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**PERSONAL AND SITUATIONAL PREDICTORS OF CHINESE COLLEGE
ATHLETES' USE OF COPING STRATEGIES AS A FUNCTION OF GENDER
AND SKILL LEVEL**

By
Qiwei Gan

A Dissertation Submitted to
the Faculty of The Graduate School at
Middle Tennessee State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Murfreesboro, TN

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QIWEI GAN, PhD. Personal and Situational Predictors of Chinese College Athletes' Use of Coping Strategies as a Function of Gender and Skill Level (2005). Directed by Dr. Mark H. Anshel.

ABSTRACT

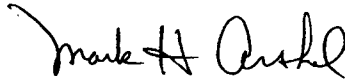
The purposes of this study were to determine the personal and situational factors that predict participants' coping styles in response to sport-related stressful events, to determine the relationships between the acute stressors, appraisal, and coping styles, and to determine the extent to which the coping process differs among athletes as a function of gender and skill level.

A total of 400 college athletes as participants were selected from China. Five stress factors were abstracted from 20 stressors by exploratory factor analysis. MANOVA and Chi-square results indicated that skill level significantly influenced the athletes' perceived intensity of the stress sources, appraisals, and coping style, while gender significantly affected participants' appraisals and coping styles. Three stress sources (Threats-from-Others, Coach-Dissatisfaction, and Environmental-Sources) and two appraisals (Control-by-Self and Control-by-Others) significantly predicted the athlete's coping style. Results of the study supported the transactional coping theory in which coping with stress is a function of both personal and situational factors. It was also concluded that athletes' coping styles is a function of gender and skill level. Implications of these findings for stress management training are discussed.

APPROVAL PAGE

PERSONAL AND SITUATIONAL PREDICTORS OF CHINESE COLLEGE
ATHLETES' USE OF COPING STRATEGIES AS A FUNCTION OF GENDER AND
SKILL LEVEL

Committee Chair

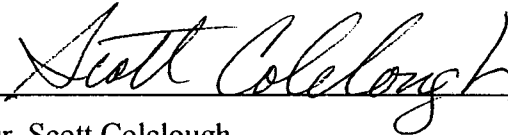


Dr. Mark H. Anshel

Committee Members



Dr. Jwa K. Kim



Dr. Scott Colclough

HPERS Department Chair



Dr. Dianne A. Bartley

Dean of Graduate Studies



Dr. Abdul S. Rao

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Chapter I

Introduction

Stress can directly and indirectly contribute to disorders of the body and mind. Previous evidence indicates that stress raises blood pressure and heart rate. Stress can also impact physical performance. Psychological and physiological studies reveal that stress decreases athletes' athletic ability and negatively influences athletes' performances.

A primary component of stress is a person's appraisal of an event. Appraisal "refers to the ways in which people interpret their environment and the stimuli that impinge upon them" (Stephens & Vogele, 1986, p. 243). According to Fontana and McLaughlin (1998), "Stressful appraisals of stressors are positively associated with various indices of cardiovascular dysfunction and disease" (p. 6). In the appraisal process, the perceived stimulus by the person, which then determines if the stimulus is stressful. This process may happen frequently in competitive sports activities. Athletes make appraisals to different stimuli to determine if they are under stressful, unpleasant, or threatened situations. Appraisal is central to transactional theories of stress and emotion. Another feature of the athlete's response to competitive stress is coping.

Hardy, Jones, and Gould (1996) contend that "Compared to the general psychology literature there is a paucity of sport psychology coping research. In fact, prior to the late 1980s there were almost no articles published on the topic" (p. 214). Over the last two decades, however, coping with stress has become an attractive research area in sport psychology.

Coping is defined as a person's conscious attempt at managing the demands and intensity of events perceived as stressful or improving one's personal resources, self-control, and confidence, in attempting to reduce or manage one's perceived stress intensity (Lazarus, 1999). To Frydenberg (2004) "Coping is a function of the situational determinants and the individual's characteristics, perception of the situation, and coping intentions" (p.15).

Research Problem

The research problems of this dissertation are:

1. To examine the relationships between sources of acute stress, cognitive appraisal, and coping style among competitive Chinese athletes.
2. To examine the extent to which the athletes' cognitive appraisal, defined as perceived controllability, is associated with their coping style in response to selected sources of acute stress.
3. To determine the factors that influence Chinese college athletes' coping styles.
4. To compare male and female Chinese athletes at the elite and non-elite levels on these measures.

The following research questions will be examined:

1. What are sources of acute stress in sport that are appraised as highly intense among Chinese college athletes?
2. Do sources of acute stress in sport differ as a function of skill level?
3. Do sources of acute stress in sport differ as a function of gender?
4. Is there any interaction of gender and skill level on sources of acute stress?
5. Do cognitive appraisals in sport differ as a function of skill level?

6. Do cognitive appraisals in sport differ as a function of gender?
7. Is there any interaction of gender and skill level on cognitive appraisals among Chinese athletes?
8. Are there any significant relationships between stressors and appraisals, stressors and coping style, and appraisals and coping style?
9. Can sources of acute stress predict the athletes' cognitive appraisal?
10. Can sources of acute stress and appraisals predict the athletes' coping style?
11. To what extent do athletes' coping styles differ as a function of gender?
12. To what extent do athletes' coping styles differ as a function of skill level?

Significance of the Study

The significance of this study is the paucity of published literature in the area of examining the personal (e.g., coping style, appraisal) and situational factors (e.g., stressors) that explain and predict the use of coping with acute stress as a function of gender and skill level among competitive athletes. Predicting an athletes' coping style and their selection of coping strategies will provide coaches and sport psychology consultants with an improved understanding of the factors that influence ways in which athletes respond to stressful events and to help athletes improve their coping skills. Coping research, in general, is scant, and apparently nonexistent with Chinese athletes. This investigation will make unique contributions to the coping literature by emphasizing the personal and situational predictors on Chinese college athletes' use of coping strategies as a function of gender and skill level.

Study Design

Establishing the relationship between athletes' cognitive appraisals and coping style is the primary focus of this study. The design of this study is based on two suppositions based on existing research: (a) that coping with acute stress is primarily a function of characteristics of the stressful event, the person's appraisal of that event, and their coping style (Aldwin, 1994; Anshel & Wells, 2000; Lazarus & Folkman, 1984); and (b) the transactional theory, also called the transactional model (Lazarus & Folkman, 1984, Folkman & Lazarus, 1985) posits that the use of coping strategies is a function of combined personal and situational characteristics.

The transactional model emphasizes the relationships between environmental demands, the individual's perceptions of these demands, and the individual's ability to handle or manage the demands. Research is needed to ascertain the personal and situational predictors of the athletes' use of coping strategies. According to the transactional theory, factors such as gender, previous sport experience and skill level can predict appraisal and coping with stress in strategies and styles (Anshel & Wells, 2000; Folkman, 1992; McCrae, 1992).

The present study followed the conceptual model in Figure 1.1. The model consisted of determining the intensity of different acute stressors, then determining the participant's appraisal of the stressful situation and, finally, the athletes' use of coping style in response to that stressor. Based on this conceptual model, the athletes' use of coping style as the function of personal and situational factors is the research topic of this study. Previous research indicates relationships between the athletes' use of coping

strategies and situational factors in which stressful events are experienced. The relationships can be expressed by the following equation:

$$S_{ij} = f(P_i, S_j) \quad (\text{Equation 1})$$

where S_{ij} represents the athletes' use of coping style, and f is the function of the two elements (P and S) in the vector. P_i summarizes the individual's response caused by personal characteristics (individual i 's gender, athletic level) and S_j is an individual's response in situation j (cognitive appraisal on stress sources). Based on this equation, the athletes' use of coping strategies can be viewed as the function (f) of personal and situational characteristics.

Delimitations

The following delimitations were evident in this study.

1. Three hundred participants were selected from selected universities in the People's Republic of China (Guangxi Normal University, Guilin, Guangxi; Sichuan Normal University, Chengdu, Sichuan; and ShangRao Normal University, ShangRao, Jiangxi). These schools included a department of physical education and college athletic teams.
2. Other participants have been selected from the seventh Chinese National College Sports Game (2004).
3. Sample size consisted of 400 male and female athletes was based on a power = .80, alpha set at .05.
4. Inventories used in this study consisted of the findings from earlier research rather than from validated inventories related to competitive sport.

5. An authorized linguistic expert translated all inventories for this study. The inventories first were developed in English, and then translated into Chinese. This delimitation was to help ensure the internal validity and reliability of the inventories.

Limitations

1. This research was limited to Chinese college athletes who are currently students in physical education or college team members. This limits the generalization of the results of this study to other populations.
2. The questionnaires in this study were translated into Chinese received psychometric validation. The environment in which participants complete the inventories varied (e.g., completed in groups or individually), although all inventories were anonymous and the data will be confidential. Some participants completed the survey in a classroom setting, while others completed the survey before a competitive event. In all cases, the coach was not present.

Assumptions

The following assumptions were included in this study:

1. The inventories used in this study reflected the psychological content of cognitive appraisal and coping.
2. The participants responded honestly and candidly to the questionnaires.
3. The Chinese translation of the English generated inventory was accurate
4. The Chinese version of the inventories was reliable and valid.

Purpose of the Present Study

The purposes of this study were: (a) to determine the personal and situational factors that predict participants' coping style in response to sport-related stressful events experienced by competitive Chinese athletes, (b) to determine the relationship between cognitive appraisal and coping style in sport, and (c) to determine the extent to which the coping process (e.g., sources of acute stress, cognitive appraisal, and coping style) differs as a function of skill level and gender among male and female college athletes from China.

Hypotheses

Based on the research questions, the following hypotheses were tested in this study:

1. For Chinese college athletes, specific sources of highly acute intense sport-related will be identified.
2. There will be a significant difference on sources of acute stress in sport between Chinese elite and non-elite college athletes.
3. There will be a significant difference on sources of acute stress in sport between Chinese male and female athletes.
4. There will be a significant interaction effect of skill level and gender on sources acute stress.
5. There will be a significant difference on stress appraisals in sports between Chinese college elite and non-elite athletes.
6. There will be a significant difference on stress appraisals in sports between Chinese college male and female athletes.

7. There will be an interaction effect of gender and skill level on stress appraisals in sports.
8. There will be significant relationships between stressors and appraisals, stressors and coping style, appraisals and coping style.
9. There will be a significant regression line to predict Chinese college athletes' cognitive appraisal with particular factors of acute stress sources.
10. The linear combination of stress sources and appraisals would be a significant discriminant function for Chinese college athletes' coping styles.
11. Chinese college athletes' coping styles will be influenced by gender.
12. Chinese college athletes' coping style would be influenced by skill level.

Operational Definitions

Appraisal: A process through which an individual judges the meaning and the significance of a particular situation.

Approach coping: Describes coping that consists of active steps taken to alleviate the effects of the stressor.

Avoidance coping: Describes coping that involves the shunning of anxiety-inducing stimuli and their consequences.

Coping: The conscious response to a stressful situation affected by environmental and personal factors in a sport setting.

Coping strategy: An athlete's cognitive or behavioral conscious reaction to a stressor.

Coping style: An individual's tendency to use a certain type or category of coping strategy in response to acute stressors.

Stress: A stimulus or circumstance causing mentally or emotionally disruption.

Stressor: A situation or event that provokes stress.

Transactional model: A fundamental theory of coping in which coping is the result of the relationships between environmental demands, perceptions of those demands, and the individual's ability to handle or manage the demands.

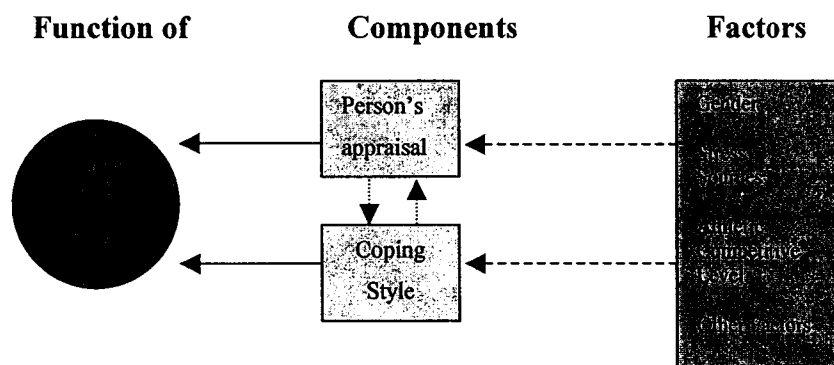


Figure 1.1 Conceptual Model of Coping with Acute Stress in Sport in the Present Study

Chapter II

Review of Literature

Introduction

The topic of this study concerns Chinese college athletes' cognitive appraisal and coping style as a function of gender and skill level. This review will consist of three segments: stress and cognitive appraisal, coping strategies and coping style, and the personal factors of gender and skill level that may influence coping. Stress is an inherent feature of competitive activities. Appraisal is a process through which an individual judges the meaning and the significance of a particular situation. Coping strategies refers to the athlete's response to stress and coping style refers to a disposition that influences an athlete's selection of using certain types of coping strategies after the stress or is appraised. Coping style predicts a person's use of coping strategies (Endler & Parker, 1990a; Krohne, 1993). Hardy, Jones, and Gould (1996) concluded that "there is a paucity of sport psychology coping research. In fact, prior to the late 1980s there was almost no article published on the topic" (p. 214).

Stress

Stress has been defined in different ways (Dewe, 1991). Stress is a medical term for a wide range of strong external stimuli (both physiological and psychological), which can cause a physiological response called the general adaptation syndrome (GAS). Hans Selye (1976) first described GAS in the journal *Nature*. GAS has three stages:

1. Alarm reaction, where the body detects the external stimulus

2. Adaptation, where the body engages defensive countermeasures against the stressor
3. Exhaustion, where the body begins to run out of defenses.

Stress has a significant impact to human being's health, for example, cardiovascular disorders which are the leading cause of death in the U.S. In addition to biological factors, the impact of psychological factors on the cardiovascular system has received extensive attention among researchers. For example, Fontana and McLaughlin (1998) examined coping and appraisal of daily stressors to predict heart rate and blood pressure levels. They found that the more frequent use of certain emotion-focused coping processes in the natural environment can help participants decrease their baseline heart rate levels.

Chronic stress is a continuous stimulation caused by person's expectation on a future activity, such as deprivation, abuse, discrimination, or too high expectation towards a task. For example, an approaching exam may bring a prospect graduate student chronic stress. According to Anshel (1996), chronic stress is the individual's experiences that consist threatening, harmful, or challenging over an extended time period, while acute stress refers to the sudden exposure to stimuli. An acute stressor is a situation or event sudden occurred to bring negative stimulation to individuals. Such as errors, penalties, or unpleasant comments from spectators, could negatively influence numerous cognitive and psycho-physiological processes (Anshel, 1990; Giacobbi, Foore, & Weinberg, 2004; Smith, 1986). These acute stresses cause physiological and psychological responses to influence athletes' performance unfavorably (Anshel & Delany, 2001). Smith and Carlson (1997) contend that 'stressors vary in intensity and can

originate both from within the individual and from his or her environment' (p. 27).

Sources of Stress in Sport

Krohne and Hindel (1988) examined the relationship between general and sport specific trait anxiety, emotional reactions to stress situations, coping dispositions, and athletic performance in 36 Germany top table-tennis players. Their study was called one of the first studies to examine coping in sport and was important because it studied stress and coping simultaneously (Hardy, et al, 1996).

Researchers found that sport violence, sources of worry, athletic injury, athletic Burn-Out, "Bad call" from a referee, getting media attention, an important game, and bad weather conditions are factors that related to athletes' stress (Anshel, 2001a; Junge, 2000; Smith, 1986). These factors also are called situations (Ntoumanis & Biddle, 1998).

Madden, Summers and Brown (1990) examined the acute stress sources of Australian basketball players. They reported that "the ball was stolen by an opponent," "receiving a 'bad' call, penalty from the referee," "missing a lay-up or an easy jump shot," and "team is losing and has no chance to keep the ball" were the highly stress situations.

Various studies have also focused on the stressors that influence referees' coping skills, for example, Goldsmith and Williams (1992) found that verbal abuse from players, coaches, fear of failure, and game-related pressures were sources of high-intensified acute stress among volleyball and football officials.

Anshel and Weinberg (1996) examined the stressors of American and Australian basketball referees based on their responses to each of 15 acute stressors. They reported that abuse by coach, arguing with coach, threats of physical abuse, abuse by spectators,

making a wrong call, controversial call, and presence supervisor were frequent stress sources of relative high intensity. Among these, making a wrong call, verbal abuse by coaches, threats of abuse, being in the wrong location when making a call, and experiencing injury were the top five sources of stress. Their study partially supported the findings of Goldsmith and Williams, who found that “Verbal Abuse for Players and Coaches” and “Fear of Physical Harm” were high acute stressors.

In the process of determining participants’ acute stressors, one way to get the stressors is by calculating the frequency of ranking and percentage to decide the intensity of the stressor (Anshel & Delany, 2001; Anshel, Robertson, & Capui, 1997). For example, Anshel, Robertson, and Capui investigated the acute stressors among Australian police. The participants were asked to rank total 17 stressors in a questionnaire with listed stressors in rank order. The most acute stressors were decided by frequency. All the stressors whose frequencies were less than the overall mean were eliminated.

Another way to assess stress intensity is to use Likert-type scale (e.g., 1= not at all. 5 = very much). Participants were asked to indicate the intensity of the stressors by selecting the scale. Many researchers applied this method (Aldwin & Revenson, 1987; Anshel & Wells, 2000; Kaissidis, 1993; Ptacek, Smith, Espe, & Rafferty, 1994).

Appraisal

Appraisal “refers to the ways in which people interpret their environment and the stimuli that impinge upon them” (Steptoe & Vogele, 1986, p. 243). Lazarus and Folkman (1984) divided appraisal into two categories: primary and secondary. In primary appraisal, the individual evaluates a particular encounter with the environment, and then estimates whether the situation is relevant or important to him (under stress). The primary

appraisal is further divided into three types: irrelevant, benign-positive, and stressful (harm-loss, threat, and challenge). In secondary appraisal, the person assesses what, if anything can be done to overcome or prevent harm, or to improve the situation. Primary and secondary appraisals determine the quality and intensity of the stress to influence coping. Dewe (1993) tried to develop a measure of primary appraisal by factor analyzing the information that was collected from samples on the most important factor that make a work situation stressful for participants. He found five stress components of primary appraisal in work settings. These were losing credibility, being sense a difficult person, feeling you may not achieve, being made to feel responsible, and feeling a sense of injustice.

Appraisal is a process that individuals judge the meaning and the significance of a particular situation for themselves. Based on transaction model, appraisal is also an evaluating process to assess the relationships between a person and the environment. Gratch and Marsella (2004) indicated that the environment not only means the current conditions, but also the events that lead to this situation and future developments. Steptoe and Vogele (1986) claimed “The cognitive appraisal process is often difficult to observe empirically because he individual may be unaware of any or all of the basic elements of an appraisal. However, the appraisal process affects the quality and intensity of the emotional reaction in a given situation” (p. 246).

One form of cognitive appraisal is called perceived controllability. Perceived control examined concerning the extent to which individuals believe that outcomes of events can be attributed to internal (determined by personal cause) or external

(determined by outside forces) sources, controllability, the cause, or the predictability of an event.

Researchers have studied the distinction between stressors that are perceived as controllable and uncontrollable. This distinction is important because perceptions of controllability have been shown to influence coping strategies among adults and children in non-sport studies (Gamble 1994). When stressors were appraised as controllable, adults employ proportionately more problem-focused coping strategies than emotion-focused were used (Folkman, 1984). (Problem-focused and emotion-focused coping is defined later in the coping section.) Individuals will utilize more emotion-focused strategies in highly stressful situations than in less stressful situations.

Researchers have found that perceived controllability of the stressful situation influences individual's choice of coping strategies (Folkman, 1984; Valentiner, Holahan, & Moos, 1994). People are likely to use emotion-focused strategies when they perceive the situation as uncontrollable, whereas if the situation is perceived as controllable, people tend to resort to problem-focused strategies (Folkman, Schaefer, & Lazarus, 1979; Forsythe & Compas, 1987).

Appraisal in Sport

Cognitive appraisal is particularly relevant in the coping process in competitive sport because the manner in which an athlete interprets a stressful event mediates the level of perceived stress intensity and influences his or her coping responses (Anshel, 2001a; Steptoe & Vogele, 1986). Anshe and Delany (2001) contend that in sports "one critical mediator of an athlete's selection of coping strategies is his or her cognitive appraisal of the event or situation" (p. 330).

Appraisals influences the use of particular coping methods include situational characteristics (Gould, Eklund, & Jackson, 1993), as well as person characteristics (Carver, Scheier, & Weintraub, 1989). Anshel, Jamieson, and Raviv (2001) studied the manner in which skilled athletes interpreted and coped with acute stress during sport competition. The results of this study indicated significant relationships between appraisal and stressors, appraisals and coping strategies. These relationships differed as a function of the source of stress. Their results confirmed that appraisal influence subsequent use of coping strategies.

Anshel and Delany (2001) studied the cognitive appraisals, coping strategies and coping styles of female and male child athletes in Australia. The responses of participants on different sources of acute stress showed that the referee's "unfair" call and "made an error" were the most frequently cited sources of acute stress for both genders. After experiencing most stressors, the athletes tended to make negative cognitive appraisals (72% and 58% for males and females, respectively) followed by an avoidance coping strategy. Approach coping, on the other hand, was more common following positive appraisals. The study indicated there was a positive relationship between approach coping and appraisal. The results suggest that examining positive and negative appraisals, approach, and avoidance coping strategies forms an appropriate conceptual framework in future research in understanding the coping process among child athletes.

