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Mental Training of the Chinese Gymnastics Team in Preparation for the Beijing Olympic Games

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Introduction

The inexorable rise in standards in the sport of artistic gymnastics sets an increasingly high demand for psychological competence on the part of the athletes. Successful performance in major competitions, especially the Olympic Games, depends not only on advanced technical training and physical conditioning, but also on the stability of psychological factors. The setback experienced by the Chinese gymnastics team at the 2004 Athens Olympic Games, where China won only one gold medal, shocked the nation and deflated the Chinese gymnastics community.

An assessment of the reasons for the team's underperformance in Athens attributed the poor showing primarily to the gymnasts' unstable mental states. Factors such as excess stress, emotional disturbance, and low psychological tolerance, which were exhibited by some gymnasts during the competition, were identified as seriously affecting the execution of even the more basic gymnastic techniques, and bringing about some unexpected errors. For example, in the final of the team competition in Athens, one gymnast fell on nearly every piece of apparatus. Given the precise nature of the sport and the tiny margins for error, psychological issues are a perennial challenge for all gymnasts, in that a stable psychological state is required to be able to compete at the same level in competition as achieved during training.



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bring honour to
their country



view video:
*Very sad
moments in
gymnastics*

Within the rapidly-developing world of gymnastics, and against a backdrop of frequently-revised international rules, increasingly-demanding performance levels, and ever-improving international competitors, the Chinese gymnastics team faced a significant challenge at their home Olympic Games in 2008. As one of the Chinese teams with the potential to secure gold medals in Beijing, the gymnasts were faced with high expectations in their home country and abroad. In response, the team wanted to live up to these expectations, bring honour to their country, and fully display the charm of gymnastics to the world.



view video:
China's
Golden Girls:
Beijing 2008



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Although the Chinese gymnasts were among the best in the world, they faced formidable competition in the Beijing Olympic Games from opponents in the USA, Japanese, Russian, and Italian teams. As the sport psychologists appointed to support China's gymnasts, the authors of this chapter had responsibility for helping to strengthen the overall competitiveness of the team and improving its prospects of success. As things eventuated, the Chinese gymnastics team won 14 medals, including nine gold medals, from the 14 artistic gymnastics events in Beijing, which represented China's most successful performance ever. The men were especially dominant, producing seven gold medals, while the women's team captivated television audiences around the world in winning the team event for the very first time. In this chapter, we provide an account of the psychological preparation and support for the Chinese gymnasts in the lead-up to the 2008 Olympic Games.



view video:
Men's Team
Artistic
Final - Beijing
2008 Summer
Olympic Games

Prior to the 2004 Athens Olympic Games, no systematic and well-directed research or psychological support had been provided for the Chinese gymnastics team. The complexity of gymnastic techniques, the danger of the moves, and the variability of the competition environments created a clear need for the structured development of psychological skills among gymnasts. For example, they needed to understand how to cope with the intense atmosphere in international venues, especially the psychological pressure of competing at a home Olympic Games in Beijing; how to deal with their own successes and failures as well as the successes and failures of teammates and opponents; and how to face the particular challenge of qualification rounds.





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These considerations meant that the gymnasts needed a high degree of psychological stability to be able to excel in a fierce Olympic competition environment and challenge for gold medals. In competition, the gymnasts complete 4 (women) or 6 (men) events. Women compete on the vault, floor exercise, balance beam, and asymmetric bars, whereas the men's event comprises the vault, floor exercise, parallel bars, rings, high bar, and pommel horse (see http://en.wikipedia.org/wiki/Artistic_gymnastics). Consistent, high-quality performance on every apparatus relies not only upon outstanding technical competence, but also stable mental states. Therefore, a key task was to develop a strategy to strengthen the gymnasts' stability in training and competition and to enhance their all-round competitiveness, in order to maximise the probability of success at the Olympic Games.

The intervention program took into account the typical range of scenarios the gymnastics team would face, the personalities of individual gymnasts, and the demands of specific forthcoming competitions. The intervention was designed to strengthen their competition skills by implementing standardised psychological measurements, using sophisticated technological devices for mental training and testing, providing individualised psychological counselling, training in bidirectional emotion regulation, and assisting with mental preparation prior to major events.



