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## The effects of nutrition on the cognitive skills of students from kindergarten through third grades

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# **The Effects of Nutrition on the Cognitive Skills of Students from Kindergarten through Third Grades**

We are currently bombarded in the media with the effects of obesity on the American elementary and adolescent population. My interest in nutrition has been fueled by our national obsession with obesity because I believe that in order to effectuate dietary changes in our student population, the students themselves have to see the appeal. The benefits of good nutrition go well beyond avoiding obesity. A diet that is rich in nutrients and varied in content has a direct effect on the cognitive skills of children. Skills such as memory, pattern making, abstract thinking, and small motor skills are all directly effected nutrition. Good nutrition can assure that that effect is a positive one.

Since I am a mother myself, I am always interested in maximizing my own children's potential. In researching this topic, I discovered that most of the information readily available to parents regarding nutrition speaks to the physical effects of a diet high in fat with regard to obesity and physical fitness. While this is also enormously important, I feel that there is a lack of information directed towards

the kids and the parents touting the positive and beneficial effects of a good diet. Rather than speak about a bad diet's detrimental effects, I believe reaching students early about the positive effects of nutrition on their academic skills and the way they feel can also be convincing.

Sending students off to school in Kindergarten, for many families, often represents the first time that parents are not choosing all of their children's meals for the day. It is a phenomenal time to employ the child's own desire to want to the best for their bodies and their own success. It is a crucial time to educate students on nutrition's potential effect on their school day.

## INTRODUCTION AND BACKGROUND

This research paper is a study on what effects nutrition, specifically good nutrition, has on the cognitive skills of students in Kindergarten through Third grades. My focus was on students in California, but because of the limited research in this area, many of the specific studies cited were spread throughout the United States.

Studies on children and nutrition are often focused on the negative effects of a 'bad diet'. In approaching this study, I was interested in taking a positive approach, and instead of talking about the bad of the bad, I came up with the good of the good.

The end result is a tri-fold brochure that is aimed towards students in the Kindergarten through Third grades giving them good ideas about why eating well is going to make them look better, feel better, and do better in school. I believe that my research can be beneficial to educators and parents as well as the students themselves. Quick packaged foods are easy to find and easy to eat. Kids, just like adults, need to know the reward for making the extra effort to eat well. As educators and parents if we can be informed of what the benefits will be, then we will be better sources of information for our kids. Within this research I will be exploring the following learning outcomes from my minor, Human Development:

C8: Human Growth & Development

C3: Technology

C11: Physical Development and Health

My Primary Research Question:

*How does good nutrition effect the cognitive skills of elementary school students?*

I will follow the study of my primary research question by exploring the following secondary research questions:

*What constitutes good nutrition for children at the elementary school level?*

*What types of foods are currently being offered to elementary school students?*

*How does good nutrition benefit students academically?*

*What nutrition education programs are currently in place within California?*

*How can we increase the awareness of good nutrition and its link to the academic success of elementary school children?*

## LITERATURE REVIEW

Before discussing the benefits of good nutrition on cognitive skills, a definition of cognitive skills must be established. Also, both cognitive skills and nutritional needs vary by age group, and this study is specific to the age group specified, Kindergarten through Third Grades. In California that is the ages five through 9, with limited exceptions. Cognitive skills will be defined in this section as well as the effects of specific nutrients on those skills.

One definition of cognitive skills is “Cognitive skills are mental abilities that help us process external stimuli.”. (Pearson Canada, 2006). Cognitive skills, by this definition, include differentiating between letters and thinking symbolically, effecting a students ability to read. For non-readers, the concentration that is required to suddenly think of letters abstractly and establish them into their schema requires a significant attention span as well as mental alertness. Cognitive skills also include distinguishing patterns and orders which has a direct affect on math skills.

