

THE FACTORIAL STRUCTURE OF SPORTS INTEREST IN ADOLESCENTS¹

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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 from 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 from 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 ($\chi^2(13) \geq 40.07, p \leq 0.01$; 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 – PS₂ (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 IBM SPSS 23.

RESULTS

Table 1 shows the main descriptive statistical 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	<i>M</i>	<i>SD</i>	<i>Sk</i>	<i>Ku</i>	<i>Sk SE</i>	<i>KuSe</i>	<i>K-S</i>
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 ($\chi^2 = 5081,35$; $KMO = .97$; $p \leq .01$) 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*

Main components	Eigenvalues		Cumulative % of explained variance
	Total	Variance percentage	
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 sports*. 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: F_I – outdoor sports, F_{II} – martial arts, F_{III} – fundamental and artistic sports, F_{IV} – ball and racket sports, F_V – 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. It 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 from 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.

REFERENCES

1. Aljuhani, O., & Sandercock, G. (2019). Contribution of physical education to the daily physical activity of schoolchildren in Saudi Arabia. *International Journal of Environmental Research and Public Health*, 16(13), 2397. <https://doi.org/10.3390/ijerph16132397>
2. Azimov, A., Azimova, M., & Melikuziev, A. (2021). Razработка naučnih osnov podgotovki sportivnogo rezerva. *Obučestvo i inovacii*, 2(8), 283–286.
3. Barnett, L.M., Lubans, D.R., & Timperio, A. (2018). What Is the Contribution of Actual Motor Skill, Fitness, and Physical Activity to Children’s Self-perception of Motor Competence? *Journal of Motor Learning and Development*, 6(2), 461–S473. <https://doi.org/10.1123/jmld.2016-0076>
4. Bergh, R., Davis, G.K., Hudson, S.-k.T.J., & Sidanius, J. (2019, December). Social dominance theory and power comparison. In J. Suls (Ed.), *Social comparison, judgment, and behavior* (pp. 575–597). Oxford Academic.
5. Bosnar, K., Gošnik, J., Hošek-Momirović, A., & Prot, F. (2004). The comparison of sport interests in metropolitan and small town elementary school boys. In R. Pišot, V. Štemberg, J. Zurc & A. Obid (Eds.), *Abstracts and Proceedings of 3rd International Symposium „A child in motion”* (pp. 48-49). Koper: University of Primorska Znanstveno- raziskovalno središče.
6. Bosnar, K., Gošnik, J., & Prot, F. (2002). Primerjava latentnih struktur preferenc športov pri dečkih različne starosti. U R. Pišot, V. Štemberger, F. Krpač i T. Filipčič (Ur.), *Zbornik prispevkov 2. mednarodnega znanstvenega in strokovnega posveta „Otrok v gibanju”* (str. 189-195). Ljubljana: Univerza v Ljubljani,
7. Brinkmann, M. (2021). Die Wiederkehr des Übens. *Praxis und Theorie eines pädagogischen Grundphänomens* [Return of Practising: Practice and Theory of a Fundamental Phenomenon in Pedagogy]. Stuttgart: Kohlhammer.
8. Bull, F.C., Al-Ansari, S.S., & Biddl, S. (2020). World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *British Journal of Sports Medicine*, 54, 1451–1462.
9. Comeaux, E., & Martin, A. (2018). Exploring NCAA Division I athletic administrator perceptions of male and female athletic directors’ achievements: A photo elicitation study. *Sociology of Sport Journal*, 35(2), 132–140. <https://doi.org/10.1123/ssj.2016-0167>
10. Currie, C., Zanotti, C., Morgan, A., Currie, D., de Looze, M., Roberts, ... Barnekow, V. (2023). *Social Determinants of Health and Well-Being among Young People: Health Behaviour in School-Aged Children (HBSC) Study: International Report from the 2009/2010 Survey*; World Health Organization, Regional Office for Europe. Health Policy for Children and Adolescents, 6, <https://doi.org/apps.who.int/iris/handle/10665/326406>.