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Team Psycho-Education

understanding of the psychological demands

Basic knowledge about sport psychology was imparted to the team via a lecture series to improve understanding of the psychological demands of their sport. Mutual understanding was fostered and trust was built between the gymnasts and the support team through this psycho-education program, which paved the way for the smooth development of the mental skills training that followed.

The first lecture was titled “Psychology of Success in Gymnastics,” which provided the coaches and gymnasts with a preliminary understanding of the psychological component of athletic success, and the benefits that mental training could bring to the team. Participants responded positively to the lecture, which created enthusiasm for further sessions. A second lecture on the “Purpose and Significance of Psychological Testing” increased their awareness of the role of psychological measurement, laying a foundation for the systematic monitoring that followed. A third lecture on “Overcoming Common Psychological Barriers” helped the gymnasts gain understanding of some of the common psychological issues they might face in daily life and training, and presented them with a range of coping strategies.

A fourth lecture on “Imagery Training for Gymnasts” gave the gymnasts a preliminary understanding of the role and methods of imagery, increasing their receptiveness to using imagery practice in training and competition. The final lecture, on the theme of “Embracing Competition with a Positive Mindset,” was attended by gymnasts preparing for major competitions during the lead-up to the 2008 Olympic Games. Through these presentations, the gymnasts learned to appreciate the psychological attributes they needed to develop before participating in major competitions.



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Psychological Measurement and Monitoring

A range of psychological and physiological indicators were used to assess each gymnast and to provide baseline data that facilitated the identification of objective changes in their psychological characteristics and mental states. To develop a comprehensive database of information about the gymnasts, an extensive battery of standardised measures was used over the four year period of the intervention. These measures included Chinese-language versions of well-known personality tests, such as the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) and the NEO Personality Inventory (Costa & McCrae, 1992); neurological assessments such as the Mini Mental State Examination (Folstein, Folstein, & McHugh, 1975) and the Uchida-Kraepelin test (Kashiwagi

an extensive
battery of
standardised
measures

et al., 1985); measures to assess the traits of attention distribution, attention span, and attention stability (Qiu, 1990); and a custom-designed Multiple Psychological Testing Software to test the willpower and volitional characteristics of the gymnasts.



Credit: Courtesy of Ding Xueqin

Psychological Measurement

Changes in psychological states were assessed using measures of electroencephalography (EEG) and heart rate variability (HRV). The Spirit EEG biofeedback monitoring instrument was used to acquire the rhythm, amplitude, and wave of the electrical activity of the brain, which closely aligns to emotional and attentional activity. A biofeedback training system was used to teach the gymnasts how to actively control their own EEG activity, which helped to relieve fatigue, prevent insomnia, and enhance imagery and attentional skills. Additionally, a Self-generated Physiological Coherence System (SPCS) that used HRV as an indicator of emotional states was used with the

gymnasts. The SPCS had powerful gaming functions, which allowed the gymnasts to play a variety of computer games as a novel way of training their emotional control, focus, and ability to cope with setbacks.

Test results were fed back to coaches and gymnasts, helping them to develop an objective view of themselves and discover their psychological strengths and weaknesses. Through this extensive monitoring program, psychological profiles of each gymnast were created and entered into an information database, which acted as a point of reference for the sport psychology team and the coaches, as they developed training, management, and education programs for the gymnasts. During the period of the intervention, we monitored more than 50 gymnasts and provided individualised case reports after the tests. The testing formed the basis for developing targeted mental training programs and personalised psychological services for these gymnasts. We found that the measures of attention, willpower, and personality provided a valuable reflection of the psychological characteristics and mental skills of elite gymnasts, and concluded that EEG and HRV could be used both for biofeedback training and for evaluating changes in psychological states.

Mental Training Methods

individual needs of the gymnasts

Based on our analysis of gymnastics and its competition environment, and after considering the specific circumstances and individual needs of the gymnasts, the following mental training methods were selected for inclusion in the intervention.

