THE EVOLUTION OF PHYSICAL EXERCISE: HEALTH BENEFITS AND ITS ADAPTABILITY TO MODERN LIFESTYLE

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Abstract: This article attempts at referring to the evolutionary sources of physical exercise in order to assess the positive impact of physical exercise on health aspects and quality of life in modern day life. Using evolutionary theories as a basis to evaluate the impact of physical exercise on man's health may raise human awareness to its importance. The findings of this study refer to the lack of adaptation between the needs of human body functions and circumstantial modern lifestyle. Moreover, there are changes that need to be implemented in gym classes in order to provide the pupils with understanding and incentives regarding the importance of sports.

Key words: Human kinetics**,** physiology, evolution, diseases of civilization, health factors, modern lifestyle, physical exercise, developmental psychology.

Introduction

Physical education in its most common definition is an interdisciplinary field, which references in the least both pedagogy and physiology but in fact, as a research field it is neglected from the educational and physical point of view. Instead of analyzing pedagogy as a whole, physical education concentrates almost completely in ways to raise motivation in pupils, and instead of dealing with physiology as a whole, physical education concentrates almost entirely on human

kinetics. Therefore, instead of combining in entirety all available knowledge from these related fields, the academic literature in this field limited research in each of these major fields so much so that it became a constrained and narrow niche, characterized by a slower pace of development than that of pedagogical development and definitely much faster that the pace of development in physiology. Accordingly, this study aims at combining all the insights and discoveries in order to promote the discussion on physical education by referencing content fields that do not receive adequate research evaluation. From a physiological point of view these insights relate to the development of evolutionary processes pf adaptation to the environment and to the environmental requirements that the human body needs today in order to function optimally in light of these processes; from the pedagogical point of view, these insights are identity narratives for shaping the pupil's self-image and impacting his own definition of self as a tool in decision making – this article focuses on physiological aspects[1] [2] [3] [4].

1. Evolutionary changes

Evolutionary changes are measured in periods of millions of years, in the least by hundreds and thousands of years. This pace is completely different to the pace of change in human beings' lifestyle beginning the Neolithic revolution 12,000 years ago. The period of the most significant body-evolutionary change for physical exercise in humans is the process of separation between hominids to pogonias that began about seven million years ago. This change marked the transformation of walking on two feet, a larger body, a bigger head, lessening of

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[1] (Schmidt & Lee, 2005)
[2] (Ntoumanis, 2001)
[3] (Henry, 1964)
[4] (Eshel, 1996)

body hair, and a little later the development of a perspiration system to cool body temperature further followed by a decrease in upper and lower body parts. This change was brought about by environmental changes: tropical forests experienced dry periods and became like savannahs, and food accordingly became more disperse, so that prehistoric man was forced to engage in strenuous physical activity on a daily basis in order to survive. As a result, the increase in energy levels spent on finding food and escaping from wild animals in order to survive, all the hominids existed as tribal gatherers. All along this period, human beings' prehistoric forefathers survived and proliferated based on their capabilities and ability to adapt to strenuous physical exercise, especially running and walking. In order to adapt, their body systems shaped up and to an extent encouraged these activities in order to survive. However, the rapid pace of changes in lifestyle in humans for the last 10,000 years from tribal gatherers to office employees, especially during the last hundred years of technology, prosperity and living conditions that allow for a life without any physical effort; the pace is too rapid for genetic evolutionary change so that the modern human body is still adapted to physical exercise, and moreover requires physical activity in order to function optimally; accordingly, this lack of harmony between the body's requirements and circumstantial lifestyle of the modern man is responsible for significant health consequences, meaning to say, one has to regard the chronic lack of physical exercise as an abnormal situation[5] [6] [7] [8] [9] [10] [11] [12].

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[5](Chen, 1999)
[6] (Mattson, 2012)
[7] (Eaton & Eaton, 2003)
[8](Reaven, 1993)
[9] (Horton, 1991)
[10] (Hedgecoe, 2002)
[11] (Hu, 2008)
[12] (Ogden, Yanovski, Carroll, & Flegal, 2007)

2. Physical exercise and the modern lifestyle (diseases of civilization)

This abnormal situation is one of the most significant characteristics of modern society throughout the world, so much so that the lack of physical exercise has become a norm and physical activity is regarded as a distraction from life's routine. Parallel to social these social changes regarding the level physical activity, the ability to treat and cure illness and injuries has highly improved, so much so that the majority of severe illness that individuals living in developed countries experience are " diseases of civilization ", diseases caused by the modern lifestyle and of ageing populations. They include physiological diseases such as diabetes, its derivatives and prediabetes which target an increasing number of cases in the population as obesity in itself has become more prevalent and extreme.

