

# THE INFLUENCE OF YOGA EXERCISES ON WOMEN'S ANXIETY LEVELS

Monika Guskowska

Psychology Unit, The Jozef Pilsudski Academy of Physical Education, Warsaw, Poland

## ABSTRACT

**The aim of the study** was to define the influence of one-time yoga exercises on the level of anxiety in three measurements (at the beginning of systematic training, after three and then after six months of the training) and the factors that determine them.

**Material and Methods:** The research was conducted on 16 women at the age of 20 to 26. The researchers made use of the state anxiety level scales from Spielberger's *STAI* questionnaire, as well as the standard psychological questionnaires (*NEO-FFI*, *CISS*, *SOC-29*).

**Results:** A considerable decrease in anxiety level was noted after one-time yoga classes in all three measurements. In the first measurement it correlates with the levels of mood state of the subjects, and can be prognosed on the basis of these levels. In the two following measurements correlations were noted with openness to experience and with the sense of comprehensibility.

**Conclusions:** The little size of the group of subjects limits the possibility of generalising the results of the research. One-time yoga exercises may cause a considerable decrease in young women's anxiety level, and the anti-anxiety effects are probably diversified according to the initial anxiety level and the personality traits of the subjects.

*Key words:* physical exercises, yoga, anxiety, women

## Introduction

Research on the influence of physical exercises on the psyche would most often focus on exercises increasing the oxygen intake, such as running, intensive walking, cycling. It was proved that they bring psychological profits expressed among others in a decrease in anxiety level after one-time physical training (the so-called rapid anti-anxiety effect), as well as in reducing the general tendency to react with anxiety as a result of long-term systematic physical training (1).

What is more, yoga exercises can cause positive psychological effects, through both physiological and psychological mechanisms. Even Patañjali would point to such profits coming from yoga as controlling the mind, achieving emotional balance or intellectual development.

The only form of yoga that is preoccupied with the body is hatha yoga. It includes body positions (asanas) and breathing exercises. Hatha yoga exercises are isometric, they are performed with the attention concentrated on the muscles and parts of the body engaged in the exercises (2). The positions of the body are to strengthen the body, protect it from illnesses, and to achieve and maintain psychophysical harmony. The latter is possible thanks to combining psychological and physical training – a given position of the body is accompanied by an appropriate mental state. Asanas should be performed with full concentration and with the awareness of one's own emotional state, they should not cause fatigue. Also the necessity of elimi-

nating all kinds of competition is being stressed. The aim of controlling the breathing energy is to achieve control over the mind, the role of breathing exercises is to cleanse and relax (3-5).

According to Kulmatycki (3), ethical and self-educational recommendations, as well as practices connected with the physical body, breathing and vital energy, and the ability to control psychophysical tensions, constitute a preparatory stage, which consists in distancing physical tension and verifying negative emotional and mental habits. The yoga-system training is treated as a means in this process. In the second stage – the proper yoga training – exercises and practices concentrate on spiritual and psychological integration.

Research results indicate that people who take up yoga exercises expect to achieve a state of relaxation and an improvement in their physical condition (4). The substantial motives of taking up the exercises are: the will to reduce somatic ailments or mental tension, to achieve balance, to prevent illnesses and the effects of stress (6).

Among the psychophysical changes resulting from the training subjects enumerate reduction of physical tension, change in the breathing habits, in the functioning of the nervous system and activity of the mind. They find profits in deep relaxation, better self-comprehension, emotional stability, improving physical fitness and in a surge of energy, as well as in good mental and physical state, general mood improvement, better concentration and tenacity (4, 6).

People who practiced yoga demonstrated an improvement of the mood state and a reduction of emotional distress in confrontation with stress, both of experimental character and in real-life situations (7). Those students who practiced yoga systematically, were characterised by lower anxiety and aggression level than their peers from a control group (8). It was noted that practicing yoga has a positive influence on the divisibility and concentration of attention, and on some memory functions (9). Not much is known, however, about the influence of one-time yoga training on the psychological sphere.

Yoga exercises can be taken up for various reasons. Kulmatycki (2) singles out three scopes in the reception of yoga in western culture: the health, the therapeutical and the philosophical and religious scope. The present study is restricted to the first of these three. It considers yoga as a kind of relaxing and concentrating training which helps to achieve psychophysical relaxation. The study focuses on changes in anxiety level after one-time training in different periods of the training programme. The following research questions were formulated:

1. What changes occur in the anxiety level after one-time yoga training?
2. Is the scale of the change dependant on the length of the period of systematic training?
3. What are the relations between changes in anxiety level and selected permanent psychological characteristics of an individual (personality traits, the sense of coherence, strategies of coping with stress)?

