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Assessing Motivational Factors in Young Serbian Athletes: A Validation Study of the Sport Motivation Scale-II

Damjan Jakšić[a*], Jovana Trbojević Jocić[b], Marko Manojlović[a*]

[a]*University of Novi Sad, Serbia*
[b]*University of Kragujevac, Serbia*

*Corresponding author. E-mail: markomanojlovic1995@gmail.com

Background. Motivation is considered crucial in sports participation and performance, influencing athletes' psychological well-being, investment in training, and interpersonal relationships. Self-determination theory (SDT) is a prominent framework used to understand motivation in sports, highlighting the importance of autonomous motivation for optimal performance and well-being. A large number of questionnaires for examining processes in sports were created by relying on the constructs of SDT.

Objective. This study explores the psychometric characteristics (construct validity) of the Sport Motivation Scale II (SMS-2), as well as gender and age differences in motivation among young Serbian athletes. This questionnaire has proven to be important for understanding the motivation of adult athletes, but so far, its psychometric characteristics have not been sufficiently examined on a sample of young athletes in Serbia. Given the high dropout rate from sports in adolescence, valid questionnaires to assess the motivation of young athletes can help to identify athletes who are at risk of leaving a sport.

Design. The sample consisted of 365 young athletes (51% girls, aged 12–16) from Serbia participating in team sports (at an organized level, not a recreational level), including volleyball, basketball, and handball. They completed the SMS-2 using paper and pen, in the presence of a psychologist and with parental consent obtained by the clubs. The questionnaire has been translated into Serbian. Young athletes from team

Keywords: SMS-2, motivation, youth sports, adolescence, handball, volleyball, basketball

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sports were selected due to the large number of adolescents in Serbia who are engaged in organized team sports. There is a small number of adolescents who are involved in organized individual sports.

Results. Factor analysis of the SMS-2 revealed six factors, in line with the original structure of the Scale: identified motivation, intrinsic motivation, amotivation, external motivation, integrated motivation, and introjected motivation. The questionnaire demonstrates satisfactory psychometric properties, with Cronbach's alpha coefficients indicating good internal consistency. Gender differences were obtained only in external motivation, where boys scored higher than girls. No significant differences emerge in motivation across age groups or among athletes participating in different sports. It is possible that differences were not found in relation to the type of sport because there are similarities in the process of working with young athletes in team sports.

Conclusion. The Sport Motivation Scale II (SMS-2) showed satisfactory psychometric characteristics in a Serbian sample of young athletes. The original structure was replicated, with six factors representing six types of motivation, in line with SDT. These findings suggest the SMS-2's validity across gender, age, and sport types, offering a valuable tool for assessing motivation in young athletes engaged in organized team sports.

Introduction

Motivation is one of the most frequently investigated factors in sports participation and performance; thus, it is not surprising that a large number of studies connect motivation with staying in sports (e.g., Trbojević & Petrović, 2021), the psychological well-being and mental health of athletes (Sheehan et al., 2018), the degree of investment in the training process (Pope & Wilson, 2012), sports results (Gillet et al., 2010), cognitive processes such as coping (Mouratidis & Michou, 2011), and the quality of interpersonal relationships (Chang et al., 2020). Research into motivation is still a current and important topic for a better understanding of both success in sports and the process within the athletes themselves.

Motivation for Sports

The broadest understanding of motivation is that it is an activation process: initiating, directing, and regulating a person's activities towards a certain goal (Vallerand & Thill, 1993). Considering that motivation is a latent variable, its measurement is, therefore, a complex task.

When creating a questionnaire for assessing sports motivation, the authors started from different theoretical positions, such as Self-Efficacy Theory (Bandura, 1997) and Achievement Goal Theory (Ames, 1992; Nicholls, 1989). However, in recent years, one of the most frequently applied and examined theories is Self-Determination Theory (SDT, Deci & Ryan, 1985; Ryan & Deci, 2017), which has also found application in the sports context.

SDT is a macro theory that observes human processes from the viewpoint of volition and autonomy, and asserts that if we approach an activity with the experience of choice and autonomy, we will be more successful in its performance — i.e., the more autonomous, more willing our motivation is, the more successful we will

be and the better our psychological well-being. SDT deals explicitly with the issue of motivation as a multidimensional construct that extends on a continuum from amotivation (when an individual has no desire and intention to participate in an activity) through external motivation (when an individual is active only because of the external value that the activity brings) to intrinsic motivation (participation for satisfaction) (Trbojević & Petrović, 2021). According to SDT, the individual tries to integrate and organize values, regulatory processes, and experiences from the environment into the self (Weinstein & DeHaan, 2014). The tendency towards integration takes place within the individual over time, but also between the individual and others. The goal of integration is the formation of autonomous self-regulation that entails internalized personal values, beliefs, and interests that encourage voluntary actions (Weinstein & DeHaan, 2014).

SDT distinguishes six types of motivation that differ in relation to the level of autonomy and control, such as amotivation, external motivation, introjected motivation, identified motivation, integrated motivation, and internal motivation.

Amotivation is the absence of motivation due to low self-regulation or autonomy; the experience of incompetence mainly accompanies it. In the context of sports, athletes with amotivation feel incompetent and do not know why they play sports.

Concerning *external motivation*, behaviour is regulated by external factors like reward and punishment, and the athletes, for example, play sports to win a medal or to avoid criticism.

Introjected motivation represents behaviour regulated by internal contingencies of self-esteem and self-regard, i.e., intrapersonal rewards and punishments that motivate action and performance efforts (Ryan et al., 2023). Thus, athletes with introjected motivation participate in sports activities because they would feel bad if they did not set aside time for them. In addition, athletes feel they must compete in sports, and not because they want to. Athletes also engage in activities to increase their self-confidence and improve their self-image based on external factors, because the values are not internalized.

Identified motivation implies that an individual behaves in a way that will enable the achievement of a relevant goal (Lonsdale et al., 2009). This type of regulation is more autonomous than external and introjected motivation. It implies, before internalization, an evaluation of a goal or value. Internalization will occur if the goal or value is assessed as relevant to the individual. Athletes with identified motivation engage in sports to develop certain parts of their personality that they consider important.

Integrated motivation is to the greatest extent autonomous and self-regulated compared to other forms of motivation. Integrated motivation implies that regulations are assimilated with the self and are integral to beliefs based on personal needs (Ryan & Deci, 2000).

Internal motivation refers to participation in activities that spontaneously lead to a reward and new knowledge, causing enjoyment and satisfaction of basic needs. This type of motivation is autonomous, because a person's behaviour is based on initiative with a high degree of satisfaction, enjoyment, and conscious selection of activities.

The specificity of sports is reflected in the fact that a person cannot be successful without training, and according to the theory of deliberate practice (Ericsson et al., 1993), a larger number of deliberate practice hours is necessary to be successful, rather than innate talent. Deliberate practice involves effortful activity that is closely connected with motivation — person needs to be motivated to practice for hours and hours, which are aimed at improving one's performance, but are sometimes not so enjoyable, or do not lead directly to rewards (Rottensteiner et al., 2013).

Research has recognised different types of motivations for playing sports in relation to the training process, competition, and type of sport. Thus, motivation for achievement is more pronounced during competitions, and internal forms of motivation that are focused on investing effort and learning are more prevalent during the training process, in athletes in both individual and team sports (van de Pol & Kavussanu, 2012). Young athletes, who are still at the stage of sports specialization and have not progressed to the stage of professional sports, achieve slightly higher scores on intrinsic motivation (Rottensteiner et al., 2015) than athletes who play sports professionally (Stewart & Meyers, 2004).

Athletes' motivation during adolescence comes through a series of changes — the training system itself changes, there is more training and competition, with greater scope — all of which can affect the process and stability of motivation. Bearing in mind that motivation is one of the factors in further sports participation and achievement in sports, testing the motivation of young athletes is especially important with the aim of overcoming the negative consequences of amotivation both for performance and retention, as well as for the mental health and well-being of young athletes.

Testing Motivation for Sports

The instruments created so far are mostly self-report questionnaires; six questionnaires are most often used in sports psychology, which aim to assess the motivation of athletes (Clancy et al., 2017): the Sport Motivation Scale (Pelletier et al., 1995), the Intrinsic Motivation Inventory (McAuley et al., 1989), the Situational Motivational Scale (Guay et al., 2000), the Perceptions of Success Questionnaire (Roberts et al., 1998), the Behavioral Regulation in Sport Questionnaire (Lonsdale et al., 2008), and the Task and Ego Orientation in Sport Questionnaire (Duda, 1989).

Guided by the principles of SDT, in 1995, French researchers created the Sport Motivation Scale (Pelletier et al., 1995), one of the most frequently used questionnaires, which was translated and implemented among athletes from various countries. The scale aims to measure different types of motivation for sports. The scale consists of 28 items that form intrinsic motivation subscales (IM-to know, IM-to accomplish, IM-to experience), extrinsic motivation (identified regulation, introjected regulation, external regulation), and amotivation.

The authors of the scale decided to revise it, and in 2013, they created the Sport Motivation Scale II (SMS-2, Pelletier et al., 2013). The need for a revised version of the questionnaire arose because the original scale was not fully in line with the SDT, so that both the metric characteristics and the factor structure of the questionnaire oscillated when applied in different countries and at various ages (Pelletier

et al., 2013). To improve certain items, the authors added a subscale of integrated motivation and shortened the scale to make its use easier and faster (Pelletier et al., 2013).

The revised scale consists of 18 items and measures six types of motivation defined according to SDT. The fit indices ranged from satisfactory to very good (RMSEA = .07; RMSEA 90% CI = .05-.08; CFI = .94; NFI = .90; TLI = .92), while the item factor loadings ranged between .47 and .95 (Pelletier et al., 2013).

Available studies have largely examined the factor structure and psychometric characteristics of the original scale for motivation for sports (e.g., Bayyatet al., 2016; Komarc et al., 2020; Mladenović & Stojanović, 2022), and research on the revised scale is somewhat scarce, but current. The revised SMS-2 scale was translated into French (Pelletier et al., 2019), Chinese (Li et al., 2018), Turkish (Ocal & Sakalli, 2018), Spanish (Granero-Gallegos et al., 2018), and Portuguese (Junior et al., 2014; Rodrigues et al., 2021). On a sample of Turkish athletes in various sports (individual and collective), SMS-2 proved to be a good six-factor solution, where Cronbach's alpha for the total scale was .76 and .72 for intrinsic, .61 for integrated, .81 for identified, .55 for introjected, .73 for external, and .72 for amotivation (Ocal & Sakalli, 2018). The Persian adaptation of the SMS-2 also proved to be valid, with the original six-factor solution and good internal consistency (intrinsic = .80, integrated = .78, identified = .77, introjected = .75, external = .77, amotivated = .80, and the total = .79) (Kashani, 2016).

The validity of the scale was examined primarily in a population of athletes, who are often students who attend faculties for sports science. One of the few available studies that examined a sample of younger athletes (from 16 to 21 years of age) engaged in various individual and team sports was conducted in Malaysia (Chin et al., 2021), where the proposed six-factor solution of the SMS-2 was obtained, but with somewhat weaker internal validity: .71 intrinsic, .73 integrated, .75 identified, .46 introjected, .61 external, and .52 amotivation.

When examining the motivational profile of young athletes of both sexes in team sports, based on questionnaires based on Self-Determination Theory and Achievement Goal Theory, researchers found that the largest number of young athletes, about 36%, belong to the category of athletes in whom the autonomous form of motivation and the controlling form of motivation are equally expressed, and 28% belong to the category of highly expressed and autonomous and controlling motivation (Rottensteiner et al., 2015).

Most of the studies that explored gender differences in the motivation for sports either included recreational sports, were conducted on a student population, or applied questionnaires that did not refer so much to internal motivation processes, but were more focused on defining different motives such as social motives, competition motives (*e.g.*, Malčić, 2012), or goal orientation. Such studies have generally found that women gravitate toward social and affiliative motives for playing sports and men more toward competitive motives and ego orientation (*e.g.*, Flood & Hellstedt, 1991; Murcia et al., 2007). In addition, it should also be noted that men score higher on intrinsic and extrinsic motivation to engage in physical activity than women (*e.g.*, Sáez et al., 2021). In the adolescent population, some research

found that boys and girls differ in motives for physical activity, where boys achieve higher scores on motives such as socializing, competition, enjoyment, social recognition, and strength and persistence, and girls on motives like appearance, agility, maintaining and improving health, and body mass control (Ivanović & Ivanović, 2018). Regarding investigations that applied the SMS-2, gender differences were not recorded in most types of motivation for playing sports, but it was found that males achieved higher scores on extrinsic motivation than females — i.e., that girls achieved the highest scores in intrinsic motivation and lower in extrinsic motivation than boys (Miller, 2000; Recours et al., 2004). Similar results were obtained in a study performed on a sample of adolescents from Norway. Girls achieved higher scores on intrinsic motivation for playing sports and boys on extrinsic motivation (Jakobsen & Evjen, 2018).

Scientific evidence with respect to the age differences in motivation is quite scarce. Studies pertaining to young athletes and adolescents were mostly conducted outside the framework of organized sports and more in the context of physical activity in general. Thus, research conducted on Greek adolescents examined age differences in the motivation for attending physical education classes, where older adolescents achieve lower scores on internal motivation (Digelidis & Papaioannou, 1999). A study conducted on athletes aged 11 to 19 revealed that self-determining motivation decreases with age — i.e., that the degree of autonomous motivation for playing sports decreases with age (Guzman and Kingston, 2012). The studies support the hypothesis (and experience of sports organizations) that adolescence is a risky age period for dropping out of sports due to a decrease in motivation for playing sports.

Just as research aimed at determining gender and age differences in motivation for playing sports among young athletes is rare, so is research that has dealt with the question of whether there are differences in motivation for playing sports in relation to the type of sport played at this age. Some studies have shown that athletes who play individual sports achieve lower scores on enjoyment as an internal motive for playing sports, compared to athletes who play team sports (Jakobsen, 2014), while some studies have obtained the opposite findings (Howard et al., 2018).

In terms of athletes in Serbia, studies were directed toward the examination of the original scale (e.g., Mladenović & Stojanović, 2022; Vesković, 2012), whereas until now, no research on the revised scale had been conducted on young Serbian team sports athletes. The topic of motivation among younger athletes is of particular importance, since adolescence is the period when the largest number of children drop out not only from physical activity, but also from organized sports (Trbojević & Petrović, 2021).

The aim of this research is to apply and validate the Sport Motivation Scale-II among young Serbian athletes, contributing to the comprehensive understanding of motivational factors in the context of sports engagement. Also, our aim is to examine gender and age differences in motivation, as well as differences in relation to the type of sport.

Methods

Participants

The sample consisted of 365 young athletes from Serbia, province of Vojvodina (51% girls) aged 12 to 16 years (mean = 13.79, SD = 1.25), who train in basketball (N = 131), volleyball (N = 125), and handball (N = 109). They trained three to five times a week (average of eight hours of training per week), 80% of them trained in only one sport at the time of the research. They all trained and competed at the club level in an organized manner. More details relating to the participants' characteristics are provided in *Table 1*.

Table 1

Characteristics of the Sample

Variables	Girls	Boys	Total
Age category			
12 years	36	21	57
13 years	57	63	120
14 years	34	34	68
15 years	42	40	82
16 years	19	19	38
Type of sport			
Volleyball	65	60	125
Basketball	65	66	131
Handball	56	53	109

Procedure

The first phase of the research included the preparation and translation of the questionnaire from English to Serbian by a sports psychologist. The author's consent was previously obtained for the use of the questionnaire. During the translation, linguistic constructions were considered to make them understandable to adolescents.

The second phase of the research entailed establishing contacts with sports clubs of the Autonomous Province of Vojvodina in the domain of collective, indoor sports, including volleyball, basketball, and handball. A public invitation to participate in the research was sent to clubs from the territory of Vojvodina.

The third phase of the research involved data collection. The inclusion criteria to participate in this study were: (a) to be actively training in a sports club during the time of data collection; (b) to be actively training in the same sport for at least 1 year and at least 4 months in their current club; (c) to be actively training in sports such as volleyball, basketball, or handball; (d) to consent to participate in the study. Young athletes from team sports were selected due to the large number of adolescents in Serbia who are engaged in organized team sports, but also because of the high rates of

adolescents who drop out of these three sports in Serbia. There is a small number of adolescents who are involved in organized individual sports, so the sample was based on the accessibility criterion.

Data was collected during 2017 in Vojvodina. Data collection was carried out on the premises of the clubs, on the field itself, or in the dressing rooms. Of note, the athletes were alone with the psychologist while filling out the questionnaire. The procedure had been previously explained to them, as well as that the data would not be publicly available but would be used strictly for scientific purposes, and that only the psychologist conducting the research would have access to their answers. The coaches were also informed that they would not have access to their athletes' answers and were asked to leave the room while the athletes completed the questionnaire. Filling out the questionnaire took an average of 15 minutes. The working conditions were not at a high level due to the lack of adequate space when filling out the questionnaires, as well as the fact that some respondents filled out the questionnaires immediately after or immediately before training, which led to reduced motivation to work.

Instruments

The Sport Motivation Scale-II (SMS-2, Pelletier et al., 2013) consists of 18 items that measure intrinsic motivation (*e.g.*, "Because it is very interesting to learn how I can improve"), identified motivation (*e.g.*, "Because I found it is a good way to develop aspects of myself that I value"), introjected motivation (*e.g.*, "Because I would feel bad about myself if I did not take the time to do it"), integrated motivation (*e.g.*, "Because practicing sports reflects the essence of whom I am"), extrinsic motivation (*e.g.*, "Because people I care about would be upset with me if I didn't"), and amotivation (*e.g.*, "I used to have good reasons for doing sports, but now I am asking myself if I should continue"). In the original questionnaire, the athlete answered on a seven-point Likert scale to what extent a certain reason for playing sports applies to him or her. A five-point Likert scale was employed on the sample of the current study, since the questionnaire was filled out by young adolescents, for whom it turned out that the five-point scale was more comprehensible.

Data Analysis and Research Design

The study was an instrumental study within empirical studies based on a quantitative methodology (Montero & León, 2007).

Data analysis was conducted on ordinal data, necessitating specialized statistical procedures. Spearman rank correlation was employed to assess the relationships between variables, with the resulting Spearman's matrix serving as the foundation for subsequent factor analysis. It is noteworthy that the factor analysis was carried out using Promax rotation. Four distinct criteria, involving Kaiser-Guttman's, Parallel, Optimal Coordinates, and Acceleration Factor Criteria, were employed to determine the significance of the identified factors. Importantly, the factor analysis was performed not on the raw matrix but on Spearman's matrix, emphasizing the robustness of the analytical approach. The analysis was conducted using R 4.3.2,

Table 2

Spearman's Intercorrelation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	1.	11.	12.	13.	14.	15.	16.	17.	18.
1. SMS1		.038	.045	.002	.000	.001	.000	.000	.200	.718	.514	.000	.194	.010	.019	.000	.049	.033
2. SMS2	.106		.100	.000	.002	.602	.287	.000	.092	.000	.000	.505	.000	.004	.019	.388	.000	.701
3. SMS3	.102	–.084		.000	.630	.000	.031	.277	.000	.017	.001	.000	.029	.000	.383	.003	.000	.000
4. SMS4	.156	–.198	.202		.624	.004	.045	.754	.000	.000	.000	.084	.000	.000	.919	.000	.000	.035
5. SMS5	.288	.162	.025	.025		.008	.000	.000	.238	.003	.870	.044	.002	.907	.000	.000	.178	.292
6. SMS6	.167	–.027	.209	.147	.136		.000	.064	.000	.910	.002	.000	.693	.000	.002	.000	.001	.000
7. SMS7	.418	.055	.110	.103	.253	.202		.000	.021	.804	.149	.001	.113	.000	.000	.000	.145	.002
8. SMS8	.278	.204	.056	.016	.524	.095	.331		.559	.013	.019	.014	.006	.304	.000	.000	.008	.050
9. SMS9	.066	–.086	.385	.253	–.060	.197	.118	–.030		.015	.000	.000	.001	.000	.822	.000	.000	.000
1. SMS10	.019	.449	–.122	–.225	.149	–.006	.013	.126	–.125		.000	.533	.000	.001	.148	.170	.000	.139
11. SMS11	.033	–.227	.169	.446	.008	.156	.074	–.120	.219	–.270		.004	.000	.000	.507	.000	.000	.002
12. SMS12	.202	.034	.242	.088	.103	.464	.166	.126	.321	–.032	.147		.146	.000	.084	.000	.000	.000
13. SMS13	.066	.361	–.111	–.233	.155	–.020	.081	.141	–.166	.535	–.317	–.075		.019	.064	.758	.000	.619
14. SMS14	.131	–.148	.269	.285	–.006	.269	.192	.053	.335	–.168	.295	.278	–.120		.008	.000	.000	.000
15. SMS15	.120	.120	–.045	.005	.310	.154	.178	.363	–.012	.074	.034	.088	.095	.135		.000	.491	.006
16. SMS16	.312	.044	.151	.177	.239	.292	.376	.213	.278	–.070	.182	.293	–.016	.331	.233		.000	.000
17. SMS17	.101	–.187	.308	.272	–.069	.177	.075	–.135	.530	–.234	.275	.210	–.263	.311	–.035	.290		.000
18. SMS18	.109	–.020	.269	.108	.054	.577	.158	.100	.317	–.076	.161	.561	–.026	.338	.139	.390	.261	

a language and environment for statistical computing (R Core Team, 2023). R is available from the R Foundation for Statistical Computing, Vienna, Austria (https://www.R-project.org/), leveraging libraries such as ggstatsplot, metan, ggcorrmat, corrgram, nFactors, and psych to ensure comprehensive and rigorous data exploration. Cronbach α coefficients were also calculated for inter-item reliability. For differences between gender, age, and sports, Mann-Whitney and Kruskall-Wallis tests were applied.

Results

We present the results in the following order: First, we show the Spearman correlation matrix to illustrate the relationships between the ordinal variables. Next, we detail the results of the factor analysis, including the extraction of significant factors

Table 3

Pattern Matrix Based upon Correlation Matrix

Variable	RC1	RC4	RC3	RC2	RC6	RC5	h^2	u^2	com
SMS–18	**.883**	.064	–.008	–.003	–.077	–.074	.756	.244	1.04
SMS–6	**.869**	–.178	.011	–.032	.043	.038	.675	.325	1.10
SMS–12	**.780**	.094	–.034	–.034	–.170	.057	.627	.373	1.14
SMS–9	.008	**.857**	.081	–.029	.027	–.086	.701	.299	1.04
SMS–3	–.016	**.785**	–.050	.076	–.169	–.032	.535	.465	1.13
SMS–17	–.051	**.703**	–.071	–.107	.129	.012	.601	.399	1.15
SMS–10	–.012	.011	**.873**	–.035	.019	–.062	.730	.270	1.02
SMS–13	.018	–.068	**.776**	–.054	–.035	.073	.643	.357	1.05
SMS–2	–.037	.097	**.704**	.081	–.073	.014	.546	.454	1.09
SMS–15	.103	–.102	.034	**.829**	.190	–.311	.653	.347	1.47
SMS–8	–.081	.066	–.071	**.787**	–.206	.155	.708	.292	1.28
SMS–5	–.098	–.025	–.001	**.718**	–.023	.155	.600	.400	1.14
SMS–11	.008	–.084	–.065	–.019	**.835**	–.056	.680	.320	1.04
SMS–4	–.197	.059	.018	–.026	**.805**	.130	.641	.359	1.19
SMS–14	.224	.228	.035	.055	**.409**	–.013	.447	.553	2.26
SMS–1	–.028	–.066	.008	–.076	.022	**.882**	.698	.302	1.03
SMS–7	.026	–.057	–.019	.039	.031	**.773**	.622	.378	1.02
SMS–16	.245	.126	.041	.150	.180	**.348**	.483	.517	3.20
Cronbach's α	.77	.70	.66	.68	.59	.64			

Notes. RC = rotated component. h^2 = squared multiple correlation. u^2 = unique variance. com = communalities.

and their loadings. Following this, we report the outcomes of the Mann–Whitney U test to examine differences between genders. Subsequently, we present the Kruskal-Wallis H-test results to explore variations across different age groups and sports. This structured approach provides a comprehensive overview of the data and facilitates a clear understanding of the findings.

The Spearman rank correlation revealed a range from low to high associations among variables (*Table 2*). Principal components were identified, and the selection of significant components was based on consultation of four criteria.

Results from *Table 3* mostly indicate a six-factor solution, each factor formed by three items. Principal components are rotated in a better Promax solution, and factors saturated with more than .300 were taken into account in the interpretation. All results are in line with the proposed factors defined by the authors of Sport Motivation Scale-2: identified motivation (first factor), intrinsic motivation (second factor), amotivation (third factor), external motivation (fourth factor), integrated motivation (fifth factor), and introjected motivation (sixth factor).

The results indicate a strong relationship between the variables and the underlying factors, as evidenced by the h^2 values (and their corresponding uniqueness values). These relationships range from 75.6% for SMS-18, which loads strongly on the first rotated component, to 44.7% for SMS-14, which shows a substantial association with the sixth factor.

Young Serbian athletes achieve above theoretical average score on more autonomous types of motivation — intrinsic motivation, integrated motivation (*Table 4*), but also on identified motivation.

Table 4

Motivation for Sports in Young Athletes

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	355	3.00	15.00	13.4535	1.90745
Integrated Motivation	350	5.00	15.00	12.8371	2.05910
Identified Motivation	349	3.00	15.00	12.4871	2.52527
Introjected Motivation	346	3.00	15.00	8.0867	3.26749
External Motivation	354	3.00	15.00	5.1582	2.59611
Amotivation	355	3.00	14.00	3.8085	1.73121

The results of the Mann-Whitney test, as shown in *Table 5*, indicate statistically significant differences between boys and girls regarding external motivation. In this aspect, boys had a median score of 5 and an interquartile range (IQR) of 3 to 7, compared to girls, who had a median score of 4 and an IQR of 3 to 6. This suggests that, on average, boys reported higher levels of external motivation than girls.

Table 5

Gender and Motivation for Sports

Factor	Boys (N = 179)	Girls (N = 186)			
	Median [IQR]	Median [IQR]	U	Z	p–value
Identified Motivation	13 [11–15]	13 [11–14]	15215.50	–1.44	.149
Intrinsic Motivation	14 [12–15]	14 [13–15]	15456.50	–1.23	.218
Amotivation	3 [3–4]	3 [3–3.25]	16148.00	–.64	.521
External Motivation	5 [3–7]	4 [3–6]	14236.00	–2.47	**.014**
Integrated Motivation	13 [11–15]	13 [12–14]	15821.50	–.83	.404
Introjected Motivation	8 [5–11]	8 [6–11]	16309.00	–.34	.736

Notes. IQR = interquartile range. U = Mann-Whitney U-test. Z = z-value. p = significance.

Although not statistically significant, there are variations in motivational aspects between boys and girls. For identified motivation, intrinsic motivation, and integrated motivation, the median scores were similar for both genders, with overlapping IQRs indicating no disparities. However, for introjected motivation, despite both boys and girls having a median score of 8, the IQR for girls (6 to 11) was slightly narrower than that for boys (5 to 11), suggesting a more consistent response trend among girls in this domain.

Table 6

Age and Motivation for Sports

Factor	12 years (N=57)	13 years (N=120)	14 years (N=68)	15 years (N=82)	16 years (N=38)	H	p-value
	Median [IQR]	Median [IQR]	Median [IQR]	Median [IQR]	Median [IQR]		
Identified Motivation	12 [11–14]	13 [11–15]	13 [11–14.75]	13 [11.75–15]	13 [11–15]	4.057	.255
Intrinsic Motivation	14 [12–15]	14 [13–15]	14 [12–15]	14 [11.75–15]	14 [13–15]	3.361	.339
Amotivation	3 [3–4]	3 [3–4]	3 [3–3][D]	3 [3–4.25][C]	3 [3–4.25]	4.331	.228
External Motivation	4 [3–7]	5 [3–6]	4 [4–5]	4 [3–6.25]	4.5 [3–7]	1.876	.599
Integrated Motivation	13 [11–14]	13 [12–14]	13 [12–15]	13 [11–15]	13.5 [12–15]	4.135	.247
Introjected Motivation	7 [5–9]	8 [6–10]	7 [5–11]	8 [6–11]	8.5 [5–11]	7.617	.055

Note. H = Kruskal-Wallis H-test.

