

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Psychological And Biological Issues In Physical Activity: Sport Self-Regulation As A Motivational Source.

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ABSTRACT

The study of sport self-regulation is one of the major problem at sports science. The aim of the study is to determine the sport motivation influence on self-regulation, self-affirmation and psychosomatic competence. The experimental sample included 140 athletes (35 adolescents, 82 students and 23 adults) of the same age in each category. The data were obtained from the questionnaires. The mathematical and statistical analysis was applied: K-Means Cluster analysis, Kruskal-Wallis H-test and Student t-test. It was shown that the autonomous self-regulation in physical activity, due to the intrinsic motivation and identification in physical activity, is associated with the aspiration for perfection and improvement of skill, as well as the high level of psychosomatic competence. Typological features of self-regulation in physical activity have impact on different kinds of self-regulation. Autonomous sport self-regulation has a considerable impact on training performance, results and achievements in physical activity. Internal and identified sport motives create clusters of combined and autonomous self-regulation in physical activity, characterized by high level of aspiration for perfection. Internal sport motive is a factor of successful physical activity and associated with more prosperous self-affirmation and psychosomatic competence in athletes.

Keywords: sport motives, sport self-regulation, self-affirmation, psychosomatic competence, successful physical activity.

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INTRODUCTION

The different aspects of self-regulation as a main motive for successful physical activity are analyzed from different point of view. No doubt, researchers' data about motivation, motives as a motivational source of successful physical activity is very important. The basic papers in the field are Deci and Ryan who analyze intrinsic motivation and self-determination [1]. Roberts et al. study motivation in sport and exercise [2]. Markland et al. describe the measurement of exercise motives [3, 4]. Together with Ingledew et al. they study the roles of motives in some aspects [5, 6, 7, 8]. Lonsdale et al. connect self-determined motivation and students' physical activity [9]. Strommer et al. show the development of the exercise motives and gains inventory [10].

It is known, that self-regulation of physical activity seems particularly relevant in connection with the need to ensure the success of the psychological support of physical activity. Available national studies reveal: leading role of internal and professional motivation in self-regulation of physical activity [11], positive influence of self-regulation of physical activity at the stage of competitions [12], formation of self-regulation culture as an integral component element of physical culture teacher's professional competence [13], the success of mastering sport activity depends on the ability of to form a style of self-regulation that is characterized by a high integrated system of its components [14].

To our mind, it is very important to follow World Health Organization standards and global recommendations on physical activity for health [15]. There are different points of many aspects of successful physical activity such as physical activity and exercise [16], physical activity and lifestyle [17], physical activity and cardiorespiratory fitness [18], physical activity and the life quality of students in mid and late adolescence [19], exercise motives and gains inventory [20]. There are papers about physical activity and quality of life of adolescents [21], assessment of free-living physical activity of adolescents [22], physical activity and its comparison with the international physical activity questionnaire [23], physical activity and well-being [24], physical activity and memory functions [25], health benefits of physical activity [26] etc.

The aim of this study is to examine whether sport-regulation related to measured motivational and psychosomatic qualities leading to successful physical activity. The purpose was achieved by the following materials and methods. The experimental sample included 140 athletes (35 adolescents, 82 students and 23 adults).

MATERIALS AND METHODS

Participants

The experimental sample included 140 athletes (35 adolescents, 82 students and 23 adults) of the same age in each category.

The study design

The present research has demanded to apply the following psychodiagnostic methods: 1) 'Self-regulation of physical activity Questionnaire' [27], 2) 'Training Self-regulation in athletes' [14], 3) The original technique of psychodiagnostics of hubristic motivation [28], 4) 'Bodily Self projective diagnostics' [29].

The experiment was carried out according to the quasi-experimental plan [30] and included 2 stages: revealing peculiarities of regulatory motives of physical activity in athletes according to the level of succeed in sport, revealing peculiarities of self-regulation, self-affirmation and psychosomatic competence in athletes according to their typological profiles of sport motivation.

On the 1st stage of the experiment the level of success in physical activity was an independent variable and the sport motives were dependent variables. On the 2d stage the cluster profiles of sport motivation were chosen as an independent variable and peculiarities of self-regulation, self-affirmation and psychosomatic competence – as dependent variables.

Statistical analysis

With a purpose of validation and credibility of the obtained results mathematical and statistical analysis was applied: K-Means Cluster analysis, Kruskal-Wallis H-test and Student t-test. The calculation was realized with the help of computer program SPSS 17.0.

