CHARLES UNIVERSITY, PRAGUE

FACULTY OF PHYSICAL EDUCATION AND SPORT

Cross-cultural comparison of school P.E. and body composition in schoolchildren in Greece and the Czech Republic

Bachelor Thesis

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I declare that I wrote my graduation dissertation (bachelor's/graduate) independently, and that I have stated all the information sources and literature I used. Neither this thesis nor any substantial part of it have been submitted for the acquisition of another or the same academic degree.

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Gratitude

I would like to thank Professor PaeDr. Ludmila Fialova, Ph.D for her endless help, support and understanding throughout this stressful process, as well as my family and friends that helped in the conduction of my research. This Thesis is dedicated to my father, as without him I would not have had the opportunity to be here and study in my desired field.

ABSTRACT

Name: Cross-cultural comparison of school P.E. and body composition in schoolchildren in Greece and the Czech Republic

Goal: This dissertation attempts to look at two systems of teaching PE - one in Greece, one in the Czech Republic, and see how effective the different ways of teaching, as well as other relevant measures, are for the prevention of childhood obesity.

Methods: In our work we used the analytical method and the comparative method. We applied the analytical method in an analysis of the individual education systems, and we used the comparative method in analyzing our results, comparing the two different systems and their traceable effects.

Results: We found that the two systems have very different outcomes, some successful, some not so, the Czech one seemingly more effective in preventing childhood obesity, but the Greek one likely more effective at inspiring in children a dedication to movement.

Keywords: Physical education, school system, obesity, body mass index, Greece, Czech Republic, activity level

CONTENTS

INTRODUCTION

In my thesis, I chose to examine the link between schools' programs of physical education, their extent, as well as their structure, with the development of childhood obesity. In order to make it more interesting and less biased, I decided to look at the problem through the prism of a comparative study of two physical education systems in two countries - Greece, my homeland, and the Czech Republic, the country I got acquainted with over the course of my studies.

I feel that the problem of obesity in general, and childhood obesity in particular, has been losing popularity in discussions lately, and it upsets me. While the topic does not have the shock value it used to, and doesn't get nearly as much attention in the media as it used to get, I don't think the problem has disappeared or even diminished. In fact, numbers continue to show growing trends in obesity, both adult and childhood, with all of the serious implications commonly associated with this.

Heart disease, adult onset diabetes, mobility issues, those are all health problems that frequently go hand in hand with obesity. All of them, as well as many others, impact the patient's quality of life negatively, and drastically so. All of them are burdens for the individual, for the health care system, and for the economy.

While the government realizes the scope of the problem, most of the measures are still focused on the adults. They are the ones getting the uncomfortable briefings on their weight dutiny their appointments with their general therapists. They are also the ones who are targeted by health clubs and their marketing campaigns. One way or another, an adult is usually exposed to the idea that healthy weight equals healthy life. The problem with the model is, however, in that external influence rarely trumps the lack of internal motivation, and, most importantly, the lack of habitual healthy behavior. To put it in simple terms, it is always easier to eat a cookie when that is all one knows. Creating new behavioral patterns is often painful, and ineffective. On the systematic level, most importantly, it is too expensive.

With these implications in mind, I strongly believe we should look at all possible ways to prevent the situation from arising on a micro level, in every individual separately. Unfortunately, the last time somebody's health gets any regular personalized attention in the preventive sense is usually at school. That is why I think it is imperative to make sure that the practices we use on our children are the best practices known.

Within the European Union, it is very easy to standardize and adopt the best practices from other member countries. Starting with these two, the Czech Republic and Greece, I would like to see if there are differences between the systems that make a noticeable difference in the children's health. If there is a chance somebody knows better, I think it is a fact worth the time and energy to discover.

THEORETICAL PART

CHILDHOOD OBESITY AND EUROPEAN OBESITY STATISTICS

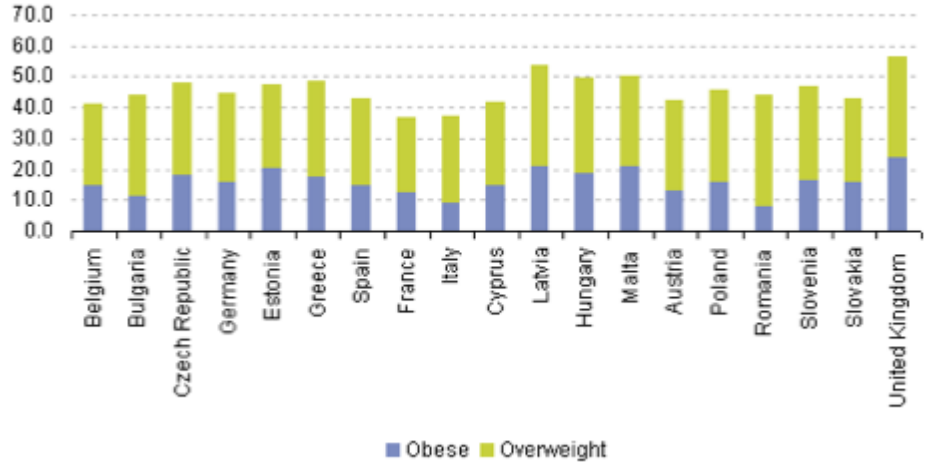
According to the World Health Organization, obesity has been a serious problem for our countries for a long time, and the trends do not paint a happy picture, as the percentages of population affected are only expected to rise further.

The European Health Status Survey (EHSS), implemented over the years of 2006-2009, first took note of the situation in 19 Member States, surveying the adult population aged from 18 to 74, and investigating the percentages of overweight and obese population in those states using the Body Mass Index Marker.

Body mass index, accepted as the most common body composition measure, is calculated as the result of dividing body weight in kilograms by body height in meters squared. The resulting index of 25 to 30 would indicate that the person in question is overweight. The BMI of equal or greater than 30 is interpreted as obesity (Ferrera, 2005).

It is important to note that BMI is only part of the picture, as it does not accurately represent the ratios of lean muscle mass to fat, water weight, or any other body composition information. It is however the most commonly used parameter for a quick evaluation, is accurate in gauging the general situation with the exception of extreme cases (athletes, for example), and is the indicator most widely used in professional texts (Ferrera, 2006).

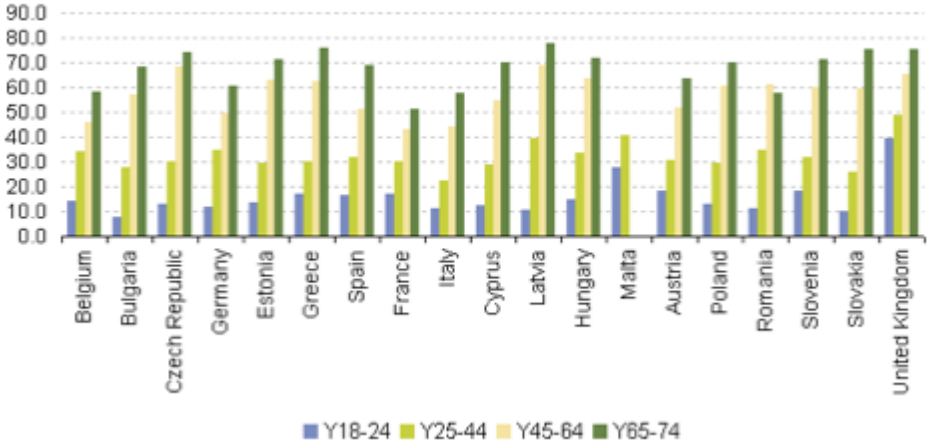
Using that index, the EHSS came up with results that characterize the overall situation as highly undesirable, with around 42% of women and 55% of men on average either overweight or obese. To make matters worse, the countries in question in this dissertation, Greece and the Czech Republic, have ranked among the highest in this survey. On tables 1.1. and 1.2., we can see the Czech Republic with 48% obese/overweight for women and 66% obese/overweight for men. Greece is shown to have 49% obese/overweight for women and 64% obese/overweight for men.



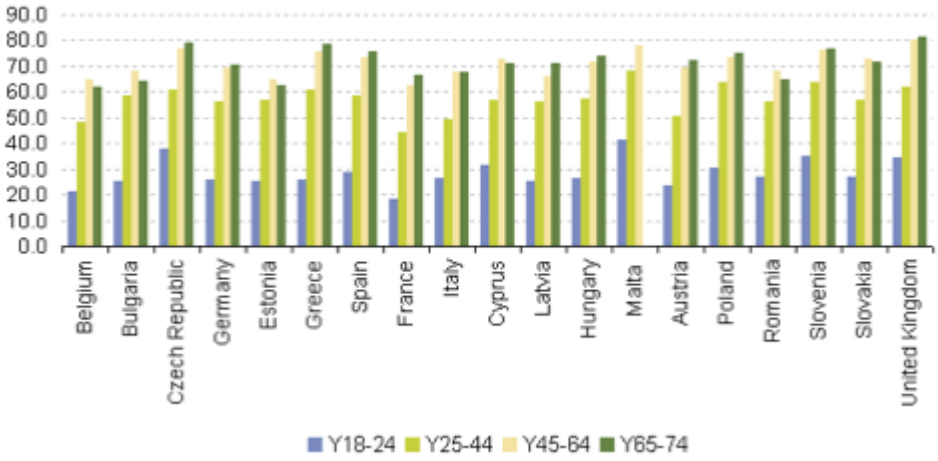
Graph 1.1. EHSS obese/overweight population % by country, women.

Graph 1.2. EHSS obese/overweight population % by country, men.

Furthermore statistics showed that the overweight/obesity rate only grew as the researchers moved through the age groups, with the oldest people in the sample being the most susceptible to this problem, across both genders and all countries. Czech women reach 74% obese/overweight, and Czech men - 79% obese/overweight, when they reach the age bracket 65 - 74. The equivalent numbers are 76% and 78% for Greece.



Graph 1.3. EHSS overweight/obese population % by age, women.



Graph 1.3. EHSS overweight/obese population % by age, men.

Childhood obesity is especially dangerous, since it only heightens the health risks for the individuals affected. In fact, according to WHO statistics, over 60% of children who are overweight before puberty will stay overweight as young adults (Branca, 2007). It has been shown in multiple studies that childhood obesity can be predictive for obesity in adulthood, even in children as young as 8 years old. (Kiess, 2004)

Childhood obesity is also strongly associated with risk factors for cardiovascular disease, type 2 diabetes, orthopedic problems, mental disorders, underachievement in school and lower self-esteem (Smith, 1999).

As the children turn into adults, the odds do not get stacked in their favor either, as sarcopenia sets in. That means that after the age of 25, unless systematic prevention measures are in place, they start losing skeletal muscle mass at a rate of about 0,5 to 1% yearly. That change causes

the slow basal metabolic rate decline, which, unless countered with a decrease in caloric intake, leads to insidious weight gain.

That is also where the school system of physical education would ideally play a part, motivating children to partake in enjoyable physical activities, guaranteeing their investment in their physical health for years to come. This instilment of positive habits is often overlooked, but with factors like sarcopenia it might be necessary to give the children a better chance of transitioning into adulthood as healthy individuals.