11. Demir, S. (2022). Comparison of Normality Tests in Terms of Sample Sizes under Different Skewness and Kurtosis Coefficients. *International Journal of Assessment Tools in Education*, 9(2), 397–409. <https://doi.org/10.21449/ijate.1101295>
12. Ding, L.H. & Chen, J.C. (2020). A survey on the current status of physical activity of college freshmen: Taking Central China Normal University as an example. *Journal of Hubei Sports Science*, 39, 554–557.
13. Dorsch, T.E., Smith, A.L., Blazo, J.A., Coakley, J., Côté, J., Wagstaff, C.R.D., Warner, S., & King, M.Q. (2022). Toward an Integrated Understanding of the Youth Sport System. *Research Quarterly for Exercise and Sport*, 93(1), 105–119. <https://doi.org/10.1080/02701367.2020.1810847>.
14. Eime, R.M., & Harvey, J.T. (2018). Sport participation across the lifespan: Australian trends and policy implications. In R.A. Dionigi & M. Gard (Ed.), *Sport and physical activity across the lifespan* (pp. 23–43). Palgrave Macmillan.
15. Fajgel, S. (2003). *Psihometrija, metod i teorija psihološkog merenja*. Beograd: Centar za primenjenu psihologiju.
16. Formica, I., Pellerone, M., Iacolino, C., Falduto, M.L., Gualtieri, S., Calabrese, L., ... Romeo, V.M. (2019). Impairment of the Body Image: Perceptions and Subjective Evaluations in Adolescents and Young Adults. *World Futures*, 75, 393–409.
17. Gošnik, J., Fučkar Reichel, K., Špehar, N., & Sedar, M. (2011). Povezanost bavljenja sportom s interesima za akademske teme iz kineziologije. U V. Findak (Ur.), *Zbornik radova 20. ljetne škole kineziologa Republike Hrvatske „Dijagnostika u područjima edikacije, sporta, sportske rekreacije i kineziterapije“* (str. 183-189). Zagreb: Hrvatski kineziološki savez.
18. Grošić, V., & Filipčić, I. (2019). Tjelesna aktivnost u poboljšanju psihičkog zdravlja. *Medicus*, 28(2), 197–203.
19. Guimarães, J.P., Fuentes-García, J.P., González-Silva, J., & Martínez-Patiño, M.J. (2023). Physical Activity, Body Image, and Its Relationship with Academic Performance in Adolescents. *Healthcare*, 11(4), 602. <https://doi.org/10.3390/healthcare11040602>
20. Guthold, R., Stevens, G.A., Riley, L.M., & Bull, F.C. (2020). Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1·6 million participants. *Lancet Child & Adolescent Health*, 4, 23–35.
21. Lam, B.S.Y., & Choy, S.K. (2019). A Trimmed Clustering-Based 11-Principal Component Analysis Model for Image 25.
22. Lee, W., Jones, G.J., Hyun, M., Funk, D.C., Taylor, E.A., & Welty Peachey, J. (2021). Development and transference of intentional self-regulation through a sport-based youth development program. *Sport Management Review*, 24(5), 770–790. <https://doi.org/10.1080/14413523.2021.1907973>
23. Maksić, S., & Tenjović, L. (2008). Povezanost interesovanja i verbalna fluentnost kod učenika osnovne škole. *Psihologija*, 41(3), 311–325.
24. Malčić, B. (2018). Fizička aktivnost u detinjstvu kao prediktor sportsko-rekreativnih interesovanja u odrasloj dobi. *Pedagoška stvarnost*, 1, 76–89.
25. Martelli, S., & Porro N. (2018). *Nuovo manuale di sociologia dello sport e dell'attività fisica* (2a edizione). Milano (I): Franco Angeli.
26. Mišigoj-Duraković, M. (2018). Tjelesno vježbanje i zdravlje (2. dopunjeno izdanje). Zagreb: Znanje.
27. Prot, F. (2011). Postignuće u sportu i bavljenje sportovima zagrebačkih maturanata i maturanata. U I. Prskalo i D. Novak (Ur.), *Zbornik radova 6. Kongresa FIEP-a Europe „Tjelesna i zdravstvena kultura u 21. stoljeću - kompetencije učenika“* (str. 660-666). Zagreb: Hrvatski kineziološki savez.
28. Sampedro-Piquero, P., Zancada-Menéndez, C., Bernabéu-Brotons, E., & Moreno-Fernández, R.D. (2023). The Relationship between Binge Drinking and Binge Eating in Adolescence and Youth: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, 20(1), 232. <https://doi.org/10.3390/ijerph20010232>
29. Sorkkila, M., Ryba, T.V., Aunola, K., Selänne, H., & Salmela-Aro, K. (2020). Sport burnout inventory–Dual career form for student-athletes: Assessing validity and reliability in a Finnish sample of adolescent athletes. *Journal of Sport and Health Science*, 9(4), 358–366. <https://doi.org/10.1016/j.jshs.2017.10.006>
30. Stojaković, M. (2019). *Važnost tjelovježbe za psihofizičko zdravlje osoba svih životnih dobi* (Doktorska disertacija). Split: Kineziološki fakultet.

31. Strandbu, Å., Bakken, A., & Sletten, M.A. (2019). Exploring the minority–majority gap in sport participation: Different patterns for boys and girls? *Sport in Society*, 22(4), 606–624. <https://doi.org/10.1080/17430437.2017.1389056>
32. Strategija razvoja sporta u republici Srbiji za period 2014-2018. godine. (2015). Beograd: *Službeni glasnik Republike Srbije*, 1/2015.
33. Toselli, S., Zaccagni, L., Rinaldo, N., Mauro, M., Grigoletto, A., Latessa, P.M.,... & Marini, S. (2023). Body Image Perception in High School Students: The Relationship with Gender, Weight Status, and Physical Activity. *Children*, 10(1), 137.
34. Vella, S.A., Mayland, E., Schweickle, M.J., Sutcliffe, J.T., McEwan, D., & Swann, C. (2022). Psychological safety in sport: A systematic review and concept analysis. *International Review of Sport and Exercise Psychology*, 1–24. <https://doi.org/10.1080/1750984X.2022.2028306>
35. Wall, A.E., Simmering, M.J., Fuller, C.M., & Waterwall, B. (2022). Manipulating Common Method Variance via Experimental Conditions. *The Electronic Journal of Business Research Methods*, 20(1), 49–61.
36. Wang, Y., Li, P., Zhang, B., & Han, Y. (2022). Does Cognitive Attitude Matter When Affective Attitude Is Negative in Physical Activity Behavior Change? *Research Quarterly for Exercise and Sport*, 1–9. <https://doi.org/10.1080/02701367.2022.2111021>
37. Wangensteen, S., Johansson, I.S., & Nordström, G. (2015). Nurse Competence Scale–psychometric testing in a Norwegian context. *Nurse education in practice*, 15(1), 22–29.
38. World Health Organization. (2022). *Global Status Report on Physical Activity*. Geneva, Switzerland, pp. 1–2.