In the context of competitive sport, cognitive appraisal consists of evaluating the significance of a particular stressful encounter, for example, making a physical or mental error. It means that participants' cognitive appraisal relate to athlete's psychological and physical well-being and performance quality (Anshel, 2001a).

Based on the transactional model, Anshel and Wells (2000) examined the degree to which basketball players in Australia were consistent in their cognitive appraisals and coping strategies in response to particular stressful events. The authors predicted that both approach and avoidance coping strategies would be dependent on the type of stressful event, in accord with the transactional model. The results supported that prediction: Approach strategies were more prevalent than avoidance strategies following 3 of the 4 events. Cognitive appraisals and perceived stress intensity also strongly influenced the participants' use of coping strategies, accounting for 34% of the variance. The results supported the transactional model and showed that cognitive appraisals and perceived stress intensity strongly influenced the participants' use of coping strategies.

Coping

According to Lazarus and Folkman (1984), coping is “a process of constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands or conflicts appraised as taxing or exceeding one's resources” (p. 41). Coping represents cognitive, affective, and behavioral efforts to manage specific internal and external demands (Crocker, Kowalski, & Graham, 1998; Lazarus, 1999; Lazarus & Folkman, 1984).

The transaction and trait coping models are the two theoretical frameworks for researchers to study coping strategies in sports (Anshel & Wells, 2000). The transactional model is assessed in relation on specific stressful conditions or in relation to a combination of personal dispositions and situational variables (Folkman, 1992; Terry, 1991). The transactional model defines coping as the relationships between environmental demands, a person's perceptions of the demands, and the individual's

ability to handle or manage them. The transactional model involves the interaction between an individual's situational appraisal and coping responses.

The trait model is based on the assumption that a person's use of coping strategies is consistent across situations. Personal dispositions would affect and predict the individual's coping responses in a given situation. The influence of personality traits in coping will generalize across situations. The trait model was criticized by Lazarus and Folkman (1984). Lazarus and Folkman did not think that coping was a static process. According to Ntoumanis and Biddle (1998), "A central theme in Lazarus's theory is that coping is highly contextual, varying across situations and within different stages of the same situation" (p. 773).

Coping with acute stress is a function of the competitor's perception, or appraisal, of a situation. This function expresses the extent to which a person believes that he or she can shape or influence a particular stressful person-environment relationship (Anshel, 1996; Lazarus & Folkman, 1984). Coping with acute stress is primarily a function of three components: the characteristics of the stressful event, the person's appraisal of that event, and the coping strategies used by the person (Lazarus & Folkman, 1984). Coping is a person's conscious attempt at managing the demands and intensity of events perceived as stressful or improving one's personal resources, self-control, and confidence in attempting to reduce or manage one's perceived stress intensity (Lazarus, 1999). Coping is a strategy use to reduce stress in response to an event or stimulus appraised as threatening or harmful.

Coping also is defined as any conscious effort to deal with stressful demands, consisting of learned behavioral responses that successfully lower stress by limiting the

importance of a dangerous or unpleasant condition (Stone, Kennedy-Moore, Newman, Greenberg, & Neale, 1992). McCubbin, Thompson, and McCubbin (1996) define coping as actions taken by persons directed at confronting demands, solving problems, and/or altering and managing stressors.

Coping is referred as the thoughts and acts that individual applied to manage the internal and external demands posed by a stressful encounter (Fontana & Mclaughlin, 1998). Researchers questioned whether coping are both an automated and a conscious response (Crocker, Kowalski, & Graham, 1998; Hardy, Jones, & Gould, 1996). Coping was subordinated to defense in the clinical context, “which was thought to be a largely unconscious process, and the stressors to which it was applied were primary intrapsychic conflicts” (McCrae, 1984, p. 919).

Determinants of coping, according to Terry (1991) include coping resources and situational appraisals. Terry contends “Coping resources are available to a person when they develop their coping strategies” (p. 32). Coping is consisted by internal control beliefs, self-esteem, neuroticism, denial, and social support. To Terry, “Central to a person’s appraisal of a situation is the extent to which it is considered to be stressful” (p. 1032). Events can be appraised in ways that promote or reduce stress such as controllability, importance of a situation, and self-efficacy.

Folkman and Lazarus (1985) classified coping as problem-focused and emotion-focused. Problem-focused coping involves strategies to manage or alter the stressor. Problem-focused coping attempts to address the cause of the person-environment interaction. Examples of problem-focused are such as planning strategies or increasing effort to coping stress. Intentional use of humor and laughter could be viewed as a

problem-focused approach to stress coping (Iwasaki, MacKay & Mactavis, 2005). Specifically, deliberately finding positives in the midst of stressful encounters is a problem-focused approach to dealing with stress. Emotion-focused coping involves regulating emotional responses resulting from a stressor (Holt & Mandigo, 2004; Lane & Jones, 2002), such as wishful thinking, relying on emotional social support, self-blame or venting of emotions.

In problem-focused coping, the person attempts to change the individual-environment relationship that “causes distress by acting directly on the environment or on oneself” (Fontana & McLaughlin, 1998, p. 6). For emotion-focused coping, the person tries to alleviate stressful emotions associated with encountering a stressor.

According to Crocker, Kowalski, and Graham (1998), problem-focused coping is consisted by different components: information seeking, planning, suppression of competing behavior, increasing efforts, and problem-solving. The components of Emotion-focused are avoidance, acceptance, wishful thinking, denial, self-blame, etc. that can be identified mental and behavioral withdrawals.

In addition, Compas (1987) reported that studies with adults indicated that both problem and emotion-focused coping strategies are used during almost all stressful episodes. Emotion-focused coping consists of efforts to regulate emotional states associated with or resulting from the stressor (Leventhal, Suls, & Leventhal, 1993). These efforts also influence the manner in which the individual attends to appraise the stressor.

Most studies support the idea that high levels of stress would be positively associated with emotion-focused coping, and negatively related to problem-focused coping (Terry, 1991). However, Terry’s found contrary results. Terry examined the

effects of both coping resources and the situational variable by taking a psychology exam. She found that “at high levels of stress, problem-focused coping was more likely to be utilized than at a low level of stress” (p. 1044).

The Coping Process

The coping process begins with an individual’s appraisal to stressor of a specific environment. The environment or situation plays a critical role in initiating the stress appraisal process. Dispositions influence the ongoing appraisal of threats and resources (Buntrock & Reddy, 1992).

In the first coping stage (see Figure 2.1), experiencing an event appraised as stressful triggers coping. After perceiving a stimulus or experiencing an event, cognitive appraisal evaluates the perceived stress intensity and perceived controllability. Appraisal is an important first step in the coping process.

The results of appraisal influence the choice of the athlete’s coping style which influences the use of coping strategies, using either approach or avoidance coping, each consisting of either cognitive (thoughts) or behavioral strategies (actions).

The third stage, post-coping activity, includes reappraising the stressful situation, examining the effectiveness of the coping strategy and going off task. Post-coping activity is a feedback loop to determine whether the strategies are appropriate or are used again or rejected for future use. In summary, appraisal of the situation, the coping actions, and post-activity are three important components that make up the coping process.

Besides the three-stages process of coping, the coping process has also been characterized into four steps (Smith & Carlson, 1997). These include determining if the event is stressful and whether it is controllable; (b) selecting coping strategy; (c) carrying

out the coping strategy; (d) evaluating one's coping efforts to reduce the effect of stressor or manage individuals' coping responses.

Coping Strategies

In the general psychology literature, Folkman, Lazarus, Dunkel-Schetter, Delongis, and Gruen (1986) identified eight coping strategies: confront coping, plan problem solving, distancing, self-controlling, accepting responsibility, positive reappraisal, escape-avoidance, and seeking social support. Pico (2001) investigated the coping structure in an adolescent population and identified four coping strategies by factor analysis. These four factors were named passive coping, problem-analyzing coping, risk coping, and support-seeking coping. The first three, according to the researcher, reflect the dimensions of coping found in other research, whereas risk coping, a new dimension, "consists of risk-taking behaviors as drinking, eating, smoking, using drugs, or doing something very risk (p. 231).

Anshel (2001a) emphasized the difference between approach and avoidance coping strategies that "Approach coping strategies reflect the intensified intake and processing of unpleasant or threatening information" and "avoidance coping strategies reflect a consistent attempt at physically or mentally turning away from stressful sources" (p. 228). They are different concepts with approach coping style and avoidance coping style that will be talked later. According to Roth and Cohen (1986) and Anshel (2001b), to improve one understands or control of the stressful situation is main objective of approach coping strategies (approach coping). For avoidance coping strategies (avoidance coping), the main objective is to maintain focus on the task.

Anshel and Kaissidis (1997) found that high-perceived controllability would be positively related to approach coping and negatively related to avoidance coping. In the following study, Kaissidis-Rodafinos and Anshel (2000) testified that approach coping was more predictable than avoidance coping in accounting for both situational and personal variables. Buffard and Crocker (1992) found that individuals with physical disabilities did not use a consistent coping across three challenging physical activity settings. Their study indicated that coping consistency might also be affected by psychological factors related to specific demands.

Coping in Sport

In the research on coping strategies used by U.S. Olympic wrestlers, Gould, Eklund, and Jackson (1993) reported 20 members of the 1988 U.S. Olympic Wrestling Team regarding their efforts to cope with stress experienced during the Seoul Olympics. The coping strategies that wrestlers employed were (a) thought control strategies, (b) task focus strategies, (c) behavioral based strategies (changing or controlling the environment, following a set routine), and (d) emotional control strategies. Gould, Pinch, and Jackson, (1993) studied coping strategies used by national champion figure skaters. They found that coping strategies for national champion figure skaters included rational thinking, mental preparation prior to competitions, hard training, and improving partner relationships. Stress sources included physical and psychological demands, external experiences of success, and relationship pressures.

Crocker (1992) investigated how competitive athletes cope with stressful athletic events based on the transactional model (Lazarus & Folkman, 1984) to examine coping strategies used by competitive athletes in stressful athletic situations. The results of the

study indicated that athletes used a wide range of cognitive and behavioral strategies to manage sport related stress. Results of their factor analysis indicated eight dimensions of coping. These were active coping, problem-focused, social support, reappraisal, wishful-control, detachment, and self-blame. These factors appear to have important functional significance to sport.

An investigation of runners' coping strategies revealed that all participants utilized at least one strategy within each of the four coping subtypes (somatic, behavioral, cognitive, and social), with social and cognitive strategies being the most frequently used. Social strategies also were perceived to be the most effective in reducing pre-competitive anxiety. (Campen & Roberts, 2001).

As indicated earlier, researchers have identified coping strategies categorized and as approach and avoidance (Anshel & Kaissidis, 1997; Krohne & Hindel, 1988). An approach strategy consists of confronting the source of stress and attempts to reduce it deliberately. Avoidance coping consists of avoiding of the anxiety-inducing stimuli (Anshel & Kaissidis, 1997).

Krohne and Hindel (1988) found that successful elite table tennis players used avoidant coping strategies less state anxiety following performance errors than their less successful teammates (Krohne & Hindel, 1988). They concluded that elite players than their less successful counterparts used avoidance coping more often. Another study by Madden, Summers, and Brown (1990) provided evidence that avoidance coping may be more efficient than approach coping. They found that avoidance coping was not significantly related to basketball players who had a higher stress level.

Anshel (1996) found that approach coping were more common following stressful events that reflected greater situational control, while avoidance coping was more likely under low controllable conditions. Anshel and Kaissidis (1997) found that the basketball players used more approach coping than avoidance coping during the games. The results concluded that “Avoidance coping is associated with reduced perceived stress in acute stress situations, at least in competitive basketball” (p. 275).

Different results were found from a research on basketball officials (referee). With reduced perceived intensity of acute stress, Anshel (2000) reported that basketball officials use avoidance coping more often than approach coping. Greater use of approach coping was significantly related to increased stress. “This finding implies that, although basketball referees may feel compelled to use approach responses during their games (e.g., by giving technical fouls to coaches for inappropriate behavior), avoidance responses may be more adaptive than approach responses” (p. 340).

Lane, Jones and Stevens (2002) investigated the relationship between self-esteem, coping strategies, and changes in self-efficacy following defeat in a tennis tiebreak competition. Researchers found that self-efficacy reduced significantly more in the low self-esteem group. Maladaptive coping strategies such as behavioral disengagement and self-blame, were associated with low self-esteem. It is suggested that interventions to reduce the potentially debilitating effects of failure on self-efficacy should focus on using adaptive coping strategies.

Holt and Mandigo (2004) examined the nature and extent of coping strategies used in response to performance worries among male youth cricket players. The study

results indicated that making mistakes related primarily to performance worries.

Participants used both of problem-focused and emotion-focused strategies.

To extend their previous findings that individuals with physical disabilities did not use a consistent coping across three challenging physical activity settings, Crocker and Isaak (1997) investigated young swimmers to examine if these athletes use consistent coping strategies in different swim events. The results confirmed their previous study (Buffard & Crocker, 1992) indicating a difference in coping consistency between training and competition situations.

In a most recent coping strategy study to determine if athletes use coping strategies consistently, Louvet and Genty (2004) examine coping patterns of French soccer players. They found that the players changed their coping strategies significantly over the time. The high-level players controlled their emotions and coped with stressful events using cognitive techniques. These results support the transactional model that coping is constantly changing as the nature of the person-environment relationship changes.

Anshel (1997) examined the links between situational appraisals, coping style, and the subsequent use of coping strategies in response to acute stress among competitive Australian basketball players. He found that participants used approach and avoidance coping responses differently across the sport-related stressful situations. For avoidance coping, situational appraisals were better predictors of than personal dispositions.

Coping Styles

Athletes possess an orientation, or disposition, toward using a preferred coping strategy. This disposition is called coping style. Coping styles also called dispositional

coping are “methods of coping that characterize the person’s reactions to stress either across different situations or over time within a given situation” (Compas, 1987, p. 394). Coping style, which was measured in the present study, reflects a consistent manner of dealing with stressors across time and situations. “Coping styles differ from a person’s use of coping strategies in that a style refers to a relatively stable disposition that reflects coping tendencies over time, while a strategy refers to a person’s situational coping attempt” (Rawstorne, Anshel, & Caputi, 2000, p.1).

Researchers contend that coping style reflects the tendency of person to respond in a predictable manner under particular stress situation (Anshel, 2000). Roth and Cohen (1986) dichotomized coping styles into approach (also referred to as sensitization, engagement, vigilance, or attention) and avoidance categories.

Coping Styles in Sports

In the current reviewed sport psychology literature, researchers have taken two main directions, examining factors that influence coping strategies and the disposition of coping styles. Coping strategies are concerned with an athlete's actual coping response following a particular event appraised as stressful. Coping style, on the other hand, concerns the athlete’s usual, preferred method of coping; it measures the athlete's ‘typical’ coping responses to each of several stressors or stressful situations as previously experienced in sport competition (Anshel, 2001a). In the real world, individuals respond to stressful events with different manners. This manner or tendency is called coping style. It is the fundamental difference that we distinguish coping strategies and coping style (Anshel, 1999). Anshel contended that researchers and theorists had provided different labels and categories of coping styles.

Anshel and Caputi (2000) emphasized the differences between coping strategy and styles. Coping strategy refers to a person's situational coping attempt. Coping style, on the other hand, refers to a relatively stable personal disposition. Anshel and Caputi thought that it was very important to identify an athlete's coping style, because it could reflect the need to provide researchers, coaches, and athletes with information that might explain the antecedents, underlying causes, and predictors of perceived stress and, ultimately, coping effectiveness.

The popular conceptual framework for examining coping style in the general psychology literature (Endler & Parker, 1990a; Roth & Cohen, 1986; Suls & Fletcher, 1985), and in sport psychology (e.g., Anshel, 1996; Anshel & Kaissidis, 1997; Anshel, Williams, & Hodge, 1997; Krohne & Hindel, 1988) concerns approach and avoidance (Anshel, 1999, 2001a). These researchers pointed out that athletes who wish to reduce emotional arousal or are engaging in continuous tasks and open, unstable environments should use cognitive avoidant coping strategies, while approach coping is usually preferred under conditions of high controllability, when obtaining information or social support are desirable, and when there is ample time to address the source of stress. Approach /avoidance coping style are different concepts with approach/ avoidance coping strategies or approach/avoidance coping that talked in the previous paragraph.

To explain the difference between approach and avoidance coping styles, Anshel (2000) suggested two examples of approach and avoidant coping styles. One example consists of approach coping, which might be an athlete who engages with the referee after receiving a penalty, either positively (e.g., asking for information about the reason for the penalty) or negatively (e.g., arguing the call). Avoidance coping, on the other

hand, might occur when athlete psychologically discounts the referee's penalty call by labeling it as "unimportant" or as the referee's "mistake," and then quickly attends to forthcoming task demands. Approach and avoidance coping style is evident in response to stressors. Coping style was moderately consistent across different situations (Anshel & Caputi, 2000).

Anshel and Wells examined the personal and situational variables to describe coping with acute stress in competitive sport with 147 Australia amateur basketball players (2000). Their results provided evidence for greater use of approach coping than avoidance coping style following the specific stressors. This finding was contrary with Krohne and Hindel's report in which avoidance coping was preferred among players. In another study, Anshel and Anderson (2002) reported that approach coping was significant related to negative affect.

Researchers have questioned whether coping is stable or athletes use a consistent coping style to manage competitive demands. According to transaction model, individuals have a preferred set of coping strategies that applied across time and different situations (Crocker & Issak, 1997). Individuals always use a similar coping style within a specific area. Many researchers support this model and agree that athletes cope in a consistent fashion and such styles can predict performance, psychological or health variables (Madden, Kirkby, & McDonald, 1989; Madden, Summers, & Brown, 1990; Prapavessis & Grove, 1995).

In an experimental design, Wang, Marchant, and Morris (2004) actually manipulated pressure to examine the relationship between coping styles and choking of basketball players. They concluded that approach coping style is related to choking, and

avoidance coping style is not. “Approach coping style is positively associated with increased intensity of cognitive A-state, and an avoidance coping style is negatively related to the intensity of cognitive A-state.” (p. 89).

Coping as a Function of Gender

Besides cognitive appraisal, additional factors that influence the use of particular coping strategies include gender (Anshel, Porter, & Quek, 1998; Anshel, Jamieson, & Raviv, 2001). As an important factor that potentially influences human’s cognitive appraisal and coping, gender differences have received far more attention in the both general and sport psychology literature. One of the conceptual models used to study gender and coping with stress is socialization theory (Pearlin & Schooler, 1978; Petcek, Smith, & Zanas, 1992). Socialization theory posits “women have been socialized in a way that less adequately equips them with effective coping patterns” (Pearlin & Schooler, 1978, p. 15). According to this theory, women are taught to express their emotions more openly and to act in a more passive manner, whereas men are taught to approach situations in a more active, problem-focused, and instrumental manner (Folkman & Lazarus, 1980).

Role constraint theory (Rosario, 1988) argues that gender differences in coping may be explained by the social roles for women and men. Social roles can be changed as the society developing. Thus, socialization theory would predict that gender differences in coping strategy use would be found across situations and social roles, whereas role constraint theory would predict that if individuals occupy the same social role, gender differences in coping strategy use would disappear.

Sigmon, Stanton, and Snyder's research results supported for both socialization and role constraint theories (1995). Effectiveness and frequency of coping strategy use were moderately correlated. Gender differences in cognitive appraisal varied with dispositional as opposed situational assessment.

Hobfoll, Dunahoo, Benporath, and Monnier (1994) found women were more pro-social than men in their coping but no less active. Men were more likely to use antisocial and aggressive strategies, but were less assertive coping strategies than women. Antisocial and passive strategies tended to be related to lower mastery and more traditional gender-role orientation. Active coping was related to lower emotional distress for men and women, but both pro-social and antisocial coping were related to greater emotional distress for men. Significant gender differences in coping styles also have been reported by Anshel & Kaissidis (1997); Anshel, Williams and Hodge (1997); Anshel, Jamieson, and Raviv (2001).

Previous studies have found gender difference resulted in different perceived intensity of stress, different stress appraisal, and different coping response with different coping strategies. For example, in an exploratory study on gender and gender-role orientation differences with eighth-grade and ninth-grade public junior high school students, Washburn-Ormachea, Hillman, and Sawilowsky (2004) reported that arguments/fights with same-sex friends was the most frequently reported stressful event. Girls reported more arguments/fights with opposite-sex friends. Boys reported more physical fights and threats. Another research to investigate the interrelationships among coping styles, gender roles, and level of depression for early adolescents concluded that girls displayed more depression than boys, and more highly depressed girls demonstrated

coping patterns similar to those of depressed adolescent and adult women (Broderick & Korteland, 2002).

Some researchers reported that females apply more avoidance coping than do males (e.g., Reid, Dubow, & Carey, 1995). Other researchers got the contrary results that suggest females' use more approach coping strategies and males use more avoidance coping strategies (e.g., Phelps & Jarvis, 1994). Some others suggest that there is no significant difference between male and female on coping strategies (e.g., Causey and Dubow, 1993).