Table 6 displays an analysis of what drives individuals to participate in sports across age groups. No statistically significant differences were revealed in motivation

levels for sports among athletes of all the age brackets. The median scores for types of motivation, such as identified, intrinsic, amotivation, external, integrated, and introjected, show trends across the range of 12 to 16.

Table 7
Type of Sports and Motivation for Sports

Factor	Volleyball (N=125)	Basketball (N=131)	Handball (N=109)	H	p-value
	Median [IQR]	Median [IQR]	Median [IQR]		
Identified Motivation	13 [11–15]	13 [11–15]	13 [12–14]	.537	.765
Intrinsic Motivation	14 [13–15]	14 [12–15]	14 [13–15]	.713	.700
Amotivation	3 [3–4]	3 [3–4]	3 [3–3]	.475	.789
External Motivation	4 [3–7]	4 [3–6]	4 [3–6]	.620	.733
Integrated Motivation	13 [12–14.50]	13 [12–15]	13 [12–14]	.075	.963
Introjected Motivation	7 [5–10]	8 [6–11]	8 [6–11]	2.903	.234

Notes. IQR = interquartile range. H = Kruskal-Wallis H-test.

Differences in motivation levels of athletes according to the type of sports are depicted in *Table 7*. The findings suggest that there are no differences in motivation for sports among athletes participating in team sports, like volleyball, basketball, and handball. The median scores for types of motivation exhibit similar trends across all three sports.

Discussion

The phenomenon of motivation for sports has been a continuous research question through different generations of athletes, with a special focus on young athletes. Bearing in mind that there is a trend toward dropping out of sports in adolescence, when young athletes in collective sports move to the stage of sports specialization (Trbojević & Petrović, 2020), and soon after to the investment stage, which leads to the path of professional sports, it is necessary to study the factors that contribute to that trend. Most importantly, a robust body of evidence indicates that motivation for sports represents one of those factors. Therefore, this research aimed to determine the psychometric characteristics of one of the most frequently used questionnaires of motivation for sports in the world, the Sport Motivation Scale II – SMS-2 (Pelletier et al., 2013), on a sample of young Serbian athletes who play in team sports, such as volleyball, basketball, and handball.

The results of the factor analysis show that this questionnaire has satisfactory metric characteristics in the Serbian sample and that six factors of the questionnaire can be distinguished, which the authors themselves proposed, and many studies on other populations of athletes also obtained (Li et al., 2018; Ocal & Sakalli, 2018; Pelletier et al., 2019). Thus, on the Serbian sample of young athletes aged 12 to 16, we obtained a six-factor questionnaire solution with identical loading of items as in the

original Scale: identified motivation (6, 12, 18); intrinsic motivation (3, 9, 17), amotivation (2, 10, 13), external motivation (5, 8, 15), integrated motivation (4, 11, 14), and introjected motivation (1, 7, 16).

Cronbach's alpha for obtained factors was somewhere in line with previous research (*e.g.*, Ocal & Sakalli, 2018): identified motivation (.77); intrinsic motivation (.70), amotivation (.66), external motivation (.68), integrated motivation (.59), and introjected motivation (.64). Factor integrated motivation had the lowest Cronbach's alpha score in the sample of young athletes, which may be the result of the age of the athlete. Young athletes have a developmental task in adolescence to question themselves, "Who am I?", to form an identity at the end of this developmental period. Having in mind that integrated motivation implies that regulations are assimilated with the Self, that they are an integral part of beliefs and based on personal needs (Ryan & Deci, 2000), it could be that young athletes have some difficulties understanding items that form this factor because they are in the process of questioning their personal Self and forming their identity. During data collection, some athletes asked for help clarifying these items.

The second goal of our research was to further investigate SMS-2 in line with gender, age, and sport type. The results show that there were no age differences in motivation for sports, and no differences in motivation in athletes who play different types of sports (volleyball, basketball, and handball). It is possible that there is a similar motivation for participation in team sports, and that differences were not obtained in relation to the type of sport because there are similarities in the process of training young athletes in these three sports. As to difference in motivation in relation to age, a small number of studies that focused on age differences in motivation in young athletes found that autonomous motivation decreases with age (Guzman & Kingston, 2012). In our study, age differences were not observed, which could be a result of sample size of some age groups, but also a result of not taking into account the training experience as a control variable. But, also, these results could indicate additional validity of the questionnaire — i.e., that it can be applied to young athletes who play team sports of different ages, those who are in the period of early adolescence, middle adolescence, and entering late adolescence.

Regarding gender differences, following some previous research (Chin et al., 2012; Miller, 2000; Recours et al., 2004), we found that girls achieved lower scores on extrinsic motivation compared to boys, while no differences were recorded for other types of motivation. The obtained differences indicate the different socialization of boys and girls within sports: that boys are more oriented towards an ego-oriented approach to sports compared to girls, who are more oriented towards teamwork, building a healthy body, and not so much towards winning. The highlighted results are additionally supported by research that has shown that girls are more task-oriented than ego-oriented (Chin et al., 2012) and that they generally assess the motivational climate in the team as focused on learning and not on achievement (Vazou et al., 2006).

This study was one of the first in Serbia to address the motivation for sports in youth athletes who train and are on a developmental sports path in organized sports. As the results suggested, young athletes engaged in collective sports achieve higher scores on more autonomous types of motivation defined by SDT, such as

intrinsic motivation, integrated motivation, and identified motivation. In line with SDT, athletes who have a developed identified motivation play sports to develop certain parts of the personality that they consider important. Combined with integrated motivation and intrinsic motivation, young Serbian athletes play sports because doing so reflects their essential lives and personal values, and because they want to develop new skills, become more competent, and enjoy the process. These results posit a healthy foundation for the further development of young athletes towards professionalism.

The results have practical application for psychologists in sports in the form of identifying the motivational profile of young athletes who are engaged in team sports in order to prevent the development of amotivation and to recognize low-autonomous forms of motivation in order to prevent dropping out from sports or burnout syndrome. In addition, the adaptation of the motivation assessment questionnaire for the Serbian sample of young athletes can be useful in working with the athletes themselves in order to better understand the internal factors that affect participation in sports and sport achievement; and in working with coaches as a guideline on how to change their approach with athletes who are at risk to develop amotivation.

In addition to the scientific contribution in the form of expanding the empirical results of sports psychology in Serbia, the results invite researchers in Serbia to further examine and test the translated questionnaire in order to create a more precise instrument for assessing motivation for participation in youth sports.

Conclusion

The Sport Motivation Scale II - SMS-2 is one of the most widely used questionnaires of motivation towards sport participation, which is based on the theory of self-determination. As such, it found its role in researching the numerous processes in sport.

Until now, there has been no research that specifically dealt with the construct validity of this questionnaire on young athletes between the ages of 12 and 16 who are engaged in organized indoor collective (team) sports. In the sample of young Serbian athletes, it was shown that the SMS-2 has somewhat satisfactory psychometric characteristics, and six factors or types of motivation defined by the authors in the original questionnaire can be distinguished. The translation of the questionnaire from English to Serbian proved to be valid with respect to gender, age, and type of sport. It is also essential to highlight that the present study was conducted on a sample of young athletes who are engaged in organized team sports, not recreational sports or school sports.

Future research should explore the psychometric characteristics of the employed questionnaire in a sample of Serbian athletes competing in individual sports and take into account the effect of years of training and competition on motivation to play sports. To gain a better insight into age trends of motivation for sports, longitudinal studies should be conducted. Better understanding of age trends in motivation is an important topic, keeping in mind that young athletes aged 13 to 16 are at risk of dropping out of sports. Continued research of motivation is needed to develop interventions and preventive activities so that young athletes remain in sports and achieve their sporting potential.

Limitations

The potential limitations of this research are the absence of athletes who compete in individual sports as well as the conditions in which athletes completed the questionnaire. More precisely, some athletes filled out the questionnaire right after practice or just before practice, and some had to do it in the dressing room. These conditions could have affected some of the responses, considering that the athletes were very limited in time. Also, it should be noted that the convergent and discriminant validity of the adaptation has not been calculated, as well as test-retest reliability. Years participating in official competitions were not controlled in the study.

Ethics Statement

All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee, and with the 1964 Helsinki Declaration and its later amendments, or comparable ethical standards. This article does not rely on any studies with animals performed by any of the authors. The Scientific Council of the Faculty of Philosophy in Novi Sad and the Ethics Committee of Faculty of Sport and Physical Education in Novi Sad approved this study (Decision No. 50-05-16/2024-2).

Informed Consent from the Participants' Legal Guardians (if the participants were minors)

Informed consent was obtained from all individual participants included in the study. Club Management of the sport clubs that participated in the study was asked to inform parents about the study and to collect consent for their children's participation in the research.

Author Contributions

J.T.J. and D.J. were responsible for the idea, writing, and methodological aspects of the study. M.M. reviewed the manuscript and contributed to the interpretation of the results. All authors read and approved the final version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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Winners or Losers? Two Academic Years in Experiences of COVID-19 Pandemic

Ivana M. Milovanović[a], Radenko M. Matić[a], Brigita Banjac[a], Saša Pišot[b]*

[a] *University of Novi Sad, Serbia*
[b] *Institute for Kinesiology Research, Science and Research Centre Koper, Koper, Slovenia*

*Corresponding author. E-mail: sasa.pisot@zrs-kp.si

Background. The COVID-19 pandemic declared on March 11th, 2020, has had a substantial impact on the lives of all over the world. The student population, being one of the most vulnerable and substile ones, was forced to face specific unexpected circumstances for the first time in their lives.

Objective. In this paper, the authors explored the reflections of the COVID-19 experience and basic segments of everyday life of university students after the first academic year under pandemic measures and a follow-up year with their subjective perception of to what extent their lives have changed and how they were able to adapt to COVID-19 emergency measures.

Design. The field research was conducted among students in two European countries: Slovenia and Serbia. The qualitative semi-structured interviews with students (N = 20, 50% male) were executed in June-July 2020 and June-July 2021.

Results. The basic segments of students' daily lives underwent significant changes, yet they successfully coped and adapted to the COVID-19 emergency measures. Notably, improvements were observed in study strategies, reducing fear and loneliness. Above all, the primary longing was for social contact and gathering with friends. In their private lives, they were more concerned about opportunities but on the other hand, they gained more free time for various non-academic activities. Finally, sports science students have proven better-coping mechanisms with extraordinary circumstances.

Conclusion. This study contributes to a deeper understanding of the changes in the daily lives of students during the first and second waves of the COVID-19 pandemic.

Keywords: students, everyday practice, e-learning, perspective of the future, fear and loneliness, COVID-19 pandemic measures, public health

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Introduction

The origin of the COVID-19 pandemic is linked to Wuhan, China, and was first reported in December 2019. The virus rapidly spread globally, reaching Slovenia and Serbia in March 2020. During the first wave, Serbia immediately implement emergency measures (Cvetković et al., 2020). Conversely, Slovenia experienced a more significant impact during the second wave of the pandemic (Gorenjec et al., 2021). While these restrictive measures successfully curbed the spread of the virus, they had adverse effects on individuals (Hawryluck et al., 2004), including higher loneliness, poorer sleep quality, and mental health difficulties (Bakul & Heanoy, 2022; Dumciene & Pozeriene, 2022; Klanidhi et al., 2021).

The pandemic restricted various elements of the usual social actors daily life (Romero-Blanco et al., 2020) and has far-reaching consequences on education, health care, the economy, tourism, and relationships (Iyengar et al., 2020; Knight et al., 2021; Ochnik et al., 2021; Seyfi et al., 2023), resulting in uncertainty and numerous challenges (Van Tienoven et al., 2022). The shift to online classes during the lockdown is unsurprising led to a significant increase in sedentary behavior (Gallè et al., 2020). Given the established link between the level of physical activity and health-related quality of life (Meza-Miranda & Giménez, 2021), maintaining adequate PA plays an important role in preventing psychological problems (Elce et al., 2022; Tanir & Özmaden, 2018; Xiang et al., 2022).

The purpose of this study was to examine and analyze how students responded to changes in everyday life practices during the period of the COVID-19 pandemic restrictions. The researched domains were as follows: (1) Study: investigation of the to shift distance learning, adaptation in the subsequent study year; changes in residence for students in dormitories and rented apartments; study outcomes. (2) Feelings and Social Construct: exploring emotional responses, particularly fear and loneliness, within the context of the new circumstances of socialization. (3) Family life: examining the unplanned and intensive time spent with family members. (4) Personal life: assessing individual perspectives of the future, both personally and professionally.

This paper serves as a valuable contribution to addressing the gap in academic awareness concerning the potential consequences of emergency measures. Secondly, it sheds light on students' adaptive and coping strategies developed to navigate the new circumstances of everyday life.

Methods

This study employed a participants recruitment based on prior, larger-scale research with a mixed-method approach. The original study, conducted by a consortium (Pišot et al., 2022) included students from three European countries (Croatia, Slovenia, and Serbia) where the primary focus was to examine everyday life changes (daily habits, routines) during the first wave of COVID-19 pandemic emergency measures in 2020 (Pišot et al, 2022).

Participants

The sample of the interviews consists of N = 20 (50% male, 50% female) university students with an average age of 21.86 years (SD ±2.06). Participants were drawn from

different study programs and categorized into two groups. Group one includes sports sciences while group two encompasses other disciplines such as natural, technology, humanistic, and social sciences. The students represented the University of Novi Sad in Serbia as well as the Universities of Ljubljana, Primorska, and Alma Mater Europaea in Slovenia. See *Table 1* for the sample characteristics.

Table 1

Sample Characteristics

Variables	N	%
Gender		
Male	10	50
Female	10	50
Study program groups		
Group 1 sports sciences (sports, kinesiology, physical education)		
Male	4	
Female	5	
Group 2 other sciences (natural, technical, humanistic, and social science)		
Male	6	
Female	5	

Procedure

Qualitative research was conducted among university students in Slovenia and Serbia to observe and analyze their responses to the changes in everyday life practices during the time of COVID-19 restrictions over two years (the first and second wave of the pandemic). The study included undergraduate and postgraduate programs and aimed to explore their experiences. A total of 40 semi-structured interviews were conducted, with 20 students, at two-time points; from June 10th to July 27th, 2020, and with a follow-up after a year from June 7 to July 20, 2021.

The interviews were structured around two central concepts: *(1) changes in everyday life routines and habits during COVID-19 measures focusing on aspects of sleeping and eating habits, physical activity, sedentary behavior, and screen time), and (2) the psycho-social impact of COVID-19 restrictive measures referred to personal relationship, feelings, coping with new study regimes, and perception of the future post COVID-19 experiences.*

Empirical data from the interviews, including transcriptions, annotations, codes, and node layouts, were made by the researcher and then stored and analyzed using the qualitative analysis software NVIVO 12. Researchers from Slovenia and Serbia followed and agreed-upon protocol for the initial code tree, tracking blocks of protocol questions, and any additional elements. The basic nodes for analysis included:

"study strategies", "feelings", "socialization" and "personal life". Detailed analysis of the data within these nodes involved examining study strategies — coping or adapting to new (e)learning; feelings — fear, loneliness, crampedness, etc.; investigation socialization in terms of what participants missed and lost from objective or subjective issues, family relationships; and assessing the perspective of the future, specifically how is related to career plans. The data analysis involved categorizing the impact of COVID-19 pandemic into sub-entries based on its duration and intensity (no impact, short-term impact, longer-term impact).

The conducted interviews carried out with a commitment to ethical standards, and without situations raising ethical concerns were encountered by the researchers. Anonymity was guaranteed to all participants, with each assigned a pseudonym (i.e., number) to ensure deidentification in the description of acquired data. Before participation, all interviewees willingly consented to the research by signing a consent form. Before the interviews, participants were provided with comprehensive information about the interview protocol, and the conditions under which acquired data would be utilized. The interviews were recorded using a dictation machine or smartphone application, and all recordings adhering to safety standards were securely stored in the researchers' private databases.

The average length of the first wave of interviews was 23:37 minutes, with the shortest being 8:38 minutes and the longest being 50:53 minutes. During the second wave, the interviews were held between 20:28 and 44:39 minutes in Slovenia, as well as between 21:24 and 55:19 minutes in Serbia. The duration of the interviews was related to factors such as the type of interviewees (restrained-honest to completely honest), gender of the interviewees, year of study, and study program, but also the need and willingness of the interviewee to speak openly about his/her personal experience of the first and second wave emergency measures caused by the COVID-19 pandemic. All interviews (20 in the first wave were made in face-to-face form (offices or cafes), while in the second wave, 18 were recorded in person and two online, due to the incoming restriction measures of the COVID-19 pandemic. There were no significant differences observed between the online and in-person interviews. Participants were equally open and engaged in both formats, which we attribute to the semi-structured interview design and the comfortable environment provided by the researchers. This consistency suggests that the method of interview delivery did not influence the quality of the data collected.

Results

Study Strategies

The pandemic had a significant impact on the conventional academic routines of students. During the first wave of the pandemic, face-to-face classes were forced to switch to online learning, characterized by initial ambiguity, and lack of structure, and depended mainly on professors. Lectures were either shortened or canceled, and practical lectures were transformed into seminars in written form. While the shift to studying at home proved beneficial for some student, providing more flexibility and facilitating easier exam success, others encountered challenges such as difficulties in

concentration, a higher stress level due to the online exam time constraints, and a lack of, cooperation opportunities with their peers.

The subsequent academic year presented a somewhat different scenario. During the second wave, professors adapted well and presented notable improvements. Classes were better prepared and organized often in a hybrid or online format.

> *…they were very well prepared; you can see that they put that first period through and what didn't work, and they were able to fix it in the second wave. It made the experience better; they were very approachable and responded promptly to emails on time. SL10*
>
> *…all the practical work was postponed to May… and it was very reduced… SL5*
>
> *It depends on the semester… winter semester was completed online, but when the summer semester started… classes started to be regularly held for students who are home, so they have practical work in the classrooms. SR2*

Even though the situation has improved, there are still some difficulties with distance learning, such as issues related to concentration, interaction, quality, or knowledge acquisition.

> *Everything was online… all day at home. You wake up, open your computer, and sit in front of the screen until 6 pm. I had a hard time concentrating and it's not the same as if the professor saw us, communicated with us. SL7*
>
> *My biggest problem was online learning. Because I came in my fourth year and realized I didn't know anything about those subjects. That I hadn't absorbed the knowledge… SR1*
>
> *It's much harder to keep the focus on online teaching… SR4*

In addition to the negative aspects, students have also highlighted positive aspects. One notable advantage was that they improved ability to manage their time effectively better for study commitments. Then they can watch the recorded lectures again to better understand the lecture.

> *So, I didn't have any distractions and I could work on my work, I listened to the lecture and if I wasn't interested, I did something else for the fax, so time wasn't wasted… SL9*
>
> *I think we even got a lot by recording our lectures and I think that helped us a lot later, when we were preparing for those exams. To listen again to something that we don't understand, and that's a big advantage. SR9*
>
> *…I managed to prepare for some of the remaining exams and to graduate. SR8*

To summarize, students' strategies improved, and their overall perception of academic life during the second year of the COVID-19 pandemic was more positive.

Feelings

The pandemic, as an unexpected and unfamiliar phenomenon during the 2019/2020 academic year, triggered a range of emotions, including fear, anxiety, and stress. Among students, worries about potential health risks to their family members were a common concern. They also reported feeling discomfort and confusion due to the

overwhelming information and imposed restrictions. Their longing for their pre-pandemic lives marked by unrestricted freedom of movement, was evident.

In the second interview round (2021), students emphasized the persistent lack of socialization and contact with family members, friends, and people in general.

I was mostly worried that I couldn't visit my parents, my sisters and brother, and my nephew, yes… we usually see each other at least once a month… the worst thing was that we didn't know how long we wouldn't be able to see each other. SL2

What I missed the most - all that was done in life… that we lacked contact with people, physical contact with people. SL5

The university students found the constant changes to the restrictive measures against coronavirus infection confusing. They had to deal with psychological consequences such as fear or frustration, and the media only strengthened those negative feelings.

It got my nerves because every week something was changing… because no one would convince me that after a week you could tell… whether a measure had an effect or not… and also people couldn't get used to the measures so quickly. SL1

The time was so tight, that they were very weak… so they tightened again, and then weakened again. So, it mentally left, to be more accurate, impact on a lot of people… SR2

Fear for their own for this for that, and I think that the most was caused by this sensationalist reporting on all this I think it's a disaster… SR8

Among the various measures, the strictest ones, including restrictions between communities and lockdowns, were particularly challenging for the students to navigate.

What bother were the restrictions on the municipalities… SL4

Over time, however, the students became more familiar with the extraordinary circumstances and adapted better psychologically.

For me, it was less stressful, less fearful for the future, less like panic attacks like the first wave, depression, and fatigue… SL1

…I would say that the view on the whole situation has changed, in the first wave… there was some fear present. No, I understand much more easily… it seems to me that everything is overblown… I still followed the measures. SL3

The analysis also revealed that the students miss their freedom and opportunities to travel.

On the other hand, I was longing to go anywhere. Freedom, no limits… SL5

We didn't, so most of us didn't have much opportunity to travel… SR5

In summary, students, over time, decreased levels of worry, fear, and loneliness and showed improvement in their adaptation to the emergency measures caused by the COVID-19 pandemic. Notably, when compared to students from other disciplines (Group 2), those in sports science (Group 1) demonstrated generally more positive attitude.

Socialization

The challenges posed by the first wave of the pandemic, including lockdown, social distancing protocols, and the shift to online education, significantly reduced face-to-face interaction. When students were asked about what they missed the most, a prevalent theme emerged — the loss of socialization, contact with friends, and public life. While some students reported minimal alterations to their daily routines, others indicated being forced to move out of the dormitory and return. Interestingly, the increased time spent with their parents and siblings in this period strengthened family relationships for some students.

The second round of interviews reaffirmed the crucial role of socialization and gatherings in the well-being of young people. Meaningful connections, positive relationships, and personal social interactions were identified as having numerous benefits for the individual.

The hardest thing — quite honestly, I missed a bit of socializing with friends, I missed the weekend parties… SL3

For the first three months I didn't see any of my friends… SL8

But most of all I lost that kind of contact with people… SR4

Due to restrictive measures to maintain the connection between friends, the way of meeting and their activities had to be adapted. Face-to-face conversations were replaced by online meetings, games, and video or phone calls. As the measures have become less strict in the second year, students regained the opportunity to meet with friends in person again.

The difference was that in the first one, I only saw a few (bubble), while in the second one, I saw more friends e.g., 1-2 times a month. SL3

With friends only practically via Zoom and video games … after they were split in, second semester I started hanging out… SL9

Just as it got back to normal, more and more I had the opportunity and options to go out with my friends from college, from high school, with everyone to see each other. SR10

Social distancing measures forced students to return home, increase time spent indoors, and had more interaction with family members, which, in most cases, strengthened family relationships. On the other hand, some students reported prolonged periods without seeing their loved ones during this time.

With the mother, normal communication, together at home. SL8

We've had a great relationship before, I just didn't feel the need to tell my parents maybe everything. And now my parents have become like my friends to me, and they are versed in all my events. SR7

I had no contact with my parents at all because we were afraid that I don't know… don't transmit COVID… and haven't seen my parents for a very long time… SR8

In general, the imposed restrictive measures resulted in isolation and a pervasive sense of loneliness among the students.

Personal life

In general, the students reported in the first interviews that their lives had slowed down, becoming less structured. Their familiar habits and routines were disrupted, and the new normal was characterized by monotony and undefined obligations. Consequently, they had more free time for non-academic activities, such as pursuing a new hobby, engaging in regular physical activity, spending quality time with family members, and contemplating future priorities and careers. Despite awareness of the potential for working online, the majority of students expressed concerns about diminished job opportunities and finances. Their summer plans underwent alterations, with social events (sports, concerts, or festivals) being postponed or canceled. Due to the restrictive measures, students refrained from planning trips or vacations focusing primarily on studies or writing their thesis. However, in some cases, the pandemic had no impact on work or career.

The second interview highlighted an improvement in students' daily lives although they continue to face challenges.

I remember there were two weeks of university and then everything stopped again. SL8

…if I had to describe the whole year, I could even describe it in a few words. I'd call it a big change. SR1

Compared to the first wave of the pandemic, maintaining daily habits and routines was easier for students. With fewer study obligations than pre-pandemic times, students find themselves more engaged in healthier behaviors, hobby activities, or dedicating their time to personal development.

No there were no changes, I kept my biorhythm quite normal… SL1

I've started working on myself a lot over the past year. SR2

When it comes to sleep, I slept a lot more regularly… SR9

Physical activity didn't suffer so much because it's something I love to do, so I've always found a way to do it. SR4

I did a lot of sport… I've found that it relaxes me. A new hobby… I read more books than I used to. SL7

When comparing sports science students and those in other study programs, it became apparent that a higher proportion of sports science students tended to maintain healthier habits (*e.g.*, regular exercise, balanced diet) across the pandemic waves, where this trend was less present in the other group of students.

Students reported varied perspectives on their future and careers. While some emphasized positive effects including new job opportunities arising of the pandemic, a significant number expressed concerns and worries about their prospects.

The problem was to get a student job… also from a financial point of view… SL4

At the beginning of this year, I started working in a sports school because I realized that I just had time for something like that. SRB4

Given that the pandemic lasted over two years by the time of the second interview, it is not surprising that it could had various consequences for some students.

There might be consequences on the labor market because there will be a generation that has no skills… no experience, no laboratory exercises… SL10
In the last two months, things have returned to normal. SR9
Maybe I appreciate some things more. SR9

Based on the results of this study, it can be concluded that the basic segments of the students' daily routines have undergone changes, and they demonstrated the ability to adapt to the emergency measures imposed by the COVID-19 pandemic.

Discussion

This study focused on the students' reflection of their basic segments on everyday life practices during two key periods: the first academic year under pandemic measures (June-July 20) and the subsequent year (June-July 21). Students provide a subjective perception of the changes they experienced in their lives and discussed their strategies for adapting to the challenges posed by the COVID-19 emergency measures.

One of the preventive measures implemented during pandemic was the switch from face-to-face to online learning (Wang & Zhao, 2020). Initially, the lack of use of technology and technical issues such as internet connection were a problem (Suryaman et al., 2020). In the second academic year of the pandemic, there was notable improvement as professors and classes were better prepared and organized for online learning. Nevertheless, despite these achievements, the online format still differed from in-person classes with persisting issues like lack of motivation, concentration, reduced quality, and limited social interactions with professors and peers. On a positive note, students were happy with recorded lectures and appreciated the increased flexibility in organizing their time.

Even before the first wave of the pandemic, university students were prone to high levels of anxiety and stress (Vigouroux et al., 2021). As the pandemic rapidly spread and persisted, their stress levels, anxiety, and loneliness intensified (Elmer et al., 2020). Students began to concern for the well-being of their family and friends, and fears of infecting with the coronavirus also become prominent (Chesser et al., 2020). On the other hand, some students reported not feeling significantly affected by the circumstances (Knight et al., 2021). The influx of information, coupled with inconsistent measures and travel restrictions contributed to pervasive sense of uncertainty and negative emotions, including anxiety, frustration and stress).

The impact of reduced social interaction was observed in both waves of the pandemics student faced restriction on their social life. Social distancing measures led to prolonged periods of separation from peers and friends and other social opportunities (Crăciun, 2024). Coping with this situation, students found ways to maintain contact, and as time progressed and measures eased, they gradually returned to their usual social habits, meeting in person. Notably, as they become more familiar with to the ongoing pandemic, students reported improved mental health experiencing lower levels of fear, frustration and loneliness. Another important consequence was the enforced reallocation of students from campus (Conrad et al., 2021). Interviews also revealed that they had to move back home, leading to increased time spent with family members and strengthening their interpersonal relationships. However, it is

important to note that some students stated not seeing their family members for an extended period during this time.

