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FAKTORSKA STRUKTURA INTERESOVANJA ADOLESCENATA PREMA SPORTOVIMA [1]

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Apstrakt: Cilj ove empirijske studije bio je ispitivanje latentne strukture interesovanja adolescenata prema sportovima. Prigodni uzorak obuhvatio je (N = 144) valjevska maturanta srednjih škola muškog pola prosečne starosti 18.05 ± 1.82 godina. U ovom transverzalnom istraživanju primenjena je adaptirana verzija Upitnika interesovanja prema sportovima – PS (Prot i Bosnar, 1999). Maksimalna srednja vrednost ocena u PS2 upitniku evidentirana kod preferencije sportova automobilizam i motociklizam (M = 3.72), a minimalna kod sportske gimnastike (M =1.10). Analizom glavnih komponenti (PCA) na osnovu Gatman-Kajzerovog kriterijuma ekstrahovano je pet glavnih komponenata, uz 61.91% objašnjene ukupne varijanse. Izdvojena petofaktorska struktura latentnih dimenzija interpretirana je kao: sportovi na otvorenim objektima fizičke kulture, borilački sportovi i sportovi snage, fundamentalni sportovi i sportovi sa naglašenom umetničkom dimenzijom, sportovi sa loptom i reketom i sportovi sa preciznošću. Linearne korelacije izolovanih zajedničkih faktora su statistički signifikantne $p \leq 0,05$), pozitivnog su smera, niskog ili umerenog intenziteta, što pokazuje da te izdvojene latentne varijable nisu međusobno nezavisne, već da postoji relevantna korenspondencija među njima. Preferencija sportskih interesovanja u petofaktorskoj strukturi adolescenata orijentisana je na „muške“ i delimično „neutralne“ sportove, što signalizira na relevantnost rodnog stereotipa u oblasti sporta. U radu se raspravlja i o praktičnim implikacijama relevantnosti izolovane petofaktorske strukture interesovanja adolescenata prema sportovima. Sprovedeno transverzalno istraživanje doprinelo je postojećoj literaturi i empirijskim podacima o ovom retko istraživanom fenomenu na srpskoj adolescentskoj populaciji.

Ključne reči: *maturanti srednjoškolci, sportovi, latentna struktura, Promax faktori*

UVOD

Poslednjih decenija u oblasti razvojne psihologije, ali i sociologije, demografije i drugih naučnih disciplina *interesovanja* prema sportovima imaju značajne funkcije u svim fazama čovekovog života u raznim oblastima, npr. igri, učenju, radu, izboru poziva, provođenju slobodnog vremena i dr. (Maksić i Tenjović, 2008). Pomenuti autori smatraju da u procesu determinisanja interesovanja adolescent isprobava svoje psihofizičke sposobnosti u oblasti u koju će usmeriti svoj talenat i u kojoj će dati kreativne doprinose, pri čemu potpora porodice i škole imaju dominantnu funkciju.

Prema autorima (Sampedro-Piquero et al., 2023) *adolescencija* kao poseban uzrasni period označava relativno dug, zanimljiv, ali i složen razvojni put koji svaki pojedinac mora da prođe da bi se od biološkog organizma, kakav

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dolazi na svet, razvio do zrele ličnosti, ali predstavlja i rizik i šansu za napredak i dalje formiranje na kompleksnom putu ka odraslom dobu. Osim toga, pomenuti autori naglašavaju da period adolescencije karakterišu intenzivne transformacije u fizičkom, kognitivnom, emocionalnom i socijalnom funkcionisanju.

Sport je internacionalni fenomen koji je rasprostanjen u celom svetu. Inicijalne komponente definicije sporta egzistiraju još u antičkoj Grčkoj i drevnom Rimu. Savremeni sport predstavlja popularan društveni fenomen i sastavni deo kulture. Aktuelne sportske događaje kao što su: zimske i letnje olimpijske igre, biciklistička trka *Tour de France*, teniski turnir *Wimbledon*, svetsko fudbalsko prvenstvo, i dr., prati milionski auditorijum bez obzira na starost, pol, rasu ili socijalni status (Azimov et al., 2021). Međutim, u traganju za naučnom definicijom sporta, nije uspostavljen konsenzus, što otežava operacionalizaciju ovog pojma (Brinkmann, 2021; Malčić, 2018). U ovom radu koristiće se definicija autora (M. Ivanović i U. Ivanović, 2015), koji pod sportom podrazumevaju „svaku visoko strukturisanu ciljanu fizičku aktivnost, uređenu pravilima (*fair play*), koja poseduje visok nivo posvećenosti i obuhvata prevladavanje sebe ili protivnika, sadržavajući pojedine elemente igre", te bavljenje takmičenjem (vrhunski, profesionalni, amaterski i školski) koje uz intenzivan mišićni napor proizvodi kretanje, harmoničan telesni razvoj i povećanje radne sposobnosti, zdravlja i kvalitetniji život mladih.

U cilju značaja zdravlja, u Kini se 2500 godina pre n. e. verovalo da se telo razvija, ostaje zdravo i sporije stari ukoliko je izloženo fizičkim i sportskim aktivnostima. Takođe, u starom Rimu, čuveni lekar Galenus preporučivao je fizički aktivan život radi očuvanja i unapređenja zdravlja. Sa druge strane, fizička neaktivnost je identifikovana kao dominantni faktor smrtnosti u svetu (WHO, 2022). Za našu zemlju i implikacije ovog rada od izuzetnog značaja su i sledeći podaci: svaka peta odrasla osoba u Srbiji je gojazna, svaka treća odrasla osoba konzumira cigarete, skoro polovina ukupnog stanovništva ima hipertenziju, dok se sportsko-rekreativnim aktivnostima jednom nedeljno bavi samo 1/2 stanovništva, dok se čak 50% stanovništva uopšte ne bavi sportsko-rekreativnim aktivnostima (Strategija razvoja sporta Republike Srbije za period 2014-2018. godine, 2015). Takođe, u empirijskim studijama (Dorsch et al., 2022) dokazan je pozitivan efekat redovnih sportskih aktivnosti na zdravstveni status adolescenata. Međutim, prema ovim autorima upražnjavanje sportskih aktivnosti je ispod zadovoljavajućeg stepena interesovanja u populaciji mladih, čak i kad postoje optimalni uslovi za sprovođenje različitih sportskih aktivnosti.

Prema nalazima nedavne studije (Wang et al., 2022) interesovanja prema sportskim aktivnostima u adolescenciji se razlikuju u zavisnosti od demografskih faktora, npr. pola, uzrasta, prebivališta, profila, lokacije mesta boravka, stila života, godišnjeg doba, potpore porodice, socio-ekonomskog stanja, uticaja medija i dr. Ovi istraživači veruju da je minimalna verovatnoća da će se i kod mladih pojaviti interesovanje za bavljenje sportom s kojim se retko susreću ili koji ih ne interesuje.

Potreba za zdravim i aktivnim stilom života u adolescenciji je u trendu zbog svakodnevnog porasta sedentarnog načina života u porodici i školi, te prekomerne telesne mase i gojaznosti (WHO, 2022). Međutim, iako svesni pozitivnih efekata upražnjavanja sporta i fizičkih aktivnosti za očuvanje i unapređenje zdravlja, adolescenti nisu dovoljno telesno aktivni (Formica et al., 2019; Mišigoj-Duraković, 2018). Najnoviji rezultati istraživanja (Currie, et al., 2023) ukazuju na nedovoljnu fizičku aktivnost, posebno među decom i mladima. Prema podacima u svetu 28%, oko 1,4 milijarde odraslih ne upražnjava dovoljno fizičke aktivnosti, odnosno godišnje oko 3,2 miliona ljudi umre zbog nedovoljne fizičke aktivnosti (WHO, 2022). Stoga Svetska zdravstvena organizacija preporučuje hodanje, biciklizam, plivanje i aktivne oblike rekreacije, kao što je – ples, joga, tai chija kao najfrekventnije fizičke aktivnosti. U toj sudiji se zaključuje da prekomerno teški adolescenti verovatno će ostati gojazni i kao odrasle osobe, što povećava rizik od hroničnih oboljenja i uzrokuje češći morbiditet i mortalitet. Usled posledica hipokinezije nalazi autora (Bull et al., 2020) pokazuju da preko 80 % adolescenata ne zadovoljava minimalne kriterijume za sprovođenje fizičke aktivnosti koji su neophodni za održavanje zdravlja. Stoga u cilju poboljšanja srčano-sudovnog i lokomotornog sistema, kondicije, smanjenja rizika od oboljenja od nezaraznih bolesti – moždanog udara, raka dojke i debelog creva, kao i depresije, standardi preporučuju sprovođenje najmanje 150 minuta nedeljno fizičke aktivnosti umerenog intenziteta (WHO, 2022). U istraživanju (Grošić i Filipčić, 2019; Prot, 2011; Stojaković, 2019) više od 61% zagrebačkih adolescenata je izjavilo da nije nikada redovno treniralo niti učestvovalo na sportskim takmičenjima. Generacija današnjih adolescenata više je povezana putem tehnologije, medija i interneta, nego bilo koja druga generacija u ljudskoj istoriji. Prema nalazima studije (Martelli & Porro, 2018) u Italiji približno oko 56% osoba koje napuste sport su adolescenti. Glavni razlozi zbog kojih mladi napuštaju bavljenje sportom najčešće su: nedostatak interesovanja (74,5%), porodični i ekonomski razlozi (15,6%) i frustracije takmičarskog karaktera (4,9%). Takođe, nedostatak zabave i samopouzdanja, socijalni pritisci trenera, roditelja, prijatelja, kao i nedostatak vremena, novca, povrede i dr.

predstavljaju razloge odustajanja od aktivnog učestvovanja u sportu kod adolescenata (Sampedro-Piquero et al., 2023). Pomenuti autori su ustanovili da najviše utiču intrapersonalni faktori (nedostatak uživanja u sportu) i interpersonalni (pritisak trenera), dok oni strukturalni znatno manje, a među njima najznačajniji razlog predstavlja manjak vremena.

