

SELF-REGULATION OF ELITE ATHLETES IN CHINA

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The perceived self-regulation of Chinese world-class athletes were examined in this study. Qualitative data from 14 athletes were analyzed by a grounded theory method. The feelings of Chinese elite athletes who achieved either successful or unsuccessful self-regulation were noted. Results showed that successful self-regulation involved a calm mental state, smooth rhythm in performance, concentration, and flow, whereas rhythmic disorder, stress, mental fatigue, and loss of flow were cited by athletes during unsuccessful self-regulation. Our analysis indicated that a calm mind, rhythmic preparation, and lack of pressure were the major factors contributing to the maintenance of control. Preparation that was not well-planned and regular, the influence of stress, and mental fatigue did not support successful performance.

Keywords: concentration, flow, mental fatigue, stress, self-regulation, elite athlete.

The performance of athletes in competitive sports depends on their athletic skills and psychological state. High-level competition usually provides a unique competitive environment, for example, the world's focus on the Olympic Games results in increased pressure. There are many examples of great athletes

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suddenly performing poorly and failing to win a major competition. Intuitively, we understand that these athletes have choked under pressure. *Choking* can be defined as *a self-regulation failure* (Ferrari, 2001). *Pressure* in this context has been defined by one expert as *any factor or combination of factors that increases the importance of performing well on a particular occasion* (Baumeister, 1984, p. 610). It is often assumed that the increase of pressure is reflected in increased anxiety that, in turn, is seen as an indicator of perceived pressure (Gucciardi & Dimmock, 2008; Jackson, Ashford, & Norsworthy, 2006; Masters, 1992; Mullen & Hardy, 2000; Sanchez, Boschker, & Llewellyn, 2010). Although some athletes do not live up to performance expectations, others perform well within this environment. There is consistent evidence from laboratory experiments that choking under pressure is an actual phenomenon. The scientific evidence is mixed, with some research teams finding support for the concept and others not (Beilock, Kulp, Holt, & Carr, 2004; Jordet, 2009; Wang, Marchant, Morris, & Gibbs, 2004). Nor is it known why it is prevalent among highly skilled athletes.

Perhaps a different question should be asked. Does the anxiety of the competition or poor anxiety control affect performance? Our review of the extant literature revealed that the process of controlling anxiety and pressure has not yet received much attention. Self-regulation enables individuals to control and direct emotions, thoughts, and attention. Literature relating to peak performance has consistently provided evidence of the importance of self-regulation strategies and of the rhythm of preparation for successful, elite athletes (Gould & Udry, 1994; Manfredini, Manfredini, Fersini, & Conconi, 1998; Wimmer, 2003). Compared with those who are unsuccessful, successful athletes have greater self-confidence, sufficient energy to focus on task, and better control of anxiety (Masten, Tušak, & Faganel, 2006).

It should be noted that athletes preparing to participate in a competition are using a continuous process of self-regulation as they make an effort to achieve an excellent competitive state. Many factors can affect athletes' performance, but control has the ultimate effect. The capacity of self-regulation, therefore, plays a key role in performance. Self-control is the core component of self-awareness and has a major executive function of self. It can trigger or suppress impulse inhibition, temptation resistance, gratification delay, plan making and execution, and changes in behavior made to adapt to social and other standards (Baumeister, Gailliot, DeWall, & Oaten, 2006). The best performance is associated with smooth optimal functioning, and, therefore, self-regulation of behaviors is relevant to success (Singer, 2002).

In this study we focused on the psychological processes of Chinese world-class athletes, particularly within the domain of pressured and competitive performance. Specifically, we examined stress in terms of mental fatigue, ego depletion, and the effects of a calm mental state and a high level of concentration. A *calm mental state* in relation to the athletes was defined as *a positive appraisal of cognition or*

an optimal emotional state. Concentration was defined as the ability to mobilize and coordinate one's resources in order to obtain and maintain an optimal state to perform effectively and efficiently (Gaillard, 2008). Mental fatigue refers to the feeling that people may experience after or during prolonged periods of cognitive activity (Boksem & Tops, 2008). Ego depletion is a term used to explain a state of mental fatigue that leads to a breakdown of self-regulation (Seeley & Gardner, 2003).