EXPERIMENTAL

The comparison of two independent groups shows statistically significant mean differences ($p < 0,01$) in each indicators analyzed in more and less successful groups (table 1).

Table 1: Indicators of sport motives in more and less successful athletes.

Description of parameters	Successful		Less successful		t	p
	X	S	X	S		
External regulation	13.35	3.11	11.98	2.30	2.85	<0.01
Introjected regulation	14.94	2.35	13.26	2.78	3.85	0.0001
Identified regulation	16.78	2.00	14.76	2.79	5.00	<0.0001
Internal self-regulation	17.41	1.84	14.03	2.71	8.78	<0.0001

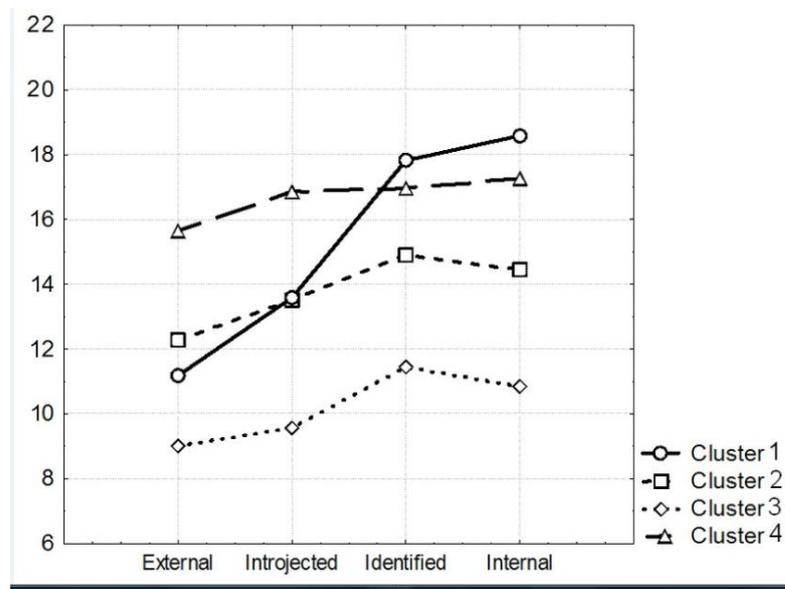
Thus, identified and internal regulation characterize more successful in physical activity athletes and external and introjected regulation characterize less successful in physical activity athletes.

According to the tasks of the study, which concerns the determination of the role of self-regulation in physical activity, we have examined the typological features of sport motives (fig.1) and their influence on training self-regulation in athletes, self-affirmation and psychosomatic competence (tables 2, 3 and 4).

K-Means Cluster Analysis was used to identify relatively homogeneous groups of cases based on the characteristics of sport motives – cluster profiles of motivation. The results of cluster analysis of regulatory motivation indicators are presented in fig.1.

Cluster 1 was produced by high rates of identified and internal motive and low rates of external and introjected motives and was labeled as ‘Autonomous sport self-regulation’. Cluster 2 was produced by moderate rates of all types of sport motives and was labeled as ‘Moderate sport self-regulation’. Cluster 3 was produced by low rates of all types of sport motives and was labeled as ‘Low sport self-regulation’. Cluster 4 was produced by high rates of all types of sport motives and was labeled as ‘Combined sport self-regulation’.

Figure 1: Cluster profiles resulting from the K-means clustering of sport motives.



As seen in Table 2, the comparison of four independent groups shows statistically significant mean differences ($p < 0.01$) in each self-regulation indicators analyzed in cluster profiles.

Table 2: Indicators of athletes' training self-regulation.

Description of parameters	Cluster 1		Cluster 2		Cluster 3		Cluster 4		H	p
	X	S	X	S	X	S	X	S		
Planning	6.22	1.85	4.53	1.74	3.64	2.54	4.83	1.94	26.29	<0.0001
Programming	4.78	1.44	3.80	1.27	4.14	0.99	3.17	1.71	25.86	<0.0001
Results evaluation	4.76	1.39	4.53	1.01	4.00	1.51	3.29	1.11	30.42	<0.0001
Flexibility	5.80	1.33	5.63	1.07	4.50	1.22	3.76	2.00	32.89	<0.0001
Self-dependence	4.98	1.36	4.17	1.58	3.73	1.64	4.64	1.06	13.96	<0.01

Thus, higher rates of planning, programming, results evaluation, flexibility and self-dependence are associated with high level of identified and internal regulation and low rates of external and introjected regulation, which are the characteristics of a group with 'Autonomous sport self-regulation'. Moderate rates of sport self-regulation in a group of cluster 2 also suppose higher level of flexibility. Lower rates of training self-regulation of athlete characterize groups by clusters of 3 'Low sport self-regulation' and 4 'Combined sport self-regulation'. Consequently, autonomous or self-determined motivation is associated with high level of training self-regulation of athlete.