While the WHO advocates early prevention, the Member States are currently not fully equipped to handle the task. In fact, there is not even a standardized system of obesity measurement tools, data calculation nor presentation. According to official data, not every country even pays attention to what's going on in that realm, with only 13 out of 53 states having validated obesity data on 6-10 year old children at all, and only a handful of countries with a system in place that would collect and analyze weight and height data of children at regular intervals.

Country-specific studies (Sigmundova, 2014) of Czech schoolchildren have described a trend towards an increase of overweight and obese boys and girls in the past 10 years. Moreover, on the whole, there is a trend for children to not meet the standard physical activity requirements.

Greek children haven't been exempt, with their behavior described as increasingly sedentary, and their BMI's have been on the rise. Greece has the second-highest rate in childhood obesity internationally (Tsolakidou, 2012) , with 21,9 percent of teenagers heavier than normal (UMHRI, 2012). Apart from the classic determinants, studies suggest that interventions need to address the parents and promote their involvement (Farajian, 2012).

PHYSICAL EDUCATION IN GREECE

School attendance in Czech Republic is compulsory for nine years, from the ages of 6 to 15.
The primary school in Greece is compulsory and it lasts for 6 years. The Greek Education system is governed by national laws and legislative acts (degrees, ministerial decisions). The administration of primary and secondary education is conducted hierarchically by: the Ministry of Education and Religious Affairs, Culture and Sports; the Regional Education Directorates; the Directorates of Education (Prefecture); and the school (Eurypedia, 2013).

The history of P.E. in Greek educational system

The first documentations date from 1834 until 1900, when the German system was being taught in Greek schools. It was brought over by Otto and the Bavarians when the country was under their control and the main content was gymnastics and military exercises. This system had disadvantages and came across a lot of difficulties during its implementation, such as:

1. It took many gyms and hangars to be installed for the protection from adverse weather conditions of the expensive exercise equipment, at a time when the Greek state had big financial difficulties.

2. It was impossible to have many people exercising the same time, unless performing drill exercises. If not, the supervision and teaching was not easy for the teacher, because at the same time all the exercising equipment was used by exercisers.

3. Practicing, on gymnastics equipment (horizontal and parallel bars, rings, etc.) was not easy and approachable to everybody, because special physical and psychological skills were required, such as increased strength, decreased bodyweight, courage and many more.

Then, from 1900 until 1950, the Swedish system was implemented, which at the time, had some advantages in comparison to the German system, like:

A. For the daily exercise, sheltered areas and exercising equipment were not necessarily needed, since it was possible to do it in a school yard or in any open space.

B. One teacher could easily teach a big number of students, by giving commands and the students performed the exercises.

C. The overall system relied on scientific basis of that time, such as anatomy, physiology, kinesiology, good hygiene and body posture.

D. The system matches the pedagogical and teaching methods of the “teacher concentrated education” the Greeks had at the time, since the teacher was the epicenter of decisions and the students were just the executive agents.

From 1950, a variation of the Swedish system was applied, which was called Pedagogical Gymnastics and retained the same goals and organization of the lesson, but was differentiated in the way the exercises were performed. Meaning that the exercises which were performed in a static way, became more continuous and rhythmical.

The methodology of teaching, as well as the organization of the lesson remained “teacher concentrated” since students were only requested for performance - not as creative and participating agents.

In this system, the students were obligated to perform the exercises evenly and simultaneously.

They did not have the liberty to express themselves, take initiatives, cooperate and create, elements needed to provide the “free and responsible citizen”. As a positive effect, though, it enforced discipline and the sense of duty.

Because of this, the unilateralism and the counter- educational character this system featured, there had been efforts made to upgrade the analytical program for primary and secondary education; efforts which, unfortunately, impacted the peculiarities the lesson of Physical Education presented in contrast to the rest of the subjects, such as:

1. There global change being made on the purpose and goals of the lesson of Physical Education.
2. The content was very long and the funds for the completion of the project were hard to find, which made the teaching of particular activities problematic.
3. The didactic methods differed between schools because of the variety of facilities, the student population and the differences in education and training between the P.E. teachers.
4. The evaluation of the results of the teachings was hard because specially designed tests are required to establish whether the objectives of the course were achieved or not (Mpoupas, 2013)

The lesson of Physical Education in primary schools

The Swedish system was officially removed from High schools in 1977, while in Elementary schools in 1988. Today's analytical schedules for Elementary schools were put in effect in 1995 (Athanasios, 2004).

A. The purpose of the subject

Purpose of teaching Physical Education is, through the various mobile and athletic activities, to aid primarily in the bodily growth of students and contribute to their mental and spiritual cultivation, as well as their harmonic adjustment to society.

The specialized goals of P.E. are, by category, the following (Athanasios, 2004):

1. Mobility purposes: the perception of body in space and time. The coordination and synchronization of body and limps with visual aid. The perception and improvement of dynamic and static balance, the development of sideways movement. The perception and cultivation of rhythm and mobile aptitudes and learning of the basic techniques behind specific activities.

2. Biological purposes: the natural development of the basic bodily capabilities of endurance, strength, speed, flexibility and dexterity, as well as preventing, improving and correcting morphological and functional deviance.

3. Social purposes: the development of social and mental qualities like cooperation, team spirit, self discipline, will-power, responsibility, patience, persistence and courage. The development of self- esteem with the improvement of natural abilities, the learning of mobile skills and participation in gaming events. Becoming confident in themselves with knowledge of their limit and potential in comparison to others and the cultivation of a free and democratic expression.

4. Moral purposes: the development of moral values, such as honesty, fairness, meritocracy, respect towards the opponent, modesty, treating victory or defeat with prudence etc.

5. Aesthetic purposes: the familiarization with the Hellenic mobility traditions. The

cultivation of expressing through rhythmic movements and Greek traditional dances.
To provide assistance in finding the appreciation of grace in movements.

6. Learning purposes: the understanding of the terminology and acquisition of knowledge concerning P.E. and sports. Knowledge of the rules of different exercises and games. The acquisition of knowledge related to the Olympic Idea and movement. Becoming aware of actions related to song, music and dance, in a local, or, national level. The acquisition of basic knowledge regarding hygiene and first aid, and the development of imagination and creativity.

7. Experiential purposes: The realization of the need of "for life" exercise or sport and the benefits provided by it, as well as the acquisition of habits related to sport for application in an amateur environment.

B. Mediums

The mediums used for the success of the goals set for the subject of P.E. in elementary schools, are the multiple movement and sporting activities, such as: Pedagogical mobile games, the recognized sports of the country that teaching can be applied for -especially in classes for students of higher ages- , free movement activities with or without music and, finally, traditional folk Hellenic dances. Material mediums for the teaching of the class, are: mattresses, balls, mobile and static baskets, elastic handballs, elastic ropes, hoops, pins, balloons, cassettes with various rhythms etc.

C. Methodological directions

1. The teacher can choose the particular objective in which he will emphasize during either a teaching session or a daily lesson, but bigger gravity must be given to the purpose of movement.

2. In order for obstacles to be dealt with, regarding the lack of materials and infrastructure, for the loyal application of the Analytical Schedule of P.E. in elementary schools, we must consider the following:

i) Utilize possible sporting facilities located in close range of the school, such as municipal or public parks, sports centers, stadiums etc.

ii) Given the option, other sporting activities can be taught, with the condition that the expected from the Analytical Schedule activities have been taught, or there have been proven unable to be applied. For example, if a school does not have the space to teach football in the 5th and 6th grades, then another activity outside the indicated from the Analytical Schedule can be taught, after an arrangement has been made with the Principal of the school and the school counselor, with the condition that enough time will be dedicated to the new activity, enough to provide obvious beneficial results to the students.

iii) Regarding swimming in particular, where there is the potential to utilize the sea, or private and public swimming pools, it is to be taught by preference, even at the expense of other activities receiving less time being taught, again in agreement of the school's Principal and school counselor and, with the condition that all safety regulations are enforced and a minimum level of progress will be expected after completion of the class.

3. The content of grades 5 and 6 is distributed in 3 month periods (trimester), so that every movement activity begins and ends within the limits of the trimester and not split between more trimesters, in order for its goals to be accomplished more easily and a smoother intake by the students. The dances and events of athletics and sporting games are distributed amongst more than one trimester, but the teaching of one must be completed before the teaching of the other can commence. In the case of changes made in the Analytical Schedule, activities are not split between trimesters, but start and complete within the same trimester.

4. It is advisable for the differentiating Analytical Schedule to be applied after agreement of the school Principal and counselor in the beginning of the academic year.

5. In the end of the academic year, and within context with the cultural theme of the day, it is possible for a day to be dedicated to a sport and movement exhibition, displaying the teachings of the year from the students. Preparations for the demonstration are made with the co-operation of teachers and students and in a way that allows the students to show initiative.

6. In elementary schools, a first initiation in athletics and movement activities is sought for all students, rather than notable performance in few students (Stefanopoulos, 1995).

Curriculum

The curriculum is divided into three stages; for 1st and 2nd grades, 3rd and 4th, 5th and 6th. The content of each stage is a bit differentiated towards more specific exercises, as children are growing and their body follows this evolution. There are two obligatory hours of PE every week, for all classes. Unfortunately, although the teaching of swimming exists in the official curriculum of the Ministry of Education, there is no school in Greece that applies this obligation. In respect to the terminology used and the way curriculum is presented, I will not change the terms and order used by the authors (CCTFPSPE, 2013)

During the first stage (1st and 2nd grades) of primary school motor activities are mainly planned, aimed at the all-around mobility of children and promote physical, emotional and spiritual development.

The game fills the biggest part of life of children at this age. It is the mean by which knows himself, learns about people and the world around him, understands the abilities and his limits and contributes to his socialization. Children learn by playing to cooperate, accept responsibilities and roles, learn to observe and respect rules. It is needed the children in small classes in primary school to move a lot and freely.

More specifically, the content of the P.E. lesson is:

Psychosocial: sense of space and time, motor-optical timing and coordination, static-dynamic balance, lateral motion, respiratory education, correct body posture education, imagination and creativity

Musicokinetic: the elements of rhythm, rhythmical education

Games: in groups, individual, traditional, free and organized games

Greek traditional dances: syrtos, hasapiko, local dances

In third and fourth grades (8-10 years old) children are physically and mentally more mature than children of earlier ages. In here too are planned kinetic activities aimed at the all-around mobility of the child, but can start to introduce more systematically the motor skills that are part of the mainstream sports and events.

There are opportunities created for children to play alone, in pairs, or being involved in small groups.

The content of the P.E. lesson is:

Psychosocial: sense of space and time, motor-optical timing and coordination, static-dynamic balance, lateral motion, respiratory education, correct body posture education, imagination and creativity

Musicokinetic: songs and exercises accompanied with drumming, space exercises with rhythmic hits, rhythmic motives, kinesiological improvisation

Games: in groups, individual, traditional, free and organized games

Sports: football, basketball, volleyball, handball

Classical sports: sprints, jumps

Greek traditional dances: syrtos, hasapiko, local dances

In fifth and sixth grades (10-12 years old) the P.E. teacher should prepare in the beginning of the year annual ,quarterly and weekly programming. The teaching of sports and competitions must be done to both boys and girls, without any differentiation.

