Elite Athletes' Assessment of Mental State for Competition in Individual and Team Sports

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Abstract: *Pre-competition mental state is an important component of a sports outcome. In terms of the type of sport, the results of pre-competition state research differ depending on the methodology used. The aim of this paper was to determine mental states for elite sports competitions in one individual (shooting) and one team sport (handball). The research involved 41 elite athletes of both genders (11 males and 30 females) aged 16 to 34, who were members of the senior national shooting (N_1=24) and senior national handball (N_2=17) teams of Serbia. The applied instruments included the CSAI-2 and the CA test. Data processing involved descriptive statistics and variance analysis. The results indicate significant differences between athletes in individual and team sport, in favour of team sport athletes. Elite shooters show more cognitive anxiety, they are more prone to mental perception of pain, fear, and reliance on habits and automatism in competitions. Elite handball players showed significantly higher values on scales of desirable mental state for training and competition.*

Keywords: *psychological assessment, elite sport, competition, CA method, CSAI-2.*

Introduction

Psychological assessment for competitions traditionally relies on personality inventories which seek to determine character traits or the characteristics of an athlete's mental state for competition. What is usually examined is whether an athlete possesses an anxiety trait and to what extent, as well as whether they express a smaller or larger amount of cognitive or somatic anxiety prior to a competition (Spielberger et al. 1983; Martens, Vealey & Burton, 1990). Those psychological variables are very significant factors for success in elite sport.

The research on psychological differences between athletes in individual and team sport also covered other

Procena mentalnog stanja za takmičenje vrhunskih sportista u individualnom i kolektivnom sportu

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Apstrakt: *Psihičko stanje pred takmičenje važna je komponenta sportskog ishoda. U odnosu na tip sporta, rezultati istraživanja predtakmičarskih stanja, razlikuju se u zavisnosti od primenjene metodologije. Cilj ovog rada bio je da utvrdi psihička stanja za takmičenje vrhunskih sportista iz jednog individualnog sporta (streljaštvo) i jednog kolektivnog sporta (rukomet). U istraživanju je učestvovao 41 vrhunski sportista, oba pola (11 muškaraca i 30 žena), starosti 16 do 34 godine, koji su bili članovi seniorske streljačke (N_1=24) i rukometne (N_2=17) reprezentacije Srbije. Primenjeni instrumenti bili su CSAI-2 i metod asocijacije bojama (CA). Podaci su obrađeni deskriptivnom statistikom i analizom varijanse. Rezultati pokazuju da postoje značajne razlike između sportista u individualnom i kolektivnom sportu, koji idu u prilog sportistima iz kolektivnog sporta. Vrhunski strelci značajnije su kognitivno anksiozni, više podložni psihičkom doživljaju bola, straha i oslanjanju na navike i automatizam na takmičenju. Vrhunski sportisti u rukometu pokazali su značajno više vrednosti na merama poželjnog psihičkog stanja za trening i takmičenje.*

Ključne reči: *psihološka procena, vrhunski sport, takmičenje, CA metod, CSAI-2*

Uvod

Psihološka procena za takmičenje tradicionalno se oslanja na inventare ličnosti koji nastoje da utvrde crte ličnosti ili karakteristike mentalnog stanja sportiste za takmičenje. Obično se ispituje da li sportista i u kojoj meri poseduje crtu anksioznosti, kao i da li u situacijama pred takmičenje poseduje manju ili veću količinu kognitivne ili somatske anksioznosti (Spielberger et al. 1983; Martens, Vealey & Burton, 1990). Te psihološke varijable veoma su značajne za uspešnost u vrhunskom sportu.

Ispitivanja psiholoških karakteristika i razlika između sportista u individualnom i kolektivnom sportu odno-

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personality features. For example, significant differences are revealed in psychological skills and motivation for success in performance (Pluhar et al, 2019). Feelings of social acceptance, skill development and coaching influence are more emphasized in team sports. Individual sports involve greater focus on the development of concentration ability and mental strength. The lack of social support in individual sport emphasizes the development of personal responsibility and self-reliance (Boone & Leadbeater, 2006). The negative psychological aspects that develop with respect to the social context specific to both individual and team sports, make team sports more stressful as a result of competition outcomes, team dynamics and coaching approaches in team sports. Individual sport athletes proved to be significantly prone to developing feelings of shame and greater internal attribution of responsibility for failure, which may lead to depressive symptoms. Vulnerability to the development of depression in elite athletes has proven to already exist at the junior competition level (Nixdorf et al, 2016). Anxiety, as the most commonly studied personality trait in elite sport, has been shown to be significantly more prevalent in individual sports where performance depends on a referee's decision. These athletes feel immense pressure to differentiate themselves from the competition in the pursuit of perfection.

The research of differences in terms of mental states of athletes in individual and team sports were mostly focused on determining differences in anxiety as a mental state. The results mostly underline that cognitive and somatic anxiety scores prior to a competition showed statistically significant difference between individual and team sports. Higher results of pre-competition cognitive and somatic anxiety were found in individual sports (Han et al, 2006; Hanton et al, 2008), although one meta-analysis on the connection between cognitive anxiety, competitive self-confidence and sport performance showed no significant differences between athletes in individual and team sports (Woodman & Hardy, 2003).

Inconsistency in the results of psychological research of pre-competition mental states in individual and team sports is ascribed to different methodology. Time distance between the psychological assessment and competition is also important.