Attention Control Training

Relaxation training based on deep breathing techniques was combined with computer game software as a form of mental training to improve attentional stability (Ding, 1998; Ma & Zhang, 1998). The training was designed to develop the ability to lock focus on fixed targets (e.g., instructions, imagery, or movements) without becoming distracted by irrelevant stimuli.

Learning Routines Through Imagery

Gymnastics routines were divided into 8-10 action links, and one or two concise words were used for each action link to provide performance cues and to direct attention (Ding, 1998). Coaches checked the appropriateness of the cue words and worked with the sport psychology team to refine them where necessary. The gymnasts recited the cues silently while mentally practicing the routines, until they were committed to memory and could be applied in training and competition.

Biofeedback Training

Information about biological functions related to psychological and physiological processes, such as electromyography (EMG), galvanic skin response, skin temperature, heart rate, blood pressure, and EEG, was displayed to athletes in visual and/or audio form. The gymnasts were trained to become aware of this biological information and consciously control their own psychological and physiological activities. Most biofeedback training occurred in the psychology laboratory although, where competition conditions permitted, we would use portable biofeedback instruments in the competition arena and conduct on-site biofeedback with the gymnasts.



Credit: Courtesy of Ding Xueqin

Mental Training

Psychological Counselling

confidence in competition

Individual counselling was provided to help the gymnasts maintain a positive outlook on life, enhance confidence in competition, correct irrational beliefs, stimulate motivation and overcome psychological barriers in training and competition, and adjust emotional states. Psychological methods, including cognitive restructuring, switching roles, positive thinking, and strengthening merits, were used to help gymnasts change destructive or distracting cognitions, and to establish new philosophies about training, competition, and life generally.

Pre-competition Adjustment

Both the psychological demands of competition and the characteristics of different gymnasts were considered when helping gymnasts enhance their confidence prior to competition. The goal was for each gymnast to commence competition in the right frame of mind and a positive emotional state. Psychological adjustment prior to competition involved boosting confidence and establishing psychological countermeasures to help the gymnasts plan for various stressful or unexpected situations.

Enhancing Confidence

Confidence was enhanced by reminding gymnasts of their strengths and their previous successful performances, setting attainable goals for competition (such as the completion of a set of high quality routines), and developing the habit of positive thinking. Activities included visualising successful performances, looking at pictures of their own excellent skill execution, and using cue words to boost morale and engender a sense of dominance prior to competition.

developing the habit of positive thinking

Psychological Countermeasures

The gymnasts created databases of possible incidents that might happen and a range of methods they could use to deal with them. They created a psychological countermeasure database not only for routine issues related to competition but also for unexpected situations. The former referred to issues that the gymnasts were certain to encounter when participating in competition (e.g., arriving at the Olympic village, the day before competition, and the night before competition). The latter addressed issues that might or might not happen (i.e., “what if?” scenarios) and provided psychological and/or behavioural countermeasures to implement when unpredictable events occurred (e.g., if pre-competition training had not gone well, or if a teammate performed poorly).

