IOSR Journal of Sports and Physical Education (IOSR-JSPE)
e-ISSN: 2347-6737, p-ISSN: 2347-6745, Volume 3, Issue 4 (Jul. – Aug. 2016), PP 06-10
www.iosrjournals.org

Relationship between Mental Toughness and Behavioral Regulation among University Student-athletes

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Abstract: *The purpose of the present research was to study the relation between mental toughness and behavioral regulation among university student-athletes. To achieve this, 100 male and female student-athletes with the average age of 25.5 were chosen among student-athletes of Tehran University in the academic year 2014-2015 as available and volunteering sample.In this research, demographic information, consent forms, 14-item mental toughness scale (MTS) (Madrigal, Hamill, & Gill) and 19-item behavioral regulation exercise questionnaire (BREQ-2) of Markland and Tobin (2004) were implemented as the tools. The method of the research was descriptive-correlation, which was carried out by collecting data by means of questionnaires. Descriptive statistics was used in order to analyze the data, and Pearson correlation inferential statistics was used to find out the relation between the variable, and independent t was used in order to compare the mean between the two male and female groups with a confidence level of 95%. The results of this research indicated that there is a positive and significant relation between mental toughness and behavioral regulation in the student-athletes; however, there was no significant difference between these factors in the two groups and male and female athletes. Since physical activities play an important role in the development of mental toughness, by applying this effective mental factor in regulating mental factors, behavioral regulation can be affected through controlling motivating factors and thoughts.*
Keywords: *mental toughness, behavioral regulations, athlete*

I. Introduction

At present time, the characteristics of cognitive psychology and in particular motivating factors, self-confidence, the ability to face and signs related to anxiety and its interpretation as a facilitating factor in the conditions under pressure have been accepted as the most important factors in achieving success in any sport events (Connaughton &Hanton, 2009). Among these cognitive factors, mental toughness has been considered one of the most effective characteristics in achieving success in sports (Shird, Golbi, & Van vorsh, 2009). Mental toughness includes the ability to face pressures and hardship, passing through the obstacles and defeats, concentration on the goal, maintaining peace and comfort after defeat, stable performance in higher competitive levels and being competitive, which makes the athletes strong, making them act successfully under hard and stressful conditions such as exercising, competition, and after competition (Jones, Hanton, Connaughton, 2002). Researchers believe that compared to physical abilities, mental toughness especially in the athletes in higher levels of skills can create a bigger difference in their athletic performance results (Williams, 2009). Athletes, coaches, and applied psychologists in sports repeatedly emphasize on mental toughness as one of the most important mental characteristics, which has a link with the improvement in result and success in professional sports (Abdoli, Abedanzadeh, Ramazanzadeh, 2013). Mental toughness can be developed through effective application of cognitive skill and effectively used (Kudlackova, 2011). Most researchers have studied the effectiveness of cognitive skill as an intervening factor in increasing sports' performance (Kenneth &Tubilleja, 2003). Connaughton &Hanton (2009) showed that mental skills have an outstanding role in the development of mental toughness. One of the most important and recent discussions in the field of athletes' performance which has attracted researchers' attention concerns behavioral regulation which originates from athletes' motivation (IrajiNagandar, Poursoltani, Zarandi, &Vaghefinazari, 2013). Motivation is considered fundamental of human's behavior and it can be assumed as a force that stimulates human to do several activities. In fact, motivation is one of the most important and effective mental factor having significant importance in sports' environments. Daugherty believes that different forms of behaviors that athletes present are also controlled and regulated by motivating forces. In this regard, self-determine theory has been extensively used to explain and predict human motivation in different fields of life such as sport (Hodge, et al. 2008). Based on this theory, different forms of behavioral regulation can exist among people including integrated regulations, understanding regulations, intorjectedregulations, external regulations, etc. (Lonsdale, Hodge & Rose, 2008). Internal motivation as a sign of internal satisfaction and athlete's joy from the activity that they are doing are considered which have been formed of the three parts of internal motivation in order to know, doing tasks, and stimulation experience. By contrast, external motivation is not accompanied by external satisfaction, rather athletes

