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# Mental Training of the Chinese Diving Team for the 2008 Olympic Games

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In

## Secrets of Asian Sport Psychology

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## Introduction

There is no doubt that China is the most successful nation in the world during the modern era in the sport of diving. From the inception of the World Aquatics Championships in 1973, China has won 65 gold medals in diving events, five times as many as any other country. Since re-entering the Summer Olympic Games in Los Angeles in 1984, the Chinese diving team has won 33 gold medals out of a total of 201 won by China, more than any other sport. Team members have become household names in their own country and many divers have achieved superstar status.



view video:  
*Chen Ruo-Lin  
Wins 10m Gold  
in Beijing*

China's domination of international diving has created something of a psychological barrier for other nations. In the words of American diving reporter David Woods, "*Part of the obstacle ... for other athletes all over the world is not to be intimidated ... Before anyone can beat the Chinese divers, they've got to believe. I expect China will maintain its dominance for some time*" (Chen, 2012).



view video:  
*Chen Defends  
Her Title in  
London 2012*

The extraordinary achievements of the Chinese diving team are the result of training regimens and levels of sustained hard work that most divers from other countries could not endure. The divers train for more than 300 days every year, with their daily training including 7-8 hours' work on technique, conditioning, and all the small details that help the divers to perform at their best when it matters most, at the major competitions. The words of Malaysia's Pandelega Rinong, the 2012 Olympic 10m bronze medallist, exemplify the awe and respect that other divers have for the work ethic of the Chinese diving team, "*The Chinese are just more determined to go all-out in training and competition. Athletes in other countries do not have the willpower to keep going*" (Chen, 2012).



view video:  
*How China  
trains  
its future  
diving stars*



Diving Tower at the Water Cube in Beijing

## Chinese Sport System

In developing its approach to international sport, China has embraced the ethos of “ju guo ti zhi”, which represents whole of country support for the elite sport system. The essence of this approach is for central and local governments to use their power to channel adequate financial and human resources throughout the country to support elite sport in order to win glory for the nation. This system produces a huge financial and manpower investment into elite sport. For example, it has been estimated that China spent RMB700 million (\$103 million) to produce each gold medal won at the 2004 Athens Olympic Games (Ma, 2010).

The training regimens and total commitment shown by Chinese divers have been the subject of criticism in the western media. This was particularly the case during the 2012 London Olympic Games when it was revealed that the parents of Wu Minxia, the first woman to win diving gold medals at three consecutive Olympic Games, concealed her grandparents’ deaths a year earlier and her mother’s long battle with breast cancer, for fear of disturbing her training. Wu herself expressed her understanding of her parents’ actions, “*There may be distance from our families but the distance doesn’t make us feel we are far apart. I chose to be a diver to pursue this goal*” (Ransom & McNeill, 2012). Many of China’s Olympians draw emotional strength from teammates, coaches and support staff when they are away from family and friends. Wu was quick to acknowledge the support she receives from her teammates, “*We are just like a big family who all train together*” (Ransom & McNeill, 2012).



Wu Minxia



view video:  
Wu Minxia  
Wins Gold

## Psychological Support

Scientific research and support services for the Chinese diving team has been reported previously in relation to the preparations for the 2004 Athens Olympic Games, although only in the Chinese language (Wang, Zhang, & Ren, 2007; Zhang, 2006). In the present chapter, the mental training program for the Chinese diving team in its preparation for the 2008 Olympic Games in Beijing, where the team won 7 of the 8 gold medals on offer, is explained. The Beijing Olympic Games obviously provided a home advantage for Chinese athletes but at the same time carried huge expectations of Chinese success. As a result, and especially given the close proximity of family and friends, the athletes felt much pressure to win their events.

Sport psychology training is an integral part of the overall training program for all divers in the Chinese national team. As part of the preparation for the Beijing Olympic Games, the psychology consulting team developed China’s first sports psychology website, launched in April 2008, which was specifically designed for Olympic athletes and their coaches. The website included a range of multimedia resources about sport psychology and facilitated direct communication between the athletes and mental health experts. The psychological consulting team for the 2008 Beijing Olympic Games included 22 practitioners from organisations such as the Institute of Psychology at

huge  
expectations of  
Chinese success



view video:  
China Wins 4th  
Diving Gold in  
Beijing





the Chinese Academy of Sciences and the Department of Psychology at Beijing Normal University. The online system allowed athletes to download sports psychology materials to their mobile phones, to send text messages to the sports psychology team, and to make appointments for consultation with their preferred sports psychologist to address individual issues. The privacy of the athletes was protected using an advanced system, similar to what banks use for VIP customers.



view video:  
Wu Minxia  
Wins Her 6th  
Olympic Gold  
Medal

The sports psychology laboratory at the China Institute of Sport Science, where the author is based, includes a range of world-class facilities and equipment to support 18 national teams. Coach education is a big part of the service, in consideration of the fact that coaches are the architects of training activities and competition strategies. Regular lectures and workshops are hosted for coaches on a broad range of topics related to the psychological aspects of diving.

