the child is faced with an obstacle of achieving academically.

To determine if there was a relationship between eating a nutritious breakfast and academic performance, a daily log of the breakfast items eaten and a daily log of the grades was maintained. The results from the study were analyzed using the Spearman Rank Order Correlation Coefficient to determine the significance levels.

Conclusions

The Spearman Rank Order Coefficient determined that there was no relationship between eating a nutritious breakfast and good academic performance on fourteen days of the nineteen-day study. The children who did not eat a nutritious breakfast did well
It was hypothesized that the children who do not eat a nutritious breakfast will not do well academically. However, on five days of the nineteen-day study the results showed that there was a significant relationship between eating a nutritious breakfast and good academic achievement. In relation to the five days of significance, the children who ate a nutritious breakfast did well academically. The results in general were not favorable to the previous hypothesis.

Discussion

The bulk of the analysis failed to support the earlier research, which demonstrated that the lack of a nutritious breakfast negatively affects academic performance. Was this research useless? Although the research failed to support other researcher’s theories, it identifies that more research should be done to fully examine the idea of breakfast and academic performance, so others (educators, other school personnel parent’s, and students) understand the astounding affect of nutrition.

The data concluded that of the four categories (non-nutritious, no, nutritious, and fairly nutritious), the Fairly Nutritious category was chosen one hundred sixty times. The majority of the time the children ate a fairly nutritious breakfast. This can be directly related to the fact that the Good (A or B average) academic category was chosen two hundred fifty times as compared to the Fair (C average) and the Poor (D or F average) academic category.

The study suggests that there may be additional variables to consider when evaluating breakfast and the relationship it plays with academic achievement in children. Some of those variables are: overall achievement level, socio-economic status, grade
level, health, and the willingness to achieve. The logs and questionnaires used in the study were not totally useless. They helped to identify the breakfast items eaten by the children everyday. They also helped to identify the academic performance of each child on a daily basis.

Implications for Further Research

The time constraints of the study make it difficult to obtain a larger sample population. To conduct further research, one should consider locating a larger sample of children representative of the culture in which this study was conducted. Many minorities were used in the study. Afro American and Hispanic children were used in the current study. Perhaps it would be interesting to conduct a study in an area largely represented by another ethnic group. Comparing children from different grade levels might be just as equally interesting.

Most of the children in the current study were pretty well nourished. None of them appeared to be starving or severely malnourished. This could have led to the unstable results that were identified. Comparing groups of children who are well nourished with groups of children who are noticeably undernourished might be a better way to truly identify academic differences.
References


Appendix A
Informed Consent Form

I agree to let my child participate in a study entitled “The Effects of Breakfast on the School-Aged Child”, which is being conducted by Alicea Davis for the obtainment of a Master’s Degree in School Psychology. The purpose of the research is to examine the effects of a nutritional breakfast on academic achievement.

I understand that my child will be required to complete a daily log for four weeks indicating what she/he has eaten for breakfast. I also understand that, for four weeks, a daily log of my child’s academics will be kept. I have been informed that, completing the log will only take about 3 minutes daily.

I understand that my child’s response will be totally anonymous and all the data collected will be kept in strict confidence. I understand that the information gathered in the study will be used in completing the researcher’s thesis project and that my child’s name will not be used in any fashion.

I understand that there are no physiological or psychological risks involved in this study and that I may at any time relinquish my child’s participation.

I understand that participation in the study does not constitute employment for my child or myself with Rowan University, the State of New Jersey, the principal investigator, or any other project facilitator.

If I have any questions or problems concerning my child’s participation in this study, I may contact Alicea Davis at 856-256-4500 ext. 3776.

Signature of Parent/Guardian  Date  Participant #
Personal Data Sheet

Please complete each question. Please answer each question to the best of your ability and as truthful as possible.

1. What is your age? _________

2. Are you a male _________ or a female _________?

3. What is your race? European American _________

   African American _________

   Asian American _________

   Hispanic _________

   Native American _________
Appendix C
DAILY BREAKFAST/ACADEMIC LOG

Participant # ____________

Date ____________

1. Choose the correct breakfast category.
   ______ 1. Ate a non-nutritious breakfast
   ______ 2. Ate no breakfast
   ______ 3. Ate a nutritious breakfast (1 fruit, 1 starch, 1 dairy)
   ______ 4. Ate a fairly nutritious breakfast (at least two categories)

2. Choose the correct place of breakfast.
   ______ 0. Ate no breakfast
   ______ 1. School
   ______ 2. Home
   ______ 3. On the way to school

3. Choose the correct academic category for the morning.
   ______ 1. Good academics (A or B average)
   ______ 2. Fair academics (C average)
   ______ 3. Poor academics (D or F average)