The comparison of four independent groups shows statistically significant mean differences in aspiration for perfection and total level of hubristic motivation (table 3).

Table 3: Indicators of athletes’ self-affirmation.

Description of parameters	Cluster 1		Cluster 2		Cluster 3		Cluster 4		H	p
	X	S	X	S	X	S	X	S		
Aspiration for perfection	42.47	3.25	37.66	5.65	39.04	3.64	43.85	12.31	23.42	<0.0001
Aspiration for superiority	25.65	3.96	24.13	4.50	26.36	4.57	24.76	4.80	3.28	–
Hubristic motivation	68.13	6.06	61.80	7.52	65.40	6.28	68.61	15.30	11.67	<0.01

Higher rates of aspiration for perfection are associated with high level of identified and internal regulation, which are the characteristics of the groups with ‘Autonomous sport self-regulation’ and ‘Combined sport self-regulation’. Moderate rates of hubristic motivation and its forms in the group of cluster 2 ‘Moderate sport self-regulation’ and 3 ‘Low sport self-regulation’ suppose lower level of hubristic motivation and aspiration for perfection.

It was shown no statistically significant differences between groups by clusters in the rates of aspiration for superiority.

The comparison of four independent groups shows statistically significant mean differences in each indicator of psychosomatic competence (table 4).

Table 4: Indicators of athletes’ psychosomatic competence.

Description of parameters	Cluster 1		Cluster 2		Cluster 3		Cluster 4		H	p
	X	S	X	S	X	S	X	S		
Bodily awareness	6.87	2.49	4.97	1.63	3.27	2.60	5.26	2.38	29.98	<0.0001
Bodily acceptance	5.02	2.08	3.87	1.85	3.14	2.25	4.21	2.23	18.16	<0.001
Intracception ability	5.48	2.15	3.73	1.84	3.27	2.31	4.67	2.10	22.40	<0.0001
Bodily metaphorism	4.98	2.09	4.07	1.76	2.73	1.86	3.48	2.16	25.39	<0.0001
Bodily causality	6.39	2.53	3.77	1.87	2.55	2.06	4.26	2.37	42.01	<0.0001
Ability to conduct a dialogue with Body	5.67	2.57	3.67	1.84	2.91	1.74	3.88	2.39	21.16	<0.0001
Subjectivity	4.63	1.64	3.13	1.68	2.41	1.99	4.57	2.18	36.15	<0.0001
Integrity	4.91	2.33	2.53	1.36	1.82	1.92	3.98	2.37	37.65	<0.0001

Higher rates of bodily awareness and acceptance, intracception ability, bodily metaphorism and causality, ability to conduct a dialogue with Body, subjectivity and integrity are associated with high level of identified and internal regulation and low rates of external and introjected regulation, which are the characteristics of a group with ‘Autonomous sport self-regulation’. High rates of self-regulation in a group of cluster 4 also suppose higher level of bodily awareness and subjectivity. Lower rates of psychosomatic competence characterize groups by clusters of 2 ‘Moderate sport self-regulation’ and 3 ‘Low sport self-regulation’. Consequently, autonomous or self-determined motivation in physical activity is associated with high level of psychosomatic competence.

RESULTS AND DISCUSSION

The peculiarities of self-regulation of physical activity is revealed in Ryan-Deci’s self-determination theory, which concerns people’s inherent growth tendencies and innate psychological needs. According to Deci and Ryan there are three psychological needs that motivate people to initiate behavior and activity. These universal, innate and essential for psychological health and well-being needs are strivings for competence, autonomy, and psychological relatedness [31]. Self-determination theory reveals different ways of activity

regulation, the first of them is an intrinsic self-regulation or motivation, which assumes the interest and enjoyment during the activity, on the opposite side there is an extrinsic regulation, which requires the external values of behavior and activity.

The results of the research show that sport self-regulation has a considerable impact on training performance, results and achievements in physical activity. It was shown that more successful in physical activity athletes characterize by autonomous sport self-regulation, forming by high rates of internal and identified motives. Thus, more successful athletes characterize by intrinsic sport motivation, which is defined as the doing of an activity for its inherent satisfactions rather than for some separable consequence. It refers to doing something because it is inherently interesting or enjoyable [31] and characterizes successful athletes. When intrinsically motivated an athlete is moved to act for the fun or challenge entailed rather than because of sport records, pressures or rewards in physical activity.

