Relations of Competitive State Anxiety and Efficacy of Young Volleyball Players

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A B S T R A C T

With the aim of validating the Competitive State Anxiety Inventory on a population of young Croatian volleyball players, 286 examinees, 106 male and 180 female volleyball players (average age of 16.09±1.83), filled out the CSAI-2, constructed by Martens, Vealey, Burton, Bump and Smith (1990)[1]. Given the fact that all scales of the Competitive State Anxiety Inventory have good homogeneity, reliability and sensitivity, it can be concluded that they represent high-quality measuring instruments for measuring psychological characteristics of young volleyball players. Young male and female volleyball players generally have a moderate level of self-confidence, and their cognitive anxiety is more prominent that somatic anxiety. In order to determine the age and gender differences in somatic and cognitive anxiety and self-confidence, parametric analysis of differences was performed and coefficients of the independent samples t-test were calculated. By analysis of differences according to age, it has been established that female junior players, in relation to female youth players, express a significantly lower level of somatic and cognitive anxiety and a significantly higher level of self-confidence. As opposed to female players, male youth and junior players do not differ in any of the analysed variables. By analysis of differences according to gender, it has been established that male youth players have a significantly higher level of self-confidence in comparison to female youth players. No significant differences were found in the level of competitive anxiety and self-confidence by analysis of variance between different player roles. No significant differences were found by discriminant analysis in somatic and cognitive anxiety, and self-confidence of female volleyball players of different situational efficacy. The group of least efficient male volleyball players is characterized by a very low level of self-confidence, while the most efficient group of volleyball players is characterized by a somewhat lower level of cognitive and somatic anxiety.

Key words: age differences, anxiety, confidence, gender differences, volleyball

Introduction

Athletes' mental or psychological skills have always been a subject of interest for sports researchers and sports practitioners. Researchers have always been interested in relations of athletes' psychological characteristics and their sports results (achievements, quality of sports performance or presentation, medals won and winning or losing a sports match). In sports practice, extraordinary sports achievements or, on the other hand, unexpectedly poor achievements, have often been attributed to athletes' psychological characteristics.

Athletes who participate in competitive sports invariably have to deal with a great deal of pressure. This pressure is most often associated with elevated levels of stress and anxiety[2].

Graham-Jones & Hardy (1990)[3] defined stress as a state in which some demand is placed on the individual, who is then required to react in some way to be able to cope with the situation. Anxiety is generally accepted as being an unpleasant emotion. State anxiety is the individual's response to a specific threatening situation. Trait anxiety is a *general* disposition to respond to a variety of situations with high levels of state anxiety.

Multidimensional anxiety theory[4] hypothesizes that the antecedents of cognitive and somatic anxiety are different and that these anxiety components are differentially related to performance. More specifically, cognitive anxiety is hypothesized to have a negative linear relationship with performance. Somatic anxiety is hypothe-

sized to have a quadratic (inverted-U-shaped) relationship with performance, whereby performance is expected to be optimal at moderate levels of somatic anxiety. Moreover, self-confidence is hypothesized to have a positive linear relationship with sports performance[5-8]. Apart from that, a relationship has been established between higher levels of self-confidence and positive perceptions of arousal and anxiety[9]. Martens et al. (1990)[1] constructed the CSAI-2 (Competitive State Anxiety Inventory-2). CSAI-2 is a sport-specific, multidimensional inventory of state anxiety which measures the intensity of cognitive and somatic anxiety, as well as self-confidence. Good metric characteristics of the questionnaire have been confirmed in research studies conducted among athletes from different sports[4,10].

Researchers who have investigated the area of competitive state anxiety have, to a lesser extent, dealt with gender differences in the level and direction of competitive state anxiety. In volleyball, Bekiari et al. (2006)[11], compared 98 male and 110 female volleyball players and found higher values of somatic anxiety in male volleyball players, but there were no significant differences between the genders in other components. Esfahami & Soflu (2010)[12], using a sample of 82 female and 88 male university volleyball players, established significant gender differences in all competitive state anxiety components. Female volleyball players, in comparison to male volleyball players, expressed a significantly higher level of somatic and cognitive anxiety component, as well as self-confidence.