Four psychological approaches are widely used in supporting Chinese divers. These are Brief Solution-Focused Therapy, Imagery Training, Facial Expression Recognition Technology, and Yoga Training. The focus of this chapter is on describing how each of these approaches is used to support elite Chinese divers.



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## Brief Solution-Focused Therapy

Brief Solution-Focused Therapy (BSFT) is a goal-oriented approach that focuses on what athletes want to achieve rather than the problems they face, and on the present and the future rather than the past (see [http://en.wikipedia.org/wiki/Solution\\_focused\\_brief\\_therapy](http://en.wikipedia.org/wiki/Solution_focused_brief_therapy)). The therapist first invites the athletes to envision their preferred future and then assists them to take actions toward achieving it, either in small increments or large changes (Carpetto, 2008). To support this approach, a series of consultant techniques proposed by De Shazer (1985) are used, including normalizing, pre-session change questions, and pre-suppositional questions. Normalization is generally defined as a therapist's use of indirect or direct statements that refer to client issues as ordinary difficulties of life rather than pathological manifestations. The goal of this strategy is to pre-empt the client's view of their problems away from pathologic interpretations and towards viewing difficulties as a normal part of everyday life.

BSFT is a  
goal-oriented  
approach

As a pre-session change question, BSFT therapists typically ask, *“What changes have you noticed that have happened or started to happen since you made the appointment for this session?”* This question has three possible answers. First, the client may say that nothing has happened. The second possibility is that things have started to change for the worse or have started to get better. The third possible answer is that things are about the same. The therapist could then ask something like, *“Is this unusual, that things have gotten worse?”* or *“How have you managed to make things better?”* These questions may lead to information about previous solutions and exceptions, and may help to move the athlete into a solution-focused mode. Pre-suppositional questions, such as *“What things have been improving for you lately?”* are usually asked in the second and subsequent sessions. By applying these techniques, the therapist can help the athletes achieve the consulting goal little by little.



view video:  
Synchro  
10m Gold



Credit: courtesy of Zhang Zhong-Qiu

The Author with a National Team Diver



## BSFT Process

In BSFT there are four distinct phases. These are the problem-description phase, the developing a positive goal phase, the exception-seeking phase, and the feedback phase.

**Problem Description Phase.** In this phase, the primary task of the therapist is to gather information from the athletes, such as their values and beliefs. The therapist should be patient but, at the same time, consider ways to implement the next step with the information provided. Good listening is essential during this phase; it requires the therapist to concentrate intently so they do not miss any important information.

**Developing a Positive Goal.** Goal development is a positive process. In this phase, the athlete is asked to imagine a situation where all issues have been resolved. Then the therapist and athlete develop a feasible and practical script in a creative way. For example, where an athlete is uncertain of what they want to achieve, the therapist can help the athlete to clarify their ideas. Once specific goals have been clarified and understood, the therapist will assist the athlete to evaluate progress towards the achievement of the goal. For example, the therapist will use their expertise to evaluate information that emerges from discussions with the athlete and provide the necessary encouragement to help the athlete advance towards further changes.



Credit: Tom Thai/flickr/CC-BY-2.0

**Exception-Seeking Phase.** A key principle of BSFT is to assist clients to see that the problem(s) they face may not be as severe as they might seem. A therapist will try to encourage athletes to describe what they could do differently to address current circumstances and work towards achieving a goal. In practice, we communicate with the athletes to help them understand that they may need to try different strategies to achieve the goal. The aim of this phase is for athletes to understand what worked for them in the past, and to help them gain confidence about future improvement. We encourage athletes to understand and accept themselves, and to create a positive self-concept, in order to promote healthy psychological development.

work towards  
achieving a goal

The difference between a previous solution and an exception is small, but it is significant. A previous solution is what an athlete has tried once, but discontinued. An exception is something that is beneficial for solving a problem, and this often happens spontaneously and without intention. BSFT may help athletes identify these exceptions by asking, “*What was different for you before the problem existed?*” The gives athletes the opportunity to view themselves from another perspective. It also represents a first step towards making athletes feel that they are capable of solving the problems, giving them a sense of control.

