

The Relationships Between Stressors, Emotion and Sport Performance of Adolescents

Erxin Xia

No.2 High School of East China Normal University, Shanghai, China

xiaerxin@hsefz.cn

Abstract. This article analyzes the stressors and the emotions which influence adolescents' sport performance. Then a relationship model of stressors, emotion and sport performance was established. The weighting values between the factors in the model were determined through a questionnaire. The results show that the effect of stressors on sport performance is reflected through emotional responses. The degree of influence of each emotional factor on sports performance was, in descending order, concentration, sense of achievement, confidence, and anxiety. Finally, some measures of response to improve sport performance are proposed.

Keywords: Stressors, emotion, sport performance.

1. Introduction

Sport is popular among adolescents, which also plays a meaningful role in health growth of adolescents. Especially under the situation of intensive study pace and competitive pressure, sport is taken more and more seriously by parents and society. As different kinds of sport competitions are holding, improving sport performance is pursued and cared by schools and students. A large number of studies have shown that sports performance is closely related to people's psychological factors [1]. However, adolescents are in a crucial period of adolescence development whose emotion has relatively greater fluctuation resulted from different stressors, affecting the sport performance. Therefore, researching the relationships among stressors, emotion and sport performance can not only provide reference for adolescents' sport training, but also care for adolescents' physical and mental health. This paper analyzes stress, emotion and other factors that affect sport performance and then establishes relationship models of stressors, emotion and sport performance. Basing on that, the paper also furnishes some reference suggests to improve sport performance for adolescents.

2. Analysis of influencing factors of sport performance

Adolescents are in the critical period of adolescent development and its emotion is affected by various stressors and fluctuates greatly. The sport performance of adolescents mainly influenced by mental states which are emotions in this article that influence the sport performance directly. In fact, different kinds and level of emotions come from the cognition of objective conditions. By processing all the objective conditions, the stress will be accepted. Therefore, these objective conditions can be regarded as stressors.

2.1. Stressors

Stressors refers to events or stimulus of the objective conditions that can be perceived by an individual and produce a positive or negative emotional response [2]. In the field of sport, stressors come from both internal factors and external factors.

Internal factors mainly including athletic ability and expectation goal. Specifically, athletic ability refers to athletes' objective physical level, including strength and stamina, also other required skills and strategies. Obviously, the level of athletic ability has a close correlation of sport performance. Expectation goal is the aim of the final outcome which can come from athletes themselves. As a hope for the future success, over positioning makes athletes to lose confidence while low positioning will lead to deficient in fighting will. Thus, all kinds of expectations are capable of affecting sport

performance. External factors are regarded as external evaluations in most of the case. External evaluations are comments from others. For example, judgments of competitors, the praise and criticism of athletes' performance. These judgments make athletes worried about the outcome so that taking away the athletic ability.

2.2. Emotions

Emotion is a response after perceiving and processing stressors, such as happiness, anger and sadness. In the realm of sport, the major emotions that influence the sport performance are Concentration sense of achievement, confidence and anxiety.

Concentration is a high level of attention; thus, athletes focus on what they are doing without thinking anything else. Concentration will facilitate the athlete's ability to use all of his or her energy for competition. Sense of achievement is defined as an advanced feeling of satisfied and the grateful of themselves for the upcoming success. Considering the potential achievement and its great mood of fulfilling that will encourage athletes to make more efforts. Confidence is an emotion of self-affirmation and belief from the heart, it helps motivate athletes to perform at a better level. Anxiety is an irritability that results from excessive worry about failure. The spread of this emotion will inhibit the athlete from performing at a good level.

3. Modeling of Stressor, Emotion, and Sport Performance

3.1. Relationships between stressors and emotion

Stressors-Emotion part of the model explains the circle that stressors cause various emotions in certain degree and then helps to affect sport performance. The interview shows the relationships between stressors and emotions as follow.

According to theory of cognitive evaluation, athletes will assess all their resources and situation synthetically, such as task requirements, their own knowledge and skills, and outsiders' evaluations like social support and comments from friends. By Considering and comparing all the variables as a whole, athletes can subconsciously calculate the probability and price to win the competition. In this way, the factors above become stressors. If one of the factors related to stressors is enough to cope with the requirement of the competition, these stressors is weak. Therefore, the emotion which is favorable to sport performance tends to have more sense of achievement, concentration, confidence and less anxious. Conversely, when one of the factors is deficient, the stressors in turn will have a substantial impact on emotion, resulting in less sense of achievement, less concentration, less confidence and more anxious, worsening the performance.

