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Original Article

Effect of young basketball players' self-regulation on their psychological indicators

ANTON ROCHNIAK[1], ILONA KOSTIKOVA[2], FOMENKO KARYNA[3], TAMARA KHOMULENKO[4], ARABADZHY TYMUR[5], TETIANA VIEDIERNIKOVA[6], DIOMIDOVA NATALIIA[7], VERA KRAMCHENKOVA[8], OLENA SCHERBAKOVA[9], MARTA KOVALENKO[10], OLEKSIY KUZNETSOV[11]
[1,5,] Physical Education, National Technical University «Kharkiv Polytechnic Institute», UKRAINE
[2,6,] Theory and Practice of the English Language, H.S. Skovoroda Kharkiv National Pedagogical University, UKRAINE
[3,4,8,11] Practical Psychology, H.S. Skovoroda Kharkiv National Pedagogical University, UKRAINE
[7] Philosophical and and psychological anthropology, H.S. Skovoroda Kharkiv National Pedagogical University, UKRAINE
[9] Practical Psychology, Ukrainian Engineering Pedagogics Academy, UKRAINE
[10] State Institution "Institute for Children and Adolescents Health Care of the National Academy of Medical Sciences of Ukraine", UKRAINE

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Abstract.
Problem statement: One of the most important factors in the success of sports activities is the level of psychological readiness. The most significant indicator of psychological readiness is the ability to qualitatively regulate athlete's activity, behavior, and mental state by their own psychic means (i.e., the ability to self-regulate). At the same time, there is not enough insightful research in sports science and in this area of knowledge. **Purpose**: To determine the nature of the relationship and links between the psychological characteristics of young basketball players and the specific features of their self-regulation. **Materials and methods:** A total of 160 basketball players (15–20 years old) participated in the study. The methods of self-regulation of sports activity, dispositional state of flow, basic beliefs, and dispositive optimism were used. **Results:** Correlation links between the indicators of self-regulation of sports activities and the indicators of dispositional state of flow, basic beliefs, and dispositive optimism were revealed. The most significant link was defined with self-inductance and identified regulation. The differences between young basketball players with different peculiarities of self-regulation of sports activity were determined by almost all indicators of the dispositional state of flow, basic beliefs, and dispositive optimism**. Conclusions:** It was confirmed that the specificity of self-regulation of young basketball players is connected with the peculiarities of the dispositional state of flow, dispositional optimism, and basic beliefs. Through comparison, it is determined that young basketball players with autonomous sports self-regulation have the advantage of almost all indicators of the dispositional state of flow and they have more optimistic views on the future.
Key words: dispositional state of flow, optimism, typological profiles, features, mental.

Introduction

The development of self-regulation is one of the key aspects of the psychological training of athletes because the changing and unpredictable conditions of sports activities with extreme tension and physical overloading, which are an integral part of this type of human activity, can negatively affect the quality of performed sports actions. Therefore, the issue of self-regulation of their own activities is extremely relevant in the context of psychological training of athletes.

Different authors consider self-regulation and its components from the perspective of the relationship between this phenomenon and the effectiveness of sports activities (Cleary, Zimmerman, 2001; Sun, Wu, 2011; Wagstaff, 2013; Dupee, Forneris, Werthner, Perceived, 2016; Englert, 2016; Bartulovic, Young, Baker, 2017; Nakonechnyi, Galan, 2017; Elferink-Gemser, Hettinga, 2017; McCormick, Meijen, Anstiss, 2019; Malgorzata, Agnieszka, 2020). There are many studies on self-regulation related to research in the field of reducing stress, recovery, recreation, and a healthy lifestyle (Dubuc-Charbonneau, Durand-Bush, 2015; Baumeister, Vohs, 2016; Kudin, 2016; Zavydivska, Zavydivska, Khanikiants, 2016; McNeill, Durand-Bush, Lemyre, 2019; Balk, Englert, 2020). In addition, scientists are exploring self-regulation as part of the preparation for competitions (Robazza, Pellizzari, Hanin, 2004; Pilgrim, Kremer, Robertson, 2018; Pilgrim, Kremer, Robertson, 2018). A particularly interesting area of research is the study of self-regulation from the standpoint of its motivational ambiguity. In