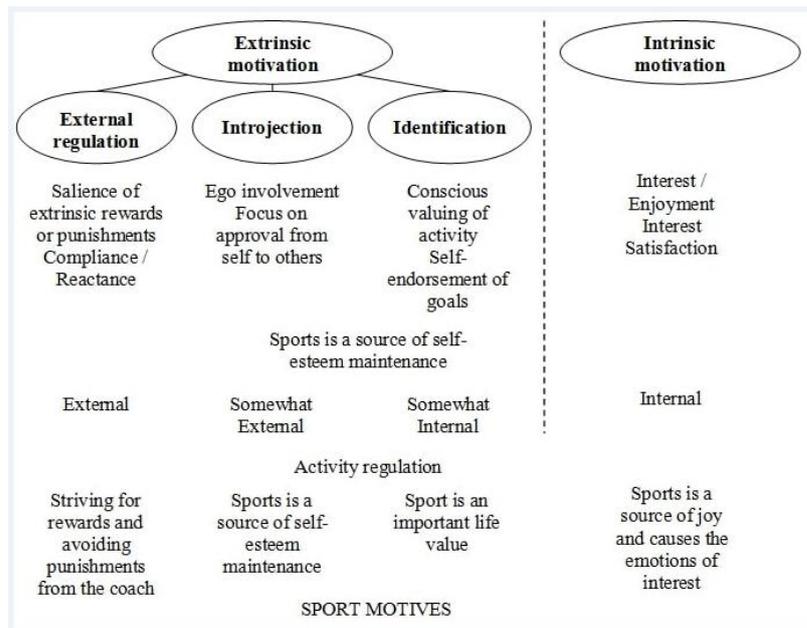
Extrinsic regulation is an opposite kind of self-determined motivation. The extrinsically motivated behaviors that are least autonomous are referred to as externally regulated. The aim of its purest type of extrinsic regulation – external regulation – is to satisfy an external demand or obtain an externally imposed reward contingency [31]. It was shown that no more successful, neither less successful athletes characterize by external motives of self-regulation. When externally motivated an athlete is moved to act because of demands, pressures or rewards in physical activity.

The second type of extrinsic motivation is an introjected regulation, which involves taking in a regulation of activity but not fully accepting it as one's own. Introjection describes a type of internal regulation that is still quite controlling because people perform such actions with the feeling of pressure in order to avoid guilt or anxiety or to achieve ego-enhancements or pride. Put differently, introjection represents regulation by contingent self-esteem [31]. Both more and less successful athletes characterized by moderate level of introjected motive. The one of the forms of introjection is ego involvement [32, 33], in which a person performs an act in order to enhance self-esteem and the feeling of worth. Ego involvement is a relatively controlled form of regulation in which behaviors are performed to avoid guilt, fear or anxiety or to achieve the feeling of pride [31]. Introjected regulation presumes to act in order to improve the feeling of worth in physical activity.

The third form of activity regulation is regulation through identification, which is more autonomous, or self-determined. Identification reflects a conscious valuing of a behavioral goal or regulation, such that the action is accepted or owned as personally important. The person has identified with the personal importance of a behavior and has thus accepted its regulation as his or her own [31]. An athlete who memorizes the most significant somebody's performances because them seems to be relevant to his (her) own physical activity, which he (she) values as a life goal, has identified with the value of this physical activity. This study has shown positive role of identified sport motive in successful physical activity.

To sum up our research on sport self-regulation according to the self-determination theory we consider four main sport motives that can be applied to physical activity. According to fig. 2 we consider sport motives for each form of self-regulation: 1) striving for rewards and avoiding punishment from the coach (external regulation), 2) considering sport as a source of self-esteem maintenance (introjected regulation), 3) considering sport as an important life value (identification), 4) considering sport as a source of enjoyment and interest (intrinsic motivation).

Figure 2: A taxonomy of motivation applied to physical activity.



The subject’s activity in setting and achieving goals is mediated by the integrated system of individual regulation, which functions as a tool for integrating and connecting the dynamic and content aspects of personality, its conscious and unconscious structures for goal setting and goal attainment [34]. In this study we received yet another confirmation of the fact that the sport self-regulation is one of the factors ensuring positive outcomes of physical activity. New is the fact that conscious self-regulation (sport goals planning, modeling of significant conditions in training activity, programming of actions according to sport goals and sport results evaluation) associated with autonomous regulatory motivation in physical activity.