Crocker and Graham (1995) had different view on gender effect in coping. They examined the effects of gender difference in coping. They reported that there was no substantial difference between males and females. Lopez; Mauricio, Gormley, Simko, and Berger (2001) found no gender differences in coping, in contrast to previous researchers (Spivak & Shure, 1985; Stark, Spirito, Williams, & Guevremont, 1989). Ntoumanis and Biddle (1998) also argued, "it is not clear whether these reported gender differences were a function of gender or whether they are contaminated by differences in other variables examined, namely skill level and culture" (p.775). Gender difference in coping with stress is still an attractive research topic up today.

Coping as a Faction of Gender and Skill Level in Sport

Various studies have focused on the extent to which gender influences the personal dispositions between elite and non-elite athletics. In one particularly extensive study in this area, Gill (1992) examined the psychological characteristics and behavioral between elite and nun-elite athletes. The results indicated similar psychological characteristics and behavioral tendencies in the elite athletes. This situation did not occur

in non-elite athletes, who revealed different psychological characteristics and behavioral tendencies. Mahoney, Gabriel, and Perkins (1987) reported that non-elite women athletes tended to be more anxious and less self-confident than did non-elite male athletes.

Hammermeister and Burton (2004) contend that the question about gender difference in coping with stress in sports remains largely unanswered. They investigated endurance athletes to assess whether male and female endurance athletes exhibit different appraisal and coping strategies. Their results indicated no gender differences on competitive state anxiety and no gender difference for perceived threat between the gender groups. However, there were gender differences on the secondary appraisal process. Williams and Krane (1992) reported that gender differences were significant in both state anxiety and state self-confidence.

In a study of Singaporean athletes, Anshel, Porter, and Quek (1998) was concerned with the extent to which gender differences was associated with the use of coping strategies following seven acute stressors commonly experienced during competition. Results generally supported evidence for predicting the use of coping strategies as a function of the athlete's gender. In addition, the use of approach coping strategies was associated more often with males than females, and with some types of stressful events more than others. Their results indicated that elite female athletes possess similar psychological characteristics to their male counterparts. Both male and female athletes' coping patterns exhibited far more similarities than difference. The results strongly suggest consideration of gender as a factor for further study of the coping process following acute stress in sport.

Various studies have focused on the extent to which skill level influences the stress intensity perceives, appraisal, and use of coping strategies. For instance, skill level has been viewed to be an important individual difference variable in coping research. Neil, Mellalieu, and Hanton (2004) reported elite athletes perceived a lower intensity of stressful events than did non-elite athletes. Elite athletes reported higher self-confidence and a more facilitative interpretation of symptoms associated with worry. Elite athletes also reported more effective use of problem-focused coping than non-elite athletes.

Summary

Coping is a strategy use to reduce stress in response to an event or stimulus appraised as threatening or harmful. The coping process consists of cognitive appraisal, coping response, coping strategy selecting, and post-coping activity. Acute stressors in sport, such as errors, penalties, or unpleasant comments from spectators, could negatively influence numerous cognitive and psycho-physiological processes. Appraisal is an important first step in the coping process. The results of appraisal influence the choice of coping style to take the strategies. Coping style reflects a consistent manner of dealing with stressors across time and situations. Coping strategies consist of reaction to a stressor. Gender and skill level are important factors that potentially influences human's cognitive appraisal and coping.

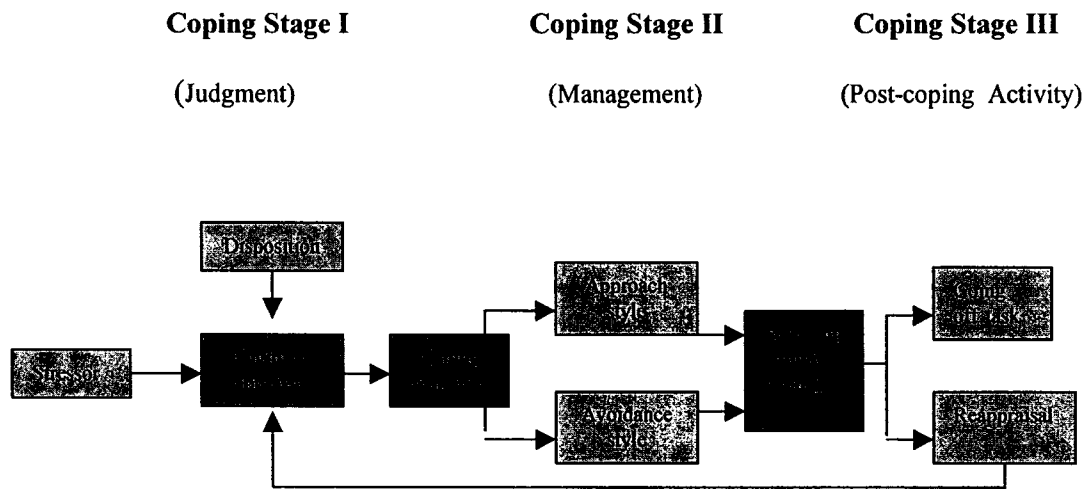


Figure 2.1 Coping Process

Chapter III

Methods

Participants

Sample size consisted of 400 male and female athletes based on a power = .80, alpha set at .05. A total of 300 participants were selected from three universities in the People's Republic of China (Guangxi Normal University, Guilin, Guangxi; Sichuan Normal University, Chengdu, Sichuan; and ShangRao Normal University, ShangRao, Jiangxi). These schools include a department of physical education, sport, or athletics. Other participants were selected from the seventh Chinese National College Sports Game (2004) volleyball Championship.

Table 3.1 displays the frequency information of the participants. 104 participants came from Guanxi Normal University (76 males and 28 females); 96 participants from Shangrao Normal University (58 males and 38 females); 100 from Sichuan Normal University (88 males and 12 females); 100 were athletes participated the 7th Chinese National College Volleyball Championship, Shanghai, 2004. They came from 12 universities national wide located. Female were 139 and male 261.

Participants offered the information on gender, sport item, and nature of game attended (team or individual item), the level of competition (high school, college, county, province or national professional, etc. total six classes). Total participants have been divided into different groups by the related characteristics, for instance, athletic level (sport experience) and gender.

Participants were required to complete a consent form that explained the general purpose of the study, and informs them that they may withdraw from the study at any time without penalty or hardship to their future participations on the team. The Institutional Review Board of Middle Tennessee State University approved the procedures and interview content. The same documents will send to the four schools in China.

Materials

A survey (interview) was generated to determine the participants' sources of acute stress that they have encountered during a previous sport event, the coping style they usually employed in response to the specific stressors, the perceived controllability of the stressor (measure of appraisal), their use of coping strategy following their appraisal. Survey materials included an interview guide, acute stress sources identification, stress appraisal, and coping style identification. See Appendix B for a copy of the inventory.

Interview Guide (Appendix A). To minimize interview bias and ensure that all participants were asked identical questions, an interview guide was used to ensure that similar questions were asked in the same sequence. Before the survey was introduced, the test administrator told the participants the following explanation of coping style, controllability, and stress:

Coping cognitive appraisal is levels of perceived controllability and is associated with the athlete's coping style. Coping style is any method you use to deal with a stressor to less its negative impact. There are different ways to cope with stress, for example, such as turning away from the stressor, through ignoring, seeking out other people, or taking

active steps to deal directly with the stressor, for instance, engage in positive self-talk, use relaxation exercises. There is no “good” or “bad” coping style.

After instructions were read, all participants received the following instructions:

“I would like you to tell me about the ways in which you respond to stress events experienced during sport competition”.

The inventories used in this research were selected from the following list. The actual measures go into Appendix B (Chinese) and C (English) at the end of the dissertation.

Part 1: Acute stress sources identification, 5-point, 21-item scale. The purpose of the part one of these questionnaires was to determine how the participants reacted to each of stressful events during sport competition. Part 1 lists a total of 21 stressful events often experienced during sports competition. Participants were asked to respond according to how they usually view the situations when they occurred in the game. The 21 stressors were generated based on interviews with athletes, coaches, and sport psychologists, as well as from extant sport psychology research (e.g., Anshel, 1996; Anshel, Robertson, & Capui, 1997; Anshel, Porter, & Quek, 1998).

Part 2: The Stress Appraisal Measure (Peacock & Wong, 1990), 5-point, 28-item scale. Based on cognitive-relational theory, Peacock and Wong created a multidimensional approach for appraisal measurement named “The Stress Appraisal Measure” (SAM). SAM is a 28-item Likert-type scale, with responses ranging from 1 (not at all) to 5 (extremely). SAM measures six relatively independent appraisal dimensions, three of which are primary appraisals called threat, challenge, and centrality. Threat appraisal is defined as the expectation of future harm; challenge appraisal is

defined as the opportunity to achieve growth, mastery profit in order to meet some demand; centrality appraisal is defined as the perceived importance of an encounter for one's well being. Three secondary appraisals are focused on perceptions of controllable-by-self, controllable-by others and uncontrollable. "Primary appraisal involves an assessment of the importance of a transaction for one's well-being. Secondary appraisal is primarily concerned with the evaluation of what can be done about the situation. They It involve a complex assessment of one's coping option" (p. 227).

The overall stress is an index of overall perceived stressfulness, reflecting the individual's feelings about the general level of controllability and predictability in their life. The primary and secondary appraisal contributes to an individual's overall perception of stress. The actual measures go into Appendix E.

Part 3: Coping style identification, 5-point 39-item scale. The purpose of the Part 3 was to determine the participant's coping style. The inventory was generated from items validated in previous studies (e.g., Anshel, 1996; Anshel & Anderson, 2002; Anshel & Caputi, 2000; Anshel & Raviv, 2001; and Anshel and Kaissidis, 1997). A total of 39 items were concluded. Among them, 13 items are used to distinguish for approach style, and 26 to distinguish for avoidance style. The mentioned researchers developed these items in their studies, for example, Coping Style Inventory for Athletes (CSIA) was an inventory developed by Anshel and Kaissidis (1997) to measure the athletes' coping style in acute stress situations. Content validity and construct validity were ensured by:

- All items were actually selected by athletes and confirmed by coaches and other professional specialists in sports and physical education area.

- All items were adapted from the previously validated scale of approach and avoidance forming the theoretical framework of the survey (Roth & Chohen, 1986).
- Approach and avoidance style came from the solution of factor analysis technique.

Chinese Translating of Questionnaire

Wendan Li, PhD, major in linguistics, is an associate professor in Chinese Language and Linguistics department: Asian Studies at University North Carolina - Chapel Hill. She was invited to translate all the inventories of this study from English into Chinese. In the process of translating, Qiwei Gan, the researcher gave the translator necessary assistance in explaining some coping and other psychological concepts.

Pilot Tests

- Prior to the investigation, a pilot survey was used with the selected Chinese graduate students at a university in the southeast U.S. The purpose of the pilot survey was to test the reliability of the Chinese version. The participants of the pilot test completed English and Chinese versions of the questionnaires.
- A second a pilot test was completed in China to obtain information about the clarity of instructions, participants' understanding of what being asked of them, time needed to complete the survey, and any potential problems in completing all survey items.

Survey Administration

All surveys were administered in China by selected faculty at each of universities in China. Each individual was familiar with conducting survey research and obtained the data in a similar manner; and volunteered to engage in the data collection process.

Survey Procedures

1. *Participants.* Each participant is under him/her selves' agreement to attend this survey voluntarily. Before the survey, each participant will be required to complete a consent form
2. *Data collection.* All data were obtained under the controlling of the administrators. Data collection occurred using the following protocol.
 - There was sufficient time for answer the questionnaire,
 - The environment was quiet and without interruption,
 - There was no discussion among participants,
 - Each completed inventory had to be signed by the administrator.
 - All inventories were completed in China and sent to the researcher in the U.S. by post mail.
3. *Statistical Methods.*
 - *Reliability Analysis.* This statistics was used to test the reliability of questionnaire.
 - *Exploratory Factor Analysis (EFA).* This statistics was used to identify the main acute stress sources that might influence Chinese college athletes.

- *Multivariate Analysis of Variance (MANOVA)*. This statistics was used to test the linear combination for group variance in stress sources and appraisals.
- *Multivariate Multiple Regression (MMR)*. This statistics was used to determine the linear relationship between appraisal and stress sources.
- *Discriminant Analysis*. This statistics was used to determine the linear combination of stress sources and appraisals would be a significant discriminant function for coping styles.
- *Canonical Correlation*. This statistics was used to determine the degree of correlation between the linear combination of the set of appraisals and the linear combination of set of stress sources.
- *Point Bi-serial Correlation*. This statistics was used to determine the linear relationship between stress sources and coping styles, the linear relationship between appraisals and coping styles.
- *Phi-coefficient*. This statistics was used to determine the linear relationship between gender and coping style, the linear relationship between appraisal and coping style.
- *Chi-square*. This statistics was used to determine gender and athletic level group frequency difference in coping style.

The statistical computing was completed with SAS software (8.0 version).

Table 3.1
Frequency of Participants

	Female <i>n</i>	Male <i>n</i>	Total
GNU	28	76	104
SNC	38	58	96
SNU	12	88	100
NCSG	61	39	100
Total	139	261	400

GNU: Guangxi Normal University, Guangxi, China

SNC: Shangrao Normal College, Shangrao, Jiangxi

SNU: Sichuan Normal University, Sichuan, China

NCSG: National College Sports Championship, 2004, China

Chapter IV

Results

Prior to data analysis, the raw data were examined for outliers and missing values. The original data set consisted of sets of values. Missing data were handled by replacing missing values with a series of means. Eleven players' records were identified as invalid data and were removed from the data analysis. The total valid participants were 391 (see Table 4.1). Among the valid participants, non-elite athletes were 253 (60 females and 193 males) and elite athletes were 138 (74 females and 64 males). Measures from the questionnaire consisted of interval (Part 1 and 2) and nominal scales (Part 3).

Eight selected Chinese graduate students engaged in a pilot test to determine the reliability of the Chinese version of the questionnaire. The pilot test included all 50 questions in Part 1 and 2 of the questionnaire. Participants were asked to complete these questions both in English and Chinese, respectively. The participants finished the English version first without knowing that they would do the Chinese version in the following week. The Split-Half reliability was computed to determine the reliability of the Chinese version of the questionnaire. The reliability coefficient was .92 for Part 1 and .90 for Part 2, reflecting a high internal consistency for each version of this testing.

The alpha reliability was calculated to determine the reliability of Stress Sources with a 21-item scale and Appraisals with a 28-item scale. The reliability coefficient was .86 and .76, respectively.

Sources of Stress

Hypothesis 1 stated that for Chinese college athletes, specific sources of highly acute and intensive sport-related stress would be identified. In order to test Hypothesis 1, exploratory factor analysis (EFA) was used to extract underlying factors from observed variables that were inter-correlated. One of the EFA methods is called Principal Component Analysis (PCA). Principal components are linear combinations of the observed variables with an orthogonal transformation. The purpose of PCA is to convert a set of variables into a new set of variables that is an exact mathematical transformation of the original data. All variance in the obtained variables contribute to the solution. In this study, PCA was used to determine the sources of acute stress in sports among Chinese college athletes. A total of 21 stressors were factor analyzed.

Table 4.2 showed that among the 21 stressors, Item 16, "Referee 'reprimanded' me intentionally in the game" had the highest mean score of 3.7. In this scale, the higher the score, the more the participants perceived the stress sources. Thus, Item 16 was viewed as the item describing the most stressful situation. Item 15, "Excellent performance of my opponent" had the lowest mean score of 2.17.

The procedure of PCA may include three steps: (a) the initial factor method of principal components; (b) pre-rotation with the Varimax method of orthogonal rotation; and (c) rotation with the Promax of oblique rotation.

The initial statistics results indicated (see Table 4.3) that the first five eigenvalues (5.73, 1.72, 1.22, 1.12 and 1.04) were above the average eigenvalue of 1, and each of these accounted for 5% of variance or more (27.29%, 8.18%, 5.83%, 5.42%, and 4.96%).

The cumulative proportion variance accounted for the five factors were 51.58%. Five factors were retained for factor analysis by the minimum eigenvalue criterion.

The rotated factor loadings were displayed in Table 4.4. Item 19 “Equipment problem in the game” was a complex item, because it was loaded on two factors with the loading value over .30. Thus, Item 19 was eliminated from the stressor list, leaving 20 stressors to be factor analyzed.

The EFA was performed again after deleting the stressor item 19 (see Table 4.5). Still five unrotated factors were extracted by the minimum eigenvalue criterion. The eigenvalues of these five factors were 5.41, 1.65, 1.21, 1.12, and 1.04 respectively. The cumulated variance explained with the five factors was 52.18%. These five factors provided a reasonable summary of the data.

The five extracted factors were rotated and the final solution was derived. Table 4.6 revealed that five items were loaded on Factor 1: Item 4 ($\lambda = .72$) “When spectators were against my team in the game, I felt stressful,” Item 10 ($\lambda = .69$) “When opponent(s) threatened me in the game, I felt stressful,” Item 3 ($\lambda = .6$) “Having spectators (audience) said something bad to me. I felt stressful,” Item 14 ($\lambda = .54$) “When spectators were against me, I felt stressful,” and Item 12 ($\lambda = .43$) “Having my team member says something bad to me, I felt stressful.” According to the amount of loading, the first factor was named as “Threats-from-Others”. The results suggested that Factor 1(Threats-from-Others) primarily reflected athlete’s negative feelings caused by the threatening words or behaviors from competitive opponents or audience.

The second factor had positive loadings from Item 16 ($\lambda = .80$) “Referee against me intentionally in the game,” Item 5 ($\lambda = .63$) “An unfair referee made me fell

stressful,” Item 2 ($\lambda = .62$) “ When arguing with another person in the game, I felt stressful,” Item 11 ($\lambda = .57$) “When my opponents cheated but was not caught, I felt stressful,” and Item 9 ($\lambda = .50$) “Poor performance of referee made me stressful.” The second factor was labeled “Conflicts-with-Official”. The results suggested that Factor 2 (Conflicts-with-Official), was primarily a measure of participants’ concern about being treated unfairly by referee or cheating behaviors of competitive opponents.

The third factor had positive loadings with Item 8 ($\lambda = .83$) “My coach reprimanded me in public. I felt stressful,” Item 2 ($\lambda = .61$) “When my coach was not satisfied my performance, I felt stressful,” Item 17 ($\lambda = .51$) “My coach threatened to give me a penalty in the game. I felt stressful,” and Item 1 ($\lambda = .34$) “Making mistakes repeatedly in the game made me stressful.” The components factor was labeled “Coach-Dissatisfaction”. The results suggested that Factor 3 (Coach-Dissatisfaction) was primarily a measure of perception on the coach dissatisfaction.

The fourth factor revealed positive loadings with Item 6 ($\lambda = .76$) “Bad weather (rain, heat, wind or cold) hurts my performance. I felt stressful,” Item 7 ($\lambda = .56$) “My teammate made an error in the game, I felt stressful,” and Item 13 ($\lambda = .52$) “Too much noise from the crowd made me stressful.” The components factor was labeled “Environmental-Sources”. The results suggested that Factor 4 (Environmental-Sources) was primarily a measure of negative perception on the environmental conditions.

The fifth factor had positive loadings with Item 18 ($\lambda = .77$) “After experiencing pain or injury, I felt stressful,” Item 20 ($\lambda = .61$) “When I was controlled by my opponent in technique and strategies, I felt stressful,” and Item 15 ($\lambda = .64$) “Excellent performance of my opponent(s) made me stressful.” The components factor was labeled “Opponent-

Skills". The results suggested that the Factor 5 (Opponent-Skills) was primarily a measure of negative feeling caused by an opponent's performance or suddenly occurred injury.

In addition to factor loadings for each item, factor scores for each subject were computed. Factor scores were defined as estimates of the underlying factor values for each observation and were based on the rotated factor matrix. The factor score estimates were compared for all five extracted factors utilizing the 'score' option in SAS. Table 4.7 showed the means of each extracted factor (not the factor scores). The mean of Conflicts-with-Official was 3.31, SD = 0.75. The mean of Coach-Dissatisfaction was 3.11, SD = 0.73. The mean of Threats-from-Others was 2.74, SD = 0.78. The mean of Environment-Sources was 2.52, SD = 0.70, and the mean of Opponent-kills was 2.62, SD = 0.78. Based on the mean score, Conflicts-with-Official and Coach-Dissatisfaction were the top two intensified acute stress sources for Chinese college athletes.

The highest inter-factor correlation coefficient was $r = .37$ that were between Threats-from-Others and Conflicts-with-Official; and between Conflicts-with-Official and Coach-Dissatisfaction. The lowest inter-factor correlation coefficient was $r = .16$ between factors Conflicts-with-Others and Opponent-Skills (see Table 4.8). The correlations among these five stress sources (factors) were comparatively small. It seems that there were five relatively independent factors reflected in the correlation matrix related to Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills. Since the five factors were identified as acute stress sources for college athletes, the first research hypothesis (for Chinese college

athletes, specific sources of highly acute and intensive sport-related stress would be identified) was supported.

Skill Level / Gender and Sources of Stress

Hypotheses 2 stated that there would be a significant difference on sources of acute stress in sports between Chinese college elite and non-elite athletes. Hypothesis 3 stated that there would be a significant difference on sources of acute stress in sports between Chinese college male and female athletes. Hypothesis 4 stated that there would be an interaction effect between skill level and gender on sources acute stress.

