

HOW TO TEACH CHILDREN HEALTHY NUTRITION

by

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## ABSTRACT

Obesity rates worldwide and health problems associated with poor nutrition are still growing in spite of an increasing number of education programs, various approaches and money being spent. Even when nutrition education for children is generally recognized as a necessity to reverse this growing epidemic, there is no existing consensus on how to teach nutrition or how health information should be communicated to the public. The purpose of this study was to collect opinions and suggestions from teachers, parents and students of different nationalities on how to teach healthy nutrition and its results could serve to facilitate the establishment of an accepted and successful nutrition education curriculum.

This study evaluates personal views on different methods and tools for how to teach healthy nutrition. Participants were students, their parents and teachers from one American International School and several Czech schools. The limited number of participants as well as the voluntary participation of the schools somewhat decreases the ability to make wide-sweeping generalizations of presented conclusions.

The results of the study presents very strong support amongst all participating groups for incorporating healthy nutrition into regular school curriculum, preferably continuously in all school levels. It provides information about preferences for individual methods and tools for teaching healthy nutrition. There is alarming information that shows that the media is the most common source of information about nutrition for

parents and teachers. This study, in addition to many others delivered surprisingly strong agreements even with regard to notably unpopular measures such as eliminating candy and vending machines in school. Generally, there was unexpected support for various methods and tools that could be used to support healthy nutrition choices. The qualitative part of the study positively evaluated the healthy nutrition activity book, Food for Fun. The results suggest using this FFF activity book as an effective source for preparation of grade level specific books for the continuous teaching of healthy nutrition at elementary schools.

Previous studies presented in the research often did not reach needed statistically significant long-term results. Individual interventions were usually time limited and implemented in schools by outside sources. These facts as well as the responses in this study asking also for the education of teachers and parents are supporting the idea of involving nutritionists at schools as an important part of successful nutrition education. A professional in the field of nutrition can help with the preparation and implementation of the school food/wellness policies. Further, an expert in the field would provide not only nutrition education for students but could also offer professional courses for teachers and informational lessons for parents in order to sustain the program and achieve lasting results. Therefore, the author of the study sees the professional approach to nutrition education via school nutrition counselors as the most important challenge when considering the implementation of nutrition curriculum at schools.

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## CHAPTER ONE

### INTRODUCTION TO THE PROBLEM

The purpose of this study is to collect opinions about how to teach and what tools to use when teaching nutrition in elementary schools. The study will focus on exploring opinions about healthy nutrition education from students, their parents, and teachers of different nationalities.

#### Statement of the Problem

Childhood obesity in the USA is reaching epidemic proportions and childhood obesity rates in other rich countries worldwide are following this unhealthy, unfavorable trend. Obesity today takes center stage in studies about chronic diseases in children. According to the World Health Organization (2000), overweight and obesity represents a rapidly growing threat to the health of populations in an increasing number of countries. Nutrition education for children is generally recognized as a necessity to reverse this growing epidemic (Centers for Disease Control and Prevention, 1996; Organic Consumer Association, n.d.; French, Story & Jeffery, 2001; Joy, Pradhan & Goldman, 2006; Perrin, Bloom & Gortmaker, 2007; Price, 2008), but currently there is no agreement among the experts regarding how this should be approached. According to Fitzgibbon et al. (2007) there is no existing consensus on how to teach nutrition or how health information should

be communicated to the public. The United States federal government spent more than \$1 billion on nutritional education in 2008. However, according to Mendoza, the review of scientific studies examining 57 such programs found mostly failure (2007). The result of the work by Mendoza raised a question about what kind of education programs and methods would have been successful in bringing about a change? Can we learn from the experiences and suggestions of the participants in this study who represent a variety of nationalities?

Eating preferences are usually strongly associated with family values, habits, knowledge, and experiences. Exploring nutrition from this perspective is inherently a sensitive issue and needs to be addressed respectfully and cooperatively with the families involved. It is important to ask, how would the parents like their children to be educated about healthy nutrition and what kinds of methods or tools would the children most willingly accept?

### Background and History of the Problem

In human history there was usually a limited amount of available food. People, with few exceptions, ate only what they needed for survival thus there was no concern about overeating and diseases related to poor food choices. For thousands of years, the human body consumed just the necessary amount of food and stayed remarkably stable. As Kessler (2009) states, millions of calories passed through our bodies, yet with rare exceptions our weight neither increased nor decreased by any significant amount. A perfect biological system seemed to be at work in spite of the fact that until fairly recently, there was no scientific knowledge about individual nutrients.

This ideal body regulation drastically changed with the invention of commercial food processing and broader availability of inexpensive, convenient, processed food. The current “food environment” predominantly promotes food choices loaded with refined sugars, fats, and additives. Such food lacks any real nutritional value and has significantly changed the assortment of food being eaten in homes today. The problem with unhealthy food choices is further exacerbated by its availability, low cost, and peoples’ tendency to overeat. As Brownell, Schwartz, Puhl, Henderson and Harris (2009) state record levels of obesity in children and adolescents are predictable in light of powerful conditions that promote high consumption of calorie-dense, nutrient-poor foods and discourage physical activity. Most of the children living in affluent countries are confronted with proclamations from the food industry beginning in their first years of life. They are attacked with advertisements for “kids’ foods” which are in reality usually the least healthy possibilities overloaded with sugars and sodium (Marketing and advertising for least healthy breakfast cereals, 2009). Kids are targeted as they play on playgrounds on fast food premises, enjoy toys added to meals, and, as Simon (2006) describes, even pass by vending machines located directly in their schools. Convenient and inexpensive unhealthy food is often accompanied with eating beyond what our bodies require and subsequently followed by health problems associated with over consumption. The consequence is a generation of children who have been brought up with many nutrient deficiencies, resulting from a variety of problems including the poor quality of soil, foods overloaded with concentrated sugars and fats, nutrient depleted food, and foods heavily laden with chemical additives. As Perrin et al. (2007) document, the number of children and adolescents with chronic health conditions has dramatically increased in the past four

decades. The authors gathered evidence about the high prevalence of obesity, which now affects at least 18% of children and adolescents. Since the 1980s, the cases of child and adolescent asthma have doubled and there has been a dramatic increase in the number of children diagnosed with attention-deficit/hyperactivity disorder. They predict that increasing rates of childhood chronic conditions portend major increases in long-term pulmonary, cardiovascular, and mental health burdens among adults, accompanied by increasing expenditures for health care and disability programs, and decreased workforce participation and quality of life. According to Blenchard, Gurka and Blackman (2006), recent health surveys have documented a high prevalence of emotional, developmental, and behavioral problems among children. The children with developmental problems had lower self-esteem, more depression and anxiety, more problems with learning, and missed more school. As the Organic Consumer Association (n.d.) reported, today we face a literal epidemic of food allergies, obesity, asthma, premature onset of puberty, childhood cancer, and diet related behavioral and learning problems affecting the nation's youth. World Health Organization (2000) stated that obesity comorbidities include coronary heart disease, hypertension and stroke, certain types of cancers, non-insulin dependent diabetes, gallbladder disease, dyslipidaemia, osteoarthritis and gout, and pulmonary diseases, including sleep apnea. According to this report, overweight and obesity has become so widespread that they are replacing more traditional problems such as undernutrition and infectious diseases as the most significant causes of ill health. Hesketh, Waters, Green, Salmon and Williams (2005) noted that the numbers of those overweight and obese are also steeply increasing in Australia and almost 25% of children are affected, presenting a major challenge to develop contemporary, effective,



population-based prevention and management strategies. The Centers for Disease Control and Prevention (CDC, 1996) state that poor diet and inadequate physical activity together account for at least 300,000 deaths in the United States annually and are second only to tobacco use as the most prominent identifiable contributor to premature death. The changes in the availability of unhealthful foods and its subsequent health consequences have led to an urgent need for preparation and implementation of education materials and tools to help children make better choices in the current food environment.

Despite the fact that the contribution of poor diet has been acknowledged as a risk factor for chronic diseases such as cardiovascular disease, diabetes and certain cancers, according to Fitzgibbon et al. (2007), a consensus does not exist on how to teach children about nutrition nor how to convey health information to the general public. The schools are ideal settings for nutrition education, because they reach almost all children and adolescents, they have skilled personnel, they provide opportunities to practice healthy eating, and they can teach students how to resist social pressures (CDC, 1996).

### Significance of the Study

An approach that addresses the unhealthy eating habits of children can benefit an entire society. The medical and economical consequences of unhealthy nutrition are far-reaching. According to United States Department of Agriculture (USDA, 2009) the prevalence of poor nutrition and lack of physical activity exacts a heavy toll in morbidity, mortality, and economic costs due to disease and lost productivity in target populations. Treatments of obesity, diabetes, high blood pressure, orthopedic problems, and many other diet influenced diseases are reaching billions of dollars a year. Interventions that

promote healthy eating and encourage physical activity during childhood and adolescence may not only prevent some of the leading causes of illness and death, but also decrease direct healthcare costs and improve quality of life (CDC, 1996). Perrin, Bloom and Gortmaker (2007) predict that the expanding epidemic of child and adolescent chronic health conditions will likely lead to major increases in disability among young and then older adults in the next several decades, with major increases in public expenditures for healthcare and income support. In addition, many childhood chronic conditions will lead to large numbers of younger adults with chronic illnesses and disease depending on public programs and expenditures, and experiencing lower quality of life, poor social interactions, and less community participation. The unfavorable situation described above is difficult to understand in light of the fact that adhering to four simple healthy lifestyle factors (no smoking, maintaining a healthy weight, engaging in physical activity, and healthy eating) can have a strong impact on the prevention of chronic diseases, such as cardiovascular disease, diabetes, and cancer (Ford et al., 2009).

Our society urgently needs to find new approaches on how to teach nutrition that will have long-term effectiveness. For example, according the study of Dollahite, Kenkel and Thompson (2008), a program to teach low-income adults about healthy food choices is a good bargain in terms of the health and economic benefits achieved. They reported the benefit-to-cost ratio when one dollar spent on such a program resulted in about \$10 in benefits. Similarly the work of Joy et al. (2006) demonstrated that for every \$1.00 spent on nutrition education in California, between \$3.67 and \$8.34 is saved in health care costs. The authors stated that their results bolster the argument that nutrition education programs are a good investment and funding them is sound public policy. It is estimated

that food preferences are anchored by the age of 10 (Mendoza, 2007), and therefore the education in elementary schools is of primary importance. It is expected that the current study will be successful in generating information with respect to nutrition education curriculum from elementary school students, their parents and the valuable experience of the teachers. The multinational background of the participants will result in a broader variety of opinions and perhaps even some unconventional or less than typical approaches to nutrition education will be discovered in the proposed study. The results of this study would then serve as a foundation for establishing an accepted and successful nutrition education curriculum for many other educators.

The present study will build a base to further my efforts as consultant specializing in nutrition education for families with children. Moreover, the independent evaluation of the Healthy Nutrition Activity Book Food for Fun (respectively “Jidloveda”) used by all the participants will provide valuable feedback for the preparation of additional age specific study materials for an accepted and successful nutrition education curriculum.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE AND RESEARCH

#### *Literature evaluating methods or tools used in nutrition education*

There are many studies examining the influence of various nutrition education methods on children's eating preferences. Some of these studies were initially successful, however, in several studies, the chosen intervention either did not bring long-term positive changes or the studies did not investigate this topic further. One clear indicator of a lack of a successful method for changing eating behaviors is that despite the determined efforts of educational systems, the levels of obesity and associated health problems in rich countries are still growing.

