

2014

Development and validation of instruments for assessing mindfulness and decentering in Chinese athletes

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Development and Validation of Instruments for Assessing Mindfulness and Decentering
in Chinese Athletes

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A thesis submitted in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

Principle Supervisor: Prof. CHUNG Pak-Kwong

The Hong Kong Baptist University

December 2014

DECLARATION

I hereby declare that this thesis represents my own work which has been done after registration for the degree of PhD at Hong Kong Baptist University, and has not been previously included in a thesis, dissertation submitted to this or other institution for a degree, diploma or other qualification.

Signature: _____

Date: December 2014

ABSTRACT

Recently, mindfulness and decentering have been incorporated into mindfulness- and acceptance- based training programs in the sport context as two important components. Mindfulness is defined as “paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment”, while decentering refers to “stepping outside one’s immediate experience and observing oneself in the process of constructing that experiences”. The purposes of the current study were to develop and validate a sport-specific, self-report, mindfulness measurement, the Athlete Mindfulness Questionnaire (AMQ), and a sport-specific, self-report, decentering scale, the Decentering Scale for Sport (DSS). The psychometric evidence supports the clear three-factor solution of the AMQ with which to measure mindfulness and its key constituents, in the sport context, including present-moment attention, awareness and acceptance. Likewise, the psychometric evidence supports the clear single-factor solution of the DSS which measures decentering in the sport context. Content validation of the initial pool of mindfulness and decentering items, evaluated by experienced researchers and practitioners, yielded high ratings for the components of mindfulness and decentering. Good internal consistency reliability was demonstrated and strong relationships with the other constructs were found, within an independent sample of Chinese athletes for the final 16-item Chinese AMQ. In addition, good internal consistency reliability was demonstrated and strong relationships with the other constructs were found, within three independent samples of Chinese athletes for the 12-item Chinese DSS. One noteworthy finding was that, based on the psychometric evidence using two independent samples of Chinese athletes, the direct-worded items of the acceptance subscale may be more

appropriate than the reverse-worded items for use with Chinese athletes. However, an investigation into the direction of acceptance items using additional samples of athletes is recommended for future research. Implications, study limitations, and future directions are discussed.

ACKNOWLEDGEMENTS

I am so grateful to have many people helping me to walk through the process of completing this project. To my principal supervisor, Prof. Pak-Kwong Chung, I would like to thank him for his guidance, encouragement, trust and support through every stage of my study and research work of this project. He is such an excellent mentor who has not only nurtured his students' academic capabilities, but also their personal interests in pursuing a healthy life and well-being. It has always been a great honor and a real pleasure to work with him. I will be forever grateful to be his student.

I also would like to thank my co-supervisor, Dr. Yanping Duan for her comments, encouragement and support. My thanks also extended to Dr. Jing Dong Liu for his encouragement, suggestions and support, Dr. Gangyan Si for his comments, encouragement and tremendous help with data collection. In addition, I would like to thank those lovely friends and old colleagues, Ms. Chengyan Liu, Ms. Guoyan Feng, Ms. Danran Bu, Ms. Jie Zhu, Ms. Shuang Shan, Ms. Shuangling Zhang, Ms. Xiaoqian Wen, Ms. Xuan Wei, Ms. Yibing Tan, Mr. Baoming Chen, Mr. Daliang Zhao, Mr. Yuan Wang, Mr. Zhiqing Gao, Dr. Hao Liu and others, for their assistances on data collection. I would never been able to collect enough data without their full support. I am also indebted to those experts, coaches and athletes who participated in my study.

Moreover, I would like to thank the panel members for my PhD candidature confirmation, Prof. Siu-Yin Cheung and Prof. Patrick Lau, for their constructive comments and suggestions. I wish to extend my thanks to my fellow PhD candidates and friends at the Department of Physical Education for their encouragement and support.

Finally and most important, I want to express my love to my supportive parents, kind-hearted Mum and good-tempered Dad, for their unconditional love and encouragement. Whenever I stayed late at the office, I knew they were working hard too for the family at the same time. Thank you for believing in me.