The content of the P.E. lesson is:

Sports: basketball, volleyball, football, handball

Classical sports: athletics; sprints, jumps, throwing

Gymnastics: free gymnastics, gymnastics with tools, rhythmic gymnastics

Greek traditional dances: same as before and some more complicated ones.

There are 8000 official PE teachers in the country, and 5000 more are working part-time (Puhse, 2005).

PHYSICAL EDUCATION IN CZECH REPUBLIC

School attendance in Czech Republic is compulsory for nine years, from the ages of 6 to 15. All pupils start in a comprehensive single structure institution called základní škola (the primary school), during the second stage it is possible to proceed to gymnázium – secondary school providing general education (EURYDICE, 2010).

The P.E. history in Czech primary schools

Back in 1869, when Czech Republic was a part of Austro-Hungary, was the first time that P.E. was introduced as a compulsory in primary schools, as part of a general reform of the school system, with teachers starting to learn the necessary practices two years prior. The first system used was based on the formal movement analysis. Fittingly, since it was introduced after the Austro-Hungary's loss to the Prussians, the teaching was aimed at the development of skills, confidence, and courage. At 2 hours a week, the curriculum revolved around specifically created exercises, and relied much less on games or hikes. A very progressive system for its time, it included girls in the class, introduced regular testing on which a pupil's progression to a higher level was reliant, as well as professional training requirements for the teachers. However, the way the system itself was structured, it led to new schools being built without playgrounds, and a generally standardized approach.

Slowly, new practices were introduced, mostly influenced by the Scandinavian and the French systems. That, along with the need to let go of some elements that were no longer fitting, led to the reworking of the official standards. New norms that came out in 1911 for boys and 1913 for girls, while keeping to the 2-hour-a-week course load, were describing a structure that was very different from the one before. Track and field was included in the compulsory curriculum, games were allotted more time, and optional games were introduced. Vocational schools differed in that girls had no compulsory physical education, but from 1910 it could be arranged, separately from the boys, with the limitation that the teacher had to be female as well. By 1915, girls only had 1 hour of physical education a week as an elective.

Once the independent Czech Republic came to be, the system was changed yet again. A lot of it was based on the Tyrs system (the one prevalent before), however it was enriched with the ever more present French influences. This time, the structure changed to include seasonal sports such as

swimming, skiing or ice skating. Static exercise has given way to even more games and track and field.

In the thirties, the teacher-centric principles received wide application, as taught by the Austrians K.Gaulhofer and M.Streicher. The pupil was now more consciously treated as an object, no t a subject, their health was the main aim of the training, and safety was a substantial concern. For instance, contrary to the way things were done before, any kind of competitions could now be held only at the disciplines the pupils had safely mastered, in order to minimize risks. Theoretical teachings on healthy lifestyle and daily safety precautions were included (Rychtecky, 1998).

During World War II, the training was upped to four hours weekly, mainly though the addition of self-defence training. Once the war was over, the structure changed yet again, for this new period emphasized new goals. Now the objectives of physical education went beyond health to encompass educational and behavioral goals. A lot of the program shifted towards sports. Cognitive approaches were used. The most widely used teaching model was now imitation - instruction - feedback. Year 1948 finally saw full gender equality in the didactics of physical education. All schools now had it as a compulsory subject (Rychtecky, 2006).

These days, the school year starts at 1st of September and finishes at 31st of June of the following year. Lessons of 45’ are arranged over 2 days a week. Number of students is approximately 20 per class, all of the same age.

The school head draws up a school educational program in accordance with the Framework Educational Program and the school's conditions (EURYDICE, 2009).

The Czech primary education consists of two stages; the first one includes 1st to 5th class and the second one 6th to 9th class (White Paper, 2001). In this document I will describe just the first stage of the basic education, as in Greece the primary education is only 6 years.

The main purpose of the first stage is to create the conditions for lifelong learning – acquiring basic habits and skills for work in and outside school and a motivation to learn, mastering basic literacy as an instrument for further successful education, the cultivation of a pupil’s personality (their attitudes, value orientation, and interests) and of their health.

The first stage of basic education has an essential role in the early correction of possible

disadvantages, but also in the recognition and encouragement of different pupils' interests, abilities or talents.

An appropriate working atmosphere, close human contacts between teachers and pupils and between pupils, which are transformed into generally recognized codes (rules), based on mutual understanding, respect, co-operation, activity and space for everybody, are all very important for the education of pupils in a given age.

Every teacher should be able to work individually with the whole range of the child population and to master basic procedures in the correction of learning and other problems (EURYDICE,2010).

The lesson of Physical Education in primary schools

The Framework Educational Program for Basic Education (FEP) was introduced in 1st and 6thgrades the 2007/2008 school year and gradually introduced in other grades. According to the FEP, the chapter of Humans and Health taken from the primary school curriculum, is divided into two parts; Physical Education and Health Education. The educational content of Health Education is realized only at stage 2 of basic education. Also, the educational content of the P.E. field includes the thematic area of Remedial Physical Education, elements of which are applied preventively during Physical Education for all pupils (VUP, 2007).

The objectives of this area are:

-To let the students know that health is the most important value in life

-To perceive health as a balanced state of physical, psychical, emotional and social well- being and to make pupils feel comfortable and happy when exercising in a nice environment that positively affects interpersonal relationships

-To recognize humans as biological individuals, with their own behavior

-To give students the right orientation of how they can protect themselves and recognize the threats that can damage their health

-That they should combine behavior and activities related to health with basic ethical and moral values

-To introduce students fitness and its benefits, such as a good physical appearance and a balanced psychical state which are so important elements during a person's socialization.

Curriculum

The lesson of P.E. is divides into two periods

Expected results of the 1.-5. years:

students will

• Associate regular daily physical exercise with their health and make use of available opportunities

• On the basis of individual abilities, manage simple physical activities as individuals and as a group and work to improve their skills

• Cooperate in simple team- based physical activities and competitions

• Apply the fundamental basics of hygiene and safety during physical activities in familiar school spaces

• Respond to basic commands and instructions related to acquired activities and the organization of these activities

Expected results of the 6.- 9. year:

students will

• Participate in establishing a regular physical exercise regimen; make use of conditioning activities; demonstrate the appropriate level of independence and desire to improve their level of fitness

• Include corrective exercises into their physical exercise regimen, especially in relation to repetitive strain on weakened muscles

• Based on their individual abilities, manage their acquired physical skills; come up with variants of learned physical games

• Apply rules of hygiene and safe conduct in regular sporting environments; respond appropriately to other pupil's injuries

• Perform a simple assessment of the quality of other pupil's physical activities and respond to instructions for performing physical activities

• Act in the spirit of fair play: follow rules of games and competitions, recognize and name obvious violations of rules and react accordingly; respect the other sex during physical activities

• During physical activities, make use of basic terminology which they have learned; exercise on the basis of simple drawings or descriptions of the exercise

• Organize non' demanding physical activities and competitions at the class level

• Measure basic physical performance and compare it with previous results

• Be familiar with sources of information on physical activities and sports events at school and in their community; independently seek out the required information

Subject matter

-ACTIVITIES AFFECTING HEALTH

• the importance of physical exercise for health – pupils' exercise regimen, length and intensity of exercise

• physical preparation – pre-exercise preparations, relaxing after physical exertion, tension exercises and stretching exercises

• health-oriented activities – proper body posture, proper lifting of heavy loads; basic, compensational, relaxation and other health-related activities and their practical application

• developing various forms of speed, endurance, strength, flexibility, coordination

• proper health habits during physical education – healthy habits for physical activities and the exercise environment, proper clothing and footwear for physical exercise

• safety during physical activities – organization and safety of exercise space, safety in dressing and shower rooms, safe preparation and storage of gym apparatus, equipment and aids, first aid during physical education

-ACTIVITIES AFFECTING THE LEVEL OF PHYSICAL SKILLS

• movement games – with various objectives; non-traditional movement games and activities; exercise using toys and non-traditional equipment; creative movement

• basic gymnastics – basic exercises, acrobatics, exercises using gym apparatus and on equipment of appropriate size and weight

• rhythmic and conditioning exercises for children – conditioning exercises with music or rhythmic accompaniment, fundamentals of aesthetic movement, expressing melody and rhythm through movement, simple dancing

• basic grappling techniques – pulling, pushing

• basics of athletics – sprints, motivated long-distance running, long jump or high jump, ball throwing

• fundamentals of sports games – using balls, bats or other sports equipment of appropriate size and weight, individual sporting activities, teamwork, basic games, matches using simplified rules

• hiking and nature – field trips, proper conduct in transport vehicles, hiking, camping, nature preservation

• swimming – (basic swimming instruction) healthy habits for swimming, acclimation to the water environment, basic swimming skills, one swimming style (technique), elements of self-preservation and helping a drowning person

• skiing, ice skating (depending on schools' possibilities) – games on snow and ice, fundamental techniques of movement on skis and ice skates

• other physical activities (depending on schools' possibilities and pupils' interest)

-ACTIVITIES PROMOTING PHYSICAL LEARNING

• communication during physical education – basic physical-education terminology for acquired activities in physical education, common instructions, signals

• organization during physical education – basic organization of space and activities in a familiar (everyday) environment

• rules of conduct – fair play, Olympic ideals and symbols

• rules of simplified acquired physical activities – games, races, competitions

• measuring and evaluating physical skills – measuring performance, basic physical tests

• sources of information on physical activities

REMEDIAL PHYSICAL EDUCATION

The expected results of the first period:

students will

• adopt proper basic exercise positions

• manage simple special exercises targeted at their impairments

The expected results of the second period:

students will

• include special exercises for balancing their impairments into their regular exercise regimen, with the optimum number of repetitions

• manage basic special exercise techniques; adjust their exercise technique by observing themselves in the mirror and on the basis of their teacher's instructions

• independently identify activities/environments which are incompatible with their impairments

Subject matter

-ACTIVITIES AND INFORMATION ENCOURAGING THE CORRECTION OF HEALTH IMPAIRMENTS

• health impairments- the pupil's specific health impairment, prevention, exercise regimen, appropriate clothing and footwear for P.E., fundamentals for proper body posture, breathing exercises, being aware of feelings and sensations during exercise, inappropriate exercise and activities

-SPECIAL EXERCISES

• fundamentals of special exercises- basic exercise positions, basic exercise technique, collection of special exercises for independent exercise

-MULTIFACETED DEVELOPMENTAL PHYSICAL ACTIVITIES

• physical activities related to the content of P.E.- with a view towards the specific type and level of impairment (Jerabek, 2007)

It is important to note that unlike Greek children, who sometimes have no access to a pool, Czech children are required to take swimming lessons until the 3rd grade.

Even though there isn't official data on the number of PE teachers in the country, a lot can be said by mentioning the fact there are 3 faculties of education specializing in studies of physical education and sport.

Since the system is fairly decentralized, there is no one set of objectives that all schools pursue in their PE curriculum. Generally, however, they resemble the following (Puese, 2005):

1. Orientation in psycho-physiological issues
2. Sensation of social relations and roles in sport and other physical activities
3. Inserting knowledge from the domain of movement activity in one's daily regime

4. Pupil’s physical development.
5. Acquiring of new movement skills, correct body posture.
6. Health-oriented fitness development and appreciation of its social value.
7. Function of experience as an alternative to the efficiency concept of PE
8. Creation of a positive approach to movement activity and sports
9. Understanding efficiency as an instrument for rational relaxation, amusement and compensation for one-sided mental activity
10. Improvement of basic physical skills in recreational PE and chosen events.

