Journal of Exercise and Health Science, Vol. 02, No. 02, Spring 2022, Page 75-90

Research Paper

The Role of Cognitive Flexibility, Metacognition and Positive Emotion, and Cognitive Emotion Regulation in Psychological Burnout in Skilled Girl Athletes

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Received: 2022/03/14 Accepted: 2022/09/12

Abstract

The aim of present study is to investigate the role of variables such as cognitive flexibility, meta cognition and positive emotion and cognitive regulation of emotion in the psychological burnout of skilled female athletes. 250 skilled female athletes in the sports of volleyball, soccer, futsal, basketball and handball (the age range of 20-30 years) are selected randomly. The questionnaires of cognitive flexibility, cognitive regulation of emotion, metacognition and positive emotion and psychological burnout of athletes were used. The results of the regression analysis showed that the sub scales of suppressing stable thoughts and emotions and setting the hierarchy of flexible goals from the variable of meta cognition and positive meta cognition and the sub scale of perception of controllability from the variable of cognitive flexibility, as well as the sub scales of refocusing on planning, positive evaluation and acceptance of the variable of cognitive regulation of emotion had a significant negative impact on burnout of skilled female athletes. On the other hand, the sub scales of blaming others, blaming oneself, and rumination had a significant positive effect on burnout. The obtained results emphasized the importance and role of meta cognitive variables in the occurrence or prevention of psychological burnout in skilled female athletes.

Keywords: Cognitive Flexibility, Metacognition, Cognitive Emotion Regulation, Burnout, Skilled Athletes.

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Introduction

Studies revealed that psychological burnout is one of the main problems in sports. In fact, athletes spend many hours doing exercise that require a lot of physical and mental energy. They are also evaluated by referees and spectators during sports competitions, which gives them a lot of stress. This stress increases when the athletes do not live up to their expectations. The fear of being removed from the team or from the competition, especially in a situation where sports is considered a source of income for athletes, increases their psychological pressure (Gustafsson, 2007). Therefore, the coaches are trying to get information about the factors affecting the burnout of the athletes. Weinberg and Gould stated that overtraining, coaches' leadership style, perfectionism, and parental pressure are the most important causes of athletes' burnout (Weinberg, Gould, 2014). From Cox's point of view, burnout is an individual's response to chronic and continuous stress (Cox, 2002). According to Smith's cognitive-emotional model presented in 2006, when the player feels that the demands of the environment are more than his abilities and cannot overcome the stress resulting from these conditions, his cognitive and physiological performance will be impaired. The player also prefers to withdraw from the sport to reduce his stress (Smith, 2006). Therefore, research on factors affecting sports burnout is very important for athletes.

One of the factors that can affect the performance of athletes is cognitive flexibility. Cognitive flexibility refers to a person's ability to adapt to cognitive process strategies that are used to face unexpected and new conditions in the environment; in such a way that in a person's victory, the concern of replacing inefficient thoughts with more efficient thoughts is important (Canas, Quesada, Antolí, Fajardo, 2003). Flexible people have more capacity to regain their physiological and psychological balance after stressful events (Reich, Zautra, Hall, 2010). In addition to coping with high stress, flexible people reduce their adverse effects and maintain their mental health (Agaibi & Wilson, 2005). In fact, people who have high levels of flexibility have a greater ability to deal with stress and as a result will experience less stress; therefore, this factor may also be effective on the burnout caused by chronic stress of athletes (Baruth & Caroll, 2002). Since athletes often compete in stressful situations, and in such situations, stress and anger are high; as a result, they experience excitement in such situations (Martin, Dahlen, 2005).