Most research studies of sports anxiety[7,13–16], have analyzed the relation of the anxiety components and sports efficacy. Thus, for example, Jones et al. (1994)[17], by analyzing the differences between 97 elite and 114 non-elite swimmers, have not found any significant differences in the level of cognitive and somatic competitive state anxiety. Elite swimmers, in comparison to non-elite swimmers, considered anxiety symptoms to be more stimulating. On a sample of 91 football players, swimmers and track and field athletes, Wigins & Brustad (1996)[18] established that athletes with a more positive direction of competitive state anxiety expect better competitive performance. On a sample of 37 female and 47 male university volleyball players who had played 3 matches, Alexander & Krane (1996)[19] found no significant relations of the trait anxiety level a few days before the match and of the state anxiety components just before the 1st match. The level of cognitive state anxiety component in all three matches was a significant predictor of state self-confidence. As opposed to the results obtained in some previous studies, no significant relation was found between the precompetitive somatic anxiety component or perceived team efficacy and precompetitive self-confidence. The hypothesis stating that previous performance and expected team performance would be predictors of cognitive and somatic state anxiety before the next match was confirmed. Poor performance in the previous match had caused a higher level of state anxiety for the next match. Woodman & Hardy (2003)[5] have determined that cogni-

tive anxiety has a significantly higher negative impact on sports performance in male athletes in comparison to female athletes, with the negative impact of this component also being significantly higher in competitions of higher quality and importance. Self-confidence also had a significantly higher positive impact on sports performance in male athletes in competitions of higher quality level. Craft et al. (2003)[20] found no significant relation between cognitive anxiety and sports performance, while the relation between somatic anxiety and sports performance was small, negative and not statistically significant.

Very few research studies analyzing precompetitive anxiety of volleyball players have been conducted in Croatia[21,22]. These research studies were conducted on a relatively small subject sample, by using the abbreviated version of the questionnaire assessing competitive state anxiety and by analysing precompetitive anxiety of female volleyball players of different situational efficacy. In the available literature, the authors have not found any research studies which have analysed gender, age and positional differences in state anxiety of Croatian male and female volleyball players. In order to conduct these types of research studies in Croatia, the Competitive State Anxiety Inventory (CSAI-2) must be validated on a larger sample of male and female volleyball players. Therefore, the main goal of this research is to validate the Competitive State Anxiety Inventory on a larger sample of male and female volleyball players and to use this questionnaire to determine gender, age and positional differences, as well as differences in situational efficacy of male and female young volleyball players in competitive state anxiety.

Methods

Study subjects

The subject sample consisted of 286 male and female young volleyball players from clubs all over Croatia, members of the teams which competed in the Croatian championship competitions, average aged 16.09±1.83. The sample included 180 female and 106 male volleyball players. The target group was represented by young players whose teams have won the right to perform in the final tournament of Croatian Championship for their age category, due to their volleyball quality within the Croatian population of young players. Besides them, members of volleyball teams which have not qualified for the final CH tournament were also included in the research.

Instruments

The measurement of psychological characteristics of the examinees (anxiety and self-confidence) was performed by applying the Competitive State Anxiety Inventory – 2 (hereafter the CSAI-2), constructed by Martens, Vealey, Burton, Bump and Smith (1990)[1]. The inventory consists of 27 items measuring: somatic anxiety (percep-

tion of personal physiological reactions in competitive situations); cognitive anxiety (fear of negative social evaluation, fear of failure and loss of self-esteem) and self-confidence (belief or degree of certainty individuals possess about their ability to be successful in sport). First, the inventory was translated, and then each item was agreed on by three volleyball experts. Then, it was applied on a small sample of young volleyball players of both genders, with the primary purpose of testing the content validity of its items. The item which has been marked as less understandable or not fully applicable in the volleyball context by any male or female volleyball player was discussed again by the expert team. Besides measuring anxiety and self-confidence, other important data about volleyball players was collected: gender of the examinees, examinees' date of birth for precisely determining the age category of playing volleyball, player position most frequently played in the team (setter, opposite player, passer-hitter, midlle blocker, and libero player), and individual player efficacy index was calculated as a measure of efficacy of each examinee.

The individual player efficacy index represents a combination of two different efficacy criteria: the first one being the categorization of the examinee's general importance for the team given by the coach of that team, and the second one being team efficacy of the examinee's team in the 2011 Croatian Championship in each age category. Coaches assessed individual efficacy (value) of each examinee in their team by categorizing 3 to 4 of their players into two categories of importance for the team: a) most efficient players – most efficient players and more important members of the first line-up, and b) least efficient players – those who are members of the team, but rarely or never play. The other players from the team, who had not been mentioned by the coach in either category, were »assigned« to the third category – the category of players of mediocre efficacy (value). Regardless of the efficacy level of the team, the members of national teams in the youth age category were categorized by the highest individual player efficacy index. The higher the index assigned to a player, of numerical values between 2 and 5, the higher the level of achievement of his/her team in the national championship, and, in turn, the higher the player's importance in comparison to his/her team-mates.