Sumiranjem navedenih nalaza u navedenim studijama uočava se da se struktura interesovanja prema sportovima razlikuje, što u znatnoj meri zavisi i od operacionalizacije predmeta istraživanja. Dosadašnje studije ukazuju na to da su interesovanja prema sportovima kod adolescenata relevantno, ali nedovoljno razjašnjeno pitanje teorije i prakse, naročito u našoj sredini. Otud, na osnovu formulisanog problema cilj ovog transverzalnog istraživanja bio je da se na srpskoj adolescentskoj muškoj populaciji proveri faktorska struktura Upitnika prema sportovima (PS2) na uzorku srednjoškolaca, ispita latentna struktura interesovanja adolescenata prema sportovima, kao i utvrde statistički značajne relacije između ekstrahovanih bazičnih dimenzija. U skladu sa teorijskim pretpostavkama, rezultata prethodnih studija i cilja istraživanja formulisana je *alternativna hipoteza* (H) – očekuje se identifikovanje faktorske strukture interesovanja prema sportovima i korelata izdvojenih bazičnih dimenzija kod adolescenata srednjoškolaca u doba adolescencije. S obzirom na deficit istraživanja u razvojnoj psihologiji, posebno kod ispitanika muškog pola u adolescenciji, kao i na različite rezultate, očekuje se da će ova transverzalna studija da doprinese potpunijem uvidu i boljem razumevanju faktorske strukture interesovanja adolescenata prema sportovima.

METOD

Uzorak i procedura istraživanja

U istraživanju je učestvovao prigodan uzorak (N = 144) učenika muškog pola iz pet srednjih škola u Valjevu: Medicinske škole, Valjevske gimnazije, Tehničke, Ekonomske i Poljoprivredne škole. Prosečna starost ispitanika je 18.05 godina (SD = 1.82). Na sumacionim skrorovima svih varijabli nisu pronađeni univarijatni ($z \geq 2.89$), kao ni multivarijatni autlajeri ($\chi 2$ (13) ≥ 40.07, $p \leq .01$; Tabachnick & Fidell,2007).

Istraživanje je odobrio Naučni savet Srpske akademije inovacionih nauka u Beogradu i sprovedeno je u skladu s etičkim principima koji se zasnivaju na Helsinškoj deklaraciji. Pre podele upitnika, maturanti su informisani o istraživanju, načinu zaštite anonimnosti podataka, posle čega su potpisivali saglasnost o učešću u istraživanju. Testiranje su sproveli stručno obučeni merioci, uz superviziju psihologa. Prosečno vreme trajanja ispunjavanja upitnika iznosilo je oko 30 minuta. Istraživanje je započelo nakon dobijene saglasnosti direktora škola. Istraživanje je sprovedeno u oktobru 2023. godine.

Upitnik interesovanja prema sportovima – PS2 (Prot i Bosnar,1999).

Cilj korišćenog upitnika je dobijanje uvida u sadržaj, intenzitet i frekvenciju interesovanja ispitanika prema sportovima. U ovom istraživanju autori ovog rada su originalni merni instrument od 54 varijable redukovali na 25 sportova koji egzistiraju u Kolubarskom okrugu. Ispitanici imaju zadatak da odabirom jednog odgovora na petostepenoj Likertovoj skali procenjuju koliko se svaki od tih sportova odnosi na njihovo bavljenje sportom: 1) sport koji nikad, ni pod kakvim uslovima ne bi hteli da upražnjavaju, 2) sport kojim ne bi želeli da upražnjavaju, tj. bave pod uslovom da nemaju drugog izbora, 3) sport koji bi upražnjavali povremeno ili u povoljnim okolnostima, 4) sport koji bi rado upražnjavali i (5) sport koji bi svakako želeli da upražnjavaju kada bi imali mogućnosti za to. Mogućnost odabira samo jednog od ponuđenih odgovora, omogućuje kontrolu socijalno poželjnog odgovaranja. Ukupni rezultat izračunava se kao aritmetička sredina odgovora na svim varijablama.

Obrada podataka

Za obradu podataka korišćene su deskriptivne statističke metode i faktorska analiza glavnih komponenti, sa Promax rotacijom i Kiser normalizacijom. Rezultati su obrađeni pomoću statističkog softvera verzija *Statistica 12.0 for Windows*.

REZULTATI

Osnovni deskriptivni statistički parametri analiziranih manifestnih varijabli primenjenih mernih instrumeata u istraživanju na celom uzorku ispitanika prikazani su u Tabeli 1.

Tabela 1. *Deskriptivni parametri analiziranih varijabli na Upitniku interesovanja prema sportovima*

Varijable	*M*	*SD*	*Sk*	*KU*	*Sk CE*	*KuCE*	*K-S*
Automobilizam i motociklizam	3.72	1.39	.07	.06	.12	.36	.79
Plivanje	1.27	1.19	-.22	.98	.12	.36	.85
Skijanje	4.01	1.28	.45	.11	.12	.36	.78
Sportski ribolov	2.43	1.40	.06	-.23	.12	.36	.63
Biciklizam	3.21	1.29	-.36	.45	.12	.36	.12
Sportsko vazduhoplovstvo	2.96	1.49	.52	.03	.12	.36	.23
Karate	2.67	1.42	.67	.36	.12	.36	.64
Dizanje tegova	2.96	1.52	-.03	-.57	.12	.36	.18
Rvanje	2.78	1.39	.77	.28	.12	.36	.25
Boks	3.39	1.40	.05	.34	.12	.36	.37
Džudo	2.79	1.28	.28	.49	.12	.36	.45
Plesovi	1.79	1.20	.13	.12	.12	.36	.28
Aerobik	1.88	1.25	.90	.05	.12	.36	.15
Atletika	2.59	1.50	-.03	.03	.12	.36	.33
Sportska gimnastika	1.10	1.18	-.15	-.18	.12	.36	.46
Fudbal	3.60	1.47	.30	.20	.12	.36	.56
Košarka	3.23	1.29	.26	.05	.12	.36	.24
Odbojka	2.99	1.19	.43	.36	.12	.36	.63
Rukomet	3.38	1.30	.09	.23	.12	.36	.44
Tenis	3.19	1.28	.35	.59	.12	.36	.70
Stoni tenis	3.20	1.30	-.48	.46	.12	.36	.28
Streljaštvo	3.19	1.50	.05	-.33	.12	.36	.89
Streličarstvo	3.19	1.54	.88	.01	.12	.36	.75
Kuglanje	2.37	1.09	-.90	.60	.12	.36	.60

Legenda: *M* = Aritmetička sredina; *SD* = Standardna devijacija, *Sk* = Skewness – horizontalna asimetričnost distribucije, *Ku* = Kurtosis – vertikalna spljoštenost distribucije, *SkSE* = Standardna greška skjunisa; *KuSE* = Standardna greška kurtozisa; *K-S* = Kolmogorov-Smirnovljev test

Rezultati merenih varijabli pokazuju maksimalnu aritmetičku sredinu kod varijable automobilizam i motociklizam (*M* = 3.72), a minimalnu kod varijable sportska gimnastika (*M* = 1.10). Najveća vrednost standardne devijacije je kod varijable *streličarstvo* (*SD* = 1.54), dok najmanju disperziju rezultata pokazuje ritmička varijabla *kuglanje* (*SD* = 1.09). Skorovi Kolmogorov-Smirnovljevog (*K-S*) testa normaliteta distribucije podataka i koeficijenata zakrivljenosti (skjunisa) i zaravnjenosti (kurtozisa), kreću se u granicama dozvoljenih vrednosti, između ±1 (Demir, 2022). To ukazuje da nema statistički značajnih varijacija raspodele skorova od Gausove krive verovatnoće, što je preduslov za sprovođenje daljih statističkih parametrijskih analiza.

U cilju boljeg upoznavanja predmeta merenja – interesovanja adolescenata prema sportovima i da li su ispunjeni uslovi za faktorizaciju, testirane su vrednosti dva statistike: Bartlettovog testa sfericiteta (engl. *Bartlett's test of sphericity*), koji proverava postoji li statistički značajna razlika između korelacione matrice i matrice identiteta u kojoj je linearna povezanost između varijabli jednake nuli i *Kaiser-Meyer-Olkinovog* testa reprezentativnosti – KMO koji pokazuje proporciju varijanse koja je objašnjena latentnim faktorima, odnosno meri nivo adekvatnosti modela (Wangensteen et al., 2015).