Among the skills that affect the performance of athletes in stressful situations is the cognitive regulation of emotions, playing a significant role in adapting to stressful events. Cognitive regulation of emotions plays an important role in maintaining emotional disorders and covers a wide range of cognitive processes (Gross, 2001). Emotion regulation requires an interaction of cognition and

emotion to face negative situations; because man interprets everything he encounters, and this interpretation determines his reactions (Vohs & Baumeister, 2016). Although it has been proven that emotions have a biological basis, people can overcome emotions and their factors (Aldao & Nolen-Hoeksema, 2010). Mayer et al. (2000) believe that an athlete who is skilled in regulating his emotions can compensate better for his negative emotional states. Considering the important role of cognitive regulation of emotion as one of the methods of dealing with stress in sports in the success of athletes, it seems that this skill can also be effective on sports burnout of athletes. The metacognitive variables of excitement are among other factors that have caught the attention of researchers. Metacognition includes a set of skills that a person must know which skills and strategies are needed to perform a sports task. The concept of metacognition includes ideas, processes and ways that evaluate and control cognition (Baspinar SG & Ziyagil, 2019). Although external factors play an important role in encouraging physical activity or quitting it, it is important to point out that external factors largely influence a person's behavior through the mediation of cognitive activities to participate in or quit sports. (Kavyani, Farsi, Kavyani, Moradi, 2020). There are two interconnected types of metacognition called knowledge cognition and cognitive regulation and monitoring. Cognition emotion regulation occurs when thinking is regulated and monitored through it (Schwartz, 2009). Metacognitive knowledge and metacognitive awareness are different from each other. Metacognitive knowledge is the clear and obvious knowledge of a person about his cognitive strengths and weaknesses. However, metacognitive awareness refers to our feelings and experiences (Kuhn, 2000). Meta-emotion is used to describe a person's emotions by himself and his provocation towards it. Meta-emotion is defined as a subset of secondary emotions. Theorists have provided different definitions of meta-emotion, but it is generally stated that meta-emotion is a complex and multidimensional event that its results lead to preparation for something. Pakran, Gatz and Perry consider emotion as a system of psychological strategies that are related to each other, including emotional, cognitive, physiological and motivational parameters (for example, feelings of discomfort, worry, physiological activation and release are mentioned as parameters of emotional anxiety) (Pekrun et al., 2011). Meta-emotion is used to describe a person's own emotions and his provocation towards it. Meta-emotion, or secondary emotions that occur in response to primary emotions, are sometimes associated with psychological pathology. A meta-emotional experience includes positive or negative primary and secondary emotions, as primary emotions are the subject of secondary emotions. For example, if a person feels guilty in response to his happiness, he has experienced positive-negative meta-emotion. Besides,

meta-emotional experiences can occur in negative-negative, positive-negative, and positive-positive forms (Norman, Furnes, 2016). The importance of cognitive and metacognitive strategies in increasing the motivation of athletes has been proven in various researches (Malekian, NarimanI, Sahebjamei, 2010). These mental processes are related to increasing the students' skill to make the right decision and encouraging them to have the right behaviors in life, and they reduce the feelings that make exercising difficult in the eyes of a person, and as a result, increase healthy behaviors such as exercise and its consistency (Kelly, Metcalfe, 2011). Researchers have conducted extensive researches on a wide range of sports emotions and investigated various psychological factors on athletes' sports performance (Martin, Vause, Schwartzman, 2005; Lane, Thelwell, Lowther, Devonport, 2009; Khani, 2012; Shirvani, Barabari, Keshavarz Afshar, 2015; Gross & John, 2003), but a few researches have been done on the relationship between cognitive emotion regulation strategies and positive meta-emotion and coping mechanisms against sports stress and burnout, especially in professional athletes who face different emotional challenges during competition (Niemi, Vainiomäki, 2006; Gerber et all., 2018). Some researchers have shown the relationship between cognitive emotion regulation and cognitive resilience (Pourebrahimi, VaezMousavi & Amini, 2022).

Khani showed that awareness skills and cognitive flexibility can predict the symptoms of psychopathology, and also stated that awareness and cognitive flexibility are useful for understanding the mental health of athletes (Khani, 2012). Lin et al. also concluded in their research that the more capable the athlete is in understanding and identifying cognitive regulation of his emotions, the more efficient he is in his performance, and metacognitive skills have a positive relationship with youth sports performance (Lane, Thelwell, Lowther, Devonport, 2009). It has been proven that there is a relationship between the ability related to emotion regulation skills and the emotional states related to the successful performance of players, and players who can manage their emotions properly are able to use the emotions experienced during the game to improve their own performance (Gerber et all. 2018). In their research, Nimi and Vainyumaki (2006) concluded that players who choose difficult goals, are forced to make extreme efforts and overtraining, and this overtraining is an abnormal behavior that may lead to athlete burnout. Cresswell and Eiklund (2007) showed that there may be a relationship between the three symptoms of burnout (inhibition, decreased sports value, low performance) and it was found that high levels of inhibition in combination with low performance lead to feelings of decreased sports value and will generally cause a high level of burnout (Beer, Moneta, 2010). It has also been proven that people who had found higher mental toughness scores with the help