Psycho-Cultural Development

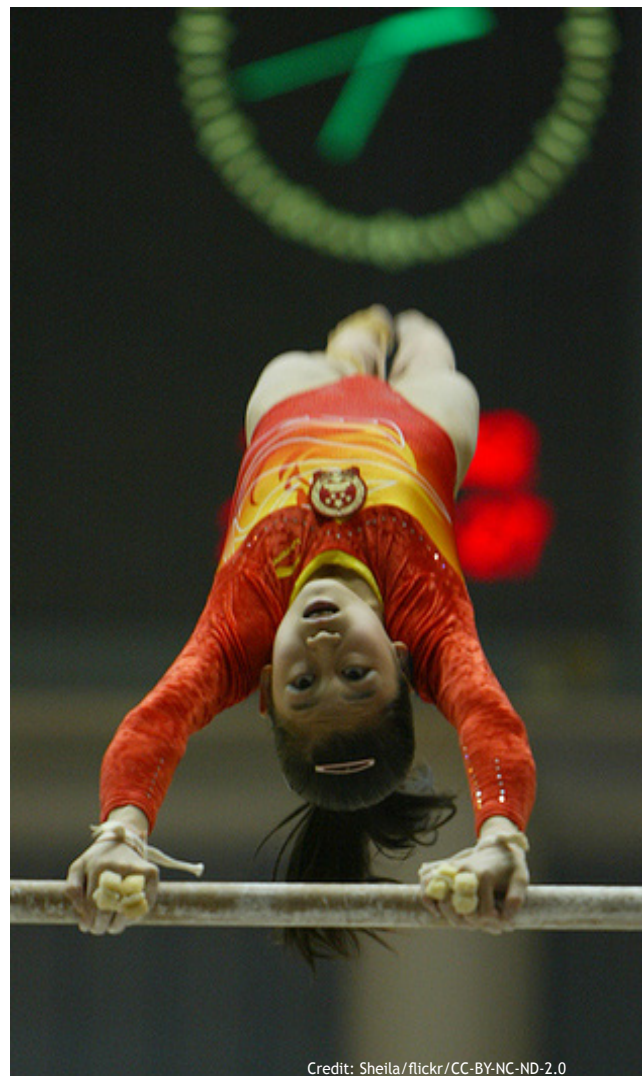
Sports training is a process of educating athletes, in which the coach plays the principal role of educator. Coaches' educational philosophies are reflected in various aspects of how they train the gymnasts, which may exert a decisive impact on the development of the athletes. The age of female gymnasts involved in national training ranges from 14 to 18, a time when they are developing rapidly, accumulating life experiences, and hoping that others will respect their intentions, judgments and personalities. The rapid development of adolescents' self-awareness can be a turning point in character development. Therefore, great care was taken in deciding how to praise the gymnasts and how to make the most of their positive qualities.



view video:
*Chinese
Gymnastics
Training
Montage*

Appreciation education is a coaching practice that focuses on athletes' strong points, progress, potentials and successful experiences rather than their setbacks, weak points, problems, and failure experiences. It can produce the social-psychological mechanism reflected in the Pygmalion Effect, whereby the greater the expectation placed upon the person, the better they perform (Rosenthal & Jaconsen, 1992). High expectations of the gymnasts by the coaches are also reflected in strong emotional support provided by the coaches for the athletes, creating a collaborative, supportive atmosphere. Due to the high expectations, the coaches tend to provide feedback to the gymnasts with praise and encouragement. Coaches answer the gymnasts' questions thoughtfully and respectfully, giving them timely assessment and detailed feedback regarding their performance.

Appreciation education is seen as an essential element in developing gymnasts' potential. Praise and encouragement promotes a strong sense of confidence in the athletes from an early age. By understanding the psychological characteristics of each gymnast, the coaches are better equipped to encourage them when necessary and give them tolerant criticism when they make errors.



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Building the Psychological Culture