Another factor that must be taken into account is the fact that traditional psychological 'paper-pen' methodology does not always provide relevant data for a simple reason: athletes may report to be in an adequate mental state even though they are not (Mladenović, 2016). Athletes are not always necessarily aware of their real

sila su se i na druge personalne karakteristike. Pokazalo se, na primer, da postoje razlike u pogledu psiholoških veština i motivacije za uspehom (Pluhar et al, 2019). U kolektivnim sportovima izraženija je osetljivost na prihvatanje okoline, razvoj veština i uticaj trenera. U individualnim sportovima veći je fokus na razvoju sposobnosti koncentracije i mentalne snage. Izostanak socijalne podrške u individualnom sportu ističe u prvi plan razvoj lične odgovornosti i oslanjanje na sebe (Boone & Leadbeater, 2006). Negativni psihološki aspekti koji se razvijaju s obzirom na socijalni kontekst specifičan za kolektivne i individualne sportove, odnosi se na veći doživljaj stresa koji se povezuje sa ishodom takmičenja, grupnu dinamiku i pristup trenera u timskim sportovima. Kod sportista iz individualnih sportova pokazalo se da je značajan negativan psihološki faktor razvoj osećaja krivice i unutrašnje atribucije odgovornosti za neuspeh, što je značajno povezano sa razvojem depresivne simptomatologije. Vulnerabilnost na razvoj depresije kod vrhunskih sportista, pokazalo se da postoji već na juniorskom uzrastu (Nixdorf et al, 2016). Anksioznost kao najčešće ispitivana crta ličnosti u vrhunskom sportu, pokazalo se da je značajno više prisutna u individualnim sportovima kod kojih uspešnost zavisi od procene sudija. U tim slučajevima sportisti lakše podlegnu pritisku da moraju da budu bolji od konkurencije kako bi ostvarili visoke ciljeve.
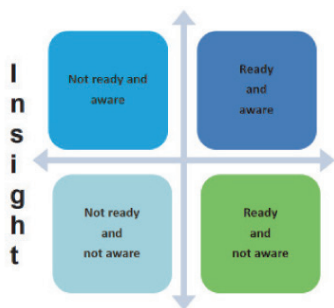
Ispitivanje razlika u pogledu psihičkih stanja sportista u kolektivnim i individualnim sportovima najčešće su se odnosila na utvrđivanje razlika u pogledu anksioznosti kao mentalnog stanja. Rezultati takvih istraživanja pretežno ukazuju na statistički značajne razlike u količini kognitivne i somatske anksioznosti. Sportisti iz individualnih sportova više doživljavaju anksioznost kao predtakmičarsko stanje, nego sportisti iz timskih sportova (Han et al, 2006; Hanton et al, 2008). Međutim, jedna metaanaliza o povezanosti kognitivne anksioznosti, takmičarskog samopouzdanja i postignuća u takmičarskom sportu, ukazala je da nema značajnih razlika između sportista iz individualnih i kolektivnih sportova (Woodman & Hardy, 2003).

Nekonzistentost rezultata psiholoških istraživanja mentalnih stanja pred takmičenje u individualnim i kolektivnim sportovima, pripisuje se različitoj metodologiji, a od značaja je i vremenska distanca između trenutka sprovođenja ispitivanja i održavanja takmičenja.

Dodatni faktor koji treba uzeti u obzir je i činjenica da tradicionalna psihološka "papir - olovka" metodologija ne donosi uvek verodostojne podatke iz jednostavnog razloga što sportista može da saopšti da je u adekvatnom psihičkom stanju iako zapravo nije (Mladenovic,

competitive mental state and they may believe to possess a higher degree of self-control of activation and anxiety level than they actually do. Coaches may wrongly conclude that in such cases, athletes have been using psychological manipulation and deliberately reporting to be in a more optimal competitive mental state than they really are, just to be a part of the performing team.

Athletes differ in their degree of awareness of their actual competitive mental state (Mladenović, 2018). In general, athletes can be mentally ready or unready for a competition, and they may or may not be aware of the fact whether they are or are not mentally ready for a competition (Picture 1). An athlete can be mentally ready for a competition and have conscious insight into his mental readiness. A different situation occurs when an athlete is mentally ready for a competition, but for some reason, he believes at the conscious and rational level, that he is not ready to compete (for example, a lack of self-confidence, increased concern and anxiety related to the outcome of the competition). The following two situations occur when an athlete is not mentally ready for a competition, for whatever reason. In one version of this situation, an athlete is consciously and rationally aware of this fact, and in the other version – even though he is generally not mentally ready to compete – at his conscious level he believes he is (which happens in situations when an athlete is highly motivated to compete, even though he is not ready enough for the competitive situation).
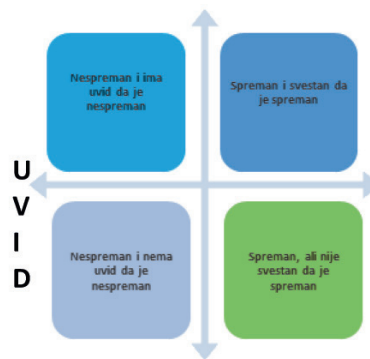

Picture 1. *Mental readiness for sports competition and level of conscious psychological insight (Mladenović, 2018)*

Research suggests that self-assessing one's own mental state at the conscious level is not necessarily accurate. Some neuroscience studies point out the complexity of the relation between the conscious and the unconscious, suggesting that the "authority" of the conscious is overrated (Damasio, 2010; Damasio & Carvalho, 2013). An athlete truly wants to be in the best mental state and give his best at a competition, but in a large number of situations there seems to be something within preventing

2016). Sportisti ne moraju uvek da budu svesni svog realnog psihičkog stanja za takmičenje i mogu da veruju da poseduju veći stepen samokontrole nivoa aktivacije i anksioznosti, nego što to objektivno jeste. Treneri mogu pogrešno da zaključe da je u tim slučajevima reč o psihološkoj manipulaciji od strane sportista i da sportista namerno saopštava da je u optimalnijem psihičkom stanju za takmičenje nego što zapravo jeste, samo da bi bio u sastavu ekipe na terenu.

Sportisti se razlikuju prema stepenu svesnog uvida u aktuelno psihičko stanje za takmičenje (Mladenovic, 2018). Generalno, sportisti mogu da budu psihički spremni ili nespremni za takmičenje i mogu da imaju ili da nemaju svestan psihološki uvid da jesu ili nisu psihički spremni za takmičenje (Slika 1). Sportista može da bude psihički spreman za takmičenje i da ima svestan uvid u svoju mentalnu spremnost. Druga situacija postoji kad je sportista psihički spreman za takmičenje, ali iz nekog razloga, na svesnom i racionalnom nivou smatra da nije spreman da se takmiči (npr. trenutni nedostatak samopouzdanja, pojačana zabrinutost i anksioznost za ishod takmičenja). Sledeće dve situacije postoje kada sportista iz bilo kog razloga nije psihički spreman za takmičenje. U jednoj varijanti ove situacije sportista ima svestan i racionalan uvid u to, a u drugoj varijanti – iako suštinski nije psihički spreman da se takmiči, na svesnom nivou veruje da jeste (što se događa u situacijama kada je sportista visoko motivisan da se takmiči iako nije u sportskom i/ili psihološkom smislu dovoljno spreman za takmičarsku situaciju).

