

Theses of doctoral (PhD) dissertation

**SPORT: A CRUCIAL FACTOR IN PRESERVING MENTAL
HEALTH**

Keczeli Danica

Supervisor:
Dr. Bácsné Prof. Dr. Bába Éva
Professor



UNIVERSITY OF DEBRECEN
Károly Ihrig Doctoral School of Management and Business

Debrecen, 2021

Tartalomjegyzék

1. RESEARCH BACKGROUND, OBJECTIVES AND HYPOTHESES.....	3
2. MATERIALS AND THE METHODS	6
2.1 <i>Methods</i>	6
2.1.1. Place, time, circumstances, process of examination	6
2.1.2. Statistical methods.....	7
2.2. <i>Materials</i>	8
2.2.1. The sample of respondents of the questionnaire.....	8
2.2.2 The sample of the respondents of the interview	8
3. RESULTS	9
3.1 <i>Summary result: 3+1 dimensional mental health model (3+1 DME model)</i>	24
5. PRACTICAL APPLICABILITY OF THE RESULTS	32

1. RESEARCH BACKGROUND, OBJECTIVES AND HYPOTHESES

„Sport nurtures body and soul equally”

Mental health plays a crucial role in today's performance-oriented world, and according to a number of studies, sport has a positive impact on many areas of life, while physical inactivity poses a serious threat to quality of life. These phenomena led me to start and investigate the question of whether those who exercise regularly do indeed have a measurably stabler mental health as opposed to those who are not physically active; and – as the workplace is a dominant scene of adult life – the question of whether decision-makers are aware of, and/or are taking effective measures to unlock the potential of sport activities in order to preserve or improve the health, especially the mental health of their employees.

The essence of mental health is balance and mental strength, the ability to cope with the difficulties of life. Today, the importance of mental health occupies a central position in a nation's human, social and economic capital. According to the GREEN PAPER ON MENTAL HEALTH (2006:7), an individual's mental health status depends on numerous factors, including biological (genetics, sex), personal (subjective experience), family and community (social support), as well as economic and environmental (social status and living conditions) factors (quoting NAGY, 2016).

Mental health problems – from physical and mental strain and overexertion to serious illness – are becoming increasingly significant, not only in Hungary, but all over the world. They may have serious consequences: on a personal level, they could lead to a severe deterioration in one's quality of life; on a socio-economic level, they may result in a loss of 3-4% of GDP, or in an increase in public health spending due to absence from work and/or early retirement (NAGY, 2016). The interrelation between health and performance is quite obvious: when health (including mental health) declines, performance suffers. In the course of my work as a therapist, I have often arrived to this conclusion, as well as to the observation that there is a close connection between sport and performance.

Sport can contribute greatly to the improvement of one's health, not only in a physical but also in a mental sense. Sport may have an essential role in the development of a number of positive qualities (self-esteem, perseverance, team spirit, respect for others, selflessness etc.), and thus in the healthy development of one's personality. It is due to this correlation that my research focuses on these two areas: sport and mental health. It is my contention that one's way of life, and in particular regular exercise has a significant effect on one's mood, mental state, and performance.

The novelty of my research lies in the comparison of competitive athletes, recreational athletes, and those who do not exercise.

One of the main objectives of this study was to develop a complex understanding of the connection between sport and mental health, as well as between sport and the mental capacities measured as part of my inquiry, based on a review of the relevant literature, a theoretical approach, and my own research. My goal is to prove that sport can serve as a factor in protecting mental health, and thus overall well-being.

The **other key objective** of this study was to explore the form and extent to which sport features in the working environment, and whether company leadership considers it important that employees exercise regularly and live balanced lives.

Based on my research I aim to arrive at conclusions that will, on the one hand, help to shed some light on the health-enhancing effects of sport, and which on the other hand may serve as useful tools for employers who, by providing them with opportunities of exercise, wish to contribute to maintaining their employees' health, thereby also guaranteeing better, more efficient workplace performance.

In the course of my research, I sought answers to the following questions:

1. The validity of the Mental Health Continuum Scale factor's structure was confirmed by REINHARDT's (2013) survey with Hungarian participants. In the case of the present sample, are the main factors of mental health – emotional, psychological, and social well-being – clearly separable?
2. Can the Mental Health Continuum Scale be used to prove the beneficial effects of sport on mental health?
3. The higher the intensity of exercise, the the better one's mental health?
4. What is the source of motivation for those who exercise regularly?
5. Is it possible to confirm the protective effect of sport, which would serve as evidence as to its usefulness in the treatment of people with deteriorating mental health and/or mental illness, in the form of prevention and intervention programmes?
6. Does the intensity of competitive sport neutralize the beneficial effects of sport on mental health?
7. Do individuals active in sports display more effective coping strategies and more health-conscious behaviours than those who do not partake in sport?
8. Does the stress of competitive sports neutralize the beneficial effects of sport?
9. Is it possible to prove that those who exercise have a better body-image?
10. Does sport provide protection against depression?

11. Does sport build resilience?
12. Do employers consider it important that employees exercise and maintain balance, and for that purpose, do they organise health-enhancing sports programmes?
13. How much do employers spend on health maintenance at the workplace, and do they find that such spending enhances performance and reduces illnesses?
14. Do employers apply stress- or depression-preventing measures, and do they find these to have a positive effect on employee retention?

Based on these research questions, I formulated the following hypotheses:

Based on questions 1-6., I formulated the following hypothesis:

I. HYPOTHESIS: *I contend that those who exercise more have better mental health than those who do not; furthermore, I contend that sport, regardless of its intensity, serves as a factor in protecting mental health, and this protective effect increases with intensity. I further suggest that the desire to exercise stems from intrinsic motivation.*

Based on question 7., I formulated the following hypothesis:

II. HYPOTHESIS: *I contend that those who exercise more prefer active coping strategies rather than passive ones; furthermore, that they display better health-behaviours than those who do not exercise.*

Based on questions 8-11., I formulated the following hypothesis:

III.HYPOTHESIS: *I contend that those who exercise tend to be less depressive, have a better body-image and are more resilient than those who do not; however, the stress experienced in competitive sports (constant pressure to perform) neutralises the positive effects of sport.*

Based on questions 12-14., I formulated the following hypothesis:

IV. HYPOTHESIS: *I contend that employers have a clear understanding of the fact that healthy (physically as well as mentally) employees work more efficiently, and therefore employers encourage employees' health-enhancing and physical activities.*

2. MATERIALS AND THE METHODS

My research is divided into two parts. In the first part, I investigate the relationship between sport and mental health via a questionnaire. In the second part, I analyse sport in the working environment with the help of expert interviews. When designing the questionnaire used in the first phase of the research, I posed questions I formulated, and used standardized and validated assessment tools.

I inquired about the socio-demographic characteristics of the respondents, such as such as place of residence, education, occupation, financial background, and I also assessed their smoking and alcohol consumption habits, as well as their own and their immediate environment's exercise habits.

In designing the questionnaire, I used standardised and reliable assessment tools (Mental Health Continuum Scale, Coping Modes Questionnaire, Tennessee Self-Impression Scale, The Back-Depression Inventory, Perceived Stress, Resilience Questionnaire).

In my research related to workplace health promotion, I conducted expert interviews with company executives. The set of questions asked consisted mainly of closed-ended questions, but on some points, such as the questions related to the subject of well-being at work and measures taken by employers, respondents were also free to express their views in their own words. I also applied Likert scales in order to measure the degree of agreement in the case of the various statements.

2.1 Methods

2.1.1. Place, time, circumstances, process of examination

The first phase of my research was carried out with the help of an online questionnaire I created.

The collection of data, that is, the completion of the questionnaire was carried out via Internet networks in the first round, and by contacting various schools and sports organisations in the second round. A total of 842 adults participated in filling the questionnaire, of which 813 yielded evaluable data, so the response rate was 96,5%. The completion of the questionnaire took approximately 12-14 minutes. The complete questionnaire incorporates sociodemographic variables on the one hand, and six standardized and reliable assessment tools on the other. The questionnaire allowed for anonymous responses. The primary objective of my research was to assess the mental health of competitive athletes, so I first contacted active athletes via Internet and in person. The group of competitive athletes includes all those who stated that they exercise more than 4-5 times a week. As a second step,

keeping in mind the age of adult competitive athletes, I aimed to seek out recreational athletes, as well as young adults who do exercise at all. The group of recreational athletes includes those who said they exercised once, twice or three times a week, while the group of those who do not do sports includes those who said they do not or rarely exercise, e.g. once a month.

My research related to workplace health promotion was in one part comprised of my investigation carried out on the Internet, where I measured the popularity of the following phrases: workplace health promotion, workplace sports programmes, workplace health maintenance. The other part of this research focused on the expert interviews I conducted with seven company executives, who all together manage a total of 1544 employees. The interviews were conducted in person and carried out at each company's premises. The average duration of the interviews was half an hour. I recorded the spoken responses in writing.

2.1.2. Statistical methods

The statistical analysis of the collected data was carried out using an SPSS 25.0 statistics software. Firstly, I used descriptive statistics to analyse the study sample. I compared the frequency values of the categorical variables using a test of independence.

In the case of two independent groups, variables with continuous distribution were compared using Student's t-test, and in the case of several independent groups, analysis of variance was applied.

To explore the connections between continuous variables, I used Pearson's correlation analysis. In cases where the goal was to predict a dependent variable by means of independent variables, I employed linear and binary logistic regression.

In the case of the latter, I selected the independent variables affecting the dependent variable by means of backward stepwise logistic (regression). In order to analyse the interaction between the factors included in the model, and in order to exclude potential multicollinearity between the variables, I checked the variance inflation factor (VIF) of the variables, which was below 5 for each variable.

Missing values were excluded from the analysis in all cases.

The results of the statistical tests were considered significant at $p < 0.05$.

