

SUMMARY OF THE PHD THESIS

MARGIT BORKOVITS

The development of an exercise program for socially disadvantaged pupils based on their dietary habits and performance related to physical education

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INTRODUCTION

A major task of our age is to reduce the level of risk-taking by school-age children. That is why solving problems connected to dietary anomalies, lack of exercise, and stress at school has become urgent. I have elaborated an exercise programme for socially disadvantaged pupils as a possible means to resolve this issue in line with the principle of equal opportunities.

Given the specific conditions, entering the upper primary level of education entails major changes in the life of a young person. The world of tales and games characteristic for the lower primary level is replaced with a set of school obligations that require higher focus on performance. Families, too, face different tasks due to the fact that they are required to assist their children and the teachers as cooperating mediators. This prompts the question of what actions are to be taken if a parent fails to properly support his or her child's education? If studying is the most suitable means of psychic development of the individuals concerned due to their multiply contradictory situation stemming from their age, which pedagogical and social factors should be identified as the most influential? Abilities, age-related aptitude, and external affective factors should be confronted on a regular basis. A major source of conflicts is related to the fact that psychic development does not go in parallel with age. Based on an analysis of the issues associated with corrective/compensational education, I came to the conclusion that the negative impact of a socially disadvantaged situation is connected to psycho-social and emotional education, rather than a lower level of cognitive development. Group effects appear to be felt in upper primary classes, where socio-metric position becomes gradually important. It is at this age that teachers should utilize group forces to trigger competition, enhance performance, and shape proper lifestyle. An informal and free opportunity to achieve this is offered by making use of afternoon recreation exercises that grant successful completion. These include activities aimed at self-expression based on motion.

The availability of legal provisions and the above considerations have led me to the elaboration of an afternoon recreation exercise programme. Its feasibility has been confirmed by survey results. I have worked out an alternative music-based exercise programme (*Törvény a nemzeti köznevelésről*, 2011) [*Law on national public education*, 2011]. My objective was to provide the content, methods, and means needed in our age. Content-wise, the resource includes a music-based exercise programme supported with multimedia developed for the purpose. It can be used to develop an active culture of upper primary school children and also as a part of health education promoting recreation based on exercise. The exercise resources developed are characterized by using an interdisciplinary approach. The resource capitalizes on my cross-sectional analysis and the results published in special literature. The primary objective of the afternoon recreation exercise programme is to provide an opportunity to live an entirely happy life and promote social integration through exercise-based activity (community action).

Assessing the social economic background includes a number of controversies. Several surveys of adolescents revealed that this age period is free from the differences in health shown to converge with the social position of adults (*Pikó & Keresztes*, 2007). Other studies suggest that the health condition of adults is primarily determined by the health status of adolescence (*Susánszky & Szántó*, 2008). It can be argued, of course, that the actual social position of a parent does not pre-determine, in a youth-adult relation, the health parameters of an adolescent. It does, however, definitely predict the extent to which an adolescent's health condition pre-determines his health condition as an adult. That is, there is a shift in time taking place here. An adolescent's endurance will basically shape his health as an adult, along with the diet applied. What and how often a child will eat until early adolescence as clearly defined by the family and public catering. Preventive programmes are called for in order to improve grievous public health figures. My research addresses these considerations.

THEORETICAL BACKGROUND

The first part of my thesis introduces the role of exercise-based health development on the basis of the evolutionary structure of the notion of health and health development. The notion of health and the scope, objectives, and methods of health development has been gradually refined at various WHO meetings (Nagy & Barabás 2011). Today, health represents a constantly evolving notion which takes everyday challenges into consideration. I take *Insel and Roth's* (2007) definition of the theory of the “*illness-wellness continuum*” as a starting point. The authors specify the notion of health on the basis of six interrelated dimensions (*intellectual, emotional, social, environmental, intellectual, spiritual, and physical wellness*). A high level of these dimensions allows one to live a full and healthy life. The essence of the external and internal balance is conceptualised in *Antonovsky's* (1979) salutogenesis. According to that theory, individuals need to identify the resources that provide them with options to become healthy. Such resources include belief, social support, sports, and flow experience (*Csikszentmihályi*, 2001; *Varga* 2002). The family and the environment play a major role in developing the sense of coherence, since stability is formed in early childhood under the influence of rewarding and blocking processes (*Konkoly*, 2008). Salutogenesis as the basis to create opportunities is connected to a coherent and happy life at three points, viz., individual well-being, self-efficacy, and learned resourcefulness, which may appear important for creating opportunities (*Konkoly*, 2008).