One example of failure is a pilot study done in a primary school in South Wales. This study investigated the effect of a nutritional education intervention on the nutrition concepts of a sample of nine-year-old children. According to the authors (Bullen & Benton, 2004), even though the children had positive attitudes towards the introduced nutrition concepts, they did not seem to be able to translate what was in their minds into what they put into their mouths. A comparison of the results before and after the intervention suggests there was no significant change in the participants' conceptual understanding of food.

There are many studies that have recorded moderate positive eating changes. For example, the meta and pooling analysis from seven studies evaluating school-based nutrition programs found that "school-based nutrition interventions produced a moderate increase in fruit and vegetable intake among children" (Howerton et al., 2007, p.187).

Many of the research studies tried various interventions and evaluated nutritional knowledge and/or eating behaviors via surveys in post or pre and post-experimental periods. One design was described in the studies evaluated by Woolfe and Stockley (2005). Their study reviewed and analyzed final reports from five studies commissioned by the Food Standards Agency. Similar approaches that evaluated various interventions are found in the work of Penkilo, George, and Hoelscher (2008), where fourth grade students were surveyed about their nutrition behavior, physical activity, weight, and overall food selection skills. Another project that evaluated pre-test and post-test interaction eating behaviors of schoolchildren is described in the study of Morris, Briggs, and Zidenberg-Cherr (2002). This study evaluated selected knowledge and behavior results of the children who received garden-enhanced nutrition education curriculum and compared these with the children without intervention. The pattern of surveys for parents and children about their dietary intake was also in the study of Florence, Asbridge and Veugelers (2008), which investigated the effects of nutrition on health and school performance.

The report from Cebuski and Farris (1996), stated that schools are mostly focusing on increasing students' knowledge about what is meant by good nutrition, with less emphasis on influencing students' motivation, attitudes, and eating behaviors. According to this report the majority of schools (61 %) also have no nutrition education coordination, meaning each teacher is responsible for his or her own lessons and 86 % of schools receiving nutrition lesson materials get these from the food industry.

The most successful studies were usually those that described a coordinated, complex approach where nutrition classes were supported by a school wide policy. In the

work by Cluggish and Kinder (2008), a successful project targeted the before school, school day, after school, home, and community environments to expand opportunities for physical activity and availability of healthful foods. The authors stated that initial resistance in the cafeteria was shorter lived than they anticipated because children were getting the message about healthy eating everywhere. A similar experience was described in the article: Plant-based meals rock the schoolhouse - nutritional education program aimed at school children (1997). Here nutrition classes were supported through hands-on experiences and healthy choices offered in the cafeteria. The study stated that children will eat up to 20 times more low-fat, high-fiber foods if they learn about them. Also the program described by Whelan (2008) attributed its success to an integrated program that included field trips to farms, classroom visits by farmers, frequent food tasting, lunchroom composting and recycling, school gardening, and art projects that focused on food and community.

Schwartz (2007) evaluated an environmental intervention intended to increase consumption of the fruit being served to elementary school children. The author of the study noticed that simple, verbal prompts appeared to have a significant impact on the likelihood that children will take, and subsequently consume, a fruit serving as part of their purchased school lunch. Another study (Story et al., 2000) reported success with intervention when it included curricula in classrooms, parental involvement, school food service changes, and food industry support. Results of this study showed a high level of participation and interest for all of the intervention components, with the exception of parental involvement.

A fresh new approach of the described topic of nutritional education was

presented in the study from Vecchiarelli, Takayanagi and Neumann (2006). They asked high school students how they regard the implemented nutrition policies at their school and if they agreed with the measures taken.

Another example of an exceptional project was a study of 9 and 10-year-old children. The students were actively involved in the interviews and were treated as experts, defining for themselves the issues they considered to be important. The study is also special because as its authors Gosling, Stanistreet and Swami (2008) wrote “children’s views, opinions and experiences are noticeably absent from medical literature on childhood obesity (p.168).” In some aspects the presented study will continue with the approach described by Gosling et al. Students will be asked for their opinions in order to gather more information in an area that is lacking research.

*Literature supporting need for nutrition education and parental involvement*

There were several studies expressing the need for parental involvement. Eissing (2008) demonstrated that participation of parents in a nutrition lesson delivered at the school during a parents evening, significantly improved the quality of children’s breakfast as opposed to the breakfast of students whose parents did not attend. The community food project: Fresh food program described by the USDA (2009), promotes healthy eating habits among children. In addition to educating students, it offered teacher training and parent education. In the assessment of local wellness policies by Probart, McDonnell, Weirich, Schilling, and Fekete (2008) the importance of parents being involved and engaged was also recognized. Another study (Davies et al., 2005), stated that because the family is a critical influence in modeling and shaping children’s healthy

behaviors, there are strong theoretical as well as practical reasons for using social and ecological interventions in an approach that target the family environment and its influence on dietary behaviors. The take-home intervention tried in this study received only limited and temporary results.

Fitzgibbon et al. (2007) clearly demonstrate that in developing successful messages that are personally relevant and that will resonate in ways that lead to behavior change, there has to be a solid understanding of the target audience, including understanding their background knowledge, cognitive abilities, beliefs, values, and barriers to change or communication patterns.

Price (2008) insisted that the salvation from modern health problems is prevention. He called for social reforms through education and identified our greatest need - to teach the masses by every means possible. The urgent need for support of nutrition education in schools is also expressed in the German papers of Mälzer (2007) and Aigner (2008). According to Grönemeyer (2005), nutritional education and projects in the schools can save billions of dollars in treatment costs for sick children and later chronically ill adults. The paper from European Food Information Centrum ([EUFIC], 2008) stated that nutrition education is not generally offered at the schools in Europe (except for Belgium and Spain), and the eating of fruit is not supported in the schools. Renate Künast, head of Consumption Goods Ministry in Germany, calls, in an interview with Klausman (2004), for enhanced nutrition education in the schools and preschools that, according to Künast, is needed as much learning to write and count.

One study (Affenito, 2007) delivered arguments for the need for healthy breakfasts, which has been linked with improvement in academic performance and



psychosocial functioning as well as cognition among children. The author supported the promotion of healthy family meals. Sherman and Muehlhoff (2007) stated that the profile of nutrition education in school curricula across the world is still low, the time dedicated is small, and progress is slow. Initial results from their study suggested that gains in awareness, knowledge, and behavior could be achieved among children and their families with an actively implemented classroom program backed by teacher training and parent involvement.

Eisenberg's (2009) study provides descriptive information about the logistics of establishing and delivering health information to schools that are resistant to nonacademic programming. The necessity of a healthy school environment is documented by Hesketh et al. (2005) who found that children appear to believe that school, and anything permitted at school, is inherently healthy. The CDC report (1996) asks for nutrition education from preschool through 12<sup>th</sup> grade because dietary factors contribute substantially to the burden of preventable illness and premature death in the United States. According to this report, healthy eating patterns in childhood and adolescence promote optimal childhood health, growth, and intellectual development; prevent immediate health problems, such as iron deficiency anemia, obesity, eating disorders, and dental problems; and may prevent long-term health problems, such as coronary heart disease, cancer, and stroke. The CDC also stated that school health programs can help children and adolescents attain their full educational potential.

*Literature reporting about eating habits or health of elementary school children*

The American Dietetic Association (2008) stated that the increase in overweight children during the past three decades has broadened the focus of dietary guidance to address children's overconsumption of energy-dense, nutrient-poor foods and beverages, and physical activity patterns. This report suggests that promotion of health awareness will help reduce diet-related risks of chronic degenerative diseases, such as cardiovascular disease, type 2 diabetes, cancer, obesity, and osteoporosis. Levine (2009) stated that Congress desperately needs to focus on the biggest "nail" bedeviling Americans' health – rising obesity rates caused by our high-fat, meat-heavy diets. She urged that it is time to reform federal nutrition policies that actually encourage children to eat unhealthy foods.

According to the Robert Wood Johnson Foundation (2009), nearly one-third of children and teens in the United States are overweight or obese. The study found a significantly higher likelihood of obesity among elementary students whose schools offered French fries for lunch more than once per week and the same was true for students whose schools offered dessert with lunch more than once per week. On the contrary, elementary students who were offered fresh fruits and raw vegetables daily during lunch consumed significantly fewer calories from low-nutrient, energy-dense food and consumed significantly more fruits and vegetables during the school day.

Similar alarming evidence is summarized in the work of Fleischacker (2007). According to this study, competitive foods or foods of minimal nutritional value compete for children's coins and calories in the school food environment. There is an emerging scientific record on the negative impact competitive foods have on children's diet and

health. Stephen (2007) stated that many school menus model typical fast food choices and that students are routinely exposed to product sales, direct advertising, indirect marketing, and market research, all of which are founded by commercial entities motivated solely to profit from children's consumerism. According to this author, the promotion of unhealthy foods and beverages through machines or other kinds of marketing on school property undermines the efforts they might make to promote healthy nutrition.

Smith (2008) describes how the replacement of a cafeteria's typical processed food menu with wholesome, nutritious food totally changed the behavior of students. Students consuming processed foods were out-of-control; there were weapons violations at the school, student disruptions, and a member of law enforcement on duty full time. After the change in school meals, the students were calm, focused, and orderly; there were no more weapons violations, and no suicides, expulsions, dropouts, or drug violations. Similar results came out from the additive ban at a school in Worcestershire. The school decided to ban all the additives from its meals to stop children from behaving badly. After two weeks the staff noticed a marked improvement in pupils' behavior. According to the head teacher, children's concentration levels had also improved, parents reported better behavior and improved sleeping for their children, and children commented on how much better their school meals tasted (Additive ban improves class behaviour, 2002).

*Literature warning about influence of food industry on nutrient education*

Schwartz and Brownell (2009) presented the argument that obesity should be viewed as the consequence of a “toxic environment” rather than the result of the population failing to take enough “personal responsibility.” According to the authors there are powerful economic forces that promote the consumption of unhealthy foods in our current environment, including heavy promotion of these foods by the food industry. In their opinion, the key lesson is that education alone has little impact while changes in an environment generate better results.

Simon (2006) describes an especially disturbing situation: corporations such as Coca-Cola and PepsiCo are promoting their educational programs in the classrooms while at the same time fighting to keep their unhealthy products in the hallways. According to this author, the food corporations spend roughly \$12 billion a year on marketing designed to get children to pester their parents for junk food – doing an end run around parents’ authority over their kids’ dietary choices in the process. The article *Marketing and Advertising for Least Healthy Breakfast Cereals* (2009) described the study from Yale’s Rudd Center for Food Policy and Obesity. The study found that the cereals marketed directly to children meet the industry’s own nutrition standards for “better-for-you” foods even when these cereals are the least healthy breakfast cereals with 85% more sugar, 65% less fiber, and 60% more sodium than cereals marketed to adults for adult consumption. The researcher stated that ceding authority to the food companies to regulate themselves is a mistake and that the companies want to be seen as public health allies, but their actions indicate otherwise. French, Story and Jeffery (2001) noted that the entire amount spent by the USDA on nutrition education, evaluation, and

demonstration was only 3% of what the industry spent in 1997. The authors also emphasized those foods that are most heavily advertised are those that are over-consumed, while those that receive less advertisement are under-consumed and that confectionaries and snacks, prepared convenience foods, soft drinks, and alcoholic beverages are the most heavily advertised foods, whereas fruits and vegetables are among the least advertised foods.

Henner (2001) stated that child's "brand loyalty" may begin as early as two years old and she also described how the fast food industry is advertising in the halls of our public schools. According Fitzgibbon et al. (2007) the food industry is the leading buyer of television, newspaper, magazine, billboard, and radio advertisements, spending \$7.3 billion US on advertising in 1999. In contrast, the USDA spent \$333 million US on nutrition education media campaigns during the same time period.