Certain parts of the brain are not developed by pre-school, but instead continue to develop throughout childhood. According to an article published by Nutrition Reviews, the frontal lobes, for example, are responsible for higher order thinking and processing, in other words, cognitive skills. The frontal lobes are slower in developing than other parts of the brain, and continue to develop throughout childhood, as well adolescence. The frontal lobes are responsible for cognitive skills such as problem solving, attention focusing and ordering memories. It has been long established that good nutrition is imperative for the brain development of infants, but given that cognitive skills are developing well into childhood, the importance of good nutrition remains in effect during the elementary school years. (Bryan, Osendarp, et al. 2004)

### Nutrients direct Effect

In Gobala Krishnan's article "Adolescence and Youth" (2004), the author highlights certain nutrients that are key to a student's success in school. Among them, Glucose. Glucose, which is a form of sugar, is often considered the enemy, but is actually necessary in small doses. Glucose affects blood sugar, which has a direct effect on energy. Kids that do not eat breakfast often have lower energy levels early in day, which is also the time of day that reading instruction is often given in grades K-3. Glucose can be found in almost any food a child can come up with. The only way to not get enough of it, is to skip breakfast and head to school un-fed. This

is one of the worst things for young students. It is better to eat something not so great for you before school than nothing at all. A sugary breakfast will provide temporary fuel if nothing else.

Foods not only have the ability to make our students look better and feel better but actually have a direct impact on the cognitive skills that they present with at school. As a teacher, I hope that I can encourage my students directly to come to school having eaten breakfast. The most focused kids have enough nutrients to stabilize their mood, raise their alertness, and give them slow, long lasting energy.

### THE EFFECTS OF UNDER-NUTRITION ON COGNITIVE SKILLS

The link between nutrition and cognitive skills has a lot of room to be explored in the United States. Previously, research that had been done had involved third world countries where malnutrition is more common. For example, a study was done in Ghana wherein it was established that socio-economic factors greatly influenced students' success due partially to the fact that higher socio-economic status meant better nutrition, which parlayed into more refined cognitive skills and higher academic success. (Asenso. 2005.)

In the United States, however, socio-economic status does not always equate to higher nutrition levels. With the widespread availability of packaged, frozen and fast foods, families that fall into higher socio-economic status are just as likely to have children with poor eating habits. In fact, two incomes, which often raises a family status, without proper nutritional education, can often lead to a family lifestyle where students are relying much to heavily on pre-packaged or institutionally prepared foods.

The Center on Hunger and Poverty at Brandeis University found that there was a definitive cognitive difference in adequately fed children and under-nourished children. Previous beliefs held by the scientific community were that under-nutrition created long term permanent damage, and the extent of that damage was based on the degree of malnutrition of the child. In fact, this study found that it is the long term effects of the lack of vitamins and nutrients that create a cycle of slower learning abilities, less memory retention, lower levels of spatial reasoning and developmental delays.

Factors such as motivation and energy, are also greatly affected by nutrition, and not having these factors would also have a direct effect on expression of cognitive skills. In turn, the experience of having weaker cognitive skills often creates a negative academic relationship for the student and in turn, the student may

become frustrated and less interested in doing well, creating a continuing cycle of lowered academic success.

In essence, positive nutrition can have a positive effect on biological factors or socio-economic factors that may be out of a student's control, but nutrition is a tool that is in anybody's hands. While long term under-nutrition is known to have negative effects on cognitive skills, it is good to remember that good nutrition, which includes adequate intake of necessary vitamins and minerals, can have a counter effect on the negative impact of malnutrition or under nutrition. It is good to know that it is never too late to convert a junk food junkie.

#### How Breakfast Choices Affect Learning

In this article published by Physiology & Behavior, Dr. Holly A. Taylor (2005) established a difference in eating some breakfast versus eating a good breakfast. Eating something for breakfast is always better than eating nothing, but foods that contain whole grains, fiber and protein can have an even more positive effect on the beginning of a student's school day. The article, "Effect of breakfast composition on cognitive processes in elementary school children" established that students who ate oatmeal for breakfast did better at certain cognitive skills, such as verbal and spatial memory and attention. The control group ate either cold cereal or no breakfast at all.

The make up of oatmeal, being whole grain and higher protein content requires a slower digestion, and therefore a more stable level of blood sugar after consumption.

Students should be encouraged to eat foods that contain these types of elements to give them the energy and attention span to make it through the first half of their school day. (Taylor. 2005.)

Dr. Taylor's study included elementary school students, half of which were ages 6 - 8 years old and half of which were ages 9 - 11 years old. The process of the study was that the students' parents were instructed one day a week for four weeks to send their student to school with no breakfast. On that day the designated students reported to the cafeteria and ate a breakfast of either cold cereal, oatmeal, or nothing. They were then sent back into the classroom and after an hour asked to perform specific cognitive skills, such as tasks that involved memory, spatial relations, and auditory attention. The students did not know what was being studied or what the relevance of the food was. As a result, the kids that ate a sustainable breakfast, the oatmeal in this case, did better at the tasks than the other groups, and as was expected the students who ate at least cereal were more successful at the tasks than those who ate nothing. (Taylor 2005).