2.2. Materials

2.2.1. The sample of respondents of the questionnaire

The sample size is 813 persons (N=813). 54.37% (442 persons) of the respondents are women, while 45.63% (371 persons) are men, amounting to an approximately balanced gender distribution in the sample. Based on the cumulative data, 41.94% (341 persons) of the total sample identified themselves as competitive athletes, 35.92% (292 persons) are recreational athletes, and 22.14% (180 persons) stated that they do not exercise (Table 1).

Table 1: Distribution of the sample by gender and sport level (%)

Sample	Male	Female	Total	%
Competitive athletes	168	173	341	41,94%
Recreational athletes	126	166	292	35,92%
Non-athletes	77	103	180	22,14%
Total	371	442	813	
Sample distribution %-ban	45,63%	54,37%		100%

Source: Own editing

The age distribution of the respondents was as follows: 17.22% of the sample were under the age of 18, 22.02% were between the ages of 18-20, 29.89% were between the ages of 21-23, 16.73% were between the age of 24-29, and 14.14% were 30 years old or older.

2.2.2 The sample of the respondents of the interview

In connection with workplace health promotion, I conducted expert interviews with seven company executives, whose companies together employ a total of 1544 employees, of whom 654 persons (42%) are employed for intellectual labour, while 890 persons (58%) perform physical labour. (*By physical labour I mean those who carry out tasks that require them to be more physically active, while the intellectual workforce category includes those who tend to work sedentarily.*) See Table 2. for the size of the companies managed by the contacted executives, where the company sizes have been grouped based on the number of employees.

Table 2: Distribution of companies and employees participating in the expert interview

Company	Total number of staff	Intellectual workers		Physical workers	
		People	%	People	%
No.1	220	40	19%	180	81%
No. 2	200	100	50%	100	50%
No. 3	200	130	65%	70	35%
No. 4	80	15	19%	65	81%
No. 5	78	19	24%	59	76%
No. 6	444	236	53%	208	47%
No. 7	322	114	35%	208	65%
Total	1544	654	42%	890	58%

Source: Own editing

3. RESULTS

The first hypothesis of my research emphasizes the role of sport in relation to mental health and the role of motivation as a driving force in doing sports. I conducted the mental health survey using Keyes' Mental Health Questionnaire. My research clearly outlines the three dimensions of mental health (psychological, emotional, and social), as well as the three categories of mental health (thriving, moderate, and wilting). My first hypothesis – namely, *that the mental health condition of those who exercise more is better than that of those who do not, and that sport, regardless of intensity, acts as a protective factor in preserving mental health, and that its protective effect increases with intensity; furthermore, that the desire to exercise stems from intrinsic motivation* – has been **confirmed**.

The protective role of exercise in preserving mental health has proven to be true; furthermore, as the intensity of exercise increases, so does its protective effect.

According to the first part of my first hypothesis, an important difference is to be noted among the three study groups in terms of mental health. As the examined variables displayed no normal distribution in any of the cases ((Kolmogorov-Smirnov) $p < 0.05$ in all cases), this hypothesis was examined with the Kruskal-Wallis H-test. The three groups displayed significant differences in all dimensions of mental health ($p = 0.003$; $p < 0.001$; $p < 0.001$).

The values of the mental health subscales for competitive athletes were as follows: emotional well-being: 3.37, psychological well-being: 3.60, and average value of social well-being: 2.93. The average values produced by respondents describing themselves as recreational athletes were: emotional well-being: 3.19, psychological well-being: 3.36 and average value of social well-being: 2.60. Finally, the average values for the group of those who do not exercise: emotional well-being: 3.01; psychological well-being: 3.13; social well-being: 2.39.

The results illustrate that competitive athletes and recreational athletes produced significantly better values than those who do not exercise in all three dimensions of mental health. My hypothesis was also reinforced by the fact that competitive athletes also achieved better average values in the dimensions of mental health than recreational athletes.

Concerning the mental categories, I also found significant differences among the three groups examined. When defining these mental health categories, I considered the frequency of experiencing mental health symptoms as a basis (REINHARDT, 2013). Consequently, I established three categories of mental health: thriving, moderate, and wilting. I diagnosed a person with having **thriving** mental health if they experienced at least one of the three symptoms of emotional (hedonic) well-being almost every day or every day, and if they also experienced at least six of the eleven symptoms of positive functioning (meaning

psychological and social well-being) almost every day or every day. As opposed to this, I considered a person to be of **wilting** mental health, if they experienced one out of the three symptoms of emotional well-being only once or twice, or not even once in the past month, and if the minimal six out of the eleven symptoms of positive functioning were also only experienced once or twice, or not at all. Those who could not be classified as either thriving or wilting fall into the category of those with **moderate mental health** in accordance with the model (REINHARDT, 2013).

Consequently, it can be concluded that 38.38% of the total sample (312 persons) belong to the category of thriving mental health, while 56.21% (457 persons) fall into the category of moderate mental health, and finally, 5.41% (44 persons) are of wilting mental health.

By means of a test of independence, I compared the groups established based on exercise habits in the mental health categories. For the results, see Table 3.

Table 3: Correlations between categories of mental health and sport level in the sample

MENTAL HEALTH CATEGORIES				
	Thriving	Moderate	Wilthing	Total
Competitive athletes	153	183	5	341
	44, 87 %	53,66%	1, 47%	100%
Recreational athletes	103	170	19	292
	35, 27 %	58, 22%	6,51%	100%
Non-athlete individuals	56	104	20	180
	31,11%	57,78%	11,11%	100%
TOTAL	312	457	44	813
Percentage distribution of mental categories in the sample	38, 38%	56, 21%	5, 41%	

Source: Own editing

Based on these results, it can be concluded that exercise habits and (the state of) mental health are significantly interrelated ($\chi^2=28.83^a$ szf.:4 p=0.00).

The results also demonstrate that as the intensity of exercise decreases, the number of those with wilting mental health increases and the number of those with thriving mental health declines, so it may be established that mental wellbeing reduces as the intensity of exercise decreases. This affirms a certain part of my hypothesis, namely, that *those who exercise more have better mental health than those who do not exercise*. This is in line with the findings of PLUHÁR ET AL. (2004) which have demonstrated that the general well-being and quality of life of those who exercise regularly is more favourable than that of those who do not exercise. It can also be established that the more time a person devotes to exercise, the sooner and more intensely the positive effects of sport on mental health appear. Noticeable effects include anxiety relief, stress relief, alleviation and prevention of depression, general improvements in

mood, increased self-esteem, increased self-confidence, improved learning ability and memory, increased ability to concentrate, increased enthusiasm for work, improved creativity, more restful sleep (KECZELI, 2019).

So far, Keyes' mental health questionnaire has been used to survey athletes in two studies: a national survey based in Egypt (SALAMA - YONUNES, 2011) and another one in Australia (VENNING ET AL., 2013). In none of their cases was there a control group included, made up of physically inactive participants from their respective countries, and no symptoms of any disease were measured. This also underscores the novelty of my research, in which I compared three categories of exercise (involving competitive athletes, recreational athletes and people who do not exercise), and I also measured, among others, perceived stress and depression.

In the case of the examined sample, I was also looking for discrepancies between genders, however, only a slight, tendency-like difference could be observed in the case of social well-being, in favour of men. Concerning mental health categories, the gender ratio was nearly evenly distributed, which accentuates the effect of sport, regardless of gender, even more.

However, when I compared genders taking into account the intensity of exercise, it became visible that the role of sport in preserving health is equally apparent in the examined female and male samples, and the conclusion in the case of both genders is that the number of those with thriving mental health decreases with the decline in the intensity of exercise, and, vice versa, the number of those with wilting mental health increases as the intensity of exercise falls. In the case of women, the correlation is significant ($\chi^2 = 17.844$ af.:4 $p = 0.01$), while in the case of men, it indicates a trend-level difference ($\chi^2 = 13.723$ sf.:4 $p = 0.08$). So we may conclude that in the case of both genders, mental well-being decreases with the fall in the intensity of exercise.

Regardless of the intensity of exercise and the gender of the participants, in the course of my research I also sought to find an answer to how mental health evolves with age. My conclusion is that psychological well-being improves with advancing age, partly owing to the favourable social position one establishes due to evolving personal relationships and professional development as time progresses. Concerning the mental categories, there was a significant difference ($p=19.835$ a sf.:8 $p=0.015$). It is also clearly visible that in the younger age groups (under 18) there is a significantly higher percentage of people with wilting mental health, in which an uncertain vision of the future, career choice issues, etc. might be contributing factors.

When comparing health behaviour and exercise habits in the analysed sample, the protective role of sport against *smoking* was clearly confirmed. On the one hand, the majority of competitive athletes identified themselves as non-smokers and the lowest percentage claimed they were smokers. This is consistent with previous research which described exercise as a means of preserving one's health, and which found that young people who exercise regularly tend to lead a healthier lifestyle (e.g. they smoke less) (BURKE ET AL., 1997). Those who do not exercise have the smallest percentage of non-smokers, while the majority are smokers. U.S. results have also demonstrated that exercise has a beneficial effect on developing a more health-conscious behaviour. According to the study by PATE ET AL. (1999), carried out among high school students, male athletes smoked significantly less as opposed to their non-athlete peers. The protective role of sport against smoking has been suggested by several studies. SIMANTOV ET AL. (2000) surveyed smoking- and alcohol consumption habits among American adolescents and found that sport had a role in preventing smoking, while no significant correlation could be made between sport and alcohol consumption.

A research project investigating smoking and alcohol consumption habits in a sample group of Hungarian adolescent and young adult athletes yielded similar results: in the case of smoking, sport was confirmed to have a protective role, while there was no significant difference between athletes and those who do not do sports in terms of alcohol consumption (MIKULÁN, 2007b).