According to the American Dietetic Association (ADA, 2008) children seem to possess an innate ability to self-regulate their energy intake, but their food environment affects the extent to which they are able to exercise this ability. The study also stated that the influence of advertising on children's eating patterns is an increasing concern, because there is strong evidence that the marketing of food and beverages did influence the preferences and purchase requests of children. A report from the USDA (2009) insisted that the external environment has a fundamental impact on efforts to influence diet-related behavior. According to this report it is unrealistic to expect consumer behavior to be consistent with healthy eating goals in an environment that promotes the opposite.

### Relationship of Current Literature to Present Study

It is an accepted fact that current eating and exercise behaviors are driving the obesity epidemic as well as other nutrition related health problems, and are largely due to an environment that promotes excessive food intake and discourages physical activity as stated in the work of Hill and Peters (1998). There is a general consensus between scientists, medical organizations, and the government that complex nutrition education is of critical importance in resolving the obesity epidemic and with this, related health, economical, and social problems. The study of French et al. (2001) suggests that an imbalance between resources available to educate people about good nutrition versus those that encourage the overconsumption of food may be a major contributing factor of obesity. However, according to Fitzgibbon et al. (2007) a consensus does not exist on how to teach nutrition and how health information should be communicated to the public. Hesketh et al. (2005) noted that there is an absence of published research relevant to the pre-adolescent, school-aged population. A program is needed to examine the views of children and their parents regarding effective promotion of health and sustainable obesity prevention. The purpose of the presented study is to evaluate the views of students, parents, and teachers on how to teach, in a school setting, healthy nutrition and what tools in particular will evoke long-lasting, positive change for the community and society as a whole. It is assumed that preventive health strategies as well as incorporating the views of target participants will improve the likelihood of overall success. The views of the study participants will provide a direct and vital contribution in the preparation and communication of nutrition education curriculum.

In addition to the voices for nutritional education in schools there is also a growing demand for change in school cafeterias and in the general school environment. The Organic Consumers Association (n.d.) summarizes these particular needs in its program “Appetite for a Change.” The goals of this program are as follows: kick junk foods and junk food ads out of the schools, start converting school lunches to healthier menus, stop spraying toxic pesticides on school grounds and in buildings, and to teach students about healthy choices and sustainable agriculture. The request for healthier school meals is expressed also by Dr. David Katz, director of the Prevention Research Center at Yale University School of Medicine, who said that school nutrition standards were originally devised to protect children from malnutrition and want, but in an age of epidemic childhood obesity, when children are far more likely to get too many calories than too few, and when more and more succumb to what was called “adult onset” diabetes than just a generation ago, the time-honored school food standards are clearly obsolete (School meals needs to get healthier, 2009). The presented study will identify specific changes being asked for by its participants when considering school cafeterias as well as the general school environment.

## CHAPTER FOUR

### RESULTS AND FINDINGS

This chapter presents the results given by concurrent mixed method design.

#### Results and Findings

The researcher sent 724 copies of survey sheets for students, 724 copies of survey sheets for the parents of these students, and 42 copies of survey sheets for the teachers. The students returned 416 completed surveys, 440 were returned by parents, and the teachers returned a total of 38 surveys. That translates to 57% participation from the students, 60% participation from the parents, and 90% participation among the teachers. This general high turnout of surveys is attributed to the very active contact between the researcher and the teachers with repeated email reminders and topical time schedule of the study.

When all the responses from the American and Czech schools were compared, there was a much higher response rate from students at the American school than from their parents. This translates to 83% turnout from students and only 55% turnout from the parents. The response rate at the Czech schools was 61% completed surveys from parents and 52% completed surveys from students. A possible reason for the relatively low response rate of parents at DAIS could be explained by the fact that many parents of these students are not fluent in English and the language barrier may have hindered their



participation. The general lower rate of responses from students than from parents could be explained with the timeframe of the study. All students completed the survey together during one school day, but the parents received the surveys at home and were then given a one-week deadline for completion. Therefore, all of the students absent on the day when the class was answering the survey were automatically excluded from participation even if their parents were actively participating. The researcher also excluded all survey sheets with more than half of the answers missing. This happened on only a few of the student surveys. The higher response rate from DAIS could be explained by almost daily direct contact between the researcher and the teachers at DAIS, while there was only email or phone contact with the teachers from the Czech schools.

#### Results from Quantitative Data

The exact results are presented in the following figures. Answers for each question from students, parents, and teachers are compared and an explanation of the most important or interesting findings is documented under each bar graph.

The answers to the question: “Where did you learn the most about healthy nutrition?” (see Figure 1) suggests that parents and teachers from this study have received most of their nutrition education from media. The students have received most of their information from school and their parents. It is possible to deduce that many students are receiving nutrition education from their parents or teachers based on the media, a very poor source often influenced by food manufacturers. This information, in addition to the responses provided by the teachers and parents in the qualitative section of the survey confirms the need for a more reliable resource in the area of nutrition education.

An important piece of information is that most of the students surveyed indicated that they had received their nutrition education at school and the question is how much of this was based only on FFF healthy nutrition activity book.

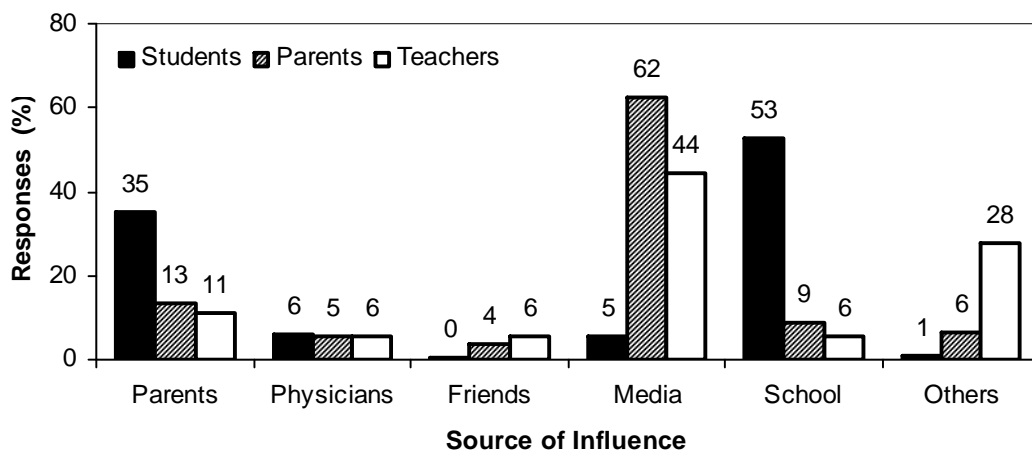
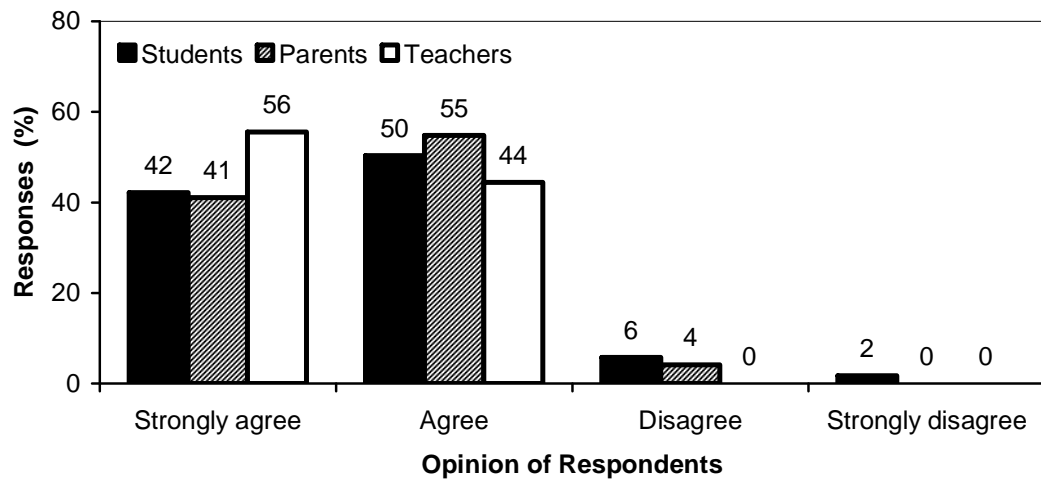


Figure 1. Where did you learn the most about healthy nutrition?

Question answered by 409 students, 382 parents and 36 teachers.

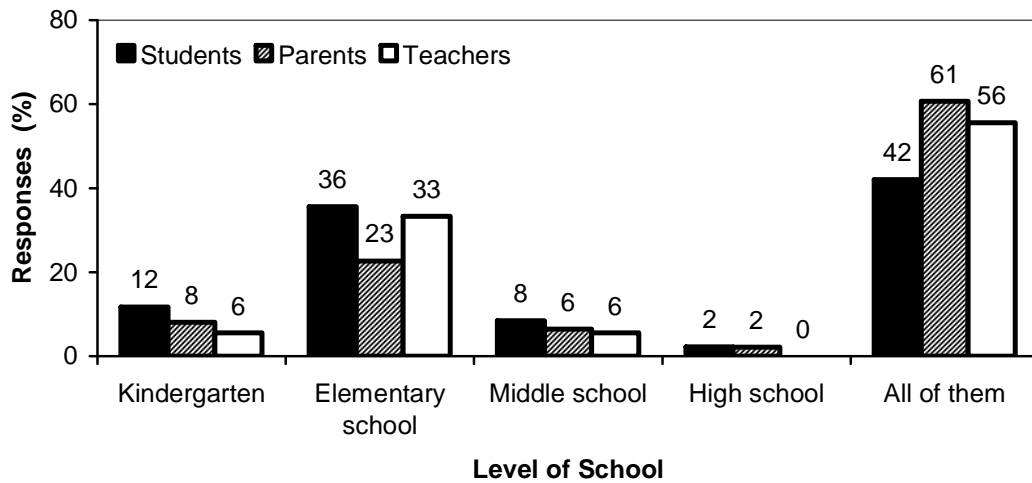
Answers to the question “Do you agree that healthy nutrition should be taught at school?” brought broad agreement across all of the groups (see Figure 2). What is exceptional is that not only did 100% of the teachers agree that healthy nutrition should be taught at schools, but also the vast majority of parents and students are very positive about the implementation of nutrition into school curriculum. The results present a very strong argument for teaching healthy nutrition at schools and this argument is further supported by the same message in the qualitative part of the study.



*Figure 2.* Do you agree that healthy nutrition should be taught at school?

Question answered by 415 students, 438 parents and 36 teachers.

The responses were very similar from all three groups on the survey question “At which grade level should we teach about healthy nutrition?” The majority of the participants wish that healthy nutrition would be taught continuously from kindergarten to high school. The second most popular response shows the wish to teach healthy nutrition at elementary school (see Figure 3).



*Figure 3.* Grade level in school where healthy nutrition should be taught.

Question answered by 402 students, 420 parents and 36 teachers.

In their response to a question about family eating style (see Figure 4) many parents expressed their desire to eat healthier is often hindered by obstacles. Similar percentages of students and teachers reported the same answers. Participants from all three groups together mostly reported that they usually eat healthy foods, even if this is not a family priority. The following prevalent response was that healthy nutrition is an important part of a family's lifestyle. Both of these answers are very positive and prove that most families do understand the importance of healthy nutrition.