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LISTS OF SYMBOLS

β	Beta
χ^2	Chi-square
α	Cronbach's alpha
df	Degrees of freedom
Δ	Delta
λ	Lambda
M	Mean
n	Sample size
p	Probability
R^2	R-square
ρ	Rho
SD	Standard deviation
SE	Standardized error
θ	Theta

LISTS OF ABBREVIATIONS

AMQ	Athlete Mindfulness Questionnaire
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CR	Composite reliability
CVI	Content validity index
DSS	Decentering Scale for Sport
EFA	Exploratory factor analysis
MI	Measurement invariance
PA	Parallel analysis
RMSEA	Root mean square error of approximation
SRMR	Standardized root mean square
TLI	Tucker-Lewis index
WLSMV	Mean- and variance-adjusted weighted least square
WRMR	Weighted root mean square residual

CHAPTER 1.

Introduction

Background of the Study

Mindfulness

During the past decade, a surge of interest in mindfulness-based applications has been witnessed in Western psychology (Williams & Kabat-Zinn, 2011), particularly in the research and practice of clinical psychology for coping stress, depression, anxiety and other psychological disorders and cultivating salutary effects, such as general well-being (e.g., Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). Sport psychology researchers and practitioners have also adopted the construct of mindfulness to better understand and enhance sport performance of athletes for over a decade (Gardner & Moore, 2012). Mindfulness is a concept originated from Buddhist philosophy and practice (Bodhi, 2011), and the term mindfulness itself is an English translation of the Pali word ‘sati’, which refers to the dispositional present-moment attention and awareness (Brown & Ryan, 2003; Brown, Ryan, & Creswell, 2007). Brown and Ryan (2004) argued that mindfulness consists of a single factor described as attention to, and awareness of, what is taking place in the present, while the acceptance is subsumed within the capacity to pay full attention to the present moment. In other words, people who are high in mindfulness are believed to be aware of and attentive to present-moment experiences in daily life (Brown & Ryan, 2003). However, some researchers support the view that mindfulness is a multidimensional construct (e.g., Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Bishop et al., 2004; Cardaciotto, Herbert, Forman, Moitra, & Farrow, 2008; Chadwick et al., 2008). Although consensus on a definition of

mindfulness, among a variety of descriptions, is difficult to achieve (Bishop et al., 2004; Brown et al., 2007), most of the definitions include the components of attention, awareness and acceptance.

Given its dispositional nature, mindfulness capacity can be nurtured through the practice of meditation (Hanh, 1976), which has been integrated into several mindfulness- and acceptance- based therapies (Cardaciotto et al., 2008). Among them, three therapies have been widely recognized and applied, namely, Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999). Initially, MBSR was developed for helping people coping with stress that might lead to emotional disturbance and MBCT was focused on dealing with depression and depression relapse. A number of psychometrically sound self-report instruments of mindfulness have been developed, in order to facilitate the investigation of the process and efficacies of mindfulness practice and interventions (Bishop et al., 2004; Brown & Ryan, 2004; Dimidjian & Linehan, 2003). Most of these instruments were developed by measuring dispositional mindfulness for normal people or clinical patients as a unidimensional or multidimensional construct, varying from one-dimension Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) to Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006), which measures the dimensions of observing, describing, acting with awareness, nonjudging, and nonreactivity. On the other hand, two self-report scales have also been developed to measure state mindfulness after meditation practice. The Toronto Mindfulness Scale (TMS; Lau et al., 2006) consists of two dimensions, curiosity and decentering, while the State Mindfulness Scale (SMS; Tanay &

Bernstein, 2013) consists of two factors measuring the state mindfulness of mind and state mindfulness of body. Although a trait version of the TMS has been further developed by Davis, Lau and Cairns (2009) with good internal consistency reliability and convergent validity, its reliability and validity cannot be established in a sample of Hong Kong Chinese college students (Chung & Zhang, 2014). These scales have been widely used in the investigations of relationships of mindfulness with other psychological variables as well as the levels of change in mindfulness-based intervention and experiment. The efficacies of mindfulness-based training have been demonstrated in improving positive psychological constructs as well as decreasing a series of psychological disorders on healthy and clinical populations (Baer, 2003; Hofmann, Sawyer, Witt, & Oh, 2010; Keng, Smoski, & Robins, 2011).

