Physical and Psychological Indicators for Canoeing Athlete Selection

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Physical and Psychological Indicators for Canoeing Athlete Selection

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ABSTRACT

The athlete selection is very important for the success of the team in the event. The study aim is to establish the dominant variable for canoeing athlete selection based on physical and psychological approach. The type of research is development research. This research was conducted at the national training center canoeing athletes in Jatiluhur, West Java, Indonesia. The results showed that there are two predominant indicators of physical and psychological factors in the selection of canoeing athletes. First, Physical includes of height, sitting height, arm span, stretch height, arm length, back muscle, shoulder, and arm muscle strength, abdominal and arm muscular endurance, explosive power, balance, aerobic and anaerobic capacity. Second, Psychological Skills includes: self-confidence, concentration, motivation, mental readiness, team emphasis, and control anxiety. It can be concluded that the selection of canoeing athletes can be done by measuring the physical and psychological indicators, but not all of the physical and psychological indicators can be used as the instruments in the selection of canoeing athlete.

1 INTRODUCTION

The discussion about how to develop the sport in a systematic and a sustainable way is not appeared yet. Developing sport cannot only be based on the knowledge and experience that is speculative and intuitive. Actually achievements in the sport are observable, measurable and predictable [1]. Therefore, the sport sciences should be applied to development of athletes achievement. It is includes also the athletes selection. The athletes who appeared at the field certain competitions require an athlete to meet a qualifying standard, meaning a mark as good or better than this set mark, in order to be eligible to compete. Naturally, an elite level competition does not want to embarrass its reputation nor the competitor in an event beyond their competition level.

Canoeing is one of sports which has special characteristics in physical and psychological factor. The physical factors influence in canoeing achievement such as anthropometric factors (proportion, composition and structure) of the body, bio-motoric and physiologic. Psychological factors have great influence in canoeing. It's because canoeing is a sport that is carried out in the wild nature, has characteristics that prioritize physical ability with aerobic endurance dominant element (50%), with the emergence of excessive fatigue will affect the psychological condition [2]. Nowadays, there no model that canoeing athlete multifactor selection include physical, psychological and performance. The approach that used for the canoeing athlete's selection often based on the evaluation of the factors, for example, based on the results of a championship. The effect of this approach is still vulnerable like and dislike, conflict of interest and manipulation of data so Indonesia canoeing athletes are not compete at the International level championship.

2 THE ATHLETES SELECTION

The selection of athletes is the momentum to determine the success and achievements of athletes in an event or championship. The quality of athletes who will be sent in a championship determined by the quality of the selection. Based on those conditions, the selection of athletes should be carried out based on the needs of the branch of sports achievement. It means that the selection process should be based on the indicators determined sport achievements. There is a very fundamental difference determinant of achievement

of each sport [3]. Several scientific approaches of major concern in the selection of athletes, there are physiological/anthropometry approach, performance approach, and psychological approach [4]. According to Regnier (1983), the selection of athletes is done by measuring physical, physiological, psychological, and social attributes [5]; [6]. Tanner was quoted as saying by MacQuaker mention the selection of athletes is to look at the characteristics of the body (body characteristics) and biometric profile [7] . Selection of athletes for individual sports such as canoeing, weightlifting, cycling, and athletics is through a special anthropometry approach and physiological approach [8]. Anthropometric and specific physiology in question is adapted to the characteristics of the sport branch [9]. Theoretically canoeing achievement numbers are influenced by several factors such as physical, technical, tactical, psychological / mental, and supported by social factors and nutrients. Furthermore, the researcher developed model of construct canoeing achievement numbers selection as follows:.