GOALS AND THEMES

The main goal of our work is to compare the systems of PE teaching in Greece and the Czech Republic, and see whether there is a demonstrable direct link between the physical education of children at school and the development of childhood obesity. It is very clear that there is a connection between the two, it is not entirely certain, however, whether physical education alone can have a big influence on the weight problems or lack thereof in school children. In order to see whether there is in fact causality in the relationship, we took it upon ourselves to take a closer look at the way PE is taught in two school systems - Greek and Czech, to be more precise.

Since physical education is multifaceted, so is its influence on the children's physical development. For that reason, we aim to look at the above mentioned main question from several perspectives.

The first factor is the volume. Since the volume of compulsory physical education is two hours in both countries, we do not expect much dependence of the results on that factor alone.

The second factor is the content, namely the type of exercise included. We expect the system with more formal exercise than games to produce better results in the general physical fitness of their children.

The third factor is motivational and inspirational work. Since lifelong commitment to exercise is one of the desired outcomes of any school physical education program, we would like to see which one is better at accomplishing that, and, by extension, potentially has better results in obesity prevention.

Moreover, we will review the compliance to EU regulations and the general guidelines each school system has, by taking a closer look at what is actually happening at Czech and Greek schools.

Finally, we would stereotypically expect that Greek children have higher obesity rates, and hence are exposed to physical education practices inferior to those adhered to in the Czech Republic.

Hopefully, this work will answer all of the above questions and shed some light on the situation, maybe even proving useful for taking further action against childhood obesity.

METHODOLOGY

Main scientific question:

Is there a link between the system of teaching physical education at school and whether or not a child exposed to that system will develop childhood obesity?

Additional questions:

What are the aspects of the system of teaching PE that have the most impact on the child's body composition, directly or indirectly?

What other factors are of strong influence over the child's body composition?

How do actual schools in Czech Republic and Greece compare to the systems they are a part of, as stated on paper?

Is one of the systems (Czech or Greek) clearly superior to the other?

Sampling:

- school-age children (6 to 12)
- public schools in Greece and in the Czech Republic
- voluntary
- (unintentional) computer-literate parents

Data collection methods:

- print source analysis
- questionnaire for parents - predominantly online

Reasons questionnaire aimed at parents:

- comprehensive source - all aspects of child's life
- non-biased - ability to compare the schools' practices to the ones prescribed/desired
- direct consumers - they, not the children, are actually the ones schools work for/provide services to
- no comprehensive records of height/weight at Greek schools.

Questionnaire structure:

- basic information on child - height/weight/age/country
- school PE - volume, structure
- activity outside of school
- school nutrition
- satisfaction with/ perceived importance of PE

Data processing and analysis:

- quantitative variables arranged into tables
- unfitting cases discarded
- numerical values assigned to some qualitative variables
- statistical processing
- BMI calculations
- comparisons of 2 systems by aspect
- correlation calculations

Technology used:

- Microsoft Excel

RESULTS

Data collection and organization.

The questionnaire we distributed to get the data for this work consisted of 10 questions:

1. What is your child's age?
2. What is your child's height?
3. What is your child's weight?
4. What country does your child go to school in?
5. How many weekly hours of physical education does your child have at school?
6. How are physical education lessons structured at your child's school?
7. Is your child physically active outside of school?
8. Does your child eat at the school cafeteria?
9. What does a typical meal at the cafeteria look like?
10. Do you feel that physical education at school has played a big role in your child's development?

Questions 1, 2, and 3 called for a simple number answer and weren't prompted.
Question 4 had two answer options: either the Czech Republic, or Greece.
Question 5 had the parents choose a number from 0 to 6.
Questions 6 provided three options: mostly games, mostly formal exercise, a mix of the two.
Question 7 had four possible answers: not at all, not very (e.g. walks the dog several times a week), moderately (e.g. plays outside a lot), and very (e.g. practices a sport).
Question 8 was a yes/no question.
Question 9 called for a sentence or a paragraph describing the typical fare at the school's dining facilities.
Question 10 offered the option of expressing an opinion in a sentence or paragraph, or just picking one of the three preset options - no, not very, yes.

In our analysis of the results, we started by organizing the quantitative data into two tables by country, and assigning identification numbers to each child. Since the survey was conducted anonymously, assigning the numbers was the only way to make sure the data could be handled responsibly and correlations could be observed. .

Table 1. Quantitative characteristics of Czech children.

ID number	Age, years	Height, cm	Weight, kg	Hours of PE weekly
1	6	116	21	3
2	7	129	33	3
3	11	139	40	2
4	8	136	40	3
5	8	115	25	2
6	12	156	43	1
7	7	122	23	3
8	6	115	27	3
9	7	121	22	3
10	7	128	28	2
11	8	127	31	3
12	8	134	43	2
13	12	150	47	2
14	12	152	52	2
15	9	138	32	3
16	11	142	42	2
17	9	133	38	2
18	6	117	31	2
19	7	132	33	3
20	12	159	51	2
21	10	145	39	2
22	9	128	39	3
23	7	118	26	2
24	10	148	49	1
25	8	119	30	2
26	11	142	43	2
27	8	120	24	2
28	6	120	27	2
29	10	142	51	2
30	7	123	25	3

ID number	Age, years	Height, cm	Weight, kg	Hours of PE weekly
31	10	132	34	2
32	6	122	29	2
33	8	128	36	3
34	12	143	37	2
35	6	118	28	2
36	7	119	27	2
37	10	147	45	2
38	8	125	28	2
39	8	128	32	2
40	9	130	33	3
41	11	160	45	2
42	7	118	33	3
43	6	120	25	2
44	10	150	48	2
45	9	140	36	3
46	9	145	45	2
47	8	126	30	2
48	10	142	41	3

Table 2. Quantitative characteristics of Greek children.

ID number	Age, years	Height, cm	Weight, kg	Hours of PE weekly
1	7	128	26	3
2	12	146	47	2
3	6	115	33	3
4	10	140	35	2
5	12	145	45	2
6	9	138	34	2
7	6	117	37	3

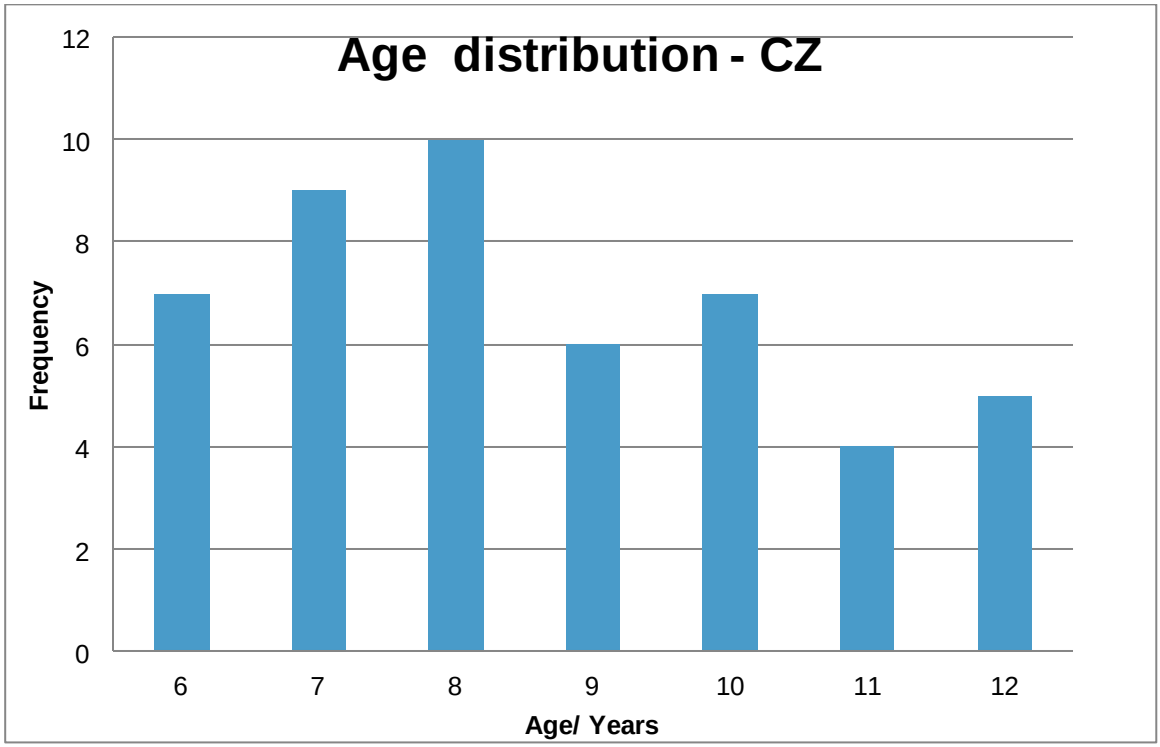
ID number	Age, years	Height, cm	Weight, kg	Hours of PE weekly
8	11	147	46	2
9	6	119	32	3
10	8	121	29	3
11	8	138	40	3
12	6	117	23	3
13	9	134	32	3
14	8	126	36	2
15	11	136	39	2
16	6	116	32	3
17	7	120	41	3
18	6	130	40	3
19	7	124	34	2
20	11	140	40	2
21	8	131	33	3
22	12	155	40	2
23	11	160	52	2
24	9	136	32	2
25	6	128	34	3
26	7	122	40	3
27	8	139	37	2
28	11	158	48	3
29	10	133	31	2
30	8	136	35	3
31	6	125	28	3
32	12	142	40	2
33	7	125	33	3
34	9	135	42	2
35	11	159	52	2
36	6	129	32	3
37	10	132	45	2

ID number	Age, years	Height, cm	Weight, kg	Hours of PE weekly
38	6	119	27	3
39	11	130	32	2
40	8	126	27	3
41	10	137	39	2
42	7	133	32	3
43	7	126	30	3
44	12	167	59	3
45	11	152	54	3
46	6	120	34	3
47	6	123	29	3
48	6	98	22	3
49	11	147	43	2
50	8	128	32	3
51	12	155	48	2
52	9	150	46	2