The notion of health developed in parallel with the evolution of health promotion. Health promotion is characterized by partnership and alliance. „Enabling people to recognize and develop their health potential; ensuring interaction between various layers of the society” (*Nagy & Barabás* 2011). Research into community activity and the skills required to cooperate with others provides a basis for the development of new methods and the renewal of the practice to develop school population. (*Nagy* 2000; *Csapó* 2002; *Csikós* 2002, 2003; *Józsa* 2007).

Physical activity in combination with a healthy lifestyle appear to impact the quality of life and, hence, wellness (*Vullemin, Boinin, Bertrais, Tesser, Oppert, Hercberg, Gullemin & Briancon*, 2005). The importance of physical education can be captured on the level of primordial prevention („zero level”) (*Tari-Keresztes*, 2009). The influence of exercise-related activities manifests itself in better learning achievement, improved quality of life, and position assumed in life. Evidence for the protective impact of exercise is related to the flow experience during exercise (*Csikszentmihályi*, 2001) and the feeling of being together. Exercise can improve mood and lower stress (*Anderson & Brice*, 2011; *Biddle & Mutrie*, 2001; *Dasilva, Guidetti, Buzzachera, Elsangedy, Krinski, & De Campos* 2011). In addition to its clearly beneficial influence (*Pikó & Keresztes*, 2007), sports may offer socially deprived layers an opportunity to catch up *Borkovits* (2013a); (*Egressy*, 2005). Financial situation determines an individual's lifestyle. Social background, on the other hand, has an impact on the attitude to health *Schaub & Bácsi* (2010); *Schaub & Szabó* (2007); *Schaub* (2010); *Schaub* (2011a); *Borkovits* (2012); *Borkovits* (2013b). Disadvantage may be mitigated by recreational exercise programmes and other forms of physical activity aimed at improving health (*Schaub, Szabó & Fritz*, 2011; *Borkovits*, 2012; *Borkovits*, 2013c). I take *Biróné's* (2004) definition as a starting point. She draws a distinction between *testi nevelés* [bodily education] and *testnevelés* [physical education]. A reform of physical education, including daily physical education classes and recreational activity at school, is aimed at shaping a health-conscious attitude of young people. It also involves healthy nutrition (*Bíró, Antal & Zajkás*, 1996). In line with this, my thesis envisages the elaboration of a measurement-based recreational exercise programme which focuses on the promotion of equality of opportunity *Borkovits* (2013d; 2014).

RESEARCH HYPOTHESES

My research embraces a broad variety of topics that are eventually discussed within a common project. My hypotheses are thus formulated according to the topics concerned.

H₁: Research into special literature has revealed that the dietary habits of primary school children are crucially determined by their social background.

H₂: Sporting habits of primary school children are significantly determined by the relevant socio-demographic factors.

H₃: Pupils with a kindergarten background are expected to have significantly better aerobic and anaerobic performance results on the basis of their HUNGAROFIT results.

H₄: Family background determines the habits related to exercise-based activity.

H₅: Features of family background affect performance and changes in efficiency in different ways; among them, the level of education of the mother appears crucial.

H₆: Due to social background, significant differences are identified in terms of self-concept and attitude to body, considerably affected by PE performance.

H₇: Physical activity plays a major role in shaping pupils' attitude to health, significantly affected by the opportunities offered by the school.

H₈: The opportunities for active spare time activities offered by the school and the risk-behaviour of the pupil appear to be interrelated.

H₉: Research into earlier special literature, as well as survey data suggest that the elaboration of a preventive exercise programme as part of the afternoon school activities is highly actual.

H₁₀: My survey results confirm that the recreation exercise programme developed helps improve the motor performance of disadvantaged pupils.