The data were analyzed with a 2 x 2 (skill levels x Genders) multivariate analysis of variance (MANOVA) to determine the effect of gender and skill level on the linear combination of participants' stressful source. In order to control the alpha rate, Familywise Error Rate (α_{FW}) was set at .05 levels using the Bonferroni method.

The dependent variables were the five extracted factor scores: Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environment-Sources, and Opponent-Skills. Factor scores could be used as input to another analysis, such as MANOVA (Gorsuch, 1983). Independent variables were skill level (elite and non-elite), gender (female and male), and the interaction effect of skill level and gender. With these three independent variables, three questions were addressed:

1. Do the two skill level groups differ significantly on the five acute stressors?
2. Do the male and female groups differ significantly on the five acute stressors?
3. Is there an interaction of gender and skill level in relation to the five acute stressors?

The job of missing data replacing and outliers eliminating had been done before the statistical analyzing in this study. In addition, data normality and homogeneity assumptions had been checked before MANOVA and ANOVA. The results of the test for normality (Kolmogorov-Smirnov) in Table 4.9 showed that each dependent variable was normally distributed: Threats-from-Others, $D = 0.03$, $p = .15$, Conflicts-with-Official, $D = 0.04$, $p = .15$, Coach-Dissatisfaction, $D = 0.04$, $p = .10$, Environmental-Sources, $D = 0.04$, $p = .14$, and Opponent-Skills, $D = 0.04$, $p = .15$. The assumption of data normality distribution was met.

Table 4.10 displayed the homogeneity test results of the five factor scores. The results indicated that the variance in each gender groups as well as the variance of the skill level group was equivalent. All the five dependent variables did not violate homogeneity assumption at both gender and skill level.

The descriptive statistics were presented in Table 4.11. In the gender groups, females had higher factor scores in Conflicts-with-Official, $M = 0.04$ (Factor 2), $SD = 0.98$, Coach-Dissatisfaction (Factor 3), $M = 0.08$, $SD = 0.94$, and Opponent-Skills (Factor 5), $M = 0.01$, $SD = 1.02$ than males, $M = -0.02$ (Factor 2), $SD = 1.02$, Coach-Dissatisfaction (Factor 3), $M = -0.04$, $SD = 1.03$, and Opponent-Skill (Factor 5), $M = -0.01$, $SD = 0.99$. Males had higher factor scores in Threats-from-Others (Factor 1), $M = 0.03$, $SD = 1.02$ and Environmental-Sources (Factor 4), $M = 0.02$, $SD = 1.04$ than females, Threats-from- Others (Factor 1), $M = -0.06$, $SD = 0.97$ and Environmental-Sources (Factor 4), $M = -0.04$, $SD = 0.92$.

The Elite group had scores in Threats-from-Others, $M = -0.22$, $SD = 0.95$, Conflicts-with- Officials $M = -0.20$, $SD = 0.98$, Coach-Dissatisfaction, $M = -0.05$, SD

=1.01, Environmental-Sources, $M = -0.25$, $SD = 0.94$, and Opponent-kills, $M = -0.04$, $SD = 0.91$ (see Table 4.12). The mean scores for non-elite group in Threats-from-Others, $M = 0.12$, $SD = 1.01$, Conflicts-with-Official, $M = 0.11$, $SD = 1.00$, Coach-Dissatisfaction, $M = 0.03$, $SD = 1.00$, Environmental-Sources, $M = 0.14$, $SD = 1.00$, and Opponent-Skills, $M = 0.02$, $SD = 1.05$, respectively. Non-elite group had a higher factor score than elite group on all factors.

The first MANOVA results indicated a significant combined effect of skill level on the participants' five sub-domains (Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environment-Sources, and Opponent-Skills), *Wilks' Lambda* = .94, $F(5, 383) = 4.57$, $p < .001$. There was a significant overall skill level effect on these five factors between elite and non-elite athletes. The null hypothesis of no main effect of skill level on participants' five dependent variables was rejected.

The second MANOVA indicated that there was no significant combined effect of gender on the participants' five sub-domains (Threats-from-Others, Conflicts-with-Officials Coach-Dissatisfaction, Environment-Sources, and Opponent-Skills), *Wilks' Lambda* = .99, $F(5, 383) = 0.81$, $p > .05$. There was no significant overall gender effect on these five factors between male and female athletes. The null hypothesis of no gender effect on participants' five dependent variables was not rejected.

The third MANOVA results indicated that there was no significant interaction effect of gender and skill level, *Wilks' Lambda* = .99, $F(5, 338) = 0.55$, $p > .05$. The null hypothesis of no interaction effect of gender and skill level on participants' five dependent variables was not rejected.

Because the multivariate tests showed that there was no significant interaction effect of gender and skill level groups, only a significant overall main effect of athletic level was obtained. The post hoc tests were applied only to skill level in order to determine on which factor score showed a significant difference between two groups.

The post hoc result indicated that there was a significant skill level effect between elite and non-elite participants on Factor 1, Threats-from-Others, $F(1,389) = 7.77, p < .01$. It was apparent that elite athletes scored significantly lower than did non-elite athletes. Elite athletes perceived less intensity stress on Threats-from-Others than did non-elite athletes (see Table 4.13). A significant mean difference on Factor 2 [Conflicts-with-Official, $F(1,389) = 10.79, p < .001$] was found between elite and non-elite participants. Non-elite athletes scored higher than elite athletes on this factor. Elite athletes perceived less intensity on Conflicts-with-Official than did non-elite athletes.

The skill effect was also observed between the elite and non-elite athletes on Factor 4, Environmental-Sources [$F(1,389) = 10.79, p < .001$]. Elite athletes scored significantly lower than non-elite athletes did. Non-elite athletes perceived more intensity on Factor 4 than did elite athletes.

The post hoc results indicated that there was no significant skill level effect between the elite and non-elite participants on Factor 3, Coach-Dissatisfaction, $F(1,389) = 0.83, p > .05$ and Factor 5, Opponent-Skills, $F(1,389) = 0.41, p > .05$. The different mean scores on these two factors between elite and non-elite participants can be said that is caused by chance.

Thus, in summary, the following results were found:

1. There was a significant skill level effect. For Chinese college athletes, the more athletic experience and higher skill level that each athlete had, the more likely it was that an athlete would perceive less intensity of stress. The three factors on which there were significant mean differences between elite and non-elite participants were Threats-from-Others, Conflicts-with-Official, and Coach-Dissatisfaction. The research Hypothesis 2 (there would be a significant difference on sources of acute stress in sports between Chinese college elite and non-elite athletes) was supported.
2. Gender had no significant overall gender effect on these five factors between male and female groups. Both of males and females perceived the same intensity on the five stress sources. The research Hypothesis 3 (there would be a significant difference in the way the athletes perceived the intensity of the stress sources in sports between Chinese college male and female athletes) was not supported.
3. There was no significant interactive effect between skill level and gender on the five factor scores. The research Hypothesis 4 (there would be an interaction effect of skill level and gender on sources acute stress) was not supported.

Cognitive Appraisals

Hypothesis 5 stated that there would be a significant difference on stress appraisals in sports between Chinese college elite and non-elite athletes. Hypothesis 6 stated that there would be a significant difference on stress appraisals in sports between Chinese college male and female athletes. Hypothesis 7 stated that there would be an interaction effect of gender and skill level on stress appraisals in sports.

The appraisal data were analyzed with a 2 x 2 (skill levels x genders) MANOVA to determine the effect of gender and skill level having any effect on the linear combination of participants' appraisals. For controlling the alpha rate, Familywise Error Rate (α_{fw}) was set at .05 levels using the Bonferroni method.

The dependent variables were the six appraisal dimensions: Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable. The independent variables were skill level (elite and non-elite), gender (male and female), and the interaction effect between skill level and gender. With these three independent variables, three questions were addressed:

1. Do the male and female groups differ significantly on the six appraisals of Stress Appraisal Measurement (SAM)?
2. Do the two skill level groups differ significantly on the six appraisals of SAM?
3. Is there significant interaction of gender group and skill level group in relation to the six appraisals of SAM?

The detailed data checking results have been reported at the start of this chapter. All the missing data and outliers were replaced and eliminated. The Kolmogorov-Smirnov test results indicated that the data of the six appraisals were not normally distributed (see Table 4.14): Threat, $D = 0.10, p < .01$, Challenge, $D = 0.13, p < .01$, Centrality, $D = 0.10, p < .01$, Control-by-Self, $D = 0.10, p < .01$, Control-by-Others, $D = 0.10, p < .01$, and Uncontrollable, $D = 0.11, P < .01$. The data were not transformed for improving the normality because ANOVA is robust against the violation of normal distribution (Maxwell & Delaney, 1990) due to the Central Limit Theorem.

The homogeneity test results indicated that the variances of the gender and athletic level groups were equivalent. Each of the six dependent variables, Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable had a non-significant *levene's test* value ($p > .05$). They did not violate the homogeneity assumption at both gender and athletic level (see Table 4.15)

Table 4.16 displays the descriptive statistics of the six appraisals. Males scored higher in variables of Threat ($M = 11.95, SD = 2.46$), Challenge ($M = 10.33, SD = 2.22$), and Control-by-Others ($M = 11.18, SD = 2.31$) than did females [Threat ($M = 11.81, SD = 2.25$), Challenge ($M = 10.25, SD = 2.11$), and Control-by-Others ($M = 11.14, SD = 2.46$)]. Females scored higher in variables of Centrality ($M = 12.14, SD = 2.49$), Control-by-Self ($M = 10.75, SD = 2.03$), and Uncontrollable ($M = 13, SD = 2.46$) than did males, ($M = 11.67, SD = 2.54$), Control-by-Self ($M = 10.61, SD = 2.37$), and Uncontrollable ($M = 12.92, SD = 2.29$).

Elite athletes (see Table 4.17) scored higher in variables of Threat ($M = 12.26, SD = 2.28$), Centrality ($M = 12.46, SD = 2.66$), Control-by-Others ($M = 11.26, SD = 2.26$), and Uncontrollable ($M = 13.01, SD = 2.54$) than did Non-elite athletes, Threat ($M = 12.26, SD = 2.28$), Centrality ($M = 11.49, SD = 2.42$), Control-by-Others ($M = 10.77, SD = 2.34$), and Uncontrollable ($M = 12.91, SD = 2.24$) (see the Table 18). Non-elite group scored higher in variables of Challenge ($M = 10.36, SD = 2.24$) and Control-by-Self ($M = 10.77, SD = 2.34$) than did elite athletes, Challenge ($M = 10.20, SD = 2.08$) and Control-by-Self ($M = 10.44, SD = 2.08$).

The first MANOVA results displayed that there was a significant combined overall effect of skill level on the participants' six sub-domains, *Wilks' Lambda* = .96, *F*

$(7, 381) = 2.36, p < .05$. The null hypothesis of no overall skill level main effect on participants' appraisal scores was rejected.

The second MANOVA results showed that there was no significant combined main effect of gender on the participants' six sub-domains, *Walks' Lambda* = .97, $F(7, 381) = 1.43, p > .05$. The null hypothesis of no gender main effect on participants' appraisal scores was not rejected.

The third MANOVA results on the interaction effect indicated a significant interaction effect of gender and skill level on the participants' six sub-domains, (Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable), *Walks' Lambda* = .95, $F(7, 381) = 2.76, p < .01$. A significant interaction effect implies that the effect of one factor is not consistent across the levels of the other factor. The null hypothesis of no interaction effect of gender and skill level on participants' appraisal scores was rejected.

Because the MANOVA results had indicated that there was an interaction effect of gender and skill level on the participants' appraisals, the future analysis was focused on the simple effect issue. In the procedure of general linear model of this study, the simple effect test was used to determine if there is a significant effect of skill level on the linear combination of six cognitive appraisals within the male and female levels; if there is a significant effect of gender level on the linear combination of six cognitive appraisals within the elite and non-elite athletes. The questions were addressed:

1. Is simple effect of skill level significant within specific levels (female /male) of gender using $\alpha = .025 (= .05 / 2)$?

2. Is simple effect of gender level significant within specific levels of skill levels (elite /non-elite) using $\alpha = .025 (= .05 /2)$?

The first null hypothesis stated that there would be no effect of skill level among females and males. Two One-way MANOVA were used for simple effect analysis. The multivariate test of the overall effect of skill level in the female group was significant, *Wilks' Lambda* = .82, $F(7, 126) = 4.05, p < .001$. In females, different skill level influence athletes' appraisals on stress at overall level. The null hypothesis of no effect of the skill level for the female group was rejected.

The multivariate test of the overall effect of skill level in the male group was significant, *Wilks' Lambda* = .95, $F(7, 249) = 2.02, p = .05 (> .025)$. The null hypothesis of no effect of the skill level for the male group was not rejected.

Because the multivariate tests showed that only a significant overall simple effect of skill level in females was obtained, the post hoc tests were applied only to females in order to determine on which appraisal score showed a significant difference between the two skill level groups. The results of simple effect post hoc analysis (see Table 4.18) indicated a statistically significant skill level effect within females on the appraisal of Centrality. Elite females had the higher scores ($M = 12.61, SD = 2.52$) than non-elite females ($M = 11.57, SD = 2.33$), $F(1, 132) = 6.03, p < .025$. For Centrality appraisal, the greater the score, the less level of perceived importance of an event for an individual's well being. The skill level significantly affected females' Centrality appraisal. The null hypothesis of no simple effect of athletic level on Centrality appraisal in females was rejected.

Similar calculations showed no significant skill level effect on the participants' other five appraisals within females. The significance test results as follows: $F(1,132) = 4.76, p = .03$ ($\alpha = .025$) for Threat appraisal; $F(1,132) = 0.07, p = .79$ for Challenge; $F(1,132) = 1.40, p = .24$ for Control-by-Self appraisal; $F(1,132) = 3.85, p = .05$ ($\alpha = .025$) for Control-by-Others appraisal; and $F(1,132) = 2.01, p = .16$ for Uncontrollable appraisal. Because all the p values were bigger than the alpha rate of .025, gender had no significant effect in females on the five appraisals. All the null hypotheses of no simple effect of skill level on the five appraisals in females were not rejected. In addition, there was no significant skill level effect on the participants' appraisals among males (see Table 4.19). The null hypotheses of no simple effect of skill level on the total six appraisals were not rejected.

The second simple effect analysis tested on gender at each athletic level (see Table 4.20). The multivariate test of the overall effect of gender for the elite-group was not significant, $Wilks' Lambda = .89, F(7, 130) = 2.30, p > .025$. The null hypothesis of no overall effect of the gender for the elite-group was not rejected.

The multivariate test of the overall effect gender for the non-elite-group was also not significant, $Wilks' Lambda = .95, F(7, 245) = 1.81, p > .025$. The null hypothesis of no overall effect of the gender for the non-elite-group was not rejected. Because the multivariate tests showed that there was no significant overall simple effect of gender in both females and males, the post hoc tests to determine on which appraisal score showed significant differences between two gender groups not needed.

Thus, in summary, the following results were found:

1. There was a significant overall skill level effect on Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable appraisals. The research Hypothesis 5 (there would be a significant difference on stress appraisals in sports between Chinese college elite and non-elite athletes) was supported.
2. The research Hypothesis 6 (Chinese college athletes' cognitive appraisal would be influenced by gender) was partly supported because there was a multivariate significant result for overall interaction effect of skill level and gender on the six appraisals.
3. There was a significant interaction effect of gender and athletic level on the participants' appraisals. The research Hypothesis 7 (there would be an interaction effect between gender and skill level on the appraisals) was supported.
4. The simple effect test results showed that female elite athletes had higher scores only on appraisal of Centrality than female non-elite athletes. Compared to female non-elite athletes, female elite athletes perceived less potential harm/loss in the future, and perceived the stress sources less importance to their well-being.

Relationships between Variables

Hypothesis 8 stated that there would be significant relationships between stressors and appraisals, stressors and coping style, appraisals and coping style. Canonical correlation analysis and Point Bi-serial correlation were used to test this hypothesis. Canonical correlation analysis was a statistical technique employed to determine the degree of relationship between the linear combination of two or more sets of variables. In the presented study, the first set of variables was stress sources (5 variables) and the other set of variables were six SAM appraisals. Point Bi-serial correlation was a statistical

technique employed to determine the degree of relationship between the linear combination of an interval or ratio scale and a nominal and dichotomous variable.

The assumptions of canonical correlation analysis include normality, outlier, sample sizes, and matrix Ill-conditioning. Both of the results of normality and outlier test have been reported in the previous sections (MANOVA on stress sources and appraisals) of this chapter. Based on the recommendation of Stevens (1986), the minimum size for this study should be 11 (variables) times 20 and the number is 220. In fact, the sample size of this study was 391. Assumption of Matrix Ill- conditioning was also not violated (see Table 4.21). When there are perfect correlations in the correlation matrix, or if any of the multiple correlations between one variable and the others is perfect ($R = 1.0$), then the correlation matrix cannot be inverted, and the computations for the canonical analysis cannot be performed.

The five variables associated with stress sources were the five extracted factors from the 21 acute stressors: Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills. The six variables associated with SAM appraisals were Threat, Challenge, Control-by-Self, Centrality, Control-by-Others, and Uncontrollable. The canonical variate in Set 1 was named Chinese-Stressor (CS) and the canonical variate in Set 2 was named Chinese-Appraisal (CA). With these two sets of variables, the question addressed is “How perceived intensity of the stress sources relates to the stress appraisals domains?”

The first canonical correlation coefficient (the correlation between the first pair of variables) was .30. The second to fifth canonical correlations all were less than .20 and

were not future analyzed. The null hypothesis that the canonical correlation in the current row and all that follow are zero was rejected, $F(30, 1522) = 2.60, p < .0001$,

Based on the descriptive results, the coefficients of the second to fifth canonical correlation were less than .20. Thus, the canonical correlation in this study was just only focus on the first pair canonical variates (CS 1 and CA 1). Standardized coefficients of the canonical variates and the correlations between the canonical variates and their original variables were inspected to identify the canonical variates of Chinese Stressor and Chinese Appraisal. Standardized coefficients are standardized canonical weights used to look at the weights for interpreting the "meaning" of each canonical root. In general, the larger the weight, the greater is the respective variable's unique positive or negative contribution to the canonical variate.

The standardized canonical coefficients in the Table 4.22 show that the canonical variate, Chinese-Stressor, was a weighted sum of the variable Threats-from-Others (0.71), Coach-Dissatisfaction (0.39), and Environmental-Sources (0.39) with the emphasis on Threats-from-Others. The larger the weight, the greater is the respective variable's unique positive or negative contribution to the canonical variate. Therefore, a participant with a large degree of perceived intensity on Threat-by-Others would score high on the canonical variable Chinese Stressor.

The results of coefficients for the canonical variate, Chinese-Appraisals, indicated that Control-by-Self, Threat, Centrality, Challenge, Uncontrollable, and Control-by-Others contributed to the Chinese Appraisal canonical variate with canonical coefficients of 0.64, 0.47, -.38, .37, - 0.19, and 0.06 respectively (see Table 4.23). A participant with a high score on Control-by-Self would score high on the canonical variate Chinese-

Stressor, because the larger the weight, the greater is the respective variable's unique positive or negative contribution to the sum.

The first canonical correlation represented the highest possible correlation between any linear combination of the SAM appraisal variables and any linear combination of the stress source variables. It was concluded that the two sets of variables were related.

Since Coping Style was a nominal variable, Point Bi-serial correlation, a special case of the Person product-moment correlation was used to measure the relationship between the five extracted stress variables (Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent- Skills) and the coping style (avoidance and approach).

Table 4.24 displayed that significant correlation existed between coping styles and the stress sources. Both of the avoidance and approach coping style had the same coefficient values but reversed correlation directions with each of the stress source. The range of correlation between coping styles and the five stress sources was from $r = .24$ to $.36$. Based on the results of Point Bi-Serial correlation, avoidance coping style had a positive coefficient and approach coping style had a negative coefficient with the stress sources. Because avoidance coping style had a positive coefficient, the higher scored on these stress sources the more likely avoidance coping style; otherwise, the lower scores on the stress source the more likely an approach coping style.

Point Bi-Serial correlation was also used to measure the relationship between SAM appraisal variables (Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable) and the coping styles (avoidance and approach).

Table 4.25 indicated that there were significant correlations between the coping style and the six SAM appraisals. The correlation coefficients between avoidance coping style and the appraisals of Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable were $r = -.08, .26, -.10, .41, .27,$ and $-.21$ respectively. The correlation coefficients between approach coping style and the appraisals had the same values, but reversed correlation directions. All the relationships were significant at $p < .01$.

It was concluded that less Control-by-Self and Control-by-Others were related to avoidance coping style. The higher the score on these two variables, the bigger the possibility of avoidance coping style might be. The lesser the score on these two appraisals, the bigger possibility of approach coping style might be.

Lower scores on Challenge appraisal were related to approach Coping Style (negative correlation) and higher scores were related to Avoidance coping style (positive correlation).

The significant results are summarized:

1. The canonical correlation analysis indicated that there was a significant relationship between the linear combination of the set of SAM appraisals and the linear combination of the set of stress sources. Threats-from-Others, Coach-Dissatisfaction, and Environmental-Sources were important variables in the set of stress sources. However, Control-by-Self, Challenge, and Control-by-Others were important variables in the set of SAM appraisals.
2. There were correlation coefficients between the stress sources and coping style. The higher the scores on these stress sources, the higher possibility of avoidance

coping style. Likewise, the lower scores on the same stress sources, the higher possibility of approach coping style.