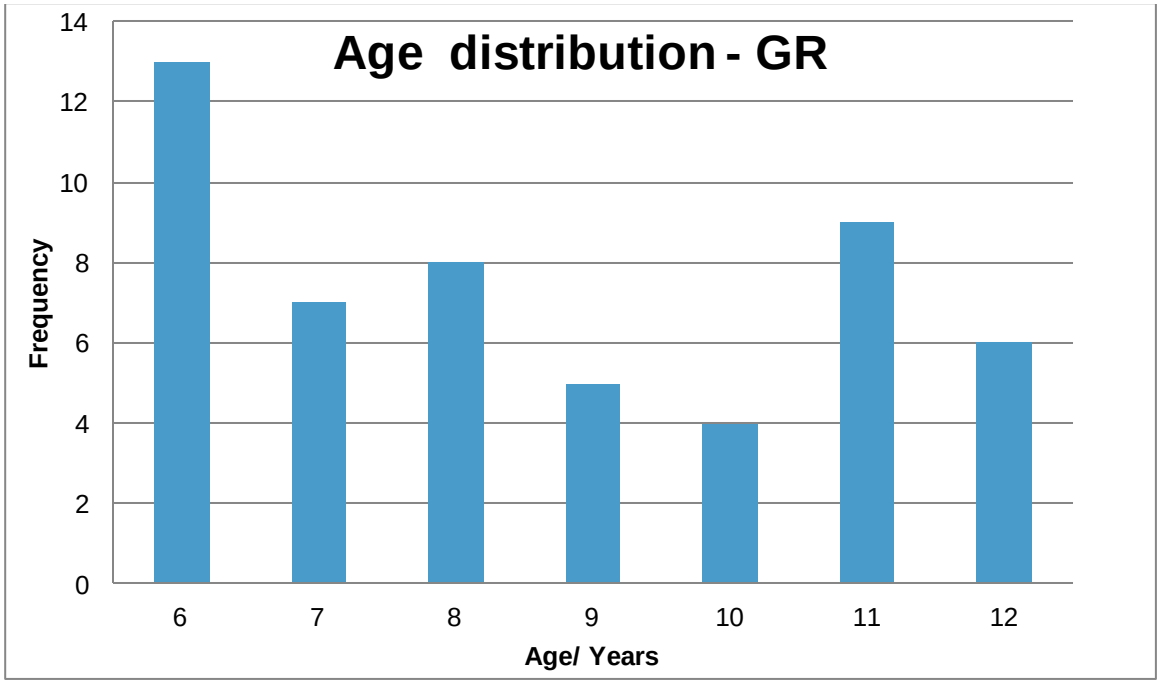
Age distribution

It came to our attention that six of the children in the Greek sample were, in view of their age, most likely in kindergarden. Since children are exposed to a lot more unstructured movement there, we had to eliminate those subjects. We also cut two cases from the Czech sample, because they were too old - 14 and 15 years old, to be specific.

In order to see whether the samples could be representative of the actual situation, we constructed an age distribution histogram for each subset.



Graph 2.1. Age distribution in Czech children.



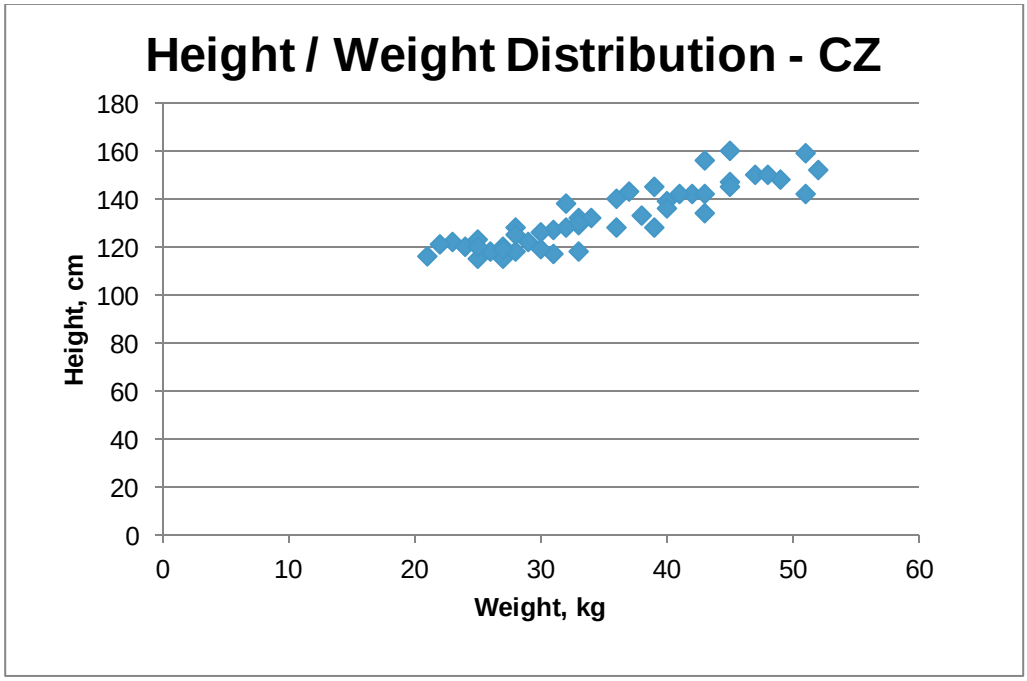
Graph 2.2. Age distribution in Greek children.

As we can see on the figures above, age distributions do not vary between the two countries..

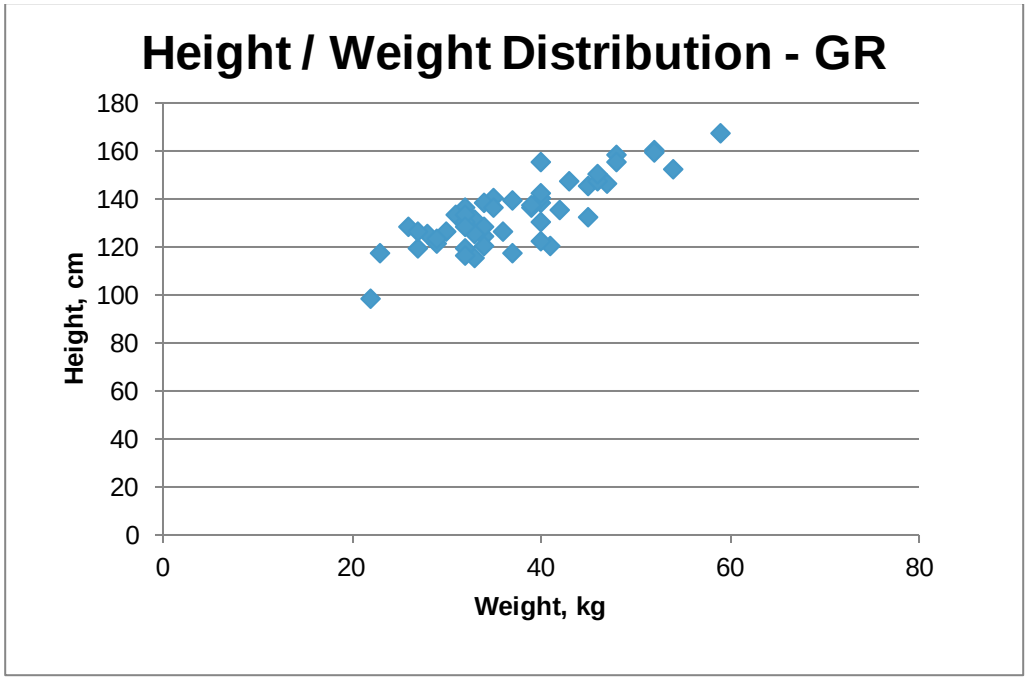
Within their respective ranges, the samples do not appear severely skewed. Neither is a perfect example of a standard distribution, but they aren't only representative of a single age group, either.

Height and weight distribution

Next, we wanted to look at the height and weight data we were provided. In order to check for simple data entry mistakes, we constructed simple scatter plots for both subsets. Any obvious mistakes, like the entry of height in meters instead of centimeters would show up on the graph as outliers.



Graph 2.3. The overall height and weight distribution in Czech children.



Graph 2.4. The overall height and weight distribution in Greek children.

It is fairly obvious from these two graphic representations that no such occurrence happened. Also, a pattern started to emerge - the height-weight distribution already seemed more linear for the Czech children than it was in Greek children.

BMI

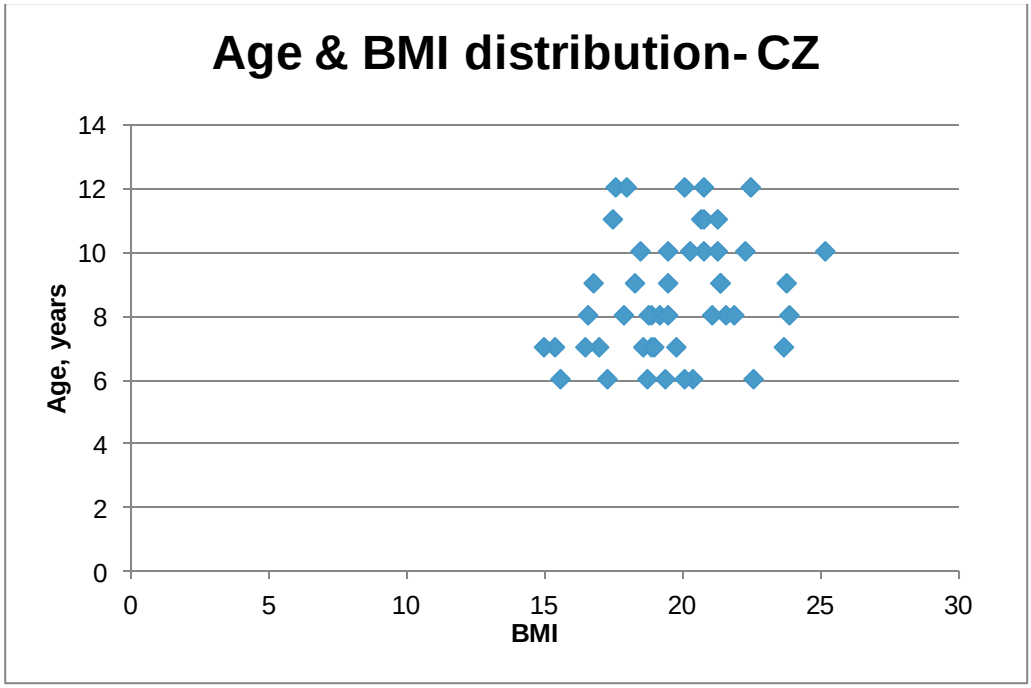
Body mass index and body composition

To move towards the actual aims of our dissertation, we needed a measure to gauge the presence of overweight/obese children in the sample. The body mass index presented itself as the only viable option that was both possible to use in the circumstances, and widely recognized as a generally reliable marker, in both adults and children.