**Consultation Feedback.** Before providing feedback, both the therapist and athlete should pause to reflect on what has been said, what has been done, and which strategies have been applied during the consultation. Generally, feedback from the therapist to the athlete should provide evaluation, suggestions, and assignments. It is crucial to make an evaluation, emphasizing the progress and effort the athletes have made to address issues, which can improve the sense of accomplishment and self-esteem. It is not necessary that an evaluation will solve the problem, but it can improve the athletes' self-awareness of their effort. Suggestions should be comprehensive, perhaps providing athletes with guidance not only on their physical and mental training but also on their future lives. Towards the end of the consultation, as well as providing an evaluation and making suggestions, assigning questions for athletes to consider prior to the next consultation, such as, *“What do you think are your strengths and weaknesses?”* or *“Do you think your image of yourself affects your performance?”* is also advantageous.

It is crucial  
to make an  
evaluation

During preparations for the Beijing Olympic Games, BSFT was used with five members of the Chinese diving team to address issues that included pre-competition anxiety, lack of confidence, attention regulation, role orientation, motivation, and so on. Most issues had been resolved within an average of 3.5 consultations. De Shazer (1985) argued that BSFT inspires and guides clients, including athletes, to see the positive side of themselves and to expand this self-awareness to influence their thoughts, feelings, and behaviour, so that they develop the courage to transform their negative experiences into positive beliefs.

Given that athletes often face harsh, challenging environments such as undergoing boring, repetitive training far from home or competing against a talented field of opponents, it is necessary to develop strategies that are appropriate for the personal circumstances of the athletes. Athletes and coaches are often more concerned about progress, improvement, and performance, and less concerned about weaknesses and problems. In the context of trying to address issues of concern to athletes at a time when they need to maintain a demanding training and competition schedule, BSFT is a simple and effective therapeutic approach.



view video:  
Women's 3M  
Springboard  
Final - Beijing  
2008 Summer  
Olympic Games



Credit: courtesy of Zhang Zhong-Qiu

Guo Jingjing and Coach

# Imagery Training

Research shows that imagery training is frequently applied by coaches and athletes for a variety of purposes (Martin, Moritz, & Hall, 1999), and also that it is effective in enhancing performance (Curran & Terry, 2010). Anecdotally, many elite athletes have acknowledged how imagery training has contributed to their success (Zhang, 2005) and decades of research have confirmed the benefits of imagery training on skilled physical performance. Although studies of the positive effects of imagery for athletes are fairly common, there is a paucity of investigations of elite athletes, especially those who compete at an Olympic level. Therefore, we explored the effect of imagery training on the quality and stability of the Chinese divers' motor skills.

imagery training is frequently applied by coaches



view video:  
Women's 10m  
Synchronised  
Gold in London  
2012



Credit: Song Xie/Wikimedia Commons/CC-BY-2.5-CN



## Case Study #1

During preparation for the Beijing Olympic Games, three 10m platform divers participated in an imagery program delivered by the sport psychology team. On the basis of objective analysis of performance and interviews with the coaches, specific elements of performance that required improvement were identified for each diver. Laboratory imagery training underpinned field training, in that laboratory-based practice was conducted 2 or 3 times before being transferred to the diving pool setting.

Based on relevant theories and the characteristics of the sport, we developed a diving-specific, Chinese-language version of the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973), which was completed by the three divers before and after the imagery intervention. We also used the Dartfish™ performance analysis system, which takes the form of a camcorder technology package that allows immediate feedback to learners using digital video, to provide objective data of all changes to technique. The three athletes reported significant improvements in imagery vividness following imagery training, but more importantly their performances also improved significantly. After several weeks of imagery training, performance of difficult technical dives by the three athletes, as assessed by total score, had increased by 23%, 25% and 23%, indicating that imagery training was associated with significantly greater consistency of performance. After several weeks of personal imagery training, in both laboratory and field training settings, the performances of the three divers had improved by a competitively-meaningful margin.

allows immediate  
feedback to  
learners



view video:  
*Technical  
Precision of  
Chinese Divers*



Credit: SYOGOC-Pool/Guo Lei/flickr/CC BY-NC 2.0

## Facial Expression Recognition Technology (FERT)

Facial expression is the motion of muscles in the face, including eye muscles, facial muscles and mouth muscles. These movements convey emotional signals to other people and represent important objective indicators in the study of emotion. Also, as the external representation of human emotions, facial expression plays an important role in interpersonal communication. Facial expression acts as a medium to transmit interpersonal emotions accurately and without words or bodily movements. Facial expressions have a bi-directional relationship with subjective feelings, not only do expressions reflect our feelings but they can also influence them. Seminal experiments have shown that participants who make specific positive facial expressions can enhance their subjective feelings (Ekman, 1970). Researchers agree that the movement of facial muscles is the reaction of the nervous system and the facial muscles to the internal and external environment, leading to various facial expressions. Therefore, facial expression, as a form of emotional activity, has a physiological basis.