Corresponding Author: ANTON ROCHNIAK, E-mail: rochniak15@ukr.net

this context, the method of "self-regulation of sports activity" is the most effective means of research because it allows to determine the incentive basis for the process of self-regulation of sports activities (Khomulenko et al, 2019). To better understand and manage the process of self-regulation of athletes, this psychological phenomenon should be considered through the prism of psychological peculiarities. By taking this phenomenon into account, special attention should be paid to the study of links of self-regulation with the peculiarities of the dispositional state of flow (Csikszentmihalyi, 1990) and dispositive optimism (Scheier, Carver, 1987) of athletes.

Thus, the state of "flow" is characterized as the complete absorption by the process of activity, a sense of confidence, and a genuine pleasure. We believe that one of the key aspects of self-regulation is the formation of an inclination to such state. This is why we are interested in studying the relationship between the indicators of the dispositional state of flow with the peculiarities of self-regulation of sports activities.

It is important to study the relationship between dispositive optimism with the peculiarities of self-regulation because these construct can reveal the cognitive basis of the process of self-regulation of sports activities. These psychological characteristics reflect the harmony of the athlete's inner world, his/her attitude towards the future. Such psychological features should be related to the specifics of self-regulation of sports activities. *Thus, the purpose of our research was to determine the nature of the links between the psychological characteristics of young basketball players and the specific features of their self-regulation.*

Materials and methods

Participants. The sample of subjects of the study included 160 people who were 15–20 years old. They were boys who were engaged in basketball for more than 5 years and participated in regional and national competitions between high school students.

Research methods. The study used a set of psychodiagnostic techniques, which included a "self-regulation of sports activities" survey (K. I. Fomenko, I. V. Poliluyeva), a "Dispositional scale of flow. Full version "(S.A.Jackson, in adaptation A. Yu. Rochniak, K. I. Fomenko and Yu. I. Panfilov) and a test of dispositive optimism (Ch. Carver, M. Sheyer, in the adaptation of T. O. Gordeeva, O. A. Sychov and E. M. Osin).

Statistical analysis. Statistical data processing was carried out using the cluster analysis by the Medium method, Pearson linear correlation coefficient (r), nonparametric criterion for the comparison of independent groups (Kruskal-Wallis ANOVA analysis), and the Mann–Whitney U-criterion.

Results.

In this study, we relied on the results of cluster analysis with the allocation of four typological profiles of self-regulation of sports activities, which were described in another study (Rochniak, 2018). Given the combination of indicators, these profiles were labeled as: 1 - "Moderate sports self-regulation", 2 - "Low sports self-regulation", 3 - "Autonomous sports self-regulation", and 4 - "Combined sports self-regulation". We will compare the indicators of the dispositional state of flow and dispositive optimism of young basketball players on the basis of these self-regulation profiles. By performing the correlation analysis between the indicators of self-regulation of sports activity and the indicators of the disposition state scale of flow, it was determined that there was a positive correlation at the statistically significant level for all flow scales in addition to the loss of self-consciousness and the transformation of time with introjective regulation, which was identified by regulation, internal motivation, and the relative index of autonomy (Table 1). Of note, the strength of correlation links for these scales, as well as statistical reliability, is lower than that between the introjective regulation and self-induction, where the link is already sufficiently strong.

Table 1

Correlation links of indicators of self-regulation of sport activities with the scales of state of flow

Scales	External regulation	Introjective regulation	Identified regulation	Self-induction	Relative index of autonomy
Balance of complexity and competence	0,01	0,25**	0,39***	0,38***	0,34***
Merging of consciousness and action	0,02	0,21**	0,45***	0,49***	0,44***
Clarity of purpose	0,08	0,17*	0,3***	0,21**	0,16*
Feedback accuracy	0,09	0,16*	0,44***	0,41***	0,35***
Concentration at the current moment	0,17*	0,23***	0,4***	0,41***	0,28***
Sense of control	0,04	0,22**	0,46***	0,4***	0,35***
Loss of self-consciousness	−0,1	0,12	0,17*	0,14	0,18*
Transformation of time	−0,01	0,01	0,07	0,15	0,13
Autotelic experience	0,08	0,27**	0,41***	0,54***	0,41***
Total score	0,06	0,31***	0,58***	0,6***	0,5***

Note: «*» – p < 0,05; «**» – p < 0,01; «***» – p < 0,001

External regulation is poorly correlated only with the concentration at the current moment. The indicator of loss of self-consciousness is poorly correlated with the indicators of the identified regulation and the relative index of autonomy.