Compared to the traditional Psychological Skill Training (PST) that based on the cognitive-behavioral training models (Meichenbaum, 1977), mindfulness-based training has been proposed as an alternative approach to enhance athletes' sport performance and overall well-being (Gardner & Moore, 2004; Moore, 2009). This is because the basic assumption of the traditional PST is that athletes need to develop the capacity to control internal states for the purpose of achieving an optimal psychological state (Hardy, Jones, & Gould, 1996), while to change or control the naturally occurring internal states in PST is at best ineffective and at worst counterproductive (Gardner & Moore, 2004). Although PST can help athletes achieve ideal performance state, there was still a lack of empirical support for the efficacy of traditional PST (Gardner & Moore, 2007). Besides, the challenging situations in competition make it hard to stay at the ideal performance state (Haberl, 2007; Si, 2006). Therefore, mindfulness-based approach might have an

advantage over PST as it focuses on the present-moment attention and awareness, with an attitude of acceptance. Along with the rapid development of mindfulness-based studies in clinical field, sport-specific mindfulness training programs have also been developed. Based on the MBCT and ACT, the Mindfulness–Acceptance–Commitment approach (MAC; Gardner & Moore, 2004, 2007) has been developed. The Mindful Sports Performance Enhancement (MSPE; Kaufman, Glass, & Arnkoff, 2009) has also been developed by adopting the mindfulness meditation and mindfulness movements used in MBSR and MBCT. More recently, based on the MAC, a mindfulness-based training program for Chinese athletes has been developed (Si, Zhang, Su, & Zhang, 2014). The increase of performance and positive psychological states as well as decrease of negative psychological states have been reported by empirical studies in mindfulness training in sport context, using self-report instruments developed in general and clinical populations (e.g., Bernier, Thienot, Codron, & Fournier, 2009; Kaufman et al., 2009; Thompson, Kaufman, De Petrillo, Glass, & Arnkoff, 2011). Nonetheless, more empirical evidence on the effectiveness of mindfulness-based training over PST should be built before the advantage of mindfulness-based training approach can be claimed, especially through using the experimental approach with randomized control trial design (Birrer, Röthlin, & Morgan, 2012; Chung, Si, & Zhang, 2013; Gardner & Moore, 2012).

As a high demand of attention, cognition and emotion is required on athletes in their training and competitions, the state of mindfulness in sports context might be slightly different from the mindfulness in daily life. For example, athletes need to pay full attention and awareness to the present moment without breaking their routines, and quickly refocus on the performance once the mind wanders. Given the centrality of self-

regulation of mindfulness in movement automaticity and the prevalence of performance goal-related cues in sports context, the ability to refocus on the helpful cues once the attention confronted with the disruptive stimuli should be emphasized (Thienot et al., 2014). Taking the contextual difference between clinical and sport settings into consideration, Thienot and colleagues (2014) developed a sport-specific mindfulness measure, the Mindfulness Inventory for Sport (MIS), which was based on the conceptualization of mindfulness in sport context by Gardner and Moore (2007). The MIS is consisted of three factors, namely, awareness, non-judgmental, and refocusing.

Decentering

In both clinical (Baer, 2010) and sport contexts (Birrer et al., 2012), it has been suggested that a further investigation on the mechanisms of the changing process of mindfulness practice through which the benefits received will provide more in-depth information. Several possible mediators have been proposed, which include acceptance (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), working memory (Jha, Stanley, & Baime, 2010), self-compassion (Neff, 2003a), emotional regulation (Arch & Craske, 2006), and decentering (Segal et al., 2002; also known as re-perceiving, Shapiro, Carlson, Astin, & Freedman, 2006, or metacognitive awareness, Teasdale, 1999). Among these propositions, decentering provides the explanation resembling the Buddhist's teaching of changing the perspective on self (Hölzel et al., 2011), and aligns with the changing mechanism of cognitive behavioral therapy on depression and anxiety (Safran & Segal, 1990). Decentering has been defined as the ability to observe the thoughts and feelings as "just thoughts and feelings", which are objective and transient, and are opposed to the reflections of true self (Safran & Segal, 1990). With regard to applied practice,

participants in MBCT are taught to “decenter” from thoughts, sensations, and emotions rather than just changing the content of thinking (Segal et al., 2002). Similarly, the sport-specific training program MAC which targets acceptance and emotion regulation (i.e., improving acceptance, emotional awareness, clarity, and distress tolerance) as the goal of intervention and the mechanism of action (Moore, 2009). In the mindfulness-based training program for Chinese athletes, decentering has been introduced in an independent module (Si et al., 2014).

Given the importance of investigating the changing mechanism in mindfulness-based training and practice, developing reliable and valid instruments measuring these mediators as independent constructs are needed. These well-developed self-report instruments can be used to examine the mediating effect of the changing mechanisms, and explain why distress is reduced and well-being is improved (Baer, 2010).