When looking at the correlation between exercise habits and the regularity of alcohol consumption, I discovered that competitive and recreational athletes, and those who do not exercise consume alcohol with similar frequency, although the highest percentage of competitive athletes said they never or rarely consumed alcohol, thus contradicting previous studies (GROSSBARD ET AL., 2007; VELIZ ET AL., 2015, in KECZELI, 2020c). In contrast, a higher percentage of recreational athletes and those who do not exercise drink alcohol weekly, while most of those who said to consume alcohol almost on a daily basis came out of the category of those who do not do sport. In conclusion, in the consumption of legal substances, both in terms of smoking and alcohol, competitive athletes have shown healthier behaviour. Although there are some studies that have not found an unambiguously positive correlation between sport and the consumption of legal substances (alcohol, tobacco) (FAURIE ET AL, 2004), and between sport and a healthy lifestyle (KERESZTES – PIKÓ, 2008a), these correlations were demonstrable in the present study. Psychoactive substance use, on the other hand, may certainly be influenced by factors other than exercise habits, such as sport-specific factors (nature of occupation, the atmosphere in which one lives, various

situations related to performance, etc.), and various psychosocial (stress, anxiety, depression, financial and social situation, etc.) factors.

The final part of my first hypothesis, in which I suggested that the desire to exercise stems from intrinsic motivation, has also been **confirmed**.

Table 4: Distribution of motivation by sport categories in the sample

	Avoid punishment		Reward-seeking		Intrinsic motivation	
	N	%	N	%	N	%
Competitive athletes (N=298)	3	1,01%	40	13,42%	255	85,57%
Recreational athletes (N=289)	37	12,80%	118	40,83%	134	46,37%
Non-athlete individuals (N=179)	99	55,31%	60	33,52%	20	11,17%

Source: Own editing

The results clearly illustrate that in the case of competitive athletes, motivation does not come from the desire to avoid punishment or from seeking reward, rather, their motivation appears to be intrinsic, which is absolutely essential for making significant efforts. 85,57% of competitive athletes pursue sport out of an intrinsic motivation. In the case of recreational athletes, intrinsic motivation and reward-seeking are dominant, but to a lesser extent, the desire to avoid punishment also emerges.

Lastly, only 11,17% of those who do not exercise feel an intrinsic motivation to exercise. In this group, the desire to avoid punishment predominates: 55,31% exercises occasionally in order to avoid illness or obesity (see Table 4.).

Concerning mental health, the importance of developing an intrinsic motivation to exercise is also corroborated by the fact that more than half of those with thriving mental health possesses intrinsic motivation, while almost half of those with wilting mental health exhibit punishment-avoiding behaviour, thus a significant difference may be observed between those with thriving and wilting mental health in terms of types of motivation ($\chi^2=29.992^a$ sf.:8 $p<0.001$).

Furthermore, as a partial result within these results, it is crucial that, as suggested by the results, the supportive behaviour of parents is a significant ($\chi^2=17.454^a$ sf.:2 $p<0.001$) determining factor in forming exercise habits, and could certainly serve as an important basis for developing positive health behaviour. Moreover, the results have also demonstrated that it is not only parents' supportive behaviour that affects the child's exercise habits positively, but the parents' (the mother's and father's) own commitment to sport; that is to say, parents'

physical activity also has a significant (mothers: $\chi^2=23.740^a$ sf.:4 $p<0.001$; fathers: $\chi^2=29.564^a$ sf.:4 $p<0.001$) impact on the formation of their child's exercise habits. The parents of the competitive athletes having participated in this study – mothers and fathers alike – are significantly more active than the parents of recreational athletes or those who do not exercise. Nevertheless, I believe that parental behaviour may only be considered as a partial solution, as the process of forming exercise habits may be affected by a number of other factors (school system, relationships with friends, intrinsic need for exercise, etc.).

My second research hypothesis, that sport as a positive coping mechanism (KOPP, 1995) helps *in employing active coping strategies in difficult life situations, as opposed to passive coping strategies*, **has partially been confirmed**.

The proper management of frustrating, conflict-filled situations has a major impact on the evolution of one's interpersonal relationships, while it also affects one's professional performance, and one's state of health and psychological well-being (McMURRAN – McGUIRE, 2005).

The coping mechanisms applied also determine one's behavioural decisions, thus they affect one's health-behaviour as well (PLUHÁR ET AL., 2003).

In the present study I have distinguished (between) four coping categories: cognitive restructuring, tension reduction, problem-solving and passive coping. I considered the first three as active coping strategies, while the last one was considered as a passive coping strategy.

Out of the three groups studied, competitive and recreational athletes prefer to resort to cognitive restructuring in difficult life situations, as opposed to those who do not exercise. This result suggests that sport as a means of positive coping aids one in contemplating and understanding difficult life situations properly, which may lead to a more appropriate handling and a positive solution of these situations. This is substantiated by other studies as well, which suggest that cognitive evaluation plays a key role in the coping process, meaning that responses do not arise from emotions, but rather, that the emotions themselves, as well as the coping strategies are the result of cognitive evaluation (OLÁH, 2005).

Table 5: Mean value and deviation of coping strategies among competitive, recreational and non-athletes in the sample

	Competitive athletes (N=341)		Recreational athletes (N=292)		Non-athlete individuals (N=180)	
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.
Cognitive restructuring	2,64	0,47	2,64	0,49	2,48	0,54
Tension reduction	1,77	0,62	1,79	0,62	1,89	0,67
Problem analysis	2,82	0,46	2,83	0,40	2,76	0,53
Passive coping	1,59	0,65	1,64	0,62	1,65	0,72

Source: Own editing

Based on these results it may also be concluded that individuals who exercise actively are more likely to perform problem analysis and cognitive restructuring as coping strategies. As Lazarus stated, the “has power over the events”-approach has a role to play in this. Those who exercise are obliged to handle constantly changing, occasionally difficult competitive situations as a part of sport activities, due to which they develop a “problem-solving thinking”, the impression that they have power over the events, and in order to retain this feeling they tend to be more willing to make more active efforts in the process of coping. As sport entails lots of challenges, athletes understandably learn to handle difficult situations as challenges to be overcome, in consistency with the findings of Lazarus, namely, that problem-focused, active coping strategies are more frequently used in situations one interprets as a challenge (OLÁH, 2005).

Given that the study found a moderately strong connection between cognitive restructuring as a coping strategy and all the dimensions of mental health, I have come to the conclusion that sport prioritizes the use of active coping strategies, which may contribute to improved mental health. As other studies also underscore the cultivation of coping skills (ITO – BROTHERIDGE, 2003; STAUDER, 2007, 2008), I would consider it important to organise training programmes to improve coping effectiveness.

According to the gender-based analysis of coping strategies, a significant difference may be observed in problem analysis ($p < 0.001$) and passive coping ($p < 0.001$), in favour of women compared to men.

The stress-reducing effect of smoking is apparent in the overall sample as a coping strategy. According to KOPP (1995), smoking belongs to the category of negative coping strategies, so based on my findings which have shown that those who are physically active smoke the least, I consider the foregrounding of sport – as a means of positive coping and a health-preserving activity in everyday life – to be a solution.

Regarding alcohol consumption, I found significant differences among the coping strategies of stress reduction, problem analysis, and passive coping. In the coping process, frequent alcohol consumption has a tension-reducing role and entails passive coping, while in the case of moderate alcohol consumption, the ability to analyse problems increases significantly. Positive coping (e.g., sports) does not produce side effects, while negative coping strategies – although they may prove intermittently or occasionally useful in the coping process – can present a risk, e.g. smoking or alcohol consumption may lead to health problems. Sufficient exercise can reduce stress, restore balance in the body, and has no harmful side effects. Sport plays an important role in preventing the developing of harmful addictions (PIKÓ, 2000; MIKULÁN ET AL., 2010), however, some studies question the role of sport, in particular that of competitive sports, as a protective factor against alcohol consumption and smoking (VINGENDER, 2003; LISHA - SUSSMAN, 2010; COTTLER ET AL., 2011; PINCZÉS - PIKÓ, 2013a; GRACE ET AL., 2017 in MÁRVÁNYKÖVI ET AL., 2018). However, in the present study the role of exercise as a protective factor against legal substance use was confirmed.

My third hypothesis, which states that *those who exercise are less likely to develop depression, have a better body-image and are more resilient than those who do not exercise, however, the stress experienced in competitive sports (constant pressure to perform) neutralizes the positive effects of sport*, **has been confirmed.**

Table 6: Mean value and deviation of depression among competitive, recreational and non-athletes in the sample

	Competitive athletes (N=341)		Recreational athletes (N=292)		Non-athlete individuals (N=180)	
	Mean	St.dev.	Mean	St.dev.	Mean	St.dev.
Depression	12,54	4,70	12,45	4,33	14,32	5,28

Source: Own editing

In the case of the three focus groups, those who exercise proved to be less prone to develop depression than those who do not, which is consistent with the findings of a number of studies. South African university athletes also reported significantly fewer psychosomatic and depressive symptoms, more positive experiences and a greater sense of coherence than their non-athlete peers who are physically inactive (MALEBO ET AL., 2007).

However, during the active years of my sporting career, and later on, in the course of my work as a sports psychologist, I have met a number of competitive athletes who occasionally

experience depressive symptoms. Continued pressure to perform can be a source of severe stress in an athlete's life, and the resulting failure to perform as expected can significantly affect an athlete's mood, diverting attention away from performance to his or her emotional state, leading to a deteriorating performance, which may become a source of further failure. Through this mechanism, without being provided with necessary support, a competitive athlete may produce various depressive symptoms even for prolonged periods (KECZELI, 2020a).

The fact that competitive athletes may be highly vulnerable to developing depression is substantiated in two aspects: on the one hand, a publication by the WHO (World Health Organization) states that by 2020, depression will become the second leading cause of reduced capacity to work after cardiovascular diseases (I-2); on the other hand, due to the physical, social and psychological strain involved in competitive sports, the former becomes intertwined with the phenomenon of chronic stress, which is widely regarded as a health risk. Thus, in my research I looked at how the degrees of depression vary between the two groups of athletes. As illustrated by the results, competitive athletes' average value in terms of depression slightly exceeded that of recreational athletes, which is consistent with the results obtained in a previous study I conducted (KECZELI, 2020a). This result partially confirms the claims of HAMMOND ET AL., 2013; MARKSER, 2011, namely, that today's competitive athletes are under tremendous physical, social and psychological pressure. As demonstrated by these findings, competitive sports are entail a level of stress that can lead to an increased presence of depressive symptoms in competitive athletes (KECZELI, 2020a). Perpetual challenges such as frequent competition, pressures to perform, constant media attention, and fear of failure can undoubtedly manifest in psychopathological forms (HAMMOND ET AL., 2013).

