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Original research article

DOES PRECOMPETITIVE ANXIETY AFFECT PERCEIVED COMPETITIVE EFFICACY OF VOLLEYBALL PLAYERS?

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Abstract. *Sixty minutes before their match, 47 senior male volleyball players filled out the CSAI2R questionnaire for assessing the level and the direction of somatic and cognitive anxiety and self-confidence. Volleyball players, on average, have a low level of somatic and cognitive anxiety (just over the minimum values), and a high level of self-confidence. On average, the participants perceive somatic and cognitive anxiety as something that has a slightly positive impact on their performance, while self-confidence has a moderately positive impact on their performance. For the purposes of further data analysis, the participants were classified into two groups. The first group included volleyball players (N=31) who, following the match, evaluated their performance as above average. The second group included volleyball players (N=16) who evaluated their performance as below average. There were no significant differences in the level and directionality of separate anxiety components and self-confidence found by an independent sample T-test between the two groups of volleyball players. In order to emphasize the differences between the groups, the analysis of differences was performed between 5 volleyball players who evaluated their performance as excellent and 5 volleyball players who evaluated their performance as very poor. Players who, just after the match, evaluated their performance as very poor, had a significantly higher level of cognitive anxiety prior to the match, in comparison to players who evaluated their performance as excellent. The obtained results confirm the negative relationship of the cognitive anxiety component and situational efficacy.*

Key words: *somatic anxiety, cognitive anxiety, self-confidence, volleyball.*

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INTRODUCTION

Anshel et al. (1991) define anxiety as a "subjective feeling of apprehension or perceived threat, sometimes accompanied by heightened physiological arousal". Gould & Krane (1992) state that anxiety can be considered the "emotional impact on cognitive dimension of arousal", while Hardy, Jones, & Gould (1996) state that it results when the individual doubts his or her ability to cope with the situation that causes him or her stress. Early concepts viewed anxiety as a one-dimensional construct, and most recently, anxiety has been defined in terms of cognitive, physiological and behavioral components. Martens, Burton, Vealey, Bump, & Smith (1990) "introduced" the concept of multidimensional anxiety theory by constructing the Competitive State Anxiety Inventory-2 (CSAI-2). CSAI-2 is a sport-specific, multidimensional inventory of the state of anxiety which measures the intensity of cognitive and somatic anxiety, as well as self-confidence. The authors of the questionnaire adopt the definitions given by Morris, Davis, & Hutchings (1981), which define cognitive anxiety as "negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences", and somatic anxiety as "one's perceptions of the physiological-affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feelings states such as nervousness and tension". Swain & Jones (1992, in Kais 2005) state that the way in which an athlete perceives anxiety is also important, so the direction component or directionality of anxiety was included in the questionnaire. As a result of critique of the factorial structure of the questionnaire, CSAI2-R was constructed (Cox, Martens, & Russel, 2003), which consists of 17 items.

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, Patsiaouras, Kokaridas, & Sakellariou (2006), 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. Esfahami & Soflu (2010), using a sample of 82 female and 88 male university volleyball players, 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, as well as self-confidence.

Most research studies of sports anxiety have analyzed the relation of the anxiety components and sports efficacy. Thus, for example, Jones, Hanton, & Swain (1994), 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) 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) 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 precompetitive 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) have determined that cognitive 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) 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. A positive relation, although smaller than expected, was found between self-confidence and sports efficacy. On a sample of 125 male and 139 female handball players of average age of 15,83 ±0,92 years (Mean±St.Dev.), Papastergiou, Proios, Yiannakos, & Galazoulas (2010) established that winners have a significantly lower level of cognitive and somatic anxiety and a significantly higher level of self-confidence. Moreover, the winners, as opposed to the defeated, considered these components to be more stimulating.

Kais (2005) established that groups of elite and non-elite beach volleyball players do not differ in the level of somatic anxiety. By analysis of variance, he established that elite beach volleyball players had a significantly higher level of self-confidence and a significantly lower level of cognitive anxiety. Apart from that, elite volleyball players viewed anxiety as facilitating, while non-elite players viewed it as debilitating for their performance. By regression analysis, he established that self-confidence was the best predictor of efficient performance in beach volleyball. Botica & Jurko (2010) applied the CSAI2-R on a sample of 48 female volleyball players, members of 4 national teams, during the Junior Volleyball European Championship. They concluded that with the higher team ranking the level of somatic and cognitive anxiety decreases, while the level of self-confidence increases.