Accordingly, self-report measure of the experiential avoidance, cognitive defusion, decentering, and self-compassion were developed. The Self-Compassion Scale (SCS; Neff, 2003b) was designed to measure six components of self-compassion, including self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. The Acceptance and Action Questionnaire II (AAQ-II; Bond et al, 2011) has been developed as a unidimensional measure of the experiential avoidance and psychological inflexibility (the opposite of psychological flexibility), and it has been further translated into other languages and contexts, for example, the population of Chinese college students and elite Chinese athletes (Zhang, Chung, Si, & Liu, 2014). More recently, the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) was developed as a single-dimensional measure of cognitive fusion (the opposite of cognitive

defusion). Both the experiential avoidance and cognitive defusion are two important compositions of the ACT model, in which experiential avoidance is referred to that people are unwilling to remain in contact with the experiences (e.g., thoughts, feelings, memories, and bodily sensations) and attempt to alter, control, or avoid them (Hayes et al, 1999). Whereas the cognitive fusion (the opposite of cognitive defusion) is referred to the tendency for behavior to be overly regulated and influenced by cognition when people act on thoughts as though they are literally true (Gillanders et al., 2014). Similar to the concept of cognitive defusion, decentering was measured by the self-report measure, the Experiences Questionnaire (EQ; Fresco, Moore et al., 2007), in which the items were developed from three facets, including: (a) view one's self as not synonymous with one's thoughts, (b) not to habitually react to one's negative experiences and (c) the capacity for self-compassion. More recently, Gecht et al. (2014) examined the dimensionality of the EQ in a German sample and found two dimensions, namely, accepting self-perception and distanced perspective.

Statement of the Problem

Considering the high demands on attention and awareness of athletes during sport training and competitions, the instruments (e.g., FFMQ and MAAS) developed using general or clinical populations may not be able to adequately capture the sport-specific dispositional mindfulness (Thienot et al., 2014). For example, in order to work effectively in their performances, athletes need to be aware of the automatic thoughts, the entrenched and distracting beliefs, and the disturbing emotions while maintaining full attention to their performance (Haberl, 2007). Without psychometrically sound mindfulness instruments in sports context, further empirical research cannot be easily conducted.

Although Thienot and colleagues (2014) developed the three-dimensional MIS to measure awareness, nonjudgmental and refocusing, two limitations are existed in the MIS. Firstly, items for both nonjudgmental and refocusing subscales were based on the awareness subscale, the nondjudgmental attitude and refocusing happen after the state of awareness, rather than parallel to the awareness. Secondly, in the conceptualization of the present-moment attention, it includes only the refocus facet, rather than both the components of (a) sustaining attention to the present moment and (b) quickly and gently bring the attention back to the present moment when distracted. In view of that no mindfulness instrument was developed for Chinese athletes, a reliable and valid sport-specific self-report mindfulness scale should be developed for this population.

The importance of examining the potential changing mechanisms in the process of mindfulness- and acceptance- based intervention has been recognized (Baer, 2010). Decentering was proposed as a mediating factor in the process of mindfulness-based cognitive therapy (MBCT; Segal et al., 2002) it has also been integrated into the mindfulness training programs for athletes, including the mindfulness-acceptance-commitment (MAC; Gardner & Moore, 2004, 2007) approach and the mindfulness-based training programs for Chinese athletes (Si et al., 2014). However, the investigation of decentering in sport context is still stagnant. This might be caused by a lack of reliable and valid instruments measuring decentering in sport context. Although the uni-dimensional Experiential Questionnaire (EQ; Fresco, Moore et al, 2007) for measuring decentering was developed, the inclusion of the facet of self-compassion has been criticized (e.g., Gillanders et al., 2014). In addition, question remains on whether decentering is a unidimensional or multidimensional construct when applying it to

another population, such as German (Gecht et al., 2014). Therefore, developing a sport-specific self-report instrument measuring decentering for Chinese athletes can not only provide a psychometrically sound inventory for Chinese athletes but also evidence on whether decentering is unidimensional or multidimensional construct in this population.

Purpose of the Study

The purposes of this study were to: (a) to develop and initial validate a self-report mindfulness scale, the Athlete Mindfulness Questionnaire (AMQ), which is grounded on the experience of athletes; and (b) develop and examine the psychometric properties of the Decentering Scale for Sport (DSS), which is based on the conceptualization of decentering in existing Experiences Questionnaire (EQ; Fresco, Moore et al, 2007).