Slika 1. *Psihička spremnost za takmičenje i nivo svesnog psihološkog uvida (Mladenovic, 2018)*

Istraživanja sugerišu da procena sopstvenog psihičkog stanja na svesnom nivou ne mora da bude tačna. Neka istraživanja u neuronauci sugerišu da je odnos između svesnog i nesvesnog složen, kao i da je 'nadležnost' svesnog precenjena (Damasio, 2010; Damasio & Carvalho, 2013). Sportista istinski želi da bude u najbo-

him from doing so. During a psychological testing using traditional personality inventories, or in a conversation prior to a competition, an athlete may report to be in an optimal mental state for the competition, without that actually being the case. And that is not because athletes want to deceive the coach to place them in the start line-up at a competition, but because they consciously believe they are mentally ready for the competition. Competition as a sort of a stressful situation provokes reaction not only at the conscious and rationally controlled level, but also mental states and reactions that are not controlled by the conscious self. A very significant research-related and practical question concerns the assessments of an athlete's overall mental state prior to a competition: the conscious and available for introspection, as well as the unconscious.

A significant contribution to the assessment of the unconscious mental state was made by a Swiss psychologist Max Lüscher (1971). In the mid-20th century, Lüscher presented a colour test as a projective technique that measures unconscious mental states (Lüscher, 1971). Unlike other projective techniques, such as the Rorschach test, which are mostly used as assessment instruments in clinical psychology, the Lüscher colour test is a widely used psychological instrument for non-clinical population (Stone, 2003; Singg & Whiddon, 2000). Three decades ago, while using the Lüscher test, Czech psychologist Jiri Simonek came up with an idea to connect colours with words. Uncensored automatic associations that an observed colour triggers in a perceiver are possible to channel in a certain direction by associating a word to a colour. The Colour Association Method (CA) came as a result of Simonek's work and research (Simonek, Bohonek & Simonek, 2012).

Considering the inconsistency of the research results on differences in competitive mental states among athletes in individual and team sports, the aim of this research was to determine the pre-competition mental state of elite athletes in a team sport (handball) and an individual sport (shooting), using one traditional personal inventory (CSAI-2) and one new method of psychological assessment: the color association (CA) projective test.

Method

Instruments

Two instruments were used for the research: CSAI-2 and the CA method.

Competitive State Anxiety Inventory II, or CSAI-2, measures cognitive anxiety, somatic anxiety and competi-

ljem psihičkom stanju i pokaže svoje najbolje izvođenje na takmičenju, ali u velikom broju situacija, kao da ga nešto iznutra 'sabotira' u tome. U situaciji psihološkog testiranja klasičnim personalnim inventarima ili u razgovoru pred takmičenje, sportista može da saopšti da je u optimalnom psihološkom stanju za takmičenje, a da zapravo to nije slučaj. I to ne zato što želi da obmane trenera da bi bio u startnoj postavi na takmičenju, već zato što na svesnom nivou doživljava da je psihološki spreman za takmičenje. Takmičenje kao svojevrsna stresna situacija provocira reagovanje ne samo sa svesnog i racionalno kontrolisanog nivoa, već i psihička stanja i reakcije koje nisu pod svesnom kontrolom. Veoma značajno istraživačko i praktično pitanje tiče se dijagnostike celokupnog mentalnog stanja sportiste pred takmičenje: svesnog i dostupnog introspekcji, kao i nesvesnog.

Značajan doprinos proceni nesvesnog psihičkog stanja dolazi od Švajcarskog psihologa Maksa Lišera (Lüscher, 1971). Sredinom prošlog veka Lišer je prezentovao test boja kao projektivnu tehniku koja meri nesvesna psihička stanja (Lüscher, 1971). Za razliku od drugih projektivnih tehnika, poput Roršahovog testa koje su uglavnom korišćene kao dijagnostički instrumenti u kliničkoj psihologiji, Lišerov test boja široko je korišćen psihološki instrument procene na nekliničkoj populaciji (Stone, 2003; Singg & Whiddon, 2000). Pre tri decenije, češki psiholog Jirži Šimonek, radeći sa Lišerovim testom, došao je na ideju da spoji boje sa rečima. Necenzurisane automatske asocijacije koje u opažaču izaziva posmatrana boja, moguće je kanalisati u određenom smeru, tako što se reč asocira sa bojom. Tako je nastao Metod asocijacije bojama – CA test (Simonek, Bohonek & Simonek, 2012).

Imajući u vidu nedoslednost dosadašnjih rezultata istraživanja razlika u psihičkim stanjima za takmičenje sportista iz individualnih i kolektivnih sportova, cilj ovog istraživanja bio je da utvrdi psihičko stanje pred takmičenje vrhunskih sportista u kolektivnom (rukomet) i individualnom sportu (streljaštvo), koristeći jedan tradicionalni personalni inventar ličnosti (CSAI-2) i jedan novi metod psihološke dijagnostike: projektivni test asocijacije bojama (CA).

Metod

Instrumenti

U istraživanju su korišćena dva instrumenta: CSAI-2 i CA metod.

Competitive State Anxiety Inventory II, ili CSAI-2, meri kognitivnu anksioznost, somatsku anksioznost

tive self-confidence (Martens, Vealey & Burton, 1990). It consists of three subscales. The first subscale measures the extent of athletes' concern about their performance prior to a competition, whether they doubt themselves, fear failure or bad performance, whether they are concerned about disappointing important people (cognitive anxiety). The second subscale measures the extent of somatic anxiety symptoms: body tension and tight stomach, nervousness, agitation, palpitation, sweaty palms, dry throat, wet and cold hands, etc. The third subscale determines the level of self-confidence and belief in good performance, achievement of goals, stress relief and acceptance of challenge. Each subscale involves 9 items. In each subscale the result can range from the minimum of 9 and maximum of 36 points. Higher scores indicate higher presence of cognitive anxiety, somatic anxiety and self-confidence.