Data analysis

The testing was conducted mostly during final tournaments of the Croatian Championship in the youth and junior age category for both genders, by group testing before the first match of the tournament. The other examinees, players of the teams which did not qualify for the final CH tournament, were measured later in their clubs.

Basic metric characteristics were determined to validate the translated Competitive State Anxiety Inventory: homogeneity (by analyzing the principal components of items in each scale); reliability (by calculating the Cronbach's alpha, and ICC Consistency coefficients), and sensitivity (by calculating the Kolmogorov-Smirnov test, distribution normality, and coefficients of Skewness and Kurtosis). In order to determine possible differences in somatic and cognitive anxiety and self-confidence according to age and gender, parametric analysis of differences was performed and coefficients of the independent samples t-test were calculated. Differences in the level of anxiety and self-confidence between the examinees with different player roles were tested by One-way ANOVA. In order to determine the differences in the level of anxiety and self-confidence between groups of players with different individual player efficacy indices, discriminant analysis procedure was performed.

Results and Discussion

In order to enable the use of results of the measurement of psychological characteristics of competitive state anxiety and self-confidence in the present research, validation of metric characteristics of CSAI-2 scales was conducted.

Basic metric characteristics of validated scales of the CSAI-2 are presented in Table 1. The scales of cognitive and somatic anxiety are inverted in relation to the self-confidence scale, and a lower result in those scales represents a more desirable result. The CSAI-2 scale of cognitive anxiety has good homogeneity because all the items were projected on a single component which explains 49.85% of the common variance. The scale has good reliability (Cronbach's alpha coefficient is 0.87, and ICC coefficient is 0.43). The items that were most saturated by the extracted component are: *I am concerned about performing poorly,* and *I am concerned I may not do*

TABLE 1
MEANS AND METRIC CHARACTERISTICS OF THE CSAI-2 SCALES

Variable	M	SD	Cronbach's Alpha	ICC Consistency	% VAR	D* (K-S test)	MIN	MAX	SKEW	KURT
Cognitive anxiety	2.77	0.80	0.87	0.43	49.85	0.08	1.00	5.00	0.37	–0.15
Somatic anxiety	2.21	0.87	0.84	0.36	57.63	0.11*	1.00	5.00	0.56	–0.42
Self-confidence	3.29	0.72	0.86	0.41	48.62	0.06	1.00	5.00	–0.26	0.20

M – mean; SD – standard deviation; Cronbach's Alpha – coefficient of internal consistency; ICC Consistency – consistency coefficient of ICC internal consistency type; % VAR – percentage of the explained variance; D (K-S test) – coefficient of the Kolmogorov-Smirnov test; * – the level of significance of the K-S test coefficient; MIN – minimum result; MAX – maximum result; SKEW – measure of distribution asymmetry; KURT – measure of distribution shape

TABLE 2
DIFFERENCES OF THE CSAI-2 RESULTS ACCORDING TO THE GENDER AND AGE OF THE EXAMINEES

Variable	Female youth players (N=105)		Male youth players (N=51)		Gender differences	
	M	SD	M	SD	t-test	p
Cognitive anxiety	2.96	0.81	2.79	0.76	1.25	0.21
Somatic anxiety	2.42	0.96	2.22	0.89	1.21	0.23
Self-confidence	3.09	0.74	3.45	0.74	–2.80**	0.006

Variable	Female junior players (N=75)		Male junior players (N=55)		Gender differences	
	M	SD	M	SD	t-test	p
Cognitive anxiety	2.58	0.69	2.66	0.92	–0.51	0.61
Somatic anxiety	2.00	0.64	2.11	0.87	–0.83	0.41
Self-confidence	3.39	0.60	3.42	0.76	–0.26	0.80

	t-test	p	t-test	p		
Differences according to the date of birth	3.28***	0.001	0.80	0.42		
	3.26***	0.001	0.62	0.54		
	–2.86**	0.005	0.18	0.86		