In my research, compared with the results of previous similar studies (JANG ET AL., 2007; STORCH ET AL., 2005; SILVERSTEIN, 1999; HAMMOND ET AL., 2013), I also looked at whether women produce more depressive symptoms than men. The results of my research suggest that men are more prone to depression than women (KECZELI, 2020a), but this is not consistent with the results obtained in other studies (HAMMOND ET AL., 2013). In my previous investigation (KECZELI, 2020a), I found that significantly more men actively involved in sport meet the diagnostic criteria for depressive disorders than their female peers. A similar conclusion can be drawn now, suggesting that expectations regarding performance may place a greater burden on male competitive athletes, while for women, as MARKSER (2011) finds, there are factors that can significantly reduce depression: for example, female

athletes usually find it easier to seek help, and report negative symptoms to a healthcare professional sooner. Gender differences can also be related to the different sports motivation of boys and girls (PIKÓ ET AL., 2004), according to which girls are much more likely to play sports to be pretty, healthy, while boys often play sports for the sake of racing, to demonstrate their strength, and to strive for victory (FINKENBERG, 1991; KOIVULA, 1999; KECZELI, 2020a).

Regarding the overall sample, it can be concluded that the younger generation is considerably more depressive ($p < 0,001$) than those aged 30 and older which can be explained by the problems specific to younger age groups. Those between the ages of 18-23 are primarily concerned with “the most important questions of life,” more precisely, the questions of whether they should choose a career in sports or rather a more “traditional” one; of how to establish a relationship and a family, of what their adult life will be like. By contrast, those aged 30 and older have already settled these questions, they have already selected their path (KECZELI, 2020a).

Upon looking at the correlation between legal psychoactive substances (alcohol consumption and smoking) and depression, the only significant difference I have found was in the case of alcohol consumption ($p = 0,010$). Those who do not consume alcohol at all and who consume alcohol almost on a daily basis produced a higher average value compared to those who consume alcohol only rarely or weekly.

It can be concluded that further investigations are necessary to understand what increases the risk of depression among male and female athletes. Subjective indicators based on one’s own assessment and on one’s own description of one’s physical and mental health are becoming increasingly important, just like preserving one’s health. On the basis of this information, screenings and support systems should also be improved.

The second part of my third hypothesis according to which *one’s own body image has a strong influence on one’s mental health – has been confirmed*. In the course of my analysis I found moderately strong correlations between mental health and body image. Furthermore, my contention according to which competitive athletes have a better body image than others, has also been proven true. Competitive athletes have a better body image than recreational athletes or those who are not active physically at all. The results are consistent with PERÉNYI’s (2013) point of view, who claims that sports and regular physical activities come hand in hand with greater satisfaction with one’s physical condition, thus, entail a higher self-esteem. The supportive role of sports is apparent in a higher level of self-esteem; thereby, it

contributes to a greater sense of contentment with life and increased happiness, which can be considered the principal elements of subjective well-being (FROST – McKELVIE, 2005). In their study, HARRISON – NARAYAN (2003) describe similar results and according to them young people who engage in some kind of sports activity have a healthier body image.

7. Táblázat: Mean value and deviation of body image among competitive, recreational and non-athletes in the sample

	Competitive athletes (N=341)		Recreational athletes (N=292)		Non-athlete individuals (N=180)	
	St.dev.	Mean	St.dev.	Mean	St.dev.	Mean
Body image	3,90	0,56	3,63	0,58	3,32	0,53

Source: Own editing

The impact of sport is also reinforced by the tendency-like difference between genders in favour of men, and by the fact that in my analysis I discovered no correlation between age and body image. In the present study, the body image of groups distinguished on the basis of smoking and alcohol consumption habits indicates a tendency-like difference in both groups. It can be observed that the more one smokes, the worse their body image becomes; moreover, those who only rarely consume alcohol produced the best values with regard to body image. These results further underscore the importance of sport when it comes to preserving mental health.

The third part of my third hypothesis elaborates on resilience which influences stress sensitivity. In my research, *I contend that those who exercise have enhanced resilience. My hypothesis – has been confirmed.* There was a significant difference between the three focus groups (competitive athletes, recreational athletes and those who do not exercise) in terms of the level of resilience, in favour of competitive athletes.

Table 8: Mean value and deviation of resilience among competitive, recreational and non-athletes in the sample

	Competitive athletes (N=341)		Recreational athletes (N=292)		Non-athlete individuals (N=180)	
	St.dev.	Mean	St.dev.	Mean	St.dev.	Mean
Resilience	3,91	0,70	3,83	0,69	3,57	0,75

Source: Own editing

The results of my investigation confirmed my suggestion according to which there was a positive link between resilience and mental health; this also renders the importance of this variable predictable with regard to performance in sport. Moreover, in my research I also established that resilience has a positive impact on social

well-being, in line with research conducted with other athletes which also confirmed that resilience affects the quality of relationships with others (BONANNO ET AL., 2005) and subjective well-being (BURNS ET AL., 2010); moreover, that resilience has a positive effect on physical and psychological health and well-being (DAVIS ET AL., 2009; FAVA – TOMBA, 2009); besides, it fosters faster rehabilitation, too (YI – FRAZIER ET AL., 2009). Resilience is to be understood as a protective factor that comprises personal characteristics that facilitate successful adaptation despite precarious living conditions, mitigate the negative effects of stress and allow people to cope with changes in an adaptive manner. It means a kind of mental flexibility (MASTEN, 2001) and the success of positive adaptation in spite of the unfavourable environment (KECZELI, 2019). According to the correlation values displayed in my research, there is a strong reverse link between perceived stress and resilience. The more resilient someone is, the lower the level of perceived stress is and vice versa. According to BONANNO (2004) resilience means more than survival and it is not synonymous of invulnerability (PHILIPPE ET AL., 2009); however, it corresponds to positive attitude (DONNELLAN ET AL., 2009).

As per the results of the research, the more time one dedicates to exercise, the more resilient one becomes and the more intensively one experiences the positive effects of sport. Former investigations established that resilience could help one control one's emotions and develop positive emotions even in situations that trigger stress and anxiety, and this is something that could lead to enhanced performance among competitive athletes (ONG ET AL., 2009; PHILIPPE ET AL., 2009; DONNELLAN ET AL., 2009). It has been confirmed that sport strengthens resilience as a supporting factor, and thereby contributes to mental and psychological well-being as well. Mental resilience may be understood as a kind of positive emotion (the feeling that one is able to adapt to changing circumstances), thus, it improves one's self-esteem and psychological well-being; one may feel healthier as a result of more effective coping (TUGADE – FREDRICKSON, 2004; FOX, 2000). Analysing the differences between genders in terms of resilience, I have established that as far as the analysed sample is concerned, women are significantly more resilient than men.

Among psychoactive substances, smoking affects resilience negatively; non-smokers have stronger resilience than the other two groups. In terms of alcohol consumption, no significant difference has been found, however, it seems to be a clear tendency that the more alcohol one consumes, the lower average values of resilience one produces.

As the last part of my third hypothesis, *I contended that the stress experienced in competitive sports (constant pressure to perform) neutralizes the positive effects of sport. This hypothesis has been partially confirmed.* I observed tendency-like discrepancies between perceived stress and the intensity of exercise. The results confirmed that sport activities help one cope with stress, which is in line with other studies which found that one of the simplest, most easily accessible ways of dealing with stress is exercise (URBÁN – HANN, 2003; ASZTALOS ET AL., 2012; BOND ET AL., 2002; BALOGH ET AL., 2008). However, constant challenges, competitions and concealed dangers can be sources of stress as well.

There is no difference between genders when it comes to perceived stress, moreover, with advancing age, a trend of significant development can be observed: those over the age of 24 cope with stress more efficiently than those under 24. In this case, psychoactive substances did not affect the level of perceived stress in any way.

Further results have also illustrated an obvious connection between perceived stress and mental health. Generally speaking, it can be concluded that the lower the level of perceived stress is, the stabler one's mental health is, furthermore, the stronger one's mental health is, the lower the level of perceived stress is.

As per my fourth hypothesis, namely, that *it is obvious to employers that healthy (physically as well as mentally) employees work more efficiently, and therefore, they facilitate employees' health promotion and physical activities - has been partially confirmed.*

Taking into account all the results obtained it seems evident that company executives are aware of the importance of health promotion and sport programmes. In addition, they find it important that employees exercise regularly and live balanced lives. However, three out of the seven companies interviewed do not offer any health promotion programmes to its employees (this affects 64% of the employee sample). This result is similar to that of an earlier research according to which more than 40% of enterprises do not offer any kind of health promotion programmes (SZABÓ – JUHÁSZ, 2019). Companies involved in the course of the study were SMEs. In the case of large companies, the situation is better: as per the data of XEROX (2016), in 2008, 34%, in 2014, 56 %, and in 2016, 69% of multinational companies have launched such programmes globally (SZABÓ – JUHÁSZ, 2019).

Concerning health promotion programmes launched by the companies involved in my research, it can be observed that the first place is occupied by physical exercise. This is similar to the result of THORPE (2015), who, after having reviewed the health-enhancing programmes offered by the “44 healthiest American enterprises”, found that the first-ranking

component is exercise. My findings are also consistent with the study carried out by VIRGIN (2016), according to which the fight against smoking is also dominant element of companies' health promotion programmes.