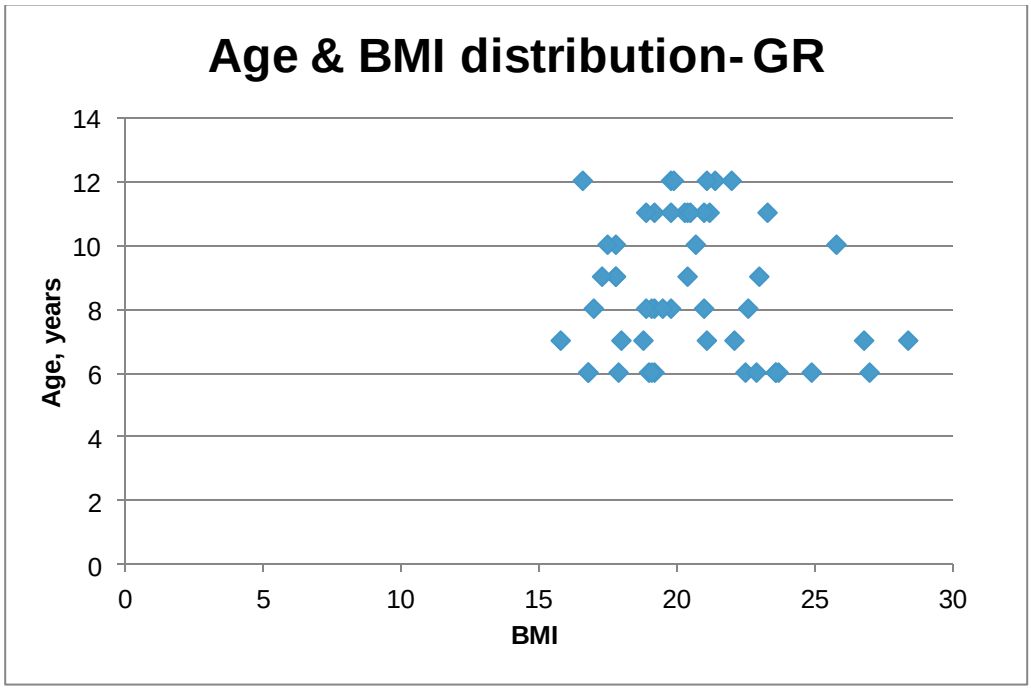
The formula for calculating the body mass index is the individual's body mass in kilograms divided by the square of their height in meters. Using the data collected, we calculated the BMI for every child in question. We then proceeded to organize the results according to the official BMI ranges used for children with the help of the US CDC Children's BMI Calculator.

The ranges for adults are, as follows (Ferrera, 2006):

Less than 15 - very severely underweight
from 15.0 to 16.0 - severely underweight
from 16.0 to 18.5 - underweight
from 18.5 to 25 - healthy weight
from 25 to 30 - overweight
from 30 to 35 - moderately obese
from 35 to 40 - severely obese



Graph 2.5. The age and BMI distribution in Czech children.



Graph 2.6. The age and BMI distribution in Greek children.

However, in children these characteristics depend not only on height and weight, but also age (for anyone under 20) and gender. The descriptions of body composition are defined by comparison to general values (Onis, 2006) for most common height and weight at that age, as follows:

5th percentile and under - underweight

5th - 85th percentile - normal BMI

85th percentile and above - overweight and obese

95th percentile and above - obese

We analyzed the distribution among those ranges for each country separately.

CZ				GR		
Underweight (< 5th %ile)		0		Underweight (< 5th %ile)		0
Normal BMI (5th - 85th %ile)		38		Normal BMI (5th - 85th %ile)		37
Overweight or obese (≥ 85th %ile)*		4		Overweight or obese (≥ 85th %ile)*		11
Obese (≥ 95th %ile)		6		*Obese (≥ 95th %ile)*		4

Table 3. Comparison of BMI range distributions in Czech and Greek children. .

In all samples, the Czech Republic showed healthier BMI ranges in children, with 79,2% of children within the normal range and 20,8% obese, as opposed to the Greek 71,15 and 28,85 percent, respectively.

Judging from the graph 2.6. the Greek children in our sample entered the school heavier, with the mean BMI of Greece's 6 year olds being 21,3, in comparison with 19,1 for the Czech Republic.

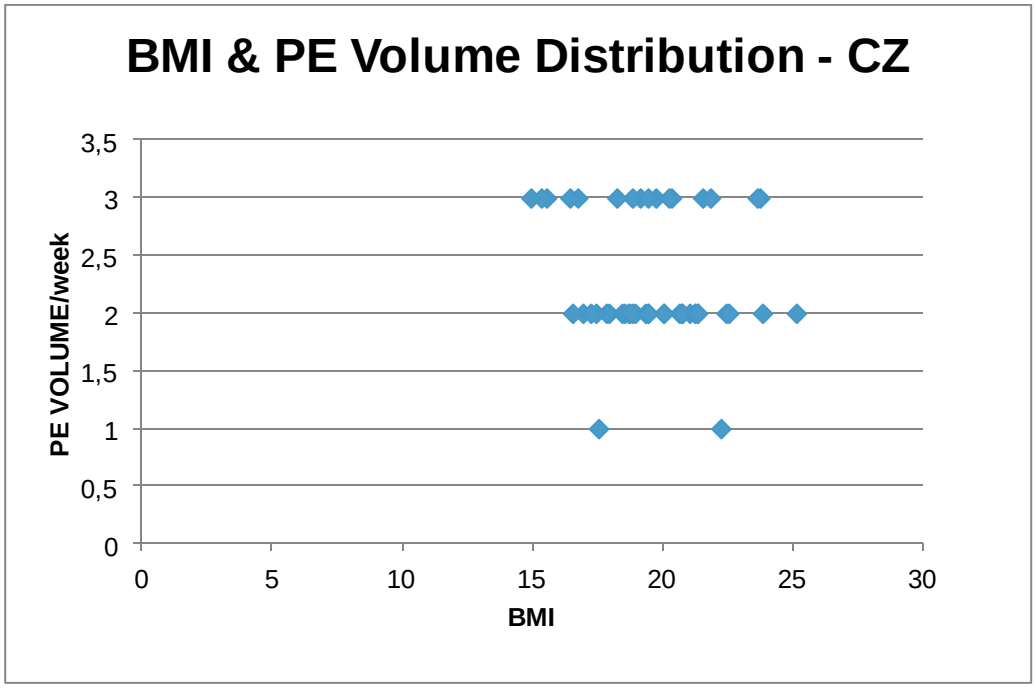
To confirm the general tendency, we also calculated the mean BMI for each country, overall. The results for the Czech Republic and Greece are 19,7, and 20,55, respectively, which is a statistically small difference.

For now, we can conclude that the Greek children in our sample are heavier generally. That alone, however, says nothing about the Czech school system's superiority, or the Greek system's inferiority. At the very least, there would need to be a correlation between the body mass index and the attention paid to physical education at schools.

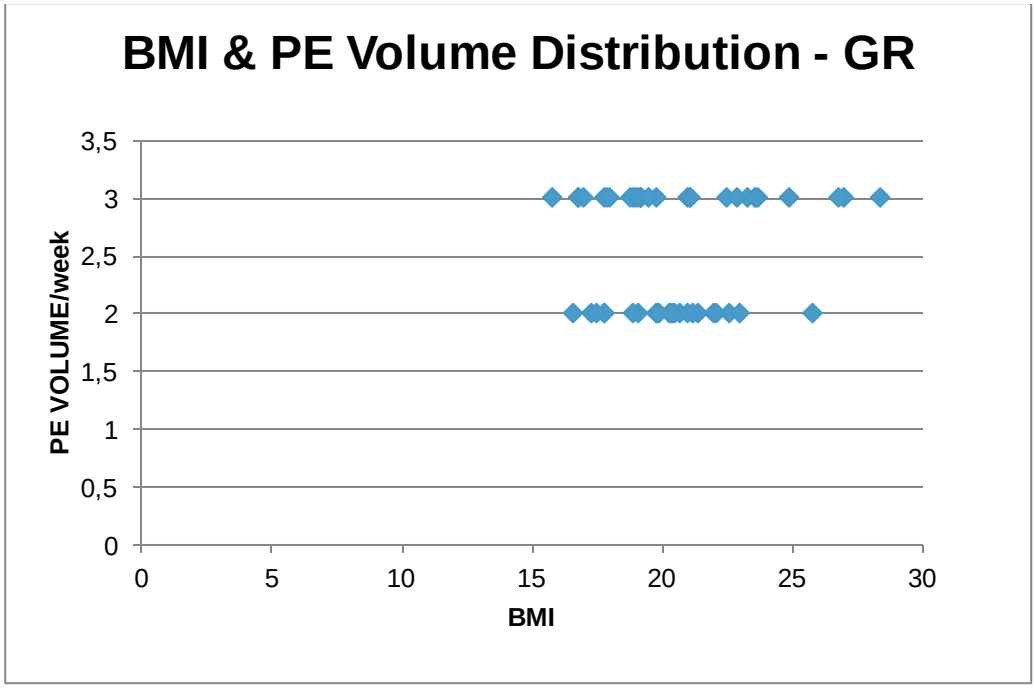
BMI and the volume of PE at schools

To that end, we looked at the average volume of PE at schools in both countries, according to the data reported. For Greece, the mean for the hours of PE weekly metric is 2,55. For the Czech Republic, the number was slightly lower at 2,29 hours weekly.

In order to see whether those distinctions actually have any implications for the quality of physical education in both countries, correlation would need to be looked at, first. That is why we constructed scatterplots to visualize such a correlation or a lack thereof, between BMI and the volume of physical training at schools.



Graph 2.7. The distribution of BMI and the volume of PE in Czech primary schools



Graph 2.8. The distribution of BMI and the volume of PE in Czech primary schools.

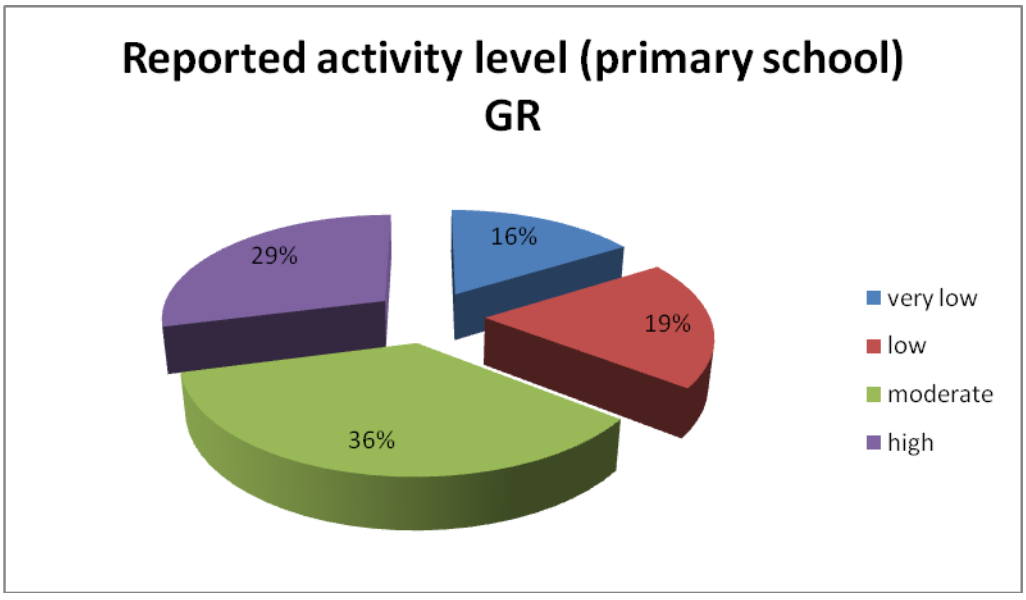
Judging from the graphs, it looks like there is a stronger correlation between the amount of physical training at schools and the BMI in the children who go to school in the Czech Republic than in those enrolled in Greek schools, with their BMIs going down with the increase of weekly PE volume.

Physical education and reported activity levels

Since one of the most important aims of school physical education is laying the groundwork for a lifelong healthy and enthusiastic approach to movement, we had to examine the reported activity level of children. We assigned numbers to the data, from 1 to 4, 1 being very low, 2 - low, 3- moderate, 4 - high. We then proceeded to examine the averages, the range distributions, and the correlation tendencies.