M – mean; SD – standard deviation; t-test – coefficient of the independent samples t-test; p= level of statistical significance; ** – statistically significant at the level of p<0.01; *** – statistically significant at the level of p<0.001.

as well in this competition as I could. The CSAI-2 scale of *somatic anxiety* has good reliability (Cronbach's alpha coefficient is 0.84, and ICC coefficient is 0.36) and homogeneity, while the single extracted component explains 57.63% of the common variance. The items that were most saturated by the extracted component are: *My body feels tense*, and *I feel tense in my stomach*. The CSAI-2 scale of *self-confidence* has good reliability (Cronbach's alpha coefficient is 0.86) and homogeneity, and the single component explains 48.62% of the common variance. The items that were most saturated by the extracted component are: *I feel secure*, and *I feel self-confident*.

Only the scale of somatic anxiety has questionable sensitivity because the value of Kolmogorov-Smirnov test exceeds the threshold value, indicating that the distribution of results deviates from normal distribution. However, by calculating the coefficients of distribution asymmetry and kurtosis, it has been established that the deviation from normal distribution in the scale of somatic anxiety is not great (coefficients are lower than ± 1.00), so parametric statistical procedures were used for the validated CSAI-2 scales in further statistical data analysis. Validated scales of the translated CSAI-2 represent quality measuring instruments for measuring psychological characteristics of young volleyball players.

Mean of the cognitive anxiety variable (2.77) is discernibly higher than the mean of somatic anxiety (2.21), but this difference has not been statistically tested in the overall subject sample. The result on the self-confidence scale (3.29) is expressed on the level of average of the cognitive anxiety scale (if the mean of this variable of 2.77 is inverted, a »positive« value of 3.33 is obtained). None of the three measured psychological characteristics of young

male and female volleyball players was expressed on a high level. Young male volleyball players generally have a moderate level of self-confidence, while their cognitive anxiety is more prominent than somatic anxiety.

In order to determine possible differences between younger (youth) and somewhat older (junior) male and female volleyball players, parametric analysis of differences was conducted and coefficients of the independent samples t-test were calculated. Also, differences between the genders in terms of prominence of the measured psychological characteristics were tested by the same test. All the results are shown in Table 2.

By comparing the results of volleyball players according to their gender, it has been established that male and female (junior) volleyball players do not differ significantly in any of the measured variables, while male and female youth volleyball players differ only in the self-confidence variable. Self-confidence of male youth volleyball players is significantly higher than that of female volleyball players.

Previous research studies of gender differences in state anxiety in volleyball have not obtained consistent results. Bekiari et al. (2006)[11], by comparing 98 male and 110 female volleyball players, found higher values of somatic anxiety in male volleyball players, but there were no significant differences between the genders in other components. As opposed to them, Esfahami & Soflu (2010)[12], using a sample of 82 female and 88 male university volleyball players from Iran, established significant gender differences in all state anxiety components. Female volleyball players, in comparison to male volleyball players, expressed a significantly higher level of somatic and cognitive anxiety component, but also of self-confi-

TABLE 3
DIFFERENCES OF THE CSAI-2 RESULTS ACCORDING TO THE PLAYER POSITION OF THE EXAMINEES

	Female youth players (N=105)					
Player role	Cognitive anxiety		Somatic anxiety		Self-confidence	
	M	SD	M	SD	M	SD
Setter	2.91	0.71	2.25	1.01	2.95	0.73
Opposite player	2.96	0.93	2.35	1.02	3.12	0.81
Passer-hitter	2.91	0.84	2.44	0.87	3.02	0.75
Middle blocker	2.83	0.86	2.44	1.07	3.13	0.79
Libero player	3.27	0.64	2.60	0.94	3.29	0.64
ANOVA	F	p	F	p	F	p
	0.79	0.53	0.32	0.86	0.55	0.70
	Female junior players (N=75)					
Player role	Cognitive anxiety		Somatic anxiety		Self-confidence	
	M	SD	M	SD	M	SD
Setter	2.77	0.88	2.05	0.58	3.43	0.63
Opposite player	2.53	0.54	1.76	0.56	3.47	0.63
Passer – hitter	2.40	0.60	2.05	0.69	3.46	0.60
Middle blocker	2.49	0.65	2.00	0.57	3.34	0.66
Libero player	2.95	0.71	2.00	0.77	3.21	0.52
ANOVA	F	p	F	p	F	p
	1.70	0.16	0.31	0.87	0.41	0.80
	Male players (N=106)					
Player role	Cognitive anxiety		Somatic anxiety		Self-confidence	
	M	SD	M	SD	M	SD
Setter	2.64	0.97	2.23	0.94	3.52	0.80
Opposite player	2.53	0.63	1.95	0.84	3.54	0.67
Passer – hitter	2.73	0.81	2.09	0.90	3.49	0.79
Middle blocker	2.72	0.90	2.24	0.91	3.40	0.79
Libero player	3.16	0.90	2.39	0.81	3.12	0.54
ANOVA	F	p	F	p	F	p
	1.01	0.41	0.55	0.70	0.67	0.61