Table 9: Health promotion programmes at the interviewed companies

Company	People	Do you offer some kind of health promotion programme?
No.1	220 persons	No , but we are planning to, as new working conditions now allow us to do so.
No. 2	200 persons	Yes , a second-generation programme: obligatory health screenings for managers, granting exercise opportunity by providing 50 employees with sport passes (unfortunately, only 20-30 people use them; they do not use them due to the nature of their work (<i>physical work, waiting staff</i>)).
No. 3	200 persons	Yes , a third-generation programme: on the one hand, providing rubber balls for colleagues doing sedentary work, on the other hand, granting flexible working hours with more, shorter breaks.
No. 4	80 persons	Yes , a second-generation programme: providing blood pressure monitors, medical checks with obligatory attendance.
No. 5	78 persons	Yes , a first-generation programme: non-smoking employees receive a higher salary. Additionally, a third-generation programme: providing the opportunity to play darts, table-tennis or go for a walk in nature during working hours, furthermore, allowing employees to fish in the lake located in the territory of the company, renting a football pitch for employees once a week, for the evenings hours.
No. 6	444 persons	No
No. 7	322 persons	No

Source: Own editing

My research results suggest that factors aiming at protecting physical and mental health (health promotion programmes and sport facilities at the workplace, occupational psychologists) play almost no role at all in attracting employees. However, when it comes to retaining employees, it seems that company directors attribute slightly greater importance to these programmes, despite the fact that some of companies do not offer health promotion programmes at all, and none of them employ an occupational psychologist. Still, out of the thirteen factors measuring opinions on attracting and retaining employees, the greatest difference emerged in the case of the values obtained for the “occupational psychologist”-factor (1.1 point). Apparently, company executives recognise that employing psychologists as a protective factor in preserving mental health is useful and necessary; however, they do not take any measures in this regard.

The role of social factors also becomes more significant depending on the amount of time spent at the workplace. The nature of work relations between employees, the working environment and colleagues' helpfulness strongly influence whether an employee decides to

continue to work at the given workplace. Unlike the findings of MERETEI (2017) according to which the work-life balance, and good relationships with colleagues are the most significant aspects for Hungarian employees when applying for a new position, the results of my research demonstrate that in attracting employees, the salary and the management skills and style of the company manager are the most important factors. What is interesting, however, is that the significance of these factors slightly decreases over time, while the role of the working environment and work relationships strengthens, which in turn coincides with the studies of the BCG, which established that six out of the ten points that employees found the most important were related to the working environment and well-being at the workplace (SZABÓ–JUHÁSZ, 2019). Based on this it can be concluded that with the help of various workplace health promotion and workplace physical activity programmes, work relations can further develop and working environment can also be improved, and thus boosting work ethic and performance, too.

A 100% of the interviewed company executives find workplace well-being to be of utmost importance. This implies a better attitude than that described by SZABÓ – JUHÁSZ (2019), who found that 74% of company leaders believed that well-being at work was a key element in employee retention and performance (SZABÓ – JUHÁSZ, 2019).

In case of the companies included in my study, the amount of financial resources dedicated to preserving employees' physical and mental health is quite low. In spite of ALDANA's (2018A) findings, according to which enterprises' expenditures on health promotion in 2018 ranged from \$150 to \$1,200 per person per year internationally, in my research I found that this figure is around HUF 10 000/person/year on average.

As far as specific measures to help employees cope with stress and depression are concerned, the results indicate that none of the companies have any specific stress-relieving practice in place. The same applies in terms of depression as well.

Regarding the occurrence rate of certain diseases, according to the estimates and experience of company executives, smoking-related diseases rank first, and problems stemming from stress and obesity come second. The third place goes to the pain in the lower back, back and neck caused by sedentary work as a form of physical inactivity (present at six companies), to be followed by problems caused by working in a standing position, also a version of physical inactivity. This trend is in line with the findings of BOLES ET AL. (2004), which indicate that those who are physically inactive and have an unhealthy diet are more than one and a half times more likely to be absent from work, or work despite being ill. Next in line are blood pressure issues due to alcohol consumption, and resulting from the lack of physical activity.

It seems that current workplace culture still pays little attention to employees' physical and mental health, despite PFEFFER's observation (2018) according to which working environment induces the most of the stress for employees.

Finally, it can be concluded that health promotion is not particularly considered as an investment in corporate practice, in spite of the findings of international and Hungarian studies which suggest that in parallel with the improvements in employees' health, the performance, and thus the competitiveness of the company also improve.

3.1 Summary result: 3+1 dimensional mental health model (3+1 DME model)

By means of linear regression, I analysed how the variables measured in my research (resilience, perceived stress, coping strategies, body image and depression) affect emotional, psychological and social well-being. I examined each subscale separately and the independent variable comprised all the variables in each case.

Emotional well-being ($R^2 = 0.359$, $F=57.869$, $p<0.001$), is significantly determined by perceived stress, cognitive restructuring, problem analysis, passive coping, body image and depression. The table also illustrates that the higher the level of stress is, the lower the level of emotional well-being is ($\beta = -0.381$); furthermore, the greater the cognitive restructuring is, the higher the level of emotional well-being is ($\beta=0.169$), finally, the better body image one has, the higher the level of emotional well-being is ($\beta=0.138$) (Table 10).

Table 10: Variables affecting Emotional well-being

	Non-standardized coefficients		Standardized coefficients Béta	t	p
	B	Std. fault			
Constans	2,913	0,362		8,035	<0,000
Resilience	0,093	0,058	0,061	1,635	0,102
Perceived stress	-0,530	0,047	-0,381	-11,350	<0,000
Cognitive restructuring	0,366	0,070	0,169	5,219	<0,000
Tension reduction	-0,097	0,54	-0,057	-1,790	0,074
Problem analysis	-0,138	0,072	-0,059	-1,912	0,056
Passive coping	0,154	0,050	0,094	3,057	0,002
Body image	0,246	0,060	0,138	4,084	<0,000
Depression	-0,018	0,008	-0,079	-2,249	0,025

a. Dependent variable on Emotional well-being

Source: Own editing

Psychological well-being is ($R^2 = 0.489$, $F=98.214$, $p<0.001$) significantly influenced by resilience, perceived stress, cognitive restructuring, stress reduction, problem analysis, passive coping and body image. The table also illustrates that the more resilient one is, the higher the

level of psychological well-being is ($\beta=0.355$); the higher the level of stress is, the lower the level of psychological well-being is ($\beta= -0.183$); furthermore, the more efficient the problem analysis is, the higher the level of psychological well-being is ($\beta=0.102$); finally, the better body image one has, the higher the level of psychological well-being is ($\beta=0.201$) (11. Táblázat).

Table 11: Variables affecting Psychological well-being

	Nem standardizált együtthatók		Standardizált együtthatók Béta	t	p
	B	Std. hiba			
Constans	-0,201	0,290		-0,693	0,489
Resilience	0,485	0,045	0,355	10,768	0,000
Perceived stress	-0,229	0,038	-0,183	-6,002	<0,000
Cognitive restructuring	0,155	0,058	0,079	2,689	0,007
Tension reduction	-0,132	0,043	-0,087	-3,080	0,002
Problem analysis	0,215	0,059	0,102	3,657	0,000
Passive coping	0,113	0,040	0,077	2,834	0,005
Body image	0,322	0,048	0,201	6,706	0,000

a. Dependent variable on Psychological well-being

Source: Own editing

Social well-being ($R^2=0.303$, $F=40.285$, $p<0.001$) is significantly affected by resilience, perceived stress, cognitive restructuring, stress reduction, problem analysis, passive coping and body image. The table also illustrates that the more resilient one is, the higher the level of social well-being is ($\beta=0.187$); the higher the level of perceived stress is, the lower the level of social well-being is ($\beta= -0.133$); furthermore, the greater the cognitive restructuring is, the higher the level of social well-being is ($\beta=0.118$); finally, the better body image one has, the higher the level of social well-being is ($\beta=0.204$) (12. Táblázat).

Table 12: Variables affecting Social well-being

	Nem standardizált együtthatók		Standardizált együtthatók Béta	t	p
	B	Std. hiba			
Constans	-0,248	0,330		-0,753	0,452
Resilience	0,257	0,052	0,187	4,913	0,000
Perceived stress	-0,167	0,045	-,133	-3,754	0,000
Cognitive restructuring	0,292	0,064	0,150	4,541	0,000
Tension reduction	-0,091	0,050	-0,059	-1,826	0,068
Problem analysis	-0,098	0,069	-0,046	-1,409	0,159
Passive coping	0,175	0,048	0,118	3,670	0,000
Body image	0,328	0,056	0,204	5,833	0,000

a. Dependent variable on Social well-being

Source: Own editing

In my research I also sought to find an answer to the nature of the relationship between the measured variables and mental well-being. Using Pearson's correlation coefficients I examined the strength, trend and direction of the connection between the measured psychological factors and mental health.

The table demonstrating Pearson's value (Table 13) indicates the link between resilience, body image and the dimensions of mental health, and it can be observed that there is a moderately strong correlation between these variables. The results allowed me conclude that the more frequently one exercises, the more resilient one will be and the better body image one shall have; furthermore, the more resilient one is and the better body image one has, the stronger one's mental health is.

Table 13: Pearson correlation between measured variables and mental health

Pearson correlation	Emotional well-being	Psychological well-being	Social well-being	Mental health
Resilience	0,404**	0,621**	0,428**	0,565**
Body image	0,388**	0,497**	0,397**	0,483**
Perceived stress	-0,530**	-0,488**	-0,360**	0,505**
Depression	-0,347**	-0,396**	-0,247**	0,368**
Cognitive restructuring	0,303**	0,361**	0,338**	0,382**
Tension reduction	-0,179**	-0,195**	-0,124**	-0,179**
Problem analysis	0,026	0,221**	0,080*	0,140**
Passive coping	0,024	0,017	0,094**	0,064

* :The correlation is significant at the 0,05 level

** : The correlation is significant at the 0,01 level

Source: Own editing

There is a moderately strong reverse correlation between the dimensions of mental health, depression and perceived stress, which means that the lower the level of depression and perceived stress, the better one's mental health is, moreover, the better one's mental health is, the lower the level of depression and perceived stress is. Among the coping strategies it is only cognitive restructuring that has a moderately strong relation with the three dimensions of mental health. Stress reduction is only weakly connected to the three dimensions of mental health. In the case of problem analysis, there is a slight connection with emotional and social well-being, while there is a weak relation with psychological well-being. There is also a slight link between passive coping and the dimensions of mental health (Table 13).