of mental skills exercises showed less mental issues and problems when faced with high stress. High stress was associated with an increase in mental health problems, and mental toughness with the help of mental skills can neutralize some of the negative consequences of mental exhaustion (Gerber et all. 2018). According to the mentioned studies, it can be seen that despite the importance of defense mechanisms in dealing with stressful situations and as a result of sports burnout, there are few studies in this field. Therefore, it seems that studying and analyzing coping strategies and styles in professional athletes can be an effective step in reducing and neutralizing the effects of sports burnout in athletes. In general, according to the research done on mental burnout, no research has been done on the role of metacognitive processes in its occurrence. As mentioned, burnout is one of the uncontrollable side effects in professional athletes with a lot of hard training. Therefore, the relationship and effect of metacognitive factors on it should be investigated. Current research has been investigated the role of cognitive flexibility, cognitive regulation of emotions and metacognitive and positive meta-emotion on the mental burnout of skilled athletes. Conducting such research can help sports coaches to plan to improve metacognition of champions in order to prevent burnout. As well, these results can help athletes not to reach the stage of mental burnout by improving metacognitive skills. The importance and innovation of this research is for the first time, it has examined the role of metacognitive variables in the production of mental burnout.

Method

This study was of a predictive, descriptive and correlational research.

Participants: The statistical population included female athletes (n=250) in the age range of 20-30 years with experience of sports activities of more than 5 years (professional level) who had worked in the sports such as volleyball, basketball, handball, and futsal from all over Iran. This research was carried out in 2019-2020. In order to select a statistical sample for this research, in terms of the availability of skilled female athletes (with more than 5 years of sports experience in the desired sports), this group of athletes was studied. The researcher distributed the link of the relevant questionnaire among the athletes after making the questionnaire related to the research. Out of the 292 distributed questionnaires (online), the researcher selected 250 of the received responses that were complete.

Measurement

Demographic questionnaire: In the demographic questionnaire, age, type of sport, sports experience, non-use of psychotherapeutic drugs and not being under the supervision of a psychologist or psychological counseling were asked.

Metacognition and positive meta-emotion questionnaire: The purpose of this questionnaire is to evaluate metacognitive beliefs (trust in interpreting your emotions as signs, preventing immediate reaction and strengthening the mind to solve problems, trust in bottling up the stable thoughts and emotions, trust in setting the hierarchy of flexible and practical goals). This questionnaire has 18 questions and the scoring of this questionnaire is on a 5-point Likert scale (Beer and Moneta, 2010). The validity and reliability of the Persian version of the positive meta-emotions and positive metacognitions questionnaire in Iran were conducted by Rahmanian and Vaez Mousavi (2015), and the validity and reliability of this questionnaire was confirmed. The value of Cronbach's alpha in the whole metacognition/positive emotion questionnaire was equal to 0.83 (Rahmanian and Vaez Mousavi, 2015).

Psychological burnout Questionnaire: This questionnaire has 15 questions and measures the three aspects of low sense of success in sports, emotional and physical burnout, and low value of exercising (Raedeke TD & Smith, 2001). The reliability of the three aspects of the sports burnout questionnaire based on Cronbach's alpha is between 0.70 and 0.81, which is an acceptable level and convergent validity was confirmed through a positive and high correlation coefficient with two other questionnaires (Hajloo, Sobhi, Babayi, Sadegi, 2016). The scoring of this questionnaire is on a 5-point Likert scale.

Cognitive Flexibility Questionnaire (Dennis and Vanderwaal): This questionnaire has 20 questions and is used to measure a type of cognitive flexibility that is necessary in a person's success to challenge and replace inappropriate and ineffective thoughts with more efficient ones. The scoring method of this questionnaire is based on a seven-point Likert scale and it tries to measure three aspects of cognitive flexibility, the desire to understand difficult situations such as the perception control, the ability to perceive several solutions and the ability to create several alternative solutions to evaluate difficult situations (Dennis JP, Vander Wal, 2010). In Iran, the reliability of the whole scale has been obtained by Cronbach's method as 0.90 (Soltani, Shareh, Bahrainian, Farmani, 2013).