Development and Validation of Scales

The processes of developing and initially validating the AMQ and the DSS were presented in Part I and Part II of Chapter 3, respectively. Part I presented the development of the AMQ, a multidimensional scale designed to measure three facets of mindfulness, including: present-moment attention, awareness, and acceptance. Part II presented the development of the DSS, a separate and uni-dimensional measure designed to tap the decentering skill in sports context. Different aspects of construct validity (Cronbach & Meehl, 1955; Meesick, 1995) were examined through a series of studies in each of these two parts. The construct validity is commonly described as “the degree to which an assessment instrument measures the targeted construct” (Haynes, Richard, & Kubany, 1995, p. 239), and it comprises several types of validity, including the measures of factor structure, content validity, convergent and discriminant validity, concurrent, predictive and postdictive validity, and criteria-related validity (Cronbach & Meehl, 1955;

Meesick, 1994, 1995). Further, the validation process is proposed to be divided into two distinct phases: (a) representative validity, including content, convergent, and discriminant validity; and (b) elaborative validity including the criterion-related validity (Foster & Cone, 1995).

Among those various categories of validity, content validity generally provides evidence on the relevance and representativeness of the instrument on the targeted construct (Haynes et al., 1995), and is viewed as a vital first step before other validities can be established during the process of scale development (Devellis, 2012). Given content validity is built on a multi-method, qualitative and quantitative process, it is recommended to follow the guideline on the procedures and sequence of content validation prepared by Haynes and colleagues (1995). As a first step to develop a content-valid assessment, the domain and facets of the construct should be carefully defined (Nunnally, 1978; Nunnally & Bernstein, 1994). Accordingly, the domain and facets of mindfulness and decentering in sports context have been carefully defined in Part I and Part II of Chapter 3, respectively. To establish the content validity, the next vital step is that the carefully selected items with the instructions and dimension definition are subjected to targeted population (i.e., athletes) and expert review. As such, in Part I and Part II of Chapter 3, structured and open-ended interviews were conducted with athletes and coaches to increase the chances that the items and other elements (e.g., instructions) are representative of and relevant to the dimensions of the mindfulness and decentering construct. In addition, based on the relevance ratings of each item by the experts, the Content Validity Index (CVI; Polit, Beck, & Owen, 2007) was calculated for

each item and the total scale. The CVI provides quantitative evidence from the expert panel on the extent that it has been designed to assess.

As another way of assessing the representational validity, the convergent validity was established by showing correlations with an independent measure of the same latent variable (Campbell & Fiske, 1959), with convergence supported by high correlations. The convergent validity of the mindfulness scale AMQ was established in Part I of Chapter 3. Nonetheless, prior to the establishment of the convergent validity, the factorial validity of the scale should be examined. This is because factorial validity is important in the context of establishing the validity of latent constructs, such as the construct of mindfulness and decentering. An acceptable factorial validity means that each measurement item is strongly associated with the construct (factor) it is related to, while weakly or not significantly relating to all other constructs (Gefen & Straub, 2005). The factorial validities of the AMQ and DSS were established, in Part I and Part II of Chapter 3, through examining whether the pattern of factor loadings of the measurement items conforms to the theoretically anticipated factors, via exploratory factor analysis (EFA) and/or confirmatory factor analysis (CFA). In order to avoid the problems of misspecification of the number of factors during the early stage of scale development, EFA serves as a precursor to CFA which is a more rigorous test of factor structure (Kelloway, 1995). In a CFA, the pattern of factor loadings of the measurement items is explicitly specified on the latent constructs (factors) in the model. As the factorial validity helps understanding the factorial structure of the construct in a meaningful way, the establishment of the factorial validity is needed before the examination of criterion-related validity.

With regard to the elaborative criterion-related validity, the concurrent validities of the AMQ and DSS were examined in both Part I and Part II of Chapter 3. Concurrent validity is studied when the test score and criterion score are tested essentially at the same time, and the correlations between them are calculated (Cronbach & Meehl, 1955). However, predictive validity is obtained if the criterion score is obtained sometime after the test. In short, the establishment of the criterion-related validity (i.e., concurrent validity) by relating the scores of a measure to some criterion of practical value helps elaborating the meaning of scores produced by the measure (Foster & Cone, 1995).