The restrictive measures during the pandemic prompted individuals to yearn for the freedom to travel, having holidays, or, simply enjoy a coffee with friends. These circumstances led people to reassess their priorities, goals, and careers aspirations. Prolonged restrictions heightened concerns about the future among students (Elmer et al., 2020). Even though some employment opportunities have arisen such as online jobs or positions in healthcare, these were fewer compered pre-pandemic time. In addition, students' contemplation their future plans found themselves canceling or postponing vacations and trips. On a positive note, the reduced academic obligations provided students with more time for non-academic commitments, hobby activities, and the cultivation of healthier routines. Overall, exhibited increased resilience and coping abilities during the second academy year (2020/2021).

Physical activity plays an important role in improving mood and mental health (Liverpool et al., 2023). Given that sports science students were physically active during the COVID-19 pandemic (Özkan et al., 2021), it is not surprising that they reported better coping mechanisms and responded positively to the complex situation of the pandemic (Banjac et al., 2023). Our findings align with existing literature, indication that sport science students, in comparison to their counterparts in other study programs, performed greater adaptability and resilience, they tend to maintain their daily habits and routines in an altered form (*e.g.*, continue to exercise indoors) throughout the COVID-19 pandemic period.

University students found themselves navigating a complex landscape during the pandemic, experiencing both victories and defeats. Losers in this scenario encountered disruptions across multiple facets of their lives, spanning study strategies, social interactions, habits, and considerations about their future. The pervasive feeling of uncertainty loomed, with the awareness that everything could undergo abrupt changes. Despite these challenges, students — winners showed resilience by demonstrating an ability to cope with the unusual circumstances posed by the pandemic, adapting their everyday life practices. However, amidst this adaptation, they lamented the loss of their familiar and traditional student life, underscoring the multifaceted impact of the pandemic on their collegiate experience.

Conclusion

The research provides valuable insights into the everyday lives of the student population, offering a better understanding of their perception of "new normal" and how young, predominantly healthy individuals cope with emergency measures imposed by the COVID-19 pandemic. Various studies highlight negative consequences resulting from these measures, such as poorer mental health with post-traumatic stress symptoms, avoidance behavior, anger, fears, frustrations, boredom, stigma, lack of supplies, lack of adequate information, financial loss (Brooks et al., 2020; Hawryluck et al., 2004; Kornienko & Rudnova, 2023; Reynolds et al., 2008; Wang & Zhao, 2020). Specifically, loneliness emerged as a particularly substantial consequence (Werner et al., 2021), therefore, social support is crucial in these circumstances (Eigege & Kennedy, 2021).

From the educational perspective, research indicates some negative impacts or reveals some of the challenges and obstacles experienced by students in online or e-learning refers to limited communication, outreach, and extended screening time (Radu et al., 2020; Suryaman et al., 2020). The unexpected onset of the COVID-19 pandemic prompted universities to act fast (Strielkowski, 2020), causing uncertainty among students for employability and career planning (Capone et al., 2021), as the university system was firstly shortly closed and then shift to online learning (Alsoufi et al., 2020). Consequently, students experienced uncertainty. If we consider the type of the study, the sport science students adapted better (Pišot et al., 2022) with a moderate level of uncertainty (Ulukan, 2021).

In conclusion, the basic elements of students' daily lives have changed showing their resilience and adaptability to the challenges posed by the COVID-19 emergency measures. Winners in this scenario improved their study strategies, experiencing reduce fear and loneliness and gained more free time for various non-academic activities. Remarkably, sport science students showed better coping mechanism, drawing on their prior knowledge and experiences of health-related practice in daily routines.

Conversely, the losers were marked by a continued longing for social contact and gathering with friends. Students expressed concerns about future job opportunities which became a prominent aspect of their personal life.

Overall, this not only addresses the gap of academic awareness of the potential consequences of emergency measures but also provides a deeper understanding the transformations in students' daily lives during the first and second wave of the COVID-19 pandemic. It offers valuable insights into their adaptive strategies in navigating these unprecedented circumstances.

Limitations

This study examined the experience and basic segments of everyday life of university students after the first and second waves of the COVID-19 pandemic. Further research could enhance the study by incorporating a larger and more diverse sample size for interviews, including participants from different countries. Continual investigation into the evolving dynamics of students' lives in the context of the past impact of the pandemic can contribute to a more comprehensive understanding of their adaptive processes and the long-term effects of such disruptions.

Ethics Statement

The Ethical Committee of the Faculty of Sport and Physical Education, University of Novi Sad in Serbia approved with the identification number 46-06-02/2020. Written informed consent to participate in this study was provided by the participants before taking part in the study.

Author Contributions

IMM and SP conceived the idea, developed the theory, and collected the data. IMM, RMM, SP, and BB wrote the manuscript and performed the analysis. IMM and SP verified the methods. IMM, SP, RMM and BB discussed the results and revised the manuscript. All authors contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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"I Am a Football Player and/or a Girl": Psychosemantics of Self-Consciousness among Teenage Female Football Players

Olga G. Lopukhova [a, b*]

[a] *Kazan Federal University, Russia*
[b] *Kazan branch of Federal Scientific Center of Psychological and Multidisciplinary Research, Russia*

*Corresponding author. E-mail: olga.lopoukhova@ya.kpfu.ru

Background. Women's football (soccer), despite official recognition and growing popularity, is perceived as a gender-non-typical sport. This contradiction can be implicitly transmitted by society and acts as a condition of conflict in the self-consciousness of teenage female football players (TFFPs). In this study, the model of self-consciousness is defined as the semantic structures generated in the dialogic interaction "person — sociocultural environment".

Objective. Various options, including internally conflicting ones, for the content of self-consciousness in the context of both gender (girl) and professional sports (football player) are identified in comparison with the gender personality type of TFFPs.

Design. The psychosemantic method of multiple identifications is used to assess self-consciousness in participants. Image-markers of self-identification in gender and professional sports semantics are assessed through verbal personal characteristics and non-verbal color-associative stimuli. Sample: 29 female football players aged 15 years who have been involved in pre-professional football for the last 5–7 years.

Results. In TFFPs with androgynous and masculine gender personality types, self-consciousness is not conflicted; the image of a football player has masculine semantics. In TFFPs with a feminine gender personality type, self-consciousness is not conflicted due to the transformation of the image of a football player from traditionally masculine semantics to more feminine ones. TFFPs with an undifferentiated gender personality type are characterized by contradictions at the explicit and implicit levels of self-consciousness.

Conclusion. The results confirm the concept of self-consciousness as a process of dialogical interaction between the self-image and images of the socio-cultural environment, as well as the possibility of its diagnosis as individual variants of psychosemantic structures.

Keywords: self-consciousness, psychosemantic, gender self, professional self, teenage female football players, implicit conflict

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Introduction

The development of women's football (soccer) in Russia and around the world is accelerating, and this corresponds to changing views of gender in society: the mutual penetration and mixing of activities that were traditionally considered male or female, as well as social images belonging to the categories of "masculine" and "feminine". Plaza et al. (2017) found that sport is gendered both implicitly and explicitly, which can influence individual participation. In football, these changing views on gender and their projection in public consciousness and self-consciousness are clearly presented. Football was originally a "male" sport, and to this day, from the perspective of gender semantics, it is classified as "masculine". Despite the long history of women's football, researchers classify this version of professional sport as "gender-not-typical" for a woman (Artamonova & Shevchenko, 2009; Chalabaev et al., 2013; Colley et al., 2005). Moreover, according to a survey by Damadayeva (2011) on a Russian sample, football was rated as the "most unfeminine" sport. While many studies focus on the inhibiting influence of traditional gender stereotypes on the development and popularization of women's football, and advocate for equal representation of men and women in football, the problems of developing women's awareness of their self in professional football, in particular, self-identification as a "female footballer", have not received due attention. Understanding the individual implicit and explicit semantics of the female football players' self-image can be useful for developing effective methods of preventing and correcting conflictual self- consciousness in the process of their training.

Gender Semantics of Sports

Changing concepts of gender in contemporary society are expressed in part through the fact that women are participating in activities that were previously considered the prerogative of men. Adherence to gender stereotypes means that self-realization in a gender-non-typical field of activity may result in negative consequences, including deteriorating psychological well-being and self-confidence, and irrational self-blocking of professional career opportunities (Gurieva et al., 2022). Olsen et al. (2023) found that students, in spite of their egalitarian perception of professions, show a contradictory tendency. Discrepancy in a student's gender self-identity and their gendered perception of professional requirements can lead to decreased academic performance and increased desire to drop out. The sphere of sports and physical activity, from the perspective of gender semantic analysis, appears in the form of a complex, non-linear model, where different and sometimes opposing trends at different levels of consciousness are observed (O'Reilly et al., 2023; Plaza et al., 2017). Despite the fact that in gender semantics "sport" is considered as a masculine activity, because it represents competition, the "achievement" motivation, and intense struggle, there is a tendency towards gender division within sports. Sports that demonstrate strength and power (such as football, hockey, and basketball) are more closely associated with masculinity, compared to sports with a feminine aesthetic (such as dance, rhythmic gymnastics, and figure skating) (Chalabaev et al., 2013; Colley et al., 2005; Liu, 2023). In psychology there is a tendency to divide sports into "masculine", "feminine", and "gender-neutral" types (Riemer & Visio, 2003). This allows us to study the psycho-

logy of athletes in "gender-typical" and "gender-non-typical" sports. A study of gender semantics in product advertising by Nike reveals their highly masculine tone, and highlights the danger of this marginalizing influence on women participating in sports (Rasmussen et al., 2021). A study by Slater & Tiggemann (2011) found that adolescent girls involved in organized sports were more likely to experience body image ridicule from both boys and girls.

Women's football, despite official recognition and increasing popularity, is still perceived as a gender-non-typical sport (Moreyev, 2019; Rasmussen et al., 2021), which can be implicitly and unconsciously transmitted to young football players by their environment. Research shows that in adolescence, gender differentiation of self-consciousness increases; gender stereotypes have a stronger influence on the perception of oneself and society, including sports (Boiché et al., 2014; Hill & Lynch, 1983; Meaney et al., 2002; Retelsdorf et al., 2015). At the same time, recent research has found that increased gender stereotyping in self-evaluation can be combined with more egalitarian attitudes in the evaluation of others and general beliefs (Klaczynski et al., 2020; Korlat et al., 2021). This can increase implicit conflicts in the self-consciousness of teenage female football players (TFFP). For example, it is quite typical that a TFFP, capable and promising in the opinion of her coach, leaves football without a rational understanding of her reasons for doing so. Coaches in women's football brought up this problem and the need to prevent such unstable professional self-determination of young football players (in this case, football can be classified as an area of early sports professionalization). Theoretically, these phenomena can be explained by the specific motivation "fear of success", conceptualized by Horner (1972). Fear of success is an unconscious conflict in self-consciousness, when a woman, at a rational level of consciousness, is focused on achieving ambitious goals and has every chance of achieving them, but unconsciously acts by blocking her opportunities (Horner, 1972). Thus, understanding the causes and content of such psychological problems requires a discussion of the explicit (rational and conscious) and implicit (unconscious and inexpressible verbally) components of self-consciousness.

Structure and Content of Self-Consciousness

In the Russian school of psychology, Stolin (1983), while developing the activity approach of A.N. Leontyev, proposed the concept of level structures and the dialogical nature of self-consciousness. The structure of self-consciousness includes not only a cognitive, but also an emotional and value-based attitude towards oneself. Internal contradictions play a leading role in its development. Social standards are presented in consciousness, in relation to which the individual defines the self, which is manifested, in particular, in the distinction and correlation of the "Real Self" (self-understanding) and the "Ideal Self" (generalized social images that serve as guidelines in self-development).

The level structure of self-consciousness, according to Stolin (1983), suggests that the lower level of the self-image consists of unconscious ideas, presented only in experience, and is associated with subjective, emotional attitudes about oneself. Higher-level self-consciousness is characterized as the awareness and conscious assessment of individual properties and qualities of the self. Different levels of the

self-image are both functionally interconnected and relatively autonomous, which means that contradictions and conflicts can arise between them. The unit of human self-consciousness, therefore, is the "conflicting meaning of the Self," reflecting the collision of various relationships, motives, and activities. As an individual matures, the forms and mechanisms used to identify self-consciousness are transformed and become more complex; they diverge from the factors that initially triggered them and can become conscious and controlled. In this process, complex phenomena arise that reflect such contradictions in the development of self-consciousness as "negative identification", that is, the unconscious likening of oneself to a person towards whom the subject has a negative attitude.

The most important process underlying the development of self-consciousness is self-knowledge. This process is realized through identification and subjective differentiation, filling self-consciousness with semantic content that connects a person to other people, to culture and society. At the same time, the intra- and inter-subjectivity of a person's self-consciousness do not oppose each other as two different realities (Znakov, 2007). In this understanding, the model of self-consciousness represents semantic structures that are generated in the dialogic interaction "person – sociocultural environment", which correlates with the basic ideas of the ecopsychological approach to mental development (Panov, 2014).

Therefore, the measurement of self-consciousness implies a psychosemantic study of various forms of meanings (images, symbols, verbal, and non-verbal signs) in the individual consciousness, in the configuration and content of the images of the "Self-concept" (Artemyeva, 1980; Petrenko, 2013; Shmelev, 1983; Stolin, 1983). Psychosemantic methods make it possible to identify, through quantitative analysis, not only explicit, but also implicit components of self-consciousness. In addition, psychosemantic methods are focused on diagnosing dynamic, situationally determined features of self-consciousness rather than stable ones.

Contemporary ideas about the development of self-consciousness, such as the concept of dissonance between implicit and explicit beliefs (Toribio, 2021), the existence of non-conceptual and non-linguistic forms of self-apprehension (Niemeck, 2023), and the sliding scale theory of Bowins (2022), correlate with these psychosemantic methods. Thus, the methods of psychosemantics may be considered the most suitable for identifying the structure, content, and conflict manifestations of self-consciousness.

Girls in Football: Why?

In order to investigate the causes of an athlete's psychological problems, it is necessary to understand how the athlete identifies with the sport and how the athlete perceives the possibilities of the relationship between personal development needs and a sports career. For the purposes of this study, it is important to understand what brings a girl to football (an activity considered "doubly masculine"), how she perceives herself as a football player, and how her perception of herself as a football player is related to her perception of herself as a girl.

Various reasons have been proposed to explain the desire of girls and women to self-actualize in "masculine" activities. For example, the emergence of football as an

attractive area of professionalization for girls can be explained by the general tendency of androcentrism in the public consciousness, where everything "masculine" is prioritized (Bem, 1993). It is also more common for girls who have both the ability and desire to participate in football to have the opportunity to do so without being suppressed, regardless of football's inconsistency with the traditional female role. Kavoura et al. (2018), using a qualitative analysis of interviews with female judo athletes, described "a fighter's identity construction" in their self-consciousness. By analogy, it can be assumed that the reason for the girl's self-realization in football could be that she considered herself a "natural born footballer". It is also possible that the girl's choice of football (as a masculine sport) is facilitated by masculine tendencies of her self-consciousness. By self-actualizing in football, a masculine girl can apply and develop her masculine traits (Artamonova & Shevchenko, 2009).

Based on psychosemantic diagnostics, it was experimentally found that teenagers' preference for gender images in television advertising is associated with their self-assessment of gender qualities, and such selectivity of perception reinforces existing tendencies in their self-consciousness (Lopukhova, 2015). In a study by Kavoura (2018), two types of identity were found among female judo athletes: "successful and feminine athlete" and "natural-born fighter". Thus, it is possible to distinguish different options for the development of self-consciousness in athletes who participate in gender-non-typical sports: (1) self-identification through the typical characteristics of the sport, even if this contradicts gender stereotypes; (2) ignoring gender stereotypes in sports and self-perception; (3) parallel development of both gender-normative and professional sports qualities; (4) modeling and implementation of an individually adapted gender self-image in sports (for example, a new type of "female football player"), as a manifestation of the highest level of agency in self-consciousness. Clarifying these assumptions involves studying the self-consciousness of TFFPs, through both its explicit and implicit content.

The main idea of this study is that TFFPs may face the problem of combining the images of the "gender self" and the "professional sports self" in their self-consciousness. This assumption is outlined in the following research hypotheses:

1) the content of self-consciousness of TFFPs may be varied, including conflicting self-images in the contexts of gender (girl) and professional sports (football player);
2) conflicting and non-conflicting versions of self-consciousness may be associated with the gender personality type of these female football players.

Methods

The diagnosis of self-consciousness is based on the psychosemantic method of multiple identifications by V.F. Petrenko (Petrenko & Mitina, 2010). This method consists of developing a structured questionnaire in which the respondent is asked to evaluate a set of images that include the image of "I am now" and other images of possible self-identification. Both verbal and non-verbal signs can serve as descriptors for evaluating images (Artemyeva, 1980; Solomin, 2001).

In accordance with the goals of this study, the following images were offered to TFFPs: "I am now", "My idol in football", "Ideal girl", "Ideal guy", and "Me in 10 years".

These serve as image-markers of self-identification in gender and professional sports semantic spaces. Two groups of descriptors were proposed for assessment: verbal personal characteristics and non-verbal color-associative stimuli. According to the concepts of level structure and dialogical structure of self-consciousness, verbal descriptors are used to diagnose conscious and socially defined self-assessment, while color association is focused on identifying emotional attitudes towards the same images (Solomin, 2001).

Participants

The study was organized in coordination with the teachers and administration of the Miras football school in Kazan; 29 female football players aged 15 years, who had been involved in pre-professional football for the last 5–7 years, were interviewed. The age range of the sample was selected based on the premise that respondents over 15 years old can independently decide to participate in the survey, and the theory that key structures of self-consciousness (self-attitude, self-esteem, self-acceptance, self-understanding, etc.) are actively being developed as psychological neoformations at this age.

Procedure

Questionnaires

The study used the questionnaire "Masculinity, femininity and the gender type of personality" (the Russian analogue of the Bem Sex Role Inventory) (Lopukhova, 2013) for two tasks. First, it was used to determine the gender personality type of the TFFPs based on their assessment of the "I am now" image. Second, when assessing images of self-identification, personal qualities from the questionnaire served as verbal descriptors. Ratings were made on a Likert scale from "1" (quality never appears) to "5" (quality always or almost always appears). The "masculinity scale", in the Russian version of the BSRI questionnaire, includes nine qualities: courage, strong personality, assertiveness, ability to lead, willingness to take risks, dominance, masculinity, tendency to lead, strength. The "femininity scale" also includes nine qualities: compliance, shyness, a tendency to show feelings, tenderness, femininity, compassion, gentleness in statements, desire to console, friendliness. The "buffer scale" included nine gender-neutral qualities. Accordingly, 27 personal qualities were proposed as verbal descriptors for assessing self-identification images.

The nonverbal assessment of self-identification images was based on ranking the association of each image with a set of color stimuli (dark blue, blue-green, orange-red, yellow, purple, brown, black, gray) on a scale from 1 to 8, with the images rated as most to least associated with the given color.

To determine the semantic structure of self-consciousness in groups of TFFPs with different gender personality types, the acquired data was processed in accordance with the proposed procedure of the "multiple identification method" (Petrenko & Mitina, 2010). The images rated by respondents were compared using the correlation method. The resulting correlation coefficient in this method serves as an indicator of the proximity-distance of positions in the self-concept of an individual respondent or a consolidated matrix for a group of respondents. Matrices for a group

of respondents were consolidated by the sum of ratings for each position. All statistical procedures were performed in MS Excel. The semantic similarity of the self-identification images proposed for evaluation is manifested in the degree of closeness of the calculated indicator to one or zero by analogy with the correlation coefficient. For example, an indicator exceeding .5 reflects the similarity (or identity) of images in self-consciousness, the proximity of the indicator to zero shows the non-identity of images, a negative value reflects the opposition of images in self-consciousness.

In this study, psychosemantic analysis of consolidated group matrices was carried out separately for TFFPs with different gender personality types (masculine, feminine, androgynous, and undifferentiated) and separately for assessment through verbal and non-verbal descriptors. Next, a comparison was made of the mutual configuration of different images of self-identification at the conscious (verbalized) and possibly unconscious (emotional-sensory) levels of consciousness. Significant differences in the mutual configuration of self-identification images at these two levels were interpreted as a probable implicit conflict in self-consciousness among TFFPs.

Results

The results of diagnosing the gender personality type made it possible to divide the sample of 29 TFFP into four groups: 16 TFFPs with an androgynous gender personality type, five with a masculine personality type, four with a feminine personality type, and four with an undifferentiated gender personality type. Next, the configurations of self-identification images described through verbal and non-verbal descriptors were analyzed separately among TFFPs of each gender type (*see Table*). The indicators are represented as two numbers on either side of a slash (x/x). These indicators show the degree of similarity between the image of the self and semantic images at two levels of self-consciousness: assessment through verbal concepts (personal qualities), which denote generally accepted semantic categories of perception of oneself and others, and assessment through color stimuli, which are not generally accepted semantic norms, but instead reflect the individual, deep, emotional attitude about these images. Analysis of these results on generalized matrices, depending on the gender type of personality, showed similarities and differences in the configurations of self-identification images at these two levels.

The data presented in the Table show that for female football players with an androgynous personality type, the indicators of semantic similarity/differences of perceived images at two levels of self-consciousness do not differ greatly. In addition, female football players with an androgynous personality type do not have negative indicators that would indicate the opposition of images. The image of "I am now" is closest to the image of "Me in 10 years" (.68 / .75), as well as to the "Ideal girl" image (.43 / .56), which reflects normal gender identification. Images of gender in self-consciousness are also mostly close (.36 / .33), which corresponds to the androgynous personality type. The image of sports and professional identification ("My idol in football") has the greatest discrepancies at the rational (verbal-evaluative) and emotional-evaluative levels of self-identification and perception of this image. In a gender context, this image, at the level of rational perception, is more masculine than femi-

nine (closeness to "Ideal girl" .21; closeness to "Ideal guy" .62); however, at the level of emotional perception (most likely an unconscious relationship) it has no gender differentiation (closeness .51 in both cases). The perception of oneself in the future ("Me in 10 years") is even more identified with the image of "My idol in football" (.55 / .64), which reflects an orientation towards the professional development of oneself as a football player. The image of oneself in the future is closer to the images of both male and female ideals, which also correlates with the androgynous personality type of these respondents.

Table 1

Indicators of Proximity in the Configuration of Self-Identification Images Assessed Through Verbal/Non-Verbal Descriptors by TFFPs with Different Gender Types of Personality

Gender types of personality	Images of self-identification	"I am now"	"My idol in football"	"Me in 10 years"	"Ideal girl"
Androgynous type (N = 16)	"My idol in football"	.39 / .53	1		
	"Me in 10 years"	.68 / .75	.55 / .64	1	
	"Ideal girl"	.43 / .56	.21 / .51	.57 / .61	1
	"Ideal guy"	.37 / .55	.62 / .51	.47 / .44	.36 / .33
Masculine type (N = 5)	"My idol in football"	.62 / .42	1		
	"Me in 10 years"	.67 / .54	.54 / .43	1	
	"Ideal girl"	.65 / .36	.51 / .34	.90 / .49	1
	"Ideal guy"	.43 / .43	.71 / .54	.51 / .49	.46 / .50
Feminine type (N = 4)	"My idol in football"	.07 / .32	1		
	"Me in 10 years"	.68 / .52	.40 / .58	1	
	"Ideal girl"	.48 / .40	.47 / .46	.68 / .11	1
	"Ideal guy"	.23 / .20	.56 / –.25	.36 / –.09	.35 / –.07
Undifferentiated type (N = 4)	"My idol in football"	.44 / .52	1		
	"Me in 10 years"	.37 / .80	.37 / .51	1	
	"Ideal girl"	.13 / .55	.13 / .03	.30 / .52	1
	"Ideal guy"	.13 / .30	.44 / .46	.32 / .18	–.09 / .14

In the self-consciousness of the TFFPs with a masculine type, compared to other groups, the weakest differentiation in the configuration of images proposed for evaluation is manifested. The image of "I am now" is assessed at the rational level of self-consciousness as closer to the feminine semantic (.65 with "Ideal girl") than to the masculine semantic (.43 with "Ideal guy"), although at the level of emotional attitude, the feeling of oneself is the opposite: the self-image is closer to the masculine semantic (.43) than to the feminine (.36). This reveals to us the implicit manifestations of the masculine self-consciousness of these girls. On a rational level, masculine TFFPs also described the image of the self as quite close to the image of their ideal in

football, which in their self-consciousness is presented as androgynous (close to both the male and female positions in the semantic space). At the same time, the "Ideal girl" and the "Ideal guy" in their minds are semantically similar, both at the rational and at the emotional-evaluative levels (.46 / .50), which indicates the gender undifferentiating of their self-consciousness. However, it can also be assumed that at the level of verbal assessment these girls show a tendency of "social desirability", attributing greater compliance with normative models, while at the level of emotional attitude the picture is somewhat more complex. It seems that these "masculine" football girls really feel less like a "woman" than a "football player" does. They feel their masculinity without conflict, assessing in exactly the same way the proximity of the self-image to the masculine semantic (image of "Ideal guy") at both levels of self-consciousness (.43 / .43).

TFFPs with a "feminine" gender type do not identify the image "I am now" with "My idol in football", although the deep emotional relationship between these images is closer (.07 / .32). At the same time, the image of oneself in the future is much closer to the image of an idol in football (.40 / .58). It is interesting that these TFFPs also have a rather feminine image of a football player: it is close to the image of the "Ideal girl", just like the self-image. Moreover, the image of a football player on a rational level is assessed quite close to the "Ideal guy" (.56), but is implicitly opposed (-.25). That is, the image of sports and professional self-identification is endowed with content close to their own, more feminine, self-consciousness. Gender differentiation in self-consciousness is also presented implicitly: the "Ideal girl" and the "Ideal guy" are similar in description through personality traits (.35), but in emotional and evaluative perception they are different (- .07).

TFFPs with an undifferentiated gender personality type identify themselves with the image of their "Idol in football", both now (.44 / .52) and in the future (.37 / .51). At the same time, the image of a football player in their self-consciousness is close to masculine semantics (.44 / .46 with "Ideal guy") and does not fit into the concept of femininity (.13 / .03 with "Ideal girl"). In a gender context, these girls do not identify their self with images of masculine or feminine semantics (.13 both with "Ideal girl" and with "Ideal guy"), which coincides with the undifferentiated gender type of their personality. However, at the emotional and evaluative level, they feel close to the image of the "Ideal girl" (.55), including in the future (.52 with "Me in 10 years").

Thus, among TFFPs with an undifferentiated gender personality type, the greatest discrepancies between the implicit and rational levels in the perception of oneself as a girl are manifested. Self-identification with images of gender semantics is displaced by identification with the masculinized image of a professional football player, and this causes internal contradictions with the perception of oneself as a girl.

Discussion

A comparison of the semantic context of self-identification of TFFPs of different gender types of their personality showed different tendencies in the structuring of self-consciousness at the explicit and implicit levels. The non-conflicting self-consciousness is typical for TFFPs with androgynous and masculine gender personality types. The androgynous personality type, according to the concept of Bem (1993), does not

indicate internal discrepancy in the perception of "I am a football player" and "I am a girl," since it is a manifestation of self-consciousness that is not subject to gender typing. In addition, the self-consciousness of TFFPs with a masculine personality type does not appear to be internally conflicting, since the perception of the self-image as close to the semantics of "masculine" coincides with the stereotypical perception of the "masculine" image of a football player. Girls with a masculine gender personality type apparently perceive self-realization in football, as a masculine sport, quite naturally, supporting the masculine semantics of football in self-consciousness (Artamonova & Shevchenko, 2009; Chalabaev et al., 2013; Colley et al., 2005; Damadayeva, 2011). TFFPs with a feminine gender personality type demonstrate in the content of self-consciousness a variant of transforming the image of a football player from traditionally masculine semantics to more feminine ones. TFFPs with an undifferentiated gender personality type are characterized by a discrepancy in the perception of "I am a girl" and "I am a football player," which is especially conflicting at the implicit level of self-consciousness. Overall, these findings are consistent with the position of Plaza et al. (2017), that sport is gendered both implicitly and explicitly, which is also represented at the level of the individual consciousness of athletes, in their self-perception. This confirms the idea of a complex nonlinear understanding of consciousness, recognition of its multivariance and multi-level tendencies (O'Reilly et al., 2023).