Concentration increases when athletic ability is in a high level because proficient skills and good physical fitness enable athletes to focus on what they are doing without considering strategies or worrying the probability to win. On the other hand, concentration decreases with much external evaluation. That is because lots of external evaluation distracted athletes by letting them think more about their success which actually have no decisive effect on a good outcome. Additionally, Expectation goal has little influence on concentration.

The sense of achievement will be greater if expectation goal is higher, considering a better fulfillment of aims. What's more, the sense of achievement will be increased by external evaluation because athletes feel more satisfied when recognized by others. However, athletic ability almost has nothing to do with the sense of achievement.

Confidence is correlated by athletic ability and expectation goal while is not influence by external evaluation. Athletic ability supports confidence for capability is the most important elements in the sport competition. On the contrary, expectation goals reduce confidence, because high expectation goal requires better athletic ability, dwarfing the ability at the time.

Anxiety is lower when athletic ability is ensured. Conversely, higher expectation goal and external evaluation increase the level of anxiety.

In addition, three stressors above are usually regarded by athletes in general. Moreover, different stressors have different effect of influencing different emotion.

3.2. Relationships between Emotion and Sport Performance

Emotions caused by stressors will directly stimulate the reactions of athletes towards the situation. The influence involved both physiological ways and psychological ways.

High level of emotion leads to a series of physiological reactions, which contains increase in muscle tone and changes in heart rate. One of the explanations is that physiological arousal cause muscle tension increases. However, when certain emotion improves to a certain level, such as extreme tension causes anxiety, it has a negative effect on athletic performance because anxiety is capable of interfere the processing of information and the control ability. On the other hand, studies suggests that many emotions have an impact on sport performance in psychological way directly.

Concentration is essential to sport performance. According to cognitive interference theory, task-irrelevant thoughts will divert cognitive resources, leading to fewer resources devoted to the current task, and thus adversely affecting sport performance. Conversely, sport performance tends to be good under high level of concentration [3].

The sense of achievement has a positive influence to sport performance. Because the upcoming achievement serves as a motivation for athletes to make efforts in order to experience such a good feeling. Many athletes believes that they feel a sense of achievement when in a good state for sport performance.

Moreover, some studies have suggested that confidence has a correlation in sport performance and has a stability effect. Confidence is defined as the control over their ability to be successful. Therefore, confidence is the evaluation among own sources and price to reach outcome in the process of cognitive evaluation. When athletes are confident, they feel more safety about their resources, allowing them to evaluate the outcome easier so that to lower the difficulty. Moderate easy is able to improve the performance.

According to catastrophe model of anxiety, the level of cognitive anxiety contributes to the impact of somatic anxiety [4]. As a result, when then the performance surpasses, it will over increase the somatic, dropping the performance. Multidimensional anxiety theory believes that cognitive anxiety has a reversed relationship with performance. Thus, exceeded somatic anxiety company with high cognitive anxiety, lowering the sport performance.

3.3. Stressors-Emotion- Performance Model

Based on the previous analysis, we can build a model as shown in Fig. 1(a), where the black arrows are positive correlations and the blue arrows are negative correlations. In order to investigate the extent to which each factor influences sports performance, a questionnaire was administered to 30 adolescent sports enthusiasts.

The respondents in the questionnaire chose the degree of influence between the two relevant factors from 1 (almost no influence), 2 (little influence), 3 (some influence), 4 (a lot of influence), and 5 (very much influence), and after the data were counted and normalized, the weight values between the factors were obtained, as shown in Fig. 1(b).