Based on the results of my research I have created the **3+1 DMH** model (3+1 dimensions of mental health). The 3+1 DMH model represents the link between the variables measured in my research and mental health. The model illustrates how each of the measured psychological variables affect the dimensions of mental health individually, and how they affect mental

health as a whole. The 3+1 DMH model also demonstrates the strength, trend and direction of the connection.

The strength of the connection between the measured variables and mental health is indicated by the number and type of lines. Dashed lines indicate slight links, single continuous lines stand for weak links, double lines for moderate links and finally three lines for strong links.

The trend of the connection can be declining or increasing, which means the more it declines/increases, the more it declines/increases. The trend is indicated by the colour of the lines. Green lines stand for an increasing, grey lines stand for a declining trend.

We can speak of one-way and two-way connections. In case of a one-way connection, only one of the variables has an impact on the other variable's value. In the case of a two-way connection, the two variables mutually affect each other. This is indicated by the directions of arrows.

Consequently, Figure 1 shows that there is a strong, mutual connection (with the same trend and direction) between emotional, psychological and social well-being; i.e. as psychological or social well-being improves, so does emotional well-being, and vice versa.

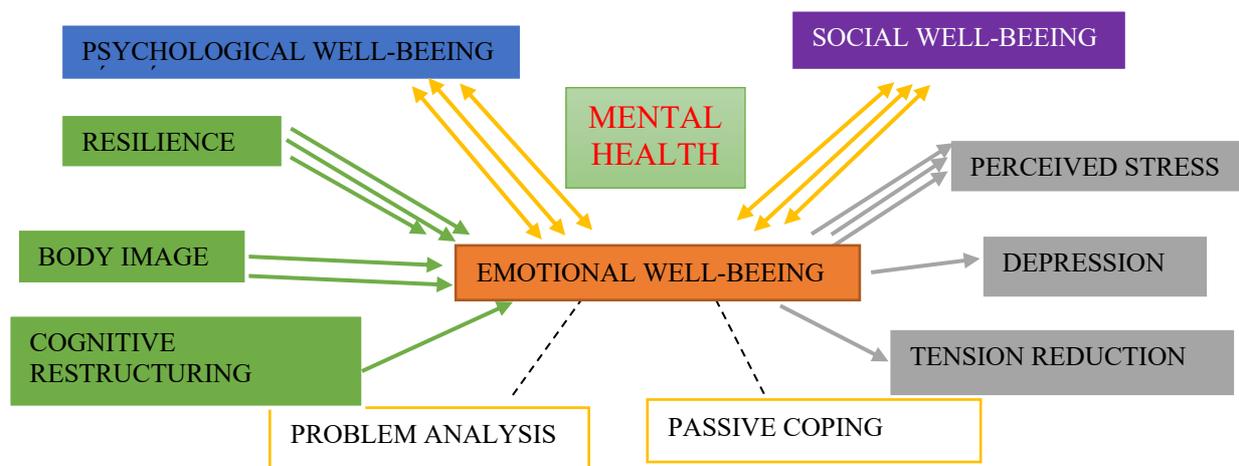


Figure 1: Relationship between emotional well-being and measured variables

Source: Own editing

Emotional well-being is strongly related to resilience and perceived stress; however, the trend and direction of the connection indicate some differences. While in case of resilience, emotional well-being improves as resilience strengthens, emotional well-being declines as the level of perceived stress rises. Thus there is reverse correlation with a declining trend between emotional well-being and perceived stress, i.e. emotional well-being improves when the level of perceived stress decreases. Emotional well-being has a moderately strong connection with body image and has only a weak connection with cognitive restructuring, depression and

stress reduction. The trend and direction of these connections show some differences. While in case of body image, emotional well-being shows signs of improvement as body image or cognitive restructuring improves, emotional well-being declines with increasing depression or stress reduction. Consequently, there is a reverse correlation with a declining trend between emotional well-being and depression, as well as emotional well-being and stress reduction; i.e. emotional well-being improves in case of a decline in the other two. There is no or only a very slight correlation between emotional well-being and the other two coping techniques (problem analysis and passive coping) (Figure 1).

As Figure 2 illustrates, there is a strong, mutual connection (with the same trend and direction) between psychological, emotional and social well-being; i.e. as emotional or social well-being improves, so does psychological well-being, and vice versa (Figure 2). Furthermore, psychological well-being is strongly connected to resilience, body image and perceived stress; however, the trend and direction of the connection show some differences. While in case of resilience and body image, psychological well-being improves as resilience strengthens or the body image improves, a decline in psychological well-being can be observed as a result of a rising level of perceived stress. So it can be concluded that there is a reverse correlation with a declining trend between psychological well-being and perceived stress, i.e. psychological well-being improves when perceived stress decreases.

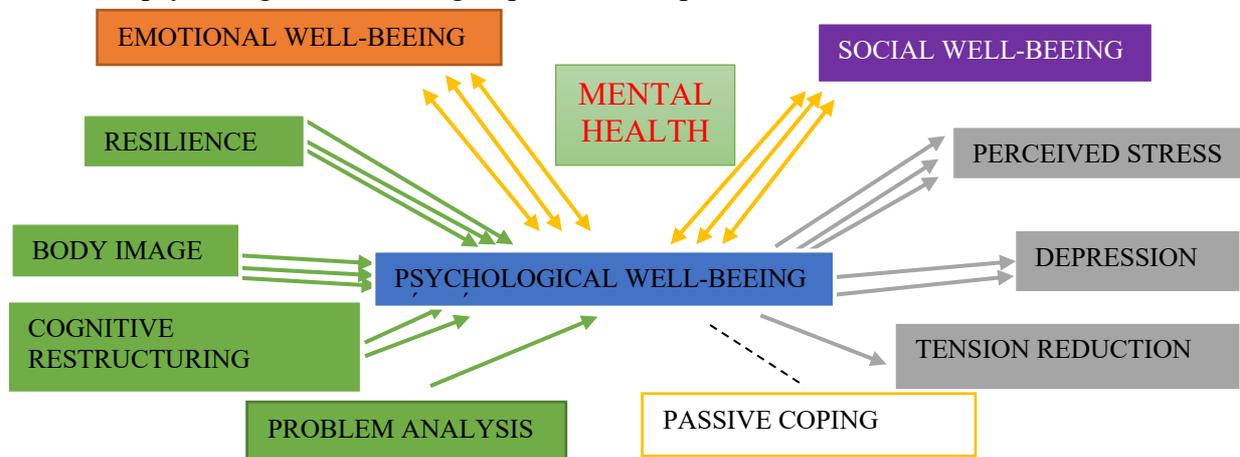


Figure 2: Relationship between Psychological well-being and measured variables

Source: Own editing

Psychological well-being has a moderately strong correlation with cognitive restructuring and depression; however, the trend and direction of their connection show some differences. While in case of cognitive restructuring, psychological well-being improves as the ability of cognitive restructuring develops, the increasing level of depression entails a decline in psychological well-being. Consequently, there is a reverse correlation with a declining trend

between psychological well-being and depression; i.e. psychological well-being improves as the level of depression falls back. Between psychological well-being and problem analysis, there is a weak, one-way connection with increasing trend; while between psychological well-being and stress reduction, there is a weak, one-way connection with declining trend. Lastly, there is no or only a very slight link between psychological well-being and passive coping (Figure 2).

As Figure 3 demonstrates, there is a strong, mutual link (with the same trend and direction) between social, emotional and psychological well-being; subsequently, with the improvement of emotional or psychological well-being, social well-being improves as well, and vice versa (Figure 3).

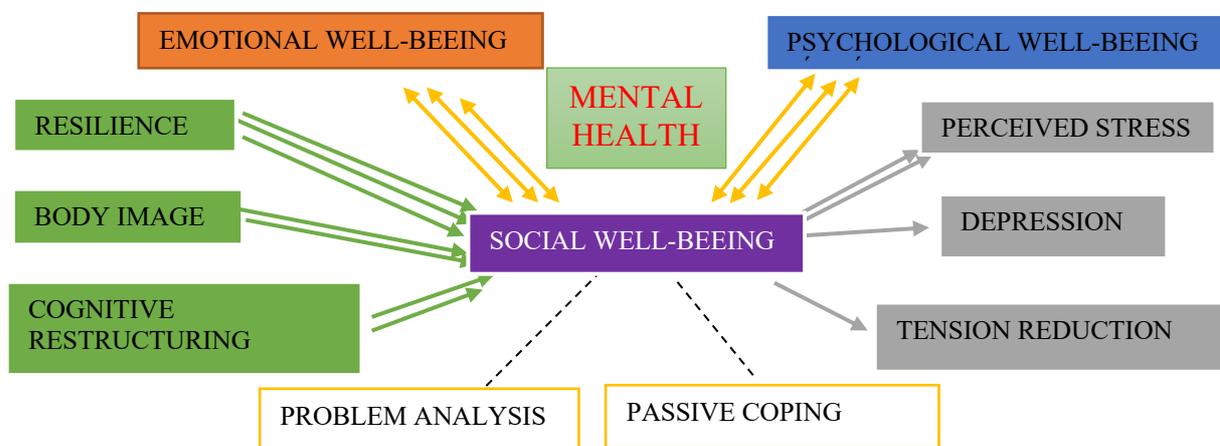


Figure 3: Relationship between Social well-beeing and measured variables

Source: Own editing

Social well-being has a strong connection with resilience, which means that with the development of resilience, social well-being also shows signs of improvement.

Social well-being has a moderately strong link with cognitive restructuring and perceived stress; however, the trend and direction of the connection show some differences. With the development of the ability of cognitive restructuring, social well-being also improves; however, the rising level of perceived stress entails a decline in social well-being. Thus, there is a reverse correlation with a declining trend between social well-being and perceived stress; i.e. social well-being improves as the level of perceived stress declines.

