

Association between motivation and decision-making in under-18 male volleyball players

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Abstract

Introduction. Motivation and decision-making are important variables of sports performance. In this perspective, identifying whether motivation is associated with decisions made by athletes is essential to provide environments that facilitate the achievement of better performances. **Aim of Study.** The objective was (a) to analyze the decision-making and levels of motivation among male under-18 volleyball athletes with different levels of experience; and (b) associating motivation and decision-making in different game situations (attack from central and court extremities, setting, and blocking). **Material and Methods.** In the study, 92 high-performance male volleyball athletes from the under-18 category were divided into two groups: more experienced group (G1) and less experienced group (G2). The motivation level was analyzed by the Sport Motivation Scale-II, and the Declarative Tactical Knowledge Test in Volleyball was used to analyze the decision-making. **Results.** The results revealed a positive, but weak and significant correlation between the attack from the extremity and integrated motivation, and among intrinsic and introjected and external motivation. There was also a positive, moderate, and significant correlation between introjected and external motivation. Besides, G1 showed less intrinsic, introjected, and external motivation when compared to G2. Regarding decision-making, G1 showed higher values for central attack and lower values for setting and blocking, when compared to G2. **Conclusions.** It is concluded that better decisions of under-18 volleyball athletes in situations of attack from extremity are associated with a higher occurrence of integrated (extrinsic) motivation and more experienced volleyball athletes have a prevalence of intrinsic and extrinsic motivation when compared to less experienced athletes.

KEYWORDS: cognition, sport psychology, sports training, young athletes, team sports.

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Introduction

Motivation is one of the psychological issues widely studied in the field of sports sciences, as it is identified as a key element in sports practice, influencing results in competitions and promoting better conditions for training and athletes' performance [24, 28]. The self-determination theory is one of the theories that try

to elucidate motivation. Proposed by Ryan and Deci, it suggests that an individual can be regulated by different types of motivation (intrinsically or extrinsically), or even be amotivated during the practice of any activity. According to self-determination theory (SDT) [13], autonomous (or self-determined) forms of motivation are the result of satisfaction of the basic psychological needs of autonomy, competence, and relatedness. When people act in self-determined ways, they act out of personal value, importance, and interest and are free to regulate their behaviors accordingly [12]. It is influenced by situations and experiences already experienced and by the emotional state of the individual [12, 13].

The extrinsic motivation, on the other hand, is that which occurs when an activity is carried out with a purpose other than that inherent to the person himself, that is, when the individual is influenced by external factors in the performance of his activities. In this manifestation of motivation, the subject seeks external or social rewards, such as receiving praise and rewards, or even avoiding punishment. The amotivation state, on the other hand, is defined by the lack of intention to act [13].

The most common reasons for sports participating in young people are related to fun and a path for striving to achieve their goals alongside friends, meet new people and try to improve their physical condition [25]. Thus, some factors must be considered when analyzing the athletes' motivation to sports practice, as there are benefits associated with sports practice in adolescence. In this context, understanding how motivation alters young people's adherence and maintenance for the sports practice, as well as maintaining or improving performance, may promote the individual's long-term commitment to the sport, helping parents, coaches and teachers in sports context [29].

Besides, previous studies have found that motivations are related to many variables, such as good performance in the training and competition process [7], persistence in sport [16], success and well-being [5, 21], and the athlete's mental health [28]. Therefore, improving the individual to practice a certain sport is essential for the

athlete to make the best decisions [3, 7]. In this context, decision-making (DM) is an important factor related to performance in team sports [4, 23, 26], as it refers to the process of choosing among a set of options, it is crucial to previously consider the consequences of the choice [22], and is shown to be influenced by the motivation for sports practice [7].

Moreover, training in team sports should provide the opportunity for the regulation of intentional actions, directed to the specific objective of the game [19]. This form of training arouses greater motivation in the athlete and therefore, should be considered in the teaching-learning-training process [27].

In this perspective, identifying whether motivation is associated with decisions made by athletes is essential to provide environments that facilitate the achievement of better performances. However, studies that contain information about this relationship are scarce in volleyball and other team sports [23].

Aim of Study

Given this, the present study has two objectives: (a) to analyze the decision-making and levels of motivation regulation among male under-18 volleyball athletes with different levels of experience, and (b) associating motivation and decision-making in different game situations (attack from central and extremity, setting and blocking). From a practical point of view, clarifying this relationship may help volleyball teams to create strategies that allow optimizing the performance of athletes in training and competitions.