First of all, upon calculating the averages, it became apparent that Czech children were more active in their everyday life than their Greek counterparts, with the calculated mean activity level at 2,96 and 2,77, respectively.

How those activity level ranges were distributed differed as well. 36% of the Greek children were reported to be moderately active, 29% were reported to have high activity levels, but the rest was distributed between very low and low levels, at 19% and 16%, respectively. It is also important to note that the activity level distribution remained nearly identical in the primary school subsample.



Graph 2.9. The reported activity level distribution in Greek primary-school-age children

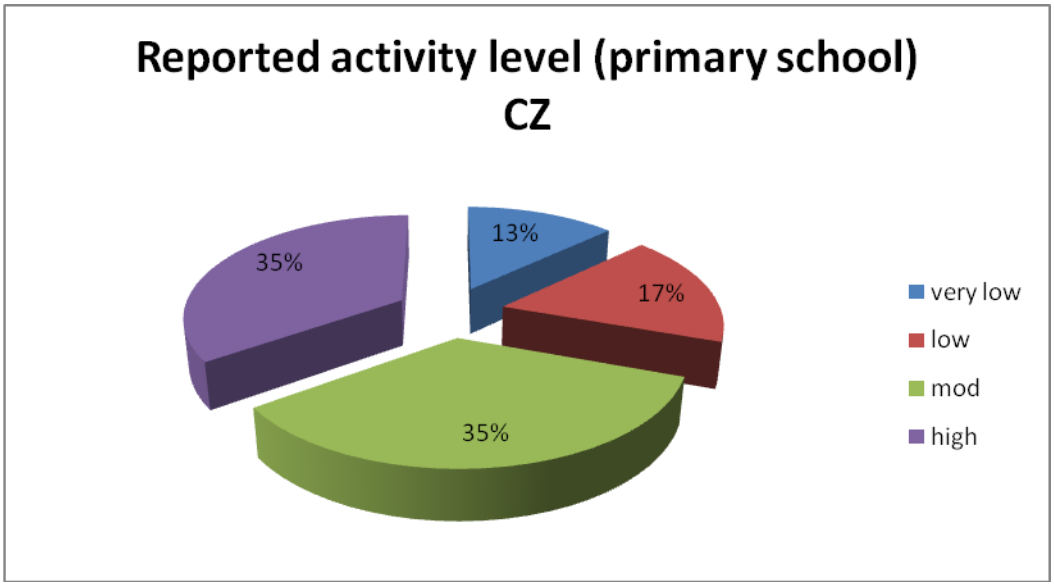
Czech children, more active judging by the mean activity level, distributed as follows:

13% - very low

17% - low

35% - moderate

35% - high.



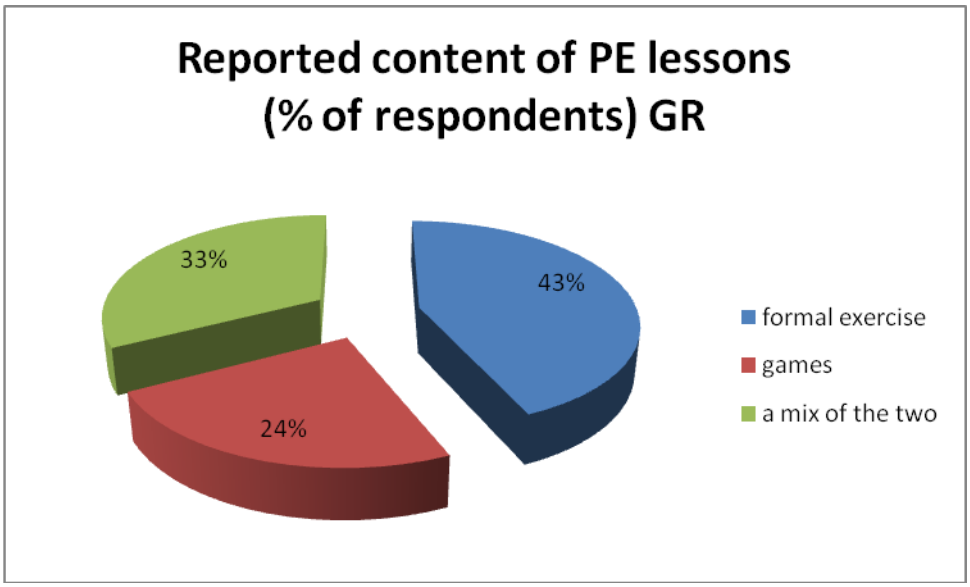
Graph 2.10. The reported activity level distribution in Czech primary-school-age children

To make the comparison more graphic, we added up the very low and low reported activity levels. Those came out to 30% for the Czech children, and 35% for the Greek children. Both numbers are staggering, but the Greeks are obviously worse off.

The next natural step was to see how that was, in fact, possible. That is why we turned to interpreting the reported PE lesson content data we got from the parents. Now, it is necessary to keep in mind the caveat that parents are not the ones directly experiencing the lesson, but we had reason to believe that the ones interested enough in their children's wellbeing to take the survey in the first place, would have been the ones who were actively interested and knew what the PE lessons were like.

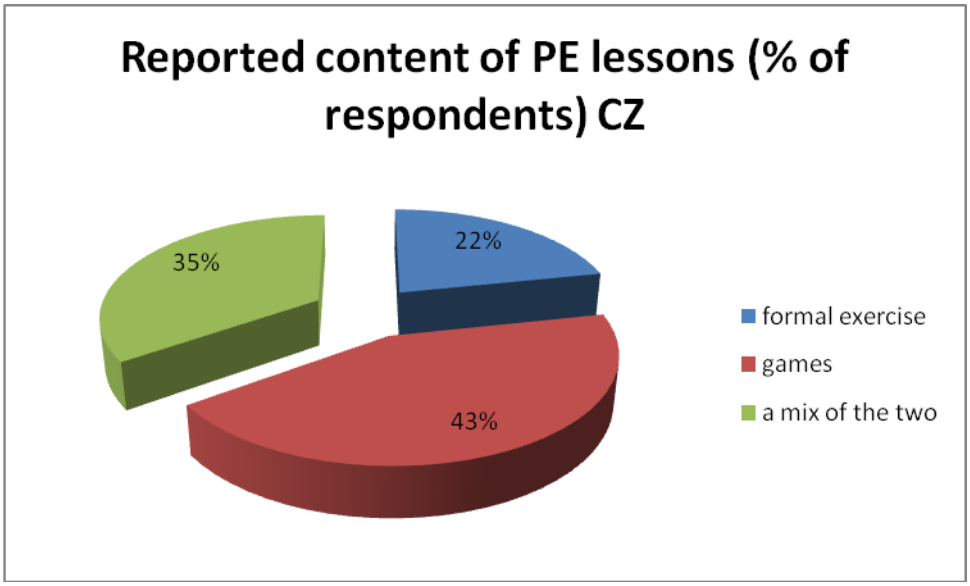
To make the correlation analysis easier, we again assigned numbers to the qualitative variable values. Since the three answers available were "mostly games", "mostly formal exercise", and "a mix of the two", we had the opportunity to turn it into a fairly clear scale. 1 would mean "mostly games", and as the contents progressed towards the more formal training, the numbers went up, with 2 meaning "a mix of the two", and 3 standing in for "mostly formal exercise".

The Greek schools turned out to have their physical education curriculums skewed more towards the formal exercise end of the spectrum, with 33% of respondents reporting "a mix of the two", and 43% reporting "mostly formal exercise" as prevalent, with only 24% stating that the lessons were "mostly games".



Graph 2.11. Reported content of PE lessons in Greek schools (% of respondents)

For the Czech school, the situation looked a bit different, with 22% of curriculums categorized as "mostly formal exercise", 35% - "a mix of the two", and 43% - almost 20% over the value the Greeks had - said that the curriculum mostly consisted of games.



Graph 2.12. Reported content of PE lessons in Czech schools (% of respondents)

Nutrition

Before we started on our research, we deemed it fair to assume that nutrition would play a big role in the physical development of the children in general, and their BMI in particular. Since the primary information source we'd chosen were the children's parents, they were also the ones we counted on in order to get an understanding of our subjects' nutritional habits. The problem with that approach, however, is that, if asked to describe those habits, the respondents would be prone to taint their responses with their subjective perception of what is healthy, as well as a desire to project a better image as a responsible and health-conscious parent. That is why the question we chose to ask instead was about their children's school lunches.

Another reason we wanted to look at the school lunches in particular was that we consider nutrition a natural part of school curriculum, part of which, it is our strong conviction, should be experiential, and that is where the organized meals would be most effective. Hence, the content of the lunches would be a reliable indicator of a school's general policy.

During the analysis of the data we got through the conducted survey, it became apparent that there was a substantial difference in the Greek and Czech approaches. In the case of Greek parents, most children were sent to school every day with their lunches packed for them. Those parents who did comment on the availability and content of school lunches, mostly reported about meat, cheese and spinach pies, as well as sweets, pizzas, and carbonated drinks. Still, 90% of the Greek parents who filled out the questionnaire suggested that they were the ones in control of how their children fuelled themselves nutritionally.

Czech parents were not as inclined to pack school lunches for their offspring, with lunch hall food being the more widely acceptable choice. The reports of the content of those lunches, however, did not always justify the decision, with simple carbohydrates prevailing on the menu, as most choices reportedly revolved around rice, pasta, potatoes, and traditional Czech dumplings, as well as heavily sweetened drinks.

All in all, it appears at this point that there is no correlation between what a child typically eats at school, and how heavy they are, in the context of this sample.

Since the reported content of lunches was fairly consistent across the board, there was no correlation to be found between the volume of physical education and the quality of school meals,

suggesting that even the schools that were committed to providing the best physical education programs, were not committed to the nutritional part of the well-being equation.

On the question of regulations, it is a two-partner.

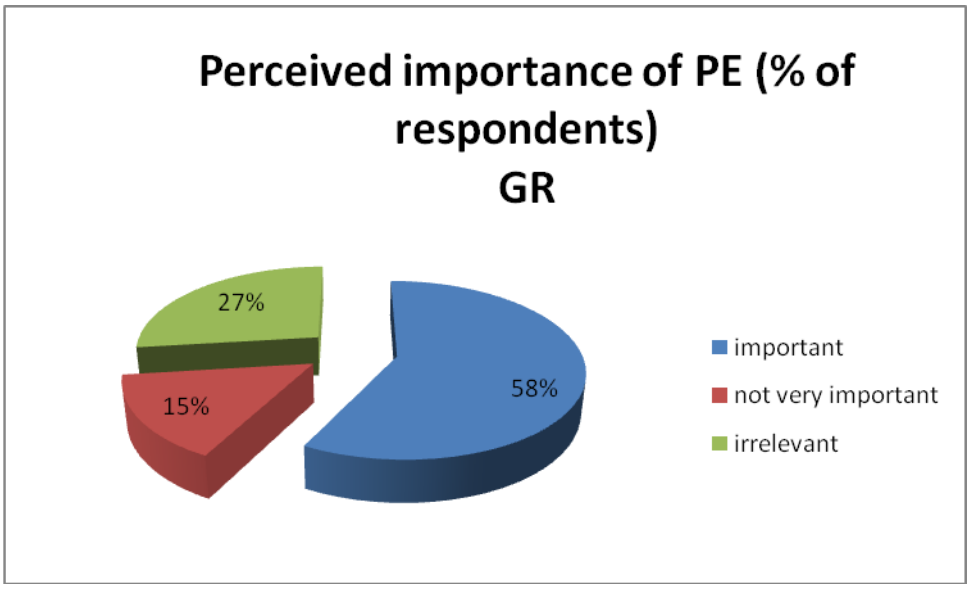
When it comes to food, sometimes children are the ones to blame for carb-laden choices because, while there is always meat available, especially in the Czech Republic, there is also very often the option of choosing a vegetarian meal, and those are usually in fact pasta and potato or rice dishes.