Thus, the more that the sporting activity of young basketball players is governed by the desire to achieve personal goals through the main results in sports, internal forces, and motivations in relation to this activity, and the more they are inclined and more often they show a merging of consciousness and actions, a sense of control, and an autotelic experience, the more often that these conditions of sports activities coincide with the conditions of entry into the state of flow (e.g., balance between the degree of complexity of the activity and the level of development of skills, clarity of purpose, feedback accuracy, and concentration at the current moment).

Because the strongest links to the flow scales have the indicators of self-inductance and identified regulation, one can say that when a basketball player feels that all his actions are performed automatically, effortlessly, and easily, he can control everything within his sporting activities and enjoy the participation in the activity, and the process of self-regulation of his activities is subjected to the inductance into basketball and the feeling of their own choice of this activity, which was previously regulated by external factors.

In general, the value of all indicators of self-regulation of sports activities correlates with the general indicator of the scale of the dispositional state of flow, which is the total indicator of the inclination and frequency of experience of the state of flow. However, the actual motivation has the strongest link with this indicator (0.6, at $p < 0.001$), although the indicator of identified regulation has almost the same correlation (0.58, at $p < 0.001$).

This analysis, the results of which are presented in Table 2, shows that there are statistically significant differences in all scales of the dispositional state of flow between the cluster profiles of self-regulation of sports activity, in addition to the indicators of loss of self-consciousness and time transformation. It is observed that the profile of "autonomous sports self-regulation" has the highest value in all scales; the profile "combined sports self-regulation" is dominated by clusters with low and moderate sports self-regulation in all scales; the profile "low sports self-regulation" has the lowest values in all scales; these profiles have statistically significant differences.

Table 2

Value of the flow scales depending on the profile of self-regulation of sports activities

Scales	Groups studied by clusters				H	p
	«Moderate sports self-regulation»	«Low sports self-regulation»	«Autonomous sports self-regulation»	«Combined sports self-regulation»		
Balance of complexity and competence	3,52±0,1	3,13±0,14	4,07±0,13	3,84±0,11	24,64	0,000
Merging of consciousness and action	3,35±0,08	2,91±0,12	3,98±0,11	3,78±0,09	42,36	0,000
Clarity of purpose	4,19±0,08	3,71±0,11	4,3±0,1	4,22±0,08	11,66	0,009
Feedback accuracy	3,54±0,08	2,98±0,11	3,99±0,1	3,75±0,08	33,7	0,000
Concentration at the current moment	3,72±0,07	3,25±0,1	4,08±0,09	3,95±0,07	25,9	0,000
Sense of control	3,51±0,07	3,21±0,1	4,05±0,09	3,82±0,08	36,68	0,000
Loss of self-consciousness	3,69±0,08	3,4±0,12	3,68±0,11	3,64±0,09	5,45	0,14
Transformation of time	3,16±0,12	3,29±0,17	3,59±0,15	3,43±0,12	4,77	0,19
Autotelic experience	4,02±0,08	3,33±0,12	4,52±0,1	4,26±0,09	37,36	0,000
Total score	32,69±0,37	29,21±0,53	36,27±0,47	34,68±0,4	63,95	0,000