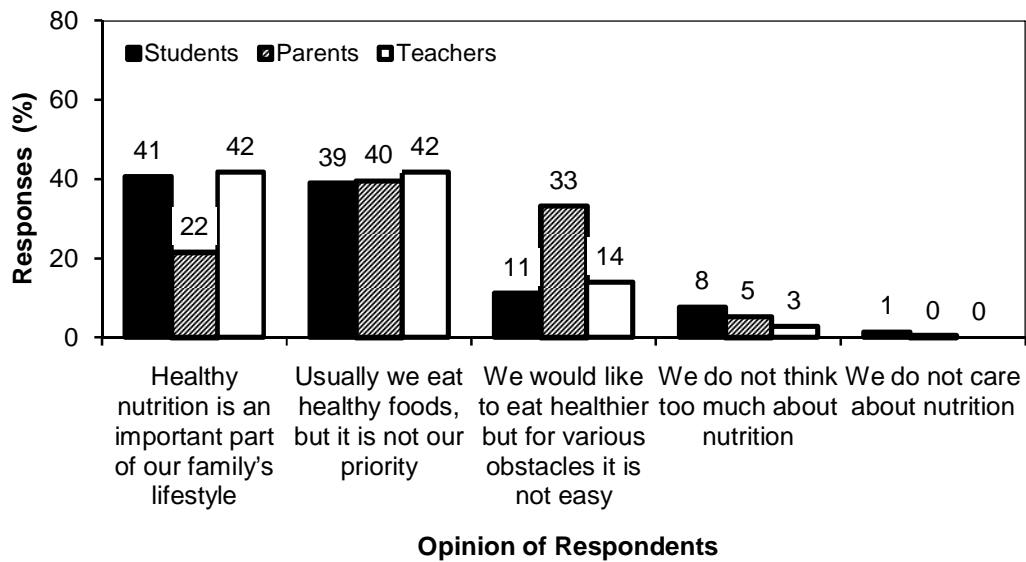
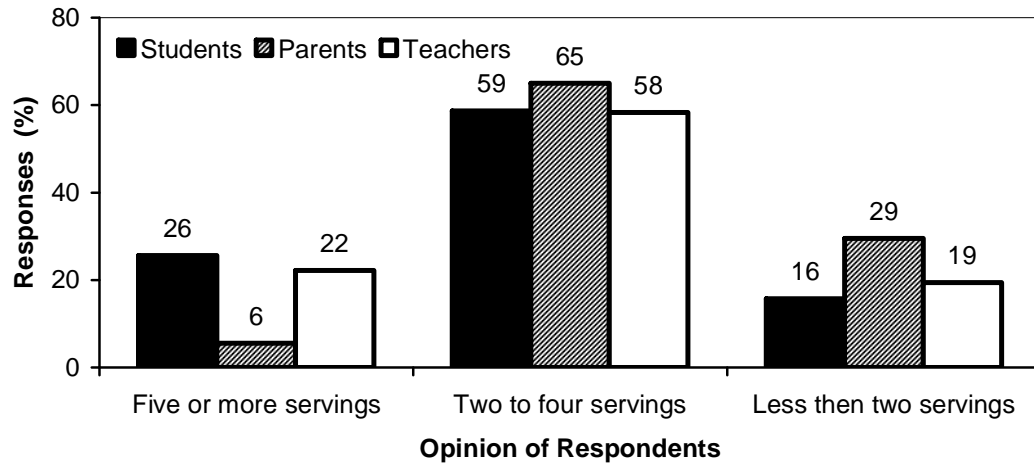


Figure 4. Which statement best describes your family?

Question answered by 413 students, 437 parents and 36 teachers.

From the responses regarding the number of fruit and vegetable servings daily consumed as shown in Figure 5, emerged that the majority of participants are not getting the recommended five or more servings of fruits and vegetables. Students reported better eating habits than parents but it is possible that they are overestimating their fruit and vegetable consumption. Answers from parents tend to be more realistic or honest. Another possible explanation is that students from this study were already positively influenced from the FFF study book and really had consumed more fruit and vegetable servings than adults. If this explanation is correct then the study proved that even a relatively small investment in the form of an activity book for students and few hours of teaching, can achieve at a minimum an immediate but important change in fruit and

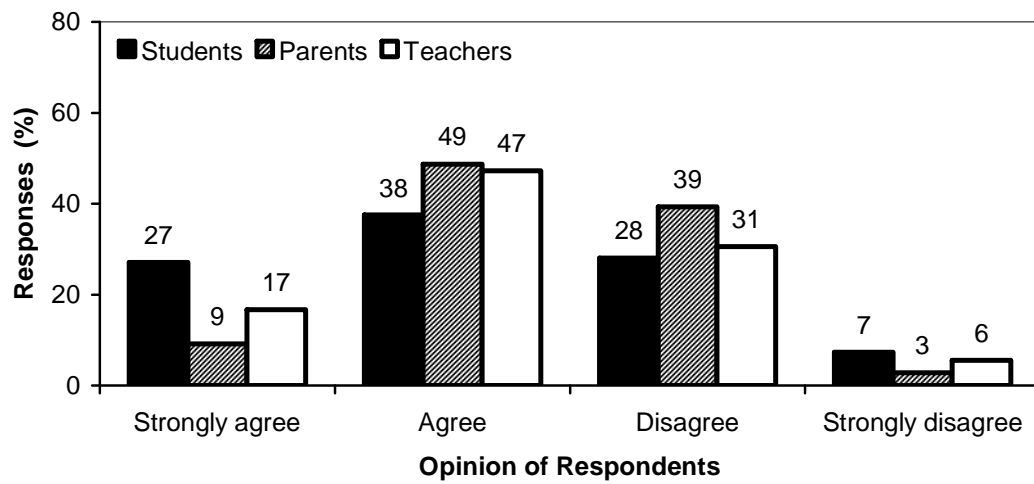
vegetable consumption. Of course this would have to be confirmed with other studies and more importantly, with long term observation of these students.



*Figure 5.* How many servings of fruit and vegetables do you eat every day?

Question answered by 414 students, 434 parents and 36 teachers.

Opinions regarding the teaching of healthy nutrition as a separate class are widely distributed, though the majority of all respondents are positive (see Figure 6). When reviewing the data of the survey responses for nutrition being taught at school and whether it should be incorporated into the traditional classroom curriculum and comparing it to the testimonies from the qualitative part of the study, the idea of separate nutrition classes received less support.



*Figure 6.* Separate nutrition classes.

Question answered by 410 students, 425 parents and 36 teachers.

The majority of students, parents, and teachers agree with incorporation of nutrition education in the traditional classes (see Figure 7).

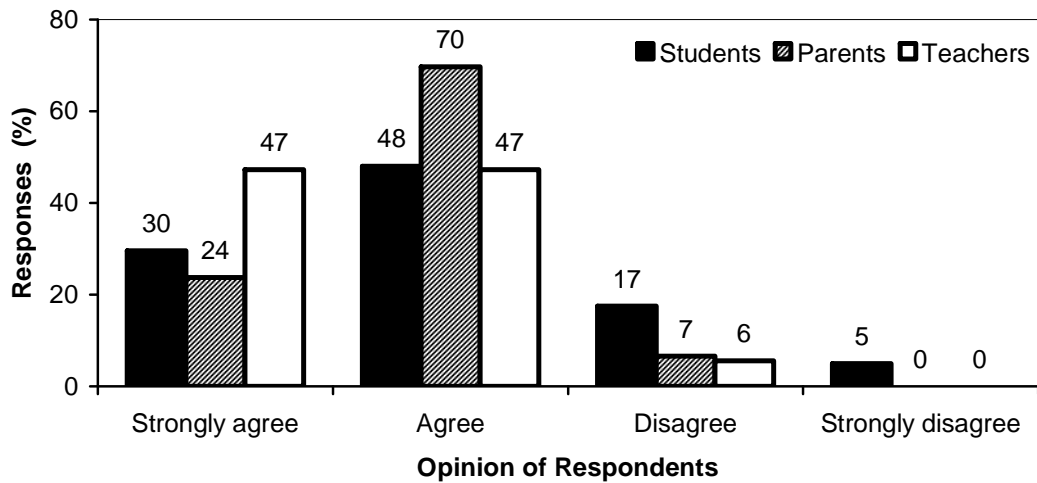


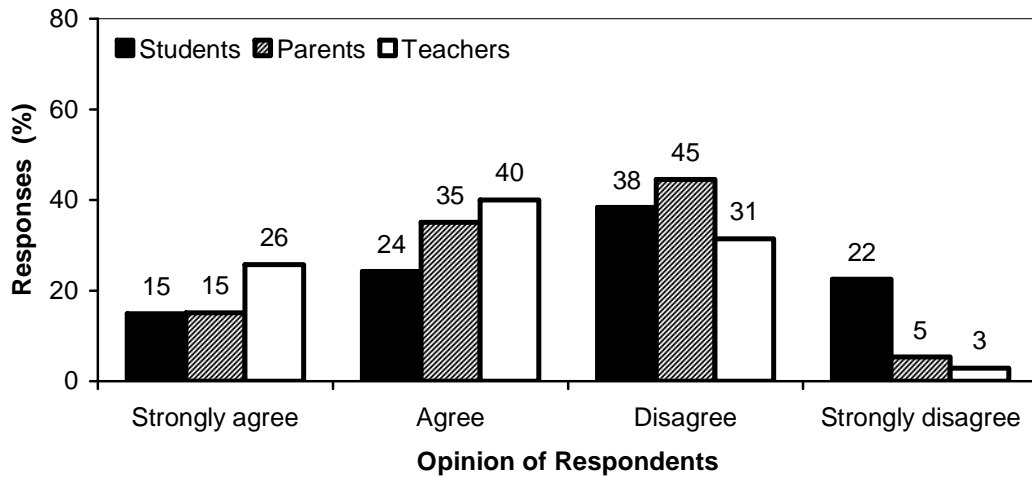
Figure 7. Nutrition education incorporated in the traditional classes.

Question answered by 406 students, 426 parents and 36 teachers.

It is interesting that the same percentage of parents and students strongly agree with a school 'no candy policy' (see Figure 8). A follow-up question worth asking in future research could investigate whether these particular children and parents are from the same families. That may show that a strong family view on healthy nutrition translates to the views of the children. A 'no candy policy' was predicted to be the most unpopular step in the efforts to implement healthy nutrition in schools. Therefore, the relatively positive outcome is quite surprising, especially the 39% agreement (strongly agree or agree) for no candy at school coming from the students. The researcher expected that the vast majority of students would oppose this suggestion and also anticipated stronger disagreement from the parents'. The presented results strongly



support that even stricter food policies if supported with proper education could be implemented at schools.



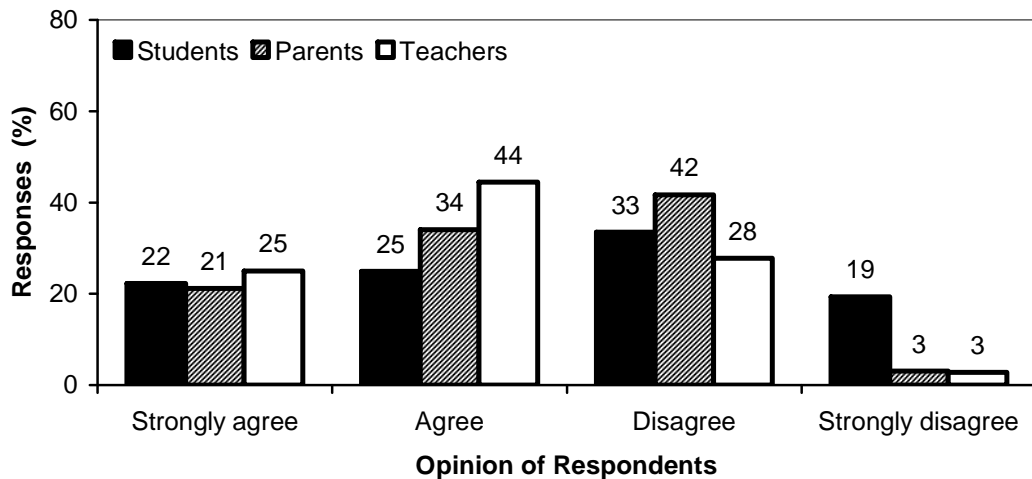
*Figure 8.* School policy: No candy for any occasion.