A qualitative research method was employed because it can provide a clearer and more detailed perspective of a person's psychological state. Our main aim was to gain more understanding of unsuccessful self-regulation by elite athletes as compared with successful self-regulation.

METHOD

PARTICIPANTS

Using a behavioral event interview approach, we collected qualitative data associated with perceived self-regulation from 14 elite athletes who had competed in the Olympics and/or world championships. Participants (5 men, 9 women) ranged in age from 20 to 36 years. Among them, they had won 10 Olympic gold medals, two Olympic silver medals, and eight world championships from events in Turin, Salt Lake City, and Nagano Winter Olympic Games, and Beijing, Athens, Seoul, Sydney, and Barcelona Summer Olympic Games. All participants took part in the study voluntarily and were assured of anonymity.

PROCEDURE

The interview guide was in two sections. The first section contained demographic information and a form for written, informed consent. The second section contained two parts that followed the same form but were focused on different events. Participants were first asked to recall an experience of successful self-regulation. They were asked to describe the context and process of the event, their feelings and thoughts in that event, the effect of those feelings, and thoughts on their performance. Following this, participants were asked to recall an unsuccessful experience using the same factors to describe their self-regulation process.

All interviews were conducted face-to-face in a comfortable environment for the participant, and lasted from 30 to 80 minutes. Interviews were recorded in their entirety using a digital voice recorder. All interview data were fully coded and analyzed inductively using QSR NVivo (version 7.0): The complete Microsoft Word file transcriptions were imported into NVivo, where free nodes were used to categorize chunks of text that were then grouped into trees (Strauss & Corbin, 1998). All tree concepts were subjected to a visual inspection and then related concepts were combined in order to develop the main categories.

DATA ANALYSES

Grounded strategy (Strauss & Corbin, 1998) was chosen as the appropriate method for qualitative data collection and analysis. The initial raw data themes were reduced in number according to identical responses from participants (Table 1), that were coded into 39 and 38 main themes, respectively, by two trained investigators. After discussion, it was agreed that eight general dimension themes best represented the raw data obtained (interrater agreement = 100%).

TABLE 1
OUTCOMES OF SUCCESSFUL SELF-REGULATION

| Raw data themes | General dimensions |
|------------------------|---------------------|
| No distraction | } Calm mental state |
| No mental fluctuations | |
| Smooth mood | |
| Calm | |
| Focus on task | } Concentration |
| Plan smoothly | } Smooth rhythm |
| Feeling of control | } Flow |
| Ease of action | |
| Clear mind | |

TABLE 2
OUTCOMES OF UNSUCCESSFUL SELF-REGULATION

| Raw data themes | General dimensions |
|-------------------------------------|--------------------|
| Abnormal intensity | } Rhythm disorder |
| Temporary alteration to plan | |
| Interrupted training | |
| Injuries undermined system training | |
| Burnout | } Mental fatigue |
| Mental torture | |
| Mental fatigue | |
| Mind not clear | } Loss of flow |
| Force disorder | |
| Loss of control | |
| Feelings of pressure | } Stress influence |

RESULTS

The following represent successful self-regulation in elite athletes.

Calm mental status Participants made a point of keeping calm in competition. This was mentioned as an important prerequisite for successful self-regulation in their performance.

We got out of trouble and started to compete in the second half because we had a calm mental state. We didn't really think about the championship at that time. We just do what we know how to do and hopefully do it better than ever before. Our team was trailing our opponents by half a boat length after the turnover. It meant we were lagging far behind when we increased our speed to make a spurt. We did not lose our confidence and changed the rhythm of the strokes boldly. We would never have managed it without a very positive mental state.

Task concentration Participants thought that successful self-regulation enables them to focus on game preparation, and believe this stage is associated with optimal preparation.

I did not think about the results before the competition. After all, I have great ability. All my attention was fully fixed on the process of the task. How to complete my first 50 meters, other two 25 meters, and the final touch, have been gone over in my mind 1,000 times before the competition. Basically, these details were registering in my brain as soon as I was at leisure since I lived in the village.