Table 3 shows the results of pairwise comparison of 4 cluster profiles on the disposition flow scales. Thus, significant differences were established: on the balance scale between the degree of complexity of the activity and competence between cluster profiles, "moderate", and "low sports self-regulation" on the one hand, and clusters of "autonomous" and "combined sports self-regulation" on the other; on the scale of the merging of consciousness and action between all clusters, except for a cluster with autonomous sports self-regulation compared to a cluster with a combined sports self-regulation; on the scale of the objective clarity among all clusters except for the cluster with combined sports self-regulation compared to clusters with moderate and autonomous sports self-regulation; on the scale of the feedback accuracy between all clusters, except for a cluster with autonomous sports self-regulation, compared to the cluster with a combined sports self-regulation; on the scale of the concentration at the current moment between all clusters except for the cluster with autonomous

sports self-regulation compared to the cluster with the combined sports self-regulation; on the scale of the sense of control between all clusters, except for the cluster with moderate sports self-regulation compared to the cluster with low self-regulation; on the scale of the loss of self-conscious cluster with low sports self-regulation and clusters with moderate and combined sports self-regulation; on the scale of the transformation of time between a cluster with moderate sports self-regulation and a cluster with autonomous sports self-regulation; on the scale of the autotelic experience between all clusters, except for the cluster with moderate sports self-regulation compared to the cluster with the combined sports self-regulation; by the general indicator of the flow scale between all cluster profiles.

Table 3

Results of pairwise comparison of the scales of the state of flow of young basketball players with different typological profiles

Scales	U					
	I / II	I / III	I / IV	II / III	II / IV	III / IV
Balance of complexity and competence	512,5	**499,5*** **	**904***	**170*** **	**312,5*** **	633,5
Merging of consciousness and action	**428****	**414*** **	**845****	**71,5*** **	**190*** **	614,5
Clarity of purpose	**463***	726	1164	**226****	**384,5*** **	704,5
Feedback accuracy	**329*** **	**529****	**948***	**124,5*** **	**235*** **	617
Concentration at the current moment	**447****	**504,5*** **	**922,5***	**172*** **	**300*** **	655
Sense of control	602	**337,5*** **	**793,5****	**117*** **	**332,5*** **	**536***
Loss of self-consciousness	**498***	885	1216	**296***	458,5	733,5
Transformation of time	671,5	**663***	1065	336	542,5	703,5
Autotelic experience	**382*** **	**451,5*** **	982,5	**94*** **	**231,5*** **	**552,5***
Total score	**260*** **	**345*** **	**713,5*** **	**34,5*** **	**84*** **	**530***

Note: «*» – $p < 0,05$; «**» – $p < 0,01$; «***» – $p < 0,001$

Consequently, autonomous sports self-regulation of young basketball players causes a higher incidence and frequency of the components of the flow state compared to other cluster profiles of sports self-regulation. Such young players are more likely to be in a state where consciousness merges with action, and they perform everything automatically and freely, feel full control within the limits of sports activity, which they take part in, and are in an autotelic state. Thus, the highest reward for athletes is the sports activity itself and achievements in it, from which they derive the best emotions. This result corresponds to the indicators of self-regulation of sports activities of these young players. Consequently, the tendency to be in the current state corresponds to those players who have high values of their own motivation and identified regulation, combined with low external regulation and moderate values of introspection.

The worst indicators on the flow scales are the "low sports self-regulation" profile. Thus, with low self-regulation of sports activities and when activities are more regulated by external factors and external pressure, the tendency towards the state of flow is minimal; therefore, these basketball players are not able to completely immerse themselves in the sports process by forgetting about themselves and about the possibility of failure and to enjoy playing the game.

During the next stage of the study, we determined that there was a negative statistically significant link between the indicator of dispositive optimism and the indicator of external regulation, as well as a positive relationship with the indicators of identified regulation and self-inductance (Table 4).

Table 1

Correlation links between the indicator of dispositional optimism and the indicators of self-regulation of sports activities

Indicator	External regulation	Introjective regulation	Identified regulation	Self-induction	Relative index of autonomy
Optimism	−0,24*	0,11	0,27**	0,34**	0,44**

Note: «*» – $p < 0,01$; «**» – $p < 0,001$

The results of the correlation analysis suggest that it is expected that in the future positive events will occur more quickly the less the activity of basketball players is regulated by external forces and coercion and the more their activity is governed by the feeling of their own choice of this activity, compared to when the activity was regulated by external factors and not by interest to basketball.