Inspekcijom nalaza zaključeno je da su zadovoljeni kriterijumi za sprovođenje faktorizacije (χ 2 =5081,35; KMO = .97; $p \leq 0.01$), pa se na temelju ovih parametara prema, uz rizik manji od 1%, opravdano može sprovesti multivarijantna statistička metoda za redukciju podataka, jer je reprezentativnost korišćenog upitnika visoka. Multivarijantnim metodom za redukciju podataka: analizom glavnih komponenti (eng. *principal component analysis– PCA*) na osnovu Gatman-Kajzerovog (engl. *Guttman-Kaiser*) kriterijuma jediničnog korena, u Tabeli 2 ekstrahovano je pet glavnih komponenata, sa zajedničkim karakterističnim korenima (*Eigenvalue*), koji premašuju graničnu vrednost ($\lambda \geq 1.00$), i objašnjavaju 62.60 % od ukupne varijanse – prosečnog kvadratnog odsupanja rezultata od aritmetičke sredine, što je iznad preporučene vrednosti od 60% (Demir, 2022).

Tabela 2. *Svojstvene vrednosti zadržanih faktora i procenat objašnjene varijanse*

Svojstvene vrednosti			
Glavne komponente	Ukupno	Procenat varijanse	Kumulativni % objašnjene varijanse
1	11.26	34.15	34.15
2	3.45	10.50	44.64
3	2.72	8.30	52.90
4	2.02	6.20	59.10
5	1.14	3.49	**62.60**

Prva glavna komponenta, tj. linearna kombinacija opserviranih varijabli, pokazuje izrazitu dominaciju u odnosu na ostale karakteristične korene jer obuhvata maksimalan segment varijabiliteta originalnog skupa podataka i objašnjava 34.15 % varijabiliteta, druga 10.50%, treća 8.30%, četvrta 6.20% i peta glavna komponenta minimalan dodatni deo varijacije (3.49%). Svojstvene vrednosti ostalih latentnih dimenzija u tom petofaktorskom modelu nisu odgovorne za strukturu podataka i nisu uključene u konačnu analizu, jer njihove vrednosti ne prelaze jedinicu. Stoga njihove informacije nisu bile značajne za analizu opserviranih podataka (Lam & Choy, 2019). Zbog prethodno objašnjenih teorijskih razloga glavne komponente su sprovedenom metodom multivarijacione analize rotirane *Promax* oblimin pozicijom.

U Tabeli 3 nalaze se koeficijenti korelacije sklopa i strukture pet izolovanih značajnih zajedničkih faktora interesovanja prema 25 analiziranih sportova. Kriterijum za eliminisanje ajtema podrazumevao je statistički značajna faktorska zasićenja sa teorijskim limitom ($\lambda \geq 30$), što znači da u interpretaciji koeficijenti bliski nuli sugerišu da odgovarajuća originalna promenljiva ne učestvuje relevantno u formiranju te glavne komponente čiji se koeficijenti posmatraju. Na osnovu vrednosti komunaliteta, odnosno dela ukupne varijanse koju varijable dele sa faktorima, zaključuje se da su koeficijenti na toj petofaktorskoj soluciji visoki što ukazuje na homogen analizirani prostor.

Tabela 3. *Faktorske saturacije uz promah faktore za upitnik interesovanja prema sportovima*

Varijable	F_1		F_2		F_3		F_4		F_5		h^2
	Sklop	Struktura	Sklop	Struktura	Sklop	Struktura	Sklop	Struktura	Sklop	Struktura	
Automobilizam i motociklizam	**.58**	**.49**	.05	.19	.12	-.25	.09	-.29	.04	-.15	.63
Plivanje	**.40**	**.47**	.24	.08	-.06	.22	.05	.17	.08	.27	.86
Skijanje	**.50**	**.46**	.17	.11	.28	-.03	.16	.07	.29	-.01	.59
Sportski ribolov	**.62**	**.60**	-.01	.25	-.02	.24	.07	.22	-.05	.18	.83

Biciklizam	**.41**	**.59**	.13	-.29	.16	.09	.12	-.11	.29	.15	.60
Sportsko vazduhoplovstvo	**.69**	**.66**	.26	.03	-.20	.08	.19	.23	.05	-.16	.85
Karate	.20	-.09	**.59**	**-.80**	.11	.09	.23	.29	.13	.02	.64
Dizanje tegova	.17	.06	**.60**	**.66**	.16	.25	.06	.15	.28	.03	.87
Rvanje	.19	.03	**.69**	**.73**	.19	-.07	.15	.20	-.02	.17	.50
Boks	.05	.17	**.80**	**.77**	-.05	.18	.12	.26	.08	.26	.49
Džudo	.19	.12	**.57**	**.65**	.19	.10	.22	.09	.26	.07	.84
Plesovi	.09	.18	.19	.28	**.69**	**.58**	-.05	.24	-.13	.06	.70
Aerobik	.19	.18	.02	.12	**.58**	**.53**	.27	.05	.16	.23	.62
Atletika	.16	.26	.26	.04	**.65**	**.63**	01	.15	.29	.26	.55
Sportska gimnastika	.18	.12	.25	.05	**.62**	**.60**	.19	.23	.26	.16	.73
Fudbal	.28	.09	.17	.20	.08	.12	**.76**	**.73**	.23	.12	.56
Košarka	05	.23	.13	.26	.02	.18	**.67**	**.65**	.28	.09	.74
Odbojka	.27	.13	.04	.20	.15	.19	**.74**	**.72**	.06	.22	.65
Rukomet	.24	.16	.10	.05	.14	.25	**.64**	**.62**	.17	.02	.82
Tenis	.01	.22	.12	.24	.16	.07	**.68**	**.66**	.25	.18	.53
Stoni tenis	.23	.14	.19	.03	.12	.25	**.64**	**.62**	.09	.26	.48
Streljaštvo	.21	.06	.18	.27	.15	.24	.22	.06	**.68**	**.73**	.72
Streličarstvo	.23	.14	.19	.05	.28	.15	-26	**.09**	**.65**	**.63**	.84
Kuglanje	.05	.23	.18	.12	.16	.26	.02	.20	.49	.60	.50
Vaterpolo	.12	.23	.27	.16	.09	.20	**.70**	**.69**	.15	.23	.60
Badminton	.22	.08	.17	.26	.07	.25	**.61**	**.58**	**.62**	**.60**	.56

Napomena: *Promax* faktori: F_1 – Sportovi na otvorenim objektima fizičke kulture, F_2 – Borilački sportovi, F_3 – Temeljni sportovi i sportovi sa naglašenom umetničkom dimenzijom F_4 – Sportovi sa loptom i reketom F_5 –Sportovi sa preciznošću; h^2 = Komunaliteti nakon ekstrakcije; Boldovana su značajna faktorska opterećenja u matricama sklopa i strukture radi lakšeg tumačenja

Na osnovu matrice sklopa i strukture petokomponetnog rešenja hijerarhijski prva latentna dimenzija obuhvata faktorska opterećenja (korelacije) manifestnih varijabli – sportova (sportsko vazduhoplovstvo, sportski ribolov, planinarenje, automobilizam i motociklizam, skijanje, biciklizam i plivanje), koji imaju maksimalno učešće u ukupnoj varijansi. U skladu sa saturacijama linearnih kombinacija, najintenzivnija latentna varijabla F_I se hipotetički interpretira kao *Sportovi na otvorenim objektima fizičke kulture*. Na drugoj zajedničkoj latentnoj dimenziji najveći koeficijenti korelacije grupišu se kod manifestnih varijabli: karate, rvanje, boks i džudo. Prema sadržaju indikatora ovaj izolovani F_{II} se definiše kao *Borilački sportovi*. Najznačajnije ortogonalne projekcije vektora manifestnih varijabli na treću zajedničku latentnu dimenziju imaju najveće faktorske težine manifestnih varijabli: plesovi, atletika, sportska gimnastika i aerobik. Prema tome, sadržaj stavki koji je grupisan u treću izdvojenu latentnu varijablu F_{III} identifikuje se kao *Fundamentalni sportovi i sportovi sa naglašenom umetničkom dimenzijom*. Najznačajnije ortogonalne projekcije vektora manifestnih varijabli na četvrtu zajedničku latentnu dimenziju imaju manifestne varijable: fudbal, odbojka, košarka, rukomet i vaterpolo, stoni tenis, tenis i badminton. Otud hijerarhijski izdvojeni F_{IV} se na osnovu faktorskih težina imenuje kao *Sportovi sa loptom i reketom*. Na kraju, poslednja peta zajednička latentna dimenzija, najveće faktorske saturacije – korelacije pokazuje kod manifestnih varijabli streljaštvo, streličarstvo i badminton. Dakle, u ekstrahovanom petokomponentnom modelu najslabiji F_V, sa najmanjim segmentom u ukupnom varijabilitetu, teorijski se interpretira kao *Sportovi sa preciznošću*.

Korelacije između rotiranih faktora interesovanja prema sportovima prikazane su u Tabeli 4. Ove latentne dimenzije teorijski se mogu smatrati ortogonalnima, iako su na empirijskom nivou neke od njih u statistički signifikantnim korelacijama.