The Colour Association method (CA) is a projective technique based on the Lüscher colour test (Lüscher, 1971). The CA measures an athlete's self-perception based on parameters named *pain, effort, fear, tiredness, injury,* readiness for a *match* and *training,* the capacity to take *risks* in a competitive situation and the athlete's tendency to rely on *habits* and automatism in competitions. Today, the Colour Association test has a form of a computer software. It consists of inputs which contain eight colours (red, blue, green, yellow, grey, black, brown, purple) in the shape of a sphere, creating a circle. At the beginning and the end of the testing, the examinee picks all the colours, one after another, according to their current preference. In addition to colours, other inputs also contain a word in the middle of the circle, and the examinee picks three colours that they currently associate with the given word. The test generates another two measures. One is operationalized as a relation between psychological volition and the organism's bodily reality in a competitive situation. Therefore, a complete domination of the organism's bodily reality and physical state is at one end of the continuum, while the other end contains complete domination of will and overcoming the bodily reality by investing mental effort. The other measure is operationalized as a total of mental energy at a given moment, which conditions the possibility of activation and involvement into the current activity. It is actually a measure of motivation and volition in a competitive situation. The values of all parameters in the CA test range from zero to 100 (Mladenović, 2015).

Sample

The sample consisted of 41 elite athlete in individual (shooting) and team sport (handball). Their age range was from 16 to 34 years of age (11 males and 30 females). The subsample of examinees from the individ-

i takmičarsko samopouzdanje (Martens, Vealey & Burton, 1990). Sastoji se od tri subskale. Prva subskala meri koliko su sportisti pred nastup na takmičenju zabrinuti za svoje izvođenje, da li sumnjaju u sebe, da li se plaše neuspeha, slabe igre, da neće razočarati važne osobe (kognitivna anksioznost). Druga subsakala meri koliko su kod sportista izraženi simptomi somatske anksioznosti: napetost u telu i stomaku, nervoza, uzrujanost, lupanje srca, znojenje ruku, sušenje grla, vlažne i hladne ruke itd. Treća subskala utvrđuje nivo samopouzdanja i sigurnosti da će nastup biti dobar, da će se postići ciljevi, osloboditi napetosti i prihvatiti izazov. Svaka subskala ima po 9 ajtema. Rezultat po subskalama može se teorijski kretati od minimalnih 9 do maksimalnih 36 poena. Viši skorovi su indikator većeg prisustva kognitivne anksioznosti, somatske anksioznosti i samopouzdanja**.**

Metod asocijacije bojama (CA) je projektivna tehnika zasnovana na Lišerovom testu boja (Lüscher, 1971). CA meri samopercepciju sportiste na parametrima nazvanim *bol*, *napor*, *strah*, *umor*, *povreda*, spremnost za *takmičenje* i *trening*, kapacitet da se preduzme *rizik* u situaciji takmičenja i tendencija da se sportista oslanja na *navike* i automatizme na takmičenju. Test asocijacije bojama danas je u formi kompjuterskog softvera. Sastoji se od inputa koji sadrže osam boja (crvena, plava, zelena, žuta, siva, crna, braon, ljubičasta), sferičnog oblika, koje su poređane u krug. Na početku i na kraju testiranja ispitanik bira sve boje redom, prema trenutnoj preferenciji. Ostali inputi, pored boja sadrže i jednu reč u sredini kruga, a ispitanik bira tri boje koje se u nameću kao trenutna asocijacija zadatoj reči. Test generiše još dve mere. Jedna je operacionalizovana kao odnos između voljnog psihološkog momenta i telesne realnosti organizma u situaciji takmičenja. Pa tako, na jednom kraju tog kontinuuma, nalazi se potpuna dominacija telesne realnosti i fizičkog stanja organizma, a na drugom kraju je potpuna dominacija volje i prevazilaženja telesne realnosti ulaganjem mentalnog napora. Druga mera operacionalizovana je kao ukupnost psihičke energije u datom momentu, što uslovljava mogućnost aktivacije i uključivanja u trenutnu aktivnost. Reč je zapravo o motivaciono voljnom momentu u takmičarskoj situaciji. Vrednosti svakog parametra na testu CA kreću se od nula do 100 (Mladenović, 2015).

Uzorak

Uzorak se sastojao od 41 vrhunskog sportiste u individualnom (streljaštvo) i kolektivnom (rukomet) sportu. Ispitanici su bili starosti od 16 do 34 godine, oba pola (11 muškaraca i 30 žena). Poduzorak ispitanika iz indivi-

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ual sport involved members of men and women senior national shooting team of Serbia (N_1=24), while the subsample of athletes from the team sport comprised members of women's senior national handball team of Serbia (N_2=17).

Procedure

As part of the psychological preparation for major international competitions in 2016 and 2017, the examinees underwent psychological testing with CSAI-2 and the CA test. With the athletes' consent, the data acquired in these tests is used anonymously and for scientific and research purposes.

Statistical analysis

Descriptive statistics and analysis of variance (ANOVA) were applied in the statistical program SPSS, version 20. Mean values, Standard Deviations, Minimum and Maximum values were calculated for each CA test variable (mental balance, overall mental energy, risk, effort, pain, fear, tiredness, injury, training, match, habits) and CSAI-2 inventory (cognitive and somatic anxiety, competitive self-confidence). The statistical significance of the differences between mean values in individual and team sport was examined using analysis of variance.

Results

Table 1 presents the results of descriptive statistics in the CA test, Table 2 presents the results of descriptive statistics in the CSAI-2 test. The differences between athletes in individual sport (shooting) and team sport (handball) are shown in Table 3.

dualnog sporta obuhvatio je članove muške i ženske streljačke reprezentacije Srbije (N_1=24), dok je poduzorak sportista iz kolektivnog sporta činila ženska seniorska rukometna reprezentacija Srbije (N_2=17).

Procedura

U sklopu psihološke pripreme za velika međunarodna takmičenja tokom 2016. i 2017. godine, ispitanici su bili podvrgnuti psihološkom testiranju instrumentima CSAI-2 i CA testom. Uz pristanak sportista podaci iz ovih testova koriste se anonimno i u naučno-istraživačke svrhe.

Statistička obrada podataka

Podaci su obrađeni primenom deskriptivne statistike i analizom varijanse (ANOVA) u statističkom program SPSS 20. Za svaku varijablu na CA testu (mentalna ravnoteža, sveukupna mentalna energija, bol, napor, strah, umor, povreda, takmičenje, trening, rizik, navike) i upitniku CSAI-2 (kognitivna anksioznost, somatska anksioznost, takmičarsko samopouzdanje) izračunavana je aritmetička sredina i standardna devijacija, minimalne i maksimalne vrednosti. Značajnost razlika aritmetičkih sredina između sportista u kolektivnom i individualnom sportu proveravana je analizom varijanse.