It is interesting to note, however, that over 30% of parents reported cafeterias/lunch halls carrying sweet drinks, which are theoretically prohibited for sale at schools in both countries. While that might be bad data, there is also the option that the regulations aren't strict enough and schools may find loopholes to satisfy the children's demand for fun foods and drinks.

Perceived effectiveness of school physical education

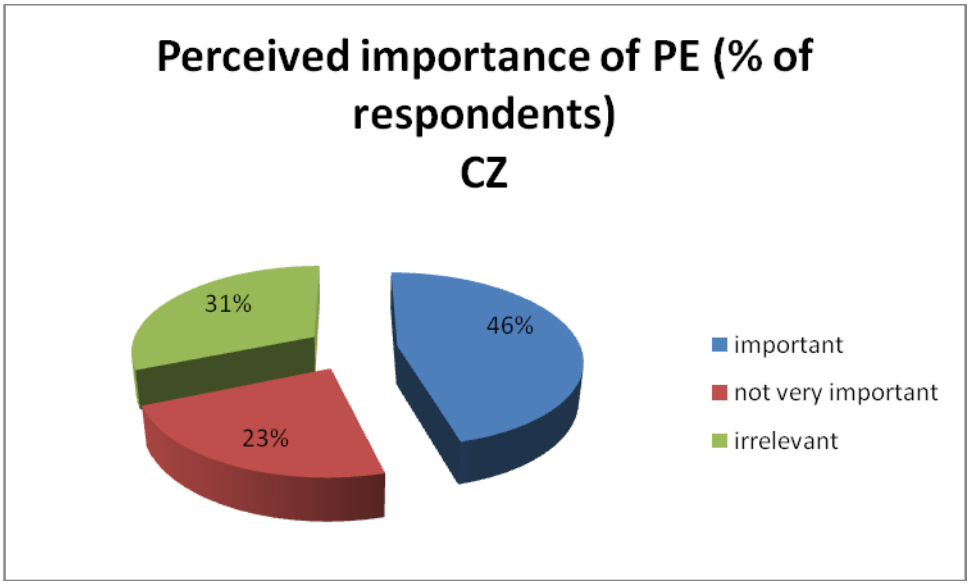
Finally, there was the parents' subjective view of how effective school physical education curriculum was at keeping their children healthy and ensuring their correct physical development.

Out of the 52 Greek respondents, 30 viewed PE as being instrumental in their children's health, 8 did not feel it made any difference, and the remaining 14 were of the opinion that their children's physical development was mostly dependent on other factors.



Graph 2.13. Perceived importance of PE for healthy body composition in Greek parents (% of respondents)

Out of the 48 Czech respondents, 22 viewed PE as necessary and important, 15 thought it didn't make much difference and thus was useless, and the remaining 11 put more faith in other factors.



Graph 2.14 Perceived importance of PE for healthy body composition in Czech parents (% of respondents)

While personal opinions are not an exact science, we believe these particular opinions are important, since these are the people that are witness to their children's behaviors and attitudes, as well as have access to their complete medical history. In this light, we believe that the stronger faith the Greek parents tend to have in their physical education system is very telling.

Concluding comparison

Table 4. Brief comparative summary of quantitative results for Greece and Czech Republic.

GR		CZ
	sample size	
52		48
	age range	
6-12		6-12
	mean BMI	
20,55		19,7
	overweight/obese, %	
28,85%		20,8%
	mean volume of PE, hrs/wk	
2,55		2,29
	mean level of activity (1-4)	
2,77		2,96
	parents' trust in school PE	
58%		46%

To recap, the samples we got were fairly compatible in their sizes and age ranges.

Greek children presented as generally heavier, and slightly less active than Czech children, despite having slightly higher mean volumes of physical training at school.

The Greeks, however, seem to be more inspired by their physical education lessons, and their parents generally put more trust in the school's way of keeping their children fit than their Czech counterparts.

DISCUSSION

Since we'd already been experienced with the extent of the childhood obesity problem in Greece, due to my background, we have to admit that we weren't surprised that the Greek children in our sample turned out to be heavier than the Czech on average. Overshooting the official obesity mark of 21,9 percent mentioned in the theoretical part of this work, the problem was evident at 28,85% of the overall sample.

As stated in the goals section, we expected that at least part of the reason for the problem would be that the quality of physical education at schools was inferior to that in the Czech Republic.

The first perspective we've looked at it from was the sheer volume of physical training, and it was a surprise when it turned out that the Greek children in our sample were exposed to more hours of physical training than the Czech ones. That went against the common idea that more movement equaled less weight, and either negated the possibility of a correlation at all, or meant we had a 'quality over quantity' type of problem on hand.

So the second aspect to consider was the content, how the curriculum itself was structured. A surprising distinction came to light, in that the countries' lessons placed emphasis on different aspects altogether. The Czech parents reported their children spent more time playing, the Greeks insisted theirs were doing more formal training.

One of the reasons the physical education curriculum in the Czech Republic is currently skewed more towards games and the more formal exercise is not as effective in sparking the children's interest might be the state of the facilities the teachers have access to. One of the glaring omissions of our questionnaire was our failure to inquire about the available facilities on the school grounds. Still, literature suggests a certain image unanimously.

Former 'socialist bloc' countries in general show signs of depleted and deteriorating provision since the revolutionary 1989-1990. The Czech Republic, in particular has been suffering from 'bad conditions, especially in big cities where old school buildings, often without sports grounds or gymnasium' (Green, 2005).

Still, Greeks do not have it much better. In fact, the lack of facilities is sometimes cited as the main problem of PE in Greek schools (Puehse, 2005). The real reason PE lessons might be more effective in making the children more active is the historical link between PE and the Olympic Games tradition. Through activities at school, the most talented children may join clubs with the hope of becoming professional athletes in the future.

In the context of lacking facilities, one of the quickest ways to get to a new level of school physical education would be to focus more on teachers, as they are the one variable that can be improved in the least time, with the least investment, and very likely with the most dramatic results. Today, it is common to assume that physical education at school is worthless. Even Woody Allen, the famous writer and director, once said that 'Those who can't do, teach. Those who can't teach, teach physical education'. In order to shift that perception, measures need to be taken.

A good teacher can truly make a lot of difference. If teaching 350 children a week, a typical educator will have worked with over 10 000 children of the course of a 30-year career. (Graham, 2008). That is a lot of influence for a single individual to have, especially when the area they have the influence over is the health and well-being of a nation, with implications ranging from medical to social, to economic.

While most teachers do meet the official requirements for working as a physical educator, the requirements themselves may not necessarily be rigorous enough. Moreover, physical education is one of the most neglected subjects in terms of the teachers' continuous learning, with only a limited amount of opportunities available to improve on their experiences and practices.

What that means is that schools individually, as well as education systems on the large scale could benefit from setting mechanisms in place that ensure that each teacher is fully equipped to make moving one's body interesting to a child, in ways beyond regular play. That is no small task, and requires not only having the right tools in the box, but also the right attitude.

The importance of personal characteristics cannot be overstated in a teacher of physical education. They are the ones who make or break the children's investment in the task at hand, and their willingness to do more of the same in their free time. With physical movement, that means, first and foremost, enthusiasm, inventiveness, and an ability to motivate the students, leading them by example, for there is no amount of logic that will make a child care about their health if the process is boring.

In the theoretical part of our work, we have mentioned a study that came to the conclusion that it was extremely important that childhood obesity prevention was a collaborative effort between the schools and the children's parents. It is our strong conviction that change on a micro scale is the only viable option for now.

Building new facilities and reforming the systems of school education is an admirable effort, and it is one that, if planned and executed correctly, could have a major impact on the health of any country's young citizens. It is however an effort that is time-consuming and requires serious financial investments. The main implication of that is that children need to be led to a healthier lifestyle by their families first and foremost, not waiting until new teacher training systems are in place, let alone until each school has a new pool to train in.

In order to build the right kind of awareness for rapid change, we would suggest a EU-wide distribution of relevant print materials, as well as introducing occasional healthy cooking lessons for children and parents at community centers. Eventually, once the teachers are caught up, there would need to be a more results-based curriculum structure, as another of the main problems right now is the lack of any kind of standards that would be heavily regulated.

With these three types of changes - teacher, parent, curriculum - implemented comprehensively, one can finally hope for a healthier future for our children, and their own emotional investment in it. Luckily, such initiatives are appearing consistently. The only real question is the question of their effective realization.

We would also like to comment on the weaker aspects of our work.

Our primary concern is the size of the samples. While samples over 30 cases are usually considered valid, we feel that the correlations would have been much more reliable and possibly a lot more interesting, had there been more cases to examine.

The second problem with the work is the questionnaire. While we maintain that it was necessary to get this information from parents for above mentioned reasons, the structure of the questionnaire itself could have been better. We omitted questions on facilities, which led us to not being able to analyze one of the most important aspects. Also, some of the data the questionnaires

provided are dubious, for instance, the nutrition information, stating that the children were drinking sweetened drinks for lunch, when this is in fact prohibited. Although there are ways to interpret it, we still feel clarification on these answers would serve the research best.

If we were to do it again, we would also change the answer options for the question on general activity level. While we have specified guidelines as to how to choose the suitable answer, we feel that listing hours of physical activities might have also been beneficial. Moreover, if it were a separate question from the earlier one, we would have been able to gauge the effect of intensity of training on the BMI and other indicators.

CONCLUSION

It was our initial hypothesis that Greek children were more prone to obesity than Czech children, and that there was a strong link between that and the schools' way of teaching PE.

While parts of that have been confirmed, it became apparent that there is no clear superiority of the Czech system over the Greek system. Moreover, we discovered that, based on our sample, the practices at different schools varied to a very large degree, both between schools themselves and from the "official" guidelines, as there was not much of a regulatory mechanism in place.

What we have observed instead were general tendencies, part of which worked in favor of the average Greek school, and the other part of them deeming the Czech school the winner. As in most cases of comparison, it turned out that there were elements in both systems that had potential to produce positive results.

The Czech way of teaching physical education made for healthier BMI values and more active children in general, however the Greek way of handling formal exercise (gymnastics, athletics) specifically, made for a stronger correlation with the increased activity levels.

Most importantly, it became apparent that while each system has its benefits and drawbacks, it is most likely the holistic approach to health or a lack thereof that has the final say over the development of obesity in children. In that regard, the most obvious weak spots were schools' nutritional policies as well as the lack of a comprehensive educational initiative encompassing the child, the teacher, the school, and the parent in a harmonious and effective way.

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