Smooth rhythm Participants noted that they monitored the progress of the competitions. When everything was falling into place, less energy was expended on the main task.

Yes, we were gagging for it. We were very meticulous in our preparation for competition. Coach, team manager, and I put forward a detailed plan for the match. All routines made me feel more confident and secure before and during competition. We tried to perform the routine in smooth way. Then, a very important thing is our grasp of rhythm when it comes to preparation.

Flow experience Participants thought that successful self-regulation made them perform with ease. The participants felt that their minds were clear, accompanied by accuracy and control. Furthermore, they felt a free flow of skills and an absence of distractions.

I won my first world championship in that tournament. I think I did not have any stress and I was fully prepared. I could use 100% perfectly the skills in my repertoire even in morning exercise. I felt quite comfortable and natural in the final. My body was as light as feather and my mind was clear.

The following represent unsuccessful self-regulation in elite athletes.

Rhythm disorder Losing rhythm was cited as a negative factor influencing participants' self-regulation.

The precompetition training should be combined effectively with the early training. If a transition or change is not made in smooth rhythm, all our work will have been wasted. As for me, the precompetition training was normal routine. The arrangement about training in last 3, 5, or 7 days was

a fixed rhythm. If this rhythm was disrupted, I was certainly off my game. We faced a surprising number of problems in this competition.

Mental fatigue Participants mentioned that great psychological troubles caused them to burn out.

Well, that is long story. . .In fact, I have the ability to win the gold medal. The game didn't make much of a difference to me. However, leader, coach and media were overwhelming. I was wrapped in a cocoon. In particular, the leader of administration really tortured me. . .You must attain good results and win honors for our country. I couldn't take it. I had no way to avoid it. It burnt me out. I was there in body but not in spirit when I played.

Loss of flow Participants found that performance was more difficult when they experienced unsuccessful self-regulation, even though they had good stamina.

The games involve many controlling factors, usually water, boats, rows, and the player. Suddenly my mind went blank, that is, I was unable to remember anything or think properly. I felt insensible at that moment. The physical system was broken. I could not control anything. All efforts to control proved in vain.

Stress Participants demonstrated the negative impact of stress in the process of unsuccessful self-regulation.

Like other people, I want to be a champion. The leader attached great importance to this match. However, I did not perform my best. I think I attach too much importance to results. You know, all problems were up to me. I should put the thoughts aside when faced the pressure. If not, the competition state was certainly impaired.

DISCUSSION

Mental state The athletes stated that their mental state played a key psychological role in their performance. Athletes could perform better because of their calm mental state. In fact, a calm mental state was associated with being refreshed, rested and relaxed (Mayer, Salovey, Gomberg-Kaufman, & Blainey, 1991). The athletes noted that one promising emotional regulation strategy is cognitive reappraisal, because this may generate positive emotions (Nicholls, Hemmings, & Clough, 2010). This is characterized by feeling energetic, vigorous, and in control of one's energy (Ryan & Deci, 2008). Performance outcomes in sports involve open skills (i.e., the environment is constantly changing so that movements have to be continually adapted as in football and hockey for example), which are better predicted by a positive mood (Beedie, Terry, & Lane, 2000). Having a calm mental state during the competition meant there was an ample supply of energy for maintaining self-regulation. From this result we suggest that the resource of self-regulation is an integral part of maintaining the

calm mental state, and the maintenance of self-regulation plays a key role in the execution of skills or tactics.

Rhythm Smooth rhythm was frequently cited as a factor, indicating that adequate preparation was an extremely important component of performance. A detailed plan was carried out in a rhythmic fashion; this indicated that measured and considered behavior was a positive factor in the athlete's performance. This confirms past research, including the findings of Greenleaf, Gould, and Dieffenbach (2001). Similarly, Gould, Eklund, and Jackson (1992) found that wrestlers reported giving their all-time worst performances after not adhering to their preparation routine. This finding suggests that a change in behavioral pattern may result in poor performance. At the same time, the athletes would then deplete their self-regulation energy, which may have adverse effects on performance. In addition, the athletes thought that the accuracy of the routine in intensive training, especially precompetition training, was extremely important to optimal performance. These observations suggest that the maintenance of a stable behavioral pattern in preparation has a positive influence on performance.

