

## Gender differences in competitive anxiety and coping strategies within junior handball national team

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### Abstract

Competitive anxiety is related to athletes' performance. Due to this, it is important to maintain it on an optimal level. While anxiety has a well-studied gender difference that is related to the opposite patterns of activity in left parietal and temporal lobes, dorsomedial prefrontal cortex, cerebellum, and occipital gyrus, gender differences in competitive anxiety and its factors are not fully investigated. Exploratory research of competitive anxiety and coping strategies in Ukrainian junior handball national team was conducted. Participants of the study are 35 adolescences with mean age 15.63 and standard deviation equal to 0.49. 13 participants were male, while 22 participants were female. Participants completed Ways of Coping Questionnaire, which was developed by Folkman & Lazarus in 1988 and adopted by Bityutskaya in 2015, and Sport Competition Anxiety Test, which was developed by Martens in 1977 and adopted by Hanin in 1982. Female athletes have significantly higher scores on both Competitive Anxiety and Accepting Responsibility scale with  $p=0.007$  and  $p=0.006$  respectively. Cohen's  $d$  was 0.47 for both tests. Spearman correlation test revealed moderate correlation  $r = 0.39$  with  $p = 0.02$  for the whole sample. Thus, accepting responsibility coping strategy is associated with increased competition anxiety in Ukrainian athletes. Both accepting responsibility coping and competitive anxiety level is gender biased.

**Keywords:** competitive anxiety, coping, gender, adolescent athletes

### Introduction

Anxiety and fear of competition are forbidden among athletes. Nevertheless, it plays an important role in the prevention of injuries and success. It is one of the reasons for leaving the sport after receiving injuries (Laver et al., 2018). It was assumed that emotionally unstable persons with high levels of neuroticism quickly give up sports activities due to inability to team games (Tukaiev et al, 2017). Football can be an effective way to improve the psycho-emotional state for schoolchildren with mental disorders. (Imaset al, 2018). An ability to deal with anxiety is one of the important skills for successful handball team (Silva, 2006). While it is an important trait, it is a personality trait with gender differences and clear biological mechanisms.

The research was conducted in a competitive period on the 54 highly skilled male sportsmen aged of 19-24 years old specialized 5-8 years in running on 100 m (19 sportsmen), on 800 m (15 sportsmen) and on 5000 m (16 sportsmen). To evaluate physiological reactivity of CRS we have used a progressively increasing hypoxic and hypercapnic stimulation in the rest and have determined characteristic of functional fitness of the athlete. To analyze the reaction CRS on physical loadings we used the complex of the testing loadings, allowing to estimate aerobic and anaerobic opportunities of a sportsman's organism. The manifestation of work capacity in athletes (treadmill LE 200 CE) and cardiorespiratory response ("Oxycon Pro", Jager), the acid-base balance of blood (Dr Lange LP 400) to the maximum and standard physical loads were studied. Women's proneness to anxiety disorder may be based on specific brain functioning. Asher, Asnaani, & Aderka (2017) revealed a higher prevalence and severity of social anxiety disorder (SAD) among women within different age groups and regions. Despite this, men more often seek help and receive treatment (Asher, Asnaani, & Aderka, 2017). Seo et al. (2016) revealed differences in brain-functioning that are related to stress-induced anxiety. According to the study, stress-related anxiety has a positive association with activity in the dorsomedial prefrontal cortex (dmPFC),

temporal lobe, precuneus, occipital lobe, and cerebellum among women. In contrast, stress-related anxiety has an opposite association with the activity of these regions in men that allowed Seo et al. (2016) to predict brain functioning based on anxiety. Personality traits moderate relationships between serotonin transporter polymorphisms and anxiety symptoms in elite athletes.

Genes that define the functioning of the serotonin transporter (5HTT) define anxiety-related traits that have an influence on sports performance. Petito et al. (2016) found that the 5-HTT-linked polymorphic region (5-HTTLPR) is related to Neuroticism and anxiety symptoms. While Neuroticism correlates with symptoms of anxiety and depression, it is a mediator between 5-HTTLPR polymorphism and skills of emotional arousal control and cognitive anxiety (Petito et al., 2016). According to Kristjánsdóttir et al. (2018), emotional control as a part of mental toughness distinguishes starters from non-starters in Iceland handball national team. Massuça, Fragoso, & Teles, (2014). In addition, anxiety trait defines the confidence of the person in the competition. Goette et al. (2015) measured competitiveness as a readiness to participate in the competition under stressful conditions. The study revealed that individuals low in anxiety prefer competition to a lottery in stress condition, while individual high in anxiety was more prone to participate in the lottery (Goette et al., 2015). According to Rocha & Osório (2018), competitive anxiety in sport correlates with anxiety trait. It is also related to demographic characteristics and sport setting.