3. There was significant relationship between SAM appraisals and coping styles. It was concluded that the higher the scores on Control-by-Self and Control-by-Others, and Challenge appraisals, the greater the possibility of avoidance coping style. The less the scores on these three appraisals, the greater the possibility of approach coping style.
4. The research Hypothesis 8 (there would be significant relationships between stressors and appraisals, stressors and coping style, appraisals and coping style) was supported

Predictors of Appraisals with Stress Sources

Hypothesis 9 stated that there would be a significant regression line to predict Chinese college athletes' cognitive appraisal with particular factors of acute stress sources. Multivariate Multiple Regressions (MMR) with the stepwise option was used to determine if the linear combination of acute stress variables was a significant predictor of the linear combination of each appraisal variable. Dependent variables were SAM appraisals of Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable. Independent variables were stress sources of Threats-from-Others, Conflicts-with-Officials, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills. Collinearity diagnostics and variance inflation factor (VIF) were used to determine whether or not that collinearity existed in the data. According to Belsley, Kuh, and Welsch (1980) propose that a condition index (CI) of 30 to 100 indicates moderate to

strong collinearity. Generally, a value of VIF below 10 is thought free the risk of collinearity.

The assumption that the distribution of variables for regression must approximately the normal curve did not violated. The test results showed that three appraisals were not violate the assumption of homoscedasticity (Challenge, $\chi^2 = 2.50, p = .286$; Centrality, $\chi^2 = 4.56, p = .102$; Control-by-Self, $\chi^2 = 9.19, p = .102$; and Control-by-Others, $\chi^2 = 3.54, p = .147$). The null hypothesis the residuals are homoscedasticity were not rejected. Appraisals of Threat and Uncontrollable violated the homoscedasticity assumption and they were corrected by SAS Proc option /ACOV. All the VIP and CI values of the six appraisals less than 2 and did not violate the assumption of multicollinearity.

The results of MMR indicated that the linear combination of five stress sources was a significant production of the linear combination of the six appraisals, *Wilk's Lambda* = .83, $F(30,1522) = 2.48, p = .0001$. The research Hypothesis 9 (there would be a significant regression line to predict Chinese college athletes' cognitive appraisal with particular factors of acute stress) was supported. After MMR analysis, a univariate multiple regression (stepwise solution) was used as post hoc test. The results were shown in Table 26.

The range of R^2 values in these five predicting models were from 1.1% to 6.7% indicating that a very small part of variance (in dependent variables could be explained by independent variables. Because 6.7 % of the variability in the dependent variable could be explained by the independent variables, the residual variability was 93%. The small correlations (canonical correlation = .31, $p < .001$) between the dependent variables

and the independent variables directly caused such a result. The predicting models do not make sense because these models can explain little variance in dependent variables.

Regression analysis is not appropriate statistical technique for determining the appraisals' predictors in this study.

Predictors for Coping Styles

Hypothesis 10 stated that the linear combination of stress sources and appraisals would be a significant discriminant function for Chinese college athletes' coping styles. Coping style was determined by the ratio of approach coping style to avoidance coping style in this study. As seen in chapter 3, part 3 of the questionnaire was used to identify participants' coping styles. A total of 39 items were included. A total of 13 questions from part 3 reflected an approach coping style while 26 questions consisted of an avoidance style. The ratio between these two styles is 0.5. So, if the ratio is > 0.5 , then the participant's coping style was classified as approach, and if the ratio < 0.5 , the participant's coping style was classified as avoidance style. If the ratio equaled 0.5, the data of the participant was not classified as approach or avoidance and was not analyzed.

Discriminant Analysis

Discriminant Analysis was used to determine which variables discriminate between two or more naturally occurring groups and to determine which variable(s) are the best predictors of an individual's subsequent specific group choice. The mathematical function that combines information from predictor variables to obtain the maximum discrimination among groups is called discriminant function. In this study, the purpose of using discriminant analysis was to establish discriminant function to predict the membership of each subject in each group of coping style using the linear combination of

5 stress sources and 6 appraisals. The construct of discriminant analysis is a multiple metric of independent variables and multilevel non-metric dependent variables.

The dependent variable was coping style with two levels: Avoidance coping style and approach coping style. Independent variables included the five extracted stress factors: Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills and six appraisal variables: Threat, Challenge, Centrality, Control-by-Self, Control-by-Others, and Uncontrollable.

General results including missing data, outliers, normality, homogeneity, and descriptive statistics have been reported in previous two MANOVA tests. All the missing data were replaced by serial mean values. Outliers and invalid data were eliminated. All the five factors were normal distributed with equal variance. However, the six appraisals all violated the assumption of normality in data distribution. All the six appraisals did not violate the assumption of homogeneity.

To identify the most important variables for discrimination, Stepwise Discriminant Analysis (SDA) was employed first. The *sl*e (Slentry) was set at .05 to control the significance levels for entry of autoregressive parameters in the Stepwise method. At each step all variables are reviewed and evaluated to determine which one will contribute most to the discrimination between groups. That variable will then be included in the model, and the process starts again.

At Step 1, the variable Control-by-Self had the highest R^2 value and was the first variable selected. The procedure of SDA stopped at the six step because none of the partial R^2 values of the others variables met the criterion for inclusion. A total of five variables entered the discriminant model: Control-by-Self, Threats-from-Others,

Environmental-Sources, and Coach-Dissatisfaction, and Control-by-Others (see Table 4.27 and 4.28).

Descriptive statistics of the five variables were given in Table 4.29. The two appraisals, Control-by-Self and Control-by-Others, had the $M = 11.09$, $SD = 2.30$, $M = 10.65$, $SD = 2.25$, respectively. The three stress sources: Threats-from-Others, Environmental-Sources, and Coach-Dissatisfaction, had the $M = -0.02$, 0.02 , and -0.01 , respectively. The prior probability of avoidance style was .49, and the prior probability of approach style was .51.

In this case, the dependent variable has two levels, avoidance coping style and approach coping style, with very significant p -value; thus, a one-way MANOVA chosen as the post hoc test. The results of MANOVA and exact F statistic results indicated that there was a significant overall mean difference between the two style groups, *Wilks' Lambda* = .71, $F(5, 349) = 28.69$, $p < .01$. The null hypothesis of no style effect on participants' acute stress sources and appraisals was rejected. Table 4.30 showed the coping style groups were significant different on the each of the five predictors.

Back to the simple statistics, (in Table 4.31 and 4.32), avoidance coping style group had higher mean scores in all of the five variables with the means of 0.35 (Threats-from-Others), 0.28 (Coach-Dissatisfaction), 0.31 (Environmental-Sources), 11.59 (Control-by-Self), and $M = 11.71$ (Control-by-Others) in comparison with the means of approach coping style group, -0.37, -0.28, -.25, 9.75, and 10.49, respectively.

Based on the results of both of the MANOVA and ANOVA procedures, various styles were significantly different on the linear combination of Control-by-Self, Control-

by-Others, Threats-from-Others, Coach-Dissatisfaction, and Environmental-Sources.

From Table 4.33, equations of Discriminant Analysis were following:

Linear Discriminant Function for Coping Style

$$AVS = -22.85 - 0.14 TBO - 0.15 CDS + 0.21 EVS + 2.09 CS + 1.71CO$$

$$APS = -17.75 - 0.72 TBO - 0.50 CDS - 0.20 EVS + 1.75 CS + 1.58CO$$

AVS: avoidance coping style

APS: approach coping style

TBO: Threats-from-Others

CDS: Coach-Dissatisfaction

EVS: Environmental-Sources

CS: Control-by-Self

CO: Control-by- Others

Based on the linear discriminant function, a row vector, α' (discriminant coefficient) can be calculated. By timing another vector, x' (an individual's scores on the five variables), a participant's discriminant score is available to be determined. After the discriminant score minus Z_c (the average of the two group's discriminant function score mean), the participant's coping style can be figure out dependents on the difference. In this study, if the value (difference) > 0 , the participant's coping style will be classified to avoidance, if the value < 0 , the participant's coping style to approach.

Hit ratio is the percentage of subjects correctly classified by the discriminant function. The hit ratio of this study was .75, $t(354) = 9.62$, $p < .001$. Based on the predicting equations, participants could be classified as avoidance or approach coping styles with the correct percentage around 75%. In this study, the different coping styles

were significantly different on the linear combination of Control-by-Self (appraisal), Control-by-Others (appraisal), Threats-from-Others (stressor), Coach-Dissatisfaction (stressor), and Environmental-Sources (stressor).

The significant results are summarized:

1. Threats-by-Others, Coach-Dissatisfaction, Environmental-Sources, Control-by-Self, and Control-by-Others were predictors of coping style. Research Hypothesis 10 (the linear combination of stress sources and appraisals would be a significant discriminant function for Chinese college athlete's coping style) was supported.
2. Various coping styles were significantly different on the linear combination of Threats-from-Others, Coach-Dissatisfaction, Environmental-Sources, Control-by-Self, and Control-by-Others. According to the created predicting equation, the greater the score on the stress sources of Threats-from-Others, Conflicts-with-official, and Coach-Dissatisfaction, and the appraisals of Control-by-Self and Control-by-Others, the more likely a participant would have an avoidance coping style; in contrast, the lower the score on the stress sources and appraisals, the more likely a participant would have an approach coping style.

Coping Style and Gender

Hypotheses 11 stated that college athletes' coping styles would be influenced by gender and that there would be a significant relationship between coping style and gender. A χ^2 was used to test if gender has any significant influence on participants' coping styles. A Phi-Coefficient was computed as an index for the relationship between coping style and athletic level. The assumptions of χ^2 (frequency data, adequate sample

size, and measures independent each other -- no subject can be in more than one cell, and no subject can be used more than once) were not violated.

When controlling for skill level, χ^2 results indicated that males and females differed significantly in their coping styles in elite athletes (see Table 4.33), $\chi^2(1) = 19.59, p < .0001, \phi = .40$. Male elite athletes had higher percentages (72%) in approach coping style than female elite athletes (32.26%); Male elite athletes had lower percentages (28%) in avoidance coping style than female elite athletes (67.74%). The Phi coefficient indicated that there was significant relationship between gender and coping style variables. The null hypothesis that gender has no effect on coping style was rejected.

There was no significant gender effect on coping style in non-elite athletes, $\chi^2(1) = 0.49, p < .48, \phi = -.05$ (see Table 4.34). Among the female non-elite athletes, 45.45 percent of them were classified to avoidance coping style and 54.55 percent were approach coping style. Among the male non-elite athletes, 50.85 percent of them were classified to avoidance coping style and 49.15 percent were approach coping style. The percentage differences were not statistical significant. The Phi correlation coefficient value was too small to make sense. The null hypothesis that gender has no effect on coping style in non-elite athletes was not rejected.

The gender's effect on athletes' coping style occurred only in elite athletes (see Figure 3 and 4). In elite athletes, an individual whose gender is female is less likely to be with an Approach Coping Style than an individual whose gender is male; otherwise, elite males are more likely to be with an Approach Coping Style than female athletes. Research

Hypothesis 11 (Chinese college athletes' coping styles were influenced by gender, and there would be a significant relationship between coping styles and gender) was supported.

Coping Style and Skill Level

Hypotheses 12 stated that Chinese college athletes' coping style would be influenced by skill level and that there would be a significant relationship between coping style and skill level. When controlling for gender level, Chi-Square results indicated that elite and non-elite athletes differed significantly in their coping style in females (see Table 4.35), $\chi^2(1) = 5.92, p = .015, \phi = -.22$. Elite female athletes had higher percentage (67.74) in avoidance coping style than non-elite females (45.45). Elite female athletes had lower percentages (32.26) in approach coping style than non-elite females (54.55). The Phi correlation coefficient indicated that there was significant relationship between skill level and coping style variables in female athletes. The null hypotheses that skill level has no effect on coping style in female athletes were rejected.

When controlling for gender level, there was significant skill level effect on male Chinese college athletes' coping style, $\chi^2(1) = 9.68, p < .01, \phi = .20$. Elite male athletes had higher percentages in approach coping style (72.13) than non-elite male athletes (49.15). Elite male athletes had lower percentages in avoidance coping style (27.87) than non-elite males (50.85). The Phi correlation coefficient indicated that there was significant relationship between athletic level and coping style in male athletes. The null hypotheses that skill level has no effect on coping style and there is no relationship between skill level and coping style in male athletes were rejected.

Skill level affected athletes' coping style in both female and male athletes (see Figure 5 and 6). According to the percentages, more elite male athletes were with approach

coping style, and more non-elite male athletes had avoidance coping style. However, more elite female athletes were with avoidance coping style, and more non-elite females were with approach coping style. When controlling for gender, skill level had reversed significant effects on the participants' coping style. Research Hypothesis 12 (Chinese college athletes' coping styles were influenced by skill level, and there would be a significant relationship between coping styles and skill level) was supported.

Table 4.1

Descriptive Statistics of Participants

Level	Gender	<i>f</i>	%	<i>C-P</i>
Non-elite	Female	60	15.35	60
	Male	193	49.36	253
Elite	Female	74	18.93	327
	Male	64	16.37	391

Table 4.2
Descriptive Statistics of Stressors

Variable	Label	<i>M</i>	<i>SD</i>
I1	Making mistakes repeatedly in the game made me stressful.	3.22	1.07
I2	When my coach was not satisfied my performance, I felt stressful.	3.04	1.02
I3	Having spectators (audience) said something bad to me, I felt stressful.	2.70	1.09
I4	When spectators were against my team in the game, I felt stressful.	2.64	1.08
I5	An unfair referee made me fell stressful.	3.49	1.15
I6	Bad weather (rain, heat, wind or cold) hurts my performance, I felt stressful.	2.64	1.03
I7	My teammate made an error in the game, I felt stressful.	2.50	0.87
I8	My coach reprimanded me in public. I felt stressful.	3.06	1.03
I9	Poor performance of referee made me stressful.	3.21	1.03
I10	Opponent(s) threatened me in the game, I felt stressful.	2.59	1.32
I11	When my opponents cheated but was not caught, I felt stressful.	2.93	1.09
I12	Having my team member says something bad to me, I felt stressful.	3.10	1.10
I13	Too much noise from the crowd made me stressful.	2.41	1.03
I14	Spectators were against me. I felt stressful.	2.66	1.07
I15	Excellent performance of my opponent(s) made me stressful.	2.17	0.99
I16	Referee 'reprimanded' me intentionally in the game. I felt stressful.	3.70	1.11
I17	My coach threatened to give me a penalty in the game. I felt stressful.	3.12	1.15
I18	After experiencing pain or injury, I felt stressful.	2.82	1.09
I19	Equipment problem in the game made me stressful.	2.75	0.96
I20	When I was controlled by my component in a game, I felt stressful.	2.88	1.07
I21	When arguing with another person in the game, I felt stressful.	3.25	1.05

I =Item

Table 4.3

Eigenvalues of the Correlation Matrix (Model 1)

Eigenvalue	Proportion	Cumulative
1	5.73	0.27
2	1.72	0.08
3	1.22	0.06
4	1.12	0.05
5	1.04	0.05
6	0.99	0.05
7	0.84	0.04
8	0.82	0.04
9	0.81	0.04
10	0.78	0.04
11	0.70	0.03
12	0.69	0.03
13	0.64	0.03
14	0.60	0.03
15	0.57	0.03
16	0.55	0.03
17	0.50	0.02
18	0.49	0.02
19	0.44	0.02
20	0.40	0.02
21	0.35	0.02

Table 4.4

Rotated Factor Pattern (Model 1)

Stress Sources	Factor Loadings				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
I1	.17	.10	.27	-.10	.34
I2	.29	-.03	-.00	-.01	.61
I3	.66	-.01	.02	-.10	.22
I4	.72	-.01	.06	.00	.04
I5	-.00	.64	.29	-.25	.12
I6	-.10	.01	.77	.03	-.09
I7	.06	.01	.58	.07	.02
I8	-.05	-.09	-.03	.08	.84
I9	-.24	.49	.35	.07	.20
I10	.71	.10	-.05	-.14	-.09
I11	.20	.56	.05	.15	-.18
I12	.44	.32	-.19	.11	.05
I13	.31	-.12	.52	.21	-.09
I14	.54	-.04	.15	.13	.14
I15	.08	-.13	.22	.62	.01
I16	.03	.81	-.03	-.14	.04
I17	.04	.26	-.20	.19	.50
I18	-.19	-.05	-.07	.77	.16
I19	.04	.17	.35	.39	.05
I20	.04	.20	.15	.61	-.06
I21	.10	.62	-.20	.28	-.09

I = Item

Table 4.5

Eigenvalues of the Correlation Matrix (Model 2)

	Eigenvalue	<i>P</i>	Cumulative
1	5.41	.27	.27
2	1.65	.08	.35
3	1.21	.06	.41
4	1.12	.06	.47
5	1.04	.05	.52
6	0.99	.05	.57
7	0.84	.05	.62
8	0.83	.05	.67
9	0.80	.04	.71
10	0.75	.04	.75
11	0.69	.03	.78
12	0.65	.03	.81
13	0.64	.03	.84
14	0.58	.03	.87
15	0.56	.03	.90
16	0.52	.02	.92
17	0.49	.02	.94
18	0.46	.02	.96
19	0.40	.02	.98
20	0.37	.02	1.00

Table 4.6
Rotated Factor Pattern (Model 2)

Stress Sources	Factor Loadings				
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
I1	.16	.11	.34	.28	-.09
I2	.30	-.03	.61	-.01	-.02
I3	.65	-.01	.22	.03	-.11
I4	.72	-.01	.04	.05	-.01
I5	-.01	.63	.12	.29	-.24
I6	-.10	.03	-.08	.76	.05
I7	.08	.01	.02	.56	.06
I8	-.06	-.09	.83	-.01	.10
I9	-.24	.50	.20	.36	.09
I10	.69	.11	-.10	-.03	-.13
I11	.22	.57	-.18	.05	.14
I12	.43	.32	.05	-.18	.11
I13	.33	-.11	-.09	.52	.21
I14	.54	-.03	.15	.16	.12
I15	.08	-.10	.01	.24	.64
I16	.03	.80	.04	-.03	-.14
I17	.07	.25	.51	-.21	.16
I18	-.19	-.03	.16	-.05	.77
I20	.05	.22	-.05	.15	.61
I21	.10	.62	-.09	-.19	.27

I = Item

Table 4.7

Means of the Extracted Factor Scores of Stress Sources

Variable	Label	<i>M</i>	<i>SD</i>
Factor 1	Threats-from-Others	2.74	0.78
Factor 2	Conflicts-with-Official	3.31	0.75
Factor 3	Coach-Dissatisfaction	3.11	0.73
Factor 4	Environment-Sources	2.52	0.70
Factor 5	Opponent-Skills	2.62	0.78

Table 4.8

Inter-Factor Correlations

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1.00	.37	.34	.28	.33
Factor 2		1.00	.37	.21	.16
Factor 3			1.00	.23	.17
Factor 4				1.00	.22
Factor 5					1.00

Table 4.9
Normality Test (K-S) Results of Factor Scores (Stress Sources)

Variable	D	p
Threats-from-Others	0.03	.15
Conflicts-with-Official	0.04	.10
Coach-Dissatisfaction	0.04	.09
Environment-Sources	0.04	.14
Opponent-Skills	0.04	.15

Table 4.10
Homogeneity Test (Levene's) Results of Factor Scores (Stress Sources)

	Source	df	F	p
Threats-from-Others	Level	1	0.90	.34
	Gender	1	0.38	.54
Conflicts-with-Official	Level	1	0.01	.93
	Gender	1	0.74	.39
Coach-Dissatisfaction	Level	1	0.70	.40
	Gender	1	0.47	.32
Environmental-Sources	Level	1	0.65	.42
	Gender	1	1.29	.26
Opponent-Skills	Level	1	1.97	.16
	Gender	1	0.07	.79
	Error	390		

Table 4.11

Descriptive Statistics of Factor Scores Grouped by Gender

Label	<i>n</i>	Variable	<i>M</i>	<i>SD</i>
Female	134	Threats-from-Others	-0.06	0.97
		Conflicts-with-Official	0.04	0.98
		Coach-Dissatisfaction	0.08	0.94
		Environmental-Sources	-0.04	0.92
		Opponent-Skill	0.01	1.02
Male	257	Threats-from-Others	0.03	1.02
		Conflicts-with-Official	-0.02	1.02
		Coach-Dissatisfaction	-0.04	1.03
		Environmental-Sources	0.02	1.04
		Opponent-Skill	-0.01	0.99

N = 391

Table 4.12

Descriptive Statistics of Factor Scores Grouped by Skill Level

Label	<i>n</i>	Variable	<i>M</i>	<i>SD</i>
Non-elite	253	Threats-from-Others	0.12	1.01
		Conflicts-with-Official	0.11	1.00
		Coach-Dissatisfaction	0.03	1.00
		Environmental-Sources	0.14	1.01
		Opponent-Skills	0.02	1.05
Elite	138	Threats-from-Others	-0.22	0.95
		Conflicts-with-Official	-0.20	0.98
		Coach-Dissatisfaction	-0.05	1.01
		Environmental-Sources	-0.25	0.94
		Opponent-Skills	-0.04	0.91

N=391

Table 4.13

Post Hoc Test Results of Factor Scores Grouped by Skill Level

Variable	<i>df</i>	<i>F</i>	<i>p</i>
Threats-from-Others	1	9.42	< .01
Conflicts-with-Official	1	10.79	< .01
Coach-Dissatisfaction	1	0.83	> .05
Environmental-Sources	1	12.84	< .01
Opponent-Skill	1	0.41	> .05
Error	389		