During the whole development processes of the AMQ and DSS, the factorial validities were examined, via EFA and CFA, after the establishment of the content validities qualitatively (via the focus groups of athletes and coaches, expert panel) and quantitatively (via the calculation of the CVIs), and before the exploration of the convergent and concurrent validities (via the calculation of correlation coefficients). In summary, it is believed the current independent studies in Part I and Part II of Chapter 3 could provide some preliminary but acceptable psychometric evidence of these two new scales. Nonetheless, more strategies and reliability (e.g., test-retest reliability) and validity (e.g., predictive validity) indices should be used to demonstrate the validities of the AMQ and DSS with more confidence.

Delimitations

Delimitations of the study include:

1. Convenient sampling method was adopted in this study.
2. Only the athletes over age 16 from Mainland China were invited to participate in the current study.

3. All the data was collected by means of self-reporting pencil-paper instruments.

Limitations

Limitations of the study include:

1. The mindfulness and decentering instruments to be designed in this study are specifically for use with athletic populations. Thus, it may not be appropriate to use these instruments for non-athletic populations.

2. The findings of the study may not be generalized to all Chinese-speaking athletes as the convenient sampling method is used.

Definitions and Terms

The definitions and terms that need to be explained include:

1. Mindfulness is defined as “maintaining one’s complete attention to the internal and external experiences occurring in the present moment, with awareness of what is taking place in a nonreactive, nonjudgmental stance” (Baer et al., 2006; Brown & Ryan, 2003; Cardaciotto et al., 2008; Kabat-Zinn, 1990, 1994).

2. Decentering is defined as “the ability to observe one’s thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true” (Safran & Segal, 1990; cited in Fresco et al., 2007, p234).

CHAPTER 2

Review of the Literature

Conceptualization of Mindfulness

Mindfulness in Buddhist traditions occupies a central role in a system that was developed as a path leading to the cessation of personal suffering (Thera, 1962; Silananda, 1990). The cultivation of mindfulness has a long history from ancient Buddhist philosophy, which holds that the practice of mindfulness leads to reductions in suffering and gaining insight into the true nature of existence (Olendzki, 2010). As a mode of consciousness, mindfulness has been traditionally termed “bare” attention (Engler, 1986; Epstein, 1995; Gunaratana, 2002; Rahula, 1974) and “pure” or “lucid” awareness which reveals what is occurring, before or beyond ideas about what is or has taken place (Das, 1997; Gunaratana, 2002; Sogyal, 1992). In current psychological field, mindfulness is viewed as a form of experiential processing (Brown & Cordon, 2009; Teasdale, 1999), simply observes what is taking place, whether external events or internal experiences (Brown & Ryan, 2003; Kabat-Zinn, 2003; Shapiro & Carlson, 2009). The most widely accepted definition is “paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003; p. 145).

With the rapid development of mindfulness research, mindfulness has been broadly conceptualized as a kind of non-elaborative, nonjudgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is (Kabat-Zinn, 1990, 1994; Shapiro & Schwartz, 1999, 2000; Teasdale, 1999b; Segal, Teasdale, & Williams, 2004). However, there are

two major controversies on the conceptualization of mindfulness, including (a) whether mindfulness is a state/psychological process or whether it is a trait-like/dispositional construct, and (b) whether mindfulness is a uni-dimensional or a multi-dimensional construct. Still, it remains unclear whether mindfulness represents a distinct construct or a quality of consciousness that spans and incorporates other states.

Dimensionality of Mindfulness

Brown and Ryan (2003) suggested mindfulness to be a one-dimensional construct referring specifically to paying attention to the present-moment experience, in which they further argued that the acceptance and non-judgment are subsumed within the capacity to pay full attention to the present moment (Brown & Ryan, 2004). In contrast, the definition of mindfulness given by Kabat-Zinn (1994) which is with intentional, nonjudgmental awareness is consistent with other scholar that recognized non-discriminatory or non-discursive awareness as central to mindfulness. In concordance with Kabat-Zinn's conceptualization, Bishop (2002) proposed a two-facet model, which includes both awareness and non-judgment/non-reactivity. Further, Bishop and colleagues (2004) proposed an operational definition of mindfulness that focuses on two components: sustained attention to present experience, and an attitude of openness, curiosity, and acceptance. This conceptualization draws heavily on self-regulation models of cognition and mood (Carver & Scheier, 1981, 1990).