Question answered by 409 students, 431 parents and 35 teachers.

Do you agree with no vending machines at school? This was believed to be another unfavorable proposal. It was predicted that students would be strongly against the elimination of vending machines from the schools because these typically offer popular junk food. The researcher also expected stronger opposition from the parents because the vending machines offer a convenient source of snack food for students of busy parents.

Exactly as expected there was a strong opposition against schools without vending machines from the student and parent groups but again there were also many surprising voices of agreement from all three groups. The positive agreement among the teachers

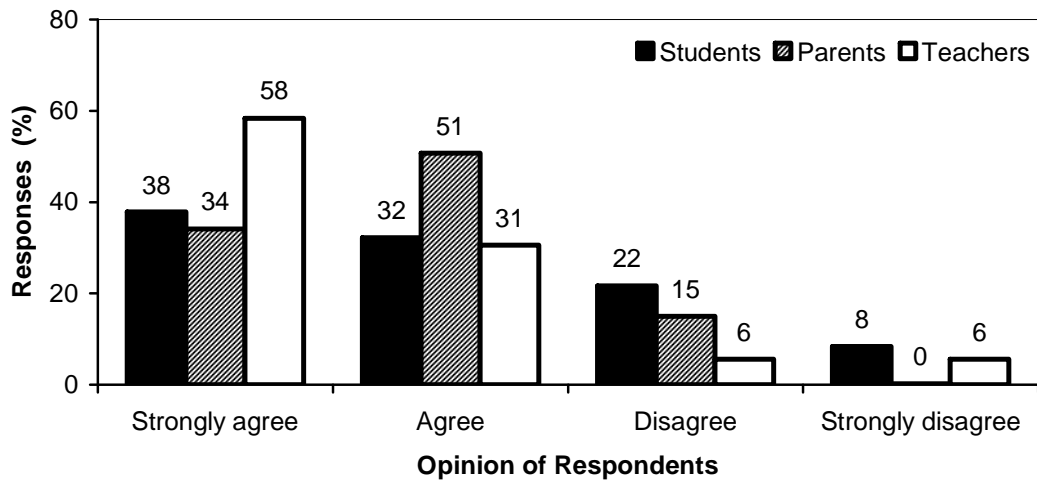
can be explained by the notion that their classroom environment is negatively influenced when students are consuming unhealthy food between classes (see Figure 9).



*Figure 9.* No vending machines at schools.

Question answered by 409 students, 420 parents and 36 teachers.

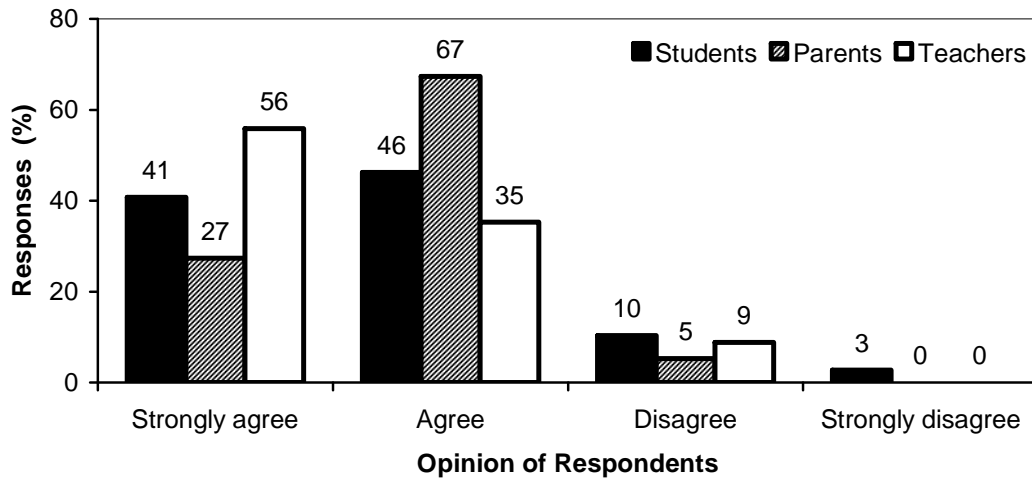
The researcher must explain that the question regarding healthy vending machines at school that would offer only healthy food choices seems not to be clearly formulated. This resulted in some opposition from participants for any type of vending machines, even those with only healthy choices because they are against the idea of vending machines at schools all together. Otherwise it could be assumed that there would be a majority agreement among the groups for vending machines providing healthy choices (see Figure 10).



*Figure 10.* Vending machines at school yes, but only with healthy choices as recommended by nutritionists.

Question answered by 407 students, 428 parents and 36 teachers.

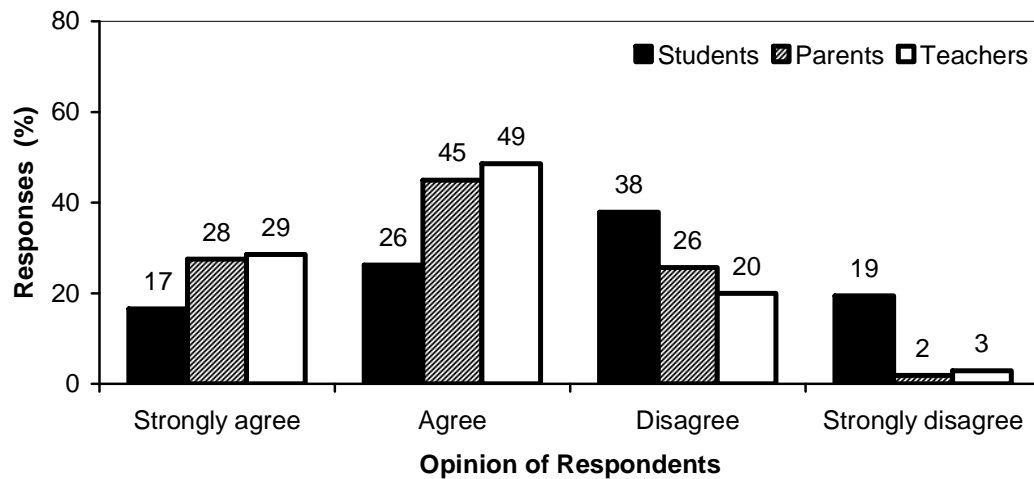
It was supposed that teachers and parents would ask for healthy choices at the school cafeteria as shown at Figure 11. It is surprising that even the majority of students would like healthy choices to be offered in school cafeterias. The answer on this question again supports that the majority of participants from all three groups understand the importance of healthy nutrition and it could also be speculated that many students are eating healthy meals at home and they enjoy it or it could mean that they do not like the cafeteria's current menu.



*Figure 11.* A choice of healthy meals alongside traditional school cafeteria menus.

Question answered by 407 students, 435 parents and 34 teachers.

The answers on the question about serving only healthy meals in cafeterias (see Figure 12) are much more widely distributed and, as expected students are voicing the most opposition. The author of the study, when participating on a food committee at Shanghai American School a few years ago, experienced strong resistance from parents against the elimination of fast food items from the cafeteria menu with this argument: “We cannot take away from the children everything that is American”. Therefore the data presented here showing agreement among most of the parents for offering only healthy meals in the cafeterias already presents a positive change.



*Figure 12.* Only healthy meals on the cafeteria menu.

Question answered by 412 students, 432 parents and 35 teachers.

When asked about making additional fresh vegetables available during lunch and fresh fruit available during snack for free, there was a very strong agreement across the groups (see Figure 13). This presents an important message for school administrators or even governments. It appears that this measure could be very popular and relatively easily implemented.

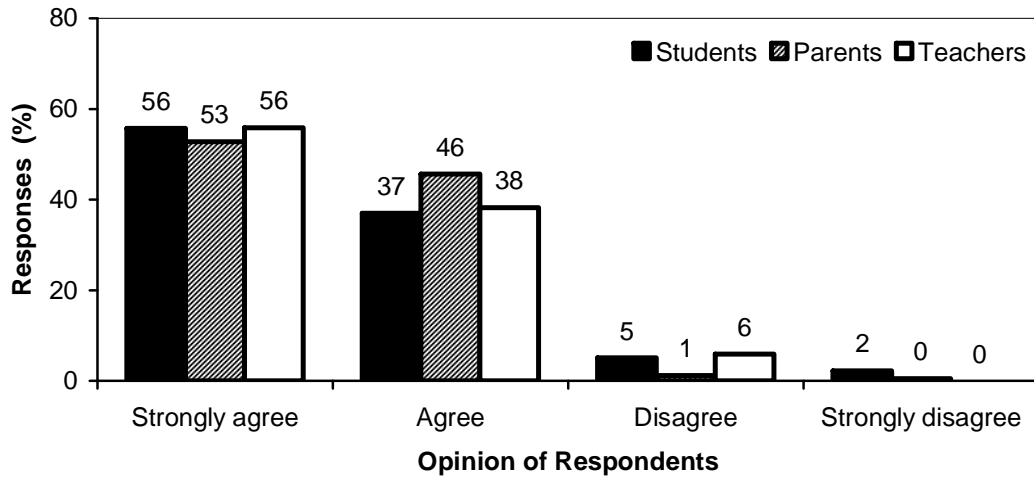
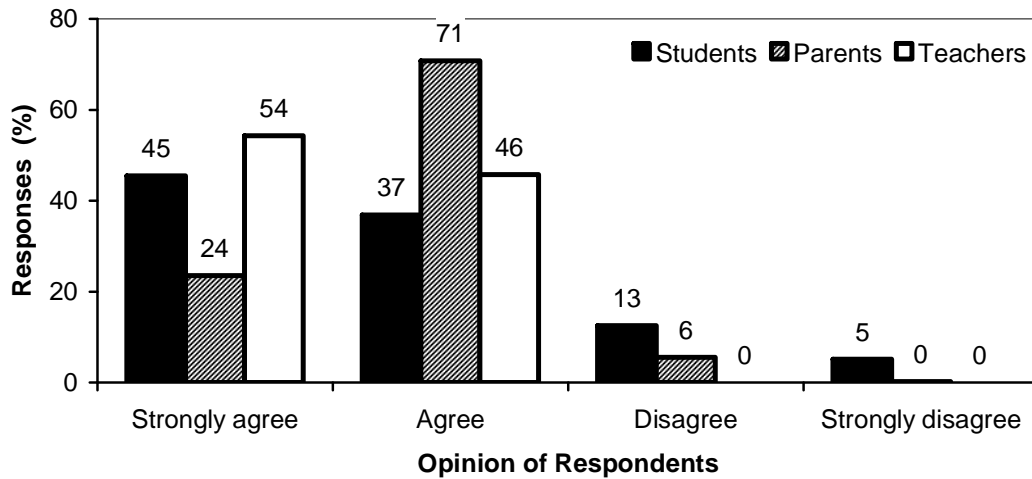


Figure 13. Additional fresh vegetables during lunch and fresh fruit during snack for free.

Question answered by 411 students, 434 parents and 34 teachers.