RESEARCH METHODS

The research conducted provided data for the elaboration of an exercise programme for socially disadvantaged pupils. Surveys pertaining to the social background, health-related value orientation, and motor performance of upper primary school pupils were performed, the relations among them were identified, and the pupils participating in the study were studied.

(1) *Measures tools and assessors*

1. A validated measuring tool developed by the Research Group on Educational Theory (2003)¹ (Environmental conditions of learning) (Csapó, 2007).
2. A measuring tool of a questionnaire developed by the Research Group on Educational Theory and adapted to upper primary school (2004) (Health-related behaviour and nutritional habits) (Schaub, 2008).
3. HUNGAROFIT *Fehérné* (1996) motor skills test system.
4. MINI HUNGAROFIT motor skills test system (*Fehérné*, 1996).
5. Laboratory measurements: InBody230 *Results Interpretation & Application* (2011), IGH laboratory concept Balance (01020003) *Kovács*, (2013) SZTE JGYPK TSTI.

(2) *Evaluation of the surveys*

I used a statistical application (SPSS 16.0) to perform statistical computations. Answers to my questions were assessed using Chi-square test, Fisher's exact test, t-test, Pearson correlation, Kruskal Wallis test, factor analysis, Cronbach's alpha. I used the Tukey post hoc test to perform multiple comparisons. I applied a value of $p = 0.05$ for significance.

(3) *Implementation of the surveys*

I conducted the surveys in randomly selected primary schools and grades, located outside the capital (grades 5-8, pupils aged 10 to 15). The research included a total of 470 individuals. The number of pupils filling in the questionnaire, performing the mandatory physical education assessment and taking part in the BMI study is $N = 293$. The questionnaires were filled out in the course of 2 form teacher classes, using the assistance of qualified teachers and university students. A questionnaire took approximately 40 minutes to complete. BMI data (body weight,

¹ *The research into the skills of disadvantaged pupils and their development was implemented between 2003 and 2007, with support from the HEFOP-2004-3.1.1 project.*

body height, sexual maturation) was provided by the school physician. I performed the motor tests during physical education classes, in the presence of the PE teacher and the school physician.

I completed the surveys of the group participating in the project on two occasions, during afternoon sessions in spring and autumn.

RESULTS

In order to elaborate the exercise programme, I explored social background, health-related behaviour, and motor performance, as well as the relations that hold among these factors, in the course of cross-sectional studies. I hypothesized that social background affects health-related behaviour, and it also has an impact on physical performance. The influence of the quality of nutrition on the results will be confirmed. To obtain the data necessary for the programme, I arranged the surveys into three projects.

1. Environmental conditions of learning.
2. Nutritional habits and health-related behaviour.
3. Assessment of physical condition.

I worked out the alternative school-based recreation exercise programme on the basis of research into special literature and the results of the surveys. Then, I completed the surveys of the pupils participating in the exercise programme.

1. The financial background and nutritional habits of the family

Children of parents with a lower level of education appear to have significantly more unhealthy food on a daily basis, compare to the children of parents with a higher level of education. While children of less educated parents with a more modest socio-economic background appear to more frequently have meals more than three times a day, this frequency does not entail an improvement in quality.

2. The family's financial background and the family's physical activity

The study was aimed at exploring the habits of the family concerning exercise-related physical activity and the pupils' demand for special classes in the afternoon. Compared to Hungarian average, in the schools involved in the study, only a few parents could afford to allow their children to attend sports activities. The results appear to confirm the hypothesis that family background needs to be taken into consideration for the elaboration of an exercise-based development programme.

3. The family's financial background, physical education performance, and the effect of the kindergarten

The results suggest that the children of highly educated mothers showed significantly higher values in physical education performance indicators than those of mothers with lower education. However, financial background alone does not influence physical education

performance. Pupils who had attended kindergarten over a period of at least three years scored significantly higher in school PE surveys.

Physical education performance appears to correlate with BMI, the latter also being influenced by the level of exercise and physical activity. As regards fears, a difference is observed between genders. The amount of exercise and the attitude toward appearance show a correlation in girls. These factors are negatively correlated in boys. The result suggests that exercise must be utilized in both shaping an ideal body and self-esteem, and in prevention.