Tabela 4. *Interkorelacije između ekstrahovanih faktora interesovanja prema sportu*

Promax faktori	F_1	F_2	F_3	F_4	F_5
F_1	–				
F_2	.37**	–			
F_3	.50**	.28**	–		
F_4	.42**	.34**	.33**	–	
F_5	.59**	.16*	.44**	.19*	–

Napomena: *Promax* faktori : F1 – Sportovi na otvorenim objektima fizičke kulture, F2 – Borilački sportovi, F3 – Temeljni sportovi i sportovi sa naglašenom umetničkom dimenzijom F4 – Sportovi sa loptom i reketom F5 – Sportovi sa preciznošću; *$p \leq .05$; ** $p \leq .01$

Izračunate pozitivne vrednosti Pirsonovih koeficijenata korelacije između izolovanih glavnih komponenti su statistički značajne, pozitivnog smera i niskog ili umerenog intenziteta, te se kreću u rangu od .32 do .59. To pokazuje dobru kriterijumsku validnost izolovane petofaktorske strukture. Ovakav sklop suodnosa faktora implicira da izolovane latentne varijable nisu međusobno nezavisne, već da postoje značajna preklapanja među njima. Maksimalan stepen uzajamne zavisnosti u matrici interkorelacija se manifestuje između tri *promax faktora: Sportovi na otvorenom objektima fizičke kulture, Temeljni sportovi i sportovi sa izrazitom umetničkom dimenzijom; i Sportovi sa preciznošću*. Sa druge strane, minimalan intenzitet koeficijenta korelacije na nivou statističke greške od 5% nađen je između izolovanih faktora F_{IV} – *Sportovi sa loptom i reketom* i F_V *Sportovi sa preciznošću*. Dakle, izračunati koeficijenti pokazuju da između izdvojenih pet latentnih dimenzija postoji hijerarhijska međuzavisnost. Dobijene relacije na ispitivanoj adolescentskoj populaciji u potpunosti se podudaraju sa teorijski očekivanim međusobnim odnosima ekstrahovanih latentnih varijabli, što se moglo očekivati zbog nisko do umereno povezanih varijabli uključenih u analizu (Fajgel, 2003).

DISKUSIJA

U novije vreme se beleži intenzivno interesovanje za istraživanja interesovanja prema sportovima, a cilj ovoga istraživanja bio je da se populaciji adolescenata muškog pola identifikuje faktorska struktura interesovanja prema sportovima, kao i da se definišu njene bazične dimenzije. Nalazi ove empirijske studije pokazuju povoljna interesovanja prema sportu kod valjevskih maturanata. Prosečne vrednosti parametara deskriptivne statistike skreću pažnju da adolescenti ispoljavaju maksimalna interesovanja prema *sportovima na otvorenim objektima fizičke kulture*: sportskom vazduhoplovstvu, sportskom ribolovu, planinarenju, automobilizmu i motociklizamu, skijanju, biciklizmu i plivanju, potom prema omiljenim kolektivnim sportovima sa loptom, kao što su fudbal, košarka, odbojka i rukomet, što se se podudara sa rezultatima u istraživanjima (Martelli & Porro, 2018; Toselli et al., 2023). Inter esovanja maturanata za fudbal i košarku na ispitivanom uzorku verovatno su posledica značajnih uspeha muških timova grada Valjeva i seniorske reprezentacije Srbije koja se nalazi na vrhu evropskog sporta. Identični rezultati pronađeni su u istraživanju (Bosnar et al., 2004) gde je pomoću diskriminativne analize utvrđeno da veća interesovanja ka sportovima pokazuju ispitanici u urbanim sredinama ka aktivnostima za koje postoje adekvatni uslovi, kao što je tenis, dok ispitanici iz ruralnih područja više manifestuju tendenciju ka manje atraktivnim sportovima kao što su: boks, aerobik i gimnastika. Očigledne razlike u davanju prednosti pomenutim sportovima objašnavaju se nejednakim uslovima za bavljenje u pojedinim sportskim aktivnostima, a delimično i staromodnošću seoskih naselja koja pokazuju tendenciju prihvatanja tradicionalnih aktivnosti.

Bosnar i sar. (2002) su analizom glavnih komponenti ispitivali faktorsku strukturu interesovanja učenika prema sportovima s obzirom na uzrast, pri čemu su zaključili da se sklop interesovanja razvija u zavisnosti od uzrasta ispitanika, tj. stariji učenici pokazuju drugačiji odnos prema sportu koji se manifestuje u sportovima oblikovanim prema njihovim važnim motoričkim sposobnostima. Takođe, u istraživanju interesovanja prema sportu (Gošnik i sar., 2011) ustanovljena je razlika u odnosu na starost ispitanika. Najveće preferencije interesovanja adolescenti su manifestoval za – fudbal, košarku, stoni tenis, biciklizam i tenis, gde se fudbal pokazao kao najpopularniji sport bez obzira na starost ispitanika. Osim toga, u drugoj studiji (Ding & Chen, 2020; Strandbu et al., 2019), zaključeno je da

interesovanja adolescenata prema sportu ne uslovljavaju isključivo demografske karakteristike nego i druga obeležja kao što su profesionalna iskustva, prirodno okruženje i forma edukativnog programa. Ispitanici u ovoj empirijskoj studiji naglašavaju manja interesovanja prevashodno ka sportovima sa naglašenom estetskom dimenzijom, koji imaju minimalne vrednosti standardne devijacije, što signalizira na homogenost uzorka, te i na manju popularnost tzv. „ženskih" sportova koje odlikuje fleksibilnost pokreta, osećaj za ritam i upečatljiva plesna unutrašnja svojstva. Kongruentni nalazi dobijeni su u inostranoj studiji (Guimarães et al., 2023). U istraživanjima (Barnett et al., 2018; Strandbu et al., 2019) klasifikovana je u smislu rodne percepcije nova prelazna kategorija – *lifestyle* između „muških" i „neutralnih" sportova u (vožnja biciklom, planinarenje i dr.) koja podrazumeva izdržljivost kao dominantnu motoričku sposobnost.

Faktorskom analizom glavnih komponenti, redukcijom rezultata ispitivani sistem od 25 manifestnih varijabli sporta, objašnjen je pomoću pet statističkih signifikantnih latentnih dimenzija, odnosno sledećih zajedničkih faktora: (F_I) – sportovi na otvorenim objektima fizičke kulture, (F_{II}) borilački sportovi i sportovi snage, (F_{III}) fundamentalni sportovi i sportovi sa naglašenom umetničkom dimenzijom (F_{IV}) sportovi sa loptom i reketom (F_V) sportovi sa preciznošću. Ekstrahovane latentne varijable su identične rezultatima ranijih istraživanja (Lee et al., 2021; Sorkkila et al., 2020; Toselli et al., 2023; Vella et al., 2022).

Interesovanja adolescenata prema sportu orijentisana su prevashodno na „muške" i delimično „neutralne" sportove, gde se očekuje relevantnost njihovog rodnog stereotipa u ovoj društvenoj delatnosti (Aljuhani & Sandercock, 2019; Ding & Chen, 2020). Skup sportova – padobranstvo, streljaštvo, plivanje, odbojka, stoni tenis, tenis, smučanje, planinarenje, streličarstvo, džudo su uglavnom klasifikovani u „neutralne" (Bergh et al., 2019; Comeaux & Martin, 2018) percipirani su malo niže od karakterističnih „muških" sportova naglašavajući relevantnost rodno „neutralnih" sportova za koje se pretpostavlja da poseduju znatan kapacitet u neprekidnom unapređenju rodne ravnopravnosti. Međutim, dobijeni nalazi redukuju skup „neutralnih" sportova s dominacijom „muških" i skreću pažnju na to, da adolescenti u većoj meri doživljavaju kao muške aktivnosti, što je u skladu sa nalazima u studijama (Guimarães et al., 2023). Istovremeno uočava se da su njihova interesovanja usmerena u suprotne strane rodnog tipiziranja sportova. Povoljni efekti se očekuju jedino ukoliko se u većem stepenu uspostavi balans kod adolescenata u pojedinom sportu. Navedeni autori smatraju da ako više adolescenata egzistira u populaciji ispitanika konkretnog „muškog" sporta, oni će se percipirati u manjoj meri kao „muški", i obrnuto, ako je više ispitanika muškog pola prisutno u populaciji konkretnog „ženskog" sporta, ta će se aktivnost percipirati manje ženstvenim.

Preferirani sportovi u kojima ispitanici u našem uzorku pokazuju interesovanje uglavnom su „muški" i malo „neutralni" sportovi. Otud se pretpostavlja da odabrana aktivnost predstavlja iskaz interesovanja, kao i da je učestvovanje u sportu strukturirano sportskim interesovanjem (Dorsch et al., 2022). Sportovi za koje se najviše interesuju mladi su: fudbal, košarka i odbojka – kolektivni sportovi, karate – borilački sportovi i biciklizam – sport na otvorenom, što je podudarno sa ranijim istraživanjima sprovedenim u adolescentskoj populaciji muškog pola (Eime & Harvey, 2018). Pored toga vidljivi su sportovi: planinarenje, smučanje, streljaštvo, streličarstvo, automobilizam i sportsko vazduhoplovstvo za koje su maturanti pokazali značajna interesovanja.