Matešić, Grgantov & Čular (2011) applied the CSAI2-R questionnaire on a sample of 66 female volleyball players just before playing at the Dalmatian Championship. They established that female volleyball players had, on average, a low level of somatic anxiety and a moderate level of cognitive anxiety and self-confidence. Female volleyball players believed that somatic and cognitive anxiety did not affect their competitive performance, and that self-confidence had a moderately positive impact on their performance. By analysis of differences in relation to competition ranking, they established that teams differed significantly in their level of cognitive anxiety and self-confidence. The team which was ranked fourth had expressed a significantly higher level of self-confidence prior to the competition, in comparison to the teams which were ranked first and last.

In all of the aforementioned research studies, the level of precompetitive anxiety was investigated in relation to athletes' efficacy which was evaluated based on some objective criteria, such as competition ranking or the competition level in which the athletes compete. In the available literature, the authors have not found any research studies which have analyzed the level and directionality of the anxiety components and self-confidence of volleyball players prior to the match in relation to their subjective evaluation of efficacy of their performance in that match. Considering that the CSAI2-R is used to evaluate the subjective perception of an athlete about separate cognitive and somatic "symptoms" as well as his/her self-confidence prior to the match, the authors think it is important to compare this subjective perception to the subjective evaluation of performance quality just after the competition.

The aim of this research is to determine the level and directionality of precompetitive anxiety in senior volleyball players, and to determine whether the level and direction of different anxiety components differs in groups of volleyball players of different perceived competitive performance efficacy.

THE METHOD

The sample of participants

The sample of participants included 47 male volleyball players, members of 5 teams, 4 of which compete in Croatian 1A league, and 1 in Croatian 1B league.

Variable sample

All participants filled out the CSAI2-R questionnaire (Martens et al., 1990) about an hour before the match. The questionnaire consists of 17 statements which are assessed on a 4-point Likert-type scale:

1. Not at all,
2. Somewhat,
3. Moderately so,
4. Very much so.

Out of the 17 items of the questionnaire, 7 items assess the somatic anxiety component (e.g., "I feel nervous"; "My heart is racing"), 5 items assess the cognitive anxiety component (e.g., I *am concerned* about choking *under pressure*"; "I'm concerned about performing well") and 5 items assess self-confidence (e.g., "I'm confident that I can meet the challenge"; „I'm confident about performing well").

The scores of the items belonging to the same anxiety component were summed so, out of 17 items, 3 variables (anxiety components) were obtained:

CSAI SOM – somatic component,

CSAI COG – cognitive component,

CSAI SEL – self-confidence.

The possible range of results in the somatic anxiety component is between 7 and 28, and in the cognitive component and self-confidence between 5 and 20.

For each item (statement), the participants also evaluated the directionality or the "directional perception" of anxiety (Swain & Jones, 1992, in Kais, 2005). They responded to the statement:

"For my performance, that is": ... They circled the numbers on a scale from -3 (very negative), across 0 (not important), to +3 (very positive).

The scores on the same components are also summed here so that the variable of somatic directionality ("DIRSOM") can assume values from -21 to +21, and cognitive directionality ("DIRCOG") and self-confidence ("DIRSEL") can assume values from -15 to +15.

After the match, the players evaluated their performance by responding to the following question: *Regarding my abilities, in this match I performed*:

In doing so, they were to circle one of the numbers in a Likert-type scale shown below:

very poorly		poorly		averagely		very well		excellent	
1	2	3	4	5	6	7	8	9	10

Data analysis

In accordance with the aim of the research, data analysis was performed by using the STATISTICA 7.0 software. Basic descriptive indicators of variables were calculated (mean, standard deviation, minimum and maximum value, and coefficients of skewness and kurtosis).

The normality of distribution in all the variables was determined by Kolmogorov-Smirnov test.

By the independent samples T-test, the significance of differences was tested in each variable between volleyball players who perceived their performance as average (evaluations 6 – 10) and volleyball players who perceived their performance as below average (evaluations 1 – 5). The same method was used to analyze the differences between volleyball players who perceived their performance as excellent (evaluations 9 and 10) and volelyball players who perceived their performance as very poor (evaluations 1 and 2).

RESULTS

Table 1. Descriptive indicators of volleyball players (N = 47).

