

Physical self-concept, dietary habits, trait- anxiety, trait depression amongst elite athletes, physically active- and obese people

Doctoral Thesis

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## 1. INTRODUCTION

In our Century, the prevalence of a more aesthetic appearance and the intention to live a healthier lifestyle is increasing. Perhaps this is the reason why there is an increased emphasis on health, disease prevention (dietary habit, regular physical exercise, etc.) and anti-aging processes in social research and in media as well. „Consumer society gave the first chance to build up the individual's own body-idol. On the other hand, the disappearance-patterns could lead to conflicts in the expression of the body. This could appear on the anorectic body in our times." (Csabai és Erős 2000).

The fear of obesity was manifested in the sixties first which characteristically was not known before. The female appetite/ desire became the metaphore of loss of self-control. The consumer society has created double bonds as it promotes more and more consumption although it considers men and women as prisoners of their own desires.

We live in a kind of Janus faced society where we are called on to consume but at the same time our desires can not be satisfied. The society creates sharp contour between the body and the outside world. The contour has double wall: one of them faces to the outside world and mediates well defined, controlled forms, the other wall is connected to the personality, feelings and desires. The distance between the outside world and the personality becomes wider. This distance between the one's soul and body is increased by the consumer society. The expression of feelings become more difficult. Signs are given to the body by society and one's personality. The visible features of the surface of the body is considered as the main target of the society: the society sends messages to the outside world by using body surface.

One's personal conflicts and the effects of society meets on the body. The control on eating, regular physical activity becomes a moral command by society.

The present research focuses on body self-worth over the study of four different subgroups. The first study focuses on the dietary habits, trait anxiety an physical self-concept of elite rhythmic gymnasts, where grace and aesthetic appearance is essential. The second part of the research focuses on the effects of different regular physical activity programs (type of sport, duration, etc.) on the body self concept and nutrition. The third part focuses on physical self-concept, readiness for physical activity, etc of obese persons. The second part of the dissertation examines the „bodysigns” of a very popular Hungarian weight loss program and it's effectivity considering weight loss, physical self-concept and readiness for regular sport activity.

## 2. PURPOSES

The purpose of the present study was to identify the physical self-concept from three (physical activity, nutrition and trait anxiety-, trait depression) different aspects on five different subpopulations (elite rhythmic gymnasts, physically active persons, sedentary and obese people and yoga practitioners).

### 2.2. Hypotheses

H.1. Among young female elite rhythmic gymnasts the striving for the perfect body comes at the very high cost of poor and unhealthy eating habits and very strict and potentially unfavorable nutritional regiments.

H.2. Because of the high demands of low BMI, there is a closer connection between BMI and physical self-concept at elite rhythmic gymnasts, than on the control group.

- H.3. Because puberty is a traumatic transition in life, there are some well defined differences between physical self-concept and anthropometrical parameters at 15-, 16-, 17-, 18- years-old age groups.
- H.4. Regular physical activity causes increase in physical self-concept, decrease in trait anxiety and trait depression.
- H.5. With the increase of physically active hours, there is increase in body satisfaction.
- H.6. As belly dancing does not require low BMI, the physical self-concept amongst belly dancers is higher.
- H.7. Higher BMI value causes lower body self satisfaction amongst obese people.
- H.8. As the physical self-concept increases, the readiness for physical activity increases parallel for obese people. Those obese persons who are more satisfied with their body are more ready for regular sport activity.
- H.9. The readiness for physical activity is influenced by bodyweight, BMI, abdominal circumference, body fat rate at obese people.
- H.10. Readiness for physical activity decreases with age. Trait anxiety and trait depression is inversely affected by physical self-concept at morbid obese group.
- H.11. Regular yoga practice decreases trait anxiety and trait depression.
- H.12. Regular yoga practise beneficially influences eating habits: decreases meat consumption and increases organic food, vegetable, grains and fruit consumption.

### 3. SAMPLE AND METHODS

#### 3.1 Sample

There were four groups (N = 401) participated in the research, who were characterized by the following:

1. Elite rhythmic gymnasts (females, n = 103), mean age was  $17.2 \pm 1.2$  years. They were volunteers, nationally selected athletes participated in the World Championships in Budapest, 2003.
2. Secondary school students (females, n = 113), mean age was  $16.2 \pm 1.0$  years. Volunteers, physically active (n = 59), sedentary (n = 54).
3. Physically active and sedentary college students (n = 84: 17 male + 67 female), mean age was  $30.0 \pm 7.3$  years, mean BMI was  $22.6 \pm 14.9 \text{ kg/m}^2$  (between 16 és 46.9)  
Subgroups were created regarding the type of sport: belly dancers (group 1, n = 14), runners (group 2, n = 23), mixed (group 3, n = 22), aerobic (group 4, n = 14), sedentary (group 5, n = 11)
4. Obese people (n = 101, 25 males + 76 females), mean age was  $42 \pm 12$  years, mean BMI was  $39.9 \pm 7.4 \text{ kg/m}^2$  (between 30 and 66). Obese group was divided into two subgroups regarding BMI: obese (BMI: 30-39.9), (n = 59) and morbid obese (BMI < 40), (n = 42) csoportra.
5. Yoga practitioners (n = 60, 13 male, 47 female), mean age was  $39.43 \pm 10.6$  years. Mean bodyweight of men was  $74.5 \pm 10.74 \text{ kg}$ , BMI =  $23.5 \pm 2.95 \text{ kg/m}^2$ , mean bodyweight of women was  $61.7 \pm 1.2 \text{ kg}$ , BMI =  $22.5 \pm 3.33 \text{ kg/m}^2$ .

#### 3.2. Methods

##### 3.2.1. Anthropometrical measures

Bodyweight was measured by a digital scale which was able to measure until the value of 200kg. Height was measured by spacer, whereas bodyfat percent was estimated by bioimpedance machine (Omron BF600 bodyfat monitor). Body mass index was calculated by the following formula:  $\text{bodyweight (kg)} / \text{height}^2 (\text{m}^2)$ .

##### 3.2.2. Psychological questionnaires

The following questionnaires were applied:

1. The Physical Self-Concept subscale of the Tennessee Self-Concept Scale [1] was used to assess the sense of physical self-worth (Dévai és Sipos 1986).
2. Basic eating habits were assessed with 12 +22 questions. Twentytwo of them asked how often the respondents ate breakfast, lunch, and dinner (1 = never, 2 = rarely, 3 = one to three times a month, 4 = 1 to 5 times a week, 5 = every day). Additional 12 items assessed the extent to which the following statements were true (5-point response format: 1 – totally false, 5 – fully true): “I eat sweets every day,” “I cannot help eating too much for dinner,” and “I like eating.”
3. State-trait anxiety was measured by the original English version of STAI (FX1, FX2), (Spielberger 1970) questionnaire, and the adopted Hungarian version (Sipos és Spielberger 1985).
4. We measured state/ trait anxiety, curiosity, anger, depression by STPY-H, Y-1/- Y2 (Spielberger Sipos 2005).
5. Readiness for physical activity was measured by the Hungarian adaptation (Sipos és mtsai 1993) of 12 item subscale of the Self – efficacy scale (Schwarzer 1992).
6. Lifestyle defence mechanism (LDM inventory), (Spielberger): Need for harmony (N/H), Rationality – emotional defensivity (R/ED) scales were adapted to Hungarian (Sipos és Spielberger 2005) and was used to measure college students, obese people in our study.

### 4. RESULTS

We did not find significant difference in physical self-concept amongst rhythmic gymnasts, secondary school students, female college students, although we measured significantly lower physical self-concept score for the obese group ( $p < .01$ ). Male college students were more satisfied with their body ( $p < .01$ ), whereas we did not find differences between men and women in the obese group. In the morbid obese (BMI > 40) group there was significantly lower ( $p = .003$ ) physical self-concept score than in the obese (BMI = 30-39.9) group. Yoga practitioners had significantly ( $p < .01$ ) higher mean physical self-concept score than the other four groups. Those college students who exercised 6-8h/week had significantly higher physical self-concept score ( $p = .006$ ) than those who had average 0-2h/week physical activity.

In the elite rhythmic gymnast group we found positive significant correlation between physical self-concept and height ( $r = .268$ ,  $p = .006$ ) and negative significant correlation between BMI and physical self-concept ( $r = -.201$ ,  $p = .041$ ), respectively.

For college students there was negative significant difference between bodyweight and physical self-concept ( $r = -.263$ ,  $p < .05$ ) and between BMI and physical self-concept ( $r = -.372$ ,  $p < .01$ ) in both sex groups.

Those runners who were more ready for physical activity were more satisfied with their body. Whereas those runners with higher BMI were less satisfied with their body. We did not find significant relationship between the readiness for physical activity and physical self concept.

Those obese people who had higher bodyfat were less ready for physical activity. We found positive significant relationship between abdominal circumference and BMI, although there was a negative significant relationship between abdominal circumference and physical self-concept in the obese group. Those obese people who were more ready for physical activity had higher physical self-concept value, whereas older obese people were less ready for physical activity.

In the obese group we found negative linear connection between physical self-concept and bodyfat. We found negative linear correlation between physical self-concept and trait depression, respectively. In the obese group, the physical self-concept and readiness for physical activity showed strong positive linear relationship.

Male college students spent more time with physical activity than female counterparts ( $r = -.224, p < .05$ ). Those college students who were more ready for physical activity had more exercise and had higher physical self-concept value ( $r = .400, p < .01$ ) at both sex groups.