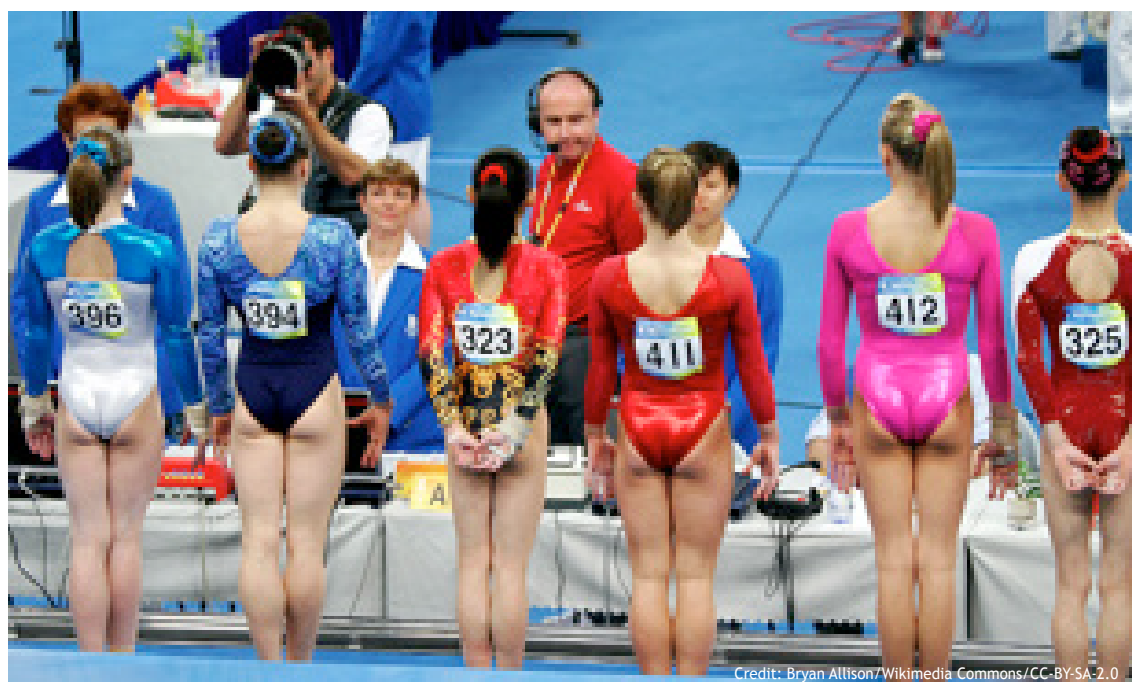
A positive psychological culture was promoted within the team by organising a range of daily activities. These activities included music, games, reading, starting a journal or website, and special features such as psychological education and sending birthday wishes. These activities helped the gymnasts improve their general knowledge, enhanced team cohesion, created a pleasant atmosphere in training, and promoted the physical and mental development of gymnasts.

defuse the emotions

A harmonious relationship between the gymnasts and the coaching staff was a key factor in achieving success. Two athletes in the team had experienced relationship issues with their coaches. Our task as psychologists was to teach the gymnasts to respect, trust, and adapt to their coaches' behaviour. Within the team, conflict with coaches was seen as detrimental for the athletes' performance and actively discouraged. When the gymnasts found it hard to meet the coaches' demands, we would try to defuse their emotions as soon as possible by offering timely intervention.

Positive and Constructive Thinking

Gymnasts' thoughts are important to their athletic performance. Positive thinking is beneficial for individual growth and is almost a precondition for maintaining a good attitude. For example, gymnasts should readily accept criticism from coaches and should never resist the coaches' advice. In addition, before completing a routine, the gymnast should mentally rehearse how to do it well instead of thinking about what might happen if they are not successful. Positive and constructive thinking was a high priority and seen as one of the cornerstones to success.



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Dealing with Success and Failure

Gymnasts inevitably face success and failure in competitions. How to properly respond to success and failure was an important focus of our psychological counselling. For example, after one of the female gymnasts won the all-round title in the national championships, we encouraged her to extract the maximum benefit from her win by, for example, writing down the reasons for the successful outcome, repeatedly visualising her performance to build confidence for future competitions, identifying the gap between her and her opponents, and getting her ready to do it all over again. To those who didn't succeed in competition, we encouraged them to face loss by identifying problems and working out solutions. Rather than fearing failure, we encouraged the gymnasts to treat it as a learning experience that would help them be better prepared next time.

identifying
problems and
working out
solutions

Response to Injuries

Injuries are an occupational hazard that every gymnast must face from time to time. Therefore, it was a common task to help the gymnasts to cope when injuries occurred. Firstly, we encouraged them to face injuries in a positive way, adapt quickly to their new circumstances, and focus on strategies that would assist recovery. Secondly, we used injuries to cultivate a spirit of perseverance, thereby turning a disadvantage into an advantage. In sum, our objective was to help the gymnasts speed up their recovery with a positive attitude and, by doing so, make them mentally stronger.



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Training Efficiency and Success in Competition



view video:
*Cheng Fei
Story*

The gymnasts, especially the females, started intensive training at a very young age, which often limited their educational experiences. Teaching them how to make better use of their mind to improve training efficiency and success in competition was an important task shared by the coaches and the sport psychology team. We taught them to remember success and forget failure. For example, during training they would quickly review and reinforce performances after successful execution, using imagery techniques. They would also analyse the reasons for mistakes made, visualise correcting those mistakes, and constantly strengthen successful routines in their minds. These practices helped them improve training efficiency and perform successfully in competition. In addition, the prominent gymnasts were given a “psychological counselling diary.” Coaches required the gymnasts to update their diaries every day and monitored them regularly. In this way the gymnasts reflected on their daily training and developed the ability to use their minds more effectively.