The identified different types of relationships between the self-image and the image of a professional football player in a sample of teenage girls are similar to the results of a study by Finnish scientists (Kavoura 2018; Kavoura et al., 2018), who, using qualitative analysis methods, also revealed two different types of identity of female judokas: "successful and feminine athlete" and "natural-born fighter".

In the present study, based on the psychosemantic method of "multiple identifications" using quantitative indicators, several variants of self-consciousness in a gender-non-typical environment of early sports professionalization (including potentially conflicting ones) were identified: (1) ignoring gender stereotypes when focusing on the image of a professional; (2) transformation of the image of a professional to suit one's gender characteristics; (3) moving away from focusing on professional development in a gender-non-typical field of activity while maintaining a focus on gender stereotypes in self-development; (4) conflict between attitudes towards different potential images of self-identification at the explicit and implicit levels.

These data correspond to the basic concept of the model of self-consciousness, which represents semantic structures that are generated in the dialogic interaction between self-image and external images of the sociocultural environment. In the self-consciousness of the TFFP, various options for dialogical interaction "personality – socio-cultural environment" have been identified, which correlates with the positions of the ecopsychological approach to the development of the psyche (Panov, 2014), but not the influence of "marginalizing" or "masculinizing" ideas about sports and a career in football in the public consciousness (Moreev, 2019; Rasmussen et al., 2021). It should be emphasized that the data obtained in this study provide a situational picture of the dynamics of the development of self-consciousness in these girls. Moreover, the data reveal the internal mechanisms of self-consciousness structuring among female football players, but not among male football players; a difference be-

tween their semantics of sports and of gender self-identification was not discovered in the context of this study. Adolescence is a period of actualization and deepening of self-consciousness; however, it is known that girls demonstrate a higher level of both social (public) and personal self-consciousness than boys (Rankin et al., 2024). Additionally, a study by Boiché et al. (2014) found that sport–gender stereotypes are stronger in boys, whereas girls' stereotypes increase with age. Accordingly, it can be assumed that the influence of gender ideas on self-consciousness and self-esteem changes dynamically with age.

Conclusion

In this psychosemantic study, different conflicting and non-conflicting self-images in gender (girl) and professional sports (football player) contexts were identified in the self-consciousness of TFFPs. Female football players with an undifferentiated gender personality type perceive themselves most contradictorily as a girl and as a football player on the rational and implicit level of self-consciousness. This causes internal instability and can become a reason for leaving the sport.

In the future, research is needed to discover other possible combinations of gender and professional self-realization in the semantic structures of self-consciousness. In addition, research is required to compare the conflict in semantic structures of self-consciousness with indicators of subjective well-being and self-esteem. It is also important to explore the possibilities of psycho-corrective methods to affect the dynamics of conflicting structures and the content of self-consciousness. The present study also shows the possibilities of using the psychosemantic method of multiple identifications in the diagnostics of implicit and explicit content of self-consciousness in the work of a practical psychologist, since such a procedure for comparing images of self-identification can be carried out on a single case. Identification and awareness of the content of attitudes of self-consciousness that are hidden from understanding can provide significant assistance in counseling and psychology correction.

Limitations

The limitations of the research results presented in this article can be divided into several aspects. Firstly, the sample is limited to late adolescence. Perhaps by studying older age groups of athletes we could obtain additional data, which could further illustrate the dynamics of self-consciousness. Secondly, this study touched only on the case of female self-realization in masculine sports; this ignores the potential differences in conflicting semantics of men's self-consciousness when they participate in gender-non-typical sports.

Ethics Statement

The Local Ethics Committee of Kazan Federal University approved the study and consented to the use of psychosemantic procedures for the diagnostics of self-consciousness (protocol of the LEC meeting No. 47 dated March 21, 2024). Participants took part in the study voluntarily and gave informed consent to participate in the survey. The survey was conducted anonymously.

Conflict of Interest

The author declares no conflict of interest.

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Competitive Anxiety and Mood States in High-Performance Cuban Student Athletes

Jesús Ríos-Garit[a*], Marta Cañizares-Hernández[b], Mario Reyes-Bossio[c], Yanet Pérez-Surita[a], Raul Touset-Riverí[b]

[a] *Central University "Marta Abreu" of Las Villas, Santa Clara, Cuba*
[b] *University of Sciences of Physical Culture and Sport "Manuel Fajardo", Havana, Cuba*
[c] *Peruvian University of Applied Sciences, Lima, Peru*

*Corresponding author. E-mail: jriosgarit1985@gmail.com

Background. The study of competitive anxiety and its relationship with mood states in high-performance athletes is relevant for predicting performance and enabling timely interventions to ensure successful outcomes in competitions. Due to the complex psychological demands arising from dual careers, the study of competitive anxiety and mood states contributes valuable insights into the emotional well-being of these student athletes.

Objective. To examine and describe competitive anxiety and mood states in a sample of high-performance Cuban university athletes across different sports and genders.

Design. A descriptive, correlational, and cross-sectional study was conducted involving 46 Cuban student athletes from national teams across 16 sports and included both male and female athletes, with an average chronological age of 20.70 years and 6.98 years of experience in a high-performance sport. The *Competitive Sport Anxiety Inventory* and *Brunel Mood Scale* were administered in their Spanish versions. The data were examined using descriptive statistics analysis including the Mann-Whitney U test, and Spearman's correlation coefficient.

Results. Although no statistically significant differences were found in competitive anxiety and mood states in relation to gender and type of sport, female athletes tend to present higher mean scores in competitive anxiety and negative mood states. Additionally, female athletes in team sports experienced slightly more intense emotions. Anxiety shows positive correlations with tension, depression, and vigour, suggesting its influence on certain mood states.

Conclusion. The results indicate that, in general, the intensity of certain moods in Cuban university student athletes is influenced by levels of competitive anxiety.

***Keywords*:** competitive anxiety, dual career, gender, mood states, sport type, high performance

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An increase in anxiety during competition can lead to heightened tension, depression, and vigour, with no significant differences observed between female and male athletes or based on the type of sport practiced.

Introduction

The psychological determinism of sports performance has been articulated in various theoretical models emphasize the mental skills athletes need to manage the stress of competitive activity and training (Loehr, 1986; Mahoney, 1987; Smith et al., 1995; Vealey, 2007). According to Ríos-Garit (2021), an athlete's success largely depends on the configuration of the cognitive and affective aspects of their personality, as this determines how they manage adaptive processes in potentially stressful situations. Effective coping in these contexts can significantly influence the distinction between success and failure in high-level sport.

In addition to psychological skills, researchers have also analysed the role of negative emotions in predicting sports performance, yielding important findings that underscore the significance of viewing the athlete as a biopsychosocial entity (Terry & Parsons-Smith, 2021). This suggests that in addition to physical, technical, and tactical aspects (Cantón & Checa, 2012; Domínguez-González et al., 2024), an athlete's performance is also influenced by the management and understanding of emotions, particularly anxiety levels, which have been found to impact competitive performance and the effectiveness of training (Cañizares, 2004).

Competitive anxiety is a common phenomenon that affects sports performance in various ways (Martens et al., 1990). If not properly managed during competition, anxiety can cause a drop in performance and lead to even among athletes with high levels of physical and technical preparation (Jaramillo et al., 2020; Menéndez-Fierros & Becerra Hernández, 2020; Triqueros et al., 2020). On the other hand, achieving and maintaining an optimal mood is considered an important part of mental preparation for achieving excellence in sport performance (Arruza et al., 2011; Feria-Madueño et al., 2023; López-Torres, et al., 2007).

Peñaloza-Gómez et al. (2016) researched the influence of competitive anxiety on the mood states of athletes in a broad and heterogeneous sample of female and male athletes from several disciplines. The results revealed significant differences in anxiety and mood states based on sex. Additionally, both cognitive and somatic dimensions of competitive anxiety were found to predict negative mood states, while self-confidence positively predicted vigour and negatively predicted confusion. Based on these findings, the authors determined that anxiety interacts with various mood states that negatively impact the performance of athletes.

The relationship between emotional states and physical activity has been studied for several decades by comparing mood profiles of athletes and exercise practitioners with non-practitioners. These studies have consistently revealed improvements in mood after performing physical exercises (Álvarez-Muñoz et al., 2023; Barrios-Duarte, 2006; Pereira-Gaia et al., 2021). Regarding high-performance uni-

versity athletes, some studies indicate that dual careers offer benefits for personal development (Harrison et al., 2020; Reyes-Hernández et al., 2021; Reyes-Bossio et al., 2023).

Despite these findings, high-performance university athletes face complex psychological and social demands due to the simultaneous engagement in sports practice and academic study as their primary activities (Massó et al., 2022). The implications of these demands have diverse effects for the athletes, significantly impacting their mental health and poses risks to their emotional well-being (Reyes-Bossio, 2020; Reyes-Bossio et al., 2023; Schinke et al., 2017). This became particularly evident during the recent COVID-19 pandemic, highlighting the importance of adherence to sport psychology (Barbosa-Granados, Arenas-Granada et al., 2022).

Consequently, research in university sport is becoming increasingly frequent, revealing findings that underscore the need to incorporate studies focused on the performance and psychological characteristics of these athletes. Several studies have highlighted the complexity of the simultaneous influence of academic study and sport on the performance of individuals in both activities (Capranica et al., 2021; Conde et al., 2021; Stambulova & Wylleman, 2019; Torregrossa et al., 2020).

Although Cuba provides support to university athletes through ongoing monitoring of their sports and academic lives driven by governmental interest (Massó et al., 2022), scientific studies on the emotional characteristics of these individuals engaged in dual career from an early age until their transition to university life have been insufficient. Therefore, this research aims to characterize competitive anxiety and mood states in a sample of high-performance Cuban university athletes across different sports and genders.

Methods

A descriptive, correlational, and cross-sectional study was conducted to characterize the competitive anxiety and the mood states in high-performance university athletes from the University of Sciences of Physical Culture and Sport "Manuel Fajardo".

Participants

46 university student-athletes pursuing a degree in physical culture participated, representing national teams from 16 different sports. A heterogeneous sample was formed in terms of type of sports (25 team sports and 21 individual sports), but equivalent in terms of gender (23 female and 23 male). The athletes had an average chronological age of 20.70 years and an average of 6.98 years of experience in high performance sport.

An intentional sampling was carried out based on the following criteria:

Inclusion: All the athletes were in the training preparation phase.

Exclusion: Athletes who do provide their consent to participate in the study.

Exit: Athletes who do not complete all the instruments for psychological evaluation.

Table 1 describes the specific sports and their classification as either a team or individual sport.

Table 1

Description of the sample according to type of sport

Nº	Sports	Type	Frequency	Gender		Total
				Female	Male	
1	Soccer	Team sport	9	2	7	25
2	Basketball	Team sport	6	4	2	
3	Volleyball	Team sport	5	2	3	
4	Baseball	Team sport	2	0	2	
5	Beach Volleyball	Team sport	2	1	1	
6	Hockey	Team sport	1	1	0	
7	Gymnasia	Individual sport	4	4	0	21
8	Olympic wrestling	Individual sport	4	0	4	
9	Karate	Individual sport	3	0	3	
10	Sport's shot	Individual sport	2	2	0	
11	Weightlifting	Individual sport	2	2	0	
12	Chess	Individual sport	2	1	1	
13	Taekwondo	Individual sport	1	1	0	
14	Swordplay	Individual sport	1	1	0	
15	Athletics	Individual sport	1	1	0	
16	Judo	Individual sport	1	1	0	
	Total			23	23	46

Materials

The Spanish version of the *Competitive Sport Anxiety Inventory* (Martens et al., 1990; Márquez, 1992) was used to evaluate competitive anxiety. The instrument comprises 27 items distributed across three subscales that measure cognitive, somatic anxiety and self-confidence, with four Likert-type response options: (1 = Not at all; 2 = A little; 3 = Moderately; 4 = A lot). The total score across the three scales was considered, resulting in a Cronbach's Alpha coefficient of .95.

The Spanish version *of the Brunel Mood Scale* (Mcnair et al., 1971; Cañadas et al., 2017) was applied to provide an evaluation of mood states in adolescent and adult populations. It consists of 24 items that describe simple mood states. Responses are recorded using a 5-point Likert-type scale: (1 = Not at all; 2 = A little; 3 = Moderately; 4 = Quite a bit; and 5 = Extremely). The instrument has six subscales, with Cronbach's alpha coefficient of .85 for Tension, .71 for Depression, .75 for Anger, .78 for Vigour, .67 for Fatigue and .80 for Confusion.

Procedure

After obtaining informed consent from the participants, the instruments were administered in the morning in printed format in the classrooms of the Manuel Fajardo University of Physical Culture and Sports Sciences, under optimal conditions for completion, following a careful explanation of the instruments' characteristics and objectives. Two consecutive days were taken for the application of the instruments over two consecutive days (one each day).

Data analysis

The data were analysed using descriptive statistics such as the mean, standard deviation, skewness, and kurtosis. The Kolmogorov-Smirnov test was applied and when a lack of normality was determined, the Mann-Whitney U test was applied to compare the psychological variables between athletes according to gender (female or male) and type of sport (individual or team). Spearman's correlation coefficient was used to determine bivariate correlations between competitive anxiety, mood states, chronological age, and high-performance sport experience. The statistical software SPSS V. 25.0 for Windows was used for data analysis.

Results

In *Table 2* shows that depression, anger and vigour have higher mean values than the other mood states. On the other hand, competitive anxiety indicates greater dispersion than the other variables but follows a normal distribution. Most variables do not exhibit normality.

Table 2

Description of the variables under study and normal distribution test

Variables	Mean	Standard deviation	Skewness	Kurtosis	Z	p
Chronological age	20.70	2.56	3.422	16.153	.253	.000
High-performance sport experience	6.98	4.45	.825	–.257	.196	.000
Competitive Anxiety	39.54	9.84	.422	.475	.102	.200
Tension	6.61	3.07	1.564	2.281	.198	.000
Depression	9.17	3.38	.067	–.660	.118	.113
Anger	8.13	3.10	.932	1.074	.169	.002
Vigour	7.00	3.36	1.217	.940	.186	.000
Fatigue	6.65	3.30	1.310	1.047	.235	.000
Confusion	6.20	3.36	1.906	3.066	.257	.000

Note. Z= Kolmogorov-Smirnov.

Table 3 it is observed that no variable establishes significant difference based on gender, however, in general sense, girls have greater competitive anxiety and negative mood states, except fatigue.

Table 3

Mood states and competitive anxiety between female and male athletes

Variables		N	Average range	Mann-Whitney U	*p*
Competitive Anxiety	Female	23	23.70	260.00	.921
	Male	23	23.30		
Tension	Female	23	25.83	211.00	.229
	Male	23	21.17		
Depression	Female	23	23.89	255.50	.842
	Male	23	23.11		
Anger	Female	23	23.83	257.00	.868
	Male	23	23.17		
Vigour	Female	23	24.15	249.50	.735
	Male	23	22.85		
Fatigue	Female	23	22.85	249.50	.732
	Male	23	24.15		
Confusion	Female	23	26.17	203.00	.151
	Male	23	20.83		

Table 4

Mood states and competitive anxiety between team and individual sports

Variables		N	Average range	Mann-Whitney U	*p*
Competitive Anxiety	Team Sports	25	23.62	259.50	.947
	Individual Sports	21	23.36		
Tension	Team Sports	25	25.38	215.50	.289
	Individual Sports	21	21.26		
Depression	Team Sports	25	24.24	244.00	.681
	Individual Sports	21	22.62		
Anger	Team Sports	25	26.22	194.50	.130
	Individual Sports	21	20.26		
Vigour	Team Sports	25	24.90	227.50	.429
	Individual Sports	21	21.83		
Fatigue	Team Sports	25	25.00	225.00	.390
	Individual Sports	21	21.71		
Confusion	Team Sports	25	23.94	251.50	.797
	Individual Sports	21	22.98		

Table 4 shows that, although no significant differences were found, athletes in team sports have higher scores in mood states and competitive anxiety.

Table 5 shows significant and positive correlations between mood states. In contrast, competitive anxiety demonstrates meaningful positive relationships only with tension, depression, and vigour.

Table 5

Correlation between chronological age, experience in high-performance sports, mood states and competitive anxiety

	Variables	1	2	3	4	5	6	7	8
1.	Chronological age								
2.	High-performance sport experience	–.080							
3.	Tension	.023	.053						
4.	Depression	–.155	.057	.581**					
5.	Anger	–.011	.050	.688**	.803**				
6.	Vigour	.054	.052	.776**	.627**	.694**			
7.	Fatigue	.106	.082	.712**	.681**	.821**	.810**		
8.	Confusion	.012	–.075	.704**	.469**	.691**	.697**	.738**	
9.	Competitive Anxiety	–.170	.244	.299*	.324*	.289	.295*	.288	.217

*Note. *p<.05; **p<.01 (two-tailed)*

Discussion

The study found that student athletes had a predominantly negative mood and competitive anxiety which did not differ statistically between female and male athletes. No significant differences were found between team and individual sports athletes. Furthermore, mood states were found to be positively and significantly related to each other, denoting systemic interdependence among mood states, while competitive anxiety was found to influence levels of tension, depression and vigour. Specifically, a higher level of anxiety in competition may be accompanied by an increase in these mood states, which may condition sport performance.

The mood states with the highest scores were depression, anger, and vigour in that order. This indicates a predominance of negative emotions at the time of the study, which contrasts with the findings of Oliveira et al. (2020) in a sample of basketball athletes, who exhibited a predominantly positive mood, as vigour obtained the highest scores at the beginning and end of the season.

No significant differences were found in mood states between female and male athletes, consistent with the findings of Castro-Sánchez et al. (2018), but differing from the results of Cañadas et al. (2017), who determined that female athletes ex-

hibited greater anger, confusion, depression, and fatigue, but less vigour than male athletes. Similarly, a study by Peñaloza-Gómez et al. (2016) showed that female athletes scored lower on vigour and higher on confusion. Other research found that female athletes tend to present more negative emotional states (Balaguer et al., 1993; McDowell et al., 2016).

Although no statistically significant differences were found, it is striking that female athletes had higher mean scores in tension, depression, anger, vigour, and confusion, while male athletes scored higher in fatigue. Therefore, it is understood that female athletes tend to experience more intense emotions than male athletes, including negative and positive emotions. These results differ from the study by Romero-Martín et al. (2017which found that men expressed more intense emotions than women; however, they coincide with the majority of previous research across both athlete and non-athlete populations (Cañadas et al., 2017; Peñaloza-Gómez et al., 2016; Terry et al., 2021).

Competitive anxiety also showed higher average scores in female athletes which is consistent with several studies that indicate a trend towards higher anxiety rates in women (Castro-Sánchez et al., 2020; Menéndez-Fierros & Becerra-Hernández, 2020; Peñaloza-Gómez et al., 2016). The divergent and concurrent results from both investigations regarding the comparison of mood states between female and male athletes implies the need for further research. However, there is greater agreement among several studies on competitive anxiety between women and men, indicating that female athletes are more susceptible to experiencing high levels of anxiety in competition.

Conversely, no significant differences were found in the levels of competitive anxiety and mood states in the athletes across the various types of sport practiced. However, higher average scores were observed for team sports. This suggests that, despite emotional affect is relatively consistent across types of sports, team sports elicit higher levels of stress or emotional burdens on athletes.

These observations are consistent with a study by Castro-Sánchez et al. (2018) which determined that team sports could require a greater degree of emotional skills due to the simultaneous interactions between teammates and opponents during games. These differentiating observations between team and individual sports could have influenced the results of this research, since, according to Terry (1997), the effects upon moods appear to be mediated by various factors including the type of sport practiced.

The correlational analysis showed that age and experience in high-performance sports are not associated with competitive anxiety or mood states, which contrasts with the findings of several authors who have determined that older and more experienced athletes better control the emotional effects of sporting situations. (Hernández et al., 2008; Peñaloza-Gómez et al., 2016). Based on the above, it was expected that athletes with more experience would present more positive moods and less anxiety in the competition. The absence of a relationship between sports experience and psychological variables associated with performance was also found by Ríos-Garit et al. (2023) in a study on young athletes from different team and individual sports. In both cases, the average experience of the athletes was not notably high, which could have influenced the findings obtained in both investigations.

On the other hand, mood states have strong relationships of positive interdependence, while anxiety is only positively related to tension, depression, and vigour. This suggests that the increased anxiety during competition is typically accompanied by heightened mood intensity, exacerbating the negative emotional experiences of athletes. Feria-Madueño et al. (2023) also observed the relationship between tension and anxiety in youth athletes during training sessions at the Cuban national athletics preselection events.

The findings suggest that the athletes have emotional experiences that can negatively or positively influence performance during the upcoming competition due to the relationships established between competitive anxiety and two of the three most intense mood states: depression and vigour. The influence of competitive anxiety on the moods of athletes has been illustrated by Peñaloza-Gómez et al. (2016). By analysing 255 athletes from 26 different sports, these authors determined that cognitive and somatic anxiety predicted negative mood states such as anger, depression, fatigue, tension, and confusion. They also found that somatic anxiety and self-confidence appear to be positively predicated on vigour. Furthermore, self-confidence also predicted negative behaviour associated with confusion.

The results of this research confirm the importance of athletes and technical staff being aware of competitive anxiety and emotional states in sport. Providing workshops, talks or educational material can help increase awareness of this topic (Barbosa-Granados, Castañeda-Lozano et al., 2022) and incorporating an approach that addresses economic, financial, educational, competitive, and social aspects is especially important (Håkansson et al., 2020).

Conclusion

Although no notable differences were found between female and male athletes, a marked trend in presenting negative mood states and greater competitive anxiety in female athletes was observed. Likewise, in team sports, slightly more intense negative and positive moods are evident than observed for individual athletes. The results obtained indicate that overall, the intensity of negative moods in these Cuban university athletes depended on their level of competitive anxiety, given that an increase in competitive anxiety can lead to greater tension, depression, and vigour.

Limitations

The cross-sectional and correlational design of the research limits the analytical scope of the results obtained, as it does not allow for the explanation or prediction of the influence of competitive anxiety on the moods of high-performance Cuban university athletes. The findings have limited generalizability due to the size of the sample and its low representativeness of the population.

Ethics Statement

Informed consent was obtained from the participants. The questionnaires were completed anonymously, and the confidentiality of the information provided was maintained. We proceeded according to the ethical standards of scientific research con-

tained in the Declaration of Helsinki (World Medical Association, 2013). The study design was endorsed by the Ethics Committee of Sports Psychology Studies Center and approved by the Executive Counsil of the University of Sciences of Physical Culture and Sport "Manuel Fajardo".

Author Contributions

JRG: Conceptualization, Methodology, Formal analysis, Research, Writing-review, and Editing.

MCH: Methodology, Formal analysis, Research, Writing. MRB: Conceptualization, Formal analysis, Writing. YPS: Formal analysis, Writing. RTR: Research, Writing.

Conflict of Interest

The authors declare no conflict of interest.

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Analysis of Eye and Head Tracking Movements During a Puck-Hitting Task in Ice Hockey Players, Compared to Wrestlers and Controls

Irina S. Polikanova[a,b*], Danila D. Sabaev[c], Natalia I. Bulaeva[c], Elizaveta A. Panfilova[a], Sergey V. Leonov[a,c], Grigory S. Bugriy[c], Boris I. Bespalov[c], Anna P. Kruchinina[c]

[a] *Federal Scientific Center for Psychological and Interdisciplinary Research, Moscow, Russia*
[b] *HSE University, Moscow, Russia*
[c] *Lomonosov Moscow State University, Russia*

*Corresponding author. E-mail: irinapolikanova@mail.ru

Background. The study of eye-movement strategies of athletes of various disciplines and skill levels is highly significant for sports psychology, since the results can be used in training to improve performance. Such studies are extremely scarce for ice hockey.

Objective. To determine successful eye-movement strategies for ice hockey players compared to wrestlers and controls (non-athletes) during puck-hitting tasks of various degrees of difficulty, using virtual reality.

Design. The study involved 31 participants (male), including 13 ice hockey players (age 20 ± 2.5), 9 wrestlers (age 19 ± 1.9), and 9 controls (age 19 ± 1.3). We used a pre-developed VR-PACE technology that simulates an ice rink in virtual reality (VR). The task was to hit pucks. VR was presented via the HTC Vive Pro Eye with a built-in eye tracker (100 Hz). We analyzed the parameter that reflected the share of puck presence in one of selected retina areas (0–5°, 5–10°, 10–15°, 15–25°, 25–35°) of the left and right eyes and the head.

Results. Ice hockey players exhibited longer puck-tracking using both the near periphery (5–15°) and central retinal area (0–5°). Puck speed had minimal impact on eye-movement strategies, and the visual focus on these areas remained consistent regardless of task type. For both wrestlers and controls, visual fixations in the central retinal area increased when tracking the puck without a motor response, likely leading to higher energy consumption and sensory fatigue.

Keywords: hockey, virtual reality, eye movements, eye tracking, eye-movement strategies

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Conclusion. The optimal eye-movement strategy involves parafoveal tracking in the near periphery (5–15°) and partial foveal tracking (0–5°), allowing for better object information retention and efficient puck trajectory tracking with reduced energy expenditure.

Introduction

Ice hockey is known for demanding not only great physical condition from its athletes, but also well-developed cognitive abilities and psychological stability, since players need to simultaneously track the puck, read the team and the field situation, control timing and coach instructions (Bugriy et al., 2022; Leonov et al., 2022; Polikanova, Leonov, et al., 2022; Polikanova, Yakushina, et al., 2022). This, in turn, might testify to better development of their sensory abilities — primarily visual system and sensorimotor coordination, which ensure smooth operation of the complex coordinated movements required for ice hockey. This implies that analyzing eye movements and eye-movement strategies in ice hockey may be relevant for proficiency diagnostics and used to train beginners (Panchuk et al., 2017). Moreover, several authors discuss the possibility of improving perceptual skills in ice hockey (Panchuk et al., 2017). There are currently very few studies of this.

Eye Tracking in Sports

Eye-movement strategies are important for a number of sports (Hausegger et al., 2016; Krabben et al., 2022; Lafont, 2008; Iakushina et al., 2024), including ice hockey (Panchuk et al., 2017; Panchuk & Vickers, 2006).

Optimal coordination of perception and action is critical for successful performance of sports tasks (Tambovsky, 2003). Foveal vision is characterized by high visual acuity. It is realized in a small retinal area that can be compared to the size of one's thumbnail (up to 5° of visual angle). But as the distance from this area increases, visual acuity decreases, and at eccentricity (the angular distance from the fovea — all visual information outside of this foveal area) of 40°, information becomes blurred by 90%. Despite the low acuity of peripheral vision, a great number of rod cells provide high motion sensitivity in this retinal area (Strasburger et al., 2011).

To process information with high visual acuity, humans use movements of their body, head, and eyes to shift the fovea to specific areas of interest. These movements are divided into saccades, smooth pursuit eye movements, vergence, and vestibular eye movements. Humans mainly rely on saccades, which are rapid eye movements with speeds up to 500°/s (Rayner, 1998). When performing saccades, sensitivity to visual information decreases, a phenomenon known as saccadic suppression (Binda & Morrone, 2018). In contrast, during smooth-pursuit eye movements, visual-information sensitivity is similar to fixations, meaning periods of relative eye stillness, but only occurs when the eyes follow an object (Spering et al., 2011). Therefore, the movement of the fovea is costly due to information loss. To avoid these costs, it is reasonable to assume that, especially in sports, where acting in complex environ-

ments with strict timing and precision requirements is necessary, eye movements are adjusted depending on the task.

Therefore, the operability of foveal and peripheral vision in sports is determined by the current sport situation and task — if there is one or more relevant stimulus; if the task is to aim or track, etc. (Klostermann et al., 2020).

During fixations, the objects that come within the central visual area that provides pattern vision (approximate diameter .5 mm, approximately 2° of visual field) are perceived and recognized. To perceive and analyze a complex situation requires numerous rapid eye movements (saccades) to move the point of fixation from one object to another. Also, as noted above, the processing of information during saccades is suppressed, causing the loss of essential information during gaze shift. This, in turn, may be crucial for fast-paced and dynamic sport situations (Binda & Morrone, 2018). That is why certain skills are necessary in sports. One of those skills is the optimization of eye movements, considering the sport task and the capabilities of foveal and peripheral vision. Another skill is the ability to process incoming visual information regardless of the visual field area (central or peripheral) from which this information was received. These skills are developed through training, and set professional athletes apart from beginners (Mann et al., 1996; Panchuk et al., 2017).