Facial Expressions of Chinese Divers



view video:  
*He Chong Wins  
Gold in 3m  
Springboard*

## Physiological Basis of Facial Expression

Facial expressions involve the geometric distortion of facial features. Abundant facial expressions can be produced, depending on the specific facial structure. The structure consists of different tissues including the bones, muscles, and skin covering. These tissues have visible striations, so they constitute the physiological basis of facial expression. Facial muscles are innervated by the 7th and 5th cranial nerves, the nuclei for which lie in the brain stem. The FERT system (Matsugu, Mori, Mitari, & Kaneda, 2003) is based on facial recognition algorithms that identify facial expression by extracting landmarks in the form of features such as the position, size, and/or shape of the eyes, nose, cheekbones, and jaw from a photograph of the subject's face. The features are then used to search for other photos with matching features. Other algorithms normalise a gallery of photos and then compress the face data so that only data useful for face detection remains.

One of the earliest successful FERT systems is based on template matching techniques applied to a set of salient facial features, providing a sort of compressed face representation. The expression recognition process has four stages: acquisition and preprocessing of the human face image; expression detection; expression feature extraction; and expression classification. A model-based feature extraction method is used to establish an accurate physical model. The human face is also modelled as a deformable 3D mesh. Based on six facial feature points, the expression is identified by matching the facial deformation with the physical model.

## Case Study #2

A male 10m platform diver, who won multiple medals at Olympic, World Championship, and World Cup levels, was experiencing unstable performance during critical moments of major competitions, especially when encountering his closest international rivals. His performances in training were excellent and his self-confidence was generally very high. The FaceReader 3.0 Facial Expression Analysis System (Noldus Information Technology, 2007) was applied to compare the facial expressions of the diver (Q) and his main competitor (M) in the World Cup final during the critical moments before take-off in Rounds 1-6.