Rezultati

Rezultati deskriptivne statistike na CA testu prikazani su u Tabeli 1, rezultati deskriptivne statistike na testu CSAI-2 prikazani su u Tabeli 2, dok su razlike između sportista u individualnom sportu (streljaštvo) i kolektivnom sportu (rukomet) prikazani su u Tabeli 3.

Table 1. Mean (M), standard deviations (SD), minimum and maximum value in the Colour Association test for elite shooters (N_1=24) and elite handball players (N_2=17)

Tabela 1. Aritmetičke sredine (AS), standardne devijacije (SD), minimalne (Min) i maksimalne vrednosti (Max) varijabli na CA testu, kod vrhunskih sportista u streljaštvu (N_1=24) i rukometu (N_2=17)

		N	AS	SD	Min	Max
CA1	N_1	24	46.27	31.88	2.47	94.89
	N_2	17	61.90	11.05	45.67	89.10
	Total	41	52.75	26.34	2.47	94.89
CA2	N_1	24	44.55	26.05	5.00	88.00
	N_2	17	48.10	6.68	36.57	60.70
	Total	41	46.02	20.27	5.00	88.00
CA3	N_1	24	47.95	11.95	30.71	70.17
	N_2	17	45.68	9.79	27.33	63.33
	Total	41	47.01	11.03	27.33	70.17

CA4	N_1	24	45.25	14.91	20.78	67.96
	N_2	17	49.74	10.34	33.67	66.67
	Total	41	47.11	13.25	20.78	67.96
CA5	N_1	24	47.92	17.41	20.80	85.02
	N_2	17	36.96	14.46	16.67	66.00
	Total	41	43.37	16.97	16.67	85.02
CA6	N_1	24	49.10	17.73	23.69	86.91
	N_2	17	37.72	14.07	18.67	68.67
	Total	41	44.38	17.09	18.67	86.91

CA7						
	N_1	24	50.60	15.92	15.76	81.17
	N_2	17	53.68	15.26	38.33	94.00
	Total	41	51.88	15.53	15.76	94.00
CA8	N_1	24	51.10	18.03	28.01	87.44
	N_2	17	44.09	14.32	26.67	79.67
	Total	41	48.20	16.77	26.67	87.44
CA9	1	24	54.10	14.31	19.56	83.22
	2	17	67.05	22.05	31.00	100.00
	Total	41	59.47	18.81	19.56	100.00

CA10						
	1	24	53.60	13.84	21.32	84.89
	2	17	64.23	20.50	32.67	100.00
	Total	41	58.01	17.50	21.32	100.00
CA11	1	24	49.42	17.74	25.71	87.55
	2	17	39.15	14.03	20.00	68.33
	Total	41	45.16	16.91	20.00	87.55

CA1: mental balance; CA2: overall mental energy; CA3: risk; CA4: effort; CA5: pain; CA6: fear; CA7: tiredness; CA8: injury; CA9: training; CA10: match; CA11: habits.

CA1: mentalna ravnoteža; CA2: sveukupna mentalna energija; CA3: rizik; CA4: napor; CA5: bol; CA6: strah; CA7: umor; CA8: povreda; CA9: trening; CA10: takmičenje; CA11: navike.

Table 2. *Mean (M), standard deviations (SD), minimum and maximum value on the CSAI-2 measures for elite shooters (N_1=24) and elite handball players (N_2=18)*

Tabela 2. *Aritmetičke sredine (AS), standardne devijacije (SD), minimalne (Min) i maksimalne vrednosti (Max) varijabli na CSAI-2 kod vrhunskih sportista u streljaštvu (N_1=24) i rukometu (N_2=17)*

		N	AS	SD	Min	Max
Csai-k	1	24	16.08	5.90	9.00	27.00
	2	17	12.44	3.16	9.00	21.00
	Total	41	14.52	5.19	9.00	27.00
Csai-s	1	24	15.24	4.88	10.00	30.00
	2	17	14.05	4.99	9.00	26.00
	Total	41	14.74	4.90	9.00	30.00
Csai-sc	1	24	28.60	4.12	18.00	36.00
	2	17	29.94	5.75	18.00	36.00
	Total	41	29.16	4.85	18.00	36.00

Csai-k: cognitive anxiety; Csai-s: somatic anxiety; Csai-sc: self-confidence

Csai-k: kognitivna anksioznost; Csai-s: somatska anksioznost; Csai-sc: samopouzdanje

As indicated in Table 3, statistically significant differences between elite shooters and elite handball players were obtained through one measurement in the CSAI-2 test and several parameters of the CA test.

Kako pokazuje Tabela 3, statistički značajne razlike između vrhunskih sportista u streljaštvu i rukometu, dobijene su na jednoj meri testa CSAI-2 i nekoliko parametara CA testa.

Table 3. *Differences between elite shooters and elite handball players on the variables of the Colour Association test and CSAI-2.*

Tabela 3. *Značajnost razlika između vrhunskih sportista u streljaštvu i rukometu na varijablama testa CA i CSAI-2.*

	Razlike	Suma kvadrata / Sum of Squares	Stepeni slobode / DF	Srednja vrednost kvadrata / Mean Square Value	F	Nivo značajnosti / Sig.
CA1	između grupa / *Between Groups*	2428,727	1	2428,727	3,738	0,060
	unutar grupa / *Within Groups*	25336,608	39	649,657		
	Total	27765,335	40			
CA2	između grupa / *Between Groups*	124,719	1	124,719	0,298	0,588
	unutar grupa / *Within Groups*	16325,279	39	418,597		
	Total	16449,997	40			