Table 4.14

Normality Test (K-S) Results of Appraisals

Variable	D	<i>p</i>
Threats	0.10	< .01
Challenge	0.13	< .01
Centrality	0.10	< .01
Control-by-Self	0.10	< .01
Control-by-Others	0.10	< .01
Uncontrollable	0.11	< .01

Table 4.15

Homogeneity Test (Levene's) Results of Appraisals

	Source	<i>df</i>	<i>F</i>	<i>p</i>
Threats	Level	1	0.28	.60
	Gender	1	1.08	.30
Challenge	Level	1	0.56	.46
	Gender	1	0.14	.71
Centrality	Level	1	3.72	.06
	Gender	1	1.71	.68
Control by Self	Level	1	1.96	.16
	Gender	1	2.12	.15
Control by Others	Level	1	1.12	.29
	Gender	1	1.06	.31
Uncontrollable	Level	1	1.24	.27
	Gender	1	0.57	.81
	Error	389		

Table 4.16

Descriptive Statistics of Appraisals Grouped by Gender

Group	<i>n</i>	Variable	<i>M</i>	<i>SD</i>
Female	134	TR	11.81	2.25
		CL	10.25	2.11
		CT	12.14	2.49
		CS	10.75	2.03
		CO	11.14	2.46
		UC	13.00	2.46
Male	257	TR	11.95	2.46
		CL	10.33	2.22
		CT	11.67	2.57
		CS	10.61	2.37
		CO	11.18	2.31
		UC	12.92	2.29

TR =Threat

CL = Challenge

CT = Centrality

CS = Control-by-Self

CO =Control-by-Others

UC = Uncontrollable

Table 4.17

Descriptive Statistics of Appraisals Grouped by Skill Level

Group	<i>n</i>	Variable	<i>M</i>	<i>SD</i>
Non-elite	253	TR	11.70	2.43
		CL	10.36	2.24
		CT	11.49	2.42
		CS	10.77	2.34
		CO	11.11	2.41
		UC	2.91	2.24
Elite	138	TR	12.26	2.28
		CL	10.20	2.08
		CT	12.46	2.66
		CS	10.44	2.08
		CO	11.26	2.26
		UC	13.01	2.54

TR =Threat

CL = Challenge

CT = Centrality

CS = Control-by-Self

CO =Control-by-Others

UC = Uncontrollable

Table 4.18

Skill Level Simple-effect Test Results in Females

Variable	<i>M</i>	Elite Group		Non-elite Group		<i>F</i>	<i>p</i>
		<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>		
Threat		12.19	2.39	11.35	1.97	4.72	.03
Challenge		10.30	1.95	10.20	2.31	0.27	.79
Centrality		12.61	2.52	11.57	2.34	6.03	.02
Control-by-Self		10.93	1.87	10.52	2.21	1.40	.24
Control-by-Others		11.51	2.39	10.68	2.49	3.85	.05
Uncontrollable		13.27	2.59	12.67	2.26	2.01	.16
		<i>n</i> = 74		<i>n</i> = 60			

Table 4.19

Skill Level Simple-effect Test Results in Males

Variable	Elite Group		Non-elite Group		<i>F</i>	<i>p</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Threat	12.34	2.15	11.81	2.55	2.24	.14	
Challenge	10.09	2.23	10.41	2.22	0.97	.33	
Centrality	12.28	2.81	11.47	2.45	4.86	.03	
Control-by-Self	9.87	2.19	10.85	2.38	8.38	.00	
Control-by-Others	10.97	2.09	11.25	2.37	0.71	.40	
Uncontrollable	12.70	2.47	12.99	2.30	0.75	.39	
		<i>n</i> = 74		<i>n</i> = 60			

Table 4.20

Gender Simple Effect Statistics of Gender in Elite Athletes

Variable	Female Group		Male Group		<i>F</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Threat	12.19	2.39	12.34	2.15	0.16	.69
Challenge	10.30	1.95	10.09	2.23	0.33	.57
Centrality	12.61	2.52	12.28	2.81	0.52	.47
Control-by-Self	10.93	1.87	9.88	2.19	9.39	.00
Control-by-Others	11.51	2.39	10.97	2.09	2.0	.16
Uncontrollable	13.27	2.59	12.70	2.47	1.72	.19

Table 4.21

Correlation Matrix for Ill-conditioning Checking

	F1	F2	F3	F4	F5	TR	CL	CT	CS	CO	UC
F1	1.0	.37	.34	.28	.33	-.02	.15	-.11	.24	.13	-.04
F2		1.0	.37	.21	.16	-.10	-.03	-.11	.13	.08	.08
F3			1.0	.23	.17	-.01	.12	-.05	.17	.15	.03
F4				1.0	.22	-.06	.07	-.09	.17	.07	-.10
F5					1.0	-.06	-.02	-.09	.15	-.01	-.07
TR						1.0	.02	.65	-.22	.03	.34
CL							1.0	.03	.46	.33	-.10
CT								1.0	-.27	.00	.31
CS									1.0	.38	-.12
CO										1.0	-.13
UC											1.0

Table 4.22

*Standardized Canonical Coefficients of Factor Scores**(Stress Sources)*

	CS1	CS2	CS3	CS4	CS5
Factor 1	0.71	-0.14	0.19	-0.75	-0.51
Factor 2	-0.28	0.86	0.42	0.36	-0.32
Factor 3	0.39	-0.12	-0.53	0.75	-0.36
Factor 4	0.39	-0.19	0.47	0.29	0.85
Factor 5	-0.07	0.59	-0.64	-0.31	0.56

CS = Canonical variate labeled Chinese Stress Source

Table 4.23

Standardized Canonical Coefficients for the Appraisal

	CA1	CA2	CA3	CA4	CA5
Threat	0.47	-0.36	-0.14	-1.08	0.41
Challenge	0.37	-0.76	0.38	0.11	-0.47
Centrality	-0.38	-0.19	-0.17	1.08	0.66
Control-by-self	0.64	0.63	-0.45	0.14	0.67
Control-by-others	0.06	0.14	0.65	0.24	-0.09
Uncontrollable	-0.19	0.41	0.85	-0.16	0.09

CA = Canonical variate named Chinese Appraisal

Table 4.24

*Point Bi-serial Correlation Coefficients Between Coping Styles
and Stress Sources*

Style	TFO	CWO	CDS	EVS	OSK
AV	.36	.24	.28	.28	.24
AP	-.36	-.24	-.28	-.28	-.24
	<.0001	<.0001	<.0001	<.0001	<.0001

N = 355

AV = Avoidance Coping Style

AP = Approach Coping Style

TFO = Threat from Others

COW = Conflicts with Official

CDS = Coach Dissatisfaction

EVS = Environmental Sources

OSK = Opponent Skill

Table 4.25

*Point Bi-serial Correlation Coefficients between Coping**Styles and Appraisals*

Style	TR	CL	CT	CS	CO	UC
AV	-.08	.26	-.10	.41	.27	-.21
AP	.08	-.26	.10	-.41	-.27	.21
<i>p</i>	.29	<.001	.11	<.001	<.001	.33

n = 355

TR = Treat

CL = Challenge

CT = Centrality

CS = Control-by-Self

CO = Control-by-Others

UC = Uncontrollable

AV = Avoidance Coping Style

AP = Approach Coping Style

Table 4.26

Multiple Regression Statistics Appraisals as Dependent Variables

		Predictor									
		Regression Coefficients (β)									
	Intercept	F1	F2	F3	F4	F5	R^2	t (390)	p	VIF	
TR	11.90										
CL	10.30	0.33					.02	3.20	< .05	1	
CT	11.83	-0.29					.01	-2.26	< .05	1	
CS	10.65	9.47			0.24		.07	2.11	< .05	1.09	
CO	11.16			0.36			.02	3.01	< .05	1	
UC	12.94		0.25		0.24		.02	-2.38	< .05	1.04	

TR = Threat

F1 = Threats-from-Others

CL = Challenge

F2 = Conflicts-with-Official

CT = Centrality

F3 = Coach-Dissatisfaction

CS = Control-by-Self

F4 = Environmental-Sources

CO = Control-by-Others

F5 = Opponent-Skills

UC = Uncontrollable

Table 4.27

*Statistics for Variables Entering Model in**Stepwise Discriminant Analysis*

Variable	PR^2	F	P
Factor1	.05	17.84	<.01
Factor3	.02	6.41	<.01
Factor4	.03	9.47	<.05
CS	.08	29.46	<.01
CO	.01	4.12	<.05

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-situations

CS =Control-by-Self

CO = Control-by-Others

PR^2 = Partial R Square

Table 4.28

Stepwise Selection Summary (Discriminant Analysis)

Step	Variable		Wilks'			
	Entered	PR^2	F	P	Lambda	P
1	CS	.17	70.92	<.01	.83	<.01
2	Factor1	.09	35.44	<.01	.76	<.01
3	Factor4	.03	11.72	<.01	.73	<.01
4	Factor3	.02	7.33	<.01	.72	<.01
5	CO	.01	4.12	<.05	.71	<.01

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by-Others

Table 4.29

Simple Statistics of Discriminant Analysis

Variable	<i>N</i>	<i>M</i>	<i>SD</i>
Factor1	355	-0.02	1.00
Factor3	355	-0.01	1.00
Factor4	355	0.02	1.01
CS	355	10.65	2.25
CO	355	11.09	2.30

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by-Others

Table 4.30

*Post Hoc Test Results of Style Groups
(Discriminant Analysis)*

Variable	<i>F</i>	<i>P</i>
Factor1	54.15	<.00
Factor3	29.67	<.00
Factor4	29.87	<.00
CS	70.92	<.00
CO	26.91	<.00

N= 355

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by-Others

Table 4.31

Simple Statistics of Avoidance Coping Style

Variable	<i>n</i>	<i>M</i>	<i>SD</i>
Factor1	174	0.35	1.03
Factor3	174	0.28	0.91
Factor4	174	0.31	0.98
CS	174	11.59	2.31
CO	174	11.71	2.28

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by- Others

Table 4.32

Simple Statistics of Approach Coping Style

Variable	<i>N</i>	<i>M</i>	<i>SD</i>
Factor1	181	-0.37	0.81
Factor3	181	-0.28	1.01
Factor4	181	-0.25	0.96
CS	181	9.75	2.13
CO	181	10.49	2.25

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by-Others

Table 4.33

Linear Discriminant Function of Coping Styles

Variable	0	1
Constant	-22.85	-17.75
Factor1	-0.14	-0.72
Factor3	-0.15	-0.50
Factor4	0.21	-0.20
CS	2.09	1.75
CO	1.71	1.58

Hit ratio = .75.

Factor 1 = Threats-from-Others

Factor 3 = Coach-Dissatisfaction

Factor 4 = Environmental-Situations

CS =Control-by-Self

CO = Control-by-Others

Table 4.34

Gender Effect on Coping Styles

Coping Style	Non-elite		ϕ	χ^2	<i>p</i>
	Female	Male			
Avoidance	25	90	-.05	0.49	.48
Approach	30	87			
Elite					
Avoidance	42	17	.40	19.59	< .0001
Approach	20	44			

Table 4.35

Skill Level Effect on Coping Styles

Coping Style	Female		ϕ	χ^2	<i>p</i>
	Non-elite	Elite			
Avoidance	25	42	-.22	5.92	.015
Approach	30	20			
Male					
Avoidance	90	17	.20	9.68	.002
Approach	87	44			

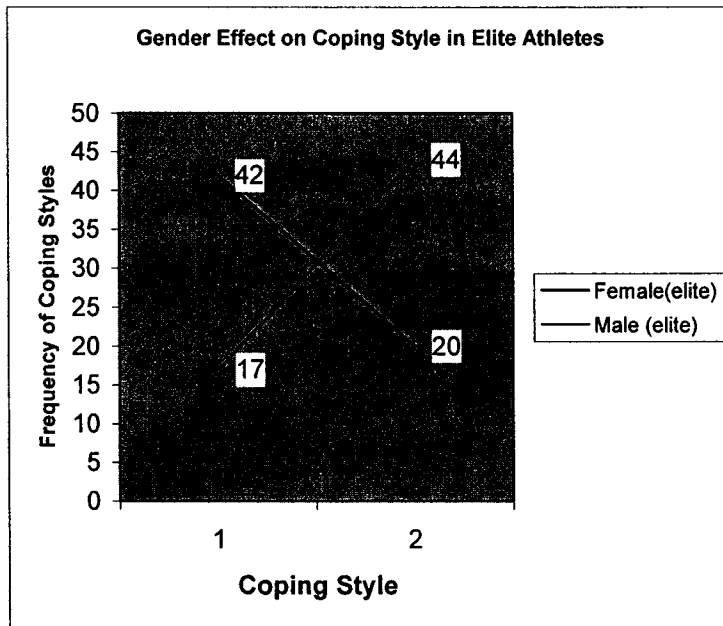


Figure 4.1. Gender effect on coping style in elite athletes

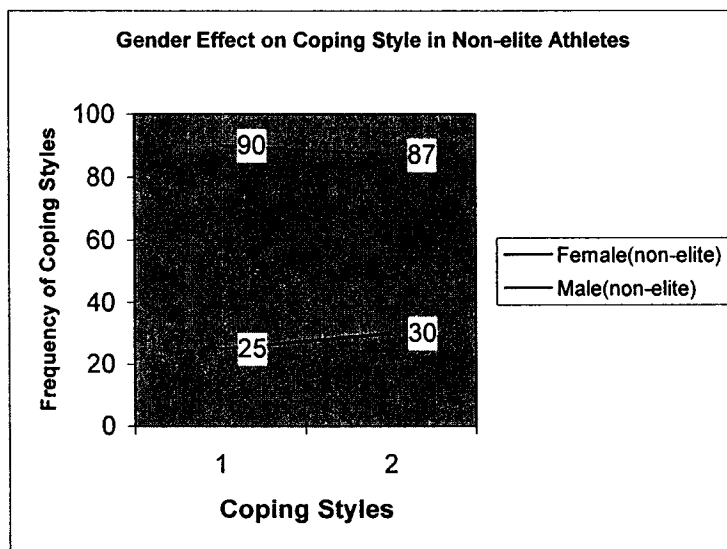


Figure 4.2 Gender effect on coping style in non-elite athletes

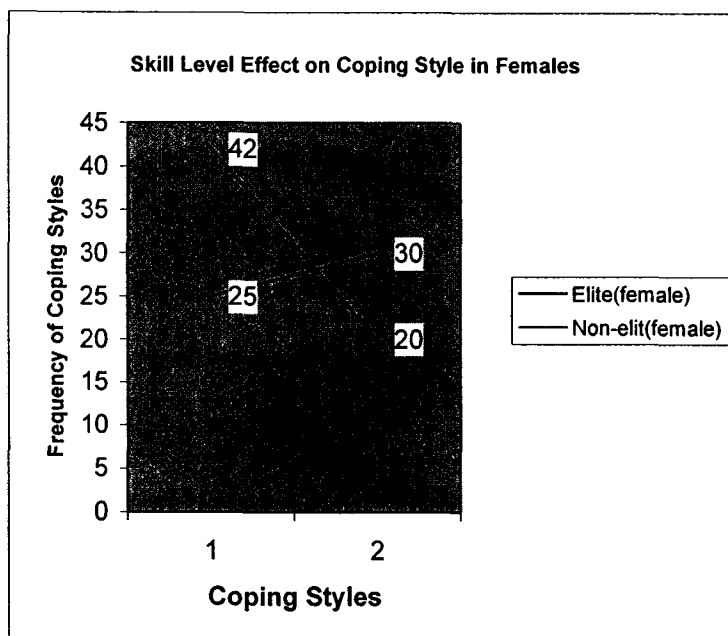


Figure 4.3 Skill Level effect on coping style in females

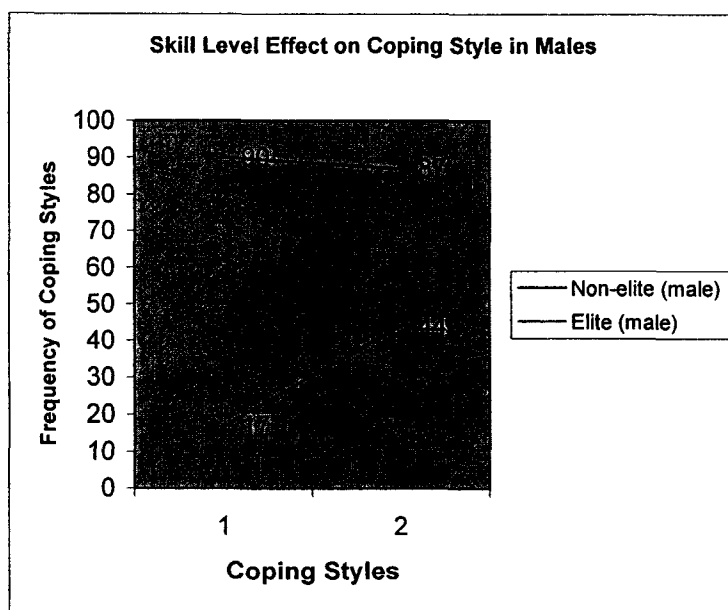


Figure 4.4 Skill level effect on coping style in males

Chapter V

Discussion

The purposes of this study were: (a) to determine the personal and situational factors that predict participants' coping styles in response to sport-related stressful events experienced by competitive Chinese college athletes, (b) to determine the relationships between the athlete's sources of acute stressors, cognitive appraisal, and coping style experiences during competition, and (c) to determine the extent to which the coping process (e.g., sources of acute stress, cognitive appraisal, and coping style) differs among Chinese college athletes as a function of skill level and gender.

The present study followed a conceptual model based on the transactional model (see Figure 1). The model consisted of determining the intensity of different acute stressors, then determining the participant's appraisal of the stressful situation and, finally, identifying the athlete's use of coping style in response to that stressor. It was assumed that there were relationships between each athlete's use of coping style and the personal and situational factors. The relationships can be explained by the following equation:

$$S_{ij} = f(P_i, S_j) \quad (\text{Equation 1})$$

Where S_{ij} represents the athlete's use of coping style. f is the function of the two elements (P and S) in the vector. P_i summarizes the individual's response caused by personal

characteristics (individual i 's gender, athletic level) and S_j is an individual's response in situation j (cognitive appraisal on stress sources). Based on this equation, the athlete's use of coping style can be viewed as the function (f) of personal and situational characteristics. Based on both the conceptual model and the relationship equation, this study addressed the personal and situational factors that predicted the coping style in response to sports-related stressful events experienced during the contest among Chinese college male and female competitive athletes. Statistical analyses were focused on the effects of personal factors (gender, athletic level, cognitive appraisal) and situational factors (acute stress sources) and the relationships between these factors in determining the predictors of coping style in sport. The study conclusions of this study will answer the following questions: Are the study results to support its conceptual model? To what extent the Chinese college athletes' use of coping style as a function of selected personal and situational factors is.

Situational Factors

The present study purposed 12 hypotheses. First, it was hypothesized that for Chinese college athletes, sources of acute and intensive sport-relate stress would be identified. Based on the conceptual model, the first research question of this study was to determine the most intensive sources of acute stress in sport among college athletes. With PCF analysis, five main acute stressor factors were identified. They were named Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills.

According to the eigenvalue and the percentage of variance explained (%), Threats-from -Others (Factor 1) (5.88 and 27%) was the dominant acute stress source

when referring to the threat actions of the audience members and competitive opponents. This was a particularly unpleasant stressor to Chinese college athletes. Chinese sports fans may be usually somewhat less restrained than Americans, especially when viewing sports, such as soccer (Football, 2004). This factor confirmed that sports-related violences; sources of worry and unpleasant comments from spectators are common sources of an athlete's stress in different cultures (e.g., Anshel, 2001a; Horn & Spreeman, 1983; Junge, 2000; Smith, 1986).

Verbal abuse from players and coaches and game-related pressures were sources of high-intensified acute stress among volleyball and football officials (Goldsmith & Williams, 1992). Anshel and Weinberg (1995, 1996) found that verbal abuse by coaches; threats of abuse, and experiencing injury were among the top five sources of stress for basketball referees. The present study also partially supported the findings of Goldsmith and Williams and Anshel and Weinberg. In their reports, spectators' insults and threatening behaviors by competitive opponents during the sources of high acute stressors. In summary, according to the previous research findings and the results of this study, Chinese college athletes had similar stress sources related to threat behaviors experienced in a game situation as Western athletes.

The subdominant acute stress source was Conflicts-with-Official (Factor 2). A conflict with a game official was related to the behaviors of referees and competitors. This stress source includes unfair treatment by a referee, poor performance by a referee, and arguing with a referee(s) or a competitor(s) in a game. Among them, unfair treatment by a referee (with the factor loading of .80) was the dominant element in this factor. Their finding supported the results of previous research in which receiving a penalty or a bad

call from the referee was a highly intense source of stress (Anshel, 1990; Anshel, 2001a; Anshel & Delany, 2001; Gould, Horn, & Spreeman, 1983; Junge, 2000; Madden, Summers & Brown, 1990; Smith, 1986). It is apparent, therefore, that the Conflicts with official are a source of highly intense stress, even to elite athletes.