Material and Methods

Sample

The sample was composed of 92 high-performance male volleyball athletes of the under-18 category in Brazil, divided into two groups (more experienced group – G1, and less experienced group – G2), according to the experience in the sport, i.e., the time they competed and the level of competitions played. So, Group 1 was

Table 1. Sample characteristics (mean and standard deviation)

	N	Age (yrs)	Volleyball experience (yrs)	Training sessions by week	Training session duration (min)	Experience in competition (yrs)	Level of competitions played
G1	46	17.2 (± 1.4)	5.0 (± 1.2)	4.9 (± 0.9)	174.7 (± 43.9)	4.8 (± 1.5)	regional, national and international
G2	46	16.6 (± 0.7)	3.8 (± 1.4)	5.0 (± 1.0)	150.0 (± 11.0)	3.6 (± 1.2)	regional, national

Note: G1 – more experienced group, G2 – less experienced group

composed of athletes with 5 years or more of sports experience, and Group 2 was composed of athletes with less than 5 years of experience.

The approach to the athletes was made through the local volleyball federation, which provided the contacts to the teams who deal with the under-18 category. For inclusion in the study, the athletes had to perform the continuous practice of volleyball at least three times a week for a minimum period of one year, and compete for their clubs. To characterize the sample, a questionnaire of demographic data was applied, as used in other studies in that field [4, 15].

The groups' profiles are described in Table 1.

Instruments

Sport Motivation Scale-II (SMS-II)

To assess sports motivation, the Sport Motivation Scale (SMS) [20, 21] is the most used instrument, and, according to Clancy, Herring, and Campbell [6], it has the highest citation rate per year (19.5 citations/year) among the most important measures of motivation in sport. In the Brazilian sports context, SMS-II was subjected to cross-cultural adaptation, presenting an analysis of acceptable psychometric properties for practical use [18].

Thus, for the analysis of athletes' motivation, the SMS-II questionnaire was applied. Originally presented by Pelletier et al. [20, 21] now widely used in Brazil as a Sport Motivation Scale. The SMS-II consists of 18 items distributed in 6 subscales: intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation.

The intrinsic regulation is the satisfaction found to perform an activity. Integrated regulation is the most autonomous form of extrinsic motivation, and occurs when the behavior is not only seen as something of value, but is also considered consistent with other goals and needs of life. The identified regulation is described as the behavior interpreted as personally important and worthwhile. The introjected regulation is defined by actions directed to avoid feelings of pity and or guilt and shame. External regulation affects situations in which behavior is controlled externally by awards or penalties. Amotivation consists of a lack of intention to practice an activity.

Declarative Tactical Knowledge Test in Volleyball (DTKT:VB)

To assess the decision-making (DM) the Declarative Tactical Knowledge Test in Volleyball (DTKT:VB) was used [10]. The test consists of 24 real action game scenes and 4 types of game situations: extremity attack – EA

(6 scenes), central attack – CA (6 scenes), setting – SET (6 scenes), and blocking – BL (6 scenes). The selected scenes' duration varied between 4 to 6 seconds and were taken from the top perspective, at 4 meters height and at an approximate distance of 7 to 9 meters from the bottom of the court, or that allowed the observer a total view of the court and depth perception in different situations.

During the test, when the scenes were interrupted, the screen became blank and the volunteer immediately had to verbalize what he would do to try to score in that specific situation. The answer was considered his DM. The objective was to extract information related to the quality of DM (number of correct answers according to the test template), approaching the test to the maximum of the time in a real game situation. All responses were immediately noted by the assisting researcher. This test has already been used with youth volleyball athletes [4] and coaches [11].

The experimental approach to the problem

This study is classified as analytical and observational research, with a cross-sectional character. The first step was signing a consent form by the volleyball club's representative and the athletes' parents or legal guardians, which contained instructions and information about the research stages. Data collection comprised of filling the Sport Motivation Scale-II questionnaire [18] and performing the Declarative Tactical Knowledge Test in Volleyball [10] by included athletes. This study was approved by the University's Research Ethics Committee (CAAE: 87133417.3.0000.5149) and respected the standards established by the National Health Council and Declaration of Helsinki (2013).