	M	SD	MIN	MAX	SKEW	KURT	KS*
CSAISOM	10,979	3,096	7,000	19,000	0,406	-0,604	0,130
CSAICOG	7,851	2,646	5,000	15,000	0,624	-0,472	0,160
CSAISEL	16,383	2,691	10,000	20,000	-0,778	0,246	0,170
DIRSOM			-16,000	21,000	0,614	1,678	0,230
DIRCOG	1,872	6,174	-12,000	15,000	0,184	0,530	0,170
DIRSEL	7,723	5,282	-9,000	15,000	-0,773	0,689	0,090

Legend: M – mean; SD – standard deviation; MIN – minimum values; MAX – maximum values; SKEW – distribution symmetry; KURT – distribution flatness; KS – Kolmogorov-Smirnov test of normality; *-cut-off value of the KS test for N = 48 is 0,19; CSAISOM – somatic anxiety component; CSAICOG – cognitive anxiety component; CSAISEL – self-confidence; DIRSOM – directionality of the somatic anxiety perception; DIRCOG - directionality of the cognitive anxiety perception; DIRSEL - directionality of the self-confidence perception

By analyzing the results shown in table 1, it can be concluded:

The "DIRSOM" variable does not have normal distribution because volleyball players show high positive values in the KURT variable (measure of flatness – peakedness of distribution). This means that the variable is oversensitive (a small number of participants had extreme scores in this variable, some of which were high negative, and some of which were high positive values). Due to this reason, this variable will not be included in further parametric procedures of data analysis. Distributions of all other variables do not differ significantly from normal distribution.

Volleyball players, on average, have a low level of somatic and cognitive anxiety (just over minimum values), and a high level of self-confidence (close to the maximum value of 20).

On average, the participants perceive cognitive anxiety as something that has a slight positive impact on their performance, while self-confidence has a moderately positive impact on their performance.

Table 2 shows the analysis of differences between the group of volleyball players (N=31) who evaluated their performance as above average just after the match (evaluations from 6 to 10) and the group of volleyball players who evaluated their performance as below average (evaluations 1 – 5).

Table 2. T-test between the groups (M – mean; SD – standard deviation; t-test – test of differences between independent groups; p – significance level of t-test; 1 – above average performance; 2 – below average performance).

	M1	SD1	M2	SD2	t-test	p
CSAISOM	10.81	2.75	11.31	3.75	-0.53	0.60
CSAICOG	7.61	2.47	8.31	2.98	-0.86	0.40
CSAISSEL	16.39	2.69	16.38	2.78	0.01	0.99
DIRCOG	2.19	7.13	1.25	3.82	0.49	0.62
DIRSEL	8.13	5.43	6.94	5.05	0.73	0.47

Legend: M1 and SD1 – means and standard deviations of variables for volleyball players who perceived their performance as above average; M2 and SD2 - means and standard deviations of variables for volleyball players who perceived their performance as below average; t-test – test of differences; p – level of significance

In order to emphasize the differences between the groups regarding their perception of performance quality, the comparison between volleyball players (N=5) who evaluated their performance as excellent (evaluations 9 and 10) and volleyball players (N=5) who evaluated their performance as very poor (evaluations 1 and 2) is given in Table 3.

Table 3. T-test between the groups (M – mean; SD – standard deviation; t-test – test of differences between independent groups; p – significance level of t-test; 1 – excellent performance; 2 – very poor performance).

	M1	SD1	M2	SD2	t-test	p
CSAISOM	9.60	3.58	11.80	2.68	-1.10	0.30
CSAICOG	5.60	1.34	9.80	3.70	-2.39	0.04
CSAISSEL	18.80	1.30	17.40	1.95	1.33	0.22
DIRCOG	2.80	7.56	-0.40	2.61	0.89	0.40
DIRSEL	7.40	6.43	7.00	5.10	0.11	0.92

Legend: M1 and SD1 – means and standard deviations of variables for volleyball players who perceived their performance as excellent; M2 and SD2 - means and standard deviations of variables for volleyball players who perceived their performance as poor; t-test – test of differences; p – level of significance