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CA3	između grupa / *Between Groups*	50,995	1	50,995	0,412	0,525
	unutar grupa / *Within Groups*	4823,025	39	123,667		
	Total	4874,020	40			
CA4	između grupa / *Between Groups*	200,740	1	200,740	1,147	0,291
	unutar grupa / *Within Groups*	6825,606	39	175,016		
	Total	7026,347	40			
CA5	između grupa / *Between Groups*	1195,426	1	1195,426	4,514	0,040
	unutar grupa / *Within Groups*	10327,998	39	264,820		
	Total	11523,424	40			
CA6	između grupa / *Between Groups*	1288,174	1	1288174	4,828	0,034
	unutar grupa / *Within Groups*	10405,788	39	266,815		
	Total	11693,962	40			
CA7	između grupa / *Between Groups*	94,368	1	94,368	0,385	0,539
	unutar grupa / *Within Groups*	9562,921	39	245,203		
	Total	9657,290	40			
CA8	između grupa / *Between Groups*	488,842	1	488,842	1,772	0,191
	unutar grupa / *Within Groups*	10760,543	39	275,911		
	Total	11249,385	40			
CA9	između grupa / *Between Groups*	1669,046	1	1669,046	5,209	0,028
	unutar grupa / *Within Groups*	12496,608	39	320,426		
	Total	14165,654	40			
CA10	između grupa / *Between Groups*	1124,176	1	1124,176	3,937	0,054
	unutar grupa / *Within Groups*	11136,920	39	285,562		
	Total	12261,096	40			
CA11	između grupa / *Between Groups*	1048,925	1	1048,925	3,935	0,054
	unutar grupa / *Within Groups*	10395,409	39	266,549		
	Total	11444,334	40			
csaik	između grupa / *Between Groups*	136,198	1	136,198	5,603	0,023
	unutar grupa / *Within Groups*	972,278	40	24,307		
	Total	1108,476	41			
csais	između grupa / *Between Groups*	14,682	1	14,682	0,603	0,442
	unutar grupa / *Within Groups*	997,504	41	24,329		
	Total	1012,186	42			
csaisp	između grupa / *Between Groups*	18,916	1	18,916	0,799	0,377
	unutar grupa / *Within Groups*	970,944	41	23,682		
	Total	989,860	42			

CA1: mental balance; CA2: overall mental energy; CA3: risk; CA4: effort; CA5: pain; CA6: fear; CA7: tiredness; CA8: injury; CA9: training; CA10: match; CA11: habits.

Csai-k: cognitive anxiety; Csai-s: somatic anxiety; Csai-sc: self-confidence

CA1: mentalna ravnoteža; CA2: sveukupna mentalna energija; CA3: rizik; CA4: napor; CA5: bol; CA6: strah; CA7: umor; CA8: povreda; CA9: trening; CA10: takmičenje; CA11: navike.

Csai-k: kognitivna anksioznost; Csai-s: somatska anksioznost; Csai-sc: samopouzdanje

Considerably higher values for cognitive anxiety were obtained for elite shooters (M=16.08; SD=5.09), than for elite players in the team sport - handball (M=12.44; SD=3.16). Significant differences turned out to exist between elite shooters and elite handball players on the CA measurements for *pain, fear, training, match*

Značajno više vrednosti na meri kognitivne anksioznosti dobijene su za vrhunske strelce (AS=16,08; SD=5,09), nego za vrhunske sportiste u kolektivnom sportu - rukometu (AS=12,44; SD=3,16). Pokazalo se da postoje značajne razlike između vrhunskih sportista u streljaštvu i rukometu na CA merama *bol, strah, trening, takmičenje*

and relying on *habits*. Shooters showed statistically significantly higher Mean values on the CA parameter for *pain* (M=47.92; SD=17.42), *fear* (M=49.1; SD=17.74), relying on *habits* (M=49.42; SD=17.74) than the members of the national handball team (pain: M=36.96; SD=14.47; fear: M=37.73; SD=14.07; habits: M=39.16; SD=14.03). Elite athletes in the team sport – handball, showed significantly higher scores on the CA parameters for *training* (M=67.06; SD=22.05) and *match* (M=64.24; SD=20.50), when compared to elite shooters (training: M=54.11; SD=14.32; match: M=53.61; SD=13.85).

Discussion and Conclusion

In psychological research that sought to identify differences between athletes in individual and team sports, the emphasis was mainly on differences in personality traits. The results of some research studies indicate that athletes from individual sports are more self-aware and care more about their personal autonomy, while athletes from team sports are more cooperative and with more prominent sociotropy (Nia & Besharat, 2010). It was also revealed that athletes in individual sports score higher on traits such as positivity, perseverance, resilience, self-efficacy, and self-esteem (Laborde et al, 2016). The explanation for the differences regarding positive personality traits in favour of athletes from individual sports lies in individual responsibility for the sporting outcome, which requires the development of adequate personality traits. In terms of motivational characteristics, the main motivation drives for individual sport athletes are set goals, while athletes from team sports put intrinsic motivation and enjoyment in the chosen sport first. Potential differences in mental health risk were also identified. Athletes in individual sports are at greater risk of developing depressive symptoms (Pluhar et al, 2019).

When it comes to mental states in sports psychology, anxiety has traditionally been considered to be a 'leitmotif' of a psychological state in competition that impedes sports achievement, although different theoretical approaches and instruments are used to measure competitive anxiety (Spielberger et al. 1983; Hanin, 1999; Martens et al, 1990; Wilson, Raglin & Harger, 2000). There are different ways of measuring anxiety: physiological, cognitive, and behavioural, but a predominant opinion in sports psychology is that the least intrusive one is the use of self-report questionnaires (Raglin, 1992). It is believed that even subsequent testing of pre-competitive anxiety can provide valid measures of an athlete's mental state prior to and during a competition (Hanin, 1997; Wilson et al, 2000). Some authors believe that it would be better to use specific instru-

i oslanjanje na *navike*. Strelci su pokazali statistički značajno više vrednosti aritmetičkih sredina na CA parametru *bol* (AS=47,92; SD=17,42), *strah* (AS=49,1; SD=17,74), oslanjanje na *navike* (AS=49,42; SD=17,74) nego članovi rukometne selekcije (bol: AS=36,96; SD=14,47; strah: AS=37,73; SD=14,07; navike: AS=39,16; SD=14,03). Vrhunski sportisti u timskom sportu, rukometu, pokazali su značajno više skorove CA parametrima *trening* (AS=67,06; SD=22,05) i *takmičenje* (AS=64,24; SD=20,50), u odnosu na sportiste u streljaštvu (trening: AS=54,11; SD=14,32; takmičenje: AS=53,61; SD=13,85).