Competition Routines



view video:
*Deng Linlin -
You'll Be In
My Heart*

Competition routines often involve complex cognitive strategies and behavioural responses, which are usually applied in the preparatory phase of self-paced events. By developing personalised and meaningful self-control strategies and preventing negative thoughts and internal and external distractions, the gymnasts were better able to control their emotions, thoughts, and performances, thereby creating a sense of internal harmony. Consistent competition routines help athletes achieve optimal arousal and attention before and during competition (David et al., 2003).

The objective of developing competition routines is to personalise preparation in terms of the nature of the event, the gymnasts' individual characteristics, and their preferences. After a competition routine had been individually tailored, we examined its effectiveness in training and competition, progressively improving it to achieve a high degree of consistency, automation, and flexibility of application. Competition routines generally contain five components. First, the preparatory phase involves adjusting physical and emotional parameters to the optimal point for each individual, often by means of abdominal breathing. The second component is imagining a perfect competition routine and the feelings associated with such a performance. Next, self-talk focuses on relevant external cues or internal thoughts. Fourth, the gymnast starts the competition in a calm state of mind. Finally, the gymnast evaluates the quality and result of their performance.



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

Targetted Pre-Olympic Preparation



Participating in the Beijing Olympics, the Chinese gymnasts enjoyed an obvious home advantage, benefitting from a familiar climate, geographical convenience, and great local support. The apparatus and venue were familiar, thousands of Chinese in the audience cheered for them, and even the judges may have been more positively disposed towards them and hesitant to impose penalties. However, the main disadvantage of competing at home lay in the greater psychological pressure to perform well.

Competing in a “mother tongue” environment, the amount of verbal information received by the Chinese gymnasts was almost guaranteed to increase exponentially. This had the potential effect of burdening them with the thought that “I must not fail. I must not lose face before the home crowd,” which would tend to push their focus towards thoughts of winning or losing, and distract them from the competition process and techniques. This could have resulted in the gymnasts focusing on concerns beyond their control (e.g., focusing on the result of the competition rather than the process, looking forward to future achievements, over-considering the role of judges, caring too much about external evaluations). In turn, this could lead to decreased confidence in completing tasks (e.g., thinking about difficult and unfavourable conditions, forgetting their own merits, worrying about possible effects of poor performance).



view video:
*The Olympic
Dream*

On the issue of coping with pressure, our philosophy was to develop gymnasts’ awareness and ability to deal with pressure on a regular basis. Ultimately, it was important that the gymnasts understood that pressure from the external environment was not going to disappear. Instead, they needed to strengthen their ability to cope with it. To prepare them to deal with thoughts such as “I must not fail” during the Games, the gymnasts were given stringent targets for skill improvement in everyday training. For example, if a gymnast made a mistake, he or she was required to perform the correct movement 5-10 times. Sometimes, even the entire team was required to accompany the gymnast in doing the same skills. Such harsh demands pushed the gymnasts to live with the thought that “I must not fail” in advance of major competitions and to become accustomed to having that thought.

To assist the gymnasts to cope with the high expectations of the people around them, we encouraged them to reframe their understanding of those expectations. For example, we explained that other people had high expectations of them because they were perceived as having the necessary talent to succeed and people had trust in them. In return, they should reward those people with their performances. In this way the gymnasts’ attention was transferred back to the process of performance rather than the outcome of the competition.

stringent
targets for skill
improvement

Emotional Strain in the Olympic Environment

Excessive tension is often caused by negative thoughts (e.g., worry, fear, or concern), perceived threats (e.g., severity of behavioural consequences), unrealistic expectations, setbacks, external stimuli (e.g., the roar of the crowd), or unexpected incidents. To address emotional strain, the gymnasts were taught to use cognitive regulation and restructuring to overcome the interference of negative thinking, and the systematic training of emotional adjustment and control to overcome excessive tension (Ma & Zhang, 1998; Yin, Ding, & Chen, 2000).