The ability to focus visual attention on objects using peripheral vision, i.e., without fixing the gaze on them, is an essential skill for an athlete. This skill is especially useful when there is more than one relevant object in sight and/or when the time needed for decision-making is limited. Peripheral vision is more beneficial for simultaneous tracking of multiple moving objects and for detecting response-demanding alterations in those objects (Vater et al., 2017).

Skilled athletes may use different strategies to optimize their eye-movement activities in any given situation. For instance, 1) gaze fixation on a single point (anchoring) and distribution of visual attention via peripheral vision to track multiple objects; 2) focus and concentration of visual attention on one relevant object via predominantly foveal and parafoveal vision; 3) gaze orientation along a certain axis between several relevant stimuli via peripheral vision and the possibility of shifting the gaze from one object to another with minimal consumption of time and energy (Klostermann et al., 2020; Vater et al., 2020).

When the vision field is restricted, skilled athletes are capable of analyzing the situation and making proper decisions based on visual information regardless of the visual field area (central or peripheral) from which this information was received (Ryu et al., 2013).

Eye-Movement Strategies in Various Sports

In martial arts (such as Kung Fu and Taekwondo), gaze fixation on a particular part of the opponent's body ("anchoring") is the most effective way to optimize the use of peripheral vision. Choosing where to anchor your gaze depends on the particular fight situation, key (motor) signals, and possible loss of visual information during saccades. Highly skilled athletes use peripheral vision to assess their opponent's attacks, switching visual attention instead of saccadic gaze shifts (Hausegger et al., 2016).

Before their fight, professional judoka gaze primarily at the opponent's chest area. This helps them monitor their opponent's hands by peripheral vision (Krabben et al., 2022). Beginners, however, are more likely to gaze at the opponent's sleeves and show a higher number of quick gaze fixations (Piras et al., 2014).

The comparison of world-class tennis players to their non-world-class colleagues revealed a pivotal difference in their eye-movement patterns during ball bounce. Before returning the ball, world-class tennis players shifted their gaze to the contact area (where the racket meets the ball) and fix it there until they hit (Lafont, 2008).

The eye-movement strategy chosen by cricket players while batting affects the success of ball reception. Professional players shift their gaze faster to the expected bounce point of the ball after their opponent's shot and track it for 100–200 ms after it bounces off the ground. This helps the batter to predict the ball's trajectory in a short time (about 500 ms) (Land & McLeod, 2000). At the same time, two predictive saccades (expected ball bounce spot and bat-to-ball contact spot) are distinctive features of the eye-movement strategy of world-class cricket players (Mann et al., 2013).

Professional baseball batters coordinate their head rotation with the ball's movement, ensuring that the ball is constantly moving relative to their head. World-class batters use specific eye-movement strategies, usually relying on two predictive saccades to anticipate (a) ball bounce spot and (b) spot of bat-to-ball contact. This allows them to aim their gaze at the ball at the time of impact (Mann et al., 2013).

Visual Areas

Despite its lower visual acuity as compared to the fovea, the periphery performs an essential function in visual perception. The processing of visual signals received by foveal and peripheral retinal areas are closely interconnected both during fixations and saccades. Such integration of central and peripheral stimuli contributes to continuity and reduces the uncertainty of perception of the environment (Stewart et al., 2020).

The boundaries between the foveal area and periphery are nominal — there are no clear borders between them. This uncertainty echoes in the vagueness of the vocabulary used in studies of central and peripheral vision. How should we label the central field of vision and how the peripheral?

Perimetry defines the central visual field as an area of approximately 60° in diameter (vision area shared by both eyes). Anything beyond this area could be considered the peripheral visual field. On the other hand, the retina has a specific structure called the macule. It is about 17° in diameter (comprising the foveola of about 1° in diameter, the fovea of about 5.2° in diameter, and the parafovea and perifovea of about 5–9° and 9–17° in diameter, respectively). The macule is the central retinal area and is responsible for high-resolution color vision. So, we can attribute everything that falls in the macule area to the central visual field (of each eye). Meanwhile, the foveal visual area is a region of 2° surrounding the fovea centralis. Everything beyond those borders is considered the peripheral visual field (Strasburger et al., 2011).

Five main areas were also nominally identified in the study of perceptual abilities of visual field periphery. This subdivision broadly reflects the visual field structure conditioned by specific features of retinal structure. The areas differ by their ability

to process different stimuli and solve different types of tasks (detection, recognition, identification, classification of test objects):

central (±2.50°) — the highest level of detection, recognition, identification, and classification of objects shown for a short time (several tens of milliseconds);

near periphery (±2.5–15°) — comparatively high level of detection, recognition, identification and classification of objects; possibility of anticipating their changes;

middle periphery (±15–25°) — limited capacity to recognize and identify short-term objects; distinct classification difficulties;

far periphery (±25–35°) — good detection, but poor identification, recognition, and classification of objects;

extreme periphery (above ±35°) — detection only (Barabanschikov, 1990; Strasburger et al., 2011).

This classification served as the basis for the present study. Our aim was to identify successful eye-movement strategies in ice hockey players compared to other athletes (freestyle wrestlers) and controls during puck-hitting tasks of various degrees of difficulty, using virtual reality.

Given the theoretical analysis, we developed the following hypotheses:

1) When comparing missed ("goal yes") and save pucks ("goal no"), the successful eye-movement strategies are characterized by the prevalence of visual attention focus on pucks in the central retinal area and near periphery;
2) Ice hockey players significantly differ from other groups of subjects in terms of the puck-holding dominance in the central retinal area and near periphery;
3) As puck speed increases, the group differences in visual puck retention in the central retinal area and near periphery will increase;
4) Eye-movement strategies in the no-motor-response puck-viewing task (block 5) differ from eye-movement strategies in the motor-response tasks (blocks 1–4).

Methods

Participants

The study involved 31 participants (men), including 13 professional ice hockey players (age 20 ± 2.5; average training experience 14.18 ± 3.8 years; different skill levels (Candidate Master of Sports — 3, 1st Senior Category — 1, 2nd Senior Category — 6, 3rd Senior Category — 1, 1st Junior Category — 2), and 9 freestyle wrestlers (age 19 ± 1.9; average wrestling experience 8 ± 6.10 years, Candidate Master of Sports — 1, Senior Category — 2, Junior Categories — 4), 9 controls (age 19 ± 1.3). Women were excluded due to the necessity for taking the menstrual cycle into account.

All subjects volunteered for the study following a pre-signed consent and prior approval from the Ethics Committee of the Russian Psychological Society (March 2021) in line with the Declaration of Helsinki.

VR-PACE Virtual Reality Technology

The study involved the previously developed original VR-PACE (**VR** Technology for training **P**uck hitting **A**nd ho**C**key skill **E**ffectiveness) using virtual reality (HTC Vive Pro Eye), aimed at diagnosing and analyzing the skill level of ice hockey players, as well as their training. For a more detailed description, please see Polikanova, Leonov et al. (2022). Before the experiment starts, the subject puts on ice hockey equipment — shin guards, skates, gloves, and a virtual reality helmet. The subject stands on special plastic ice. He holds a stick that matches the stick in the virtual environment. Pucks are presented in blocks that differ by level of difficulty. There are a total of five blocks; the difficulty increases from block 1 to block 4. Block 1 is the easiest (speed 60–80 km/h, long distance to the puck — 18 m). Block 2 is more difficult (speed 60–80 km/h and 100 km/h, average distances to the puck are greater — 12 and 18 m). Block 3 is for a medium skill level; it is a challenging mode with high speeds (up to 170 km/h) and any distances, including close ones (6, 12 and 18 m). Block 4 is the most difficult (pucks are presented in a series of two consecutively with a 1 s interval). Block 5 suggests that the subject does not hit the pucks, but only closely observes and tracks them.

The virtual environment has its own limitations and strengths. In our work, we formalize the concept of a person's visual strategy when interacting with a moving puck by analyzing the distribution of the puck's time spent in different zones of the person's visual field. By transitioning from describing the movement of the eye to analyzing the formalized visual strategy, we gain the ability to quantitatively compare different cases.

The primary advantage of a virtual environment lies in its capacity to provide comprehensive and detailed information about the state of the environment and to isolate external distracting factors.

HTC Vive Pro Eye

The Vive Pro Eye is a high-end virtual reality (VR) headset developed by HTC for professional and enterprise use. It builds upon the foundation of the original Vive Pro, with the addition of integrated eye-tracking technology. Similar to the positional data (Leonov et al., 2022) of the trackers, eye movement data exhibits temporal irregularity. This complicates the analysis, but does not make it impossible. Moreover, the recording frequency is not high, around 100 Hz, so the irregularity further reduces the ability to determine the type of movement and accurately reconstruct trajectories.

It is worth noting that the data recorded by the VivePro Eye system requires additional recalculation of the eye coordinates into a common coordinate system. It was also necessary to reconstruct the information about the position of the origin of the eye coordinate system relative to the tracked point on the helmet.

Investigated Characteristics

As the primary variable for analysis, we chose the position of the puck's image relative to the player: in which part of the field of view the puck was located. During the recording, the information on the exact puck coordinates, head coordinates and orientation, eyes position and orientation was captured. The entire described dataset

was recorded at similar frequencies (100 Hz). Based on this data, it was determined which part of the retina and which part of the person's field of vision the observed object — the puck — was located in.

Visual stimuli (pucks) were presented for varying durations — "lifetimes". The difference in their lifetime stemmed from differences in initial conditions such as speed and distance from the goal. Direct comparison of relative trajectories is not feasible due to significant variation in initial conditions. When observing the puck, the average eye velocity over .01-second intervals does not show significant deviations from values typical for slow eye movements. Therefore, we assume that during the puck's flight, the eye performs a task of fixation and tracking. Consequently, we suggest that throughout the observed time interval, the retina is consistently recognizing the image of the puck.

When observing the puck, the expected value of speed (at a sampling rate of 100 Hz) was 50 °/s with a standard deviation of approximately 30 °/s (the averaging was performed over a sample of all pucks). It is important to note the significant influence of individual trials with high average speeds, which result from both measurement errors and the presence of relatively quick shifts in gaze. Considering these values, we will assume that the puck was perceived by the person throughout its entire duration.

We proposed using a vector of parameters to describe the visual interaction with the puck. The total duration is segmented into intervals. During each interval, the puck remained within one of the specific areas of the player's visual field. To obtain dimensionless time, the time the puck spends in each area of the player's visual field is divided by the puck's lifetime total duration.

Why Don't We Use Classical Characteristics?

Classical metrics include characteristics of fixations and saccades, though there is often inconsistency in defining these states (Hessels et al., 2018). "Fixation" and "saccade" detection depends on the eye-tracking sampling rate, because definitions are often based on the concept of eye-rotation velocity. For the term "saccade", two understandings can be distinguished: physiological — rapid eye movement corresponding to an uncorrectable control pattern during execution (Holmqvist et al., 2012; Kruchinina & Yakushev, 2018), and non-physiological, which is equal to "no fixation". In mathematical terms, we should talk about periods of average fast movement and average slow movement. A mandatory parameter in this case is the averaging time, which is inversely related to frequency. For example, at 100 Hz maximal average eye velocity is approximately 500°/s, if the eye makes a saccade by amplitude 50°. As is known, the maximal velocity will be approximately 800°/s. An additional glissade cannot be detected. So, if we have data in a sample range less than 250 Hz, it is preferable to use an alternative approach.

Meaning of Investigated Characteristics

A similar measurement, such as the angle of the puck relative to the head direction, can be used to assess visual strategy. This indicates to what extent a person achieves visual objectives through eye movements versus head movements. If the eyes only make small scanning movements, then head movements essentially determine the

gaze direction. On the one hand, the eyes may only perform small scanning movements, which do not significantly influence the retinal area used for perceiving a moving object. On the other, the eyes can precisely position the image of the object on the desired retinal area, indicating the sensitivity of the chosen parameter vector to the implemented visual strategy.

Analysis of Data and Eye-Movement Strategies

Benchmarking was performed using Jamovi 2.4.1. A test for normality by Shapiro-Wilk criterion showed that all parameters are not normally distributed; therefore, it was decided to apply the Mann-Whitney *U* test. The non-parametric Wilcoxon test ($\alpha = .05$) was used for intragroup comparisons. The Kruskal-Wallis criterion was used for analysis of variation (One-Way ANOVA).

To analyze eye-movement strategies, we used the parameters of angles between (a) left eye and puck, (b) right eye and puck, and (c) head and puck.

As stated earlier, we used the following angle values that characterize the areas of central and peripheral vision: 0–5°, 5–10°, 10–15°, 15–25°, 25–35°.

The gaze share in each angle area was calculated. This parameter was calculated for each of the parameters described below:

- for 4 speed ranges (velocity ranges were calculated as puck lifetime, which depended on distance and initial velocity): very fast (.157 s to .365 s), fast (.365 s to .573 s), slow (.573 s to .781 s), very slow (.781 s to .989 s);
- for each group (ice hockey players, wrestlers, controls);
- for missed pucks ("goal yes") and saves ("goal no");
- for each of the five blocks.

Results

Analysis of Missed Pucks and Saves

Statistical analysis for the left and right eye values showed that eye-movement strategies in the case of successful saves are marked by a prevalence of focusing visual attention on pucks in the central retinal area (0–5°) as well as the near periphery (5–15°), compared to missed pucks (*Table 1*). The statistical analysis of head parameters (angle between head and puck) showed that in the case of successful saves, visual fixations in the near (5–15°) and middle periphery (15–25°) prevailed, compared to missed pucks (*Table 1*). Thus, the data allows us to accept hypothesis 1, stating that in successful saves, visual focusing will prevail when the puck is tracked by central retinal areas as well as the near periphery (for eyes).

To refine the results even more, a nonparametric one-way ANOVA (Kruskal-Wallis criterion) analysis of variance was performed, which showed significant inter-group differences only for goals for the near periphery (5–10°) for both eyes (*Table 2*). For the head, the nonparametric one-way ANOVA analysis of variance showed no significant inter-group differences.

Additional Dwass-Steel-Critchlow-Fligner pairwise comparisons analysis showed significant differences for the left eye between ice hockey players and wrestlers ($W = -4.27$, $p = .007$), and marginal means between ice hockey players and con-

Table 1

Results of Statistical Analysis of Eye-Movement Strategies for Successful Saves and Missed Pucks

Angles	Goal[1]	LEFT EYE					RIGHT EYE					HEAD				
		Mean	***SD***	***p***	***U***	**Cohen's *d***	**Mean**	***SD***	***p***	***U***	**Cohen's *d***	**Mean**	***SD***	***p***	***U***	**Cohen's *d***
0-5°	Yes	**.0890**	**.172**	**<.001*** **	**74.765**	**.1969**	**.0948**	**.180**	**<.001*** **	**74.146**	**.2035**	.0348	.105	.420	91.060	.0218
	No	**.1840**	**.258**				**.1904**	**.262**				.0382	.123			
5–10°	Yes	**.1622**	**.217**	**<.001*** **	**74.028**	**.2048**	**.1651**	**.220**	**<.001*** **	**74.361**	**.2012**	**.0931**	**.162**	**<.001*** **	**80.242**	**.1380**
	No	**.2524**	**.270**				.2572	.279				.1457	.227			
10–15°	Yes	**.1309**	**.196**	**.006****	**83.229**	**.1059**	**.1312**	**.200**	**.003****	**82.536**	**.1134**	**.1520**	**.208**	**<.001*** **	**77.096**	**.1718**
	No	**.1740**	**.237**				**.1763**	**.238**				**.2103**	**.237**			
15–25°	Yes	.1792	.235	.532	90.794	.0247	.1739	.230	.707	91.709	.0148	**.2633**	**.285**	**<.001*** **	**73.297**	**.2126**
	No	.1937	.257				.1877	.250				**.3828**	.324			
25–35°	Yes	.0432	.111	.390	90.439	.0285	.0418	.101	.540	91.199	.0203	.0418	.101	.540	91.199	.0203
	No	.0484	.117				.0447	.113				.0447	.113			

[1] *Goal: yes — goal; no — saved puck*

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2

Significant Statistical Differences (Nonparametric One-Way ANOVA) Between Different Groups on Visual Attention Focusing on Pucks in the Near Periphery (5–15°) in the Case of Goals

Eye	Sport	Mean	SD	*p*	χ^2	ε^2
left	Hockey	.199	.239	.008	9.66	.017
	Wrestlers	.125	.181			
	Controls	.162	.220			
right	Hockey	.193	.230	.006	1.07	.017
	Wrestlers	.127	.187			
	Controls	.171	.230			

trols ($W = -3.21$, $p = .06$); for the right eye between ice hockey players and wrestlers ($W = -4.52$, $p = .004$).

The data allows us to accept hypothesis 2, with several adjustments. Compared to other groups, for ice hockey players it is typical to track the puck longer at the near periphery (5–10°) in the case of goals. For the wrestlers and controls, there is also a primary prevalence of puck-tracking in the central retinal area (0–5°) and the near periphery (5–15°).

For head parameters, the middle periphery (15–25°) dominates in all three groups.

Speed Analysis of Puck Perception

Table 3 shows the results of nonparametric one-way ANOVA, which revealed significant differences between groups depending on puck speed. The most significant inter-group differences were observed for the central retinal area (0–5°) of the left and right eyes at both slow and fast speed, and for the near periphery (10–15°) of the head at very slow speed.

Table 3

Results of Statistical Analysis of Eye-Movement Strategies at Different Speeds of Puck Presentation

Speed	Eye/Head	Angle	Sport, mean (*SD*)			*p*	χ^2	ε^2
			Hockey	Wrestlers	Controls			
VERY SLOW	Head	10–15	.063 (.11)	.0169 (.253)	.239 (.212)	.033	6.795	.2
SLOW	Left eye	0–5	.313 (.285)	.167 (.211)	.219 (.236)	.036	6.622	.046
FAST	Left eye	0–5	.142 (.225)	.0684 (.147)	.0972 (.188)	.010	9.174	.021
	Right eye	0–5	.133 (.2)	.101 (.198)	.0976 (.195)	.042	6.337	.12
	Right eye	5–10	.243 (.257)	.166 (.245)	.222 (.274)	.010	9.145	.021

Table 4

Analysis of Eye-Movement Strategies with and without Motor Response

Group	Block	LEFT EYE (0–5°)					RIGHT EYE (0–5°)					HEAD (15–25°)				
		Mean	***SD***	***p***	***U***	**Cohen's *d***	**Mean**	***SD***	***p***	***U***	**Cohen's *d***	**Mean**	***SD***	***p***	***U***	**Cohen's *d***
ALL GROUPS	Block 1–4	**.123**	**.211**	**.007****	**57,863**	**.1203**	**.129**	**.218**	**<.001*****	**55,618**	**.1544**	.306	.306	.135	60,875	.0745
	Block 5	**.153**	**.209**				**.183**	**.227**				.334	.334			
HOCKEY	Block 1–4	.156	.235	.696	5,526	.0339	.153	.224	.995	5,716		.317	**.313**	**.026***	**4,529**	**.2082**
	Block 5	.155	.234				.159	.223				**.289**	**.316**			
WRESTLERS	Block 1–4	**.0934**	**.178**	**<.001*****	**2,671**	**.338**	**.121**	**.219**	**<.001*****	**2,671**	**.338**	.288	.305	.287	3,619	.103
	Block 5	**.195**	**.218**				**.248**	**.239**				.352	.284			
CONTROLS	Block 1–4	.115	.207	.104	12,238	.1064	**.117**	**.211**	**.024***	**11,635**	**.1504**	.307	.299	.214	12,430	.0924
	Block 5	.128	.186				**.160**	**.218**				.352	.287			

Notes. * $p < .05$, ** $p < .01$, *** $p < .001$

Additional Dwass-Steel-Critchlow-Fligner pairwise comparisons analysis showed significant differences for *very slow speed* between ice hockey players and controls ($W = 3.82$, $p = .02$).

Additional Dwass-Steel-Critchlow-Fligner pairwise comparisons analysis showed significant differences for *slow speed* between ice hockey players and wrestlers ($W = -3.54$, $p = .033$).

Additional Dwass-Steel-Critchlow-Fligner pairwise comparisons analysis showed significant differences for *fast speed* between:

For left eye (0–5)

ice hockey players and wrestlers ($W = -3.9$, $p = .016$),

ice hockey players and controls ($W = -3.34$, $p = .048$).

For right eye (5–10)

ice hockey players and wrestlers ($W = -4.39$, $p = .005$).

Thus, we only partially accept hypothesis 3, since significant differences between the groups are observed only in the eyes for slow and fast speeds, and for the head — for very slow speed.

Analysis of Eye-Movement Strategies with or without Motor Response

To check hypothesis 4, we conducted a statistical analysis, the results of which are shown in *Table 4*.

Average data for the whole sample demonstrate a significant alteration in eye-movement strategies when switching from a task with motor responses (blocks 1–4) to visual tracking only (block 5). In particular, there is a relevant increase in the share of pucks in the central retinal area (for left and right eyes, but not for the head).

Ice hockey players do not demonstrate such a tendency; they significantly change the head parameters — they decrease.

Thus, hypothesis 4 is accepted with several limitations, since the group of ice hockey players did not show a significant tendency.

Discussion

The results we obtained are, in general, consistent with data in the literature (Panchuk & Vickers, 2006; Ripoll & Fleurance, 1988). Earlier studies reported the importance of eye-movement analysis as a predictor for performance in cases of early detection and tracking of a still or flying object for different sports (Bard & Fleury, 1981; Ripoll & Fleurance, 1988). Panchuk and Vickers (2006) analyzed eye-movement strategies of goalkeepers when reacting to shots from 5 and 10 m on-ice. They found that success was not determined by puck distance, but rather by location, start and duration of final fixation/tracking gaze (or quiet eye, QE). The relative onset of quiet eye was significantly ($p < .001$) earlier (8.6%), and the duration was longer on saves ($M = 8.5\%$; 952.3 ms) compared to goals (onset 18.86%; $M = 7.1\%$, 826.1 ms). The quiet eye was located on the puck/stick during the preparation and execution of the shot in 7.53% of all trials, or on the ice in front of the release point of the puck (25.68%), and rarely on the body of the shooter (2.1%) (as per Panchuk & Vickers, 2006). These results were confirmed by the authors in a recent study (Panchuk et al., 2017).

This data is fully consistent with our results regarding the comparison of successful saves and goals. We demonstrated that in the case of save pucks, visual fixations are dominant in the central retinal area (0–5°) and near periphery (5–15°) for both eyes. Meanwhile, the dominant head-to-puck distance is always slightly greater: in the near and middle periphery (5–25°). Moreover, the most meaningful variations between ice hockey players and other groups are observed in the central retinal area (0–5°). This agrees with data obtained from baseball (Fogt & Zimmerman, 2014) and cricket (Mann et al., 2013). For example, Fogt and Zimmerman (2014) found that Division 1 college baseball players follow the pitched ball with their head throughout the entire pitch trajectory, while their eye moves very little to the end of the pitch trajectory. On average, gaze position matched target position along the entire pitch trajectory. However, eye and head movements were related by a common rule for all subjects (partial suppression of rotational vestibulo-ocular reflex).

Our data also complement the finding of Panchuk (2016) that there is a longer quiet eye on pucks deflected compared to goals. Thus, a longer quiet eye that tracks the central region and near periphery is a professionally relevant parameter. The results allowed us to accept hypothesis 1, that when comparing missed pucks ("goal yes") and retained pucks ("goal no"), successful eye movement strategies are characterized by a predominant focus of visual attention on pucks in the central retinal area and near periphery. The data obtained allow us to accept hypothesis 2 with several adjustments. Compared to other groups, for ice hockey players it is typical to track the puck longer at the near periphery (5–10°) in the case of goals. Meanwhile, for groups of wrestlers and controls, there is also a primary prevalence of puck tracking in the central retinal area (0–5°) and the near periphery (5–15°).

Successfully performing an interceptive action requires precisely coordinating the movements of an effector (e.g., limb, racquet, or glove) with an approaching target object (Bespalov, 2023; Vickers, 2007; Yakushina et al., 2023). When the object's trajectory is largely predictable, the flight path can be determined early from the moment of release. In the case of activities that involve less predictable object flight, which occurs during deflection in soccer or ice hockey, perceptual information that completely specifies the point of interception does not emerge until relatively late in the object's trajectory. As a result, performers must develop perceptual-motor strategies to overcome task constraints specific to their performance environment (Panchuk, 2016).

Our data also enhance the understanding of the role of head movements in interoceptive actions. Our results clearly demonstrate that the dominant head-to-puck distance is about 5–25° for all groups, and most noticeably at slow speeds (puck lifetime — .781 to .989 s). Hockey players in contrast to other groups demonstrate a significant predominance of head-to-puck distance at values 15–25° at slow speeds. It can be assumed that in this way head movements allow the player to optimize visual perception. According to our data, we see that the main range of puck retention by the eyes is from 0 to 15°. Thus, head movements allow the player to provide the most effective visual-motor control for realization of interoceptive actions.

This, in turn, aligns with the findings of other researchers (Bongers & Michaels, 2008; Hayhoe et al., 2012). When catching a ball, moving the head helps adjust the egocentric reference point, meaning the head shifts to maintain a more stable direction of the ball in relation to it. This idea aligns with the understanding that visual-perceptual and visual-motor tasks utilize different kinds of visual information. Specifically, individuals engaged in visual-perceptual tasks collect information from an allocentric perspective (focused on the object in relation to its environment), whereas those performing visual-motor tasks gather information from an egocentric viewpoint (based on their own position) (De Wit et al., 2012; Mann et al., 2013; Milner & Goodale, 1995). Mann et al. (2013) examined the eye and head movements of two of the world's best cricket players, and found that the batters coordinated their head rotation with the ball's movement, ensuring that the ball is constantly moving relative to their head. To this end, the ball could be followed if the batters simply moved their head and kept their eyes still.

The results we obtained also greatly contribute to the literature, since we demonstrated the differences in eye-movement strategies when presenting the puck at different speeds, as well as with different tasks (hitting or eye-tracking). Analysis of eye-movement strategies at different speeds of puck presentation showed relevant inter-group distinctions between groups. The results showed that the most significant inter-group differences are observed for the central retinal area (0–5°) of the left and right eyes at slow and fast speed, and for the near periphery (10–15°) of the head at very slow speed.

This allowed us to accept hypothesis 3, that group differences in puck retention in the central retinal region and near periphery would increase with increasing puck velocity.

At the same time, *post hoc* analysis showed significant differences between the group of ice hockey players, wrestlers, and controls (left eye, 0–5°); hockey players and wrestlers (right eye, 5–10°). Ice hockey players were distinguished by a significantly higher gaze share in this retinal area. It should be noted that the "very fast" puck speed corresponds to the maximum puck speed registered in ice hockey (max. registered puck speed in ice hockey history is 177.5 km/h). In other words, such speeds are usually not observed in normal practice. "Very slow" is also not typical for professional hockey, as the speed is usually higher.

Other important data were obtained in comparing eye-movement strategies in the case of a motor-response task (hitting with a stick) and a non-motor-response task (puck eye-tracking). Ice hockey players show no variation in these tasks, whereas the share of the central retinal area tracking is much higher in the other groups in the non-motor response task. This may testify to the high level of sensorimotor coordination of ice hockey players. Other groups do not show this kind of coordination; therefore, it is easier for them to perform the task when a motor system is not involved (only the visual modality is activated). Thus, hypothesis 4 is only partially accepted, because eye-movement strategies in the no-motor-response puck-viewing task (block 5) differ from eye-movement strategies in the motor-response tasks (blocks 1–4), not only for the wrestler and control group, but for the hockey players.

Conclusion

In summary, the data obtained allow us to accept hypothesis 1 and partially hypotheses 2, 3, and 4.