Like the anxiety trait, competitive anxiety is more widespread among women and manifests in cognitive and somatic symptoms. While competitive anxiety includes somatic and cognitive domains, Rocha & Osório (2018) revealed that athletes, who are female and younger, have a higher competitive anxiety score. While the difference between male and older athletes is not big, less experienced athletes experience higher competitive anxiety (Rocha & Osório, 2018). In addition, no difference was revealed between athletes with different competitive levels (Rocha & Osório, 2018). Higher competitive anxiety among athletes engaged in individual sport explains the negative impact of competitive anxiety on the powerlifting athletes' performance (Judge et al., 2016). Similarly, adolescent swimmers' performance is related to their competitive anxiety score (Verdaguer, Abad, & Mas, 2016). However, there is no difference in anxiety between more and less successful Portuguese female national handball players (Massuça, & Fragoso, 2013). In contrast, competitive anxiety trait negatively correlated with female soccer team performance (Singh et al., 2017). Psychological factors of competitive anxiety are related to coping strategies.

Several coping strategies affect competitive anxiety. Thomas, Cassady, & Heller (2017) revealed that cognitive test anxiety has positive correlations with avoidance and socially-focused coping. According to Garnefski & Kraaij (2016), catastrophising and other-blame cognitive emotion regulation strategies are associated with anxiety symptoms. While there are no gender differences in relationships of cognitive emotion regulation strategies with anxiety, self-blame is linked to depression symptoms in women (Garnefski & Kraaij, 2016). Kurimay, Pope-Rhodus, & Kondric, (2017) identified that table tennis players with higher competitive anxiety experience higher levels of behaviour disengagement and denial.

## Materials and Methods

### *Participants*

Members of junior handball national team were asked to participate in the study with the consent of coach. Participants of the study are 35 adolescences with mean age 15.63 (SD = 0.49). Thirteen participants were male, while 22 participants were female. The study was conducted as a part of complex health examination.

### *Instruments*

*Ways of Coping Questionnaire.* Russian version of Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988), which was developed by Bityutskaya (2015), was used to collect data about coping strategies. The questionnaire includes 66 items, which indicate coping methods. With a Likert-type scale from 0 (never) to 3 (most often use), participants indicated the frequency of a coping strategy's use. Items are divided between nine scales, which correspond to Confrontive Coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, Planful Problem-Solving, Positive Reappraisal, Wishful Thinking (Bityutskaya, 2015). Wishful Thinking scale was not considered into the analysis as it was excluded from the English version of WCQ (Folkman et al., 1986). Cronbach's alpha for the Russian version of WCQ is .870 (Bityutskaya, 2015)

*Sport Competition Anxiety Test.* Russian version of Sports Competition Anxiety Test (SCAT) (Martens, 1977), which was adopted by Hanin (1982), was used for evaluation of the competitive anxiety trait. The scale includes 15 items with three answers corresponding to the frequency of the described state experiencing. The final score varies between 10 (very low) and 30 (very high) points. Due to this, scale predicts situational competitive anxiety. Hanin (1982) reports higher scores in females compared to males athletes. Cronbach's alpha for the Russian version of SCAT is varied from .75 in a female sample to .83 in a male sample (Hanin, 1982).

### *Procedure*

The Handball Federation of Ukraine ordered the study in the Scientific Research Institute of the National University of Physical Education and Sports of Ukraine. Informed consent was obtained from the

parents of each participant before administration of questionnaires. Questionnaires were presented with a software-hardware complex of psychological and psychophysiological diagnostics "BOS-TEST-Professional". The complex automatically scored results and did not provide Cronbach's alpha meaning. The results of the study were provided to the coach and front office of the Handball Federation of Ukraine. R Studio was used to calculate descriptive statistics and perform correlation and regression analysis of the data.

## Results

### Descriptive Statistics

Mean scores were in the sample were 8.74 (SD = 2.50) for Confrontive Coping, 8.22 (SD = 2.98) for Distancing, 13.63 (SD = 2.67) for Self-Controlling, 11.23 (SD = 3.22) for Seeking Social Support, 7.94 (SD = 1.93) for Accepting Responsibility, 9.86 (SD = 3.52) for Escape-Avoidance, 12.49 (SD = 2.97) Planful Problem-Solving, 13.49 (SD = 3.15) for Positive Reappraisal, and 19.02 (SD = 4.20) for SCAT (Table 1).

**Table 1. Mean and Standard Deviations for WCQ and SCAT**

	Sample		Female		Male	
	Mean	SD	Mean	SD	Mean	SD
Confrontive Coping	8.74	2.50	8.64	2.44	8.92	2.69
Distancing	8.22	2.98	7.64	3.09	9.23	2.59
Self-Controlling	13.63	2.67	13.55	2.48	13.77	3.06
Seeking Social Support	11.23	3.22	11.45	3.71	10.85	2.23
Accepting Responsibility	7.94	1.93	8.64	1.92	6.77	1.36
Escape-Avoidance	9.86	3.52	10.59	3.52	8.62	3.25
Planful Problem-Solving	12.49	2.97	12.40	2.61	12.62	3.62
Positive Reappraisal	13.49	3.15	14.04	3.43	12.54	2.44s
SCAT	19.02	4.20	20.55	3.63	16.46	3.95

### Gender Difference Evaluation

T-test was performed to evaluate the between-group difference in coping strategies and competitive anxiety. Although the sample is too small for parametric test performance, the Wilcoxon test was impossible to conduct due to the repetition of observation meanings. Female athletes have significantly higher scores on both SCAT and Accepting Responsibility scale of WCQ with  $p=0.007$  and  $p=0.006$  respectively (Table 2). Cohen's  $d$  was 0.47 for both tests. Female athletes scored 20.55 with  $SD = 3.63$  on SCAT and 8.6 with  $SD = 1.92$  on Accepting Responsibility scale. Male athletes received mean score 16.46 with  $SD = 3.95$  on SCAT and 6.8 with  $SD = 1.36$  on Accepting Responsibility scale. There were no gender differences in other scopes of WCQ.