### Material and methods

The research was conducted on a group of women (n=25) beginning systematic yoga training. They had led a sedentary life and had not taken up any systematic physical activity before. They were all students of Warsaw's universities, their participation in the research was voluntary. The subjects would participate in an hour's yoga classes which took place twice a week. The whole programme lasted for six months. For the analysis were used only the results of 16 women at the age 20 to 26 (M=24.32, SD=3.18) who practiced systematically and participated in all measurements of psychological variables.

The following tools were applied in the research:

1. State-Trait Anxiety Inventory (STAI) by Spielberger (10),
2. Profile of Mood States (POMS) by McNair, Lorr and Droppleman (11) allowing for diagnosis of seven types of mood state, five negative and two positive ones,
3. Personality inventory NEO-FFI by Costa & McCrae, taking into consideration five personality dimensions: extraversion, neuroticism, openness to

new experiences, conscientiousness and agreeableness (12),

4. Coping Inventory for Stressful Situations by Endler and Parker (CISS), including scales of the task, emotion, and avoidance strategies (13),
5. Antonovsky's SOC-29 scale for examining the sense of coherence and its components: comprehensibility, manageability and meaningfulness (14).

The procedure of the research was as follows. In the first week of the practice, after three and six months of the programme, a measurement of anxiety level was conducted directly before and after yoga classes. The permanent traits of the individuals were also examined, having received appropriate instructions the subjects would fill in the remaining questionnaires (POMS, NEO-FFI, CISS and SOC-29) on their own and bring them to the following yoga classes. The instruction in POMS scale determined the period to which the assessment of mood state should relate as the preceding week.

### Results

In order to determine the so-called rapid effect of yoga exercises, anxiety level directly before and after yoga classes measured in the first week of the practice was compared with the measurements after three and six months of the programme. Appropriate data is presented in table 1. The importance of the test-retest differences was determined with the use of Wilcoxon's nonparametric test for dependent samples.

**Table 1.** Anxiety level before and after classes in three measurements

Anxiety level	Before classes <i>M±SD</i>	After classes <i>M±SD</i>	W
1 <sup>st</sup> measurement	40.25±7.94	30.67±4.81	2.944**
2 <sup>nd</sup> measurement	33.27±7.93	29.27±9.95	2.005*
3 <sup>rd</sup> measurement	32.44±7.73	28.11±8.77	2.017*
$\chi^2$	11.307**	3.630 <sup>n/a</sup>	

W – values of Wilcoxon's test for dependent samples

$\chi^2$  – value of Friedman's test relevant at the level:

\* p<0.05; \*\*p<0.01; <sup>n/a</sup> statistically insignificant

The results prove a considerable decrease in anxiety level after one-time yoga exercises, both in the first week of the programme and after three months from its beginning. The anti-anxiety effect, however, is more visible in the first instance. Anxiety levels before yoga classes in the three measurements have also been compared, and the importance of diversifying the groups was determined with the use of nonparametric variance analysis (Friedman's test). Anxiety state level is highest in the survey conducted in the first week of systematic training, in the next two it is similar. Anxi-

ety state level after the training in the three measurements does not differ significantly.

Three indicators of change in anxiety level have been calculated by deducting the result of the measurement after classes from the result of the measurement before classes (the positive value of the indicator proves psychological profits expressed in the decrease in anxiety level). The values of the change indicator in the first week of the practice would fluctuate between -1 and 23 ( $M=9.58$   $SD=7.54$ ), after three months between -7 and 12 ( $M=4.00$ ;  $SD=5.20$ ), after six months between -5 and 14 ( $M=4.33$   $SD=5.29$ ). The relations of these indicators with the mood state indicators and with the permanent traits of the individual were determined with the use of Spearman's correlation coefficient  $r$ . The improvement of the psychological state expressed in a decrease in anxiety level in the first week of the practice correlates significantly with anxiety level before the training ( $r=0.809$ ,  $p<0.01$ ), with an increase of tension ( $r=0.691$ ,  $p<0.05$ ), depression ( $r=0.712$ ,  $p<0.01$ ), and embarrassment ( $r=0.884$ ,  $p<0.01$ ) in the period directly preceding systematic yoga training. The higher was the anxiety level before classes and the intensity of three negative psychological states during the week preceding the measurement, the greater was the decrease of anxiety. No essential correlations were noted between the change indicator and the permanent psychological traits of an individual.