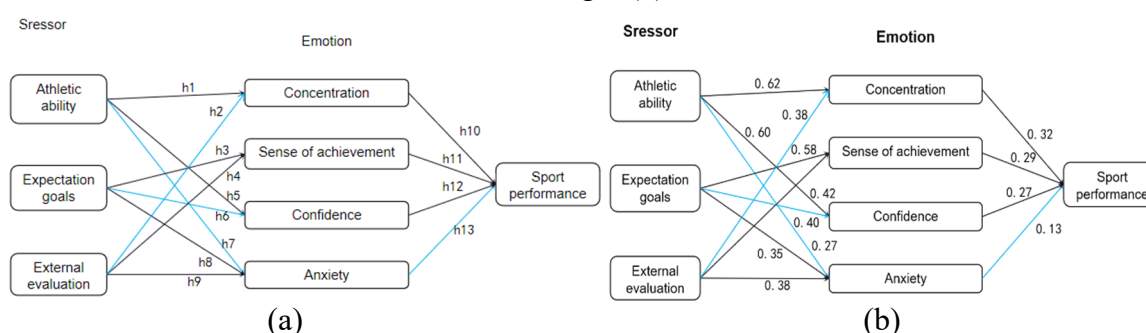


Figure 1. Stressors-Emotion-Performance model

It can be seen that the effect of stressors on sport performance is reflected through emotional responses. The degree of influence of each emotional factor on sport performance was, in descending order, concentration (0.32), accomplishment (0.29), self-confidence (0.27) and anxiety (0.13). It can be seen that concentration has the most significant effect on sport performance. And concentration was mainly influenced by athletic ability (0.62) and external evaluation (0.38). It should be noted that some factors, such as anxiety, are negatively correlated with sport performance, and their weight values are obtained after inverse processing.

According to the model, statement with high level of concentration, sense of achievement and confident but no anxiety is the peak of sport performance. In fact, this statement is flow. Flow is considered as a typical state happened in the best sport performance [5]. It is characterized by concentrating on the current activities and except unrelated thoughts and emotion, feeling methodical in spite of the challenge situation. From the perspective of emotion, athletes feel a high sense of achievement, high level of concentration and much confidence, but with only little tension which cannot reach the range of anxiety [6].

4. Approaches to improve sport performance

In order to improve sport performance, this research proposes intervention strategies during the process of model from different aspects which are cognitive assessment, self-control, physiological reaction and mindfulness.

4.1. Intervention in cognitive evaluation: emergency training

The athlete's cognitive evaluation of each stressors causes athletes to produce different degrees of emotions and affecting sports performance. In fact, in the process of cognitive evaluation, experience and ability constitute the cognitive load, leading to different assessment results in the same objective stressors. The greater the cognitive load, the greater the same level of a certain stressors an athlete can endure. Therefore, changing cognitive load can effectively help athletes cope with high-pressure environments in which the objective stressors are massive. Among the components of cognitive load, in addition to technical strength has been used as the main content of sports training, what is more controllable is the past experience of athletes.

According to the study [7], experiencing moderate adversity has a positive effect on handling high-pressure environments. When athletes have went through certain difficulties, they will regard some competitive high-pressure environments as relatively less troublesome. That is due to the fact that they have already had the ability to cope with such difficulties based on experience. Thus, trainers can consider adding appropriate adversity training and drills for emergencies into the training. Therefore, athletes are allowed to experience some adversities to ensure that they have the ability to deal with certain difficulties in real emergencies.

As some studies have shown, coaches and instructors should create stressful training environments rather than relying on extensive training to help performers adapt to stress. PT stress training is a common method created in a stressful environment, mainly by increasing the demand or outcome to control the degree of stress, where the result has a greater impact on stress, such as monetary rewards, punishments, etc.

4.2. Intervention in emotion: self-control training

Emotions affect sport performance more directly. As a decisive media in model, weaken unfavorable and improve functional emotion becomes essential. Self-control enhances the ability to regulate emotions as well as the ability to suppress impulses [8]. Therefore, improving self-control can help you regulate your emotions. Furthermore, studies have believed that self-control can be improved from one aspect to the control of the aspect. Therefore, non-exercise self-control training, such as diet regulation, smoking cessation, and restricting entertainment can also take an effect.

4.3. Intervention in physiological responses: externalization and internalization of emotion

When the athlete completes the cognitive assessment, a series of physiological responses will be triggered, including muscle tension and rapid heartbeat. Excessive physiological responses will affect concentration or behavioral responses during competition. Therefore, reducing the symptoms that affect normal exercise can effectively reduce the interference of physiological tension reactions during competition. Relaxation techniques, such as progressive muscle relaxation, are one of the most common strategies for regulating a person's arousal level and emotional state, and have been shown to be effective strategies for reducing anxiety in competitive sports and regulating the emotional state of athletes. Another idea is to give up mitigating behavioral responses but change behavioral responses to help exercise. Trainers can train subconscious emotional responses into postures conducive to movement and assist sports to play. Such as increasing the tendency to challenge movement, or posture in line with the state of movement. Emotional states not only have the above externalization tendencies, but also affect subsequent emotional processes. Regulating one's own behavior and thus mental parameters, studies have shown that the posture of holding the head up and chest can in turn increase the self-confidence of athletes. Therefore, trainers can mobilize positive emotions in sports by training athletes in positive postures during exercise.