In his book, *Don't Eat This Book*, Morgan Spurlock (2005) tells about a kid named Justin Fletcher, who at thirteen years old, decided to try to test the effects of

junk food on his brain. For two days he ate nothing but junk food, then took a set of reading, math and typing tests. Then, for the next two days he ate regular food and at the end of that same time period, took the same tests. According to the results, “After two days of junk food, his reading speed dropped by more than 50 percent, his typing speed was down by half, and he solved math problems up to 35 percent slower.” He also reported during the time that he was exclusively eating junk food, he experienced mood swings and felt sluggish.

In addition to the benefits of eating a whole grain, sustainable breakfast found that these effects were more profound in the lower ages, which coincides to my grade focus of Kindergarten through Third grade. The higher metabolism of the students in the lower age range may be a factor in the greater and more obvious effects of a good breakfast. Another factor that may influence the results is that cognitive skills are very obvious in grades K - 3 where students are just starting to make letter relationships for reading skills and spatial relationships for establishing math skills. In the later grades, students are more independent and may have already set their place as an ‘easy learner’ or ‘hard learner’ and less notice is given directly to their day to day cognitive skills. The earlier the good nutrition message can reach our students, the better for them to start building a positive environment for themselves at school. (Taylor. 2005.)

## METHODS AND PROCEDURES OF STUDY

For my research on this paper, I used the Internet extensively. I reviewed web pages that were published to gain parent's attention to the importance of their children's eating habits. In addition to articles aimed towards parents, I also studied articles published in magazines, such as Psychology Today and Health Magazine.

After searching the Internet for relevant information I then focused on our library at CSUMB where I utilized the ERIC search engine to find several peer reviewed articles that examine the relationship between nutrition and cognitive skills at the elementary level.

In exploring the community's involvement in the subject of elementary students' nutrition, I spoke with principals at local schools, the cafeteria manager at my own children's school, and made phone calls to the local district office to inquire of what programs the schools are actively involved in to increase awareness of nutrition's importance to young children.

In the end, the culmination of my research is this paper which presents an overview of the connections I found between cognitive efforts of elementary students and nutritional intake of those students. In addition, I have created a color brochure

that is to hand out directly to the kids. Literature aimed at getting parents to make wiser food choices for the kids often stays at the bottom of those kids' backpacks and eventually ends up in the trash unread. I decided to create a handout directly for the kids, so that they might read it, be interested in it and get some quick ideas about healthy snacks.

## RESULTS AND DISCUSSION

Clearly, nutrition plays an active role in a student's day. Once that had been established in the course of this research, other questions remain. What is good nutrition, for example. The secondary questions that follow explore the elements that contribute to researching the original topic of nutritional effects on cognitive skills of Kindergarten through Third graders.

*What constitutes good nutrition at the elementary school level?*

At every age, the nutrition needs for children changes. Babies for example, need a heavy dose of fats and proteins to insulate their bodies, regulate body temperature, and nourish their growing brain, which at birth is proportionately larger for their bodies than it ever will be again. My research, in the capacity of this project,

is focused on the ages of Kindergarten through Third Grades, which in the United States correlates to the ages 5 - 8 years old. At this age, the development of cognitive skills is in a crucial stage, when the implementation of reading and mathematical skills is taking place, setting up a foundation for the rest of their years of learning. Physical activity is usually at its highest levels at this age as well. The combination of factors makes it even more important that students in this age group are receiving adequate nutrition.

Specific nutrients are vital for this age group. Some of those nutrients are Vitamin B, Iron, and Magnesium. According to Krishnan (2004), "Lack of Vitamin B can cause aggressiveness and depression." The effects of a lack of Vitamin B could cause a negative effect on a student's school day. Vitamin B can be found in foods such as oatmeal, bacon, nuts and cheeses, among others.