M – mean; SD – standard deviation; F – coefficient of one-way analysis of variance; p – level of statistical significance of the coefficients.

dence. The results of the present research which indicate that male and female volleyball players do not differ in separate components of anxiety and self-confidence (except for the higher level of self-confidence in male youth players in comparison to female youth players), further confirm the inconsistency of the gender differences results in the analyzed components of anxiety and self-confidence. Further research is needed in order to determine the factors that cause the inconsistency of the results.

Furthermore, no significant differences in competitive state anxiety and self-confidence were found between male youth and junior volleyball players, while differences were found in all three variables among female volleyball players of (youth and junior) different age categories. It has been established that female junior players, in comparison to female youth players, have a significantly lower level of somatic and cognitive anxiety, and a significantly higher level of self-confidence, and all differences are very highly expressed (p=0.005 and lower).

Less expressed somatic and cognitive anxiety and a higher level of self-confidence in female junior players in comparison to female youth players was expected and it can be explained by greater playing experience and a generally higher level of technical-tactical skills which are the consequence of a long-standing process of train-

TABLE 4
DISCRIMINANT ANALYSIS OF GROUPS OF FEMALE YOUTH PLAYERS WITH DIFFERENT INDIVIDUAL PLAYER EFFICACY INDICES
ACCORDING TO THE EXPRESSION LEVEL OF CSAI-2 MEASURES

Function	λ	Rc	Wilks' lambda	χ^2	df	p
1	0.07	0.26	0.90	11.22	6	0.08
2	0.04	0.19	0.96	4.01	2	0.14

	Structure matrix	
Variable	1	2
Cognitive anxiety	0.69	0.66
Somatic anxiety	0.92	0.14
Self-confidence	−0.83	0.26

Individual player efficacy index	Group centroids	
	1	2
2	0.27	0.15
3	0.00	−0.24
4+5	−0.41	0.15

	Individual player efficacy index					
Variable	Index 2 (N=43)		Index 3 (N=44)		Indices 4+5 (N=28)	
	M	SD	M	SD	M	SD
Cognitive anxiety	3.18	0.86	2.83	0.83	2.79	0.55
Somatic anxiety	2.66	0.94	2.39	1.05	2.02	0.70
Self-confidence	2.96	0.78	3.04	0.71	3.42	0.68

λ – Eigenvalue of discriminant function; Rc – coefficient of canonical correlation; Wilks' lambda –Wilks' lambda coefficient (Wλ) of discriminant function; χ^2 – significance test of discriminant function – χ^2-test; * – significance level of DF at $p<0.05$; df – degrees of freedom; p – level of statistical significance of DF (χ^2-test); M – mean; SD – standard deviation

ing and competing. Better performance of volleyball elements in training sessions probably has a positive influence on the self-confidence level of female junior players, and therefore on reducing cognitive and somatic anxiety as well. Also, a higher number of matches played probably contributes to the greater emotional stability and less expressed state anxiety. Although a similar trend of decreased somatic and cognitive anxiety and increased self--confidence with the transition from youth to junior age group can also be noticed in male volleyball players, no statistically significant differences were found in the analysed variables. This can be partly explained by a smaller subject sample, and it is probably, to some extent, a consequence of the specificity of the male subsample in which player experience and the level of technical-tactical skills do not have great impact on the level of somatic and cognitive anxiety and self-confidence.

Due to the fact that no significant differences between the age groups of male volleyball players were found in the present research, they can be considered members of the same population. As opposed to male players, there were significant differences between the two age groups among female volleyball players. Therefore, all further procedures of statistical analysis were conducted separately on three subsamples of subjects:

the overall sample of male volleyball players, and youth and junior subsamples of female volleyball players.