Those male college students who had lower BMI had more exercise and they were more ready for physical activity.

We did not find significant difference between belly dancers and runners regarding the amount of physical activity. Belly dancers spent average  $6.43 \pm 4.65$  hours/week with training, runners spent  $6.3 \pm 3.2$  hours/week with exercise. Those in the aerobics group had average  $2.96 \pm 2.23$  h/week, although members in the mixed sport group was  $3.6 \pm 2.3$  h/week exercise.

Runners had the highest physical self-concept value ( $M = 70.7, SD = 11.7$ ), whereas it was not statistically significant than at the belly dancer group ( $M = 69.7, SD = 8.6$ ), at the aerobics exercisers ( $M = 62.2, SD = 9.0$ ), at mixed exercise group ( $M = 66.7, SD = 10.1$ ), neither at sedantary group ( $M = 59.0, SD = 11.2$ ).

At runners we found strong positive linear relationship between physical self-concept and the amount of training ( $R = .578, p = .003$ ), whereas this relationship was not found at any other examined group (Figure 1.).

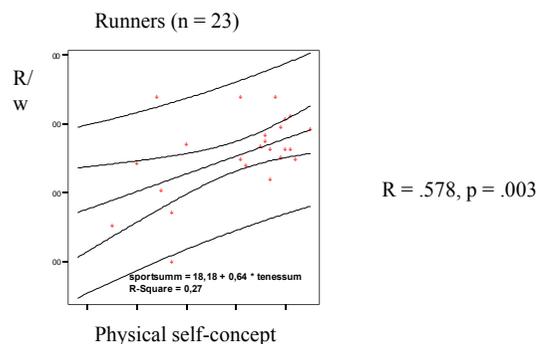


Figure 1. Linear regression model of runners ( $n = 23$ ) (dependent variable: time spent with running ( $R/w$ ); independent variable: physical self-concept)

Amongst yoga practitioners, there was no relationship amongst physical self-concept, years of yoga practice, age, education, anthropometrical parameters (BMI, bodyweight, ideal bodyweight), nor gender. Although significant ( $p < .05$ ) correlation was found between physical self-concept and weekly the amount of yoga practice.

We did not find significant difference between rhythmic gymnast and sedantary counterparts regarding the frequency of breakfast and lunch, whereas rhythmic gymnasts had dinner, fast food ( $p = .000$ ) less frequently. Sweet consumption was more frequent in the sedantary group ( $p = .000$ ). Sedantary girls more often overate for dinner ( $p = .000$ ) and enjoyed eating more ( $p = .000$ ) than rhythmic gymnasts.

For rhythmic gymnasts there was a positive significant correlation between the frequency of breakfast and physical self-concept ( $r = .265, p < .01$ ) whereas we did not find the same correlation at secondary school students ( $r = .032, p = .74$ ).

For secondary school students overeating for dinner showed positive significant correlation with trait anxiety ( $r = .196, p < .05$ ), whereas at rhythmic gymnast overeating for dinner showed positive significant relationship with age ( $r = .301, p < .01$ ).

In the elite rhythmic gymnast group those who enjoyed eating more had lower bodyweight ( $r = -.194, p < .05$ ). On the other hand those gymnasts who enjoyed eating more overate for dinner more often ( $r = -.290, p < .01$ ).

Male college students enjoyed eating more ( $r = -.229, p < .05$ ), were more satisfied with their body ( $r = -.217, p < .05$ ) consumed meat more often ( $r = -.307, p < .01$ ) than female counterparts. On the other hand we found positive significant relationship between the amount of physical activity and sweet-, fruit consumption. Those who exercised more had morning snack more often.

Belly dancers consumed sweets more often than mixed exercise group and sedantary group of college students. Runners consumed sweets more often than sedantary counterparts. Belly dancers had meat less often than runners ( $p = .042$ ).

Regarding eating habits, those who exercised 9-20 hours/week liked eating more than those of 0-2h/week exercisers ( $p = .004$ ). Those who exercised 6-8 hours/week consumed more sweets than those who exercised 0-2hours/week. Those who exercised 9-20 h/week, consumed breakfast and milk products more often than those who exercised 0-2 h/week. We found a negative linear relationship between overeating for dinner and physical self-concept at the 0-5 hours/week exercisers.

In the group of yoga practitioners, those who had been practicing yoga for a longer period, had significantly lower meat consumption. We found a negative correlation between the weekly amount and yoga practice and meat consumption and positive correlation between the weekly yoga practice and organic food consumption. Those yoga practitioners who had higher BMI had breakfast and dinner less frequently.

For rhythmic gymnast and secondary school students we found negative significant correlation between state/ trait anxiety and physical self-concept ( $r_{FX1RG} = -.395, p = .000$ ;  $r_{FX1K} = -.372, p = .000$ ;  $r_{FX2RG} = -.632, p = .000$ ;  $r_{FX2K} = -.401, p = .000$ ).