Another essential nutrient is Iron. Iron directly affects attention span, and lack of it can directly affect a student's ability to learn a new skill or master sequential order. Also, without enough iron, a student may feel irritable or tired, and unable to focus as well. Iron can be found in readily available foods such as beans, nuts, cereals, and whole wheat breads (Krishnan, 2004). According to Ward (2002), in *Healthy Foods, Healthy Kids*, "Studies show children through age 6 who consumed low iron diets performed poorly on IQ tests, learning tests, School achievement

measures that indicate short-term memory, attention span, and tasks critical to solving visual problems.”. Note that an overdose of iron can be fatal. All iron supplements, especially sweetened varieties should be kept well out of the reach of young children. (Hanula, 2001.)

Zinc, another essential nutrient for this age group, has a direct effect on the communication between nerve cells and brain cells. According to Krishnan (2004), “Deficiencies in zinc can cause your kid to have difficulty solving academic problems, something the medical world calls cognitive impairment.” Zinc can be found in foods such as eggs, almonds, chicken and garlic. A healthy balanced diet is the ideal for everyone, but it is imperative for young students who are building their knowledge and perception of the world.

This research is limited to students with no religious, medical or ethical reasons to have a limited diet. Nutritional needs would differ for students, who, for example, were vegetarians. Since, according to Barnard and Dojnay, et al. (1997) “...animal proteins are a major source of vitamin D, calcium and zinc” students who fell into that category would have additional nutritional needs to rise to the level of children whose diets incorporated animal proteins. (pp. 38-39).

*What types of foods are currently being offered to elementary school students?*

California is doing better than many other States when it comes to the nutritional content of our State's school lunches. A study done by the California Department of Education found that half of the school lunches tested passed the criteria of getting one third or less of its calories from fat, and an additional 30 percent of the lunches were just over the maximum. In this study, it was found that the elementary schools met the targets more often than did the middle and high schools. Asking that a lunch contain Vitamin C and protein as well as being one third or less made up of saturated fat is a very low criteria for nutritional sustenance. It should be shocking to parents that almost half of the school lunches are not meeting this most basic criteria. Students need more than the basics of survival, they need the most healthy choices, whole grains, whole nutrients, and natural foods, to be the best they can be. (California Department of Education. 2004.)

School lunches, in our district, are delivered once a week. In Monterey County that day is on Tuesdays, which means that any hot lunch served, on say, a Monday, has been at the school site for six days. A typical lunch consists of a 6 oz. piece of pizza that is in individual plastic wrappers, a baggie of carrots (which the kids rarely eat for lack of time) and a package of ranch to dip the carrots in. The item that serves as the 'fruit' of the meal is more often than not a sugary slushie type of

dessert. For some of the meals, such as the hamburger and fries meal, the ketchup is the fruit. I believe printing nutritional value onto the lunch menus would help parents make a more informed decision between sending their children with food from home versus having them buy lunch at school.

*How does good nutrition benefit students academically?*

Adequate nutritional intake benefits elementary school children in several ways. Eating a breakfast that consists of proteins and whole grains assures that students will have a stable blood sugar level during the first few hours of their school day. California Food Policy Advocates has a website that is “...dedicated to improving the health and well being of low-income Californians by increasing their access to nutritious and affordable food.” That goal includes assisting school districts to apply for and obtain funding for a School Breakfast Program, or SBP. Eating a nutritionally sound breakfast has been shown not only to benefit the student’s cognitive skills, but the schools that have improvised the program have also shown a decrease in the amount of tardiness and absences seen. (California Food Policy Advocates, 2006).

Since whole foods, such as those that contain protein, vitamin B and magnesium help children in the age group of Kindergarten through Third grade stabilize their mood, and Vitamin B also helps regulate mood, which improves

attention span and reasoning skills, then eating a healthy breakfast is a great start to a great day for a young elementary student. Breakfast is a crucial meal for young learners, and the School Breakfast Program is a response to the evidence of that.

If students are feeling their best, they will achieve more. As educators we have to be alert to the further functions of nutrition past sustenance. If a student is in a sugar drop period of his/her day then they will have a hard time focusing, may be sleepy and it would probably not be a high time of retention for new information. Combating these types of dips by educating parents and kids about healthier food choices is a proactive necessity.

*What nutrition education programs are currently in place within California?*

California is often a state of new ideas, and with nutrition, we often find ourselves at the forefront of new ideas. Some of the nutrition programs geared towards the success of elementary school students follow.

One of the programs I mentioned above is the School Breakfast Program. This is also known as Breakfast First - Healthy Foods for Healthy Minds. Many schools participate in this program, wherein breakfast is served in the classroom, so that hunger can be eliminated as a formidable distraction. Schools in the program have found that tardiness, absences, and behavior problems have decreased.