Cognitive Regulation of Emotion Questionnaire (Granofsky): The cognitive regulation of emotion scale evaluates the cognitive strategy of self-blame, rumination, acceptance, open-mindedness, refocusing on planning, positive refocusing, positive reappraisal, blaming others, and catastrophizing. This questionnaire contains 36 five-point questions (Garnefski, Kraaij, Spinhoven, 2001). In their study, Tahmasab and Moltfat (2019) reported Cronbach's alpha value of 0.85 for the entire questionnaire.

Procedure

To conduct this research, due to the conditions of the Covid-19 disease and the disruption of sports classes in the gym, the researcher used social media including WhatsApp and Instagram applications to distribute the link of the questionnaire. Therefore, by following the Iranian women's ball sports social media groups and cooperating with the manager of those groups, the athletes were asked to answer the questions of the questionnaire.

Statistical method

To analyze the data, after using the Kolmogorov-Smirnov test, which showed the normality of the data distribution ($p>0.05$), descriptive statistics indicators (mean and standard deviation) and multiple regression in order to investigate the effect of the subscale cognitive flexibility, cognitive regulation of emotion and metacognition and positive meta-emotion were used on athletes' psychological burnout.

Results

Demographic characteristics of the participants (average) and distribution of the frequency and percentage of subjects according to the age, sports experience, and type of sport have reported in Table 1.

Table 1- distribution of the frequency and percentage of subjects

Age (years)	Frequency	Percentage
20 to 23	130	52
24 to 27	83	33.2
28 to 30	37	14.8
Total	250	100
Average	**23.83± 3.05**	
Sports Experience (years)		
5 to 10	206	82.4
11 to 15	39	15.6
Over 15	5	2
Total	250	100
Average	**8.53±3.38**	
Type of sport		
Volleyball	114	45.6
Basketball	26	10.4
Handball	25	10
Football	18	7.2
Futsal	67	26.8
Total	250	100

We presented central tendency index such as mean and distribution statistical indices such as standard deviation, skewness and kurtosis to describe the research variables (psychological burnout, metacognition and positive meta-emotion, cognitive regulation of emotion and cognitive flexibility) in Table 1.

Table 2- Central statistical index

Variable	Subscales	Mean	standard deviation	skewness	kurtosis
psychological burnout	emotional and physical burnout	1/75	0/67	1/34	1/98
	low sense of success in sports	1/84	0/66	0/77	-0/21
	low value of exercising	2/22	0/70	0/52	0/46
	psychological burnout	1/94	0/59	0/98	0/99
Metacognition and positive meta-emotion	bottling up the stable thoughts and emotions	3/19	0/73	-0/25	0/13
	Emotions interpreting	3/72	0/66	0/52	0/60
	setting the hierarchy of flexible and practical goals	3/82	0/56	-0/42	1/51
	Metacognition and positive meta-emotion	3/57	0/49	0/18	0/39
cognitive flexibility	Problem solving process	5/32	0/70	-0/15	-0/06
	perception control	4/87	1/21	-0/53	-0/14
	cognitive flexibility	5/09	0/80	-0/06	-0/97
cognitive regulation of emotion	refocusing on planning	3/94	0/69	-0/47	-0/53
	Positive evaluation	3/76	0/72	-0/18	-0/75
	blaming others	2/45	0/382	0/44	-0/09
	blaming self-blame	2/76	0/83	0/22	-0/06
	Rumination	3/12	0/73	0/30	0/19
	Catastrophizing	2/77	0/87	0/45	0/02
	Acceptance	3/39	0/84	0/15	-0/55

The obtained results of the analysis of variance (ANOVA) showed that the multi-variables linear regression model predicted psychological burnout of skilled athletes based on metacognition and positive meta-emotion ($P<0.05$ & $F=20.489$) (Table 2), is significant at the 5% error level and at least one of the subscales of metacognition and positive meta-emotion, cognitive flexibility and cognitive

regulation of emotions of skilled female athletes significantly predicts their psychological burnout.