Accordingly, one can combine the obesity phenomenon and chronic diseases as a symptom of modern civilization, a small sacrifice to pay for extreme convenience in human's lifestyle. However, acceptance of this status quo is problematic due to the rise in obesity extremes and the diseases it causes – diabetes mellitus is not called juvenile diabetes anymore due to the fact that both types of diabetes are found in , children as well as fatty liver diseases – both its epidemiological prevalence – in countries such as Mexico there are twice as many unhealthy overweight people than people with normal weights – and especially due to the relatively easy measures needed in order to improve the current existing situation.

This relative easiness is due to the fact that physical exercise distinctly reduces the adverse effects of these ' diseases of civilization'. More importantly physical exercise prevents them from occurring, in many cases contributes to reversing the problem, in summary, an integral part of coping with diseases of civilization is physical exercise. This is true especially in relation to vascular

diseases, cardiovascular diseases and other physiological diseases mentioned before.

3. Strategies to improve the physical education classes

These insights have been recognized by governments in the western world, and needless to say, all developed countries have a variety of programs in prevention and coping with these problems especially regarding obesity and children's obesity that include physical exercise, a healthy diet and many other aspects of a healthy lifestyle. One of the underlying reasons is the huge toll of these diseases on developed healthcare systems, the impairment of both work capacity of many people, as well as social interests, values and economy. Generally speaking, these programs can be rated as compete failures. There is no improvement or regression of the increase in ' diseases of civilization ', on the contrary, they are becoming more prevalent and extreme from year to year. It is evident that physical exercise alone cannot solve the problems and accordingly it is not worthwhile to treat the failure in providing values as the major reason in the failure to cope with diseases of civilization. However, it poses an integral part of the coping puzzle that its failure is recognized, significant and is inclined to improve – so that based on the outstanding outcomes on the health and lives of children, these programs and their failure in succeeding do not only represent failure in government programs but failures in the schools' programs[13] [14] [15] [16] [17] [18] [19].

These programs are multi-layered and their failure to succeed at each level is due to common factors that apply to all layers as well as causes that impact each

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[13](Holloszy & Kohrt, 1995)
[14] (Astrand, Rodahl, Dahl, & Stromme, 2003)
[15] (Morris & Froelicher, 1993)
[16] (Alberti, et al., 2009)
[17] (Tanumihardjo, et al., 2007)
[18](Story, Kaphingst, & Simone, 2006)
[19] (Cawley & Meyerhoefer, 2012)

individual layer. For example, the advertising and marketing of fast food for children impacts nutrition individually, whereas a lack of parental guidance about healthy lifestyles has a multi-layered impact. In reference to the physical exercise layer, it is possible to reduce the various factors that cause failure to three main categories: a. ignoring the pupils' preferences such as plans to terminate activity based on aerobic dance activity, when the pupils are interested in aerobic-group-competitive activities such as dodge-ball. This category includes a broad term for a number sports activities that are compulsory health wise and not activities meant for enjoyment, improving a personal trait or any other positive trait that stems from sports, instead, sports as a health requirement such as brushing one's teeth which is not for fun but necessary; b. a lack in resources that is disproportionate to the enormous economic damage expenses due to civilization diseases that are supposed to decrease as a result of these programs, so that incompatibility between these programs and the existing infrastructures will change, otherwise, from the get-go, these programs that lack infrastructure are destined to fail simply because the resources are meager and prevent and major change for the better; c. the third category the most up-to-date one is the gap between the social acceptance movement that posits the necessity to fight for equality in the social acceptance of overweight people and the movement preventing overweight and civilization diseases, which aims to combat the health problems caused by obesity. There is an ideological gap between on the one hand, what is termed as love of self and going against social models of beauty and on the other hand, a pragmatic focus on health aspects of obesity[20] [21] [22] [23] [24] [25].