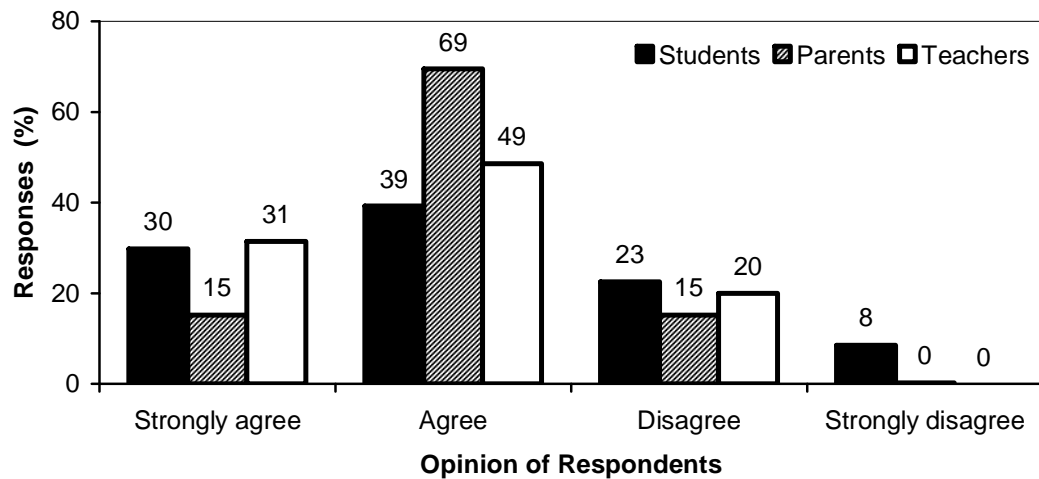
As expected, the majority of participants agrees or strongly agrees with incorporating field trips to organic or local farms (see Figure 14). The voices expressing disagreement are mostly from students.



*Figure 14.* Field trips to organic or local farms.

Question answered by 407 students, 434 parents and 35 teachers.

The majority of respondents agree with classroom visits by farmers, but there are also many disagreeing voices as shown in Figure 15. The researcher speculates that the unwillingness by the students to interact with local farmers may stem from a fear of the unknown. It is possible that many students today are living isolated from experiences on the farms and they do not know how food is grown, raised or produced, and are uninterested in learning more.

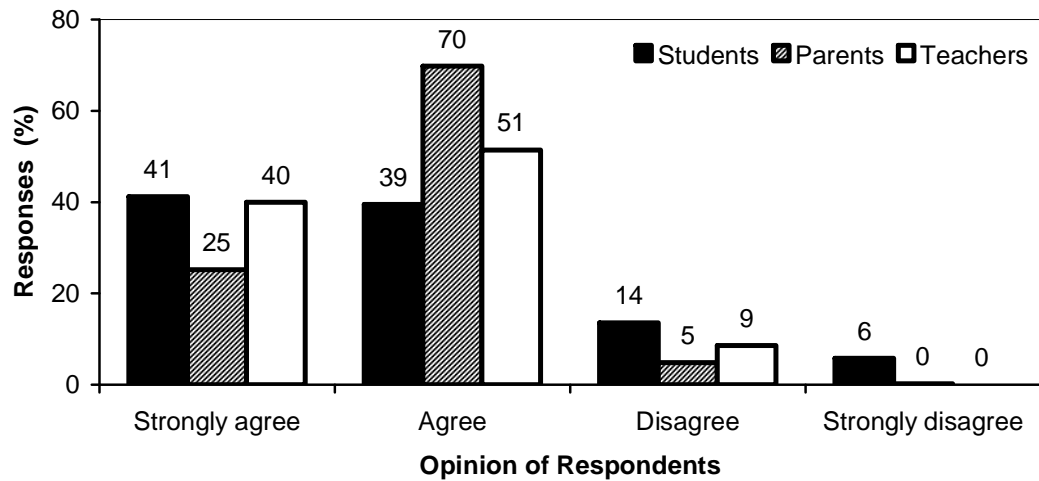


*Figure 15.* Classroom visits by farmers.

Question answered by 413 students, 436 parents and 35 teachers.

The answers to the question about providing exposure to less common healthy foods by offering frequent food tasting were primarily positive but among the students there is more than one-fourth in disagreement (disagree or strongly disagree). It could again be speculated that some students are afraid to try what is unfamiliar (see Figure 16).

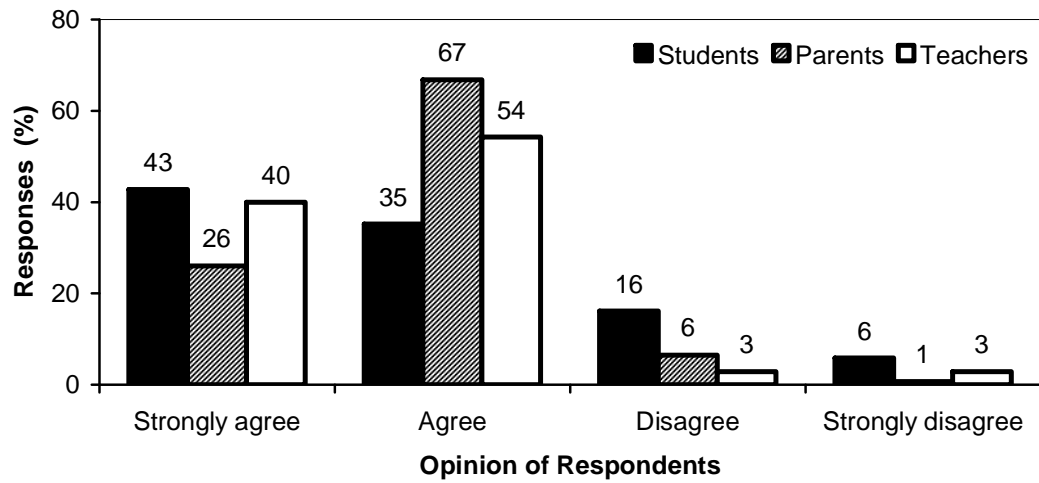




*Figure 16.* Exposure to less common healthy foods by offering frequent food tasting.

Question answered by 413 students, 437 parents and 35 teachers.

The majority of participants from all three groups agree with school composting and recycling. The most negative voices come from one-fifth of the students who disagree or strongly disagree as shown in Figure 17.



*Figure 17.* School composting and recycling.

Question answered by 409 students, 434 parents and 35 teachers.

Again the majority of participants from all three groups agree with lectures from experts and again the most from negative voices come from students. In this case it makes about 17% (see Figure 18).

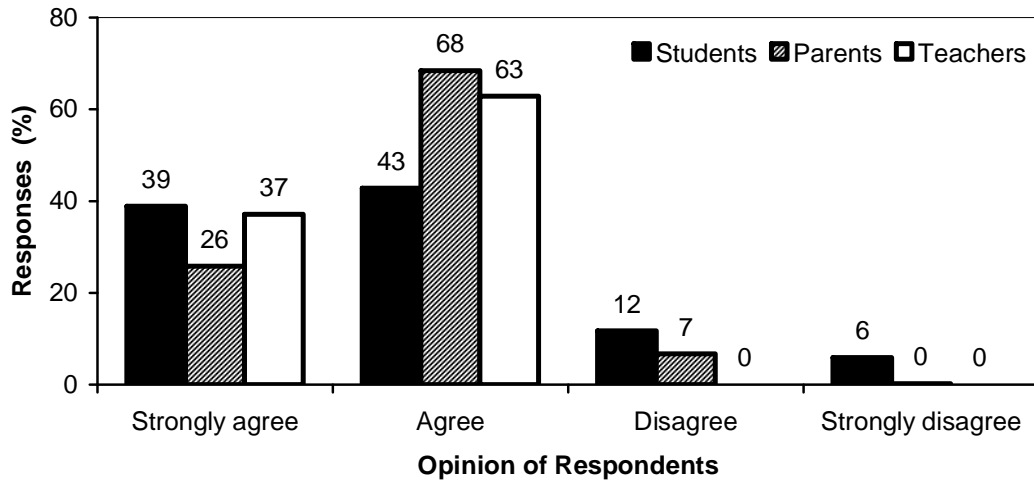


Figure 18. Lectures from nutritionist and other experts.

Question answered by 406 students, 439 parents and 35 teachers.

There is very strong agreement on school gardening among students and teachers (each group has over 50% respondents agreeing). Parents agree or strongly agree with gardening in over 90% of those surveyed as shown in Figure 19.

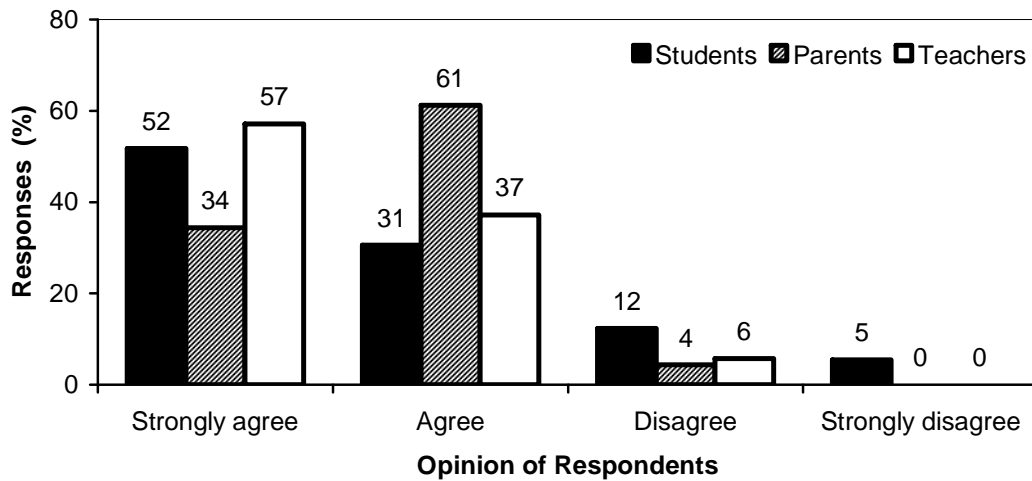


Figure 19. School gardening.

Question answered by 406 students, 436 parents and 35 teachers.

#### Sub Results from Quantitative Data

The majority of all participating students and parents were either Czech, American, or of Asian nationality. The group of teachers consisted of only American and Czech nationalities. The participants from other nationalities were in the minority and the researcher did not compare their answers when evaluating the influence of nationality on the willingness to teach or learn healthy nutrition in schools. The author of the study decided to explore what influence the participant's nationality has on his/her opinion about the teaching of healthy nutrition. This question was presented and evaluated: "Do you agree that healthy nutrition should be taught at school?" The chosen question and its answer was considered the most important to acquire before starting with the implementation of any nutrition curriculum.

The researcher decided not to evaluate the second sub question about how the nutritional status of a participant influenced their willingness for nutrition education. This is because there were a very low number of participants who, according to their description could be placed into the category of having poor nutrition (see Figures 4 and 5).

*View on nutrition education from students of different nationalities*

The most distinguishable viewpoint is found in the very strong support of nutrition lessons in school from American students. Fifty-eight percent of American students when asked if they agree that healthy nutrition should be taught in school responded 'strongly agree'. Forty-one percent of the Czech students chose the same answer and only thirty-two percent of the Asian students strongly agree that healthy nutrition should be taught. When comparing both positive answers (strongly agree and agree) from these individual nationalities, Americans are clearly leading, followed by Czech students and Asian students (see Figure 20).

The American students' awareness of the importance of healthy nutrition and the subsequent problems of unhealthy habits could be a result of the massive media coverage in the United States. This hypothesis would also explain the middle position of Czech students because obesity and its related health problems have been noticed longer in Europe than in most of the Asian countries where obesity is a relatively new phenomenon.