Social well-being has a weak connection with body image, depression and stress reduction. As body image improves, so does social well-being; however, in the case of depression and stress reduction, there is a reverse correlation with a declining trend, meaning that social well-being improves if these factors decrease. There is no or only a very slight link between social

well-being and the other two coping techniques (problem analysis and passive coping) (Figure 3).

To sum up all the results, the dimensions of mental health are significantly determined by the measured variables (resilience, perceived stress, cognitive restructuring, problem analysis, passive coping, body image and depression).

In the case of all three dimensions of mental health, it can be concluded that the more resilient one is and the greater the extent of cognitive restructuring, moreover, the better body image one has, the more significantly well-being improves; furthermore, the lower the level of perceived stress, depression and passive coping is, the more significantly mental well-being improves.

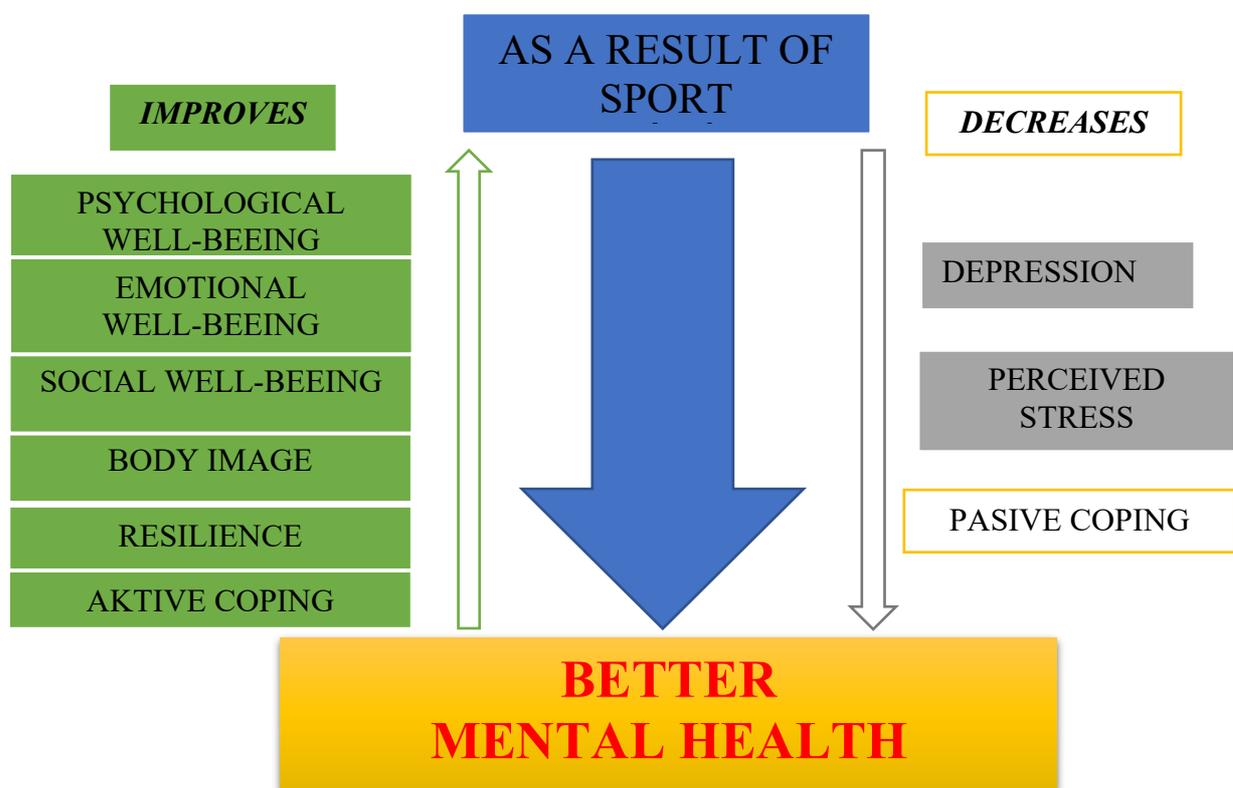


Figure 4: The relationship between sport and mental health

Source: Own editing

In the light of the findings of the study, it can be established that regardless of its intensity, sport acts as protective factor as far as the analysed sample is concerned. One's state of health in adulthood depends on one's health-behaviour, in which regular exercise may be a decisive factor. Based on the results, it can also be observed that competitive athletes tend to smoke less and are less depressive, they have a better body image, are more resilient and prefer active coping strategies; furthermore, despite experiencing higher levels of stress, they handle it more efficiently. In conclusion, it can be confirmed that sport improves mental health. (Figure 4).

4. MAIN FINDINGS OF THE DISSERTATION, INNOVATIVE AND RELATIVELY NOVEL RESULTS TO ACADEMIC KNOWLEDGE

Among the findings of my research, I consider the following to be innovative or relatively novel results:

Innovative results:

- The novelty of my research lies in the fact that I investigate mental health among competitive athletes, recreational athletes and those who do not exercise: such comparative analyses have not been conducted before;
- I consider the creation of 3+1 DMH model (3+1 dimensions of mental health) to be an innovative development which confirms the importance of sport with respect to mental health and the psychological factors measured in the study (resilience, body image, depression, perceived stress, strategies of coping);
- I consider it a new result that I managed to confirm the hypothesis that as the intensity of exercise increases, so do its effects on mental health;
- My exploration of the *raison d'être* of workplace health promotion programmes may also be considered as a new result;

Relatively novel results:

- A novel result of my study is that although the level of perceived stress of athletes increases due to competitions, I successfully proved that competitive athletes are mentally healthier than recreational athletes or those who do not exercise;
- The gender-based analysis of my results demonstrate that there is no difference between the genders with respect to mental health, which further enhances the importance of sport;
- I confirmed that men who exercise tend to be less depressive than those who do not;
- I confirmed that sport activities improve resilience; the more frequently one exercises, the more resilient one becomes;
- Among coping strategies, sport strengthens the use of cognitive restructuring;
- I also consider it a novel result that I was able to explore the importance of health promotion and physical activity programmes.

5. PRACTICAL APPLICABILITY OF THE RESULTS

As a summary of my research concerned with the connection between mental health and sport, I make the following suggestions:

- Despite a number of studies and research findings emphasizing the positive effects of sport, the role and importance of sports exercise are underestimated. Among both younger and older generations, sports experts need to raise awareness of the fact that in today's stressful, performance-oriented world, it is not only one's performance but also one's physical and mental health that are endangered due to an inactive lifestyle and to the lack of sport activities, and physical exercises, which could serve as the primary protective factors in preserving physical and mental health. ***Based on these observations, in order to protect and improve mental health, it is strongly recommended for all age groups to start or to continue to take part in sport activities, as well as increasing the intensity of exercise to a healthy extent.***
- Since sport is usually a social activity, and has an energizing effect on people, numerous hospital wards rely on sport as a therapeutic method to combat depression. It has been proven that as a result of these physical activity programmes, the dosage of antidepressant medication could be reduced or might not even be necessary anymore. Regardless of the type of sport (individual, team, aerobic or anaerobic physical activities), in addition to being used as therapeutic methods, regular sport activities can be considered as the most important tools of prevention when it comes to maintaining mental and physical health. ***I recommend participation in sport activities with the aim of preserving mental health*** Exercise proves to be a particularly useful tool in exploring and developing our own resources; in improving our self-esteem which comprises resilience, the reduction of stress and resulting anxiety; as well as in avoiding potential depression and other mental illnesses.
- Regular sport activities may contribute to establishing and maintaining relations by means of which one can avoid social isolation as a risk factor; thus, exercise can also be considered as a factor in preserving social well-being.
- It can be concluded based on my analyses that sport activities have a positive influence on the development and application of active coping strategies. ***I recommend the development of active coping strategies with the help of sport activities.***
- ***In light of the results it can be established that sport can also help to reduce the use of substances, evinced by the fact that athletes opted for health-conscious behaviour over the use of substances or were in favour of minimal usage of such substances,***

consequently, the introduction and continuation of exercise is also recommended in the development of a healthier behaviour among those using legal substances. I hope it is accurate to put it this way: legal substances can be replaced by sport activities.

- *Regardless of the type of sport (individual, team, aerobic or anaerobic physical activities), I recommend regular sport activities not only as therapeutic methods, but also as the most important tools of prevention when it comes to maintaining mental and physical health.*
- *In the case of athletes, intrinsic motivation is the driving force behind sport activities; consequently, if intrinsic motivation evolves in individuals, it can help them improve their health-consciousness. It is recommended to create situations where individuals can gain positive experience from physical exercises which may trigger the development of intrinsic motivation for physical activities.*
- *Despite the fact that other factors (education system, friendships, need for exercise, etc.) can also affect the development of sporting habits in addition to parents' attitude, based on my results I suggest that parents try to spare some time for sport activities, thus setting a good example that may not only help in teaching their children how to live an active life, but also improves their own and their children's mental health.*
- *In light of my research findings I suggest that company executives increase the emphasis on organising workplace sporting events regularly. These opportunities of physical activity can promote the improvement of society's physical and mental (!) health. Employees who exercise regularly are healthier, which can improve their performance, a positive outcome both in the employer's and the national economy's point of view. In addition, an employee who exercises regularly even as a parent may foster the development of his/her child's active lifestyle and may also contribute to a healthier and, at the same time, better performing future generation of workers and society. This process introduces the synergetic impact of sport both from the aspect of society and national economy.*

6. LIST OF THE CANDIDATE'S PUBLICATIONS ON THE TOPIC OF THE DISSERTATION



**UNIVERSITY of
DEBRECEN**

**UNIVERSITY AND NATIONAL LIBRARY
UNIVERSITY OF DEBRECEN**

H-4002 Egyetem tér 1, Debrecen
Phone: +3652/410-443, email: publikaciok@lib.unideb.hu

Registry number: DEENK/22/2021.PL
Subject: PhD Publication List

Candidate: Danica Keczei
Doctoral School: Károly Ihrig Doctoral School of Management and Business
MTMT ID: 10073171

List of publications related to the dissertation

Books (1)

1. **Keczei, D.**, Kuritárné Szabó, I.: A sport és a sportsérülések okozta mentális problémák menedzselése. , [Debrecen] : [s.n.], 65 p., 2015.