WIC - Women, Infant and Children - is a subsidized program by the State of California. Since children need healthy foods for their minds to grow, WIC provides coupons for families without financial resources that can be used at the grocery store to buy nutrient rich foods such as milk, whole grain cereals, and fruit juices. In addition, WIC gives presentations to eligible families educating them on the basics of nutrition and the importance of not feeding their growing children empty calories.

Also, California Nutrition Network for Healthy Active Families (CNNHAF) is the department at the State office that provides qualified agencies with funding for nutrition programs. The agencies, in order to receive grants, have to encourage the eating of five servings or more of vegetables and fruits for families with children. A list of active agencies are listed on the website noted.

Monterey County Health Department - Steps for a Healthier Salinas. This is a new program being implemented in Monterey County. Part of the program is an analysis of the county's needs, and then once that has been achieved, an implementation of new nutrition education programs will take place.

Community Bridges - Community Bridges is the Latino "Five a Day" campaign. It is based in Watsonville where a large number of farmworker's children

go to school. The campaign is printed and advertised largely in Spanish so that the language barrier can be eliminated and the message of the importance of nutrition to children can be spread.

At the Community Hospital of the Monterey Peninsula, here locally, several nutrition classes are offered to families. The more education parents and extended families have about the long term effects of under nutrition, the more they will advocate for their own children's success. Under nutrition is not something visible. A child can be overweight and still not be receiving the nutrition he needs to do his best academically. Parents should not be lay people when it comes to nutrition's effects on their child, they should be experts.

*How can we increase the awareness of good nutrition and its link to the academic success of elementary school children?*

Educating the students themselves of the benefit of good nutrition is a good start to increasing awareness on the subject. Many programs are geared directly to busy parents, but if the kids are not interested in eating well and nutritiously, then the dinner table can easily become a battleground, which is not good for anybody. Starting even very young children with information about nutrition by using simple

language about benefit, such as “big and strong” or “good listener” will help instill the values and desire for nutrition early. (Ward, 2002. p. 12).

More speakers should be attending elementary schools, and not only giving presentations to the students, but preparing healthy dishes that they can taste. Some recipe samples are grilled cheese sandwiches on whole wheat raisin bread, fresh fruit, granola and yogurt parfaits, or some whole wheat pasta with tomato sauce. If students can taste nutritious food and enjoy it, then soon they may be asking their caregivers to pick up whole wheat bread, or low fat cheeses when they shop.

On August 15, 2005, Governor Schwarzenegger signed SB 12 and SB 965, which effective July 1, 2007, will ban soda sales in all California K-12 schools. Most of the wording behind the Bills cite childhood obesity as the issue at hand. The banning of soft drink sales within public schools, also, however, has a great cognitive benefit. Spurlock (2005) states that according to USDA statistics, in the late 1970's boys drank more than twice as much milk as they drank soda. Girls at that time drank more than 50% more milk than they drank soda. By 1996, both genders were drinking twice as much soda as milk. Not only are kids getting the extra sugar and calories that have contributed to the obesity epidemic, but they are getting a severe shortage of calcium. Since calcium is necessary for bone growth and absorption of

Vitamin D a policy that gives students an opportunity to drink more milk is good. For students who are lactose intolerant, schools can provide fruit juices that are supplemented with Calcium and Vitamin D.

Another factor is childhood nutrition is parent education. Parents should be provided with information about nutrition and how it affects their Kindergarten through Third grade student in his academic studies. One way to give parents this information would be to put a key on the monthly lunch schedule, showing the nutritional content of the foods offered and their benefit to cognitive skills. It would probably not be a deciding factor in whether or not that parent makes lunch that day, but it might be all they read about nutritional effects on cognitive skills for their child, and more exposure means more awareness.