According to the second task of this study the peculiarities of self-affirmation in different motivational profiles in athletes were obtained. Generally hubristic motivation is understood in terms of striving for self-affirmation and provides it through aspiration for perfection, aspiration for superiority or both of them. Hubristic motivation is conceived as a cluster of motives that make people assert and enhance their self-worth (self-importance, self-esteem). According to the transgressive model of a personality [35], hubristic motivation is a major driving force of transgressive behavior, whose outcome goes beyond the boundaries of the individual's past accomplishments (in particular, training, performing and succeeding in physical activity). J. Koziellecki defined two forms of hubristic motivation, which provide the aspiration for superiority and aspiration for perfection. The first is reinforcing their self-esteem, consolidating its own place among others through interpersonal rivalries, competition with others [36]. In a case of physical activity it can be revealed in striving for winnings, triumph and ambition to defeat an opponent. The second hubristic form of motivation is to consolidate or strengthen their own self-esteem due to constant improvement of its achievements, raising the level of excellence and perfection [36]. In a case of physical activity it reveals in striving for sport records and improving the results in physical activity. It was shown, that aspiration for perfection is positively related to intrinsic motivation and identified regulation in physical activity. Internal and identified sport motives that reveal in autonomous self-regulation in physical activity and create clusters of combined and autonomous self-regulation in physical activity, characterized by high level of aspiration for perfection. Thus, interest and enjoyment as motivational forces of physical activity provide striving for perfection and aspiration to improve sport skills and capacities. The results of this study sort with the positive correlations between hubristic motivation and internal motives of physical activity in gymnasts and dancers, obtained by Fomenko and Poliluyeva [27].

Psychosomatic competence is considered as a factor of successful physical activity and it includes cluster of abilities: 1) Bodily awareness as a knowledge of the body in general and of its own body, as a product of cognition and analysis of own bodily experience; 2) Bodily acceptance as positive and adequate attitude towards the body, which manifests itself in feelings of interest, caring, friendliness, confidence, security and

rest; 3) Intraception ability as capacity to fix and focus on internal sensations, which manifests itself in their differentiated verbalization; 4) Bodily metaphorism as capacity to use figurative comparisons and analogies to characterize its own body, based on the associativity of thinking; 5) Bodily causality as ability to see in the body the cause and effect of events in the internal and external person's environment; 6) Ability to conduct a dialogue with Body as capacity to conduct an internal dialogue between 'I am in the Body' and 'I am the Body'; 7) Subjectivity as ability to subject-subjective internal communication and interaction with the physical Self; 8) Integrity as inclusion of the psyche and body in the processes of each other and their mutual influence [29]. Despite the obvious positive role of psychosomatic competence in activity self-regulation, the problem of self-regulation in physical activity and its connection with psychosomatic competence of individual hasn't already been analyzed. This study has shown that psychosomatic competence as the cognitive component of the Bodily Self is connected with autonomous sport self-regulation and includes a group of abilities and processes, such as bodily knowledge, the ability to fix attention on internal senses, the degree of development of intraceptual sensitivity, the ability to monitor its qualitative and quantitative changes; the ability to verbalize intraceptual sensitivity, the ability to capture, store and reproduce bodily information, the ability to imagine the body, its differentiation and integrity, the ability to manipulate the image of the body in its own imagination, activity of associative thinking in relation to bodily information, the ability to perceive bodily information as symbolic, mediating understanding of the message of the unconscious, the ability to make rational decisions regarding problem situations associated with the body.

CONCLUSION

Self-determination theory considers four ways of physical activity regulation: an intrinsic self-regulation or motivation, which assumes the interest and enjoyment during physical activity, beating the records, improving skills and abilities, and an extrinsic regulation (identification, introjected and external regulation), which requires the external values of physical activity. On the basis of the results of the study we can conclude that autonomous sport self-regulation has a considerable impact on training performance, results and achievements in physical activity.

It was shown, that internal and identified sport motives that reveal in autonomous self-regulation in physical activity and create clusters of combined and autonomous self-regulation in physical activity, characterized by high level of aspiration for perfection.

Autonomous or self-determined motivation in physical activity is associated with high level of psychosomatic competence and provides higher rates of bodily awareness and acceptance, intraception ability, bodily metaphorism and causality, ability to conduct a dialogue with Body, subjectivity and integrity. Thus, interest and enjoyment as a target of self-regulation in physical activity provide higher level of psychosomatic competence in athletes.

The results of the present research prove the necessity of take into account the positive role of autonomous sport self-regulation development in successful physical activity.

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