According to the indicator of dispositive optimism, statistically significant differences between the cluster profiles of self-regulation of sports activity were established (Table 5). Clearly, the highest average value for this indicators is typical for young players with the profile of "autonomous sports self-regulation".

Table 2

Dispositional optimism depending on the profile of self-regulation of sports activities

Indicator	Groups studied by clusters				H	p
	«Moderate sports regulation»	«Low sports regulation»	«Autonomous sports regulation»	«Combined sports regulation»		
Optimism	22,76±0,2	22,73±0,29	24,39±0,26	23,21±0,22	28,79	0,0000

The table shows that, according to the indicator of dispositive optimism, statistically significant differences between the typological profile "autonomous sports self-regulation" and all other profiles are established (Table 6). Consequently young basketball players with autonomous sports self-regulation statistically significantly dominate others with a relatively stable personality trait, which reflects positive expectations for the future; thus, these young people are more inclined to take active action. We can explain this by the fact that basketball requires a lot of time from these young players, and this activity brings them positive emotions. Thus, these positive emotions must dominate positive thoughts and mood, which reflects their general expectation from the future.

Table 3

Results of the pairwise comparison of dispositive optimism of young basketball players with different typological profiles

Indicator	U, p					
	I / II	I / III	I / IV	II / III	II / IV	III / IV
Optimism	655	**334***	1080	**154,5***	489,5	**423***

Note: «*» – $p < 0,001$

Discussion

The connection between optimism with self-regulation is considered in our work, which confirms the notion of the cognitive–personal component of this ability. In our opinion, future studies on the relationship and specific links between the dispositional state of flow and the self-regulation will show that these characteristics are related, topical, and have a close connection.

Self-regulation has a positive effect on the state of flow of young people engaged in digital games (Li-Xian, Chuen-Tsai, 2016). This observation agrees with the results of our research and emphasizes the importance of self-regulation for achieving maximum pleasure and immersion in the process of sports activity.

Optimism as a psychological construct, through maintaining an assurance of possible good results, has an effect on behavior. Thus, optimism significantly contributes to successful self-regulation (Carver, 2014).

Human cognitive peculiarities, along with the peculiarities of temper, character, and self-consciousness, serve as the differential basis of the universal regulatory resource, which is the mechanism of mobilizing other human resources. Thus, self-regulation of achievement of goals should be considered as an important psychological mechanism that is capable of mobilizing cognitive resources of a person (Morosanova, 2014). Thus, the cognitive abilities of a person determine the features of the regulatory mechanism and are the object of influence of this ability.

The development of the ability to self-regulate activities and behavior contributes to the development of the maximum potential of cognitive abilities of children with mental retardation (Babkina, 2016). This confirms the results of our study on the existence of a relationship between the ability to regulate their activities and cognitive features independently.

Cognitive component is one of the main components of self-regulation, the development of which depends on the overall level of this ability. The improvement of self-regulation positively affects the relationship between the team and the coach as well as the quality of performed actions (Nakonechny, Galan, 2017). Therefore, it is necessary to include a cognitive component when developing programs for the development of self-regulation.

The systemic nature of the phenomenon of self-regulation emphasizes the importance of a more extensive study of its features, which was performed in our study.

Of note, the study of the phenomenon of self-regulation started in recent years owing to the transfer of focus of science and society to the human inner world and its hidden resources.

Conclusions

In our opinion, the most valuable result of our study is the discovery of differences in the psychological characteristics among young basketball players with different profiles of self-regulation of sports activities.

The autonomous style of self-regulation of sports activity of young basketball players results in higher rates of inclination and frequency of reflection of components of the flow state compared to other profiles. Therefore, these young people are more likely to be in a state where consciousness merges with action, and they perform everything automatically and freely, feel full control within the limits of sports activity in which they take part and are in a state of autotelic experience. Thus, the highest reward for them is the sports activity itself and achievements in it, from which they derive the best emotions.

It was statistically determined that young basketball players with autonomous sports self-regulation significantly dominate others by the level of dispositive optimism as a relatively stable personality characteristic that reflects the positive expectations of the subject with respect to the future; this is why these young people are more inclined to take active actions.

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