The study took place in the pre-season. The individual appointments for data collection were scheduled in the morning before the training session (to reduce possible effects of daily fatigue), in a quiet and well-lit room at the training facility. Directly before, and during completing the tasks athletes did not have contact with each other.

Statistical analyses

The normality of data was tested by the Shapiro–Wilk test. Data were expressed as the median and interquartile range (IQR). To compare all variables, a Mann–Whitney test for independent samples was applied. Furthermore, Cohen's d was used to assess the effect size of comparisons [8]. The following classification to measure the magnitude of effect size was used: small, $d = 0.2$ to 0.49 , moderate, $d = 0.5$ to 0.79 , and large, $d > 0.8$. Spearman's correlation coefficient was applied to test for associations between the variables.

All procedures were carried out using Statistical Package for the Social Sciences (SPSS v21.0) for a $p < 0.05$.

Results

The more experienced group (G1) showed higher values in decision-making for the central attack, with small effect size, and lower values for setting and blocking compared to the less experienced group (G2) ($p < 0.05$), with great effect size. No statistical differences were found between the groups for the extremity attack ($p > 0.05$) (Table 2).

Besides, G1 reported lower intrinsic (moderate effect size), introjected (moderate effect size), and external

(large effect size) motivation than G2 ($p < 0.05$). There were no differences ($p > 0.05$) between groups for integrated motivation (small effect size), identified (no effect), and amotivated (no effect) (Table 3).

Correlation analyzes showed a positive, weak and significant correlation ($r = 0.217$; $p < 0.05$) between extremity attack and integrated motivation. The central attack showed a negative, weak and significant correlation with the introjected motivation ($r = -0.208$; $p > 0.05$) and external ($r = -0.241$; $p < 0.05$). Positive, weak and significant correlations were found between setting and intrinsic ($r = 0.230$; $p < 0.05$), introjected ($r = 0.264$; $p < 0.05$) and external ($r = 0.277$; $p < 0.05$) motivation.

Table 2. Data on decision-making

	G1 (n = 46)	G2 (n = 46)	p-value	ES (classification)
Extremity attack	0.60 (0.50-0.65)	0.60 (0.50-0.80)	0.243	-0.167 (no effect)
Central attack	0.80 (0.60-1.00)	0.70 (0.60-0.80)	0.013*	0.465 (small)
Setting	0.50 (0.30-0.50)	0.60 (0.60-0.70)	0.001*	-1.564 (large)
Blocking	0.30 (0.10-0.42)	0.55 (0.50-0.80)	0.001*	-1.405 (large)

Note: Data presented as median and interquartile range (IQR); G1 – more experienced group, G2 – less experienced group, ES – effect size
* $p \leq 0.05$

Table 3. Sport Motivation Scale-II (SMS-II)

	G1 (n = 46)	G2 (n = 46)	p-value	ES (classification)
Intrinsic	6.7 (6.0-7.0)	7.0 (6.7-7.0)	0.019*	-0.515 (moderate)
Integrated	6.7 (5.3-7.0)	6.7 (6.3-7.0)	0.155	-0.402 (small)
Identified	6.3 (6.0-7.0)	6.7 (5.7-7.0)	0.543	0.046 (no effect)
Introjected	5.3 (4.3-6.0)	6.3 (5.7-7.0)	0.001*	-0.769 (moderate)
External	2.0 (1.3-3.0)	3.6 (2.3-5.0)	0.001*	-0.877 (large)
Amotivated	1.0 (1.0-1.7)	1.0 (1.0-1.3)	0.185	0.020 (no effect)

Note: Data presented as median and interquartile range (IQR); G1 – more experienced group, G2 – less experienced group, ES – effect size
* $p \leq 0.05$

Table 4. Matrix correlation between more and less experienced players

	Intrinsic	Integrated	Identified	Introjected	External	Amotivated
Extremity attack	0.164 (0.118)	0.217 (0.038)*	0.137 (0.192)	0.142 (0.177)	0.270 (0.798)	-0.170 (0.873)
Central attack	-0.720 (0.497)	0.490 (0.642)	-0.390 (0.714)	-0.208 (0.047)*	-0.241 (0.021)*	-0.570 (0.588)
Setting	0.230 (0.028)*	0.195 (0.063)	0.091 (0.388)	0.264 (0.011)*	0.277 (0.030)*	-0.103 (0.328)
Blocking	0.153 (0.145)	0.187 (0.075)	0.089 (0.398)	0.403 (0.001)*	0.259 (0.013)*	-0.242 (0.020)*

Note: Data expressed as Spearman’s coefficient r (p-value)
* $p \leq 0.05$

The blocking demonstrated a positive, moderate and significant correlation with the introjected ($r = 0.403$; $p < 0.05$) and external ($r = 0.259$; $p < 0.05$) motivation and a negative, weak and significant correlation with amotivation ($r = -0.242$; $p < 0.05$) (Table 4).