By analysis of variance, differences in the level of competitive state anxiety and self-confidence between the groups of subjects who have different player roles in their teams were tested, and the results are shown in Table 3.

It has been established that there were no significant differences between players who play different player roles in their teams regarding the level of competitive state anxiety and self-confidence.

By analysing the tasks which must be performed during a match by players in different positions, one can speculate about different levels of engagement to which these players are exposed. Setters must organize each attack with great precision, liberos and passer- hitters must also receive serves with high precision demands during the whole match, and opposite players must often win crucial points by spiking from very difficult situations. The results obtained indicate that male and female players in different player positions in volleyball have equal levels of somatic and cognitive anxiety and self--confidence. It can be assumed that positional differences are caused by some other factors, and not by the level of

TABLE 5
DISCRIMINANT ANALYSIS OF GROUPS OF FEMALE JUNIOR PLAYERS WITH DIFFERENT INDIVIDUAL PLAYER EFFICACY INDICES
ACCORDING TO THE EXPRESSION LEVEL OF CSAI-2 MEASURES

Function	λ	Rc	Wilks' lambda	χ^2	df	p
1	0.12	0.33	0.89	8.21	6	0.22
2	0.00	0.02	1.00	0.04	2	0.98

	Structure matrix	
Variable	1	2
Cognitive anxiety	0.45	0.01
Somatic anxiety	–0.54	0.10
Self-confidence	–0.14	–0.88

Individual player efficacy index	Group centroids	
	1	2
2+3	0.34	0.02
4	0.08	–0.04
5	–0.44	0.01

	Individual player efficacy index					
Variable	Indices 2+3 (N=31)		Index 4 (N=18)		Index 5 (N=26)	
	M	SD	M	SD	M	SD
Cognitive anxiety	2.69	0.73	2.61	0.79	2.45	0.57
Somatic anxiety	1.88	0.53	1.97	0.56	2.15	0.77
Self-confidence	3.35	0.63	3.41	0.51	3.42	0.65

λ – Eigenvalue of discriminant function; Rc – coefficient of canonical correlation; Wilks' lambda – Wilks' lambda coefficient (Wλ) of discriminant function; χ^2 – significance test of discriminant function – χ^2-test; * – significance level of DF at p<0.05; df – degrees of freedom; p – level of statistical significance of DF (χ^2-test); M – mean; SD – standard deviation.

anxiety and self-confidence. Results of previous research studies indicate that the specificities of different player positions are predominantly the consequence of differences in anthropometric characteristics[23–25], and, less frequently, of differences in certain motor abilities[26,27].

In order to determine possible differences in groups of female players and then in male volleyball players with different individual player efficacy indices, discriminant analysis was performed in three previously defined subsamples. Multivariate effect of the predictor set of measured psychological characteristics of competitive state anxiety and self-confidence, and the actual contribution of each variable in differentiating the groups of volleyball players with different individual player efficacy indices was determined by discriminant analysis. Even though it is also possible to perform the discriminant analysis procedure among groups of subjects of an uneven number, in all three subject subsamples two small groups of subjects were combined during analysis so that the results obtained could be better generalized. The obtained results are shown in Tables 4 to 6.

By performing multivariate discriminant analysis on the predictor set of variables of competitive state anxiety and self-confidence, and with the aim of differentiating the groups of female youth volleyball players with differ-

ent individual player efficacy indices, the existence of a statistically significant discriminant function has not been established. However, significance coefficient of the first discriminant function was very close to the statistical significance criterion (p=0.08). By increasing the number of female subjects in this subsample or »expanding« the predictor set of psychological characteristics in some future research, significant effect of differentiating groups of female players with different individual player efficacy indices might also be determined, so it is recommended for this to be done in some future research.

By performing discriminant analysis on a subsample of groups of female junior volleyball players with different individual player efficacy indices, the existence of statistically significant discriminant functions has not been established.