The third source of acute stress, Coach-Dissatisfaction, was experienced when athletes were in situations, such as being threatened by a coach due to their unsatisfactory game performances, making mistakes repeatedly in the game, and especially, being reprimanded by their coach in public. Being reprimanded in public by their coach was the dominant element (with factor loading $\lambda = .83$) in this factor. Otherwise, repeatedly making mistakes in the game was the weakest element with factor loading $\lambda = .34$ in this factor.

Coach factor was reported by Anshel and Weinberg (1996) as being a stressful source of relative high intensity to basketball referees. In addition, making an error in a game has been amply reported in previous literatures and was thought an important stress source (e.g., Anshel, 1990; Anshel & Delany, 2001; Holt & Mandigo, 2004; Smith, 1986). Anshel and Delany found that making an error in a game was one of the two most frequently cited and intense sources of stress for both female and males (another one being a bad call by a referee). Madden, Summers and Brown (1990) reported that making an error such as missing a lay-up or an easy jump shot would make athletes very stressful. The coach's tolerance level, the level of pressure in a specific game, and the ability to cope with errors are elements that influence an athlete's perceived feeling of stress intensity.

College athletes viewed Coach-Dissatisfaction (Factor 3) as another stressful source. Being reprimanded in public by their coach was the dominant element in this

factor. Making mistakes in the game was viewed as the most intense source of stress in previous literature; however, this element was the weakest element to make the factor Coach Dissatisfaction. Based on the mean scores, Conflicts with Official was the most important stress factor. Based on the factor structure, Threats from Others was the Number 1 factor with the highest eigenvalue and accounted for the biggest percentage of variance.

The fourth factor (Environmental-Sources) included the elements of Bad weather, Teammate Making an Error, and Crowd Noise. This factor was primarily a measure of negative perception on the environmental conditions. Adverse environments should be conceptualized as potential stressors (Lane et al., 2004). Athletic performance is affected by extreme environment, such as heat, cold or at altitude. The extreme environments can produce a stress response characterized by increased negative mood and relatively poor performance, because the extreme environments will increase athletes' physiological and psychological stress (Bolmont et al., 2000; Gleeson, 2000; Acevedo & Ekkekakis, 2001). The extracted factor, Environmental Sources, is consistent with the previous reports on the effete of extreme environments to athletes' psychological stress.

The fifth factor was related to an injury, being controlled by an opponent in game, and opponent's excellent performance. Thus, Factor 5 (Opponent-Skill) was primarily a measure of negative feeling caused by an opponent's performance or suddenly occurred injury. American athletes also viewed this factor as a stressful source. Anshel, Williams, and Hodge (1997) reported that American athletes were more concerned with their opponent's performance than Australian athletes.

Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skill were five acute stress sources for Chinese college athletes. Among them, Threats-from-Others and Conflicts-with-Official could be viewed as the most intense stress sources. The hypothesis that specific sources of highly acute and intensive sport-relate stress would be identified was supported by the present results.

Gender / Skill Level and Stress Sources

After the intensity of different acute stressors was determined, the next step of this study was to determine the extent to which the coping process differs among Chinese college athletes as a function of gender and skill level. Personal factors included gender, athletic level, and stress appraisal in this study. These three factors together with situational factors were assumed to have relationships between each other. Especially, situational and personal predictors of an athlete's use of coping style were assumed a function of gender and skill level.

The second hypothesis stated that there would be a significant difference on sources of acute stress in sports between male and female athletes. The results indicated no significant difference between females and males for each stress source. Even after controlling skill level, there was no evidence that gender influenced the athletes' perceived intensity on stress sources for both elite and non-elite levels.

This result did not support the results of previous studies. For example, Mahoney, Gabriel, and Perkins (1987) reported that non-elite female adult athletes tended to be more anxious and less self-confident than male athletes were. Goyen and Anshel (1998) reported that males experienced significantly lower acute stress than females following

performance-related stressors. Males and females appeared to appraise the same stressors with different intensity levels. Girls displayed more depression than boys, and more highly depressed girls demonstrated coping patterns similar to those of depressed adolescent and adult women (Broderick & Korteland, 2002). Washburn-Ormachea, Hillman, and Sawilowsky (2004) found that female participants reported more arguments with their male friends and males reported less anxious than females. Mahoney et al, and Goyen reported that female athletes tended to be more anxious and experienced higher acute stress than their male counterparts.

One possible reason the study results of this study did not support the previous literature could be related to different cultural background. Chinese women are encouraged to participant sports activities. They have the same chance as men to develop their sports talent. In fact, Chinese women are more competitive than their male counterparts in contemporary sports activities. "In Chinese sports, women prop up more than half of the sky" (Sports Yearend, 2002). For example, in the 28th Athens Olympics, more Chinese women won medals than Chinese men. Chinese female athletes got 20 of 32 golden medals seized by Chinese athletes (Olympic Champions, 2004). The Chinese women's teams were among the best in the world. It was found in the good example present study that 55.2% of females were elite athletes (see Table 5.1) and only 25.9% of males competed at the elite level. However, the percentage of elite athletes could not explain the lack of a gender effect in this study. In addition, even after controlling for the factor of skill level, there was no evidence that gender affected on the participants' perceived intensity of stress sources at the elite or non-elite level. Thus, the hypothesis that there would be a significant difference on sources of acute stress in sports between

Chinese college male and female athletes was not supported. Gender had no effect in perceived intensity on stress for the participants.

Skill level was another personal factor emphasized in the conceptual model of this study. The third hypothesis was that there would be a significant difference on sources of acute stress in sports between elite and non-elite athletes. The results indicated a significant difference between skilled levels on perceived intensity of stress. Specifically, elite athletes reflected lower perceived stress intensity than their less skilled peers. Non-elite athletes perceived higher level of stress than did elite athletes. This finding was consistent with previous research. For example, Neil, Mellalieu, and Hanton (2004) reported that elite athletes perceived a lower intensity of stressor than did non-elite athletes. Elite athletes reported higher self-confidence and a more facilitative interpretation of symptoms associated with worry. The present study results confirmed that athletic level was one of personal factors in the conceptual model. The results also suggest that skill level factor is more important than gender on perceived intensity on stress sources. Absence of a significant gender and skill level interaction, which contradicts Hypothesis 4, indicates for athletes' perceived intensity on stress sources that skill level has the same main effect on each level of gender and gender has no effect on athletes' perceived intensity on stress sources.

Gender / Skill Level and Appraisal

The fifth, sixth and seventh hypotheses examined the extent to which athletes' cognitive appraisal would be influenced by gender or skill level. Because the α level of MANOVA test for simple-effects greater than .025 (the controlled alpha level), the post hoc procedure stopped at this step. There was no evidence that gender affect the

participants' appraisal. The result was not consistent with previous reports. In a study of female and male child athletes, Anshel and Delany (2001) examined cognitive appraisals, coping strategies and coping styles. Boys who responded to their stressors had a higher scores cognitive appraisal than girls. Hammermeister and Burton (2004) reported that gender difference did exist during the secondary appraisal process but not the primary appraisal. Females perceived less control over environmental threat than males. Important to note, after showing gender no effect on the participants' perceived intensity on stress sources, the results of the present study also shows that gender no main effect on the participants' appraisal.

However, when controlling for gender, skill level significantly influenced Chinese college athletes' appraisals. Among females, the skill level effect influenced the appraisal, Centrality. Compared to non-elite female athletes, elite female athletes scored higher on Centrality appraisal, that is, lower appraisal for perceived importance of an event for one's well-being. That is, elite female athletes estimated the situation was less relevant to them than non-elite female athletes; non-elite female athletes assessed that much could be done to overcome or prevent harm or to improve the situation by external help.

This result supported previous studies on the effect of athleticism (Gill, 1992; Mahoney, Gabriel, & Perkins, 1987). Gill's study indicated similar psychological characteristics and behavioral tendencies in the elite athletes. This situation did not occurred in non-elite athletes. Mahoney, et al. reported that individual's anxious was affected by gender and skill level in athletes.

In this study, the participants of the non-elite group consisted of physical education college students. Their experience as competitive athletes was mainly limited to high school sports teams or part-time sports schools. Elite group participants, however, were professional athletes. For example, all the 91 participants who attended the Chinese National College Volleyball Championship of 2004 averaged five years of professional game experience. The majority of these athletes were professionals, competing at the province or national level before becoming college students. Other elite participants were professional veterans in basketball, soccer, ping-pong, weight lifting, and track and field.

Important to note, when controlling for gender, there was no evidence that skill level affected the participants' appraisal among males. This result suggests that skill level's main effect only influence participants' appraisal among females not among males. The interaction effect of gender and skill level indicated that gender's effect existed. However, the gender effect result was contrary with the report of Hammermeister and Burton 's (2004), in which the gender difference did not exist during the primary appraisal process but the secondary appraisal. In the present study, the interaction effect of gender and skill level affected the participants' Centrality appraisal. In SAM, Centrality belongs to primary appraisal.

Relationships Between Personal and Situational Factors

The conceptual model for this study was based on relationships between personal and situational factors that influence the coping process in sport. To determine the relationships between the acute stressors, cognitive appraisal, and coping style among Chinese college athletes was the second purpose in this study. Hypothesis 8 stated that there would be significant relationships between stressors and appraisals, between

stressors and coping style, and between appraisals and coping style. A series of correlational analyses were used to measure these relationships.

There are five stress sources and six appraisals in the present study. One of the study questions is to explore the relationships between the two sets variables. Canonical correlation is an appropriate technique to determine the degree of relationship between the linear combination of the set of stress sources and the linear combination of set of SAM appraisals. The results of canonical correlation indicated that there was a significant correlation between the linear combination of the set of appraisal variables and the linear combination of the set of stress source variables. The finding that Control-by-Self was strongly associated with the canonical variate (Chinese Appraisal) implied that Control-by-Self (i.e., the appraisal for measuring controllability of an individual) was the dominant element in the set of appraisal variables. Threats-from-Others (Factor 1) was the item most strongly associated with the canonical variable of stress source. This result was consistent with the result of an exploratory factor analysis in which Threats-from-Others was the first factor with the heaviest eigenvalue and accounted for biggest percentage of variance. Therefore, it was concluded that Threats-from-Others was the most important stress factor to the athletes in this study.

The results of another canonical correlation showed a positive relationship between the two sets of variables (stress source and appraisal). When an individual scores a high value in stress sources, there is a possibility that he/she will score high in appraisal. Because Threats-from-Others and Control-by-Self were two dominant variables in the two sets, respectively, an individual scores high value on Threats-from-Others (stress source) will be possible to score a high value on Control-by-Self

(appraisal). Higher scores on Control-by-Self represent lower controllability. In summary, the stress source factors and the appraisals variables indicated a significant relationship between the stress source and appraisal variables in this study.

The results of Point Bi-Serial correlation computed to examine the relationship between the five extracted stress variables (Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent- Skills) and coping styles (Avoidance and Approach). The results showed significant correlations between coping style and each acute stressor factor. As with the results of canonical correlation, the correlations were low. The highest correlation coefficient was between avoidance coping style and Threats-from-Others, $r = \pm .36, p < .01$. This result was consistent with the previously stated canonical correlation that Threats-from-Others was the dominant correlated variable with appraisal. Higher degree of Threats-from-Others was associated with a greater possibility a person used an avoidance coping style. Lower scores for Threats-from-Others was linked to higher possibility a person is with approach coping style.

The second Point Bi-Serial correlation used to determine the relationship between SAM appraisal variables (Threat, Challenge, Centrality, Control-by-Self, Control-by- Others, and Uncontrollable) and the coping styles (avoidance and approach). The results showed a significant correlation between each type of coping style and each appraisal. The highest correlation coefficient, $r = \pm .41, p < .01$ were between coping style and Control-by-Self. The symbol of “±” that before the correlation coefficient “.41” indicated the two directions between Control-by-Self and avoidance coping style. Thus, athletes with a preferred appraisal of Control-by-Self were likely to adapt on avoidance coping

style. Conversely, a negative Control-by-Self value was associated with an approach coping style. Lower controllability, then, was associated with an avoidance coping style, and higher controllability was associated with an approach coping style. The result of Control-by-Self is an important appraisal related to coping style was also consistent with the previous stated result of canonical correlation that Control-by-Self was the dominant correlated variable. This result supported the findings of Anshel, Jamieson, and Raviv (2001), who reported significant relationships between the athletes' significant appraisals and their use of selected coping strategies. These relationships differed as a function of the source of stress. Athletes select coping strategies is influenced by their appraisals on different stress sources. The hypothesis that there would be significant relationships between stressors and appraisals, stressors and coping style, appraisals and coping style was supported.

Predictors of Coping Style

The main purpose of this study was to determine the personal and situational factors that predict each participant's coping style in response to sport-related stressful events experienced by competitive Chinese college athletes. The tenth hypothesis stated that the linear combination of stress sources and appraisals would be a significant discriminant function for athletes' coping styles. Discriminant analysis was completed to predict coping style. Approach and avoidance coping styles were significantly different on the linear combination of the appraisals, Control-by-Self and Control-by-Others, the stress sources of Threats-from-Others (Factor 1), Conflicts with Official (Factor 2), Coach-Dissatisfaction (Factor 3), and Environmental-Sources (Factor 4). These two

appraisals and three stress sources were identified as predictors for coping style by discriminant analysis.

The avoidance coping style participants scored significantly higher perceived stress intensity on the three stress sources than did approach group participants. The higher an athlete's perceived stress intensity, the more likely he or she had an avoidance coping style. This finding confirmed that there was a relationship between the perceived intensity of stress sources and a person's coping style. This result supports the athlete's uses of approach and avoidance coping styles in response to acute stressors in sport. Coping style was moderately consistent across different situations, similar to an early coping study by Anshel and Caputi (2000).

The approach coping style group scored significantly lower scores on the two appraisals of Control by Self and Control by Others than the avoidance style group. The lower the score, the higher the level of controllability appraisal an athlete has. The results indicated that different coping styles had significantly different controllability appraisal. This finding was identical with some previous study ideal. For example, researchers have pointed out that an approach coping is usually preferred under conditions of high controllability, when obtaining information or social support are desirable, and when there is ample time to address the source of stress (Anshel, 1996; Anshel & Kaissidis, 1997; Anshel, et al., 1997; Krohne & Hindel, 1988).

According to the created predictive equation of discriminant analysis, the higher scores on stress sources of Threats-from-Others, Conflicts-with-Official, and Coach-Dissatisfaction and highly scores for appraisals of Control-by-Self and Control-by-Others that a Chinese college athlete is associated with an avoidance coping style. Conversely,

lower scores on stress sources of Threats-from-Others, Conflicts-with-Official, and Coach-Dissatisfaction and the appraisals of Control-by-Self and Control-by-Others are linked to an avoidance coping style.

In the present study, the hypothesis that the linear combination of stress sources and appraisals would be a significant discriminant function for coping styles. However, there was no evidence of a particular preferred coping style. If gender and skill level was not controlled, an avoidance coping style was prevalent in 174 athletes, while 181 athletes preferred an approach coping style, $\chi^2(1) = 0.14, p = .71$. Both styles had almost 50% of the participants. This result did not support the researches. For example, in one particularly extensive study on youth male cricket players, Holt and Mandigo (2004) reported that problem-focused coping was more frequently than emotion-focused coping for acute stress in a game. Anshel and Wells (2000) provided evidence for greater use of an approach coping style than an avoidance coping style following the specific stressors. Mullen and Suls (1982) found that an avoidant coping style resulted in better adaptation in the short term and vigilant strategies with better adaptation in the long term.

Coping Style and Gender

Gender is a factor that influences the use of particular coping strategies (Anshel, Porter, & Quek, 1998; Anshel, Jamieson, & Raviv, 2001). To confirm the previous studies, the eleventh hypothesis stated that Chinese college athletes' coping styles would be influenced by gender, and that there would be a significant relationship between coping style and gender. Chi-square and Phi-correlation techniques were used to check gender's effect on a participant's coping style and the relationship between the two variables.

When controlling for athletic level, the Chi-square results indicated a significant frequency difference between males and females in Chinese college elite athletes. In elite athletes, females were more likely to have an avoidance coping style than males were. Conversely, elite males were more likely to have an approach coping style than elite female athletes were. The gender effect on an athlete's coping style was limited to elite athletes because there was no significant gender difference on coping style among non-elite athletes.

These findings supported the previous reports that females apply more avoidance coping than males (e.g., Anshel, Porter, & Quek, 1998; Reid, Dubow, & Carey, 1995). Anshel et al., (1997) reported that both Australian male and female athletes had more avoidance-emotion coping. And American female athletes had more approach-task coping. These previous findings did not indicate whether the gender's effect on coping style was related to skill level or age. However, past non-sport studies reported contrary results by suggesting that females use more approach coping strategies and males use more avoidance coping strategies (e.g., Phelps & Jarvis, 1994). Meanwhile, others suggest that there is no significant difference between males and females on coping strategies (e.g., Causey & Dubow, 1993).

Coping Style and Skill Level

Previous literatures addressed the influences of athletic experience and skill level to athletes' coping with stress in sports. Krohne and Hindel (1988) concluded that avoidance coping engaged by more successful players than did their less successful counterparts. Elite athletes also reported more effective use of problem-focused coping than non-elite athletes (Neil, Mellalieu, & Hanton, 2004).

Skill level was assumed to affect participants' coping styles in the conceptual model of this study. The statistical analysis results confirmed this assumption and indicated that skill level (skill and experience) affected athletes' coping styles. Research Hypothesis 12 that Chinese college athletes' coping styles were influenced by skill level and that there would be a significant relationship between coping styles and skill level was supported. More importantly, this study results supported the previous literature that skill level affected athletes' coping styles. Furthermore, this study found that skill level had different effects on athletes' coping style. This effect differs depending on the controlled gender level. When controlling for gender, skill level has reversed significant effects on the participants' coping styles. According to the percentages, more elite males had an approach coping style, and more non-elite males had an avoidance coping style. However, more elite females had an avoidance coping style, and more non-elite females had an approach coping style. Gender and skill level were two factors that interacted to influence the participants' coping style. There was no such a report in previous literatures.

Cultural Background Elements

Some of the results from this investigation were different than the previous studies' reports, for example, the issue of gender's effect on stress sources and appraisals. There was no evidence that gender influenced athletes' perceived intensity on stress sources and appraisals at either the elite or non-elite athletic levels. This result was contrary with previous reports that gender affected individual's perceived intensity on stress sources and affected individual's appraisal. The contrary result could be relevant to different cultural backgrounds.

As Frydenberg, Lewis, Kennedy, Ardila, Frindre, and Hannoun (2003) concluded that similarity in coping could not be assumed across different populations. Mauro, Sato, and Tucker (1992) examined cultural effects on appraisals in college students with different cultural backgrounds (China, Hong Kong, Japan, and the United States). They suggested that cultural differences could be in part due to differences in cultural beliefs concerning responsibility and control.

Yoshihama (2002) found that Japan-born respondents were significantly less likely to use "active" strategies and perceived their partners' violence to be less effective than did US-born respondents. Chan (1995) reported that Hong-Kong adolescents appeared to have higher depression than U.S. adolescents, and their depressive symptom levels were found to relate to avoidant coping strategies as well as low self-esteem and reduced social support. Anshel, Williams, and Hodge (1997) reported that Australian athletes were less concerned with their opponent's performance than American athletes. In this study, opponent's skill performance in games was a stressful source for Chinese college athletes.

However, some cross-cultural comparisons reported that there were more similarities than differences in their studies. For example, in a study on sources of acute stress in American and Australian basketball referees, Anshel and Weinberg (1995) reported that significant cross-cultural differences in only four of 15 sources of stress. Their finding was consistent with the report of Weinberg, Grove, and Jackson (1992) in which American and Australian tennis coach's coping behaviors were compared. Both of the samples whether came from the same race or not is not clear.

To explore the difference of ethnic identity, and self-construal, Zaff, Blount, Phillips, and Cohen (2002) studied Caucasian American and African American adolescents across various situations to determine the coping strategies used by the participants. The African American students did score significantly higher on total ethnic identity items than the Caucasian American students. Ethnicity as a discrete variable was not associated with coping, but that ethnic identity and self-construal were. This study is not a cross-cultural comparison, but it implies that race could be an important factor in cross-cultural comparison.

In this study, cultural background could be an important element to influence participants' coping stress. For example, cultural and race variation in communication behaviors could result in that Chinese college athletes viewed Coach-Dissatisfaction as a stressful source. There was a report that Chinese teachers emphasized authority, morality, and modeling. Lu reported (1997) that Chinese college teachers were more likely to use punishment-oriented, antisocial behavior alteration techniques, while previous research with U.S. teachers shows a preference for reward-based, pro-social behavior alteration techniques. Punishment-oriented techniques would make college athletes more sensitive to temper, motion status, especially the coaches' attitudes toward them. One mechanization of traditional Chinese cultural is to obey authority, including teacher (to students), father (to a family), and official (to a government). This study implies that cultural background would be an important factor in such studies in which participants are with specific cultural background.