Physical factors include all attributes that appear on the anthropometric variables, bio-motor, and physiological. Anthropometric dimensions are related to the structure, composition, and size of the human body. Anthropometric related to the mechanics of human motion. If it is connected with mechanical paddle boat canoeing, good anthropometric is the benefit of motion and speed boats. Anthropometric canoeing athletes include leg length, arm length, sitting height, shoulder wide, wide hips, weight, high, and long legs. Bio-motor is a basic component of physical condition in the sport. Canoeing is a sport that is physically, it means that the physical use is dominant in appearance. Bio- motor dominant component in the sport of canoeing is a strength, endurance, speed, flexibility, balance and power. Physiological condition is the entire organ function that supports human motion. Physiological components that really support the achievement canoeing athlete is aerobic, anaerobic capacity, and lung vital capacity.

While the psychological factor is anything that arises from the psychological conditions that affect the motoric behavior. There are six psychological skill factors were dominant in competitive sports are: confidence, motivation, concentration, anxiety control, mental preparation, and team emphasis [10], [11] . These six factors are associated with the appearance of an athlete during training and competition. Various psychological symptoms will occur when the training and competition sourced from the fifth factors. The example of capabilities focusing on the activities of the competition is often influenced by the concentration of these athletes. Confidence, goal setting, and persistence is determined by the motivation of athletes. The sixth psychological factors are called psychological skills.

Mahoney (1987), have develop an instrument to measure psychological skills namely Psychological Skills Inventory for Sport R-5 (PSIS R-5) consist of 51 items which is subsequently revised to 45 items and revised again to 44 items. Instrument PSIS R-5 consists of 44 items statement that control anxiety (8 items), concentration (7 items), confidence (8 items), mental readiness (6 items), motivation (8 items), the focus of the team (7 items). PSIS R-5 is a measurement instrument that multifactor psychological skills including cognition skills are influences the sport appearance.

3 RESEARCH METHOD

The type of this study is the development research with correlation analysis. This research aims is finding dominant indicator of physical and psychological can be used for canoeing athlete's selection Research subject in this study is canoeing athletes at training center West Java (N= 25). Research variable are:

Independent variable are:

a. Physical factor include anthropometrics, bio-motoric, and physiology

1). Anthropometric include: height, weight, sitting height, body fat, arm span, wide hips, long legs, shoulders wide, and long legs.

2). Bio-motoric include the strength of muscles (legs, back, arms), muscular endurance (abdomen, arms, legs), flexibility, legs muscle power, and balance.

3). Physiological include aerobic capacity, an-aerobic capacity, and vital lung capacity.

b. Psychological factor is psychological skills include: self-confidence, concentration, motivation, control anxiety, mental readiness, and focus groups.

The dependent variable: achievement (time) rowing canoeing 500 meters.

Data collection techniques in this study are classified into two, named performance data (physical and achievement) and psychological data. Performance data obtained by test and measurement, while psychological data obtained by PSIS R-5 questionnaires. Statistical analysis uses bivariate correlations, multivariate (multiple regression and factor analysis) to carry out the reduction of indicators, multiple regression analysis sub-sets of indicators of achievement, correlation univariate analysis to see the athlete's potential in measured parameters. Factor analysis is to identify factors pattern in which each factor (or group of similar items) measure the dimensions to be measured but does not measure other dimensions. The purpose of this analysis is to identify indicators that have construct validity (construct validity).

4 RESULT

Factors, variables and indicators of the selection of athletes canoeing literature study results

Factor analysis identify patterns of factors in which each factor (or group of similar items) measure the dimension will be measured but does not measure other dimensions. The purpose of this analysis is to identify indicators that have construct validity. Confirmatory factor analysis at this stage using Partial Least Square [12]. Analysis factor each physical variable with KMO and Bartlett's test. Factor analysis to perform the extraction of the set of variables that