On the other hand, by performing discriminant analysis on a subsample of groups of male volleyball players with different individual player efficacy indices, the existence of one statistically significant discriminant function has been established (p=0.042). This function discriminates players with lower individual player efficacy indices from players with higher individual player efficacy indices. With consideration to group centroids, projection of the group on discriminant function, it has been

TABLE 6
DISCRIMINANT ANALYSIS OF GROUPS OF MALE PLAYERS WITH DIFFERENT INDIVIDUAL PLAYER EFFICACY INDICES ACCORDING TO THE EXPRESSION LEVEL OF CSAI-2 MEASURES

Function	λ	Rc	Wilks' lambda	χ^2	df	p =
1	0.13	0.34	0.88	13.11*	6	0.042
2	0.01	0.09	0.99	0.82	2	0.68

Variable	Structure matrix	
	1	2
Cognitive anxiety	0.38	0.24
Somatic anxiety	0.25	0.92
Self-confidence	–0.98	–0.09

Individual player efficacy index	Group centroids	
	1	2
2+3	0.45	–0.03
4	–0.13	0.14
5	–0.34	–0.07

Variable	Individual player efficacy index					
	Indices 2+3 (N=38)		Index 4 (N=27)		Index 5 (N=41)	
	M	SD	M	SD	M	SD
Cognitive anxiety	2.86	0.92	2.71	0.83	2.59	0.78
Somatic anxiety	2.24	0.94	2.26	0.98	2.03	0.75
Self-confidence	3.12	0.82	3.52	0.69	3.69	0.59

λ – Eigenvalue of discriminant function; Rc – coefficient of canonical correlation; Wilks' lambda –Wilks' lambda coefficient (Wλ) of discriminant function; χ^2 – significance test of discriminant function – χ^2-test; * – significance level of DF at $p<0.05$; df – degrees of freedom; p – level of statistical significance of DF (χ^2-test); M – mean; SD – standard deviation

established that the greatest difference exists between the group of players with the lowest individual efficacy indices (group of players with indices 2+3) and the group of players with the highest individual efficacy index (group of players with index 5). The group of least efficient male volleyball players is characterized by very low self-confidence (coefficient –0.98), while the group of most efficient volleyball players is characterized by a somewhat lower level of cognitive and somatic anxiety (coefficients of 0.38 and 0.25).

In Croatia, female volleyball is much more popular than male volleyball. Consequently, there are much more young female volleyball players, in relation to male players, training in clubs. In larger cities, it is common for a couple of hundred girls to be training in one club. Unfortunately, only 12 players can play in junior and senior teams. The results obtained by discriminant analysis indicate the trend of the most successful female players expressing the highest level of self-confidence and a lower level of anxiety. Considering the fact that junior players are selected from the youth age group according to their player efficacy, it is obvious that a higher level of self-confidence and a lower level of cognitive and somatic anxiety affect this selection process. It can be assumed that not

including female volleyball players into their competitive teams additionally impairs their self-confidence, not only in sports area, but also in other areas of personal functioning. That is why this problem requires engagement of all members of volleyball organizations, but also of the entire community, with the aim of improvement of competitive state anxiety of female youth players.

A much smaller number of male volleyball players in clubs, in practice, results with the fact that usually all youth players advance to juniors without the selection process. This can also explain the absence of age differences in the level of somatic and cognitive anxiety and self-confidence of male volleyball players. A less emphasized selection in the sample of male volleyball players leads to a more heterogeneous sample in relation to competitive efficacy. This heterogeneity probably partly causes the differences established by discriminant analysis between the group of players with the lowest individual player efficacy indices and the group of players with the highest individual player efficacy indices. The group of least efficient male volleyball players is characterized by a very low level of self-confidence, while the group of most efficient male volleyball players is characterized by a somewhat lower level of cognitive and somatic anxiety.

Even though a trend can be noticed in discriminant analyses in which self-confidence increases and the level of somatic and cognitive anxiety decreases with the increase of situational efficacy, no significant discriminant functions were obtained, except in the sample of male volleyball players. Therefore, it is obvious that, for explaining the differences in situational efficacy of male and female volleyball players, variables for assessing other dimensions of the anthropological status must be included in future research. In previous research studies[28–32], prominent longitudinal dimensionality of the skeleton, explosive power and agility, along with the quality technique of all volleyball elements, were proven to be good predictors of situational efficacy of young female volleyball players, therefore measures and test assessing these dimensions should be included in future research.

Apart from that, in future research, other psychological characteristics of players, such as motivation, attention, perceived player competence, and the usage of certain techniques for state self-regulation should also be studied, and over a longer time period. In team sports such as volleyball, group characteristics such as cohesiveness, perceived team efficacy and coaching behaviour are also of great importance, and should therefore also be analysed in future research studies. In order to obtain as reliable conclusions as possible, the number of subjects in each subsample must be increased.