Gender Effect on Coping Issue

Gender effect in coping has been discussed by researchers. Previous studies have found gender difference resulted in different perceived intensity of stress, different stress appraisal, and different coping response with different coping strategies (e.g., Anshel, Porter, & Quek, 1998; Anshel, Jamieson, & Raviv, 2001; Broderick & Korteland, 2002; Hammermeister & Burton, 2004; Reid, Dubow, & Carey, 1995; Spivak & Shure, 1985; Stark, Spirito, Williams, & Guevremont, 1989; Washburn-Ormachea, Hillman, & Sawilowsky, 2004). Other researchers got the contrary results. For example, some others suggest that there is no significant difference between male and female on coping strategies (e.g., Causey and Dubow, 1993). Some researchers had different view on gender effect in coping. They reported that there was no substantial difference between males and females in coping (e.g., Crocker & Graham, 1995; Lopez; Mauricio, Gormley, Simko, & Berger, 2001). Ntoumanis and Biddle (1998) also argued, “it is not clear whether these reported gender differences were a function of gender or whether they are contaminated by differences in other variables examined, namely skill level and culture” (p.775). In the present study, gender was found to influence participants’ coping style, and consisted the interaction effect with skill level. Gender had no effect on participants’ perceived intensity of stress sources.

Important to note, when controlling the gender level for testing skill level’s effects to coping styles, and when controlling the skill level for testing gender level’s effect to coping style, the results of the present study were consistent with both previous contractor reports on gender and coping style. For example, females (elite group) in the present study were more likely to have an avoidance coping style and males (elite group)

were more likely to have an approach coping style. These results were consistent with the previous reports that females apply more avoidance coping than do males (e.g., Reid, Dubow, & Carey, 1995). However, more non-elite males had an avoidance coping style and more non-elite females had an approach coping style. These results were consistent with the previous reports that suggested females' use more approach coping strategies and males use more avoidance coping strategies (e.g., Phelps & Jarvis, 1994). The interaction of gender and skill level resulted in contrary gender effects in different skill levels. The effect of gender on stress sources and coping styles in this study indicated that gender difference in coping is still an attractive research topic and need further studies.

Transaction Model

The conceptual model of this study was designed and executed based on the transaction model. Transaction model emphasizes the relationships between environmental demands, the individual's perceptions of these demands and the individual's ability to handle or manage the demands (Folkman & Lazarus, 1985). The present study results supported the description of transaction model by some researchers in both general and sports psychologists (Anshel & Wells, 2000; Folkman, 1992; McCrac, 1992; Terry, 1991). They thought that according to the transactional theory, factors such as gender and previous sport experience/skill level can predict appraisal and coping with stress in strategies and styles.

In this study, the investigation followed the coping process to determine the intensity of different acute stressors first; then determine the Chinese college athlete's appraisal of the stressful situation, and finally, determine the participant's use of coping style in response to that stressor. The study results confirmed that the participants' use of

coping style was a function of the participants' perception of a situation and the personal factors: gender, athletic level, and appraisal. This function was based on the relationships between personal and situational factors. In this study, situational factors - acute stress sources, were stimuli to the participants. In the appraisal process, gender and athletic experience and skill level were testified to influence the participants' appraisal. The existed correlated relationships between the personal and situational factors made the coping style predictable. The participants' use of coping strategies (coping style) was confirmed a function of gender, athletic level, and appraisal. This function expressed the extent to which a person believes that he or she can shape or influence a particular stressful person-environment relationship (Lazarus & Folkman, 1984; Anshel, 1996). The study results consistent with the translation model that coping is a result of relationship between individual and the environment. Also, this study confirmed that coping with acute stress is primarily a function of three components: the characteristics of the stressful event, the person's appraisal of that event, and the coping strategies used by the person (Lazarus & Folkman, 1984).

Conclusions

Following conclusions could be made according to the study results:

1. Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, Environmental-Sources, and Opponent-Skills were five acute stress sources to Chinese college athletes. The five stress sources were the situational factors stated in the conceptual model and the function model.
2. There was no significant main mean difference between female and male athletes on the each stress source. Also, There was no significant main mean difference

between female and male athletes on appraisals. These two results were not consistent with the previous study reports in which gender affected individual's perceived intensity of stress sources and stress appraisals in sports.

3. Skill level significant affected the participants' perceived intensity of stress sources. This finding was consistent with the previous study reports that elite athletes had less perceived intensity on stress sources than non-elite athletes.
4. Gender and skill level had interaction effect on participants' appraisal. But, the effects of the both skill level and gender were limited on the part of stress appraisals. The findings supported previous literature that skill level affected individual's appraisal.
5. Approach and avoidance coping styles were found significantly different on the linear combination of appraisals of Control-by-Self and Control-by-Others, and stress sources of Threats-from-Others, Conflicts-with-Official, Coach-Dissatisfaction, and Environmental-Sources. These two appraisals and three stress sources were determined as the predictors for coping styles.
6. When controlling for skill level, gender effect on the participants' coping style was only in one factor level, elite athletes. Female elites preferred avoidance coping style and male elites preferred approach coping style. When controlling for gender, the skill level effect on the participants' coping styles was in both factor levels, female and male athletes. Skill level affected the participants' coping styles differed based on the different gender levels. Elite females preferred avoidance coping style (this result is consistent with gender's simple effect result) and elite males preferred approach coping style. Non-elite females preferred

approach coping style and non-elite males preferred avoidance coping style.

These *simple-effects* results imply that gender and skill level interactively affected athletes' coping styles. Gender and skill level were two factors that interacted to influence the participants' coping style.

7. Twenty-five percent of hypotheses (3 of 12) of this study were not supported.

These hypotheses were Hypothesis 3, Hypothesis 4, and Hypothesis 9 (see page 7-8). Seventy-five percent of hypotheses (9 of 12) of this study were supported.

These hypotheses were Hypothesis 1, 2, 5, 6, 7, 8, 10, 11, and 12 (see page 7-8).

8. The transaction model was supported by the study results. Also, the study results confirmed the conceptual model (Figure 1.1, page 10) and function model (Equation 1, page 5). Personal factors of perceived intensity of acute stress sources (Threat-from-Others, Coach-Dissatisfaction, and Environmental-Sources) and appraisals (Control-by-Self and Control-by-Others) in this study were testified being the predictors for Chinese college athletes' use of coping strategies. The study design that Chinese college athletes' use of coping strategies was a function of gender and skill level was supported by the results of this study.

Limitations of the Study

One limitation was the environment in which participants complete the inventories varied. Some participants completed the inventories in classroom, some completed in activity class, and the others completed the inventories during the break-time of sports game. Another limitation concerned the measurement of variables. The ratio of approach and avoidance was used in this study. Other limitation includes use of inventories not psychosomatically validated for sport and for use by Chinese athletes.

Also use of these particular inventories constructs (appraisal, coping style) versus other constructs that measure the same thing.

Implications and Future Directions

Several implications may be drawn from the results of this study. First, coping style has apparent relationship with participants' perceived intensity of stress sources and stress appraisal. Second, coping style was influenced not only by one factor or factors, but also the interaction effect of factors. There was no evidence of which coping style was the dominant one used by athletes, if there was no controlling for *gender and athletic level*. Such a result was not reported in previous literatures. Coping style study perhaps need be explored to more dimensions. Third, gender being a predictor of coping style implies that coping style as a disposition seems related to personality. Forth, the results of this study indicated that gender difference in coping with stress is still an attractive research topic with contractor reports. Fifth, creating a standardized, reasonable method for distinguish coping style will be much benefit coping study. Last, whether athletes' coping styles were significantly correlated or not with their use of coping strategies with a higher correlation between avoidance coping style and strategy than between approach coping

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Appendix A

Appendix A-1

Survey Instructions (Chinese)

调查须知

最理想的调查对象为高校代表队学生(不论其专业), 体育系学生其次。人数100名左右。最重要的是

调查者与被调查者都必须看懂每个问题(特别是调查者本人)。否则, 调查的结果不准确。调查者请

先向被调查者宣读每个部分前的解释(共3部分)。确保被调查者清楚如何答卷后才开始回答答卷。

请一定当面检查每份完成的问卷, 防止漏答, 特别是答卷最后的个人信息部分, 同样很重要。

答题过程中保持环境安静, 不要给被试任何暗示, 但应该解答学生对答卷中不清楚地方的疑问。

被调查者不留姓名, 但一定要知道所需的其它信息, 特别是被试是属于高校运动员、体育系或普通

系学生, 性别也很重要。

另外, 能调查多少就多少, 不够的话下学期补也行。总之, 确保质量。

谢谢,

Appendix A-2

Pilot Test Attention (English)

This survey is related to English and Chinese questionnaires. Please read carefully, and then finish all questions one by one. Maybe some questions in the two questionnaires are the same meaning. But, never compare your two versions' answers to make consistence.

Just try to do your best to understand the questions and answer them.

Thanks for your time and help.

Appendix B

Questionnaire (Chinese Version)

体育竞赛过程中的压力情景与应付

---自我评估调查表---

此问卷的目的是找出在体育竞赛活动中、在感到压抑和紧张的情况下您可能的反应。包括三部分：压抑情景选择，看法，行动。答卷将仅供本研究者使用。匿名。请注意：答案选择没有对错之分。

第一部分

在体育竞赛过程中有可能出现下述令人不高兴的情景，请您标记出您的可能反应，例如：当教练责骂您时，您可能感到压抑或者生气，或者您不觉得有什么。请作出相应选择，答案选择没有对错之分。

1. 由於自己在比赛过程中连续犯错, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

2. 教练对我不满, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

3. 听见观众说我的坏话, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

4. 观众对我们队起哄, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

5. 裁判的不公正判罚, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

6. 糟糕的天气 (风, 雨, 太热或者太冷) 影响竞技的发挥, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

7. 队友在比赛中犯错 (例如: 判断错误、传接球、发球、击球、跑位、或其它失误等), 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

8. 教练当众呵斥、指责我, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑/生气

9. 裁判水平不高, 错判/漏判, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

10. 对手威胁我, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

11. 对手有不诚实或欺骗行为, 但裁判没察觉, 对手因而得利

(如: 你击了一界内球靠近对方端线, 裁判没看清, 对手却示意为界外球。), 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

12. 听见队友说我的坏话, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

13. 比赛场地噪音太大。

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

14. 观众对我起哄, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

15. 对手表现太出色, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

16. 裁判故意整我, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

17. 因为我的失误, 教练威胁我, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

18. 伤痛发作, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

19. 设备器材不合意、不顺手, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

20. 我明显被对手在技术或战术上所控制 而摆脱不了, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

21. 与人争吵, 我 ...

A	B	C	D	E
非常压抑	压抑	有时会 压抑	不会 压抑	根本不会压抑

第二部分

下述问题与您在第一部分中所选择的情况有关。假设您正处於这种最让您感到压抑、紧张的情况下, 请您标

记出在这种情况下通常的反应。问题的答案选择没有对错之分。

1. 这种压抑的情景通常是没有办法解决的。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

2. 这种情景通常使我感到紧张。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

3. 没有人能够控制这种情况产生的结果。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

4. 如果需要，我能找到能够帮助我的人。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

5. 这种压抑的情况通常会使我感到焦虑。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

6. 这种压抑的情景通常对我会有严重的后果。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

7. 这种压抑的情景对我具有积极的影响。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

8. 我通常积极设法处理这种问题。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

9. 这种情景的后果通常对我有影响。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

10. 这种压抑情景在很大程度上会使我变得更坚强。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

11. 这种压抑情景会产生消极结果。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

12. 这种压抑情况下，我仍然有能力充分发挥竞技水平。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

13. 这种压抑的情景通常对我有严重的影响。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

14. 我具备在这种压抑情况下充分发挥竞技的能力(如技能，自信程度，心里素质等)。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

15. 当我陷入这种压抑情景时，我能够得到帮助。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

16. 对我来说，处理这种压抑情景是件很困难的事情。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

17. 有足够的人力物力资源来帮助我处理这种压抑情景。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

18. 在这种压抑情景下采取措施超出了我的能力。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

19. 对这种压抑情景的后果，我通常很关心。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

20. 这种压抑的情景对我造成很大的威胁。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

21. 没有人能够解除这种压抑情景。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

22. 我能够克服这种困难。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

23. 有人能帮助我处理这种情况。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

24. 这种情景通常造成我压抑和紧张。

A	B	C	D	E
非常不同意	不同意	说不准	同意	非常同意

25. 我具有成功处理这种情况的技能。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

26. 这种情景通常需要我本人设法应付。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

27. 这种情景对我具有长期影响。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

28. 这种情景对我具有消极作用。

A	B	C	D	E
非常不同意	不同意	說不准	同意	非常同意

第三部分

请标明在压抑和紧张的情景中，您通常有以下哪些想法或采取哪些行动？请用“√”标记出来。

(选择无数目限制)

1. ___ 我变得更有进取心。
2. ___ 我找出问题的根源，以解决问题。
3. ___ 我设法获得更多的信息。
4. ___ 我与造成问题的人争论。
5. ___ 我跟其他人讨论这个问题。
6. ___ 我计划采取措施。

7. ____ 我表现出受挫或愤怒的挑衅行为。
8. ____ 我考虑下一步应该做什么。
9. ____ 我保持冷静。
10. ____ 我很快计划出下一步行动。
11. ____ 我考虑如何反击报复。
12. ____ 我考虑所有的可能出现的坏的情况。
13. ____ 我感到这种情况对我太不公平。
14. ____ 我觉得上帝在惩罚我。
15. ____ 我反复地想事情是怎么发生的。
16. ____ 我对对手使用冒犯的言语、行为。
17. ____ 我咒骂自己。
18. ____ 我反复地想我是不是能有别的不同的反映。
19. ____ 我觉得自己对这种局面应该负全部的责任。
20. ____ 我祈求上帝(老天爷)的帮助。
21. ____ 我做其它的事来转移注意力。
22. ____ 我问别人对这件事的看法。
23. ____ 我向朋友或其他与此事无关的人报怨。
24. ____ 我避免到令我感到紧张的地方去。
25. ____ 我与另外一个人讨论这个问题。
26. ____ 我找其它的事情做(如看电视、看电影或去购物)以避免想这件事。

27. _____ 我尽量独处。
28. _____ 转移我的注意力不再被此事烦恼。
29. _____ 我安慰自己‘这种情况没什么了不起的，不必放在心上’。
30. _____ 我忽视或忘掉这个问题。
31. _____ 我认为这件事操纵在上帝手中。
32. _____ 我告诉自己这还不是最糟糕的情况。
33. _____ 我觉得这不是我的问题。
34. _____ 我认为造成问题的人是笨蛋、傻瓜，不会办事。
35. _____ 我想放弃或退出。
36. _____ 我闭上眼睛，想一些让人高兴的事。
37. _____ 我采用精神调节术，如想象法、放松法来使自己冷静或专注于其它事情。
38. _____ 尽管情况让人不愉快，我决定接受事实。不再把它当回事。
39. _____ 我觉得还可能更有更糟糕的事发生。

最后，请提供下面一些有关您个人的情况：

性别：男____ 女____

运动项目：集体____ 个人____

竞技水平：国家队____ 省队____ 市队____ 县队____ 大学校队____ 中学校队____

感谢您的时间和合作！

Appendix C

Questionnaire in English

Coping with Stress Survey Form

Part I

High intensive situations

The purpose of this questionnaire is to find out how you react to stressful events during sport competition. Below is a list of stressful events often experienced during sports competition. Please respond according to how you usually view this situation when it occurs. Please answer all questions.

1. Making mistakes repeatedly in the game made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

2. When my coach was not satisfied my performance, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

3. Some spectators (audience) said something bad to me, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

4. When spectators were against my team in the game, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

5. An unfair referee made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

6. Bad weather (rain, heat, wind or cold) hurts my performance. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

7. My teammate made an error in the game, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

8. My coach reprimanded me in public. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

9. Poor performance of referee made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

10. Opponent(s) threatened me in the game. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

11. When my opponents cheated but was not caught, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

12. My team member said something bad to me, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

13. Too much noise from the crowd made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

14. Spectators were against me. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

15. Excellent performance of my opponent(s) made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

16. Referee against me intentionally in the game. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

17. My coach threatened to give me a penalty in the game. I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

18. After experiencing pain or injury, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

19. Equipment problem in the game made me () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

20. When I was controlled by my component in technique and strategies, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

21. When arguing with another person in the game, I felt () stressful.

A	B	C	D	E
Extremely	Considerable	Moderately	Slightly	Not at all

Part II

The Stress Appraisal Measure

This questionnaire is concerned with your thoughts about responding to the highest ranked (most intense) stressful events you ranked in part I. There are no right or

wrong answers. Please respond according to how you usually view this situation when it occurs. Please answer all questions.

- | | | | | |
|-------------------|-----------------|-------------------|---------------------|------------------|
| 1 | 2 | 3 | 4 | 5 |
| <i>Not at all</i> | <i>Slightly</i> | <i>Moderately</i> | <i>Considerably</i> | <i>Extremely</i> |
1. Is this stressful situation usually hopeless? 1 2 3 4 5
 2. Does this stressful situation usually create tension in me? 1 2 3 4 5
 3. Is the outcome of this stressful situation usually uncontrollable by anyone? 1 2 3 4 5
 4. Is there someone I can turn to for help if I need it?..... 1 2 3 4 5
 5. Does this stressful situation usually make me feel anxious? 1 2 3 4 5
 6. Does this stressful situation usually have important consequences for me?..... 1 2 3 4 5
 7. Will this stressful situation have a positive impact on me?..... 1 2 3 4 5
 8. Am I eager to tackle this problem? 1 2 3 4 5
 9. How much will I be affected by the outcome of this situation? 1 2 3 4 5
 10. To what extent can I become a stronger person because of this problem? 1 2 3 4 5
 11. Will the outcome of this situation be negative? 1 2 3 4 5
 12. Do I have the ability to do well in this situation?..... 1 2 3 4 5
 13. Does this situation usually have serious implications for me?..... 1 2 3 4 5
 14. Do I have what it takes (for example, proper skills, confidence, or mental readiness) to do well in this situation? 1 2 3 4 5

15. Is there help available to me for dealing with this problem?..... 1 2 3 4 5
16. Is it difficult for me to handle the situation? 1 2 3 4 5
17. Are there sufficient resources available to help me in dealing
with this situation?..... 1 2 3 4 5
18. Is it beyond my power to do anything about this situation?..... 1 2 3 4 5
19. To what extent am I excited thinking about the
outcome of this situation? 1 2 3 4 5
20. How threatening is this situation? 1 2 3 4 5
21. Is the problem un-resolvable by anyone? 1 2 3 4 5
22. Will I be able to overcome the problem? 1 2 3 4 5
23. Is there anyone who can help me to manage this problem? 1 2 3 4 5
24. To what extent do I perceive this situation as stressful? 1 2 3 4 5
25. Do I have the skills necessary to achieve
a successful outcome to this situation? 1 2 3 4 5
26. To what extent does this event require
coping efforts on my part?..... 1 2 3 4 5
27. Does this situation have long-term consequences for me? 1 2 3 4 5
28. Is this going to have a negative impact on me?..... 1 2 3 4 5

Part III

For the next set of questions, indicate which of the following coping thoughts or actions you have often used following this type of stressful event. Usually:

1. I become more aggressive.
2. I confront the source of the problem.

3. I try to obtain more information.
4. I argue with the person responsible for the problem.
5. I discuss the problem with others.
6. I develop a plan of action.
7. I show aggressive actions of frustration or anger.
8. I think about what to do next.
9. I calm down.
10. I quickly plan my next move.
11. I think about revenge; striking back.
12. I think about everything that could go wrong.
13. I feel the situation is unfair to me.
14. I feel punished by God.
15. I keep thinking about what happened.
16. I use profanity (cussing) toward my opponent.
17. I use profanity (cussing) internally (to myself).
18. I keep thinking about how I might have reacted differently.
19. I feel full responsibility for the problem.
20. I pray about the problem or situation.
21. I do something else to occupy my time.
22. I ask other people to give me their opinion.
23. I complain to a friend or another objective party.
24. I avoid going to the area where I felt/feel stressed.
25. I discuss the problem with another person.

26. I do something to mentally escape (e.g., watch TV, go to movie, shop).
27. I try to be alone.
28. I focus my attention on something else.
29. I feel that it's nothing serious.
30. I ignore or forget about the problem.
31. I think the situation is in God's hands.
32. I think to myself that things could be worse.
33. I discount the source of the problem (e.g., that is not my problem).
34. I "label" the person or source of stress (e.g., loser, fool, or ineffective).
35. I feel like giving up or quitting.
36. I close my eyes and think of something pleasant.
37. I use a mental technique (e.g., imagery, relaxation) to calm down or focus
on something else.
38. I accept the problem as just part of the game, although the situation was
unpleasant, I decided not to take it too seriously.
39. I figure that worse things could happen.

Department of Philosophy
MTSU P.O. Box 73
Murfreesboro, Tennessee 37132
(615) 898-2907

**MIDDLE
TENNESSEE**
STATE UNIVERSITY

full IRB review approval

05/14/04

Protocol Title: Predictors of Cognitive Appraisal and Coping Strategy
Personal and Situational Predictors of Athletes' Use of Coping
Strategies as a function of Gender and Culture
Protocol Number: 04-218

Qiwei Gan
Box 96
HPERS
Dr. Mark Anshel
manshel@mtsu.edu

Dear Qiwei Gan,

The MTSU Institutional Review Board has reviewed your research proposal identified above under 45 CFR 46.110 and 21 CFR 56.110.

Approval for the protocol is granted for one (1) year from the date of this letter for 400 participants.

Please note that any change to the protocol must be submitted to the IRB before implementing this change.

Sincerely,

Robert Hood by Kim Collins

Robert Hood, Ph.D.
Chair, Institutional Review Board
Associate Professor
Department of Philosophy
Middle Tennessee State University



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MTSU is an equal opportunity, non-racially identifiable, educational institution that does not discriminate against individuals with disabilities.