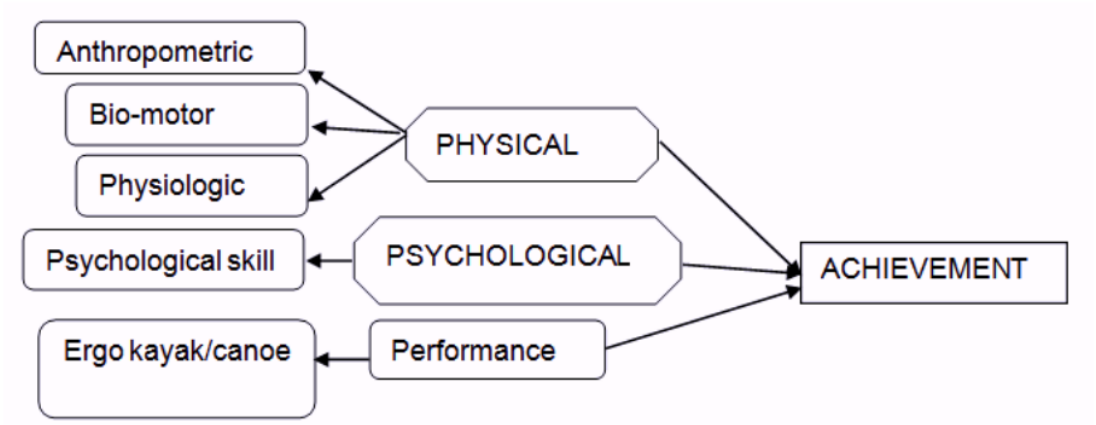

Figure 1. Simple models Canoeing Athlete Selection

Table 1. Correlation factor variables and indicators

Factors	Variables	Indicators	r
Physical	*Anthropometric*	Height	0.93
		Sitting height	0.69
		Arm lenght	0.89
		Arm span	0.88
		Stretch height	0.93
	Bio-motor	Leg strength	0.86
		Arm muscle endurance	0.64
		Flexibility	0.44
		Back muscle strength	0.70
		Arm muscle strength	0.51
		Leg power	0.65
	Physiological	Aerobic capacity	0.87
		An-aerobic capacity	0.84
Psychological	*Psychological skills 31.5%*	Self confidance	0.57
		Concentration	0.79
		Motivation	0.71
		Anxiety control	0.51
		Team emphases	0.81
		Mental readines	0.81
		Mental readines	0.81

Table 2 KMO and Bartlett'stest indicators

	Anthropometric	Bio- motor	Physiologic	Psychological skill
KMO-measure of sampling adequacy	0.829	0.560	0.510	0.599
Bartlett's test of Sphericity	111.944	52.507	8.33	63.459

exist KMO > 0.5 in order to form one or more factors.

The method used for extracting is Principal Component Analysis and Varimax rotation factor method and the interpretation of results is done by looking at a loading factor ($\geq$ 0.5). Loading factor is a number that indicates the magnitude of correlation between a variable and other form factors. Based on the Matrix Component table, there were height, sitting height, arm span, stretch height, legs length included indicator which supports anthropometric variables that will be used as indicators of the selection of athletes canoeing.

Bio-motoric variable calculation results showed that the magnitude of the value Bartlett Test of Sphericity was 52.507 on the significance of 0.003 means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.560 so that the adequacy of the sample belongs to the category satisfactory. It can be concluded that the overall instrument for measuring variables bio-motoric declared valid. Based on the table Initial Eigenvalue derived factor that has eigenvalue greater than 1.0 have been the biggest factor among other components. These factors explain 35.151% of the total variance of variables that influence. Based on the results from table Matrix Component variable arm muscle strength, arm muscular endurance, leg muscle strength, back muscle strength, flexibility, and leg power include in bio-motoric variables that will be used as an indicator in the athletes canoeing selection.

Physiological variable calculation results show that the magnitude of the value Bartlett Test of Sphericity is 8.33 on the significance of 0,040 means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.510 so that the sample's adequacy belongs to the satisfactory category. Based on the Initial Eigenvalue table derived factor that has eigenvalue greater than 1.0 have been selected the biggest factor among other components. These factors explained that 52.933% of the total variance influenced variable. Based on the results obtained from Component Matrix table variable aerobic capacity and an-aerobic include in physiological variables that will be used as an indicator in the athletes canoeing selection.