The change in anxiety level after one-time physical exercises during the second measurement (after three months of systematic training), however, revealed significant correlations with openness to experience ( $r=0.870$ ,  $p<0.01$ ) and the sense of comprehensibility ( $r=0.685$ ,  $p<0.05$ ).

In the third measurement the change in anxiety level correlates with the sense of comprehensibility ( $r=0.787$ ,  $p<0.01$ ). It should be stressed, that in many cases the correlation coefficients were moderately high, but they would not reach the level of statistical significance because of the little size of the group.

Significant predictors of change in anxiety level were also searched for. In order to find them a regression analysis was conducted with the use of step-by-step method, introducing change indicators as the dependent variable, and as independent variables – personality traits included in the Big Five Model, strategies of coping with stress, the components of the sense of coherence and the initial level of anxiety (before classes), as well as the intensity of moods in the period when measurement was conducted.

A significant predictor of change in anxiety level in the first week of the practice is the initial level of anxiety ( $\beta=0.594$ ;  $t=5.70$ ;  $p<0.001$ ) and the level of embarrassment ( $\beta=0.479$ ;  $t=4.59$ ;  $p<0.01$ ). The coefficient of determination reaches a high value ( $R^2=0.936$ ,  $F=74.37$ ,  $p<0.001$ ).

In the second measurement the change in anxiety level can be predicted on the basis of openness to new experience ( $\beta=-1.377$ ;  $t=5.39$ ;  $p<0.001$ ) and the tendency to deal with stress with the use of task strategy ( $\beta=0.782$ ;  $t=3.06$ ;  $p<0.02$ ). The value of the coefficient of determination is a little lower than in the first measurement, but also considerably high ( $R^2=0.772$ ,  $F=16.24$ ,  $p<0.01$ ).

No significant predictor of change in anxiety level was revealed in the third measurement.

## Discussion

The results of the research reveal an anti-anxiety effect of one-time 60 minutes' yoga classes. Simultaneously, they confirm the results of earlier research, in which a considerable decrease in anxiety level was observed after physical exercises. Most of the research, however, would trace changes taking place after moderately intensive exercises increasing oxygen intake (running, walking, cycling, aerobics, swimming) or after a longer period of practicing yoga (1).

Decrease in anxiety level is more visible in the first week than after three and six months of systematic training. This results from lower anxiety level before training in measurements conducted in the course of the programme. This fact can prove subjects' reduced tendency to react with anxiety in various situations. Unfortunately, the level of trait anxiety was not examined. Such a survey would allow for a verification of this conjecture. Former research results confirm a reduction of the general tendency in people participating in physical exercises' programmes to react with anxiety (1). People practicing yoga revealed a lower level of both state and trait anxiety in comparison to a control group (8).

Anxiety level after classes in all the three measurements does not differ significantly. Directly after yoga exercises the subjects would feel similarly, regardless of the initial anxiety level and the time that had passed from the beginning of the long-term training programme.

In the initial period the decrease in anxiety level is positively connected first and foremost with the mood state of the subjects – the intensity of negative emotional states during the week before the measurement. It corresponds with the regularity observed in previous research – individuals with anxiety and depression level above normal and with generally worse mood would derive more visible psychological profits from physical exercises (1).

After three months of systematic training personality correlates and determinants of decrease in anxiety level after classes become apparent. One can expect greater effects in people who are less open to new experiences. This is a surprising relation. People with lower openness to experience have conservative

views, their behaviour is conventional; their interests are pragmatic, they prefer that which is recognised and well-liked. And it is in these people that one should expect more profits expressed in a decrease in anxiety level after three months of the programme. The explanation can be as follows. People who are more open to experience, inclined toward experimentation, independent thinking and acting, experienced a considerable decrease in anxiety level already in the initial period of the programme. After three months of systematic training their tendency to react with anxiety was considerably reduced, and so the possibility of decrease in anxiety level after classes was limited. In people less inclined to enthusiastic reception of a new form of activity, who treated the classes with reserve, anti-anxiety effects would intensify in the course of the programme.