keep on doing sports activities well only because of receiving reward, attracting people's attention or their satisfaction. External motivation is not stable and only helps promote the performance of athletes for a very short time (Pelletier, 2007). Introjected and external regulations determined by self-determine theory happen when an athlete is trying to achieve reward or escape from punishment. Over time, external behavioral regulation can be internal to some extent, or in other words, it can be said that external controls are not required to maintain the behavior. Researchers state that internal motivation is an important variable that causes and maintains regulated sports behaviors. On the other hand, external motivation is also important in the primary stages of exercising, and as external motivation increases, athletes decrease their exercising level (Bassets, Herreros,&Brosa, 2007). Based on what was mentioned before, it can be concluded that understanding and studying different mental factors such as mental toughness and behavioral regulation factor, which are sought by the researcher in present study, can be effective in success, performance and behavior of the athlete and be considered as a distinct characteristic among athletes. In this regard, in one study Ragab (2015) studied the effect of mental toughness on contrastive skills in 18 elite handball players in 8 weeks under mental toughness instruction. The information was collected using mental toughness questionnaire (MTQ) Kalaf, et al. (2002) and contrastive sports skills questionnaire. Results showed that there was a significant difference between the control group and the experimental group with regard to mental toughness factors and contrastive sports skill, and that successful performance of athletes is related to their mental toughness as well as contrastive sports skills. Dishman, et al. (2015), studied motivation and behavioral regulation of physical activities in the students of junior high school. They indicated that motivation was related to physical activities and a change in behavioral regulation was effective on it through physical activities. Aboli, Abedanzadeh, and Ramazanzadeh (2013) studied the relation between mental toughness and cognitive strategies in 100 university male student-athletes. Their results revealed that there is a positive and significant relation between mental toughness and micro scales of activating, tranquilizing, imagination, and attention control in the two dimensions of exercise and competition. Phillip, et al. (2012) indicated that external regulations has a weak relation with physical activities. In this research, regression analysis results found that the identifying variable of behavioral regulations is prerequisite of predicting physical activities. In a research concerning coaches and students, Rodenbeck (2008) stated that there is a significant relation between motivating atmosphere of coaches and internal motivation of students. According to the studies mentioned above, in which each involved studying several factors concerning mental toughness and behavioral regulation individually, and considering the fact that the statistical sample in most studies carried out included mental toughness of elite and professional athletes, the level of student-athletes was different with that of professional athletes and mental toughness criteria may be different with that of professional athletes (Rahmati &Naimikia, 2015). And considering the limitations of the previous studies concerning the relation between these two components, doing the present study seems necessary. Therefore, the present study deals with studying this issue that whether there is a relation between mental toughness and behavioral regulation of student-athletes.

II. Research method

The method of this research is descriptive-correlation, which was carried out by collection data from the questionnaires. The statistical population of this study was formed of male and female student-athletes who were members of sports teams of Tehran University in academic year 2015-2016 in different sports (individual and team), with an average age of 25.5, both from bachelors and masters degrees. According to the Cochran formula, out of the above-mentioned population 100 people (50 males and 50 females) participated in the project as volunteers. In this research, demographic information, consent forms, 11-item mental toughness questionnaire (Madrigal, Hamill, & Gill, 2013), with internal uniformity (0.87) and stability (0.85) in Iranian student-athletes (Kashani, Shiri, and Monaseri, 2014), as well as 19-item behavioral regulation exercise questionnaire (BREQ-2) Markland and Tobin (2004), with validity of 0.7 in Iranian student-athlete (Farmanibar, Niknami, Heidarnia, &Hajizadeh, 2009), were used in order to evaluate various regulations in behavior in sports, which is based on the self-determine theory divided in five micro scales of reluctance, external regulation, introjected regulation, identity regulation, and internal regulation. Participants were randomlychosen through the announcements existing in training places, sports events and sports facilities available in the university. Detailed information regarding the research for athletes who were active on a competitive level was mentioned on the announcements, and after the participants announced their preparationfor the study, consent forms were completed before the data collection wascarried out, and then the original questionnaires were collected. In this research, participation of the students was completely voluntarily and they were allowed to withdraw themselves from the questionnaire anytime. Moreover, the participants were made sure, that their answers would be kept private, and that they would be used only in the direction of the research goal, so that the subjects would choose their answers precisely. In order to avoid bias toward society desirability among participants, they were informed that the research results would not have any effect on the relevant sports they would choose. To observe all moral and ethical aspects of research, the researcher providedthe best environment possible for the subjects. In the present study, descriptive statistics was used to measure frequencies, determine the central indices, distribution, drawing tables and charts. Furthermore, Pearson correlation was used in the inferential statistics

to find out the relation between variables, and the independent t was used to compare the mean between the two groups of female and male students with the confidence level of 95%. Moreover, all statistical calculations were performed by the software spss20.

III. Findings

Table 1 shows description of mean, standard deviation and maximum and minimum data relevant to the variables of mental toughness and behavioral regulation in female and male student-athletes.

Table1. standard deviation, and maximum and minimum data relevant to the variables of mental toughness and behavioral regulation in female and male student-athletes					
Variable	No	min	max	Mean	Standard deviation
Mental toughness and behavioral regulation	50	-51/00	78/00	48/5600	21/09856
	50				

Table 2 shows the test results of Pearson correlation coefficient concerning the amount of relation between mental toughness and behavioral regulation of male and female student-athletes. The results showed that there is a significant relation between mental toughness and behavioral regulation of both male and female student-athletes.

Table 2. Test results of Pearson correlation coefficient concerning the amount of relation between mental toughness and behavioral regulation of male and female student-athletes

Variable		R.m	Sig.m	R.f	Sig.f
Mental toughness	Correlation rate	1	0/419**	1	0/322*
	Significance level		0/002		0/023
	N	50	50	50	50
Behavioral regulation	Correlation rate	0/419**	1	0/322*	1
	Significance level	0/002		0/023	
	N	50	50	50	50
**. Correlation is significant at the 0/01 & 0/05 level (2-tailed).					