### PROBLEMS AND LIMITATIONS

While good nutrition is always something to strive for, some credible sources did not address a definitive correlation between good nutrition and improved cognitive skills. For example, according to the Nutrition-Cognition National Advisory Committee (1998), while there is a confirmed association between poor nutrition and lacking cognition skills, many other factors than nutrition alone may be to blame. Lower nutrition intake is often associated with lower socio-economic status, and with that status comes an association with other factors, such as “Poor housing,

inadequate health care, unemployment and weakened family and community support systems.” Any of those factors alone or combined would easily affect a student’s academic performance on any cognitive skills evaluation. Isolating nutrition from other social issues is nearly impossible. Therefore, the Advisory Committee does not confirm that poor nutrition alone can have an adverse effect on cognitive skills, but instead acknowledges the need for additional research on the correlation. Although there is an abundance of research materials for nutrition and the elementary school student, most of what is available is based on the negative effects of a poor diet, such as obesity and diabetes. A minimal amount of research is available on the direct correlation between nutrition and cognitive skills.

Nutrition is often seen as an element of the medical world, and cognition of the education or literary world. While nutrition often has quantitative measurements, cognition is measured qualitatively, therefore it is hard, even for established research agencies to create hard evidence for the link between the two. Also, with regard to my secondary research questions, I found that my question “What types of foods are currently being offered in Elementary Schools” was hard to incorporate. The question itself invites a quantitative evaluation, which is a direction that I was not planning on. In reality that question alone could be a primary question, with secondary questions that follow.

This is a relevant and critical research topic, and I believe that my findings will be useful for educators and non-profit agencies to use in the aid of planning for education of students in this age group and their families with regard to nutrition and how food choices have a direct effect on them.

### CONCLUSION

There is no doubt that nutrition effects us all. We all know what the effect is to us personally, but there are bigger implications to the society as a whole. The students in elementary school now are our future generation. If we are not teaching them to eat well so that their bodies and brains function to their best capacity, then we are doing a disservice. Poor nutrition is one of the biggest health risks in our society. In California, for example, 22 percent of Californians smoke, 18 percent do not use seatbelts, and 10 percent mis-use alcohol. The California Department of Health Services have determined that 90 percent of Americans eat a diet that puts them at risk for disease and does not provide with what is known to be optimal nutrition. This is a valid concern for the health of our children. (California Dept. of Health Services. 2003)

Any person in the United States would be hard pressed to pick up a newspaper without finding a reference to the childhood obesity epidemic. While the epidemic is real, and the health risks are prevalent, there are significant other factors involved in the effects of students' diets. When choosing to research this topic I

thought it was very important to take a positive spin on nutrition. After all, food is one of life's pleasures, to make it a negative thing without stressing the positive could easily have a counter effect on the eating habits of young people. As parents and educators we are not sending a good message if we imply that body size is the biggest reward for eating healthily. Through research of current literature I established that vitamins such as Iron, Calcium, and Vitamin A directly affect the cognitive skills of students in the Kindergarten through Third grades. When students were lacking these nutrients, they were more tired during the school day, as well as scoring lower on spatial relation and short term memory evaluations.

Kindergarten through Third Grades is a time period when students in the United States learn to read, spell, write and learn all the basic math skills that the rest of their academic career will be based on. This research establishes that good nutrition is imperative for cognitive potential of students, and since this is such a crucial time in academics, the sooner the good nutrition message reaches the students, the better.

Adding nutritional information to the school lunch menu could be the first step in involving the families of students in nutritional education. The School Breakfast Program, being implemented in many school districts in California is another boost to achieving nutritional goals of the students. Schools that have implemented that

program have reported increased test scores and decreased absences and tardies. The next step is to involve the community. Kids are our future. In grades Kindergarten through Third grades, parents and caregivers are still responsible for most of their food choices - after that, they will make most of their own choices, and their health future is in their hands. The sooner they associate eating well with a positive feeling, the better our chance of having the next generation be a healthy successful one.

As educators we have to be cautious of making childhood obesity the platform for modifying children's diets. A publicized fear of obesity, to parents that may not have a lot of nutritional education may result in a child being fed a diet of preservative laden low fat foods that still do not contain adequate nutrition to support brain growth, energy levels, and attention span. Along with the nationwide campaign against obesity needs to be an informational campaign encouraging the eating of natural nutrient rich foods, as well as fats and sugars, which despite their notorious reputation are necessary for children's and adolescents growth and mental health.

Putting fear of obesity, in the end, will not create motivation for change. If children hear and really believe that they will feel better and achieve more by eating right then that positive thinking might create a new approach for childhood nutrition. Clearly, as seen through this research, nutrition has a key effect on cognitive skills.

Lack of nutrients can cause academic deficiencies, so we all have a motivation to help our children be informed.

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