The change in anxiety level in the course of the programme is also positively connected with the sense of comprehensibility, that is with the ability to judge reality as reasonable, organized, coherent and clear. After a longer period of practice greater emotional profits are derived by those people who perceive the world around them as comprehensible, organized and predictable. The question of relation directions between variables should be clarified in future research. Systematic yoga practice, which is not limited to performing asanas, but includes application of ethical, and especially self-educational recommendations, can lead to developing specific personality traits.

Decrease in anxiety level after yoga training results from their relaxing character, they lead to muscle relaxation and through that to the reduction of psychological tension (15). Free regulation of respiration forms, which accompanies asanas, constitutes a recognised strategy of reducing tension connected with stress. Concentrating on body-positioning and breathing may distract one's attention from the source of stress (16). Yoga exercises can also increase one's conviction about their own effectiveness, as they can observe a systematic improvement of their physical fitness, especially in suppleness (4, 6).

The results of the research allow for drawing the following conclusions:

1. One-time yoga training lead to a considerable decrease in anxiety level in young women who had led a sedentary life, and it is greatest in the initial period of the practice.
2. In the initial period of the practice the change of anxiety is conditioned by the current emotional state

of the subject, a greater decrease can be expected in people with worse initial mood state.

3. After a few months of systematic training anxiety changes are connected with women's permanent psychological traits.

## References

1. Leith LM. Foundations of Exercise and Mental Health. Morgantown: Fitness Information Technology, 1994.
2. Michalska M. Wpływ ćwiczeń hathajogi na integracyjny komponent zdrowia. *Wych Fiz Zdr* 2004; 3: 10-13.
3. Kulmatycki L. Joga dla zdrowia. Podręcznik ćwiczeń. Warszawa: KiW, 1997.
4. Kulmatycki L. Trening relaksacyjny jogi i jego recepcja. Wrocław: Wyd. AWF, 1997.
5. Purna S. Joga dla ciała i umysłu. Warszawa: COMES, 1996.
6. Górna J, Ortenburger D. Wpływ ćwiczeń jogi na wybrane aspekty funkcjonowania psychofizycznego i radzenia sobie. In: Szopa J. ed. Joga dla zdrowia. Częstochowa: Wyd. Politechniki Częstochowskiej, 2004: 85-92.
7. Rostad FG, Long BC. Exercise as a coping strategy for stress: A review. *Int J Sport Psychol* 1996; 27: 197-222.
8. Siek S, Kowalski J, Terelak J. et al. The influence of practising yoga on the dimensions of anxiety and aggression. *Biol of Sport* 1986; 3: 207-13.
9. Siek S, Terelak J, Konaszyc A. et al. Wpływ uprawiania jogi na funkcjonowanie pamięci i uwagi. *Med Lot* 1986; 90: 23-8.
10. Wrześniewski K, Sosnowski T. Inwentarz Stanu i Cechy Lęku (ISCL). Podręcznik. Warszawa: Pracownia Testów Psychologicznych PTP, 1987.
11. Dudek B, Koniarek J. Adaptacja Testu D.M. McNaira, M. Lorra i L.F. Dropplemana – Profile of Mood States (POMS). *Przeł Psychol* 1987; 3: 753-62.
12. Zawadzki B, Strelau J, Szczepaniak P. et al. Inwentarz Osobowości NEO-FFI Costy i McCrae. Adaptacja polska. Podręcznik. Warszawa: Pracownia Testów Psychologicznych PTP, 1998.
13. Szczepaniak P, Strelau J, Wrześniewski K. Diagnostyka stylów radzenia sobie ze stresem za pomocą polskiej wersji kwestionariusza CISS Endlera i Parkera. *Przeł Psychol* 1996; 39: 187-210.
14. Koniarek J, Dudek B, Makowska Z. Kwestionariusz Orientacji Życiowej. Adaptacja The Sense of Coherence Questionnaire (SOC) A. Antonovsky'ego. *Przeł Psychol* 1993; 36: 491-502.
15. Votava J. Joga i EMG – podobieństwa i różnice. *Post Rehab* 1988; 2: 47-54.
16. Everly GS, Rosenfeld R. Stres. Przyczyny, terapia i autoterapia. Warszawa: PWN, 1992.

Received: July 28, 2005

Accepted: July 12, 2006

Published: August 08, 2006

Address for correspondence:

Monika Guszowska

Arki Bożka St. 8/39

01-464 Warsaw, Poland

Tel: (22) 664 19 94

606 392161

E-mail: mguszowska@wp.pl