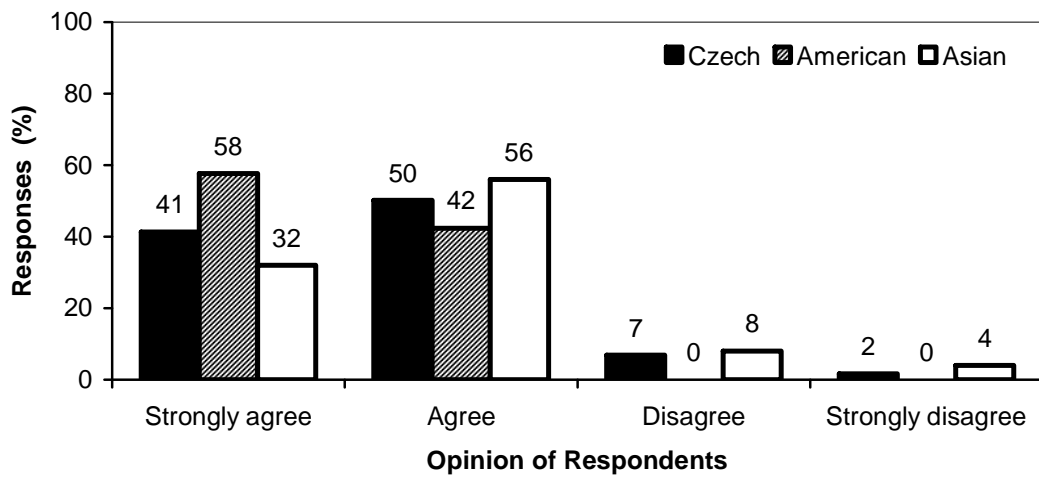


Figure 20. Students, do you agree that healthy nutrition should be taught at school?

Question answered by 305 Czech students, 52 American students and 25 Asian students.

*View on nutrition education from parents of different nationalities*

The parents of American nationality are again the most interested in incorporating healthy nutrition into the regular school curriculum and the number of answers voicing “strongly agree” is exceptionally high. The support for nutrition education among the Asian parents is surprisingly high (see Figure 21).

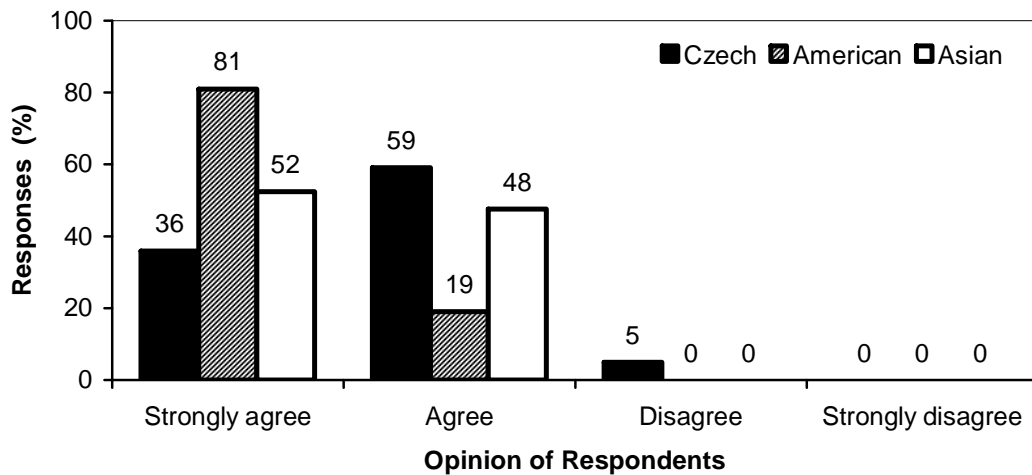


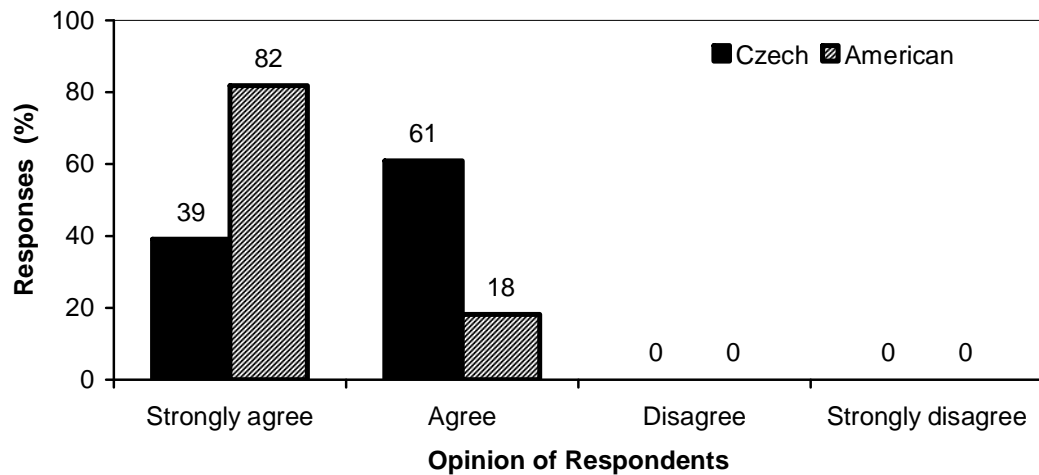
Figure 21. Parents, do you agree that healthy nutrition should be taught at school?

Question answered by 362 Czech parents, 21 American parents and 25 Asian parents.

*View on nutrition education from teachers of different nationalities*

All participating teachers of American and Czech nationality agree that healthy nutrition should be taught in school. Also, when comparing answers from American and Czech teachers, the Americans again are much more strongly in favor as shown in Figure 22. This result can again be explained by much higher awareness about the consequences of unhealthy eating in the USA than is currently publicized in the Czech Republic. In this case it is plausible to deduce that awareness and the understandings of consequences are necessary components in bringing about a readiness for change.

The researcher sees that the current economic crises and still growing expenses in the medical system may lead to more people focusing on prevention of health-related problems by making positive, proactive lifestyle changes.



*Figure 22.* Teachers, do you agree that healthy nutrition should be taught at school?

Question answered by 23 Czech teachers and 11 American teachers.

### Evaluation of Qualitative Data

The researcher used manual analyses of presented qualitative data, which meant organizing and labeling the data by hand.

#### *Qualitative data from teachers*

The researcher evaluated qualitative data from 33 teachers, respectively 87%, from all of the teachers participating also in the quantitative part of the study. All of the collected data are shown in Table 1. Among the most representative views (over 10% from responding teachers) were information about using FFF books, recommendations about how to improve the book, the evaluation of current situation regarding nutrition



education, and feedback about the need for the regulation of advertising.

Most of the teachers (58%) expressed their interest in using the FFF study books when teaching nutrition. Furthermore, the researcher received many thankful notes from teachers via the survey sheets, private letters, or private conversations expressing their interest in having their students learn about nutrition. This positive evaluation of the FFF healthy nutrition activity book represents for the researcher strong support for the use of the FFF book as a base for the preparation of more age appropriate healthy nutrition books. The suggestion to incorporate more pictures and activities (24%) was the most oft expressed recommendation regarding the FFF books and this supports the timeless motto of a well-known European teacher Comenius: “schola ludus” (“school as a play”) (Fučíková, 2008). Some teachers evaluated FFF book as too complicated for their students and suggested to better adjust the information to the age of the students (6%). The researcher was aware of this problem, which came from using one book for all of the elementary school grades. More than one third (36%) of the teachers in this qualitative part of the study again expressed their wish for nutrition to be taught more. This wish to teach nutrition in schools is supported by the results from the quantitative part of the study. Many teachers (24%) also express their wish for the regulation of advertising.

In addition to the codes the researcher specified prior to the detailed evaluation of the open-ended questions, other interesting recommendations from the teachers surfaced: include practical lessons such as cooking or shopping as part of a successful nutrition education program; in addition to educating teachers, parents would also benefit from a quality nutrition education program which would then address the complaints many teachers expressed regarding the children’s poor eating habits. Also, the suggestion was

made to create a FFF book aimed at kindergarten students, in order to start nutrition education in schools as early as possible.

A few citations from the teachers' qualitative data support the above by claiming, "Many students come to school with poor snack choices or lunches. It is hard to undo what parents instill. We just need better education for all" (Q T011). "The book presented tons of information. It could be broken down into smaller books and arranged by grade level" (Q T011). "Regulation of ads is crucial. Tax breaks on something like a membership to an organic farm" (Q T002). "Thank you for the JV books. We taught all ten lessons and would like to continue using the JV books also next school year. Children are very interested and enjoy the nutrition lessons" (Separate letter from the teacher, school Liberec).

Table 1

*Summary of Teachers' Answers in Qualitative Part of the Study*

Answers in codes	No. responses	Percent
Interest to use FFF as a teaching tool	22	58
No interest to use FFF	1	-
FFF suggestions		
Color print	1	-
More pictures and activities	8	24
Explanation of the words	1	-
Too complicated, better age adjustment	6	18
The evaluation of current situation		
Healthy nutrition teaching		
Not enough wish more	12	36
OK, enough	3	9
Do not want, not interested	-	-
Government interventions		
Yes	5	15
No	1	-
Regulation of advertisement		
Yes	8	24
No	-	-

Answers in codes	No. responses	Percent
<hr/>		
Taxes on unhealthy food choices		
Yes	2	-
No	-	-
Support of healthy food choices, organic, local	4	12

*Note.* 38 teachers participated in the study. 33 (87%) teachers responded also to this qualitative part of the questionnaire. Dashes indicate that there were no responses or percentage was less than 5%.

*Qualitative data from parents*

The researcher received qualitative data from 309 parents, which represents 70% of all the parents participating in the quantitative part of the study. All of the collected data are summarized in Table 2. Among the most representative views (over 10% from responding parents) were feedback about using the FFF books, recommendations on how to improve the book, the evaluation of the current situation regarding to nutrition education, and support for government interventions, regulation of advertisement, taxes on unhealthy food choices, and support of healthy food choices.

The majority of the parents (76%) expressed their interest in having FFF study books for their children both at home and at school. Some parents suggested ways to improve the FFF book: use color print, incorporate more pictures, games, quizzes, and activities, and adjust the information to better suit the ages of the students. As many as 41% of parents responded that the current teaching of nutrition is insufficient and were therefore, in support of more nutrition education.

The question about if and how the government should intervene received many contrasting views: 11% yes versus 8% no for general government interventions, 18% yes versus 5% no to regulation of advertisement, and 11% yes versus 6% no for taxes on unhealthy food choices. The only broad agreement was for the government support of healthy food choices, support of organic and local foods, and farmers markets.

In addition to the codes provided by the researcher prior to the evaluation of qualitative data, there were several recurring ideas presented by the respondents. First, there is a need for the school to support the parents by offering better, healthier cafeteria meals. Also noted, sweets used by teachers as an incentive or reward are not acceptable.

Some suggested that additions be made to the FFF study book, respectively the JV book, specifically a chapter about the relationship between food and health. They would like to see more information presented on illnesses such as allergies and diabetes. The information should include why a special diet is necessary and why some foods may be healthy for some, but unhealthy for others. Some parents expressed concern that they either did not see the FFF (JV) book or that it came home but did not stay at home. Finally, some parents stressed the importance of including practical, hands-on nutrition lessons such as cooking, shopping, and gardening.

A few, well-formulated responses have been chosen to represent some of the parents' qualitative data supporting the above claims: "The teaching of healthy nutrition is important but the changes in school environment are even more. How does the schools can teach not to drink Coca and at the same to offer them in the school halls" (P110)? "I wish that healthy nutrition is taught on the schools but how this could help when students have to eat unhealthy at school cafeterias" (P237)? "Healthy nutrition should be first of all in the school cafeterias" (P399). "We even agree to pay more for school lunches if they will be healthy" (P161). "We are trying to eat healthy at home but the children are buying their unhealthy snacks at school" (P380). "It is uncontrolled and exaggerated rewarding with candies at schools" (P313). "Intervention of the government is an interesting one but it helped with cigarette smoking by banning ads in the states in the late 70's & early 80's so maybe, it would overtime, help with healthy choices" (P035). "Book JV should be added with chapter explaining in simplified way food allergies and diabetes, that the children will learn why some of them can not eat the same bread or fruits or even healthy foods could be dangerous for them" (P190). "Form and the volume

of information are adequate for elementary school. In my opinion, nothing important is missing in the JV book, but I think it would be useful in future refrain from black and white and go to the color version; more expensive but it can increase the attractiveness for children ” (P291). “It is invaluable that nutrition is taught in school on every level” (P046). “Nutrition week was a very good initiative. It would have been even better if parents were more involved since I believe that we could all use a reminder from time to time and making healthy nutrition a family matter would definitely give a greater long-term impact” (P037).