DISCUSSION

In the multidimensional anxiety theory (Martens et al., 1990, in Woodman & Hardy, 2003), cognitive anxiety is hypothesized to have a negative linear relationship with performance, somatic anxiety is hypothesized to have an inverted-U-shaped relationship with performance, while self-confidence is hypothesized to have a positive linear relationship with sports performance. Based on the aforementioned, it can be concluded that a somewhat increased level of somatic anxiety probably has a positive impact on player's readiness for the match; whereas the increase of cognitive anxiety may disturb player's concentration during the match (concern distracts them from important details of the game). No significant differences were found by the independent samples T-test in the analyzed variables between volleyball players who evaluated their performance as above average and those who evaluated their performance as below average. This is not congruent with the previous research studies which have investigated this issue (e.g., Jones et al., 1994; Woodman & Hardy, 2003; Papastergiou

et al., 2010; Botica & Jurko, 2010; Matešić et al., 2011), and which have found significant differences in separate anxiety components and self-confidence between participants of different efficacy. In those research studies, the competition level or competition ranking was the criterion for group differentiation. The insufficient sensitivity of the criterion for group differentiation (above average – below average performance level) used in the present research might be one of the reasons for not finding significant differences.

Based on the obtained results, it can be concluded that volleyball players who perceived their performance as excellent have a significantly lower level of cognitive precompetitive anxiety component in comparison to volleyball players who evaluated their performance as very poor. Apart from that, "more efficient" volleyball players also have a somewhat lower level of the somatic anxiety component and a higher level of self-confidence than "less efficient" players, but these differences are not statistically significant. Also, there were no significant differences between the two groups of volleyball players in directionality of separate anxiety components, although volleyball players who perceived their performance as excellent perceive cognitive and somatic anxiety, as well as self-confidence, as more positive for their performance, in comparison to volleyball players who think they performed poorly in the match.

CONCLUSION

The obtained results indicate the possibility that subjective criteria of efficacy evaluation are not related in the same way with the level and directionality of somatic and cognitive anxiety and self-confidence as previously used objective criteria of player efficacy evaluation. In order to further clarify the relationship between precompetitive anxiety and competitive efficacy, future research should:

- Investigate their relationship on larger samples of different age and gender, as well as situational efficacy,
- Situational efficacy should be specified in such a way that it relates to the assessment of certain technical-tactical elements of the game (e.g., serve, serve reception, spike, block, etc.), using both objective (e.g., data gathered by statistical analysis or expert opinion) and subjective evaluation methods (player's perception about his/her competitive performance quality),
- Data should be gathered using a larger number of matches, with opponents of different quality.

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DA LI TREMA PRED TAKMIČENJE UTIČE NA PERCEPCIJU UČINKA NA TAKMIČENJU KOD ODBOJKAŠA?

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Šezdeset minuta pre utakmice, 47 odbojkaša seniora popunilo je CSAI2R upitnik za procenu nivoa i pravca somatske i kognitive uznemirenosti kao i nivo samopouzdanja. Odbojkaši, u proseku, imaju nizak nivo somatske i kognitivne uznemmirenosti (nešto iznad minimalnih vrednosti), a pri tom imaju visok nivo samopouzdanja. U proseku, učesnici su somatsku i kognitivnu uznemirenost doživeli kao nešto što pozitivno utiče na njihovu igru, dok samopouzdanje ima tek blagi pozitivni uticaj na njihov rad. Radi dalje analize podataka, učesnici su podeljeni u dve grupe. Prvu grupu činili su odbojkaši (N=31) koji su, po završetku utakmice, za svoj učinak rekli da je bio iznad proseka. Drugu grupu činili su obojkaši (N=16) koji su za svoj učinak rekli da je bio ispod proseka. Nisu uočene značajne razlike u nivou i pravcu komponenti uznemirenosti ili samopouzdanja koji su utvrđeni t-testom za nezavisne uzorke, odnosno dve grupe odbojkaša. Kako bi se istakle razlike između grupa, analiza razlike izvršena je između 5 odbojkaša od kojih su svi ocenili svoj učinak kao odličan i 5 odbojkaša koji su svoj učinak ocenili ka vrlo loš. Odbojkaši koji su, nakon utakmice, ocenili svoj učinak kao vrlo loš imali su značajno veće nivoe kognitivne uznemirenosti u poređenju sa odbojkašima koji su svoj učinak ocenili kao odličan. Postignuti rezultati potvrđuju negativan odnos između kognitivne uznemirenosti i situacionih sposobnosti.

Ključne reči: *somatska uznemirenost, kognitivna anksioznost, samopouzdanje, odbojka.*