Diskusija i zaključak

U psihološkim istraživanjima koja su nastojala da utvrde razlike između sportista u individualnim i kolektivnim sportovima, uglavnom je naglasak bio na razlikama u crtama ličnosti. Rezultati nekih istraživanja ukazuju da su sportisti iz individualnih sportova samosvesniji i važnija im je lična autonomija, dok su sportisti iz kolektivnih sportova saradljiviji i sa istaknutijom sociotropijom (Nia & Besharat, 2010). Takođe se pokazalo da sportisti iz individualnih sportova pokazuju više skorove na crtama kao što su pozitivnost, istrajnost, rezilijentnost, samo-efikasnost i samopoštovanje (Laborde et al, 2016). Objašnjenje za razlike u pogledu pozitivnih crta ličnosti u korist sportista iz individualnih sportova nalazi se u individualnoj odgovornosti za sportski ishod, što zahteva razvijanje adekvatnih crta ličnosti. U pogledu motivacionih karakteristika, sportistima iz individualnih sportova glavni motivacioni pokretači su postavljeni ciljevi, dok se kod sportista iz kolektivnih sportova u prvi plan postavlja intrinzička motivacija i uživanje u izabranom sportu. Utvrđene su i potencijalne razlike u pogledu rizika po mentalno zdravlje. Sportisti iz individualnih sportova pod većim su rizikom da razviju depresivne simptome (Pluhar et al, 2019).

Kada je reč o psihičkim stanjima u sportskoj psihologiji tradicionalno se smatra da je anksioznost 'lajt motiv' psihološkog stanja na takmičenju koji ometa sportsko postignuće, iako se teorijski pristupi i instrumenti kojima se meri takmičarska anksioznost razlikuju (Spielberger et al. 1983; Hanin, 1999; Martens et al, 1990; Wilson, Raglin & Harger, 2000). Postoje različiti načini merenja anksioznosti, fiziološki, kognitivni i bihejvioralni, ali u sportskoj psihologiji je dominirao stav da je najmanje intruzivno koristiti 'self-report' upitnike (Raglin, 1992). Smatra se da čak i naknadno testiranje predtakmičarske anksioznosti može da pruži validne mere o psihičkom stanju sportiste pre i tokom takmičenja (Hanin, 1997; Wilson et al, 2000). Neki autori smatraju da je bolja opcija koristiti specifične instrumente namenjene ispitiva-

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ments designed to test anxiety in sport than questionnaires of generalized anxiety (Weinberg & Gould, 1999).

A meta-analysis examining the association between cognitive anxiety, competitive self-esteem, and sports performance showed that there were no differences related to the type of sport (Woodman & Hardy, 2003). However, over the past few decades, researchers across the globe have constantly sought to identify differences in the pre-competitive states of elite athletes from individual and team sports. Athletes from individual sports proved to be at higher risk of developing anxiety symptoms and may experience significantly more pre-competitive anxiety (Pluhar et al, 2019). Other studies indicate that there is no significant difference in somatic anxiety in team sports in relation to the athlete's position on the team (e.g., defensive or offensive player) or amount of contact with the opponent (Allie, Larson & De-Beliso, 2018). Some authors suggest that significant differences may occur in relation to the type of individual sport (Sanioglu, Ulker & Sanioglu Tanis, 2017).

It could be argued that, on the one hand, athletes in individual sports have more opportunity to develop more positive and stable personality traits, while on the other hand, the competitive context in individual sports can provoke inadequate mental states. Research studies also point to the need to introduce new methods in the assessment of pre-competition mental states due to the interplay of psychological and physiological levels of functioning in a stressful pre-competitive situation. Thus, it was proven that when considering certain physiological parameters, athletes from individual sports show greater inclination to succumb to a stressful competitive situation (Radzi, Yusof & Zakaria, 2013).

This research took into account not only the conscious self-perception of mental readiness for competition, as measured by traditional psychological questionnaires, but also the unconscious perception of the stress in a competitive context. A new assessment method was used - the colour association (CA) method. Applying of the CA method indicated significant differences between athletes in individual sport (shooting) and team sport (handball) on a number of psychological parameters. An earlier study, which also used the CA method, found that there were individual differences in the mental state during competition in athletes from the same individual sport (kayaking). Taking into account the Damasio's thesis (Damasio, 2010) that a person is not always conscious of their current mental state, and pursuing the most adequate strategy of psychological preparation of elite athletes for international competitions, that study also implemented CSAI-2 and the Colour Association method

nju anksioznosti u sportu, nego upitnike generalizovane anksioznosti (Weinberg & Gould, 1999).

Meta-analiza koja je ispitivala povezanost kognitivne anksioznosti, takmičarskog samopouzdanja i sportskog izvođenja, pokazala je da nema razlika u odnosu na tip sporta (Woodman & Hardy, 2003). Međutim, istraživači širom sveta tokom proteklih par decenija kontinuirano nastoje da utvrde razlike u predtakmičarskim stanjima vrhunskih sportista iz individualnih i kolektivnih sportova. Pokazalo se da su sportisti iz indvidualnih sportova pod većim rizikom da razviju simptome anksioznosti i da mogu značajno više da doživljavaju anksioznost kao predtakmičarsko stanje (Pluhar et al, 2019). Neka druga istraživanja pokazuju da u kolektivnim sportovima ne postoje značajne razlike u pogledu somatske anksioznosti u odnosu na poziciju sportiste u ekipi (npr, defanzivni ili ofanzivni igrači) ili količinu kontakta sa protivnikom (Allie, Larson & DeBeliso, 2018), dok neki autori navode da mogu postojati značajne razlike i u odnosu na vrstu individualnog sporta (Sanioglu, Ulker & Sanioglu Tanis, 2017).

Moglo bi se reći da koliko su sa jedne strane sportisti u individualnim sportovima više u prilici da razvijaju pozitivnije i stabilnije crte ličnosti, toliko sa druge strane takmičarski kontekst u individualnim sportovima može da bude provokativan za neadekvatna psihička stanja. Istraživanja takođe ukazuju i na potrebu uvođenja novih metoda u procenu psihičkih stanja pred takmičenje usled isprepletanosti psihološkog i fiziološkog nivoa funkcionisanja u stresnoj predtakmičarskoj situaciji. Pa tako, pokazalo se da kada se uzmu u obzir i neki fiziološki parametri, pokaže se da postoji veća vulnerabilnost sportista iz individualnih sportova da podlegnu stresnoj takmičarskoj situaciji (Radzi, Yusof & Zakaria, 2013).