Table 2

*Summary of Parents' Answers in Qualitative Part of the Study*

Answers in codes	No. responses	Percent
Interest their children use FFF	236	76
No interest to use FFF	16	5
FFF suggestions		
Color print	15	5
More pictures and activities	9	3
Explanation of the words	1	-
Too complicated, better age adjustment	10	3
The evaluation of current situation		
Healthy nutrition teaching		
Not enough wish more	127	41
OK, enough	5	-
Do not want not interested	3	-
Government interventions		
Yes	55	18
No	26	8
Regulation of advertisement		
Yes	55	18
No	14	5



Answers in codes	No. responses	Percent
<hr/>		
Taxes on unhealthy food choices		
Yes	55	18
No	20	6
Support of healthy food choices, organic, local	11	4

*Note.* 440 parents participated in the study. 309 (70%) parents responded also to this qualitative part of the questionnaire. Dashes indicate that there were no responses or percentage was less than 1%.

*Qualitative data from students*

The researcher evaluated the qualitative data from 229 students, respectively 55%, of all the students participating in the quantitative part of the study. All of the collected data are shown in Table 3. Among the most representative views (over 10% from responding students) was feedback regarding the use of the FFF books and recommendations for how to improve the FFF, respectively the JV book.

Most of the responding students (83%) expressed their interest in learning from the FFF study book. Many students wrote comments about how much they enjoyed learning about healthy nutrition and their desire to continue with nutrition education. This very positive evaluation of the FFF study book from the students represents for the researcher strong support for using the FFF study book as a base for future preparation of more age appropriate healthy nutrition books. The suggestion to incorporate more pictures and activities like quizzes, questionnaires, games, and puzzles (12%) was the most often expressed recommendation regarding the FFF books. The author was surprised to learn that the students' most common complaint was that they were not allowed to draw or write in their FFF book because the teacher decided that he/she would use them for students in the next school year.

Included in the special notes were several interesting comments and recommendations. The students would like the FFF book to include more healthy recipes, help with pronunciation of difficult words, and to include more pages overall. The respondents also mentioned that the study book should be designed with each grade level in mind and with information pertaining to the nutritional needs of child athletes.

Finally, having the opportunity to try healthy foods was a favorite activity among the students.

A few responses have been chosen to represent some of the students' qualitative data supporting the above claims (the researcher is presenting direct quotations from the students): "I think Food for Fun is fun and clear enough for children to learn from. One suggestion that I have is to maybe explain big words more so we can understand what they mean" (S068). "I really like this book: Food for Fun. I would like to learn from this book but one suggestion I have is that we should make a book like this for every grade" (S095). "Thank you for all the new things I learned. You explained it simple enough for us to understand but still we learned so much" (S030)! "I read the activity book, it was interesting and I really start thinking about what I was eating" (S067). "It changed my eating" (S049). "I learned a lot from this little book and I enjoyed doing this book when I read it, it made me think about changing my diet" (S015). "I enjoyed the JV book. I want to learn from it. I do not want to change anything" (S152). "I do not suggest any changes for this book. I think it is a good idea to teach healthy nutrition at school" (S277). "It was great, only there were some words we didn't understand. The book should be for every grade of elementary school" (S408). I am sorry that we were not allowed to write into the JV book because other classes will also use it" (S409).

Table 3

*Summary of Students' Answers in Qualitative Part of the Study*

Answers in codes	No. responses	Percent
Interest to learn from FFF, like the book	189	83
No interest to use FFF	13	7
FFF suggestions		
Color print	21	9
More pictures and activities	27	12
Explanation of the words	20	8
Too complicated, better age adjustment	2	-

*Note.* 416 students participated in the study. 299 (55%) students responded also to this qualitative part of the questionnaire. Dashes indicate that there were no responses or percentage was less than 1.

CHAPTER FIVE  
CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER  
RESEARCH

Introduction

Obesity rates worldwide and health problems associated with poor nutrition are still growing in spite of an increasing number of education programs, various approaches, and money being spent. Nutrition education for children is generally recognized as a necessity to reverse this growing epidemic, but there is no existing consensus on how to teach nutrition or how health information should be communicated to the public. Previous studies of school nutrition education have focused on evaluation or observation of experimental treatment of individual methods or tools for education about healthy nutrition for children. This study contributes to the individuals, schools, and global community by providing new findings that specifically outline the viewpoints of the participants, who, in the case of the implementation of nutrition curriculum in schools will be directly impacted.

The topic of the study was chosen with the goal to offer elementary school administrators guidance on how to provide a healthy environment that would support healthy food choices, which would be further supported by education curriculum

targeting healthy nutrition. Results of the study could serve to facilitate the establishment of an accepted and successful nutrition education curriculum.

### Conclusions and Implications

After the statistical analysis, which delivered surprisingly overwhelming agreement with the suggested methods and only minor differences of opinion between participating groups, the researcher decided not to make detailed conclusions based on individual answers. Instead an overall evaluation of the results will be presented to explore the present trend toward healthy nutrition education.

#### *Answers on research questions and hypothesis*

The study presents evidence of a correct correlation between the status of the participant and his/her willingness to accept nutrition education. This confirms research hypothesis one as stated in Chapter One. Parents, students, and teachers expressed varying answers even when, in many cases, their responses were very close. The most important finding was the strong support for the majority of the suggested methods and tools for supporting healthy nutrition choices. Research hypothesis one stated: participant status will influence his willingness to support individual suggested methods and tools on how to support healthy food choices at schools. Research hypothesis two stated: participants with poor nutrition will not be interested, nor in favor of nutrition education. The second hypothesis was not addressed in this study because of the relatively small number of participants who could be categorized as having poor nutritional habits.

The study presented and answered the following questions: What are the preferences of elementary school students on how to learn about healthy nutrition? What are the recommendations of teachers on how to educate elementary school students about healthy nutrition? What are the recommendations of parents of elementary school students on how they would like their children to be educated about healthy nutrition? The study also explored the sub question about willingness to learn/teach healthy nutrition from participants of the most represented nationalities (see Tables 1 to 3 and Figures 6 to 22).

In addition to the display of preferences for individual methods and tools for implementing healthy nutrition in schools, the study highlighted important information about the sources of nutrition education. The answers to the question: “Where did you learn the most about healthy nutrition?” (see Figure 1) suggest that parents and teachers involved in this study have received most of their nutrition education from the media. The students indicated that they have learned about nutrition primarily at school and from their parents. Therefore, it is possible to deduce that many students are receiving nutrition education from parents or teachers based on media, which is a very poor source of information. The media is often influenced by food manufacturers and actually offers more open or hidden advertisements or ungrounded sensational news than real, independent, science-based information. Responses in the qualitative portion of the study confirmed that there is a need among parents and teachers for accurate and practical nutrition education. The needs of the parents and teachers for high quality nutrition education must be considered prior to the implementation of nutrition policies within the school setting.

*Practical conclusions resulting from research and study outcomes*

The methods and tools noted in this research have been tried and evaluated in other studies in both isolation and in various combinations. Simply stated, it is possible to expect that the more comprehensive approach taken to encourage healthy choices, the better the results will be. In similar health-related issues such as the campaign to stop smoking, eat more fruits or vegetables, or to exercise more, education alone was relatively ineffective. For this reason many governments, health, and medical organizations continue to look for ways to support healthy choices in addition to education. Because many negative experiences arise when letting the food industry regulate itself or educate the public about healthy nutrition clearly prove that sound education needs to be based on independent scientific facts and provided to the public by an independent nutritionist, health or medical organizations. Further, such education has to be supported by measures that will result in making healthy choices easier in school. For example, healthy school cafeterias should be the standard, schools should not have junk food vending machines in their halls, and schools should provide easy excess to all sorts of healthy choices.

When considering that teachers, as well as parents, are already very busy and often lack education in the field of nutrition, it is responsible to suggest that schools should try to employ local independent nutritionists or health educators. The experts in the field can work to organize the preparation of school food/wellness policies, to help with their implementation, to offer in addition to the education of students, professional courses for teachers and informational lessons for parents. The author of the study as a



result of the presented research and her work experience is convinced that such a comprehensive process would achieve the most effective and long-term results. The study is providing sound evidence that today all the participating groups are ready and interested in going forward with the implementation of comprehensive procedures that will lead to healthy food choices.

Moreover, the conclusion could be drawn from the studies evaluated in the research that individual, relatively short-lived intervention programs brought to schools from outsiders usually did not reach needed statistically significant long-term results. Therefore, the author of the study sees that the professional approach to nutrition education via school nutrition counselors as the most important change when considering the implementation of nutrition education at schools.

#### Recommendations for Further Research

Among the questions to ask in further research are if most of the students, parents, and teachers are really so well aware of the importance of healthy nutrition then schools should feel free to implement even seemingly unpopular methods in order to support healthy nutrition. Or is it possible that the positive results are mostly due to the influence of the relatively short focus on nutrition via the FFF activity book?

Another subject to further examine involves following up on some of the negative responses given. For example, are participants against the idea of inviting farmers into classrooms? Are they unwilling to try a variety of less common healthy foods? Or is it possible that the negative reaction to some questions was due to a certain level of discomfort with what is unfamiliar? (see Figures 15 and 16).

What the researcher deems most appealing is continued exploration of the long-term effectiveness of having professional nutritionists in the school setting. According to the results of this study, the existing research, and social, financial and medical consequences of unhealthy food and lifestyle choices a need exists. Industrialized countries need effective solutions today as very unfortunate health trends persist. The need and the desire are apparent; they are ready to participate and even requesting professional guidance.

### Summary

The results of the study present very strong support across all of the surveyed groups for healthy nutrition education, preferably continuously at all levels in school. It provides information about preferences of individual methods and tools for teaching healthy nutrition from students, parents, and teachers. Information was also gathered to explore the influence of participants' nationalities on his/her view on nutrition education. There is important information presented about the role of the media as it was noted to be the most common source of information for parents and teachers. The study also found surprisingly strong agreements on what were perceived as unpopular measures - the elimination of candy in classrooms and vending machines in hallways. Overall, there was unexpected, yet welcomed support for various methods and tools that could be implemented to support healthy nutrition choices.

The conclusions evaluated in Chapter 5 are based on the overall general trend toward healthy nutrition education. According to the researcher sound nutrition education needs to be based on independent scientific facts and then should be presented and

supported by an independent nutritionist, health or medical organization. Further, such education has to be supported by comprehensive measures that make it easier to make healthy choices. Therefore, the author of the study sees the most professional and thus beneficial approach to nutrition education via designated school nutrition counselors as the most important factor when considering the implementation of nutrition education at schools. Results of this study support the idea of involving an independent nutrition counselor at schools. An expert in the field can help with the implementation of proper nutrition education methods as well as be a source of information for students, parents, and teachers. The expert would be an irreplaceable component for the long-term success of a school nutrition curriculum. For the researcher, the long-term effectiveness of the implemented nutrition education curriculum with the support of a designated nutritionist is the most appealing idea for future research.

The qualitative part of the study positively evaluated FFF healthy nutrition activity book. These results suggest using FFF activity book as a successful base for the future preparation of grade specific books for continuous teaching at elementary schools.

The results from the triangulation of the quantitative and qualitative parts of the study provide a very strong argument for the incorporation of healthy nutrition into the regular school curriculum.

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