Nalazi u pomenutoj studiji signaliziraju da je diferenciranost interesovanja prema sportovima veća u odnosu na bavljenje njima. Za aktivno upražnavanje sportom kao što je skijanje, u Kolubarskom okrugu ne postoje povoljni vremenski – klimatski uslovi, što je limitirajući faktor za učestvovanje. Verovatno bi se ovim sportom tokom zimskog školskog raspusta i vikendom odlaskom u bliža skijaška mesta bavio veći broj maturanata kada bi imali bolje finansijske mogućnosti. Takođe limitirajuće faktore za bavljenje sportovima kao što su sportsko vazduhoplovstvo i automobilizam predstavljaju veliki finansijski troškovi koje zahtevaju ove aktivnosti. Osim toga, limitirajući faktor su povećani troškovi u streličarstvu u kojoj adolescenti malo učestvuju, a manifestuju za njega veće interesovanje. Na kraju, ograničavajući faktor predstavlja i prebivalište ispitanika koji stanuju u ruralnim sredinama udaljenim od sportskog aerodroma. Istraživanje frekventnosti bavljenja i nivoa nteresovanja za sportske aktivnosti pokazalo je da bi obezbeđenje adekvatnih pristupačnih sadržaja uz smanjenje troškova doprinelo većim bavljenjem sportovima (Guthold et al., 2020). Oni pretpostavljaju sledeće najčešće razloge za neučestvovanje i to: 1) nedostatak talenta za određeni sport, 2) zdravstveni problemi, 3) nepostojanje klubova, 4) zabrana roditelja, 5) neodgovarajuće vreme u kojem se održavaju treninzi.

Na osnovu dobijenih rezultata u ovom empirijskom istraživanju prihvata se prva testirana alternativna *hipoteza (H)* koja glasi - Očekuje se identifikovanje latentnog sklopa interesovanja prema sportu u populaciji maturanata. Zaključno, ova transverzalna studija ima izvesnih *metodoloških nedostataka*, koja u određenoj meri uslovljavaju dobijene rezultate i koja treba analizirati pri interpretaciji dobijenih rezultata. Prvo, prigodni uzorak ispitanika nije

reprezentativan za celu populaciju. Obuhvatio je isključivo muški pol iz istog grada, u jednoj vremenskoj tački, što je moglo uticati na rezultate. U ovom istraživanju korišćen je isključivo metod samoprocene svih varijabli zbog čega se može pretpostaviti egzistencija metodološke varijanse. Budući da je sprovedeno istraživanje korelacionog nacrta, pretpostavljaju se i obrnute relacije između ispitivanih varijabli, što ne dopušta donošenje zaključaka o kauzalno-posledičnoj uzajamnoj zavisnosti (Wall et al., 2022). Međutim, uprkos pomenutim metodološkim nedostacima, ova studija preseka dala je korisne rezultate i važnu osnovu za dalja istraživanja, te zato ima i važne implikacije za praksu. Ona pokazuje da ekstrahovani faktori interesovanja prema sportovima, objašnjavaju značajan deo proporcije varijanse u adolescentskom uzrastu, što može pretpostavljati smernice za dalja istraživanja u ovom području.

U narednim istraživanjima bilo bi značajno uključiti ispitanike oba pola u različitim uzrasnim kategorijama, sa teritorije cele Srbije. Pored korišćenja poznatih upitnika za ispitivanje interesovanja prema sportovima, moguće je uzeti u obzir i neke druge varijable za procenu interesovanja (roditelja, nastavnika i dr.). Takođe, uzorak ispitanika treba da obuhvati sve faze adolescencije, u kojima će se ispitati interesovanja ispitanika. Konačno, naredna istraživanja treba da budu longitudinalna ili eksperimentalna, što omogućuje potpunije shvatanje kompleksnih ispitivanih struktura relacija. Značaj ovog istraživanja doprinose faktorskom "skriningu" latentne strukture interesovanja srednjoškolaca prema sportovima, posebno što kod nas, sa ovog aspekta, nije istraživan ovaj problem na srpskoj populaciji. Takođe, rezultati istraživanja omogućuju dijagnostiku, odnosno identifikovanje modela faktorske latentne strukture interesovanja adolescenata prema sportovima. Osim toga, korišćeni merni instrument PS2 ima zadovoljavajuću validnost i pouzdanost, čime se povećava heuristički doprinos rada, kao i praktična implikacija našeg empirijskog istraživanja. Dakle, mogući efekat dobijenih relevantnih nalaza može poslužiti istraživačima u srpskom govornom području kao inicijalna referenca za naredne empirijske studije radi dobijanja novih informacija u konstruktu latentnih dimenzija interesovanja srednjoškolaca (u adolescentskom periodu) prema sportovima.

ZAKLJUČAK

U skladu sa definisanim ciljem i testiranom hipotezom u ovom istraživanju utvrđeno je sedeće: (1) – Adolescenti pokazuju maksimalno interesovanje prema auto-moto sportu, timskim sportovima - fudbalu, košarci, odbojci i rukometu, te borilačkoj veštini - karateu, dok minimalna preferencija pripada sportskoj gimnastici. Takođe, identifikovan je intenzivan doprinos rodnog streotipa u oblasti sporta pošto su interesovanja maturanata uglavnom orijentisana na „muške“ i delimično „neutralne“ sportove. (2) Faktorskom analizom glavnih komponenti, redukcijom 24 manifestne varijable sporta ekstrahovano je pet relevantnih značajnih latentnih dimenzija: (FI) – na otvorenim objektima fizičke kulture, (FII) – borilački sportovi i sportovi snage, (FIII) – sportovi i sportovi sa naglašenom umetničkom dimenzijom (FIV) – sa loptom i reketom (FV) – sa preciznošću. Linearna povezanost izdvojenih zajedničkih latentnih varijabli je statistički značajna na nivou od .05, pozitivnog je smera i niskog ili umerenog intenziteta, što ukazuje da izdvojene latentne varijable nisu međusobno nezavisne, već da egzistira relevantna podudarnost među njima.

Definitivno, uz činjenicu da postoji relativno mali broj radova u kojima je na uzorku srpske populacije istraživana data tema, zaključuje se da ova studija preseka predstavlja skromni doprinos domenu strukture interesovanja prema sportu i identifikovanju zajedničkih faktora koji doprinose formiranju takvog latentnog sklopa u adolescenatskoj populaciji muškog pola u našoj zemlji. Dobijeni podaci su putokaz za buduća longitudinalna istraživanja, uz uključivanje većeg broja varijabli i različitih uzoraka sa teritorije cele Srbije, sa namerom da se komponentnim faktorskim modelom uz signifikantan procenat objašnjene varijanse traga za latentnim varijablama interesovanja adolescenata prema sportovima.

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THE FACTORIAL STRUCTURE OF SPORTS INTEREST IN ADOLESCENTS[1]

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Abstract: The aim of this empirical study was to examine the latent structures of adolescents' interest in sports. The pertinent sample included (N = 144) male high school seniors from Valjevo, of average age 18.05 ± 1.82. The adapted version of the PS2 Questionnaire about Interests in Sports (Prot and Bosnar, 1999) was applied in this transversal research. The maximum mean value of the scores on the PS-2 questionnaire was noted in the preference for auto and motorcycle racing (M = 3.72), and the minimum one in gymnastics (M =1.10). Five main components were extracted by analyzing the main components (PCA) based on the Guttman-Kaiser criterion, with 6.91% of the total variance explained. The extracted five-factor structure of the latent dimensions was interpreted as: outdoor sports, combat sports and martial arts, fundamental and artistic sports, ball and racket sports, and precision sports. The linear correlations of the isolated common factors are statistically significant ($p \leq 0{,}05$), move in positive direction and are of low or moderate intensity, and that shows that the isolated latent variables are not independent, but that there is a relevant overlap between them. The preference of sports interests in the five-factor structure of adolescents is oriented towards "male" and partly towards "neutral" sports which points to the relevance of gender stereotypes in sports. This study also deals with the practical implications of the relevance of the isolated five-factor structure of sports interest in adolescents. This transversal research contributes to the existing literature and empirical data on this rarely examined phenomenon in Serbian sports population.

Keywords: *high school seniors, sports, latent structure, Promax factors*

INTRODUCTION

The last few decades in developmental psychology, but also sociology and other scientific areas have shown that sports interest have significant functions in all phases of human life such as – playing, studying, choosing a vocation, leisure, etc. (Maksić & Tenjović, 2008). The aforementioned authors believe that in the process of determining interests, an adolescent tests their psychophysical skills in the areas that would direct their talents and where they can make creative contributions, whereby the support of family and school plays a significant role.

The authors (Sampedro-Piquero et al., 2023) define *adolescence* as a special age which includes relatively long, interesting, but also complex period of development which each individual has to go through in order to develop from an originally biological organism into a mature person, but it also represents a risk and a chance for

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progress and further development on a complex road to adulthood. The authors also point out that adolescence is characterized by the intense transformations of physical, cognitive, emotional, and social functions.