Table 2- Test results based on metacognition and positive meta-excitement

The dependent variable	Independent variables and fixed value	Unstandardized regression coefficient β	The standard error	Standardized regression coefficient β	Statistics t	The significance level p	VIF
Psychological burnout	Constant	3/74	0/26	-	14/03	0/001	-
	Bottling up the stable thoughts and emotions	0/30	0/05	0/37	5/79	0/00	2/05
	Emotions interpreting	0/03	0/07	0/03	0/42	0/67	3/11
	Setting the hierarchy of flexible and practical goals	0/18	0/08	0/17	2/31	0/02	4/25

The obtained results of the analysis of variance (ANOVA) showed that the multi-variables linear regression model predicted psychological burnout of skilled athletes based on cognitive flexibility ($P<0.05$ & $F=39.290$) (Table 3), and also based on the adjustment of their emotional cognition ($P<0.05$ & $F=18.253$) (Table 4).

Table 3- Test results based on cognitive flexibility

The dependent variable	Independent variables and fixed value	Unstandardized regression coefficient β	The standard error	Standardized regression coefficient β	Statistics t	The significance level (p)	VIF
Psychological burnout	Constant	3/37	0/25	-	13/14	0/001	-
	Problem solving process	-0/06	0/05	-0/07	-1/24	0/21	2/89
	Perception control	-0/22	0/02	-0/46	-7/73	0/001	3/77

Table 4- The results based on the regulation of emotional cognition

The dependent variable	Independent variables and fixed value	Unstandardized regression coefficient β	The standard error	Standardized regression coefficient β	Statistics t	The significance level (p)	VIF
Psychological burnout	Constant	2/29	0/28	-	8/14	0/001	-
	Refocusing on planning	-0/17	0/06	-0/20	-2/78	0/006	3/81
	Positive evaluation	-0/15	0/06	-0/18	-2/53	0/012	2/82
	Blaming others	0/14	0/04	0/19	2/97	0/003	1/99
	Self-blame	0/11	0/04	0/15	2/77	0/006	3/44
	Rumination	0/14	0/05	0/18	2/84	0/005	2/89
	Catastrophizing	0/03	0/04	0/05	0/73	0/461	3/68
	Acceptance	-0/09	0/03	-0/13	-2/44	0/015	3/41

Discussion

The aim of this study was to investigate the role of metacognition variables and positive meta-emotion, cognitive flexibility and cognitive regulation of emotion on the psychological burnout of skilled female athletes. It showed that metacognition and positive meta-emotion, cognitive flexibility and cognitive regulation of emotion have an effect on psychological burnout of skilled female athletes. The results of this research in relation to metacognition and positive meta-emotion variable were in line with the findings of Abdi, Babapour and Fathi (2011), Rezaei and Saif (2006), Garnevsky, Kraaij and Spinhoven (2001) and Gross (2002), in relation to cognitive flexibility with the research of McCracken and Wellman (2010) and also in relation to the variable of cognitive emotion regulation with the studies of Abdi, Babapour and Fathi (2011), Isazadegan, Janabadi and Saadatmand (2010), Aldao and Nolen Hoeksma (2010), and Gross (2010).

By analyzing the obtained results of on metacognition and positive meta-excitement, we observed that the subscales of bottling up the stable thoughts and emotions and adjusting the hierarchy of flexible goals have a negative and significant effect on the psychological burnout of the skilled female athletes, and predict the psychological burnout of the skilled female athletes in negative direction. It is also observed that the emotion interpretation subscale does not have a significant effect on the psychological burnout of the skilled athletes and is not able to predict the psychological burnout of the skilled female athletes. The standardized regression coefficients (β) shows that the subscale of bottling up the

stable thoughts (37%) emotions (17%) with the highest value has a significant contribution in predicting the psychological burnout of skilled female athletes.

Moreover, the results of cognitive flexibility revealed that perception of control subscale has a negative and significant effect on the psychological burnout of skilled athletes, and it predicts the psychological burnout of skilled female athletes in a negative direction, and it is also observed that the problem-solving processing subscale has no significant effect on the psychological burnout of skilled athletes, and it does not have the ability to predict the psychological burnout of skilled female athletes. The standardized regression coefficients (β) shows that the controllability perception subscale has the most significant contribution in predicting psychological burnout of skilled athletes (46%).