Discussion

The present study aimed to (a) analyze the decision-making and levels of motivation among male under-18 volleyball athletes with different time of experience; and (b) to associate motivation with decision-making in attack (extremity and center), setting, and blocking situations. The results revealed a positive, weak, and significant correlation between extremity attack and integrated motivation. Thus, perhaps the attack action is controlled motivationally by the objectives, goals, and needs that the athlete imposes. The results showed a positive, weak and significant correlation between intrinsic and introjected and external motivation, and a positive, moderate and significant correlation between introjected and external motivation, demonstrating that perhaps athletes direct their actions to avoid feelings of guilt or shame, avoiding possible punishments.

The more experienced group showed less intrinsic, introjected, and external motivation when compared to G2. This result can be explained by the desire to stand out in the sport, as the G2 athletes were less experienced than the G1 ones. It is also noteworthy that more experienced athletes already visualize the performance they have and know the real conditions to continue their sports career. This may have influenced the types of motivation presented by G1 in relation to G2.

Moreover, it is observed that the values of intrinsic motivation were higher in both groups when related to the values of extrinsic motivation. Such results corroborate with findings by Murcia, Gimeno, and Coll [17]. In a comparable context, they observed in young athletes the higher scores for intrinsic motivation when compared to extrinsic motivation. When evaluating 34 sub-19 volleyball athletes Claver et al. [7] observed that giving the athletes responsibility for different tasks related to the training process may help to increase the intrinsic motivation and autonomy. Additionally, Vella et al. [28] showed that self-determined forms of motivation (intrinsic motivation) were associated with better results in the mental health of young male athletes from different team sports.

Regarding decision-making, in the present study, the G1 had higher values for central attack and lower values for setting and blocking, when compared to G2. Studies conducted with volleyball athletes [1, 2, 4, 9,

26] analyzed the relationship between these variables and the sports experience. In general, the results showed that athletes with more experience in volleyball make better decisions in different game situations, which is not in accordance with the present study.

Research in youth categories has shown that athletes with higher skill levels in the same game category, try to be faster and more effective in their decision-making [14]. The more experienced players have more knowledge of the sport, which allows them to recognize game patterns, detect relevant information, and solve problems more effectively [9, 14, 26]. This difference between the results of the aforementioned studies and the present one can be explained by the little difference in the experience with systematized training and competition levels of athletes participating in this study.

Recent reviews in sports [23] recommend the use of decision-making interventions or training as part of, or complementary to, training to improve the decision-making, optimizing the ability to perceive and process relevant stimuli and then generate quick and effective responses. Additionally, motivation to practice sports is essential for the athlete to make the best decisions [3, 7]. Thus, the differences found between the groups may have occurred due to different training processes, a fact that affected the results, even though one group was more experienced than the other.

The present study has some limitations, such as the fact that the tests were performed only in the initial period of the yearly training plan, which does not allow us to extend the results for the whole season and different training situations. The information obtained through SMS-II and DTKT:VB, although validated and widely used with athletes, do not evaluate the possible interactions between motivation and decision-making, being limited to statistical inference. Finally, we did not investigate the history of athletes' training regimes.

However, the possibility of analyzing the interactions between motivation and decision-making should be seen as an important factor in helping professionals working in the sports environment and training planning. Thus, as a practical implication, the possibility of creating exercises and strategies that maximize individual and collective behaviors that can make the practice more motivating without reducing its applicability and tactical-technical effectiveness is recommended.

Conclusions

It is concluded, with the results of the present study, that better decisions of under-18 volleyball athletes in

extremity attack situations are associated with a higher occurrence of integrated (extrinsic) motivation. Still, more experienced volleyball athletes have a lower prevalence of intrinsic and extrinsic motivation when compared to less experienced athletes. It is suggested that future studies be carried out in the long term, analyzing the variables at different times of the training season, in different categories, and competitive levels of volleyball.

Conflicts of Interest

The authors declare no conflict of interest.

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