Sport is a worldwide phenomenon. The initial components of defining sport come from ancient Greece and Rome. Modern sport is a popular social phenomenon and a constituent part of culture. Popular sporting events such as winter and summer Olympic Games, cycling race Tour de France, tennis tournament Wimbledon, FIFA World Cup, etc. are watched by millions of people of various age, gender, race and social status (Azimov et al., 2022). However, there is no consensus regarding the scientific definition of sport which makes operationalization of this term difficult (Brinkmann, 2021; Malčić, 2018). The definitions used in this paper are those by the authors (M. Ivanović & U. Ivanović, 2015) who define sports as "any highly structured physical activity conducted under the rules of fair play, which involves high level of commitment, contains certain elements of play, and includes competing against oneself or an opponent", and (on professional, amateur or school level) involves intense muscle effort to produce movement, promote harmonious physical development and boost work ability, health and the quality of life.

In terms of the significance of health, in China in 2500 BC, it was believed that body develops, stays healthy and ages slower if exposed to physical and athletic activities. Also, in Ancient Rome, the famous physician Galenus recommended physical activity as a way to preserve and improve health. On the other hand, physical inactivity was identified as a globally dominant mortality factor (WHO, 2022). For Serbia and the implications of this paper, the following data is exceptionally significant: in Serbia., every fifth adult is overweight, every third adult smokes, almost half of the population has hypertension, while only half of the population engages in physical activity every day, and 50% of the population does not engage in physical activity at all (Sports Development Strategy in Serbia from 2014 to 2018, 2015). Additionally, the empirical studies (Dorsch et al., 2022) have proven that regular sporting activity has a positive effect on the health of adolescents. However, according to these authors, engaging in physical activity is not at a satisfactory level among young people, even when there are optimal conditions for conducting sporting activities.

According to a recent study (Wang et al., 2022) sports interest in adolescence differs depending on demographic factors such as gender, age, location, lifestyle, season, family support, socio-economic status, media influence, etc. The authors believe that there is small chance that young people would show interest in sport which they have not engaged in before.

The need for a healthy and active lifestyle in adolescence is increasing due to excessively sedentary lifestyle at home and in school, as well as increased weight and obesity (WHO, 2022). However, even though adolescents are aware that sport and physical activity have positive effects on preserving and improving health, they are not physically active enough (Formica et al., 2019; Mišigoj-Duraković, 2018). The recent results (Currie et al., 2023) point out the lack of physical activity among children and young people. According to global data, 28% of people throughout the world (around 1.4 billion adults) do not engage in enough physical activity, i.e. 3,2 million people die each year due to lack of physical activity (WHO, 2022). Therefore, the World Health Organization recommends walking, cycling, swimming and other active recreational activities such as dancing, yoga, tai chi as most common physical activities. This study concludes that overweight adolescents will probably remain overweight in adulthood, which increases the risk of chronic illnesses and leads to increased chances of morbidity and mortality. A recent study has shown (Bull et al., 2020) that due to hypokinesia, over 80% of adolescents do not meet the minimum criteria for conducting physical activity necessary for preserving health. Therefore, with the aim of improving cardiovascular and locomotor system, fitness, decreasing the risk of illness and non-communicable diseases – brain aneurism, breast and colon cancer, as well as depression, the guidelines for adults recommend at least 150 minutes of moderate intensity physical activity weekly (WHO, 2022). In another research, (Grošić & Filipčić, 2019; Prot, 2011; Stojaković, 2019) it has been stated that 61% of adolescents from Zagreb said that they had never exercised regularly nor taken part in any sports competitions. Adolescents today are more connected via technology, media and the Internet than any other generation before. According to certain research findings (Martelli & Porro, 2018), in Italy, approximately 56% of people who quit sports are adolescents. The main reasons for which adolescents quit playing sports are: lack of interest (74,5%), family and economic reasons (15,6%), frustrations over competition (4,9%). Additionally, lack of fun and confidence, social pressure form coach, parents and friends, lack of time and money, injuries, etc. are also reasons for adolescents to quit sports (Sampedro-Piquero et al., 2023). The aforementioned authors have determined that the most influential factors are intrapersonal (lack of fun and enjoyment in sport) and interpersonal (pressure form coach), while those structural are less important, but the most important of them is lack of time.

Summing up the analyses of the aforementioned studies, one can see that the structure of sports interests differs, which largely depends on the operationalization of the research matter. The studies show that sports interest in adolescents is a relevant, but insufficiently explored field in both theory and practice, especially in Serbia. Therefore, based on the given issue, the aim of this transversal research was to examine, on the male adolescent population, the factorial structure of the Questionnaire about Interests in Sports (PS2), check the latent structure of adolescents' interest in sports, and determine the statistically significant relations between the extracted basic dimensions. In accordance with theoretical assumptions, the results of the previous studies and the aim of the research, an *alternative hypothesis* has been formulated (H) – to identify the factorial structure of sports interest and the correlates of the extracted basic dimensions of adolescent high school students. Considering the deficit of research in developmental psychology, especially ones dealing with male adolescents, as well as varying results, this transversal study is expected to provide a clearer insight and better understanding of the factorial structure of sports interest in adolescents.

METHOD

Participants and procedure

The research included the sample (N = 144) of male students from five high schools from Valjevo: Medical school, Valjevo Gymnasium, Technical school, Economy school, and Agricultural school. The average age of participants was 18.05 (SD =1.82). The sum of the scores did not show univariate ($z \geq 2.89$) or multivariate outliers ($\chi 2$ (13) ≥ 40.07, $p \leq 0.01$; Tabachnick & Fidell, 2007).

The research was approved by the science committee of the Serbian Academy of Innovation Sciences from Belgrade and was conducted in accordance with the ethical principles stated in the Declaration of Helsinki. Before the beginning of the research, the participants were informed of the research subject and the method of data anonymization, after which they gave their informed consent. The testing was conducted by trained professionals and supervised by a psychologist. The testing took approximately 30 minutes. The research began after the consent from a school principal had been acquired. The research was conducted in May 2023.

Questionnaire about Interests in Sports – PS_2 (Prot and Bosnar, 1999)

The aim of this questionnaire was to obtain insight into the content, intensity and the frequency of participants' interest in sports. The authors reduced the original measuring instrument that consisted of 54 variables to 25 sports that exist in the Kolubara district. The participants' task was to choose one answer on the five-point Likert-type scale which is used to assess how much each sport affects their sporting activity: 1) a sport that they would never, under any circumstances, want to play, 2) a sport they would not want to engage in unless they had no other options, 3) a sport they would engage in occasionally or under favorable circumstances, 4) a sport they would gladly do, and 5) a sport they would really like to engage in if they had a chance. Allowing them to choose only one option is a way of controlling socially desirable responding. The total score is measured as an arithmetic mean of the answers on all variables.

Data processing

The descriptive statistical methods and factorial analysis of the main components, with the Promax rotation and Kaiser's normalization were used in data processing. The acquired data were analyzed on the $\alpha \leq .05$ Statistics software IMB SPSS 23.

RESULTS

Table 1 shows the main descriptive statistica parameters of the analyzed manifest variables of the measuring instrument applied in the research on the entire sample of the participants.

Table 1. *Descriptive parameters of the analyzed variables of the Questionnaire about Interests in Sports*

Variables	*M*	*SD*	*Sk*	*Ku*	*Sk SE*	*KuSe*	*K-S*
Motorcycle racing	3.72	1.39	.07	.06	.12	.36	.79
Swimming	1.27	1.19	-.22	.98	.12	.36	.85
Skiing	4.01	1.28	.45	.11	.12	.36	.78
Sports fishing	2.43	1.40	.06	-.23	.12	.36	.63
Cycling	3.21	1.29	-.36	.45	.12	.36	.12
Sports aviation	2.96	1.49	.52	.03	.12	.36	.23
Karate	2.67	1.42	.67	.36	.12	.36	.64
Weightlifting	2.96	1.52	-.03	-.57	.12	.36	.18
Wrestling	2.78	1.39	.77	.28	.12	.36	.25
Boxing	3.39	1.40	.05	.34	.12	.36	.37
Judo	2.79	1.28	.28	.49	.12	.36	.45
Dancing	1.79	1.20	.13	.12	.12	.36	.28
Aerobics	1.88	1.25	.90	.05	.12	.36	.15
Athletics	2.59	1.50	-.03	.03	.12	.36	.33
Sports gymnastics	1.10	1.18	-.15	-.18	.12	.36	.46
Football	3.60	1.47	.30	.20	.12	.36	.56
Basketball	3.23	1.29	.26	.05	.12	.36	.24
Volleyball	2.99	1.19	.43	.36	.12	.36	.63
Handball	3.38	1.30	.09	.23	.12	.36	.44
Tennis	3.19	1.28	.35	.59	.12	.36	.70
Table tennis	3.20	1.30	-.48	.46	.12	.36	.28
Shooting	3.19	1.50	.05	-.33	.12	.36	.89
Archery	3.19	1.54	.88	.01	.12	.36	.75
Bowling	2.37	1.09	-.90	.60	.12	.36	.60

Legend: *M* = arithmetic mean; *SD* = standard deviation, *SK* = Skewness, *Ku* = Kurtosis, *SkSE* = Standard error of skewness; *KuSE* = Standard error of kurtosis; *K-S* = Kolmogorov-Smirnov test

The results reveal that the measuring variables show maximum arithmetic mean of the motorcycle racing variable (*M* = 3.72), and minimal on the sports gymnastics variable (*M* = 1.10). The highest value of standard deviation is of the archery variable (*SD* = 1.54), while the lowest dispersion of results can be seen on the bowling variable (*SD* = 1.09). The scores on the Kolmogorov-Smirnov test (*K-S*) for the normality of the data distribution and skewness and kurtosis range within normal values between ±1 (Demir, 2022). That means that there are no statistically relevant variations of the score distribution from the Gaussian distribution curve, which is a prerequisite for conducting further parametric statistical analyses.