Efficient eye-movement strategies in ice hockey players include long-term puck tracking, primarily using the near periphery and central retinal areas. The ability to track the puck (especially at high speeds) by the central retinal area is what sets professionals apart from other groups. It is important to note that puck speed rate affects eye-movement strategies, but preferentially for slow and fast speeds (in our work, these speeds correspond to typical speed ranges in ice hockey). The greatest differences between hockey players and the other groups are observed at fast speeds.

Significant differences between hockey players and other groups at very slow speeds are only observed for the head-to-puck parameter in the 15–25° range. It can be assumed that in this way head movements allow the player to optimize visual perception. According to our data, we see that the main range of puck retention by the eyes is from 0 to 15°. Thus, head movements allow the most effective visual-motor control for realization of interceptive actions.

Regardless of the task (hitting or tracking), ice hockey players have almost no change in the visual focus share with dominance in the near periphery (5–10°) and central retinal area (0–5°). The groups of wrestlers and controls had a significant increase in the visual fixations' share in the central retinal area when they visually tracked the puck without motor reaction. We may conclude that the most effective eye-movement strategy would be the dominance of parafoveal puck-tracking in the near periphery (5–15°), and partially foveal-tracking (0–5°). On the one hand, this prevents the information on the object (puck) from being lost. On the other, it helps track the puck trajectory in a more efficient way, with minimal energy consumption. It appears that a drastic increase in the foveal eye-movement strategy shared in block 5 with wrestlers and controls will lead to high energy consumption and, accordingly, rapid sensory fatigue.

Limitations

The following are possible limitations to this study. The viewing angle in a VR helmet is limited to 110°; hence it may have affected the parameters of eye movements. The quality of the data could also have been affected by hardware parameters, as well as motion artifacts, sweating, which, in turn, could cause the loss of some data. In addition, the sample was not large. In the case of VR hockey, it was found to be difficult to identify such parameters of eye-movement as fixations and saccades from the primary data obtained for two reasons: 1) low quality of the data obtained, 2) small intervals of stimulus (puck) presentation. Therefore, instead of analyzing fixations and saccades, it was decided to examine the angle magnitude between the subject's gaze direction and the distance from the subject's eyes to the puck.

In this paper, eye-tracking analysis was conducted for each eye individually. We propose that future studies should consider averaging the data by eye during the result analysis phase. This approach would help mitigate issues arising from tracking failures in one of the eyes.

Ethics Statement

All subjects volunteered for the study following a pre-signed consent and prior approval from the Ethics Committee of the Russian Psychological Society (March 2021) in line with the Declaration of Helsinki.

Author Contributions

S.L. and I.S. conceived the idea. A.K., G.B. and D.S. developed the theory and performed the computations. N.B., B.B. and E.P. verified analytical methods. I.P. and A.K. supervised the findings. All authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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Agentic Self-regulation of Capoeira Athletes of Different Sports Qualifications

Ilya A. Molodozhnikov[a*], Alexander Sh. Guseinov[b]

[a] *Kuban State University of Physical Culture, Sports and Tourism, Krasnodar, Russia*
[b] *Kuban State University, Krasnodar, Russia*

*Corresponding author. E-mail: ilyamolodozhnikov@gmail.com

Background. In the present study, an attempt was made to address self-regulation at the agentic (higher) level, which contributes a person's success not only in sports, but also in the organization of their own life. A group of capoeiristas was chosen as the sample.

Objective. To identify the features of agentic self-regulation in athletes engaged in capoeira with different levels of sports qualification.

Design. 202 capoeira athletes, aged M= 29.6 years, SD=6.6, were interviewed. The sample was divided into three subgroups based on different sport types and comparisons were made on the scales of the following techniques: *style of self-regulation of behavior*, strategies for coping with stressful situations, *action control*, *personality protest activity*, *psychosocial maturity*, *personality harmony*. ANOVA analysis in IBM SPSS Statistics 26 program was used for these comparisons.

Results. The *Masters* subgroup outperformed the lower grade subgroups on the parameters: *action control in planning*, *assertiveness*, *personal self-regulation*, and *psychological defense* ($p \leq .05$). The *Master Candidates* group had a significantly lower level of escapism ($p \leq .05$), an indicator of destructive agentic activity, compared to the r*ated athletes* group. *Master Candidates* outperformed *Masters* in the coping strategy of caution ($p \leq .05$) and outperformed *rated athletes* on personality harmony scales, including satisfaction with life, relationships with people, life self-determination, and life self-actualization ($p \leq .05$). On the scales of conscious self-regulation, no significant differences were found between the three subgroups ($p > .1$).

Conclusion. As capoeiristas advance in sportsmanship they enrich their regulatory experience through the development of agentic qualities such as constructive coping strategies, personal maturity and personal harmony, while reducing the manifestation of destructive activity, such as escapism.

***Keywords*:** mental self-regulation, agentic self-regulation, escapism, constructive coping, personal maturity, personality harmony

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Introduction

When considering the variety of studies concerning sport, there exists a diverse range of attitudes exhibited by researchers in relation to the issue of self-regulation. Several authors study available regulatory skills (Locke & Latham, 2013), focusing on specific aspects of self-regulation: monitoring of the current state (Balk & Englert, 2020), self-control (Baumeister, Vohs & Tice, 2007), volitional regulation (Shliapnikov & Ivannikov, 2021), coping behavior (Cosma et al., 2020), all of are certainly useful from an applied perspective. Other researchers have sought to understand the holistic personality of the athlete, identifying finding ways to reveal the psychological resources necessary for achieving and realizing high sportsmanship (Gorskaia, 2011; Vallerand, 2007; Ryan & Deci, 2017, et al.). We believe that such studies are possible when considering concepts such as self-determination, personal maturity, activity, and so on, which reflect the personal level of self-regulation and allow us to view self-regulation as the basis of agentic manifestation of a person.

Main parameters and mechanisms of agentic self-regulation in sports activity

The most well-known concept in Russian psychology is the concept of conscious self-regulation developed by Konopkin - Morosanova (Konopkin, 2004). The legitimacy of such frequent reference to this concept within the framework of sports psychology is explained by the positive influence of conscious self-regulation on the achievement of goals in sport (Morosanova & Bondarenko, 2016; Guseinov, 2012; Gorskaia, 2011) and the overcoming of competitive stress (Belozerova, Bragina, Semikasheva & Silakova, 2021). The interaction of components of conscious self-regulation with forms of protest behavior was studied by Guseinov (2013). As a result of the research, it was found that the constructive form of protest — emancipation can enhance the athlete's self-regulation and promote stability in results, while destructive forms of protest create a disharmonious athlete profile and hinder goal achievement. In general, conscious self-regulation is an important agentic resource for self-development and goal attainment. At the same time, as Morosanova points out, high rates of self-regulation can be observed in athletes with lower performance efficiency (Morosanova, 1991). This fact shows that conscious self-regulation, in some cases, is insufficient for goal achievement and requires the exploration of other psychological bases, such as volitional regulation.

At present, the dominant view of will is conceptualized as a control over action, which encompasses all processes that mediate intention (Kuhl,1994). In Leontiev, control over action is an indicator of personal potential as the potential for self-regulation (Leontiev, Ovchinnikova, Rasskazova & Fam, 2022). Athletes have a more effective type of volitional regulation and its evaluation than people who do not practice sports, as well as a better formed value-sense sphere, self-control (Shlyapnikov & Ivannikov, 2021). In basketball, players who are oriented toward action dunk the ball into the basket more forcefully and more often, while those oriented toward the state pass to a partner (Sahre, 1991). In contrast, weight lifting, which emphasizes the concentration of attention, state-oriented athletes are more successful. Memmert and Roth (2007) found that state-orientation correlates with a higher frequency of

athletes listening to their coach's advice, which has a positive effect on athletic performance.

Another regulator of athletes' activity is coping behavior, which consists of either adapting to the requirements of a given stressful situation, or otherwise avoid the stressful situation entirely (Nartova-Bochaver, 1997). Elite athletes more often use problem-oriented strategies, search for social support, planning, and visualization, which distinguishes them as reflected in their performance, demonstrating the effectiveness of these strategies (Berilova & Raspopova, 2022; Nicholls, Polman, Levy, Taylor & Cobley, 2007). Recently, coping behavior is considered a manifestation of agentic behavior and the result of human maturity, self-awareness, an established worldview, and harmony (Kriukova, 2008; Guseinov, 2012).

The concept of self-reflection, as an arbitrary turning of human consciousness to oneself, has a regulatory potential. Athletes who have developed reflective skills have a tendency to seek performance improvement on their own and require less help from the coach as week as demonstrating a higher capacity for analyzing their own technical mistakes (Loviagina, 2020). Jonker, Elferink-Gemser & Visscher (2010) found that self-reflection, together with talent, allows an athlete to acquire attributes necessary for a particular sport and to reach an elite level of sportsmanship. Self-reflection appears in both deep and superficial forms. Deep reflection is associated with individuals possessing personal maturity, an established set of life goals, and moral values (Guseinov & Shipovskaia, 2019); superficial reflection, on the other hand, leads to extremely simplified forms of self-analysis and self-management.

The analysis of the presented concepts shows that researchers refer to personal maturity, which mediates the subject's behavior, conscious self-regulation, and reflection. According to Sergienko (2011), personal maturity is the result of the coordinated work of the personality as a carrier of the inner world of the subject in achieving goals and selecting resources. In the subject-existence methodology, self-regulation and personality development are associated with of the development of personal meanings, including the creation of a meaning for one's life, as well as the possibility of resolving the contradictions arising from the e process of existence (Riabikina, 2008). By mastering new existential perspectives, individuals have a tendency to become more mature and achieve a more authentic life, as demonstrated by athletes who demonstrate subjective existential outlooks when transitioning to alternate teams, taking on new roles, or requalification from an athlete to a coach. Although Pechersky's (2024) research has shown that despite the fact that personal maturity is a resource that contributes to sports achievement, there remains an ambiguous correlation between the formation of personal maturity, which promotes self-acceptance and adequate gender identity, and the capacity for socialization, self-control, and tolerance.

Abulkhanova-Slavskaya's (1991) study, illustrated the concept of an individual's *life path*, as fundamental to the actualization of a personality and its capacity to create and fully realize one's own life. Such reflections are relevant in the context of sports. As the analysis of sport biographies illustrate, it's not the randomness of athletes' journey to international recognition, but rather a conscious strategy for achieving their goals. The planning of one's own life, and the embrace of sport as emblematic of a unique set of life values, leads to a form of self-fulfillment perhaps only fully possible for mature personalities that possess a well-formed sense of these core personal

values. In this sense, sport serves as a catalyst for personal potential and existential satisfaction. The study by Liashenko, Omelchenko, Gatsko & Gnutova (2020) showed that in the hierarchy of values found in elite athletes, *spiritual satisfaction* and *achievement* are prized above that of *material status* which falls in third place.

The degree of success achieved in a sports career and its longevity is influenced by the extent to which a person is found to be harmonious with themselves and their environment. According to Motkov (2020), a harmonious personality is a person with an optimal organization of his personality, which is characterized by a predominantly positive attitude with people and the desire for self-development. At the heart of a harmonious personality lies a flexibility of behavior, manifested in the ability to change goals and strategies for achieving them depending on external conditions, as well as the ability to coordinate opposite requirements (uniformity and diversity, stability and change, and so on) (Leontiev, & Osin, 2014). Harmony can be achieved according to the development of a style of behavior, which Gosudarev (1989) referred to as *sports rationalism*. Athletes with this style of behavior are characterized by a realistic attitude to life, an ability to predict the development of situations, and a capacity for analyzing and organizing the conditions necessary for success. Athletes who exhibit sport rationalism achieve maximum results with optimal mobilization of efforts. Athletes with disharmonious styles (sports giftedness and sports obsession) are characterized by either minimal effort to achieve results or excessive effort and perfectionism (Gosudarev, 1989).

However, sport can be both a sphere of human self-fulfillment and cause various kinds of disharmonies. In particular, sports disharmonies are connected with the problems of premature professionalization. Thus, for adolescents and individuals in young adulthood, the consequence of early professionalization can cause a narrowing of a rounded self-concept, reduced self-esteem, egoism, conflict toward collective and individual values, and anxiety (Gorskaya, 2008). Sports psychology also studies *protest* characteristics of personality including *opposition*, *nihilism*, and *escapism* all of which, when combined with negative personality traits, can form a disharmonious regulatory style that hinders the growth of sportsmanship (Guseinov, 2012).

Thus, in modern sports the research of mental self-regulation and its agentic resources is increasingly being emphasized. This can be exemplified by martial arts in particular, with their philosophy and principles of spiritual development, and harmonious personal development. As studies have shown, judo, characterized by the absence of blows in contact, contributes to the formation of a broad set of important psychological qualities, leading to well-adjusted emotional regulation, psychological stability, self-confidence, attention, optimism and other positive attributes (Silva, Dias, Corte-Real, & Fonseca, 2018). Additionally, judoka differ from representatives of team sports according to higher indicators of conscientiousness (Bojanic, Nedeljkovi, Sakan, Mitic, Milovanovi & Drid, 2019).

Our research focused on the national sport of capoeira, which, in addition to elements of combat, also incorporates acrobatics, music, dance, philosophy. These diverse components contribute to the harmonious and versatile development of a person. The everyday practice of capoeira is a non-contact fight, which allows men and women to compete on equal terms. One of our studies has shown that by integrating different forms of human creative activity, and emphasizing the beautiful fight as

opposed to victory at any cost, capoeira contributes to the enrichment of regulatory experience, the development of emotional intelligence and personal harmony (Guseinov & Molodozhnikov, 2021).

Based on the idea of the integrality of the phenomenon of self-regulation and the specificity of the sport of capoeira, the following research objective was set: to identify the features of agentic self-regulation in athletes engaged in capoeira across varying levels of sports qualification.

Hypothesis

It was hypothesized that capoeira athletes will develop self-regulation system through agentic qualities (constructive coping strategies, personal maturity, personal harmony) with the growth of sports qualification.

Methods

Participants

The study sample consisted of 202 Russian capoeira athletes (55.4% men and 45.6% women) of different levels of sportsmanship. The average age of the respondents was M = 29.6 years, SD = 6.6. The participants were athletes from different capoeira schools including, Real Capoeira, Russian Capoeira Center, Capoeira Camara, Cordao de ouro, Dende, Familia ginga e raca, Portao de ouro, ACMB. Additionally, city groupings included, Moscow, Krasnodar, St. Petersburg, Rostov-on-Don, Kazan, and Kirov. In order to determine the differences between athletes of different qualifications, the total study sample was divided into 3 subsamples, the characteristics of which are presented in *Table 1*.

Table 1

Characteristics of the research sample

Subgroup	Number of people	Belt	Training experience	Participation in competitions
Masters	48 people — 37 male, 11 female	instructor, professor	>10 years	International level
Master candidates	60 people — 38 males, 22 females	monitor	Ages 5–9	All-Russian level
Rated athletes	94 people — 37 males, 57 females	graduado, minitor	Ages 1–4	City level

Procedure

During the capoeira training camp period (November 2021), 60 athletes were tested on paper. The remaining 142 athletes during the period spanning 2021 to 2022 were surveyed online via Google-forms. To facilitate ease of completion, the online questionnaires were grouped into two blocks, each taking 20–25 minutes to complete. All respondents gave permission to participate in the survey and to publish the results. Study participants were given feedback on the test results and a brief psychological

report. The data collection procedure complied with the ethical standards of the Russian Psychological Society.

Materials

The following psychological tests were used in the study:

1. *The Behavioral Self-Regulation Style-98 (BSS-98) questionnaire* (Morosanova, 2001). It consists of 46 statements assessing the main regulatory processes and regulatory-personal properties. Answers were given on a 4-point scale, where "1" is correct and "4" is incorrect. (Cronbach's α is .72).
2. *The Stress Coping Strategies (SACS) questionnaire* (Hobfoll, 1994, Vodopianova, 2013). It consists of 54 statements designed to identify preferred strategies for coping with difficult (stressful) situations. Answers were given on a 5-point scale, where "1" means no, not at all true, "5" means yes, absolutely true (Cronbach's α is .47–.78).
3. *The Action Control Questionnaire* (Kuhl, 1994, Shapkin, 1997). This questionnaire was adapted for the Russian-speaking sample by Shapkin and is designed to determine individual dispositions *action orientation* or *state orientation*. Respondents are asked to choose one of two options (*a* or *b*), where 1 point is given for matching the key. (Cronbach's α is .70–.74).
4. *Personal Protest Activity Questionnaire* (PAQ) (Guseinov, 2015). The parameters derived from this methodological scale reveals a meaning full typology of both constructive and destructive protest attitudes derived from certain conceptual values including, *emancipation*, *escapism*, *negativism*, *opposition*, and *nihilism*. Responses complete the questionnaire by specifying a range between"0" points — absolutely disagree to "4" points — absolutely agree (Cronbach's α is .60–.81).
5. *Psychosocial Maturity Questionnaire* (PMQ) (Pashnev, 2010). This questionnaire consists of 50 statements and reveals the general level of psychosocial maturity of the personality, as well as its components (attributes) including, *self-determination*, *self-regulation*, *ego strength*, *self-actualization*, *socialization*, *cognitive motivation*, and *psychological protection*. The respondent chooses answers based on a response range as follows, "a" — very rarely, "b" — sometimes, "c" — often, "d" — almost always.6. *Personality Harmony Questionnaire* (PHQ) (Motkov, 2020). This questionnaire consists of 109 questions that allows for the analysis necessary to evaluate the integral overall harmony of personality. Responses are given on a 5-point scale, where "1" indicates very little; "5" indicates very much. (Cronbach's α is .87).

Data Analyses

One-factor analysis of variance (ANOVA) in the IBM SPSS Statistics 26 program was used to compare the averages. The sports qualification of the athletes was used as a factor, and the parameters of the above mentioned techniques were used as dependent variables. To check the suitability of the data for variance analysis, the homogeneity of variance was tested using Levene's test. After establishing significant differences

through ANOVA, multiple comparisons between groups were performed a posteriori using Tukey's HSD test.

Results

As a result of ANOVA analysis, in which the scales of conscious self-regulation (BSS-98) were used as dependent variables, it was revealed that there were no reliable differences between subgroups of capoeira athletes of different qualifications (see *Table 2*). That is, capoeira athletes of different sports qualification have equally developed abilities to govern their own actions, to select significant conditions, to plan, to be independent, and to evaluate their own actions. At the tendency level, capoeiristas of different qualifications differ in regulatory flexibility ($p = .08$), which probably indicates the favorable influence of capoeira on the ability to quickly adapt to changing environmental conditions.

Table 2

Average values of capoeiristas of different sports qualifications in self-regulation technique

Scale name	Masters		Master candidates		Rated athletes	
	M	***SD***	***M***	***SD***	***M***	***SD***
Planning	5.8	2.0	6.0	1.9	5.5	2.3
Modeling	6.6	1.7	6.2	1.7	6.3	1.9
Programming	6.4	1.5	6.3	1.5	6.5	1.8
Performance evaluation	6.7	1.4	6.3	1.7	6.4	1.3
Flexibility	6.6	1.6	6.9	1.3	6.1	1.9
Independence	4.8	1.8	5.2	2.0	4.5	2.2
General level of self-regulation	32.1	4.8	31.9	4.9	30.8	5.9

Comparison of the mean values of the three groups of athletes on the *Action Control* measure showed that at least two groups of capoeiristas differed on the *Action Control in Planning* scale ($F(2,80) = 3.034$, $p = .05$) (see *Table 3*). Moreover, a poste-

Table 3

Average values of capoeiristas of different sport qualifications according to the methodology of action control

Scale name	Masters		Master candidates		Rated athletes	
	M	***SD***	***M***	***SD***	***M***	***SD***
AC in planning	**8.2***	3.6	7.2	3.2	**5.9***	2.7
AC in realization	6.1	2.8	5.7	2.4	5.4	2.4
AC on failure	8.5	2.2	8.4	2.5	9.3	1.8

*Note: *p ≤ .05; AC - Controlling for action*

riori comparison on this scale using Tukey's HSD test showed that *masters* athletes differed from *rated athletes* (p = .04, 95% CI = [.05, 4.37]). Consequently, indicators reveal that *masters* athletes have a greater degree of task-oriented ability compared to those in lower qualification levels; they are less likely to experience anxiety about an incomplete intention. For example, in the case of an unsatisfactory result at a competition, highly skilled athletes will analyze the situation and set further goals, while less skilled athletes will have thoughts about failure.

Comparison of mean values using the "Stress Coping Strategies" technique showed that the subgroups differed on the parameter of *assertiveness* (F(2,104) = 4.790, p = .01) and *cautiousness in action* (F(2,104) = 3.806, p = .025) (see *Table 4*).

Table 4

Average values of capoeiristas of different sports qualifications according to the coping-strategy methodology

Scale name	Masters		Master candidates		Rated athletes	
	M	***SD***	***M***	***M***	***SD***	***M***
Assertiveness	**21.6***	2.8	19.9	3.1	**19.3***	3.1
Making contact	22.9	3.1	23.6	3.0	24.3	3.0
Psychosocial support	22.6	2.9	24.2	3.5	24.2	4.5
Caution	**19.1***	2.8	**21.0***	2.9	20.1	3.5
Impulsiveness	18.0	2.8	17.4	3.0	18.3	2.9
Avoidance	16.0	3.7	16.7	3.4	15.7	3.1
Manipulative actions	16.9	2.9	18.4	4.3	17.3	4.3
Antisocial behavior	15.7	4.2	15.4	4.1	14.3	3.9
Aggressive actions	16.3	4.5	16.3	4.3	15.6	4.5

*Note: *p ≤ .05*

A posteriori comparison using the Tukey HSD test showed that, on the *assertive actions* scale, *masters* differed from the level-outs (p = .012, 95% CI = [.42, 4.06]). That is, *masters* athletes differ from less experienced athletes in activity, confidence in behavior, independence from external evaluations, and the ability to defend their point of view in constructive ways.

Reliable differences were also found between *masters* and *master candidates* on the *cautious actions* scale (p = .019, 95% CI = [.27, 3.62]). Underestimated indicators in the group of *masters* indicate that elite athletes act more decisively, confidently, can take risks if the risk is justified, and athletes give their best at sporting events without "saving their strength". For the other parameters of this methodology no reliable differences were found.

Comparison of mean values of the *psychosocial maturity* (Pashnev, 2010) technique showed that athlete groups differ across parameters that include, *personal self-regulation* (F(2,177) = 4.038, p = .019), *psychological defense* (F(2,177) = 3.248, p = .041). The Tukey HSD multiple comparisons test showed that the mean value

of personality self-regulation differed between the *masters* and the *master candidate* groups (p = .014, 95% CI = [0.16, 1.77]). The *psychological defense* parameter also showed differences between the *masters* and *master candidate* groups (p = .034, 95% CI = [.03, .93]). The table below indicates the mean values of the three groups of athletes on the PPD scales (*Table 5*). It indicates that *masters* have more developed qualities associated with self-regulation, such as endurance, self-discipline, purposefulness, strategic thinking, coping with negative emotions, belief in themselves, orientation to vital, valuable deeds. The elevated level of psychological defense in *masters* in contrast with less qualified athletes indicates a refined ability to be consistent with their messaging, logical in their thinking, and demonstrate a capacity to admit one's mistakes and laugh at oneself.

Table 5

Average values of capoeiristas of different sports qualifications according to the methodology of psychosocial maturity of personality

Scale name	Masters		Master candidates		Rated athletes	
	M	***SD***	***M***	***SD***	***M***	***SD***
Self-determination	8.6	1.4	8,3	1.7	8.5	1.7
Personal self-regulation	**7.8***	2.1	**6.8***	1.9	7.2	2.4
The power of the ego	3.9	1.3	3.9	1.1	3.6	1.4
Self-actualization	4,1	1.1	4.2	0.9	4.0	1.1
Socialization	6.8	1.7	6.6	1.5	6.1	2.2
Cognitive motivation	2.1	.7	2.2	.8	2.2	.8
Psychological defense	**6.1***	.9	**5.6***	1.2	5.7	1.4

*Note: *p ≤ .05*

A comparison of the mean values of the *personality harmony* technique indicates that capoeirista groups differ across parameters that include, *satisfaction with life and relationships with people* (Ud) (F(2, 96) = 5.340, p = .006), *life self-determination* (F(2, 96) = 4.812, p = .010), *life fulfillment* (F(2, 96) = 3.923, p = .023), and *positivity of self-esteem* (F(2, 96) = 3.472, p = .035). The results of the ANOVA are presented in *Table 6*. Tukey's HSD multiple comparisons test indicate that the mean of the Ud scale was significantly different between the *masters*' candidate and *discharge* groups (p = .016, 95% CI = [.6, .66]). That is, elite athletes who achieve elevated results in sports are more satisfied with life. The situation is similar for the *life self-determination* assessment (p = .012, 95% CI = [.8, .73]) and *life self-realization* assessment (p = .037, 95% CI = [.2, .67]). That is, more skillful athletes are characterized by personal maturity, life skills, values, a tendency toward increased life planning, and a satisfaction with their successes and achievements. Despite the clear difference in the mean values between the groups according to the *positivity of self-esteem* parameter, no reliable differences were found using the Tukey HSD test.

Table 6

Average values of capoeiristas of different sports qualifications according to the methodology of personality harmony

Scale name	Masters		Master candidates		Rated athletes	
	M	SD	M	SD	M	SD
Vph	4.1	.6	4.1	.4	3.9	.4
Spiritual values	4.0	.3	4.0	.4	3.9	.3
Lifestyle	4.1	.4	4.1	.4	4.0	.4
Sr	3.7	.5	3.8	.4	3.6	.4
Constructive communication	3.9	.5	3.9	.4	3.8	.4
Self-harmonization of personality	3.8	.5	3.8	.5	3.7	.4
Mda	3.3	.4	3.7	.6	3.6	.5
Independence	4.1	.7	3.9	.5	3.7	.6
Ud	4.0	.5	**4.0***	.5	**3.6***	.5
Life self-determination	3.6	.6	**3.7***	.6	**3.3***	.6
Life fulfillment	3.7	.5	**3.7***	.6	**3.3***	.6
Positivity of self-esteem	4.1	.3	4.0	.4	3.8	.5
IHL	3.9	.4	3.9	.3	3.7	.3

*Note: *p ≤ .05; Vph - Values of personal harmony; Sr - Self-regulation; Mda - Moderate power of desires and achievements; Ud - Satisfaction with life and relations with people; IHL - Integral index of harmony*

A comparison of mean values on the *personality protest activity* technique indicated that at least two groups of respondents differed from each other on the *escapism* parameter ($F(2, 80) = 3.495$, $p=.035$). The Tukey HSD multiple comparisons test indicated that the mean value on the *escapism* parameter differed significantly between the master candidate and discharge candidate groups ($p = .031$, 95% CI = [.3; 7.58]). The mean values for all scales of the PAL are shown in *Table 7*.

Table 7

Average values of capoeiristas of different sports qualifications according to the methodology of personality protest activity

Scale name	Masters		Master candidates		Rated athletes	
	M	SD	M	SD	M	SD
Negativism	20.5	6.0	20.1	6.0	23.4	8.7
Emancipation	18.9	3.1	19.9	1.9	20.0	2.4
Opposition	9.4	4.6	10.5	4.2	12.3	5.5
Anomie	6.3	3.7	5.7	3.4	6.8	4.8
Escapism	12.1	5.7	**11.8***	3.7	**15.7***	5.9

*Note: *p ≤ .05*

Discussion

Our study showed that according to the *Behavioral Self-regulation Style-98* questionnaire (Morosanova, 2001), no significant differences were found among capoeiristas with varying levels of sports qualification. There were observed tendencies of differences among the subgroups regarding regulatory flexibility ($p = .08$). However, studies by other authors using the same technique have recorded contradictory results. According to the results of Lovyagina (2016), reliable differences were identified between elite athletes and those in mass categories regarding only one parameter of self-regulation: *evaluating the results of their own activity* In the study by Bosenko (2013), elevated differences were found across groups of boys and girls engaged in taekwondo and handball. In the work of Chub (2017), representatives of mass discharges surpass elite athletes in the *flexibility* and *evaluation of activity results* parameters. Pirozhkova (2013) correlates the characteristics of conscious self-regulation with the activity type according to team and individual sports. It can be assumed that the absence of differences in self-regulation style among athletes of varying levels may be attributed to the relatively low demands of capoeira. This sport is aimed at holistic human development and harmonious integration of all regulatory attributes; thus, we do not observe accentuations.