4. Development

In view of the afore-going, my aim was to develop an exercise material that differs from earlier compilations and reflects the approach I advocate. I would like to offer an exercise package that may be customized to anyone's individual needs. The main objective is to raise love for exercise, to reduce the burden on the backbone (recommended by the Neurosurgical Society), to prevent and correct deformities (*Somhegyi, 2012*). The programme is recommended especially for pupils who have developed pathological abnormalities due to malnutrition (adiposity, obesity, malnutrition, neurosis, spine and leg deformities). My programme represents a preventive exercise programme accompanied by music and compiled with positive psychology in mind.

The objective is to develop self-esteem, establish social interactions, improve posture and increase the level of fitness through professional session management, raise the pupils' desire to do physical exercise and make it a daily routine. Teachers, on the other hand, are required to establish a cheerful and trusty atmosphere during the sessions and motivate the pupils by example.

A further task included the compilation of a study material for exercise and music therapy. The compilation is intended to provide up-to-date content, methods, and tools for the learners. Through computational implementation, the material I have compiled may be used as a multi-media learning material to develop the motor competence of upper primary school children within the framework of exercise-based recreation, as part of an exercise-based health promotion programme. The material was compiled relying on the results of national projects and my own research, plus a practice-orientated and published recreation exercise programme (*Schaub, Szabó & Fritz, 2011*).

The proposed sessions each take 45 minutes to complete. Each session is divided into three parts: a warming-up, a main, and a concluding part. I considered variety a primary point of view in compiling the sessions, therefore each session includes one or more games, which represent a source of joy and promote the establishment of relations. Tools used during gym session: wall bars, sticks. The main forms of exercise during open air sessions include walking, breathing exercises, and games.

The study material developed is characterized by using an interdisciplinary approach². The tools to be used for mastering the material mostly include music, games, exercise, plus the use of a physical tool. The related e-book may be downloaded from the internet free of charge and used as a resource and exercise repository to assist the prevention of issues arising from disadvantages.

² The exercise programme may be downloaded from <http://www.jgyph.hu/~borkovits>

5. Survey results of the group developed

The development effect of the exercise programme shows a significant difference in terms of survey results. InBody measurements revealed no change in body mass, and no significant change in BMI was noted (*Results Interpretation és Application*, 2011). Changes in total body fat content Lee és Niteman (1998) and total body water content appeared insignificant (Bedogni, 2002). The proportion of body fat showed a significant difference in percentage. Regarding the measurement of motor skills, increase in strength showed a significant improvement, except the results of arms bending and stretching during push-ups. Survey data indicated no changes in the ability of balancing forward and backward, whereas significant improvement was noted in the ability to maintain balance in a sideways direction.

DISCUSSION

I used two questionnaires (Environmental conditions of learning and Nutritional habits and health-related behaviour) for the surveys described in the thesis, validated by the Research Group on Educational Theory (2003). I performed laboratory measurements using instruments provided by Biospace (2010) and IGH labor koncepció (2013). I assessed motor skills using Fehérmé's measuring system (HUNGAROFIT, MINI HUNGAROFIT 1996) (Fehérmé, 1996).