Based on the findings of the present research, additional education or training of coaches in the area of psychological skills training and the area of communication skills is recommended, with the aim of having a high-quality influence on psychological characteristics of young volleyball players, their competitive state anxiety and self-confidence. It is particularly important to organize this kind of education for coaches of youth male and female players, in order for youth players of both genders to persist, under coaches' positive influence, in their involvement in volleyball and to continue their development in all other areas of volleyball, sports and personal activity.

Conclusion

Volleyball is a very dynamic sports game in which actions and pauses between actions are constantly alter-

nated. Considering that a point is won by every successful action, players must constantly be concentrated on successful performance of technical-tactical elements. Mistakes must be reduced to a minimum because every unsuccessful action during the match, especially at the end of a set, may cause the loss of a set. This competitive stress very often causes an increased level of cognitive and somatic anxiety in volleyball players, and it can also result in the loss of self-confidence. Scientific value of the present research is in translating and validating the Competitive State Anxiety Inventory (CSAI-2) on the population of young Croatian male and female volleyball players. Good homogeneity, reliability and sensitivity of the inventory were obtained which creates essential preconditions for quality assessment of the level of competitive state cognitive and somatic anxiety, and self-confidence.

The obtained results indicate that with greater player experience in female volleyball players the level of somatic and cognitive anxiety is reduced, and the level of self-confidence is increased, which is not the case with male players. With the increase of competitive efficacy, self-confidence in male volleyball players is increased and anxiety is reduced, which is not the case in youth and junior female volleyball players. Regarding the fact that positional differences in both genders were also not obtained by analysis of variance, it can be concluded that gender, age and positional differences, as well as differences in situational efficacy of young male and female volleyball players cannot be explained well based merely on anxiety and self-confidence. It is obvious that, in this sample, other dimensions of the anthropological status also cause age, gender and positional differences, as well as differences in situational efficacy.

With this research space has been created for future research in the area of state anxiety and self-confidence of young male and female volleyball players. The obtained results point to the necessity of using larger batteries of tests in future research studies, which would include the Competitive State Anxiety Inventory validated in the present research. Due to the fact that the level of competitive anxiety changes depending on the quality of the opponent and the importance of the match, it is recommended, in order to explain the relations of competitive state anxiety and situational efficacy better, to collect the data on a larger number of matches during the preparation and the competitive period.

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RELACIJE STANJA NATJECATELJSKE ANKSIOZNOSTI I USPJEŠNOSTI MLADIH IGRAČA ODBOJKE

S A Ž E T A K

S ciljem validacije upitnika stanja natjecateljske anksioznosti na populaciji mladih hrvatskih odbojkaša, 286 ispitanika, 106 odbojkaša i 180 odbojkašica, prosječne dobi 16.09±1.83, popunilo je upitnik CSAI-2, autora Martens, Vealey, Burton, Bump i Smith (1990)[1]. S obzirom da sve ljestvice upitnika stanja natjecateljske anksioznosti imaju dobru homogenost, pouzdanost i osjetljivost, može se zaključiti da predstavljaju vrlo kvalitetne mjerne instrumente za mjerenje psiholoških obilježja mladih odbojkaša. Mlade odbojkašice i odbojkaši u pravilu imaju osrednju razinu samopouzdanja, a kognitivna anksioznost im je izraženija nego somatska. Kako bi se utvrdile dobne i spolne razlike u somatskoj i kognitivnoj anksioznosti i samopouzdanju, provedena je parametrijska analiza razlika i izračunati su koeficijenti t-testa za nezavisne uzorke. Analizom razlika po dobi utvrđeno je da juniorke imaju značajno nižu razinu somatske i kognitivne anksioznosti u odnosu na kadetkinje, te značajno višu razinu samopouzdanja. Za razliku od njih, kadeti i juniori ne razlikuju se ni u jednoj od analiziranih varijabli. Analizom razlika po spolu utvrđeno je da kadeti imaju značajno višu razinu samopouzdanja od kadetkinja. Analizom varijance nisu dobivene značajne razlike između pojedinih igračkih uloga u razini natjecateljske anksioznosti i samopouzdanja. Diskriminativnom analizom nisu dobivene značajne razlike u somatskoj i kognitivnoj anksioznosti, te samopouzdanju odbojkašica različite situacijske uspješnosti. Grupu najmanje uspješnih odbojkaša karakterizira vrlo nisko izraženo samopouzdanje, dok najuspješniju grupu odbojkaša karakterizira nešto niža razina kognitivne i somatske anksioznosti.