Masters have an elevated ability to be task-oriented when compared to *level-players*. Moreover, they are less likely to experience anxiety concerning efforts that remain incomplete. In their work Shlyapnikov and Ivannikov (2021) observe that the development of sportsmanship is associated with the growth of an athletes volitional qualities and their self-assessments. For example, research of basketball athletes has found that action-oriented players are more successful in sports due to c a capacity to make quick decisions, demonstrate an efficiency in response, and competently manage resources (Sahre, 1991). In martial arts, action-oriented athletes have been found to be better at maintaining confidence, anticipating opponent movements, and reacting quickly (Beckmann & Kazén, 1994). Thus, our findings on the effectiveness of action orientation in capoeira are consistent with studies conducted in other sports, indicating the universality of this trend.

The subgroup of *masters* surpasses *rated* athletes according to *coping-strategy assertiveness*. This means that *masters* are more active, confident, and independent. *Masters* have developed the ability to constructively defend their point of view, and they are less dependent on assessments from others. In the part of coping assertive actions our study is consistent with a study concerning fire-applied sport (Afanasieva, Ilina, & Svitlychna, 2023).

With increasing skill levels, it has been observed that capoeiristas' escapism decreases in relation to destructive agentic activity levels, which is consistent with the Guseinov (2013) study conducted with a sample of athletes of different specialization. Escapism is considered a manifestation of the refusal to actively master the world, marked by a high level of social anxiety, non-acceptance of oneself, sensitivity to the opinion of others, weakness of will, dependency, and external locus of control. Probably, the decrease in escapism with the growth of sportsmanship is associated with the gradual involvement of an individual in sports and the mastery of various aspects of capoeira, which provides a structured vector for self-development.

Masters have developed qualities characterizers of personal maturity indicative of agentic self-regulation, attributes that include: these are endurance, self-discipline, purposefulness, strategic thinking, coping with negative emotions, belief in oneself, and an orientation to vital matters. This elevated level of psychological fortitude is reflected in an ability to act consistently, logically, with a capacity to recognize personal mistakes. *Masters* are characterized by personal maturity, life skills, values, a tendency to life planning, and a satisfaction with their successes.

The results obtained through this study confirm the hypothesis that with the growth of capoeirista sportsmanship there is a development of agentic self-regulation. Moreover, this development occurs not in terms of structural components of self-regulation, but through the increasing agentic potential of the personality.

Conclusion

The increasing level of sports qualification leads to a decrease in escapism, or escape from reality, which is an indicator of destructive agentic activity. With the growth of sportsmanship, capoeiristas enhance not merely their ability for conscious self-regulation, which determines the success of achieving current activity goals, but also the development of personal qualities that expand their regulatory experience, enabling them to achieve better sports results.

Sports qualification contributes to the mobilization of agentic resources associated with indicators of constructive coping, personal maturity and harmony. These components form a set of qualities that determine the agentic self-regulation of athletes. The conducted research brings clarity to the specificity of the regulatory experience of capoeira athletes and, presumably, similar sports with a creative and developmental orientation.

Limitations

The comparison of mean values was based on one criterion only and did not take into account such criteria as age and gender. In the study, data collection was carried out using the test diagnostic method, which has its own disadvantages (agentic assessment, *blind* (automatic) errors, duration of performance, differences between live and online implementation, etc.). In the future, it is planned to conduct a similar study on athletes engaged in contact martial arts, so that it will be possible to compare the results.

Ethics Statement

All procedures performed in the study involving human subjects were in accordance with the ethical standards of the Kuban State University of Physical Culture, Sports and Tourism, as well as the 1964 Helsinki Declaration and its more recent ones amendments or comparable ethical standards.

Author Contributions

Alexandr Sh. Guseinov proposed the idea. Ilya A. Molodozhnikov developed the theory and performed the calculations and data analysis, primarily as part of his can-

didate thesis. Alexandr Sh. Guseinov provided extensive feedback and guidance as a supervisor. Both authors discussed the results and contributed to the final version of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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Development and Psychometric Properties of Coping Scales towards Adherence to Pharmacological Treatment, Heart-healthy Eating and Cardiovascular Physical Exercise

Jessica Berenice Flores-Mendoza[a*], Mirna García Méndez[a], Andrea Bravo Doddoli[b], Rolando Díaz-Loving[b]

[a] *Faculty of Higher Studies Zaragoza, National Autonomous University of Mexico, Mexico*
[b] *Faculty of Psychology, National Autonomous University of Mexico, Mexico*

*Corresponding author. E-mail: redapsic7@gmail.com

Background. Coping, within Lazarus transactional theoretical framework, is conceptualized as a dynamic set of cognitive and behavioral processes that adapt continually to manage specific demands, whether internal or external, perceived as exceeding an individual's available resources. This framework supports understanding healthy coping behaviors, especially regarding adherence to treatment in cardiovascular disease management.

Objective. Develop and validate coping scales designed to assess adherence to pharmacological treatment, heart-healthy eating, and cardiovascular physical exercise in mexican patients diagnosed with ischemic heart disease.

Design. The research employed both qualitative (focus groups) and quantitative (exploratory and confirmatory factor analysis) methodologies to ensure robustness. The coping scales underwent rigorous testing, including exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), which revealed a two-factor solution for medication adherence coping, a three factors solution for physical exercise adherence coping, and a three factors solution for healthy eating adherence coping.

Results. The findings suggest that coping strategies, although universal in nature, are sensitive to cultural nuances among patients with ischemic heart disease. By capturing the complexities of coping behaviors within a specific cultural context, these scales provide valuable insights into the multifaceted nature of adherence to primary prevention measures.

Conclusion. This study contributes to the understanding of how coping mechanisms intersect with cultural factors in the management of chronic conditions such as ischemic heart disease, highlighting the importance of tailored interventions that consider patients cultural backgrounds and individual coping styles.

Keywords: coping, psychometrics, therapeutic adherence, medication, heart-healthy eating, cardiovascular psysical exercise

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Introduction

Coping, within Lazarus' (2000) transactional theoretical framework, is conceptualized as a dynamic set of cognitive and behavioral processes that are continuously adapted to manage internal or external demands perceived as exceeding an individual's available resources. It emphasizes not only the importance of having personal resources but also the ability to apply them effectively in response to those demands. Sandín and Chorot (2003) suggest that coping styles help explain differences in stress adaptation, while Zavala et al. (2008) define coping as cognitive and behavioral strategies employed to manage everyday stress, ranging from avoidant approaches to positive reappraisal strategies.

Coping styles generally fall into two categories: *problem-centered coping*, aimed at modifying the environment to resolve stress, and *emotion-centered coping*, focused on regulating emotions related to stress (Lazarus & Folkman, 1984; Folkman et al., 1987). Moos and Shaefer (1986) add a third style, *problem-assessment-centered coping*, which adjusts the perception of a stressful situation through logical analysis and cognitive avoidance. The coping function is closely linked to decision-making, information seeking, maintaining autonomy, and the capacity to direct resources to meet stressful demands (Billings & Moos, 1984). Morris (1997) found that in patients with ischemic heart disease, passive coping increased diastolic blood pressure, while active coping elevated heart rate and systolic pressure, potentially contributing to cardiovascular issues.

Silva and Agudelo (2011) analyzed beliefs about disease and coping strategies as predictors of health-related quality of life in cardiovascular patients. Their findings indicated that passive coping strategies and disease-focused beliefs were linked to low quality of life, while religion served as a protective factor. Similarly, Casagrande et al. (2019) found that individuals with hypertension and heart disease used fewer problem-focused coping strategies, and Castillo et al. (2019) observed that obese adolescents employed unproductive coping strategies despite occasional efforts toward problem-solving. Depression and anxiety were associated with higher cardiovascular risk. These findings highlight the importance of understanding coping styles in clinical contexts, especially for chronic diseases like cardiovascular conditions.

Coping styles have been assessed through various methods, including semi-structured interviews, self-administered questionnaires, and inventories. Billings et al. (2000) used an interview based on the Folkman and Lazarus (1988) Coping Styles Scale, though it lacked strong reliability and validity. Other tools, such as the COPE Inventory (Carver et al., 1989) and the Ways of Coping Instrument (WCI) by Lazarus and Folkman (1984), have been more widely used and validated. These instruments are grounded in the Lazarus and Folkman model, focusing on different coping strategies, including problem-solving and emotional coping.

The WCI assessment tool evaluates coping capacity by asking individuals to recall recent stressful situations, distinguishing between problem-focused and emotion-focused strategies. The COPE Inventory evaluates stress responses through problem-focused and emotion-oriented scales, while Amirkhan's (1994) Coping Strategy Indicator (CSI) has shown consistent psychometric results in various settings. Other

scales, like Ryan-Wenger's Schoolagers' Coping Strategies Inventory (SCSI), offer age-specific methodologies for assessing coping capacities within children.

Endler and Parker's (1990) Multidimensional Coping Inventory (MCI) assesses task-oriented, emotion-oriented, and avoidance-oriented coping styles, demonstrating high validity and correlations with depression, anxiety, and personality measures, particularly in collectivistic cultures. Fernández-Abascal's (1997) Coping Styles and Strategies scale, known for its high internal consistency, has been used in Spanish and Argentinian samples. Similarly Chorot and Sandín's (1993) Revised Coping Strategy Scale (EECR), a modified version of the WCI, has been widely applied by Colombian psychologists. Other scales, like the Health and Daily Life Scale and the Multidimensional Scale of Coping Styles by Góngora and Reyes (1998), exist but have not been validated for the Mexican population.

Ischemic heart disease is one of the leading causes of mortality both in Mexico and globally. Current assessments lack consideration for how patients with this condition manage adherence to a comprehensive regimen encompassing medication, a heart-healthy diet, and physical exercise. This research aims to design and validate scales for evaluating coping styles related to these specific health behaviors, providing valuable tools for clinical settings. Such scales will enable healthcare providers a means to better understand and support patients in managing their condition effectively._However, the literature review reveals an absence of instruments specifically designed to evaluate coping styles focused onadherence to comprehensive treatments (including medication, heart-healthy diet, and cardiovascular physical exercise) for ischemic heart disease, one of the most prevalent diseases in Mexico and the world. Therefore, this study aimed to design and validate three scales assessing coping styles specifically oriented toward these health behaviors, to facilitate application in hospital environments and enable characterization of coping strategies among patients with cardiovascular disease.

Methods

Participants

Patients from a tertiary care public health hospital who were over 18 years of age and had a diagnosis of ischemic heart disease based on the criteria of the New York Heart Association (NYHA) (McMurray et al., 2012) participated. Those who had a neurological disorder or psychiatric or intellectual disability were excluded.

As it was a non-experimental cross-sectional study, there were no losses of participants in any of the phases, since all of them agreed to be part of the evaluation carried out. At the end of each phase, participants were given a certificate of attendance with curricular value, recognizing their contribution and encouraging full engagement.

Sample 1 (Focus groups)

Two focus groups were assembled with 4 participants each. The sample had an age range of 38 to 80 years (M = 55 years, SD = 14.6), most indicated that they were men (60%) and the rest women (40%). Regarding marital status, all reported being mar-

ried. 40% of the participants indicated they were active professionals, 20% were retired, 20% were merchants, and 20% of the participants indicated that they were housewives. Finally, 65% indicated that they were religious believers and 35% atheists.

Sample 2 (Exploratory Factor Analysis)
A total of 277 patients with an age range between 32 and 82 years (M = 56 years, SD = 9.6) participated, 44% were women and 56% were men. Regarding marital status, 53.6% reported being married, 31.2% being single, 7.2% in a common-law union, 4% widowed and 4% separated. In relation to their occupation, 45% indicated that they were professionals who worked in a public or private institution, 27% indicated that they were retired, 15% were engaged in commerce and 13% indicated that they were housewives. Finally, 75% were religious believers and 25% were atheists.

Sample 3 (Confirmatory factor analysis)
A total of 317 patients between 30 and 82 years of age (M = 52 years, SD = 12.15) participated, of which 43% were women and 57% were men. Regarding marital status, 53.4% reported being married, 28.2% single, 8% in a common-law union, and 5.2% widowed, and 5.2% separated. In relation to their occupation, 13% indicated that they were housewives, 13% were engaged in commerce, 29% were retirees and 45% were professionals who worked in a public or private institution. Finally, 72% were religious believers and 28% were atheists.

Procedure
Prospective participants were recruited through invitations at a third level carepublic health hospital in Mexico City. Data collection was conducted using the online platform Google Forms. Upon accessing the form, participants encountered an informed consent that ensured the anonymity and confidentiality of their data, which had been previously approved by the local Research, Ethics and Biosafety committee of the hospital with registration number 463.2020. The research was carried out in accordance with the ethical guidelines expressed in the Declaration of Helsinki of 1975 and the articles of the psychologist's code of ethics: Articles 8, 9, 12, 15, 16, 17, 18 and 49 for research on human subjects (Mexican Society of Psychology, 2007).

Exploratory factor analysis (EFA) was performed following the recommendations of Lloret-Segura et al. (2014). First, the correlation matrix was assessed for its suitability for factor analysis by evaluating the Kaiser-Meyer-Olkin (KMO) and Bartlett sphericity indices. Additionally, the criteria used to decide how many factors to retain included Kaiser's rule (i.e., eigenvalues greater than 1) and the interpretability of the solution obtained. Finally, the reliability of the scales were evaluated using Cronbach's alpha (Ventura-León et al., 2017).

Confirmatory Factor Analysis (CFA) was performed using the structural equation modeling (SEM) approach (Kline, 2016). Model fit was assessed following the recommendations of Marsh et al. (2004), i.e., CFI and TLI $\geq .90$ and RMSEA and SRMR $\leq .08$.

Results

In accordance with the guidelines proposed by Lloret-Segura et al. (2014) for assessing adherence to pharmacological treatment using the coping scale, a factor analysis was carried out using the unweighted least squares method with oblimin rotation applied. Those items that indicated communalities exceeding .30 and factorial loads equal to or greater than .40, and presented eigenvalues greater than 1, were retained. Following the application of this criterion, 2 factors called *positive reevaluation* (α = .85) and *evasion* (α = .81) were formed, with 12 items that explain 57.12% of the accumulated variance, with a global Cronbach's alpha of .84. The results are shown in *Table 1*.

Table 1

The factorial and psychometric structure of the Medication Adherence Coping Inventory

	1	**2**	**Total**
Items	6	6	12
Factorial variance	29.41	27.70	57.12
Cronbach's Alpha	.855	.815	.846
1. Me inspire a generar un calendario con fechas y horas específicas para la toma de mis medicamentos (I was inspired to create a calendar with specific dates and times for taking my medications)	.830		
2. Intente sentirme mejor tomando mis medicamentos para el corazón (I tried to feel better by taking my heart medications)	.827		
3. Soñé o imagine que las cosas eran mejores cuando tomaba mis medicamentos (I dreamed or imagined that things were better when I took my medications)	.791		
4. Busqué un poco de esperanza intentando mirar los beneficios de la medicación (I sought a glimmer of hope by trying to focus on the benefits of medication)	.780		
5. Cambié y madure como persona al tomar mis medicamentos a diario y a tiempo (I changed and matured as a person by taking my medications daily and on time)	.643		
6. Hice algo para compensar el hecho de que no había tomado mis medicamentos tal como lo indicó mi medico (I did something to make up for not taking my medications as my doctor instructed)	.515		
7. Me di cuenta de que yo mismo no quiero tomar mis medicamentos (I realized that I myself don't want to take my medications)		.811	
8. Evité que los demás se enteraran de que no estoy tomando mis medicamentos tal como me lo indicó mi médico (I prevented others from finding out that I'm not taking my medications as my doctor instructed)		.769	

9. Espere a que ocurriera un milagro para que tomara cada uno de los medicamentos prescritos por mi médico (I waited for a miracle to happen so that I would take each of the medications prescribed by my doctor)	.727
10. Me negué a creer que no estaba tomando mis medicamentos (I refused to believe that I wasn't taking my medications)	.699
11. Espere a ver que pasaba antes de tomar los medicamentos para mi corazón ("I waited to see what would happen before taking the medications for my heart")	.695
12. Seguí adelante con mi destino (simplemente algunas veces tengo mala suerte para recordar tomar mis medicamentos) (I carried on with my fate (sometimes I just have bad luck remembering to take my medications))	.535

To perform the EFA, an assessment of the multivariate normality of the data was conducted. This was done by calculating the multivariate kurtosis coefficient using Mardia's test. The value obtained was 60.83, which fell below the limit established by Bollen (1989), where the limit for 20 observed items corresponds to 440. Once this evaluation was completed, the adjustment of the model obtained in the exploratory EFA was examined.

The resulting model is presented in *Figure 1*, where the standardized factor coefficients are shown along with the adjustment indices obtained. Although the Chi-square test did not indicate an optimal fit, the other fit indices revealed satisfactory results.

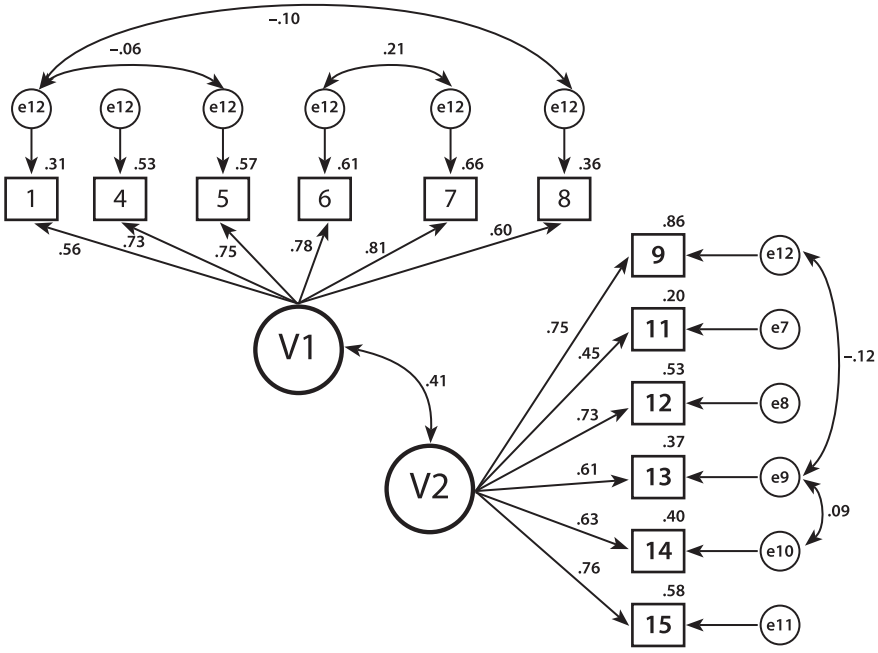

Figure 1. Confirmatory Factor Analysis (CFA) of the Coping Scale model for Adherence to Cardiovascular Pharmacological Treatment

(Hu & Bentler, 1999; Kline, 2005). The adjustment indices were: $\chi^2(157) = 630.821$; CMIN/DF = 4.01; TLI = .943 NFI = .940, IFI = .961, CFI = .988, SRMR = .0367; RMSEA = .069(.043–.066).

Coping Scale for Adherence to Cardiovascular Physical Exercise

Following the recommendations of Lloret-Segura et al. (2014), a factor analysis was performed using the unweighted least squares estimator with oblimin rotation for the scale assessing coping strategies related to adherence to physical exercise. Items with commonalities greater than .30 and factor weights greater than or equal to .40 were retained, resulting in a criterion that grouped 15 items into three factors with eigenvalues greater than 1. These factors were named: *positive reevaluation* (α = .811), *evasion* (α = .704) and *reflexive cognitive analysis* (α = .703). Together these factors explained 44.83% of the accumulated variance, with an overall Cronbach's alpha of .84, indicating good reliability. The results are shown in *Table 2*.

Table 2

The factorial and psychometric structure of the Coping Scale for Adherence to Cardiovascular Physical Exercise

	1	**2**	**3**	**Total**
Ítems	6	4	5	15
Factorial Variance	19.10	13.44	12.281	44.83
Cronbach's Alpha	.811	.704	.703	.844
1. Intenté sentirme mejor haciendo caminatas más de 30 minutos al día (I tried to feel better by taking walks for more than 30 minutes a day)	.754			
2. Busqué un poco de esperanza intentando mirar las cosas buenas del ejercicio físico cardiovascular (I sought a bit of hope by trying to see the good things about cardiovascular physical exercise)	.728			
3. Me consolé pensando que las cosas podrían ser mejores si realizo mi ejercicio físico (I consoled myself by thinking that things could be better if I do my physical exercise)	.659			
4. Tuve fe en hacer el ejercicio que me corresponde (I had faith in doing the exercise that is required of me)	.611			
5. Me inspire a hacer ejercicio físico de manera creativa (I was inspired to exercise creatively)	.578			
6. Cambie y maduré como persona al caminar por 30 minutos al día de manera frecuente (I changed and matured as a person by frequently walking for 30 minutes a day)	.528			
7. Me di cuenta de que yo mismo no quiero realizar ejercicio físico (I realized that I myself don't want to engage in physical exercise)		.780		

8. Me negué a creer que no estaba realizando ejercicio físico (I refused to believe that I wasn't engaging in physical exercise)	.643	
9. Evité que los demás se enteraran de que no estaba realizando ejercicio físico (I avoided letting others know that I wasn't engaging in physical exercise)	.580	
10. Trate de olvidarme por completo de que no estoy realizando ejercicio físico (I tried to completely forget that I'm not engaging in physical exercise)	.518	
11. Tuve el deseo de que mi flojera por hacer ejercicio físico terminara (I had the desire for my laziness regarding physical exercise to end)		.669
12. Imagine el modo en que puedo hacer ejercicio físico (I imagined how I could exercise)		.642
13. Hice algo para compensar mi falta de ejercicio físico (I did something to compensate for my lack of physical exercise)		.632
14. Seguí realizando ejercicio físico al ver los beneficios de este (I continued to exercise upon seeing the benefits of it)		.443
15. Analice diversas formas para realizar ejercicio físico cardiovascular (I analyzed various ways to engage in cardiovascular physical exercise)		.414

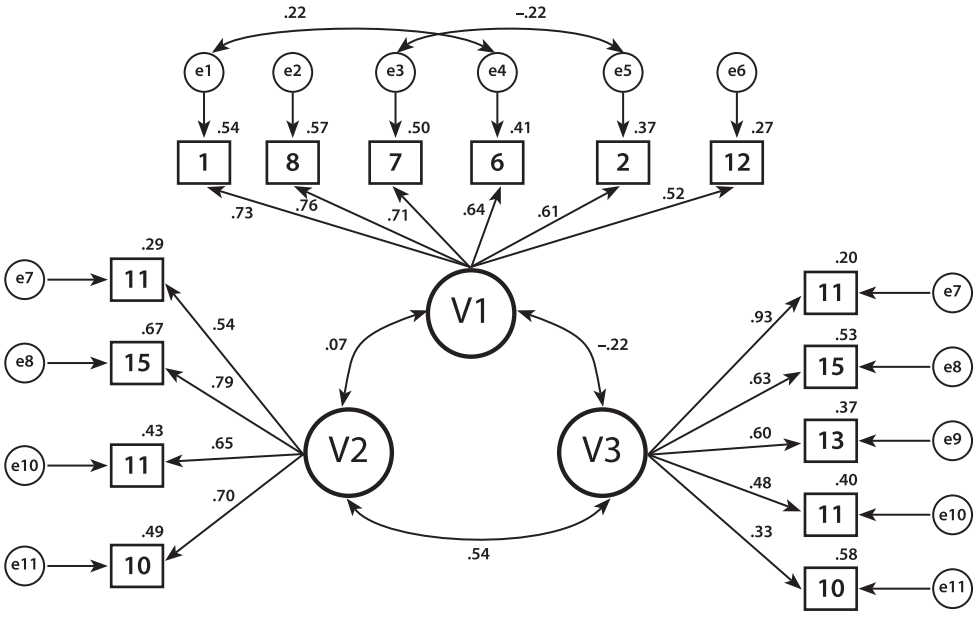

Figure 2. Confirmatory Factor Analysis (CFA) of the Coping Scale for Adherence to Cardiovascular Physical Exercise model

To perform the Confirmatory Factor Analysis (CFA), the multivariate normality of the data was first assessed using the Mardia test, which yielded a multivariate kurtosis coefficient of 33.006. This value is below the threshold set by Bollen (1989), which indicates that for 15 observed items the limit would be calculated as15 (15+2) = 255. Once this test was performed, the fit of the model obtained in the EFA was evaluated.

The resulting model is shown in *Figure 2*, where the standardized factor coefficients can be seen with the adjustment indices obtained. With respect to Chi-square, it did not have a good fit, the other adjustment indices showed satisfactory results (Hu & Bentler, 1999; Kline, 2005). The adjustment indices were: $\chi 2$ (68) = 194.38; CMIN/DF=2,859; TLI =.903 NFI=.911; IFI=.921, CFI=.925, SRMR= .0487; RMSEA=.051(.043–.060).

Coping Scale for Adherence to Heart-Healthy Eating

Following the guidelines established by Lloret-Segura et al. (2014) for the assessment of adherence to physical exercise through the coping scale, a factor analysis was carried out using the unweighted least squares method along with oblimin rotation. Items sharing commonalities greater than .30 and factorial loads equal to or greater than .40 were retained, alongside those presenting eigenvalues greater than 1.

Table 3

The factorial and psychometric structure of the Coping Scale for Adherence to Heart-Healthy Eating

	1	**2**	**3**	**Total**
Items	5	3	4	12
Factorial variance	32.85	20.72	9.54	63.12
Cronbach's Alpha	.763	.771	.698	.785
1. Intente sentirme mejor comiendo y bebiendo lo que me corresponde (I tried to feel better by eating and drinking what I should)	.766			
2. Soñé o imagine que las cosas eran mejores cuando hacia mi dieta cardiosaludable (I dreamed or imagined that things were better when I followed my heart-healthy diet)	.751			
3. Busqué un poco de esperanza intentando mirar las cosas buenas de la dieta cardiosaludable (I sought a glimmer of hope by trying to focus on the benefits of a heart-healthy diet)	.749			
4. Me inspire a hacer comidas sanas de manera creativa (I was inspired to creatively make healthy meals)	.738			
5. Me dije cosas que me ayudaron a sentirme mejor para hacer la dieta prescrita por mi médico (I told myself things that helped me feel better about following the diet prescribed by my doctor)	.522			

6. Esperé a que ocurriera un milagro para que hiciera la dieta prescrita por mi médico (I waited for a miracle to happen so that I would follow the diet prescribed by my doctor)	.881	
7. Seguí adelante con mi destino (simplemente algunas veces tengo mala suerte para hacer la dieta cardiosaludable) (I carried on with my fate (sometimes I just have bad luck following the heart-healthy diet))	.782	
8. Me disculpe o hice algo para compensar el hecho de que no había realizado la dieta prescrita por mi médico (I apologized or did something to compensate for not following the diet prescribed by my doctor)	.737	
9. Trate de olvidarme por completo de que no estoy realizando la dieta cardiosaludable (I tried to completely forget that I'm not following the heart-healthy diet)		.786
10. Evite que los demás se enteraran de que no hago la dieta prescrita por mi médico (I prevented others from finding out that I'm not following the diet prescribed by my doctor)		.755
11. Me negué a creer que no estaba realizando la dieta cardiosaludable (I refused to believe that I wasn't following the heart-healthy diet)		.536
12. Me di cuenta de que yo mismo (a) no quiero hacer la dieta cardiosaludable (I realized that I myself don't want to follow the heart-healthy diet)		.356

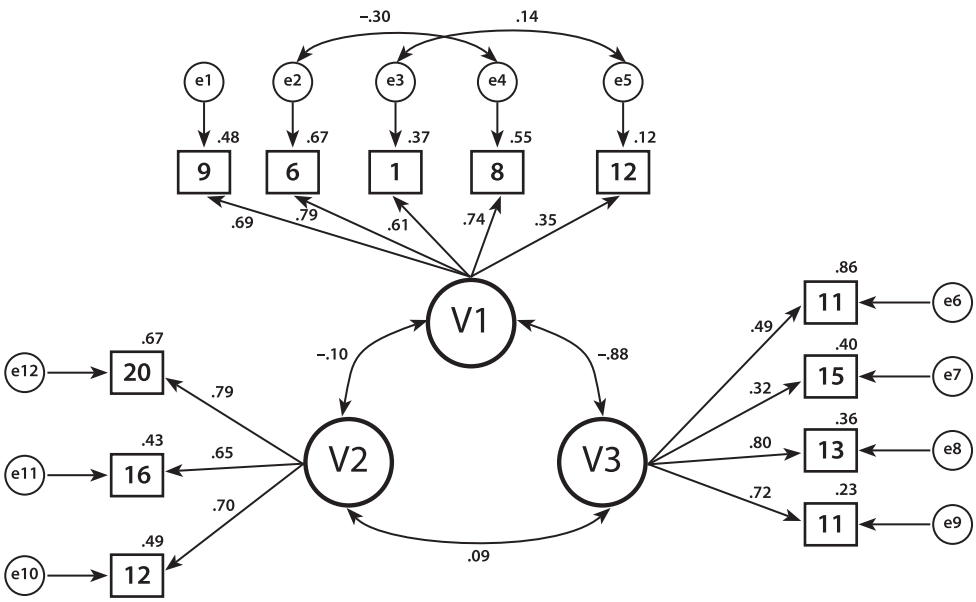

Figure 3. Confirmatory Factor Analysis (CFA) of the Coping Scale for Adherence to Heart-Healthy Eating

According to these criteria, 3 factors were identified: reflective cognitive analysis (α = .76), negative self-focus (α = .77) and avoidance (α = .69), made up of 12 items, which explained 63.12% of the accumulated variance, with a global Cronbach's alpha coefficient of .78. The results are detailed in *Table 3*.