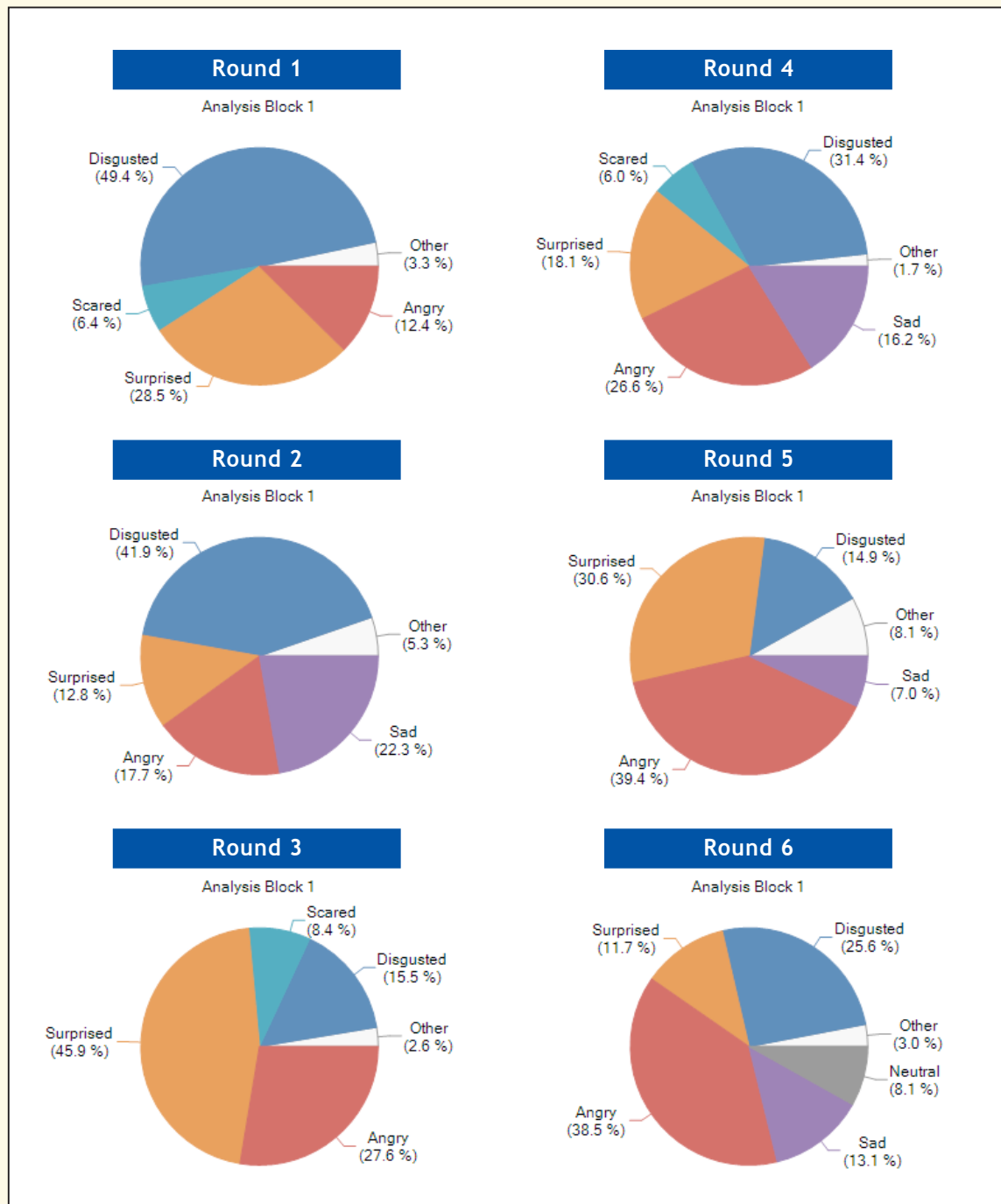


Figure 1. Q's Emotions from Round 1 to Round 6 Based on FERT





we found that his degree of calmness increased

Results highlighted the generally negative characteristics of Q's emotions over the six rounds (see Figure 1). In particular, his angry expression progressively increased, peaking at 39.4% of his overall facial expression in Round 5. By comparison, M's calm expression was dominant, accounting for 29.6% of his overall facial expression, the highest proportion of his emotion component. We also compared Q's facial expressions before take-off in the semi-finals and the finals, which showed that his negative emotions before take-off in the finals were significantly higher than in the semi-finals, suggesting that his arousal level rose above optimal during the final.

In addition, we used several standardised psychological tests, including the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), the Internal-External Locus of Control Scale (Nowicki & Duke, 1974), and the Athlete Coping Styles Questionnaire (Carver, Scheier, & Weintraub, 1989). Results indicated that Q's emotions tended to fluctuate easily, that his self-control was relatively poor, and that he tended to use problem-solving coping strategies and a self-focused attentional style when he was under pressure.

FERT analysis showed that M's emotion components were calm-based accompanied with a small percentage of fear and disgust in critical moments, suggesting that his intensity of motivation and arousal level were maintained at an appropriate level during the dive, facilitating consistent performance. By comparison, Q's emotions were characterized by high levels of anger, fear and disgust before take-off, suggesting that his pre-dive arousal level was too high. This led him to pay excessive attention to one part of the whole movement, misallocating conscious resources, destroying the automation of the dive, and resulting in poor performance.

Based on the above analyses, we provided Q with a targeted intervention lasting several weeks. Comparing his evaluations before and after the intervention, we found that his degree of calmness increased and his excitement and somatic anxiety were reduced significantly. Through systematic mental skills training, Q developed improved emotion management skills, reduced his incidence of negative emotional responses, and increased his peace of mind. His performances became more stable as a result.



## Yoga Training

Yoga originated in India but it is now practiced all over the world. Yoga training promotes the idea of a sound mind in a sound body and was included as part of the mental training program to help the diving athletes learn emotion regulation, with a particular emphasis on remaining calm in competition environments. In a Chinese diving context, yoga training first prioritises a strong body and then focuses on integrating physical and mental harmony. The Olympic Games is a tremendously stressful environment and athletes often experience high levels of anxiety that can lead to poor performance and ultimately psychological burnout. With this in mind, the diving athletes readily accepted the yoga sessions as a popular training method.

a tremendously  
stressful  
environment

Background music during yoga provides a creative outlet to help athletes release their emotions, assist them to cope with stressful situations, and regulate their moods. It is important to ensure that during yoga there is adequate sunlight, that the environment is clean, and that there are no distractions. Fresh air is especially beneficial for the breathing exercises that are inherent to yoga. Melodious background music and a pleasant environment will enhance the positive effects of yoga training.