Individual competitors had tendency-like higher state/ trait anxiety level than team competitor counterparts.

For secondary school students there was a negative linear relationship between trait anxiety and physical self-concept in the 15-, 16, 17 year-old subgroup. We did not find relationship between trait anxiety and physical self-concept at 18 year old secondary school students.

For college students we found a moderate-strong negative linear relationship between trait anxiety and physical self-concept.

There was a strong negative linear correlation between physical self-concept and trait depression the group of 1-5 h/week exercisers, although we did not find significant relationship between physical self-concept and trait depression in the 6-8h/week ( $R = -.485, p = .057$ ), and 9-20h/week ( $R = -.401, p = .284$ ) exercise groups, respectively.

Amongst yoga practitioners, the physical self concept negatively connected with trait anxiety and trait depression. The amount of weekly yoga practice showed inverse correlation with trait anxiety. Those who practiced more yoga had lower trait anxiety level.

## 5. CONCLUSIONS

1. Rhythmic gymnasts had lower mean bodyweight and BMI than sedentary secondary school students. Taller rhythmic gymnasts were more satisfied with their body. Rhythmic gymnasts with lower BMI were more satisfied with their physical self. Among young female elite rhythmic gymnasts their striving for the perfect body came at the very high cost of poor and unhealthy eating habits and very strict and potentially unfavorable nutritional regimens.

2. Because of the reverse relationship between the joy of eating and the bodyweight, we can conclude that the strict eating regimen of the rhythmic gymnast does not allow them to enjoy eating. Perhaps that is the reason why they choose mostly simple carbohydrates for favourite food. As we found comparison between the breakfast consumption and physical self-concept at rhythmic gymnasts (was not found at secondary school students), we can conclude the presence of strict eating regimen for gymnasts. Better physical self-concept demands strictness in eating behaviour which leads to deleted dinner, sometimes deleted lunch and breakfast, deleted sweet consumption and fast food. These unfavorable changes can be the first station of eating disorders. Continuous nutritional- medical-psychological counselling is essential.

3. At the age of 15-, 16-, 17 years in the rhythmic gymnast group, those who are more satisfied with their body have lower trait anxiety. At 16 years old gymnasts, those who are shorter are more satisfied with their body although at the age of 17-, 18 years it turns to opposite: those who are taller are more satisfied with their body. Whereas puberty is a traumatic transition in life, there are some well defined differences between physical self-concept and anthropometrical parameters at 15-, 16-, 17-, 18- years-old age groups, there is no difference in eating behaviour between rhythmic gymnast and secondary school students. In the process of sport-selection, it is essential to emphasise on height and graceful body shape, because of successfulness and the prevention of eating disorders.

4. Those men who have higher BMI do less physical activity and are less ready for regular physical activity. In runner group, who are more ready for regular physical exercise are more satisfied with their body. Those physically active college students who have 6-8h exercise weekly, are more satisfied with their body self than those who exercise 0-2h/week. Whereas those who exercise more than 8h/week are not more satisfied with their body. We can suggest that the recommendation for the weekly amount of regular physical activity can be at least 6 hours because of the increased physical self-concept value.

5. Those physically active college students who have higher physical self-concept are less trait anxious. Physical activity can increase body's self satisfaction which can consequently be a protection against trait anxiety and depression.

6. Belly dancing can increase physical self-concept, although there is no difference between runners and belly dancers regarding physical self-concept. Those belly dancers who are more satisfied with their body have a morning snack more often. Those who are more satisfied with their body are less likely to overeat for dinner. Those who exercise more, enjoy eating more. We can conclude that the eating habit is more controlled amongst physically active people.

7. Those who have higher bodyfat percent have higher abdominal circumference and higher BMI value which causes decreased physical self-concept and decreased readiness for physical activity amongst obese people.

8. Those who are older are less ready for regular physical activity and those who are less qualified are less ready for physical activity amongst obese people. Those who have lower bodyfat, lower BMI are more ready for physical activity. Those who are more ready for physical activity are more satisfied with their body at obese group.

9. Higher body satisfaction can have a protective effect against trait depression amongst morbid obese people. We suggest that the optimal weight loss program have to be started with a somehow strict eating regimen which can cause fast weight loss on the first week. This process can favourably increase physical self-concept. The second step to implant regular physical activity is lifestyle. Third, it is needed to ensure continuous nutritional-psychological-medical counselling.

10. For the effect of regular yoga practice, trait anxiety level decreases, although trait depression level does not change.

11. With the increase of years with practicing yoga, organic food consumption increases, whereas meat intake decreases. These changes are beneficial for health maintenance and in the prevention of diseases. Yoga practice beneficially influences physical self-concept, though it may accelerate the effectivity of obesity treatment as well.

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