Psychology skills measure with Psychological Skills Inventory for Sports (PSIS R -5). The requirements to test the good instrument can be seen from validity and reliability of these tools. Validity used in this study is the construct validity (construct validity). The construct validity estimation is done by measuring the items and the total score [13]. Limit power index difference minimal items used as a valid point was 0.30.

Results of test calculations different point, the trial against 44 items of psychological skills have different power index ranged from 0.514 to 0.814. This test is done to know whether these items represent the construct being measured or in accordance with the factors. Based on confirmatory factor calculation that all the questions have value loading factor of $\geq$ 0.5 and has been a factor as it has been determined that these items can be used for further research.

Psychological variable calculation results showed that the magnitude of the value Bartlett Test of Sphericity was 63.459 at the 0.000 significance. It means that in this study there was a significant correlation between variables and the calculation results of KMO of 0.599 so that the adequacy of the sample belongs to the category satisfactory. Based on the table Initial Eigen value derived factor that has eigenvalue greater than 1.0 have been the biggest factor among other components. These factors explained that 50 920% of the total variance is that influence variables. Based on the results obtained from table Component Matrix variable self-confidence, concentration, motivation, mental preparation, team emphasis, and anxiety control into the psychological variables that will be used as an indicator in the selection of canoeing athlete.

The tests of inner model conducted to determine the relationship between the constructs in this study. Structural model was evaluated using the R-square for the dependent construct.

Changes in the value of R-square can be used to assess the effect of certain latent variables independent of the dependent latent variables and whether to have a substantive effect. The analysis shows that the performance is explained by anthropometric variables = 34.1%, bio-motoric variables = 37.3%, and physiological variables = 33.4%.

The determination of the indicators is in line with the opinion of the experts. Anthropometric variables influence the efforts of achievement in the sport rowing of canoeing numbers. Dragan as quoted by Bompa in 2007 mentions that anthropometric variables affect canoeing are: height, leg length and shoulder width [3]. Meanwhile, according to the cited Radut mentions that the anthropometric variables which affect the achievement of canoeing is also high and sitting height [2]. Bio-motor variables that affect performance in canoeing indicator is flexibility [14], agility, power leg [15], muscular endurance [3], muscle strength [15]. While the physiological variables that affect the sport of canoeing performance indicator is the aerobic capacity and anaerobic capacity [3]. Vital lung capacity as proposed by Patel & Greydanus in 2002 has not been proven influence this study [15]. It is very possible because it has been proven with aerobic capacity. Psychological skills related to performance in sports such as motivation, concentration, control anxiety, the team's focus, confidence, and mental preparation [10]. Confident, cognitive anxiety and somatic anxiety affect sports performance [16].

5 CONCLUSION

Based on data analysis obtained, we can conclude that:

a. Anthropometric indicators: height, sitting height, arm span, stretch height, legs length.

b. Bio-motoric indicators: arm muscle strength, arm muscular endurance, leg muscle strength, back muscle strength, flexibility, and leg power

c. Physiological indicators: an-aerobic capacity and aerobic capacity.

Table 3 . R-square variablesand indicators

Factors	Variables	R-Square
Physical	Anthropometric	0.341
	Bio-motor	0.373
	Physiological	0.334
Psychological	Psychological skills	0.315

d. Psychological indicators: self-confidence, concentration, motivation, mental preparation, team emphasis, and anxiety control.

e. Performance indicators: time rowing distance of 500 meters.

6 SUGGESTION

Based on the conclusions, the suggestions of this study are:

a. This study should be continued, to get a software that is implementable and multi-factor.

b. In selecting canoeing athlete must consider the physical factors that include anthropometric, bio- motoric, and physiological and psychological factors such as the concentration, confidence, control anxiety, motivation, mental readiness, and the focus of the team.

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