For the purpose of better understanding of the measuring subject – adolescents' interest in sports, and if the conditions for factorization were met, two values were tested: Bartlett's test of sphericity which checks if there is statistically significant difference between the correlation matrix and the identity matrix where linear correlations between the variables equal zero, and The Kaiser–Meyer–Olkin test – KMO, which shows the proportion variance explained by the latent factors, or in different words, it measures the level of model adequacy (Wangensteen et al., 2015).

Analyzing the results has shown that the criteria for conducting factorization (χ 2 = 5081,35; KMO = .97; $p \leq$ .01) were met, and based on these parameters, with the risk of less than 1%, it is safe to say that the multivariate statistical method for data reduction can be conducted because the representativeness of the used questionnaire is high.

The multivariate method for data reduction including the principal component analysis (PCA) based on the Guttman-Kaiser criterion of eigenvalues was used, and Table 2 shows the extracted five main components, with ei-

genvalues, which surpass the border value ($\lambda \geq 1.00$), and explain 62.60% of the total variance – the average squared deviation of the results from the arithmetic mean, which is above the recommended value of 60% (Demir, 2022).

Table 2. *Eigenvalues of the factors and the percentage of the explained variance*

Eigenvalues			
Main components	Total	Variance percentage	Cumulative % of explained variance
1	11.26	34.15	34.15
2	3.45	10.50	44.64
3	2.72	8.30	52.90
4	2.02	6.20	59.10
5	1.14	3.49	**62.60**

The first main component, the linear combination of the observed variables, shows clear domination compared to other characteristic squared values because it includes the maximal variability segment of the original group of data and explains 34.15% of the variability, while the second explains 10.53%, the third 8.30%, the fourth 6.20%, and the fifth main component explains the minimal added part of the variation (3.49%). The values of the remaining latent dimensions are not responsible for the data structure and are not included in the final analysis, because their values do not surpass the value of one. Therefore, that information was not significant for the analysis of the observed data (Lam & Choy, 2019). Due to previously considered theoretical reasons, the method of multivariate analyses was conducted on the main components, and they were rotated using the Promax oblimin rotation.

Table 3 shows the correlation coefficients of the set-up and the structure of the five isolated common factors of interest in the 25 analyzed sports. The criteria for eliminating the items included statistically significant factorial saturations with theoretical limit ($\lambda \geq 30$), which means that the interpreted coefficients close to zero suggest that the original variable does not play significant role in creating the main component whose coefficients are being observed. Based on the value of the communality, i.e. the part of the total variance which variables share with factors, it can be concluded that coefficients on the five-factor solution are high, which implies homogeneity.

Table 3. *Factorial saturations with Promax Factors for the Questionnaire about Interests in Sports*

Variables	F_I		F_{II}		F_{III}		F_{IV}		F_V		h^2
	Set-up	Structure	Set-up	Structure	Set-up	Structure	Set-up	Structure	Set-up	Structure	
Motorcycle racing	**.58**	**.49**	.05	.19	.12	-.25	.09	-.29	.04	-.15	.63
Swimming	**.40**	**.47**	.24	.08	-.06	.22	.05	.17	.08	.27	.86
Skiing	**.50**	**.46**	.17	.11	.28	-.03	.16	.07	.29	-.01	.59
Sports fishing	**.62**	**.60**	-.01	.25	-.02	.24	.07	.22	-.05	.18	.83
Cycling	**.41**	**.59**	.13	-.29	.16	.09	.12	-.11	.29	.15	.60
Sports aviation	**.69**	**.66**	.26	.03	-.20	.08	.19	.23	.05	-.16	.85
Karate	.20	-.09	**.59**	**-.80**	.11	.09	.23	.29	.13	.02	.64
Weightlifting	.17	.06	**.60**	**.66**	.16	.25	.06	.15	.28	.03	.87
Wrestling	.19	.03	**.69**	**.73**	.19	-.07	.15	.20	-.02	.17	.50
Boxing	.05	.17	**.80**	**.77**	-.05	.18	.12	.26	.08	.26	.49
Judo	.19	.12	**.57**	**.65**	.19	.10	.22	.09	.26	.07	.84
Dancing	.09	.18	.19	.28	**.69**	**.58**	-.05	.24	-.13	.06	.70
Aerobics	.19	.18	.02	.12	**.58**	**.53**	.27	.05	.16	.23	.62
Athletics	.16	.26	.26	.04	**.65**	**.63**	01	.15	.29	.26	.55
Sports gymnastics	.18	.12	.25	.05	**.62**	**.60**	.19	.23	.26	.16	.73
Football	.28	.09	.17	.20	.08	.12	**.76**	**.73**	.23	.12	.56

Basketball	05	.23	.13	.26	.02	.18	**.67**	**.65**	.28	.09	.74
Volleyball	.27	.13	.04	.20	.15	.19	**.74**	**.72**	.06	.22	.65
Handball	.24	.16	.10	.05	.14	.25	**.64**	**.62**	.17	.02	.82
Tennis	.01	.22	.12	.24	.16	.07	**.68**	**.66**	.25	.18	.53
Table tennis	.23	.14	.19	.03	.12	.25	**.64**	**.62**	.09	.26	.48
Shooting	.21	.06	.18	.27	.15	.24	.22	.06	**.68**	**.73**	.72
Archery	.23	.14	.19	.05	.28	.15	-26	.09	**.65**	**.63**	.84
Bowling	.05	.23	.18	.12	.16	.26	.02	.20	.49	.60	.50
Water polo	.12	.23	.27	.16	.09	.20	**.70**	**.69**	.15	.23	.60
Badminton	.22	.08	.17	.26	.07	.25	**.61**	**.58**	**.62**	**.60**	.56

Legend: Promax factors: F_I – outdoor sports, F_{II} – contact and combat sports, F_{III} – ground and artistic sports, F_{IV} – ball and racket sports, F_V – precision sports; h^2 = communality after extraction; Significant factorial loads in the matrix of set-up and structure are bolded for clarity

Based on the matrix of the set-up and structure of the five-factor solution, hierarchically first latent dimension includes factorial saturations (correlations) of the manifest variables – sports (sports aviation, sports fishing, mountain climbing, motorcycle racing, skiing, cycling, and swimming) which play the biggest part in the total variance. In accordance with the saturations of the linear combinations, the most intense latent variable F_I is interpreted hypothetically as *outdoor sports*. On the second mutual latent dimension, the biggest correlation coefficients can be seen around the manifest variables: karate, wrestling, boxing, and judo. Based on the content of indicators this isolated F_{II} is defined as *martial arts*. The most important orthogonal projections of the vectors of the manifest variable on the third mutual latent dimension have the biggest factorial weights for the manifest variables: dancing, athletics, sports gymnastics, and aerobics. Based on the content of the items, they are grouped into the third latent variable F_{III} identified as *fundamental and artistic sports*. The most important orthogonal projections of the vectors of the manifest variable on the fourth mutual latent dimension have the biggest factorial weights for the manifest variables: football, volleyball, basketball, handball, water polo, table tennis, tennis, and badminton. They are hierarchically grouped in the F_{IV} and based on the factorial weights, named *ball and racket sport*s. Finally, the fifth mutual latent dimension of the greatest factorial saturation – correlation is seen with the manifest variables shooting sports, archery, and badminton. In the extracted five-component model the weakest F_V, with the lowest segment in the total variability, is theoretically interpreted as *precision sports*.

Correlations between the rotated factors of interest in sports are shown in Table 4. These latent dimensions can theoretically be regarded as orthogonal, even though some of them, on an empirical level, statistically significantly correlate.

Table 4. *Intercorrelations between the extracted factors of interest in sports*

Promax factors	F_I	F_{II}	F_{III}	F_{IV}	F_V
F_I	–				
F_{II}	0.37**	–			
F_{III}	0.50**	0.28**	–		
F_{IV}	0.42**	0.34**	0.33**	–	
F_V	0.59**	0.16*	0.44**	0.19*	–

Legend: Promax factors: FI – outdoor sports, FII – martial arts, FIII – fundamental and artistic sports, FIV – ball and racket sports, FV – precision sports; * $p \leq .05$; ** $p \leq .01$

The calculated positive values of the Pearson's correlation coefficients between the main isolated components are statistically significant, of positive direction, of low to moderate intensity, and range from .32 to .59. That shows good criterion value of the isolated five-factor structure. This type of correlations between the factors implies that the isolated latent variables are not mutually independent; instead, there are significant overlaps between them. The

maximum level of co-dependency in the matrix of intercorrelations is manifested between three Promax factors: *outdoor sports, fundamental and artistic sports,* and *precision sports*. On the other hand, minimal strength of the correlation coefficient on the level of statistical error of 5% can be seen between the isolated factors of F_{IV} – *ball and racket sports* and F_{V} – *precision sports*. Therefore, the calculated coefficients show that there is hierarchical correlation between the five isolated latent dimensions. The obtained relations on the examined adolescent population completely match the theoretically expected correlations between the extracted latent variables, which could have been expected due to low to moderate correlations between the variables included in the analyses (Fajgel, 2003).