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[20](Marlow & Abdukadirov, 2012)
[21] (Schwartz & Brownell, 2007)
[22] (Schwartz & Brownell, 2007)
[23] (Baur, 2002)
[24] (Manson, Skerrett, Greenland, & Vanltallie, 2004)

In addition to addressing the above-mentioned issues, an aspect that has not been brought up before in the academic literature as defective, is the lack of a theoretical framework of Critical Psychology or Developmental Psychology in creating these programs. After all, these programs are designed as behavior interventions per se, and therefore they need to be structured in the same manner that programs for modifying behavior are planned. In particular in the contest of children, it is necessary to develop these programs according to the existing insights in pedagogical psychology, according to which children shape their identity as according to society and its expectations as perceived by them, as well as their own feelings and emotions, and all these factors form a dynamic narrative aimed at reaching a logical consistency and an adaptation to archetypes. It is required of plans intended to modify children's behavior to be structured so that the desired behavior is easily suited to these narratives, meaning that an integral part of physical education should be learning the physiological meaning of being a human being, a subject that needs to be instilled in the children's narrative, and from within this narrative foster the values and the necessity of physical exercise. However, achieving this goal not by comparing physical ed to brushing one's teeth, or as a health necessity or not even an enjoyable activity. Presenting physical exercise as an integral part of human nature and as of being a human being. Furthermore, the program needs to take into consideration the heterogeneity of the population. It is not possible that an entire classroom of children from different backgrounds can be convinced significantly by the same messages. Children that perceive themselves as having an archetype identity detached from sports need totally different messaging from children who perceive themselves as future sportsmen. Moreover, filtering the children according to

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[25] (Kersh & Morone, 2002)

these traits is both easy and efficient – a short survey is sufficient in order to divide pupils from one district into sub groups or a division according to level of interest in sports, so that each sub group will experience a different program which can enhance appreciation for physical exercise[26] [27] [28] [29].

4. Research method

In order to analyze the best approach for dividing gym classes into groups, the first step is in identifying four categories of archetypes: those that have sports and academic capabilities, those that have only sports capabilities, those that have only academic capabilities and those that lack both sports and academic capabilities. I efficiently divided the pupils into these categories in a research performed on 549 pupils in grades 5 and 6 from northern Israel as seen below:

Primarily, I defined a pupil excellent in sports as included in 10% of the pupils, resulting in 55 pupils with the highest scores in sports. These pupils received a score of at least 83.13 in sports.

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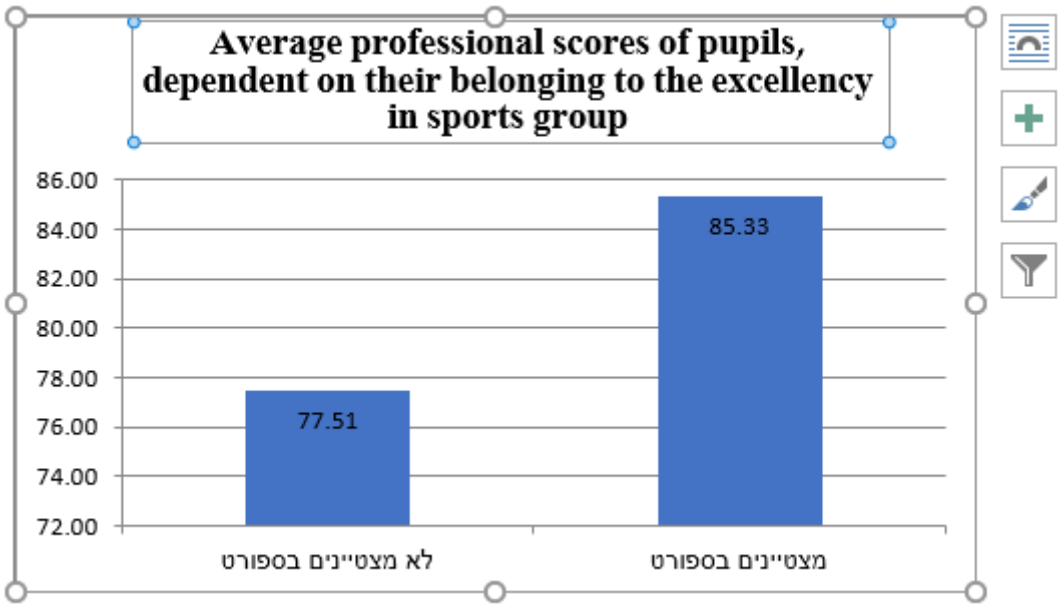
[26] (Van-Sluijs, McMinn, & Griffin, 2007)
[27] (Schiffrin, 1996)
[28](Oyserman, 2009)
[29] (Grotevant, 1987)