One of the most important benefits of yoga is that it helps athletes with their spiritual life, by offering guidance about how to live in a proper way, and how to deal with competitions. Athletes often learn to become more patient from yoga exercises, and better understand the value of gentleness and forgiveness. Yoga encourages relaxation and so helps to reduce levels of cortisol, the stress hormone, in the body. The breathing exercises during yoga may help to improve the function of the nervous, circulatory, and respiratory systems. We also find that yoga can assist injured athletes, by easing aches and pains in the body via the breathing exercises and by practicing various yoga postures.



Credit: courtesy of Zhang Zhong-Qiu

*Chinese Divers During Yoga Exercises*

## Yoga Breathing

Yoga breathing consists of a series of exercises designed to meet the body's needs and keep it in vibrant health. In the respiration phase, oxygen is inhaled, which travels through our bodily systems, then carbon dioxide is exhaled and toxic wastes are removed from our body. Through respiratory practice, the oxygen and carbon dioxide content in the body is balanced. Yoga breathing involves first inhaling deeply from the



Relaxation Sessions

abdomen and then through the middle and upper chest areas. It then involves exhaling from the chest until it becomes empty and falls and then continuing to exhale from the abdomen as it draws inwards completely. Yoga breathing is proposed to bring more oxygen into the blood and the brain, controlling the secretion of *prana*, the Sanskrit word for “life force.”

## Meditation Training

Meditation is generally an inwardly-oriented, personal practice that involves invoking or cultivating a feeling or internal state. The term meditation can refer to the state itself or to the practices and techniques used to cultivate the state. Meditation focuses on calming the mind, not by removing stimulation but rather by directing attention to one healing element, which may be a sound, a word, an image, or one's own breathing. When the mind is “filled” with the feeling of calm and peacefulness, many psychological benefits can accrue. The benefits associated with meditation include:

- *Increased brain wave coherence, which is associated with greater creativity, improved moral reasoning, and higher IQ;*
- *Decreased anxiety;*
- *Decreased depression;*
- *Decreased irritability and moodiness;*
- *Improved learning ability and memory;*
- *Increased feelings of vitality and rejuvenation;*
- *Increased happiness;*
- *Increased emotional stability.*





## Case Study #3

Thirteen diving athletes (male = 7, female = 6; age =  $16 \pm 2.9$  yr.) participated in yoga training in the lead-up to the Beijing Olympic Games. Yoga sessions were delivered by an experienced, professional yoga coach, once a week for about 1 hour. Before and after each session, electrocardiograms (i.e., electrical recording of heart rate and rhythm) were recorded for 5 minutes, with the athletes maintaining the same posture each time. Mood responses were monitored before and after each session using a Chinese-language version of the Profile of Mood States (POMS; Zhu, 1995).

After yoga sessions, the divers' heart rate variability was reduced, indicating that yoga had strengthened the activity of the autonomic nervous system, and promoted balance between the sympathetic and parasympathetic nervous systems. Mood responses were enhanced after yoga training, with scores for anger, confusion, depression, fatigue, and tension significantly reduced, and scores for self-esteem and vigour significantly increased. Our experiences with the diving athletes led us to conclude that yoga training promoted emotion management, improved autonomic nervous system function, and reduced stress.

## Summary

In this chapter, based on the experience of assisting the preparation of the Chinese diving team for the 2008 Beijing Olympic Games, it has been explained how Brief Solution-Focused Therapy (BFST) can assist with pre-competition, non-adaptive psychological issues; how imagery training can have a positive impact on the improvement of motor skills and the stability of performance; how Facial Expression Recognition Technology (FERT) can play a role in the analysis and regulation of emotional responses of the divers in competition; and how yoga training became a common and accepted way for athletes to release both physical and psychological pressure. All of these practical and effective methods of mental training were provided for the athletes and coaches of the Chinese diving team, who achieved remarkable success in the 2008 Beijing Olympic Games and other major international competitions. This impressive record continued through to the 2012 London Olympic Games, where China secured 6 of the 8 diving gold medals available, and the 2013 World Championships, where 9 of 10 gold medals were won by China. The Chinese domination of international diving shows no signs of ending.



Credit: courtesy of Zhang Zhong-Qiu



view video:  
*Diving at the  
2012 London  
Olympics*



view video:  
*World Record  
Dive*

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