Articles, studies (5)

2. **Keczei, D.:** A sport, mint a depresszióvalszembeni védőfaktor.
Acta Medicina et Sociologica. 11 (Klsz.), 5-17, 2020. ISSN: 2062-0284.
3. **Keczei, D.:** A sport hatása a mentális egészségre sportolók és nem sportolók összehasonlító vizsgálata alapján.
Magyar Sporttudományi Szemle. 21 (83), 31-40, 2020. ISSN: 1586-5428.
4. **Keczei, D.:** Relationships between coping strategies and psychoactive substance use.
Apstrac. 14 (1-2), 100-106, 2020. ISSN: 1789-221X.
DOI: <http://dx.doi.org/10.19041/APSTRACT/20201-2/13>
5. **Keczei, D.:** Sport, mint a stressz ellenszere.
International Journal of Engineering and Management Sciences. 4 (3), 69-78, 2019. EISSN: 2498-700X.
DOI: <https://doi.org/10.21791/IJEMS.2019.3.7>.
6. **Keczei, D.:** Lélektani munka egy kézilabdacsapatban.
Kalokagathia. 49 (2-4), 253-262, 2011. ISSN: 1218-1498.

Conference presentations (3)

7. **Keczei, D.:** Érzelmi intelligencia (EQ) hatása a sportbeli eredményességre.
In: Kapcsolataink világa : a Magyar Pszichológiai Társaság XXII. Országos tudományos nagygyűlése : kivonatkötet / fel. szerk. Vargha András, Magyar Pszichológiai Társaság
Budapest, 153, 2013. ISBN: 9789638791580





8. **Keczeli, D.:** Psychological work within a Handball Team.
In: 17th annual Congress of the European College of Sport Science 4-7th July ECSS Bruges 2012 - Belgium : Book of abstracts. Ed.: by Meeusen, R., Duchateau, J., Roelands, B., Klass, M., De Geus, B., Baudry, S., Tsolakidis, E, European College of Sport Science, Bruges, 191, 2012. ISBN: 9789090268682
9. **Keczeli, D.:** A sportbeli eredményesség pszichológiai összetevői.
In: 40. Mozgásbiológiai konferencia : Budapest, 2010. november 18-19. : program ; előadás-kivonatok, Semmelweis Egyetem Testnevelési és Sporttudományi Kar, Budapest, 31-33, 2010.

List of other publications

Articles, studies (8)

10. **Keczeli, D.,** Kovács, J.: Kincskereső program.
In: A mozgás szabadsága : A szabadidősport társadalmi, gazdasági és egészségügyi megközelítései. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdaságtudományi Kar, Debrecen, 243-251, 2014. ISBN: 9789634737032
11. Szabó, E., **Keczeli, D.,** Farnosi, I., Gaál, S., Keresztesi, K.: Somatic development and some motor performances of young girls based on age and birth season.
Apstract. 7 (1), 117-123, 2013. ISSN: 1789-221X.
DOI: <http://dx.doi.org/10.19041/Apstract/2013/1/20>
12. **Keczeli, D.:** Talent Management based on therapeutic work with a professional handball team.
Apstract. 7 (1), 63-66, 2013. ISSN: 1789-221X.
DOI: <https://doi.org/10.19041/APSTRACT/2013/1/11>
13. Ráthonyi-Ódor, K., Borbély, A., **Keczeli, D.,** Szabó, E.: A Debreceni Sportiskola (DSI) növendékeinek menedzselése pszichológiai szempontból.
Magyar Sporttudományi Szemle. 13 (51), 15-19, 2012. ISSN: 1586-5428.
14. **Keczeli, D.:** "Treasures" of Debrecen: Selection of and attention to sports talents in the Sport School of Debrecen in 2010.
Apstract. 5 (3-4), 55-59, 2011. ISSN: 1789-221X.
15. **Keczeli, D.,** Orendi, M.: Debreceni "kincsek" - sporttehetségek kiválasztása és gondozása a Debreceni Sportiskolában.
In: A debreceni példa : Tehetségazonosítás és tehetséggondozás a város közoktatási intézményeiben, Magyar Tehetségsegítő Szervezetek Szövetsége, Budapest, 146-154, 2011.





16. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Somatic Development and Motor Performance of Children in Hungary.
World Academy of Science, Engineering and Technology. 7, 2351-2361, 2011. ISSN: 2010-376X.
17. **Keczeli, D.**: Sporttehetség kiválasztása- gondozása a Debreceni Sportiskolában.
Magyar Sporttudományi Szemle. 12 (47), 4-7, 2011. ISSN: 1586-5428.

Conference presentations (10)

18. **Keczeli, D.**: A gyermek és serdülőkorú sportolók pszichológiai vizsgálata.
In: 45. Mozgásbiológiai konferencia : program, előadás-kivonatok, Debreceni Egyetem, Debrecen, 19, 2015.
19. **Keczeli, D.**: A sport és a sportsérülések okozta mentális problémák menedzselése.
In: 44. Mozgásbiológiai konferencia : program, előadáskivonatok, TE (TF), Budapest, 25-26, 2014.
20. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Body development and motor performance of children in South-East Hungary and in West Hungary.
In: Ifjúsági sport és tehetség-gondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 59, 2013. ISBN: 9786155183812
21. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Body development and motor performance of children in South-East Hungary and in West Hungary.
In: Ifjúsági sport és tehetség-gondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 314-319, 2013.
22. **Keczeli, D.**: Tehetség-gondozás és -menedzselés a kézilabda csapatoknál.
In: Ifjúsági sport és tehetség-gondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 126-132, 2013. ISBN: 9786155183812
23. **Keczeli, D.**: Tehetség-gondozás és -menedzselése a kézilabda csapatoknál.
In: Ifjúsági sport és tehetség-gondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 41, 2013. ISBN: 9786155183812
24. **Keczeli, D.**: The effect of emotional intelligence on sports effectiveness at handball teams.
In: Book of Abstracts of the 18th Annual Congress of the European College of Sport Science. Ed.: N. Balagué, C. Torrents, A. Vilanova, J. Cadefau, R. Tarragó, E. Tsolakidis. European College of Sport Science, Barcelona, 712, 2013. ISBN: 9788469577868



16. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Somatic Development and Motor Performance of Children in Hungary.
World Academy of Science, Engineering and Technology. 7, 2351-2361, 2011. ISSN: 2010-376X.
17. **Keczeli, D.**: Sporttehetség kiválasztása- gondozása a Debreceni Sportiskolában.
Magyar Sporttudományi Szemle. 12 (47), 4-7, 2011. ISSN: 1586-5428.

Conference presentations (10)

18. **Keczeli, D.**: A gyermek és serdülőkorú sportolók pszichológiai vizsgálata.
In: 45. Mozgásbiológiai konferencia : program, előadás-kivonatok, Debreceni Egyetem, Debrecen, 19, 2015.
19. **Keczeli, D.**: A sport és a sportsérülések okozta mentális problémák menedzselése.
In: 44. Mozgásbiológiai konferencia : program, előadáskivonatok, TE (TF), Budapest, 25-26, 2014.
20. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Body development and motor performance of children in South-East Hungary and in West Hungary.
In: Ifjúsági sport és tehetséggondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 59, 2013. ISBN: 9786155183812
21. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Body development and motor performance of children in South-East Hungary and in West Hungary.
In: Ifjúsági sport és tehetséggondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 314-319, 2013.
22. **Keczeli, D.**: Tehetséggondozás és -menedzselés a kézilabda csapatoknál.
In: Ifjúsági sport és tehetséggondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 126-132, 2013. ISBN: 9786155183812
23. **Keczeli, D.**: Tehetséggondozás és -menedzselése a kézilabda csapatoknál.
In: Ifjúsági sport és tehetséggondozás - a 21. század kihívásai : II. Nemzetközi Turizmus és Sportmenedzsment Konferencia. Szerk.: Perényi Szilvia, Debreceni Egyetem Gazdálkodási és Vidékfejlesztési Kar, Debrecen, 41, 2013. ISBN: 9786155183812
24. **Keczeli, D.**: The effect of emotional intelligence on sports effectiveness at handball teams.
In: Book of Abstracts of the 18h Annual Congress of the European College of Sport Science.
Ed.: N. Balagué, C. Torrents, A. Vilanova, J. Cadefau, R. Tarragó, E. Tsolakidis, European College of Sport Science, Barcelona, 712, 2013. ISBN: 9788469577868



25. **Keczeli, D.**: Edző-gyerek kapcsolata és ennek hatása a sporttehetségek menedzselésére, gondozására a Debreceni Sportiskolában (DSI).
In: 42. Mozgásbiológiai konferencia : program, előadáskivonatok, SE TSK, Budapest, 49-50, 2012.
26. **Keczeli, D.**, Ráthonyi-Ódor, K., Szabó, E., Borbély, A.: A Debreceni Sportiskola (DSI) sporttehetség gondozási programja.
In: 41. Mozgásbiológiai Konferencia : Program, előadáskivonatok, Semmelweis Egyetem Testnevelési és Sporttudományi Kar, Budapest, 25, 2011.
27. Szabó, E., **Keczeli, D.**, Farnosi, I., Gaál, S., Keresztesi, K.: Factor Patterns of Motor Performance of Primary School Girls According to Birth Season. 16th Annual Congress of the European College of Sport Science.
In: 16th Annual Congress of the European College of Sport Science : New horizons from a world heritage city : Book of abstracts. Ed.: by N. Tim Cable, Keith George, European College of Sport Science, Liverpool, 460, 2011. ISBN: 9780956890306

The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of Web of Science, Scopus and Journal Citation Report (Impact Factor) databases.

13 January, 2021