Conclusions



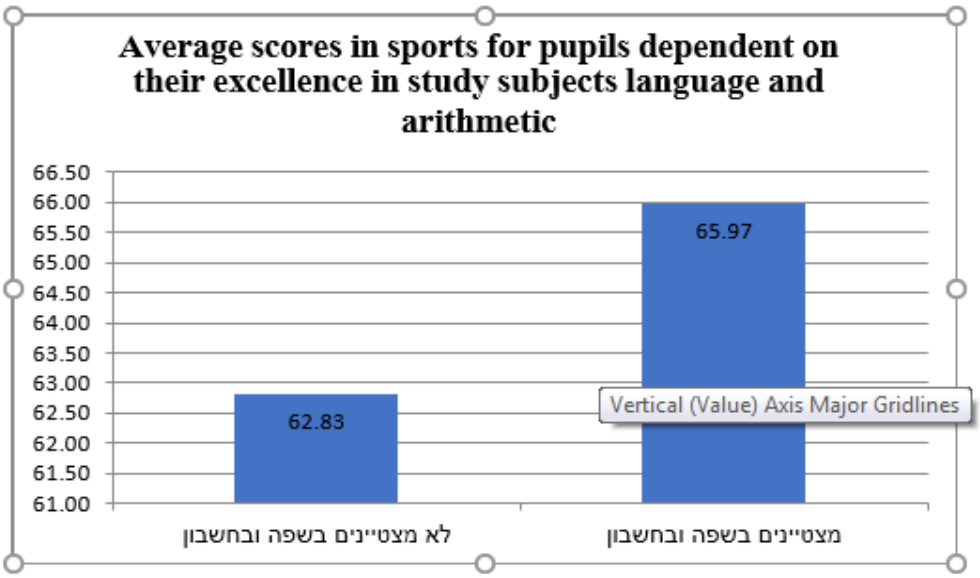
As can be observed by the chart above, the average grade in study subjects language and arithmetic of pupils that do not excel in sports is approximately 77.51, whereas the average grade for those who excel in sports is approximately 85.33, meaning there is a gap of about 7.82 points in favor of the pupils who excel in sports.

An examination of the statistical significance of the difference was performed by using t-test that in this context required using a two-tailed F-test. A result of F = 1.44 was received showing the value for P which is P = 0.999.

Accordingly, a two-tailed t-test alone was performed, resulting in a value of t = 3.98, and accordingly the value of P is $P = 7.8 * 10^{-5}$. meaning that the difference is significant.

After that this test was performed by dividing the pupils according to their excellence in study subjects - language and arithmetic and a test on their sports scores:

Let us define an excellent pupil in language and arithmetic as pupil included in 10% of the pupils, meaning 55 pupils, that have highest grades in sports, meaning pupils that received average grades of at least 97.5 in language and arithmetic.



As can be observed from the chart demonstrated above, the average scores in sports for pupils belonging to the non-excellence group in sports for language and arithmetic is approximately 62.83, whereas the average score for the excellence group in language and arithmetic is 65.97, meaning there is a gap of approximately 3.14 points in favor of the pupils that excel in study subjects (language and arithmetic).

An investigation of the statistical meaning of the difference was performed by using t-test that in this context required using a two-tailed F-test. The result received is F=1.36 giving the value of P which equals P=0.1

Accordingly, we will perform a two-tailed t-test on its own and will receive a value of t = 1.14, and accordingly the value of P of P = 0.25 meaning that the difference is insignificant.

Therefore, it is evident that for the sample archetypes sample of sports capabilities only, are significantly rarer than the archetypes of academic capabilities only. Therefore, it is correct to focus on integrating sports to these existing archetypes. Moreover, for those systems that have the resources to provide a deep individualistic heterogenous approach to pupils, it is already possible by the gross cuts in the above chart, to identify these archetype categories fit each pupil and provide the personal intervention best suited for him/her.

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