4.4. Mindfulness

Studies have shown that mindfulness training interventions can improve athletes' psychological conditions, reduce their sports anxiety, experiential avoidance and other low-performance indicators, and improve their flow scores, thereby affecting athletes' sports performance, among which the improvement of athletes' flow is the most obvious [9]. One study showed that both feedback thinking and emotion regulation were associated with mindfulness [10]. Athletes with mindfulness tend to effectively regulate their negative emotions without engaging in excessive rumination, which in turn may improve their skills to cope with a variety of sports-related challenges. Mindfulness can improve an athlete's ability to be aware and understand potential performance to suppress emotions and thoughts. In addition, a temperamental mindset can also make it easier for competitive athletes to calm down, and in general, the intensity of being aroused and strong emotions can also shorten their existence. If he has a relatively quiet, non-ruminating mind and is able to regulate negative emotions, he may be able to focus on goal-oriented behaviors, such as stimuli related to current tasks. By doing so, athletes can make the right decisions in the present moment and adapt to the challenges of the moment. When athletes face critical moments or unexpected situations during a race, athletes are more likely to create ideal conditions to achieve optimal athletic performance. Therefore, effectively regulating negative emotions and not ruminating, that is, mindfulness training, is an important mechanism for adaptive coping in the sports environment.

5. Conclusion

Athletes' internal and external stressors and the resulting variety of emotions have a significant impact on athletic performance. The model describes the types of stressors and emotions that influence sport performance and reveals the transformation process from stress to performance. It was shown that different stressors produce different levels of emotional responses, which in turn affect athletic performance through their physiological and psychological responses. Concentration, followed by achievement and self-confidence, had a greater positive impact on athletic performance, while anxiety negatively impacted athletic performance. Based on the analysis of Stressors-Emotion-Performance Model, the article proposes training methods including intervention cognitive assessment, self-control, externalization or internalization of emotions, and positive thinking in order to enable athletes to achieve their optimal athletic performance.

References

- [1] Beatty, G. F., & Janelle, C. M. Emotion regulation and motor performance: An integrated review and proposal of the Temporal Influence Model of Emotion Regulation (TIMER). *International Review of Sport and Exercise Psychology*, 2020, 13 (1): 266-296.
- [2] Jekauc, D., Fritsch, J., & Latinjak, A. T. Toward a theory of emotions in competitive sports. *Frontiers in Psychology*, 2021, 12: 790423.
- [3] Sun G. X., Zhang L. W. Theoretical evolution of the relationship between competition pressure, attention control and athletic performance. *Advances in Psychological Science*. 2021, 29 (06): 1122-1130.
- [4] Ai L. X. The effect of anxiety on attention networks and sport performance: the moderating effect of cognitive load [D]. Beijing University of Physical Education, 2017.
- [5] Swann C., Lee C., Stewart A. V. New directions in the psychology of optimal performance in sport: flow and clutch states. *Current Opinion in Psychology*, 2017, 16: 48-53.
- [6] Scott G. G., Christopher J. S., Patricia C. J., Swann. C. A systematic review of flow interventions in sport and exercise. *International Review of Sport and Exercise Psychology*, 2021, 1-36.
- [7] Moore L. J., Young T., Freeman P., Sarkar M. Adverse life events, cardiovascular responses, and sports performance under pressure. *Scand J Med Sci Sports*, 2018, 28 (1): 340-347.
- [8] Yu B., Yue G., Liu H. J. The power model of self-control. *Advances in Psychological Science*, 2013, 21 (07): 1272-1282.
- [9] Low, W. R., Sandercock, G. R. H., Freeman, P., Winter, M. E., Butt, J., & Maynard, I. Pressure training for performance domains: A meta-analysis. *Sport, Exercise, and Performance Psychology*, 2021, 10 (1): 149-163.
- [10] Josefsson T., Ivarsson A., Lindwall M., Gustafsson H., Stenling A., Böröy J., Mattsson E., Carnebratt J., Sevholz S., Falkevik E. Mindfulness mechanisms in sports: mediating effects of rumination and emotion regulation on sport-specific coping. *Mindfulness (NY)*, 2017, 8 (5): 1354-1363.