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Mental Fatigue and Psychological Recovery

Gymnasts have to regularly withstand a high physical load and intense psychological demands, bringing with it the risk of staleness and burnout. Therefore, great importance was attached to physical and psychological recovery. We used a variety of techniques to enhance this recovery. We provided relaxation to music for the gymnasts using Bandari or Chinese classical court music. These musical choices were adopted to promote relaxation, calm the nervous system, and thereby accelerate psychological recovery (Komatsu, 1995; Skille & Wigram, 1995). A second technique we used was a body-sense vibration music bed. The bed converted music sound waves into physical vibration massage, so the gymnasts listened to the music with their whole body, inducing the brain to secrete endorphins and achieve rapid relaxation and elimination of physical and mental fatigue. The bed senses the low-frequency signals inherent in the music, amplifies them, and converts them into physical vibration. The sense of vibration provides a strong effect in the form of psychological and physiological pleasure, which quickly creates mental relaxation and eliminates fatigue (Wigram & Dileo, 1997).

Formulation of “Olympic Guarantee” Plans

In light of the issues the gymnasts would likely encounter during the Beijing Olympics, including the extreme pressure to perform well, moments of confusion, and crises of confidence, we developed “guarantee plans” to ensure that each gymnast would have experts upon whom they could rely and detailed plans to which they could refer before and during the Olympics. These plans and support systems gave the gymnasts greater confidence to compete.





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Summary



view video:
Chinese
Gymnastics
Team - 2012
Olympics

The intervention program provided for the Chinese gymnastics team in the four years prior to the 2008 Beijing Olympics team was judged by all concerned to have been a great success, given that the team won 9 gold medals and 14 medals in total. Paying close attention to the characteristics of gymnastics and by applying fundamental theories of psychology, the interventions included systems for monitoring the psychological condition of the gymnasts, a psychological countermeasure database, and the creation of a positive psychological culture. Technology-assisted mental training strategies and individualised psychological counselling greatly enhanced the gymnasts' mental stability in training and during competition. A battery of systems for psychological monitoring of elite Chinese gymnasts was developed, providing a reference for the establishment of psychological profiles of China's elite gymnasts in preparation for the 2008 Olympic Games and for future Games.

mental stability
in training
and during
competition

Winning the Olympic team events for both men and women in Beijing gave the Chinese gymnasts the opportunity to come to terms with their painful failure four years earlier in Athens. Huang Yubin, Head Coach of the Chinese gymnastics team, praised the psychological control of the team in Beijing, "*the veterans kept the team psychologically stable, and the newcomers also did their job well*" (Yu, 2008a). Pommel horse gold medallist, Xiao Qin, said that winning the team event and the host of individual gold medals that followed had "*finally released the pressure that had built up for so many years*" (Yu, 2008b). Following the success of the intervention, similar techniques were used when preparing China's gymnasts for the 2012 London Olympic Games. Even without the home advantage, the Chinese team topped the gymnastics medal table again with 5 gold medals and 12 medals in total, retaining its grip on both the men's and women's team titles in the process.

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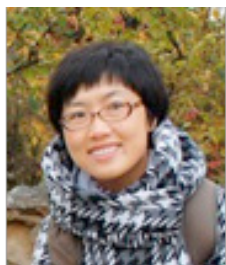
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Lu Min PhD graduated from Beijing Normal University in 2009, conducted postdoctoral research at the National Key Laboratory of Cognitive Neuroscience and Learning of Beijing Normal University, and now works at the Key Laboratory of Mental Health in the Institute of Psychology of the Chinese Academy of Sciences. As an applied practitioner, she has previously provided psychological counselling to the Chinese Women's National Basketball team, the Chinese National Youth Basketball team, and the Chinese Women's National Softball team. She has served as psychological consultant for the Chinese National Gymnastics Team since 2006 and for the Chinese National Figure Skating team since 2009.



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