Concentration Athletes believed that optimal performance benefited from maintaining concentration. However, distraction is usually associated with conflict resolution processes which occupy working memory space (Baddeley, 2002). In addition, distractions that inhibit concentration could deplete self-regulation, resulting in performance failure. Posner (1980) reported that the reaction time in an invalid-cue condition was longer than in a valid-cue condition. These points suggest that an athlete's performance might be impaired if he or she were delivering more concentration to the invalid-cue condition in competition.

Stress and flow Stress has always been regarded as an important factor in performance. However, the athletes who took part in our study said that one of the key factors in sporting success was whether or not stress affects performance. Athletes who are able to achieve a successful self-regulating state of flow in competition note a sense of control and clear feedback (Jackson, 2000). The feelings of successful self-regulation indicated that athletes went through the task with control sufficiently unaffected by stress. On the contrary, the athletes who felt that they were out of control experienced unsuccessful self-regulation. Jackson, Thomas, Marsh, and Smethurst (2001) support the idea that the capacity for self-regulation has a positive influence on performance. Athletes were ready to perform because of their physiological and psychological preparation for competition. More importantly, the nature of preparation facilitated an appropriate state by enhancing availability of energy, together with a psychological state characterized by optimal arousal to win and a high level of attention and all these factors would contribute to maximum competitiveness (Salvador, Suay, Gonzalez-Bono, & Serrano, 2003). Accordingly, effective self-regulation should embody both coping with stress and maintaining energy for performance.

Mental fatigue Typically, the Chinese athletes in the study often face mental fatigue or overtraining. This could be attributed to the governing bodies of sport and their policy. According to the athletes' descriptions, these feelings involve tiredness or even burnout, an aversion to continuing with the present activity, and a decrease in the level of commitment to the task at hand. Mental fatigue has been associated with impaired cognitive and behavioral performance (Boksem & Tops, 2008; Marcora, Staiano, & Manning, 2009; van der Linden & Eling, 2006). Failure by athletes to adapt usually has a relationship to overtraining and incorrect strategy (Tenenbaum, Jones, Kitsantas, Sacks, & Berwick, 2003). The availability of energy resources is the most important factor for explaining the relationship between mental fatigue and task performance (Kok, 1997). Athletes with depleted resources of self-regulation face physiological challenges. In China, managers, coaches, and athletes work under enormous pressure or stress (Hong, Wu, & Xiong, 2005). If athletes are not free of stress, they may be at risk of failure of their self-regulation. In many studies of causes of athletes' choking in competition has been focused on anxiety, motivation, and arousal (Edwards, Kingston, Hardy, & Gould, 2002; Hardy, 1996; Otten, 2009; Vickers & Williams, 2007). Nonetheless, these results may partly reveal the nature of self-regulation in a sports competition. It is widely believed that performance is optimal when limited attention needs to be paid to the procedures of the task. At some point, the increased need for additional control outweighs the available resources and the effort required for this leads to poorer performance.

Our findings in this study have indicated that a calm mental state, the rhythm of preparation, training, and lack of pressure were the major factors contributing to the ability to maintain control or successful self-regulation for the athletes we interviewed. In contrast, disturbance of rhythm, stress, mental fatigue, and loss of flow were the factors contributing to unsuccessful self-regulation. Our findings suggest that a change (e.g., interruption of training, distraction, overtraining) in the previous optimal behavior creates the risk of ego depletion. Self-regulation during competition appears to be a key factor in determining optimal state, even when other factors influencing the situation, including psychological factors, are taken into account.

There are a number of limitations in this study. The first limitation is the potential memory bias and/or attribution effects because of the retrospective design. Researchers should be mindful of this as a potential influence on results. Secondly, the many factors that are implicated in performance, influenced by psychological factors, need to be explored in future research in relation to suboptimal performance. Future research topics could include the factors of organizational influence on athletic performance.

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