The test results of independent t in table 3 showed that there is not any significant difference between the mean of mental toughness and behavioral regulation in the two groups of female and male student-athletes.

Table 3. Test results of independent t for comparing mean difference between mental toughness and behavioral regulation in the two groups of female and male student-athletes

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mt(f)	Equal variances assumed	0/722	0/398	0/268	98	0/789	0/40000	1/49357	-2/56395	3/36395
	Equal variances not assumed			0/268	94/867	0/789	0/40000	1/49357	-2/56517	3/36517
Breq(f,m)	Equal variances assumed	2/727	0/102	-1/064	98	0/290	-4/10000	3/85401	-11/74815	3/54815
	Equal variances not assumed			-1/064	86/936	0/290	-4/10000	3/85401	-11/76033	3/56033

IV. Discussion and conclusion

The purpose of the present research is to study the relationship between mental toughness and behavioral regulation in student-athletes. Findings indicated that there is a positive and significant relation between mental toughness and behavioral regulation in student athletes. Since no research was found, which could directly concern studying the relation between mental toughness and behavioral regulation, the present results is being studied with comparable and close researches. The results of this research was consistent with the findings of Ragab (2015),

concerning the effect of mental toughness on contrastive skills of the elite handball players; Disshman, et al. (2015), studying motivation and behavioral regulation of physical activity in junior high school students; Reifsteck, Gill, &Labban (2015), studying identity understanding, motivation and participation in sports in student-athletes; Rodenbeck (2008), the relation between the coaches' motivation atmosphere with internal motivation of students; Abdoli, Abedanzadeh, and Ramazanzadeh (2013), relation between mental toughness and cognitive strategies of male student-athletes. Whereas, this research is not consistent with the findings of the studies of Phillip, et al. (2012), concerning the relation between external regulations and physical activity; studies of Rahmati &Naimikia (2015), relation between mental toughness and emotional intelligence as well as the comparison between athlete and non-athlete students. Regarding the consistency, it can be said that many psychological variables have been identified so far, which have had an effect on athletes' success. Mental toughness is one of the variable, which have received special attention in psychological researches. Jones, Hanton, & Connaughton state that mental toughness is superiority and inherited or developed mental advantage, by the help of which the athlete can generally show a better performance in the conditions of match, exercise and even his own life compared to his rival and can specifically act with more determination, concentration and high self-confidence compared to his rival and hence he would possess more control over his thought and behavior under lots of pressure. Jones, et al. (2002), identified self-confidence, motivation and controlling effective factors, overcoming pressures and anxiety, concentration over performance, concentration concerning the life style and the factors of pain and hardship, which comprised the characteristics of tough performers, all being placed in an optimum level. According to Louver theory, athletes respond to toughness and mental stability in various ways, which results in relaxed, calm, and energetic feelings. This is because they have learnt the ability to increase the positive energy flow in critical conditions as well as thinking in their particular way enables them face the problems, pressures, and mistakes in any match with right attributes (Jones, et al. 2002). Since mental toughness in athletes is much more than non-athletes (Daneshyar&Bagheri, 2013), it seems that physical activities have been a great factor in increasing mental toughness level and hence regarding the regulation of mental factors especially controlling the thoughts, it has had an effect on motivation and emotion regulation. Therefore, it has had appositive and significant relation with behavioral regulation in student-athletes. Regarding the reasons of inconsistency, the type of the variable under study (physical activity) in the research of Phillip, et al. (2012); the type of variable under study (mental toughness with emotional intelligence); and type of athlete and non-athlete subjects in the research of Rahmati, Naimikia (2015) can be mentioned. This study showed that there is no significant difference between the mean of mental toughness and behavioral regulations in the two groups of female and male student athletes. The results, in this regard, were consistent with findings of Otaghsara and Baghani (2010), studying the relation between mental toughness and mental disorders; and Shin & Lee (2015), studying mental toughness of elite and non-elite female and male athletes. While they were inconsistent with the findings of Farrokhi, kashani and Motashare-e (2011) concerning their research about mental toughness of female and male athletes in contact vice non-contact sports and elite vice non-elite and beginner athletes; as well as the research by Nickolas, et al. (2009), regarding role of sex, success level, age, competition experience and kind of sports on mental toughness of male and female athletes.The reason regarding this difference is probably due to the dimension difference of the questionnaires used in these two studies for the tools used in the studies of above-mentioned researchers do not cover all dimensions of mental toughness questionnaire. Furthermore, the differences in the subjects' being elite were among other reasons the present study was inconsistent with the studies of Farrokhi, Kashani and Mortashae-e. The results of this study indicated that there was a positive and significant difference between the mental toughness and behavioral regulation in student-athletes, and that there was no significant difference between these factors in the two groups of female and male athletes. Since physical activities have an important role in the development of mental toughness (Daneshyar&Bagheri, 2013), with the help of this effective mental factor,regulation of mental factor can have effect on behavioral regulations by controlling motivation factors and thoughts. Therefore, it seems the relation between two mental factors can be effective in improving athletes' performance and as a result they can be studied further in future researches.

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