The results of the regulation of emotional cognition, subscales of refocusing on planning, positive evaluation and acceptance have a negative and significant effect on the psychological burnout of athletes. They predict the psychological burnout of skilled female athletes in a negative direction, and it is also observed that the subscales of blaming others, self-blame, and rumination have a positive and significant effect on the psychological burnout of athletes, and predict the psychological burnout of skilled female athletes in a positive direction. Finally, it is observed that catastrophizing subscale does not have a significant effect on the psychological burnout of skilled athletes and is not able to predict the psychological burnout of skilled female athletes. In overall, the standardized regression coefficients (β) shows that the refocusing subscale on planning has the highest significant contribution (20%) and the acceptance subscale has the lowest significant contribution (13%) in predicting the psychological burnout of skilled female athletes.

To explain obtained results scientifically, it can be said that metacognition is a cognitive model that operates at a high level and is based on control and supervision. Metacognition can be defined as a person's awareness of his thinking process and his ability to control this process (Desoete, Ozsoy, 2009). The most important theory related to metacognition is Wells and Mathews' self-regulation executive functioning model and Wells' model of emotional disorders (Wells, 2002). According to this theory, the core of the metacognitive control strategy is the process in which metacognitive self-regulation occurs consciously to evaluate events and use metacognitive control strategies, which occurs at the conscious level and infers and motivates awareness. This level along with schema levels, are the main elements of the self-regulation model of executive function, showing that self-beliefs or schemas and beliefs are used by a set of general programs (Neff, 2003). In addition, in the theory of Wells and Mathews (Wells, 2002), it is assumed that when facing a problem, a person can act in two separate modes: 1-

objective 2- metacognitive. In the metacognitive state, the person accepts the interpretation of thoughts as events or signs that must be evaluated after that, and in the objective state, the person accepts the interpretation of thoughts as the truth. According to Neff's meta-emotion theory, which was presented in 2003, adaptive meta-emotion reflects and supports the individual's emotions to improve health. Because positive emotion provides the basis for accepting one's own emotions, it means meta-emotion has a positive nature and can explain the processes of mindfulness and psychological acceptance that improve health (Neff, 2003). On the other hand, people who have the ability to think flexibly, use alternative justifications, positively reconstruct their thinking framework and accept challenging situations or stressful events, and compared with people who are not flexible, they have more psychological resilience (Burton, Pakenham, Brown, 2010). New theories consider cognitive flexibility as a multidimensional structure that includes fundamental variables such as temperament, personality and special skills such as problem-solving skills. These skills allow a person to be adaptive to tough life events. Emotions also play an important role in human life, such as adapting to life changes and stressful situations. Emotion can be considered as biological reactions to situations and it is regarded as an important opportunity. These biological reactions are associated with the response we give to that environmental situation (Garnevsky, Kraaij & Spinhoven, 2001). It is obvious that emotions have a biological basis, but people can influence the way these emotions are expressed. This ability is called emotion regulation. Cognitive regulation of emotion is internal and external processes that are responsible for controlling, evaluating and changing emotional reactions of a person for achieving goals. Therefore, the cognitive regulation of emotion is considered an underlying principle in starting, evaluating and organizing adaptive behavior and preventing the occurrence of negative emotions. This principle includes a wide range of biological, social, behavioral and conscious and unconscious processes.

Conclusion

Based on the obtained results of this study and previous researches done in this area, we conclude that sports coaches and athletes can prevent the occurrence of psychological burnout in athletes to some extent. Further, and due to the importance of the issue of psychological burnout in athletes, coaches can apply coping strategies and training and boosting these strategies in athletes can prevent the occurrence of psychological burnout and their dropout from sports.

Limitations and Suggestions

The most important limitations of the current research were that due to the presence of the conditions of Covid-19 and the lack of access to the participants

in person, the researchers could not control their mental and physical conditions and night sleep when completing the questionnaires. In the end, it is suggested that more research be done in relation to the underlying mechanisms and the effect on the production of burnout and withdrawal from championship sports.

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