DISCUSSION

Recent times have shown the intense interest in researching sports interest, and the aim of this research was to identify the factorial structure of the interest in sports of male population and define its basic dimensions. The findings of this empirical study reveal positive interest in sports among high school seniors from Valjevo. The average values of the descriptive statistics parameter reveal that adolescents show maximum interest towards *outdoor sports*: sports aviation, sports fishing, mountain climbing, motorcycle racing, skiing, cycling, and swimming, then towards ball sports such as football, basketball, volleyball, and handball, which is in accordance with the previous results (Martelli & Porro, 2018; Toselli et al., 2023). The high school seniors' interest in football and basketball on the examined sample is probably the consequence of the significant success of the teams from Valjevo and senior national teams which are one of the best in Europe. Identical results have been found in another research (Bosnar et al., 2004) where it has been determined, using the discriminant analysis, that there is higher interest in sports with participants from urban areas where there are proper conditions for certain sports, such as tennis, whereas participants from rural areas tend to show more interest in less attractive sports such as boxing, aerobics, and sports gymnastics. Clear differences in giving advantage to the aforementioned sports are explained by unequal conditions for practicing certain sports, and partly by old fashioned ways in rural areas where people tend to accept more traditional activities.

Bosnar et al. (2002) have analysed the main components in order to examine the factorial structure of sports interest based on age, and they reached the conclusion that the set-up of the interests develops depending on the age of participants, meaning that older students have different attitude towards sport which is manifested through sports that best suit their motor skills. Additionally, researching interest in sports, Gošnik et al. (2011) have found age-based difference. Adolescents manifested greatest preferences towards – football, basketball, table tennis, cycling, and tennis, with football being the most popular sport regardless of the age. Furthermore, other studies (Ding & Chen, 2020; Strandbu et al., 2019) have found that adolescents' interest in sport does not depend solely on demographic characteristics, but also on other elements such as professional experiences, environment and the type of educational program. The participants of this empirical study have shown less interest in artistic sports, which have minimum values of standard deviation, pointing to the homogeneity of the sample, and lower popularity of the so-called "female" sports characterized by flexibility of movement, rhythm and characteristic features of dance. Congruent results have been obtained in a foreign study (Guimarães et al., 2023). Certain studies (Barnett et al., 2018; Strandbu et al., 2019) classified a new transition category based on gender perception – *lifestyle*, positioned between "male" and "neutral" sports (cycling, mountain climbing, etc.) which include endurance as the dominant motor skill.

Applying the factorial analysis of the main components, reducing the results, the examined system of 25 manifest variables of sports was explained using five statistically significant latent dimensions, or the following common factors: (F_{I}) – *outdoor sports*, (F_{II}) – *martial arts*, (F*III*) – *fundamental and artistic sports*, (F_{IV}) – *ball and racket sports*, and (F_{V}) – *precision sports*. The extracted latent variables are in accordance with the previous findings (Lee et al., 2021; Sorkkila et al., 2020; Toselli et al., 2023; Vella et al., 2022).

Adolescents' interest in sport is oriented primarily towards "male" and partially "neutral" sports, where gender stereotypes appear relevant (Aljuhani & Sandercock, 2019; Ding & Chen, 2020). Sports such as parachuting, shooting, swimming, volleyball, table tennis, tennis, skiing, mountain climbing, archery, judo are usually classified as "neutral" (Bergh et al., 2019; Comeaux & Martin, 2018) and are perceived little lower than "male" sports. The relevance of gender "neutral" sports is that they are considered to possess significant capacity for improving gender equality. However, the obtained findings reduce the group of "neutral" sports with the dominance of "male", and indicate that adolescents mostly perceive them as male activities, which is in accordance to some previous stud-

ies (Guimarães et al., 2023). At the same time, one can see that their interests are oriented in opposite direction to gender-typing of sports. Beneficial effects can be expected only if greater balance is reached with adolescents within a certain sport. The aforementioned authors believe that if more adolescents exist within the examined population of a specific "male" sport, they will be perceived as less "male" and vice versa, the more male adolescents there are in "female" sport, such activity will be considered less "female".

The preferred sports which participants of this research are interested in are mainly "male" and to a smaller degree "neutral" sports. It is therefore assumed that the chosen activity is a sign of interest, and that playing such sport can be classified as sports interest (Dorsch et al., 2022). Sports which young people are most interested in are: football, basketball, and volleyball – team sports; karate – a martial art, and cycling – an outdoor sport, which is in accordance with earlier research conducted on a male adolescent population (Eime & Harvey, 2018). Additionally, the following sports were noted: mountain climbing, skiing, shooting, archery, motorcycle racing, and sports aviation, as high school seniors expressed significant interest in them.

The findings of the aforementioned study indicate that the difference in sports interest is greater than the difference in doing sports. There are no favourable weather conditions for skiing in the Kolubara district, which is a limiting factor for skiing. It is likely that a greater number of male high school students would go skiing in a nearby sky resort during winter if they were in a better financial situation. Another limiting factor for doing sports such as sports aviation and motorcycle racing are the financial costs of such activities. Increased prices for archery lessons are the reason why not many adolescents take up the sport even though there is significant interest for it. Finally, the limiting factor is also the residence of participants who live in rural areas, far from a sports airport. Researching the frequency of doing sports and sports interest has shown that providing content and lowering costs would result in increased sporting activity (Guthold et al., 2020). They assume that the following are the main reasons for not engaging in sports: 1) lack of talent for a sport, 2) health issues, 3) non-existence of sport clubs, 4) parental prohibition, and 5) unsuitable time for practicing.

Based on the results obtained in this empirical research the first *alternative hypothesis* tested is accepted (H), and it states: The latent structure of high school seniors' interest in sport is expected to be identified.

To conclude, this transversal study has certain *methodological limitations*, which partly condition the obtained results and need to be analysed while interpreting the results. Firstly, the pertinent sample is not representative of the entire population. In included only males from the same town, in one moment in time, which could have affected the results. This research included only the method of self-assessment for all variables which means that there could be some methodological variations. Seeing how this research was correlational, inverse relations between the examined variables are to be assumed, which prevents us from reaching the conclusion on the cause-effect correlation (Wall et al., 2022). However, despite the aforementioned methodological limitations, this cross-sectional study provided results that are important for future research, and therefore it also has practical implications. It has shown that the extracted factors of sports interest explain the significant part of the proportion of the variance in the period of adolescence, which can serve as a guideline for future research.

Future research should include participants of both genders of various ages, and from all over Serbia. Apart from using the well-known questionnaires to research sports interest, it is possible to take into consideration some other variables for assessing interest (parents, teachers, etc.). Additionally, participant sample should include all phases of adolescence to examine interest. Finally, future research should be longitudinal or experimental, which would enable clearer understanding of these complex structures of relations. The significance, or the contribution, of this research is that to the factorial "screening" of the latent structure of high school students' interest in sports, especially in Serbia because this aspect has not been explored much on Serbian population. Additionally, the research results enable diagnosing, or identifying, the model of factorial latent structure of adolescents' interest in sports. Besides, the PS2 measuring instrument used in this research has satisfactory validity and reliability, which increases the heuristic contribution of this paper, as well as the practical implications of the research. Therefore, the possible effect of the obtained relevant findings can serve other researchers from Serbia as an initial reference for further empirical research with an aim to obtain new information within the construct of the latent dimensions of high school students' interest in sport.

CONCLUSION

In accordance with the aim of the research and the tested hypothesis, the following has been found: (1) – adolescents show maximum interest towards motorcycle racing, team sports – football, basketball, volleyball, and handball, and the martial art of karate, while they show minimal preference towards gymnastics. Additionally, there is significant contribution of gender stereotypes in sport as male high school seniors are more oriented towards "male" and somewhat towards "neutral sports". (2) The factorial analysis of the main components, by reducing 24 manifest variables of sports, led to the extraction of five relevant latent dimensions: (F_I) – *outdoor sports*, (F_{II}) – *martial arts*, (F_{III}) – *fundamental and artistic sports*, (F_{IV}) – *ball and racket sports*, and (F_V) – *precision sports*. The linear connection of the extracted common latent variables is statistically significant on the level of .05, has positive direction and low to moderate intensity, which means that those latent dimensions are not independent, but that there is certain overlap between them.

To sum up, considering that there is relatively small number of studies on this matter with Serbian population as participant sample, this cross-sectional study is a humble contribution to the structuring of sports interest and identifying common factors which play part in creating such latent structure in male adolescent population in Serbia. The obtained data can serve as guidelines for future longitudinal research, with the inclusion of a greater number of variables and various samples form the entire country, and with the aim of finding latent variables of adolescents' interest in sports by using component factorial model with the significant percentage of the explained variance.

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