I hypothesized that social background, nutritional and sanitary habits are best assessed by using a questionnaire-based method. *Each section of the nutritional habits questionnaire and the entire questionnaire appears reliable in terms of consistency indicators (Cronbach, 1990).* It appeared suitable for assessing nutritional habits as well as assessing the relationship between social background and achievement during physical education at school. *H₁* I attained reliable results in terms of measuring the effect of social background on nutritional habits (Mészáros, Mészáros, Zsidegh, Prókai, Tatár & Osváth, 2009). I checked reliability by repeated data recording, performed 30 days after the first measurement. I also attained reliable results in the course of surveying the effect of socio-demographic factors on physical activity (Kantomaa, Tammelin, Näyhä & Taanila, 2007; Tari-Keresztes 2009). I decided on choosing this measurement tool for the surveys, adapted to school conditions, on the basis of the reliability indicators of the Mérey (2007) test and the related physician's recommendation. According to law, attending kindergarten education is mandatory, however, this law is not being adhered to in reality (Barla, 1994; Pik, 2006). Of the participants, only pupils who attended kindergarten completed this question. *H₃*. Therefore, I did not obtain results to confirm the measurement findings of Pikó & Pluhár (2002). *H₅*, Children living under more favourable financial conditions have more opportunities to do sports in the afternoon Egressy (2005); Tari-Keresztes (2009), which affects their fitness scores. This is in line with the survey results published in Keresztes, Pluhár, & Pikó (2003); Keresztes, Pluhár, Vass, & Pikó (2005); Szabó & Bauer (2009). I compared these results with the mother's level of education. *H₆*. Similarly to my findings, Hibell, Guttormson, Ahlström, Balakireva, Bjarnason, Kokkevi, & Kraus (2009) arrived at the conclusion that elective sports activities exert a preventive effect on risk behaviour. I repeated the skills survey in the spring, and compared it to the features related to family background. Elaboration of the set of exercises designed jointly with the family is based on the results of the survey (Rétsági, 2005; Nagy & Barabás, 2011). *H₇*. A review of the published studies Cotrufo, Cella, Cremato, & Labella (2007); Slutsky & Simpkins (2009) and an assessment of my findings allow me to conclude that long term exercise increases self-

esteem and is closely related to the opportunities provided by the family (Keresztes, Makó, Klembucz, Hanusz és Pikó, 2005). H_8 . I assessed the relationship between physical activity and the effect of school on the basis of Ács, Borsos, & Rétsági (2011). Earlier studies including Schaub & Szabó (2007); Schaub (2010); Schaub & Bácsi (2011); Schaub (2011a,b,c); Schaub, Szabó, & Fritz (2011); Borkovits (2012); (Borkovits, 2013a,b,c,d) and evidence from special literature, e.g., Neulinger (2009); Steinacker (2012) appear to confirm that physical activity and sports sessions definitely promote the improvement of performance of socially disadvantaged pupils (Rétsági & Ács 2010), and have a beneficial effect on their health-related behaviour (Pikó & Keresztes 2007). H_9 . Data processed in special literature, e.g., Guillaume, Lapidus, Bjorntorp, & Lambert (1997); Felton, Pate, Parsons, Ward, & Saunders (1998) appear to fully correspond to my own survey findings. H_{10} . I also attained reliable results in the course of surveying the development effect of the exercise programme (Lee & Niteman, 1998; Bedogni, 2002; Kovács, 2013, Borkovits, 2014). *The results have confirmed my hypotheses.*

SUMMARY

The results of the research appear to confirm that the recreation exercise programme organized for schools may provide a solution that allows socially disadvantaged pupils to catch up. The results suggest that the elaboration of a catching-up programme for socially disadvantaged children appears justified³.

I have checked the feasibility of the programme by performing measurements. The equipment owned by the Institute for Physical Education and Sports Science of Juhász Gyula Teacher Training College of the University of Szeged and used for measuring BMI, physical performance, and coordination skills, appeared suitable for surveying the group concerned. Under laboratory conditions, the measurement equipment provides exact data about the children's actual status and their development achieved through exercises.

The prognostic opportunities associated with anthropometric studies represent a possible future research direction. Anthropometric analyses (body form, body composition) may provide useful prognoses. The objective of anthropometric analyses is to enable the researcher to give reliable lifestyle advice on the basis of an assessment of the children's structure, form, and composition of body. Anthropometric analysis provides comprehensive information about the following parameters of body form: DC: chronological age (an age specified to 2 decimals and calculated from the date and time of the birth and the analysis), BF: biological age (expressed in terms of morphological age and used to specify an individual's body from the aspect of actual functional maturity). These parameters are important for a realistic assessment of performance (Withers, Craig, Ball, Norton, Whittingham, 1991).

In addition to the tools described in the thesis, measurements to be performed in the future may result in laboratory and anthropometric data at initial assessment and the end of the development phase. I wish to complement the measurements by performing the above analyses.³

³ The video recordings of the recreation exercise programme compiled by me were prepared within the *Study Material Development Programme of SZTE JGYPK - TAMOP - 4.1.2-08/1/A-2009-0026*.

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