**Table 2. Gender Differences in Coping Strategies and Competitive Anxiety**

	t	95 CI	p-value
Confrontive Coping	0.32	-1.59; 2.17	.756
Distancing	1.64	-0.40; 3.59	.113
Self-Controlling	0.22	-1.85; 2.30	0.825
Seeking Social Support	-0.60	-2.65; 1.44	0.549
Accepting Responsibility	-3.35	-3.00; -0.73	0.002
Escape-Avoidance	-1.68	-4.38; 0.43	0.104
Planful Problem-Solving	0.18	-2.19; 2.60	0.859
Positive Reappraisal	-1.51	-3.54; 0.52	0.14
SCAT	-3.04	-6.86; -1.31	.006

### Linear Regression

Spearman correlation test revealed moderate between SCAT scores and Accepting responsibility coping correlation  $r = 0.39$  with  $p = 0.02$  for the whole sample. No other correlations were revealed. The linear least square regression was conducted to test causal relationships between competitive anxiety and self-blame. SCAT scores were the independent variable while Accepting Responsibility scale was a dependent variable. The

obtained model was significant with F-statistic = 5.19 and p-value = 0.021. Adjusted R-squared was 0.13. Accepting Responsibility coefficient was 0.845 with p-value = 0.02. Although the model is significant, it explains a small part of the variance. A model with gender as an independent variable provided has a better predictive power (Table 3).

**Table 3. Regression Analysis Results for SCAT Scores as Dependent Variable**

Independent variable		B	Std. Error	t-value	p	Adjusted R-Square
Accepting Responsibility	IV	0.845	0.348	2.431	0.02	0.13
	Intercept	12.317	2.84	4.338	<.000	
Gender	IV	4.084	1.313	3.111	0.004	0.20
	Intercept	12.378	2.230	5.551	<.000	

**IV – independent variable**

### Discussion

The results of the study are in line with previous research. While women are more prone to anxiety disorders and are higher in Neuroticism, female brain functions differently under stress conditions (Asher, Asnaani, & Aderka, 2017; Seo et al. 2017). This together with the genetic difference in serotonin transporter may explain revealed gender difference in competitive anxiety. Due to this, different norms should be applied for evaluation of the anxiety level for men and women. Further investigation of the relationships of competitive anxiety with a performance for the establishment of the optimal anxiety level with regard to coping skills. In addition to the difference in competitive anxiety, Ukrainian junior national handball team players exhibited gender differences in coping strategies.

Adolescent female players were more prone to use of Accepting Responsibility coping strategy comparing to men. While Garnefski&Kraaij, (2016) described an association between self-blame and depressive symptoms in women, they did not found an association of this coping strategy with anxiety. Accepting Responsibility scale of WCQ, by which female athletes received higher scores compared with male athletes, corresponds to Self-Blame scale of the earlier version of WCQ (Bityutskaya, 2015). Due to this, women are more prone to self-blame comparing to men. The correlation between SCAT scores and Accepting Responsibility scale allows the assumption of causal relationships between these two traits.

Linear regression was applied to test causal relationships between competitive anxiety and self-blame. Although gender differences are revealed in both SCAT scores and Accepting Responsibility scores, linear regression that Accepting Responsibility has a meaningful impact on competitive anxiety. The model with gender as an independent variable provides has better predictive power and explain 20% of dispersion. However, the study includes a small group of participants with 22 female participants. Due to this, a higher number of participants is needed to estimate relationships between coping strategies and competitive anxiety.

### Conclusions

Results confirm the existence of the gender difference in competitive anxiety and coping strategies. The difference in SCAT scores can be related to the difference in brain functioning, have a genetic predisposition. Although evidence about the impact of the competitive anxiety on efficiency in sport is not consistent, its high level has a negative impact on the athletes' performance. While competitive anxiety correlates with Accepting Responsibility scale of WCQ, the last is worse in predicting competitive anxiety comparing with gender variable. Due to this, the hypothesis about causal relationships between coping strategies and anxiety is rejected.

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### Contributions

All authors contributed equally to this work, read and approved the final manuscript. Author contributions: D.I., S.T., S.V., I.K. and Y.P. conceptualized the overall project; D.I., S.T., Y.P. and S.F. designed research; D.I., S.F., Y.P. and O.I. conducted studies, collected the data, performed data analysis; D.I., S.F., Y.P., O.B., O.I., I.K., V.M., and S.T. wrote and edited the manuscript.

### Conflicts of interest

The authors declare that they have no competing interests.

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