Before conducting the AFC Confirmatory Factor Analysis, an assessment of the multivariate normality of the data was carried out. This was done by calculating the multivariate kurtosis coefficient using Mardia's test. The value obtained was 60.83, which was below the limit established by Bollen (1989), which for 12 observed items would correspond to 168. Once this evaluation was completed, the adjustment of the model obtained in the EFA was examined.

The model is presented in *Figure 3*, where the standardized factor coefficients are shown along with the adjustment indices obtained. Although the Chi-square test did not show a good fit, the other adjustment indices showed satisfactory results (Hu & Bentler, 1999; Kline, 2005). The adjustment indices were: $\chi^2(48) = 162.603$; CMIN/DF = 3,387; TLI = .903 NFI = .906; IFI = .9361, CFI = .934, SRMR = .0487; RMSEA=.071(.043–.060).

Discussion

The objective of this study was to develop and establish the psychometric properties of measurement instruments to evaluate coping with adherence to primary prevention measures in a sample of patients diagnosed with ischemic heart disease. To achieve this objective, three scales were generated from a qualitative and quantitative study in accordance with the literature. As a result, it is possible to assert that the developed scales of coping with medication adherence, heart-healthy eating and cardiovascular physical exercise evaluate universal elements of these constructs while simultaneously being sensitive to relevant elements of Mexican culture.

With reference to the factors resulting from the scale of coping with adherence to pharmacological treatment, two were found and confirmed. The first of these factors, termed positive reevaluation, involves the reinterpretation of the challenges associated with treatment in a more optimistic and constructive way. People who employ this coping style seek to find positive aspects within the situation, such as the long-term benefits of treatment, social support, or the personal growth that may emerge from the experience (Moos & Shaefer, 1986). Rather than focusing solely on the difficulties and limitations of drug treatment, those who use positive reappraisal seek to change their perspective to reduce stress and promote a more proactive attitude towards treatment adherence (Zavala et al., 2008). This approach can help improve motivation and perseverance, which in turn can lead to greater adherence to their medication prescription, and ultimately better health outcomes (Cando & Bermeo, 2016). The second resulting factor, termed, avoidance, refers to the tendency observed in some people to avoid or evade responsibility to adhere to the prescribed treatment. Those who exhibit this coping style may experience anxiety, fear, or discomfort with medication, leading them to avoid taking medications as directed (Mikulic & Crespi, 2008). Instead of actively facing the challenges associated with treatment, they choose to avoid the situation altogether, which can result in non-adherence and negative health consequences.

In relation to the factors of the scale of coping with adherence to cardiovascular physical exercise, three were found. The first factor, termed avoidance, reflects the desires and behavioral efforts to escape or evade cardiovascular physical exercise. In this context, those who exhibit avoidance may experience anxiety, fear, or discomfort at the thought of cardiovascular physical exercise. Instead of actively addressing these emotions and seeking solutions to overcome the barriers they face, they instead choose to avoid physical activity altogether (Endler & Parker, 1990, Carver, 1997). This coping style can manifest itself in a variety of ways, such as avoiding environments where exercise is performed, constantly delaying the start of an exercise routine, or finding excuses not to participate in planned physical activities (Patten et al., 2021). Although avoidance can provide temporary relief from perceived discomfort, in the long term it can have negative consequences for physical and mental health, as it limits opportunities to maintain an active and healthy lifestyle (Del Castillo et al., 2013). The second factor of the scale, called positive reappraisal, reflects the efforts made by individuals to make meaning from the performance of cardiovascular physical exercise and its perception as positive personal growth. Finally, the third factor called reflective cognitive analysis, involves the process of self-reflection exercises that help individuals analyze and problem solve (Lazarus, 2006; Folkman, 2010).

Reflexive cognitive analysis, as a coping style in cardiovascular physical exercise, involves a conscious and introspective approach to physical activity. People who employ this coping style tend to reflect deeply on their participation in cardiovascular exercise, carefully considering their motivations, beliefs, and perceptions associated with this activity (Góngora & Reyes, 1998). Rather than simply reacting to perceived stress or discomfort during exercise, those who use reflective cognitive analysis strive to understand the underlying causes of their emotions and thoughts (Urbano-Reaño, 2022). This may involve critically examining their expectations, identifying potential obstacles, and developing strategies to deal with challenges effectively. In addition, reflective cognitive analysis in cardiovascular physical exercise may include the application of positive thinking and cognitive restructuring techniques to promote more adaptive attitudes toward physical activity (Figueroa López et al., 2017). Ultimately, this coping style fosters greater awareness and self-efficacy in relation to exercise, which may consequently contribute to more consistent and rewarding participation in cardiovascular physical activities (Carver et al., 1989).

As for the factors derived from the coping scale of adherence to heart-healthy eating, three resulted were obtained. The first of these was avoidance, reflecting the degree of desire and behavioral effort to escape or evade the consumption of heart-healthy foods. The second was the presence of a negative self-focus, indicative of a perceived inability to cope with a given situation and a belief that things usually go wrong. The third factor, called reflective cognitive analysis, indicated a conscious, thoughtful approach to food choices. In this context, people who employ this coping style tend to reflect on their food choices and carefully consider nutritional aspects and the effects on their health (Moos & Shaefer, 1986). This involves evaluating food choices from an informed and rational perspective, considering how each choice contributes to your long-term physical and mental well-being. In addition, this coping style may involve actively seeking nutrition information and adopting healthy eating

habits as a strategy to cope with stress and promote a balanced lifestyle (Dawson & Golijani-Moghaddam, 2020). The second factor, called negative self-focus, refers to a perceived inability to cope with a given situation and a belief in an inability to eat in a heart-healthy way. The third factor, called reflective cognitive analysis, involves a conscious and reflective approach to food decisions including a consideration of the nutritional aspects and effects particular foods may have on cardiovascular health (Soria-Trujano et al., 2009; Valdez et al., 2022). According to this approach individuals reflect on their eating habits, identify emotional or situational triggers, and develop strategies for adopting a healthier diet. Additionally, reflective cognitive analysis is observed to foster greater awareness and self-efficacy in eating, thus promoting a more balanced and heart-friendly diet (Zavala et al., 2008).

Conclusion

In this paper, three scales are presented that have demonstrated their validity and reliability according to the guidelines proposed by Reyes-Lagunes and García and Barragán (2008) and the guidelines outlined by Lloret-Segura et al. (2014) and are consistent with the theoretical proposal of Lazarus and Folkman (1986). From the point of view of their practical application, these scales can be utilized to characterize a specific population in studies aimed at measuring coping in adherence to primary prevention measures in DKA. They can also serve as indicators to guide the development of strategies, programs and interventions, as well as evaluating the impact on coping as an intermediate outcome (Flores-Mendoza et al., 2022).

Limitations

Although three scales were developed and validated to assess coping with adherence to primary prevention measures in patients with ischemic heart disease, it is important to recognize that the results may not be generalizable to other populations with different medical or cultural conditions. Additionally, there could be a bias due to self-reporting, as there is a possibility that participants responded in a socially desirable manner.

Ethics Statement

The study was approved by the Local Research, Ethics, and Biosafety Committee of the Hospital with registration number 463.2020. The research was carried out following the ethical guidelines set forth in the 1975 Declaration of Helsinki and was conducted in accordance with the Ethical Principles of Psychologists of the American Psychological Association (APA) and the Code of Conduct revised in 2017 (APA, 2017); participants were given a brief description of the study and informed of their right to terminate participation at any time for any reason; anonymity was guaranteed, since no data was collected with identifying information; all were informed of the estimated duration of the study; and all provided their consent to voluntary participation as indicated by checking the box *informed consent* before starting participation. The participants were limited to 18-year-olds and older.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Author Contributions

J.B.F conceived the idea and supervised the project. Each author (J.B.F, M.G., A.B., and R.D.) has made an equivalent contribution to the conception and design of the study, the acquisition of data, the analysis and interpretation of data, and the drafting and revising of the manuscript.

Conflict of Interest

The authors declare no conflict of interest.

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The Association Between Social Desirability and Competitive Anxiety in Young Football Players with Different Qualifications

Murad B. Sultanov[a*]

[a] *Academician A. Garayev Institute of Physiology, Ministry of Science and Education of the Republic of Azerbaijan, Baku, Azerbaijan*

*Corresponding author. E-mail: murad.sultan.81@mail.ru

Background. Sports performance anxiety is understood as a tendency to respond with cognitive or physical anxiety in competitive situations where the athlete's performance can be assessed.

Objective. To investigate the role of social desirability and competitive anxiety in male football players with varying levels of skill. The study had two main objectives: first, to assess the levels of social desirability and competitive anxiety in two different groups, and second, to compare the levels of social desirability and competitive anxiety between highly skilled and less skilled players and explore their relationship.

Design. Participants were divided into highly skilled ($n = 39$) and less skilled ($n = 39$) football players. The Eysenck Personality Questionnaire was used to assess the participants' social desirability bias. The Sport Competition Anxiety Test assessed the level of competitive anxiety. The *t*-test for independent samples was used to compare social desirability and competitive anxiety between the groups. A linear regression model was used to determine if social desirability could predict anxiety levels among the players.

Results. The *t*-test showed that highly skilled players have a lower level of competitive anxiety than less skilled participants. However, social desirability did not show a statistically significant difference between the highly skilled and less skilled football players. The regression analysis showed a statistically significant association between social desirability and competitive anxiety (inverse relation) in both groups.

Conclusion. Highly skilled football players demonstrated less competitive anxiety than less skilled ones. Lower levels of competitive anxiety are associated with higher social desirability among football players in both groups.

Keywords:
football, social desirability, competitive anxiety, male, team sports

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Introduction

The Football World Cup, held in Qatar in 2022, once again confirmed the thesis that in elite sports, the personal characteristics of players, and in particular, their competitive anxiety, play an important role in achieving high results (Sultanov & İsmailova, 2019). Several studies have demonstrated differences in characteristics between highly skilled and less skilled players (de Gouvêa et al., 2017; Williams, 2000; Wright et al., 2013). However, for some personality traits, there have been few studies of these differences. At the same time, the relationship between the personal characteristics of athletes and their performance remains a pressing problem in team sports. Players' personalities are currently under active study due to the psychophysiological demands on their bodies and the impact on their sports performance. The issue of tolerance for various competitive situations and its correlation with personality traits and competitive anxiety among team sports players is being addressed (Sultanov, 2023). Sports performance anxiety (Grossbard et al., 2007) has been conceptualized as "a predisposition to respond with cognitive and/or somatic state anxiety to competitive sport situations in which the adequacy of the athlete's performance can be evaluated" (Smith, Smoll, & Wiechman, 1998, p. 107). R. Martens notes that athletes with higher levels of competitive trait anxiety tend to perceive competitive situations as more threatening than athletes with lower levels of anxiety (Martens et al., 1990). Several more recent studies have explored the role of anxiety in sporting performance (Franklin et al., 2015; Moore et al., 2013; Wilson et al., 2007). Anxiety can have a positive, negative, or no effect on performance, depending on the individual's level of anxiety and the attentional demands of the task. The influence of pre-competitive anxiety on athletes' performance depends largely on the interaction of the athlete's temperament and the competition situation.

Previous research has indicated that athletes in team sports exhibit different personality traits than those in individual sports (Allen et al., 2013), and that anxiety levels in team and individual sports may also differ (Eagleton et al., 2007). Team and individual sports are conceptually different, with team sports relying on collaboration and social interaction to a greater extent (Wold et al., 2013). Team players are generally more extroverted, anxious, and dependent, but less sensitive and imaginative than individual sports players (Cox, 1998). Concurrently, limited research has investigated social desirability factors in the context of competitive anxiety, and their relationships within team sports.

In the *Encyclopedia of Social Measurement,* T. Graeff (2005) mentioned that social desirability bias is linked to other personality factors such as anxiety, achievement, motivation, and self-esteem. Physical activity is considered socially desirable behavior (Motl et al., 2005). Moreover, social desirability bias is included in football development programs (Feichtinger & Höner, 2014). Athletes with high social desirability described greater coach support than those with low social desirability, among male and female high school tennis players, as measured by the Sport Competition Anxiety Test (SCAT) (Ryska, 1993). Thus, people may respond in a way that they think is socially desirable, which can affect how anxious they feel in sports situations. In team sports, especially football, social desirability has not been studied much, and research in this area has been pretty poor (Smith et al., 2002).

The present study aimed to test the association between social desirability and competitive anxiety among football (soccer) players with different qualifications. The first purpose of the study was to reveal the level of social desirability and competitive anxiety in two groups of interest, and the second purpose was to compare social desirability and competitive anxiety levels between highly skilled and less skilled players and to investigate their relationship.

In football, as a highly competitive game, levels of social desirability and anxiety might differ between highly skilled and less skilled football players. The hypothesis is that a highly competitive game such as football has a difference in personality traits between highly skilled and less skilled players.

Methods

Participants

The participants were male football players 17–21 years old: 39 highly skilled players (M = 18.3, SD = 1.0) and 39 less skilled players (M = 18.4, SD = 1.1). The highly skilled football players had more training hours per week (9 vs. 4.5, respectively) and a more intensive training process than less skilled players did. The highly skilled players participated in the national youth football championship, and some players were recruited for the national youth football teams. The less skilled players had 4.5 football training hours per week at Sports University. This group engaged in practice of other sports as individuals and teams, with a minimum of three training hours per week. In addition, the less skilled players were involved in competition with amateur football teams (2–5 competition hours per month). The classification of football players into highly skilled and less skilled categories has been established in the literature (de Gouvêa et al., 2017). Participants had normal hearing and vision and no psychiatric or neurological disorders.

Measures

Social Desirability Scale

Social desirability was measured using Eysenck's Personality Questionnaire (EPQ) (Eysenck & Eysenck, 1975). The EPQ was available for both languages (Azerbaijan and Russian) that were used in this study. The social desirability test is carried out using 25 questions on the EPQ. The psychometric estimation proposed by Eysenck's Personality Theory has been widely used and well established in several studies (Barrett et al., 1998; Razumnikova, 2004). In addition, a previous study mentioned that component 'A' in the EPQ lie (social desirability) scale functions as an index of socially conforming behavior (Francis, 1991).

Competitive Anxiety

The competitive anxiety of participants was evaluated by the Sport Competition Anxiety Test (SCAT), a 15-item scale that measures trait anxiety among sports performers (Martens, 1977). Respondents were required to indicate their agreement with each item by selecting their answer from *'rarely'*, *'sometimes'*, and '*often*' (three-point

Likert scale). Five of the 15 items in the SCAT questionnaire are 'buffer' questions (Iwuagwu et al., 2021). The scores on this test may vary from 10 points to 30 points. Various general anxiety inventories have been correlated with the test, demonstrating its convergent validity (Lavallee et al., 2012). For the Russian language, this test was translated and validated by Y. Hanin (Feltz et al., 1982); for the Azerbaijani language, this manipulation was done by the author using the Russian model.

Procedure

To assess social desirability and competitive anxiety, participants completed the EPQ and the SCAT after training at home and gave the forms to the researcher. In the first stage, players completed the EPQ and then the SCAT. The researcher allowed each participant nearly one week to complete both questionnaires. Data from tests and results were completed and analyzed in approximately six months.

Before the selection of participants, the researcher talked with coaches and supervisors to support him in choosing players for research in both groups. Highly skilled players were recruited for study according to actual performance before competition season (second part). Requirements for participation in this study were competitive practices, a high team position in the tournament after the first part, and membership in national youth teams (if possible). Less skilled players were recruited for the study from the Sports University, and had trained in the Football specialty. The study began in October 2015 and concluded in April 2016. The researcher obtained permission from the management of the football clubs to study the players. University students were given course credits for participating in the study. Each participant gave verbal consent for the testing. Data were collected before the COVID-19 lockdowns in Azerbaijan.

Statistical Analysis

The Shapiro-Wilk (SW) test was used to verify the normality of the data and assume normality for residual errors among participants. The study employed a *t*-test for independent samples to compare the social desirability and competitive anxiety between the two groups. A linear regression model was used to analyze social desirability as a predictor of competitive anxiety by cross-sectional study. The level of significance was set at $p < .05$. Statistical analysis of the data was performed using SPSS Statistics for Windows, v.23.0. Armonk, NY: IBM Corp. (USA) and 'Statistics Kingdom'.

Results

The study found that both of the groups demonstrated approximately equal data on the social desirability scale: highly skilled players ($M = 13.87$; $SD = 5.09$; Cronbach's $\alpha = .57$) and less skilled football players ($M = 14.28$; $SD = 5.25$; $\alpha = .43$). The SCAT showed a low level of competitive anxiety in highly skilled players ($M = 15.54$; $SD = 3.05$; $\alpha = .43$) compared to the less skilled football players ($M = 17.23$; $SD = 3.59$; $\alpha = .44$). Thus, the *t*-test for independent samples demonstrated a statistically signifi-

cant difference (p = .03). This data revealed that highly skilled football players have a lower level of competitive anxiety than less skilled participants. On the other hand, social desirability did not show a statistically significant difference between the two groups (see *Table 1*).

Table 1

Descriptive Statistics and Analysis of Differences Between Highly and Less Skilled Players

	Highly Skilled			Less Skilled			*t*-test for Equality of Means				
Scale	Mean	*SD*	α	Mean	*SD*	α	95% CI		*t*	*df*	*p*
Social desirability	13.87	5.09	.57	14.28	5.25	.43	–2.74	1.92	–.35	76	.73
Competitive anxiety	15.54	3.05	.43	17.23	3.59	.44	–3.19	–.19	–2.24	76	.03

Notes. The t-test illustrated that the two groups have differences in the competitive anxiety scale. SD = standard deviation. α = Cronbach's alpha. CI = confidence interval. t = t-value. df = degrees of freedom. p = significance.

Social desirability is a predictor of competitive anxiety in both groups. This relationship includes both highly skilled and less skilled players, each with approximately equal values (see *Figure 1*). A regression analysis suggests that the relationship between social desirability and competitive anxiety in the two groups of players has a negative slope (inverse relation). Consequently, when social desirability is higher, the competitive anxiety among players is lower, and conversely. The summary of regression analyses for the group of highly skilled players is as ($F_{(1,37)} = 5.85$; $\beta = -.22$; $p = .02$), and for the group of less skilled footballers as ($F_{(1,37)} = 6.49$; $\beta = -.26$; $p = .02$) (see *Table 2*).

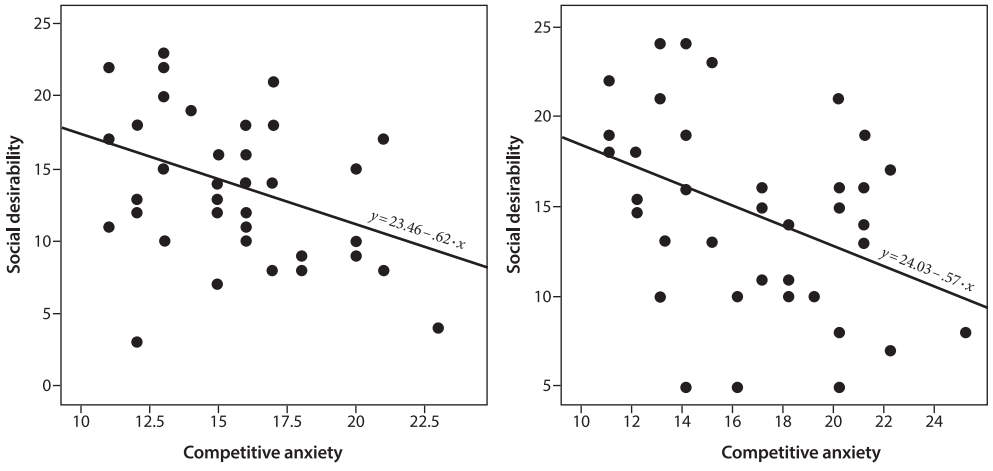

Figure 1. The relationship between social desirability and competitive anxiety among highly skilled players (at the left) and less skilled players (at the right)

Table 2

Results of Regression Analyses for Competitive Anxiety in Two Groups of Football Players

Parameter	$F_{(1,37)}$	R^2	*t*	β	95% CI		Correlation	Power	*p*
				Highly skilled players					
Social desirability	5.85	.14	−2.42	−.22	15.87	21.34	−.37	.66	.02
				Less skilled players					
Social desirability	6.49	.15	−2.55	−.26	17.81	24.19	−.39	.66	.02

Notes. F = f-value. R^2 = R-squared. β = beta coefficient.

Discussion

This study found that highly skilled players have lower competitive anxiety than less skilled football players. This is in line with other evidence, which demonstrated that football players were lower on the neuroticism-anxiety scales than general university participants (O'Sullivan et al., 1998). In addition, the low scores for competitive anxiety among highly skilled football players compared to less skilled players are consistent with evidence that regular exercise reduces anxiety (Eagleton et al., 2007; McKelvie et al., 2003). Consequently, experience and practice enable players to identify the individual methods that reduce competitive anxiety (Mottaghi et al., 2013). For instance, other research (Cartoni et al., 2005; Pears, 2007) illustrated that as athletes age, their anxiety decreases. This finding is consistent with our own, suggesting that increased competitive experience and training hours may reduce competitive anxiety. These factors suggest that team sports may cause personal changes in individuals over their sporting lifetimes. During sports activities, monitoring the helpfulness of players to their team can be used to determine the reorganization of individual-typological traits of highly skilled players compared to less skilled football players.

On the other hand, these results indicate that the skill level of football players does not affect the predictive power of social desirability for competitive anxiety among participants. Social desirability may decrease anxiety in competition through the suppression bias of individual responsibility. People with high trait anxiety tend to notice more threat-related information due to a cognitive bias (Martens et al., 1990). Therefore, players will be inspired by teamwork in contrast to self-estimation. Social desirability bias may be particularly useful for players with high levels of competitive anxiety. This behavior may have an effect on the performance. Some evidence suggests that high levels of competitive anxiety are related to poor performance (Scanlan et al., 2005; Smith & Smoll, 1991). Thus, the inverse correlation between social desirability and competitive anxiety potentially indicated this association. According to other studies, highly successful athletes have positive thoughts, better concentration, are more task-oriented, and have lower levels of anxiety (Ahmad & Safdar, 2020). In team sports, social interaction can influence overall team performance (Verburgh et al., 2014). Another study showed that social desirability was not connected with neuroticism; however, this study was conducted on non-sport subjects (Davies et al.,

1998). By contrast, in this study, both groups practiced sports. Another study demonstrated that social desirability is more strongly correlated with pre-competitive anxiety when an individual plays soccer (football) professionally rather than at the varsity level (Smith et al., 2002).

Accordingly, this study revealed an association between social desirability and competitive anxiety among football participants. This suggests that social desirability has a connection to competitive anxiety and may be associated with player performance. However, the relationship between social desirability and competitive anxiety may vary across different sports. According to these results, in football, social desirability is approximately equal among highly skilled and less skilled football players. Only the level of competitive anxiety indicated a statistically significant difference between the two groups. In the group of highly skilled players, the level was lower. The results have not illustrated differences in the relationship between social desirability and competitive anxiety in both groups, despite the contrast in the anxiety level. Thus, in future studies that will explore the relationship between social desirability and personality traits, it may be reasonable to use samples that demonstrate a wide range of abilities in sports. If a difference between social desirability or personality traits is observed, it could provide some evidence of the distinction between highly skilled and less skilled participants.

In addition, it has been found that gamma rhythm in the prefrontal cortex is associated with social desirability, which is reflected in the independence of decision-making or selective behavior modification among football players (Sultanov, 2020). The critical role of social desirability in the frame of relationship with brain activity in the frontal lobe is also supported in a study by O. Razumnikova (2004) with female participants. Furthermore, in a previous study, we determined the relationships between social desirability, type of temperament (with a tendency towards extraversion), and anxiety among football participants (Ismayilova & Sultanov, 2023).

A similar study (Grossbard et al., 2007) mentioned that "Social desirability response set may also influence another widely studied variable in sport, namely anxiety. Sport performance anxiety has been conceptualized as 'a predisposition to respond with cognitive and/or somatic state anxiety to competitive sport situations in which the adequacy of the athlete's performance can be evaluated' (Smith, Smoll, & Wiechman, 1998, p. 107)". This research has expanded this hypothesis and revealed that not only is social desirability a response, but it may also be linked with players' behavior and, accordingly, has a connection with anxiety in competitions on different levels. These factors may have a relationship with the performance and results of football players.

The present results confirmed one out of two working hypotheses: highly skilled players have a lower level of competitive anxiety than less skilled football players; however, social desirability in the two groups showed approximately equal results. This may indicate that the level of social desirability does not change during lifespans.

Conclusion

Highly skilled football players showed lower competitive anxiety than less-skilled participants. However, the study did not reveal any differences in the level of social

desirability between the two groups. The data show that the skill level of football players is not associated with social desirability's prediction of competitive anxiety and is linked to consistent participation in sports activities.

Therefore, if the level of social desirability among players increases, their competitive anxiety decreases. Social desirability traits may have a positive role in excessive anxiety among team sports athletes. One effective way to achieve important goals is to foster social desirability behavior among football players within a team. This might include benefits for a football team, such as comradery and consonance.

Practical Implications

"The developmental hypothesis" (Elman & McKelvie, 2003) declared that continuous sports practice on the professional level causes personality changes and, respectively, the differences between highly skilled and less skilled football players. The specifications for reorganizing individual-typological traits of highly experienced players, compared to those who are less skilled, can be clarified by monitoring their contributions to team goals during sports activities. Thus, trainers need to use different approaches to regulating football players' behavior during various situations in the match. This can help determine the best way to balance individual personalities with the team's priorities to achieve short-term and long-term goals.

Limitations

The study involved a small number of participants, and therefore, future research should endeavor to replicate and expand upon these findings using a larger sample. In addition, this research was conducted with a relatively young age group of sportsmen, and future studies need to check these results on adult athletes.

Moreover, social desirability and competitive anxiety traits will be interesting to observe in participants in individual sports. Further studies could investigate the correlation between social desirability and other personality traits in team and individual sports.

Ethics Statement

The researcher obtained permission from club management to participate in the study of football players. University students received course credit for their participation in the study. The studies were conducted under ethical principles outlined in the Declaration of Helsinki and were approved by the Scientific Council of the Institute of Physiology, Baku, Azerbaijan, on March 12, 2019.

Informed Consent

Informed consent was obtained from all participants included in this study.

Author Contribution

All procedures during preparing the manuscript for publication were accomplished by the author, self-contained.

Conflict of Interest

The author declares no conflict of interest.

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