U ovom istraživanju uzeta je u obzir ne samo svesna samopercepcija psihičke spremnosti za takmičenje, merena tradicionalnim psihološkim upitnicima, već i nesvesna percepcija stresnosti takmičarskog konteksta. U tom cilju korišćen je jedan novi psihodijagnostički metod – metod asocijacije bojama (CA), koji je dodatno ukazao na postojanje značajnih razlika između sportista u individualnom sportu (streljaštvo) i kolektivnom sportu (rukomet) na nizu psiholoških parametara. U jednom ranijem istraživanju u kojem je takođe korišćen CA metod, pokazalo se da postoje i značajne individualne razlike u mentalnom stanju na takmičenju kod sportista iz istog individualnog sporta (kajaka). Polazeći od Damasiove teze (Damasio, 2010) da osoba nije uvek svesna svog aktuelnog psihičkog stanja i tragajući za najadekvatnijom strategijom psihološke pripreme vrhunskih sportista za interan-

(CA). The aim was to gain insight into the mental state of athletes in major international competitions. The sample involved only two athletes, members of the Serbian senior national kayak team. Every day for 26 days, in days immediately before and during the 2014 European and World Canoe Sprint Championships, the athletes did the CSAI-2 and CA tests (Mladenovic & Trunic, 2015). The CSAI-2 results were similar for both athletes: a low level of cognitive and somatic anxiety and a relatively high level of competitive self-confidence. The data collected by the CA method indicated difference in the athletes' mental state. One of the athletes showed higher mental resilience, which means higher scores on the *match* and *training* parameters and lower values of the *fear* and *pain* parameters. The other athlete scored lower on the *match* and *training* parameters and had high values of the *pain* and *fear* parameters. The data obtained by the CA test were more congruent to the athletes' observed behaviour and made a better contribution to the development of an adequate strategy of the athletes' psychological preparation.

This research showed that in terms of the adequacy of the pre-competitive mental state, athletes in team sports enjoy a psychological advantage. The members of women's national handball team of Serbia showed statistically significantly higher scores on psychological parameters that measure positive mental state for a competitive situation (CA measures ''readiness for training and competition'') compared to athletes from the individual sport (national shooting team of Serbia). On the other hand, elite athletes in individual sport (Serbian shooting team) showed more intrapersonal sensitivity to potential distractors in a competitive situation (CA parameters ''self-perception of fear and pain, reliance on habits and automatisms'' and higher levels of cognitive anxiety on the CSAI-2).

The drawback of this research is that the number of examinees of both genders is not even, and that it involved a relatively small sample of examinees with a wide age span.

Given that competitive mental state is a complex psycho-physiological response to the stressfulness of the competitive context, it is important that future research in sports psychology uses not only personal inventories, which are based on the conscious introspection of the athlete, but also other methods. The Colour Association (CA) method used in this research may provide a contribution to the new methodology, as it points to the importance of unconscious perception of competition. Unconscious perception may be more accurately associated with actual mental readiness for competition, and that is not only of theoretical but also of practical importance in elite sport.

cionalna takmičenja, u toj studiji primenjivani su CSAI-2 i Metod asocijacije bojama (CA). Cilj je bio da se istraži psihičko stanje sportista na velikim međunarodnim takmičenjima. Uzorak je činilo samo dvoje sportista, članova kajakaške reprezentacije Srbije. Svakog dana, tokom dvadesetšest dana, u danima neposredno pre i tokom Evropskog i Svetskog prvenstva u kajaku 2014. godine, sportisti su popunjavali CSAI-2 i CA test (Mladenovic & Trunic, 2015). Rezultati na CSAI-2 ukazivali su na slične rezultate kod jednog i drugog sportiste: nizak nivo kognitivne i somatske anksioznosti i relativno visok nivo takmičarskog samopouzdanja. Podaci prikupljeni CA metodom ukazivali su na različitost psihičkog stanja sportista. Jedan sportista pokazivao je veću mentalnu rezilijentnost. To znači više skorove na parametrima *takmičenje* i *trening* i niske vrednosti parametara *strah* i *bol*. Drugi sportista pokazao je niske vrednosti na parametrima *takmičenje* i *trening* i visoke vrednosti na parametrima *bol* i *strah*. Podaci prikupljeni CA testom bili su više kongruentni opserviranom ponašanju sportista i bolje su doprineli razvoju adekvatne strategije psihološke pripreme tih sportista.

U ovom istraživanju pokazalo se da u pogledu adekvatnosti predtakmičarskog psihičkog stanja postoji psihološka prednost koja je na strani sportista iz kolektivnog sporta. Članovi ženske rukometne selekcije Srbije pokazali su statistički značajno više rezultate na psihološkim paramterima koji mere pozitivno psihičko stanje za takmičarsku situaciju (CA mere 'spremnost za trening i takmičenje') u odnosu na sportiste iz individualnog sporta (streljačka reprezentacija Srbije). Sa druge strane, vrhunski sportisti u individualnom sportu (streljačka reprezentacija Srbije) pokazali su više intrapersonalne senzitivnosti na potencijalne distraktore u takmičarskoj situaciji (CA paramteri 'samopercepcija straha i bola, oslanjanje na navike i automatizme' i viši nivo kognitivne anksioznosti na CSAI-2 testu).

Nedostatak ovog istraživanja je neujednačenost ispitanika prema polu i relativno mali uzorak ispitanika uz širok raspon godina starosti.

S obzirom da je mentalno stanje za takmičenje složen psiho-fiziološki odgovor na stresnost takmičarskog konteksta, od značaja je da buduća istraživanja u sportskoj psihologiji koriste ne samo personalne inventare, koji se zasnivaju na svesnoj introspekciji sportiste, već i druge metode. Prilog novoj metodologiji može da pruži i metod asocijacije bojama (CA), korišćen u ovom istraživanju, koji ukazuje na značaj nesvesne percepcije takmičenja koja može autentičnije biti povezana sa realnom psihičkom spremnošću za takmičenje, što je ne samo od teorijskog, već i od praktičnog značaja u vrhunskom sportu.

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