Many of the contents or components that based on Bishop et al (2004)'s definition of mindfulness are not implicit in the construct, and are more likely the outcomes of mindfulness skills practice. Some researchers critiqued the available measures of mindfulness failed to de-confound mindfulness from both its antecedents and

consequences (Brown et al, 2007; Grossman, 2008, 2011). Yet, other researchers (e.g., Kabat-Zinn, 2003) emphasized the need to include the attentional and attitudinal components of mindfulness (e.g., compassion) in the construct and accompanying measures. Although the theoretical importance of separating the central features of mindfulness from related components, a definition that incorporates key features might provide potential benefits at a practical level so as to improve the utility of the construct, such as in sport context. Although there is a lack of agreement on the meaning and nature of mindfulness, the current conceptualizations focus on three primary essential elements. The first component of mindfulness is referred to a mental state as characterized by full attention to internal and external experiences as they occur in the present moment (Brown & Ryan, 2003, 2004). The second component is referred to the present-moment awareness that involves the continuous monitoring of the ongoing experiences (Cardaciotto et al., 2008). The third component is described as a particular attitude characterized by non-judgment of, and openness to, current experience (Bishop et al., 2004; Kabat-Zinn, 1994).

Trait/Dispositional and State Mindfulness

Mindfulness can be understood in both trait and state forms. Mindfulness is more being defined as a dispositional variable that involves a more frequent receptive attention to internal and external stimuli as they occur (Brown, West, Loverich, & Biegel, 2011). Indeed, mindfulness is considered an inherent capacity of the human organism that varies in strength (Brown & Ryan, 2003; Goldstein, 2002; Kabat-Zinn, 2003). There may be some individual differences or different from time to time (Brown & Ryan, 2003; Kabat-Zinn, 2003). Thus, people high in mindfulness are believed to be aware of and attentive

to the present-moment experiences in daily life (Brown & Ryan, 2003). Other researchers (Bishop et al., 2004) view mindfulness as a state form, which is an intentionally cultivated attention to experience with an open, nonjudgmental orientation.

Mindfulness in Sport Context

It is worth noting that the mindfulness state is not passively resigned or dissociated from, but actively engaged in the observed experience (Baer et al., 2006; Cardaciotto et al., 2008; Gunaratana, 2002). This characteristic is important and consistent with the concept of ideal performance in sports context in which athletes need to actively deal with or coexist with both the internal (e.g., disruptive thoughts and emotions) and external stimulates (environmental or situational factors) while focusing on the present-moment performance (Hardy, Jones, & Gould, 1996; Si, 2006).

Mindfulness- and Acceptance- Based Interventions

Mindfulness is considered an inherent human capacity that can be enhanced through training and practice (Brown & Ryan, 2003; Kabat-Zinn, 2003). The basic premise underlying mindfulness practices is that forming a clear intention and cultivating an attitude of acceptance and openness to whatever arises in one's field of awareness fosters experiential contact with all of one's experience and a greater sense of wakefulness in one's life (e.g., Kabat-Zinn, 2003; Shapiro & Carlson, 2009; Shapiro et al., 2006). Although mindfulness-based interventions rely on meditation techniques, it is hypothesized that the skills for evoking mindfulness is not limited to meditation. Accordingly, traditional mindfulness practices have been incorporated into several treatment approaches for increasing awareness and responding skillfully to mental processes that contribute to emotional distress and maladaptive behavior. These include

Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990), Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002), Acceptance and Commitment Therapy (ACT; Hayes et al., 1999), Dialectical Behavior Therapy (DBT; Linehan, 1993a, 1993b) as well as variations on these approaches. These therapies, also referred to as “third-wave behavioral therapies” are distinct from their predecessors because they emphasize changing the context and experience of psychological phenomena rather than changing the content of thoughts and feelings (Hayes, 2004). In these programs, Mindfulness-Based Stress Reduction (MBSR) emerged in the medical and psychological literature more than 30 years ago (see Kabat-Zinn, 1982) and other approaches have followed since that time. MBSR and MBCT are designed to develop mindfulness skills mainly through formal group-based meditation up to 45 minutes each day and have duration of 8–10 weeks, while DBT and ACT include both individual and group skills training and rely on the practice of a wide variety of shorter behavioral skills in which is mindfulness-related. Besides, both meditation-oriented interventions (i.e., MBSR and MBCT), as well as interventions that teach mindfulness using less meditation-oriented techniques (i.e., DBT and ACT), are considered as a family of mindfulness-oriented therapies. MBCT and DBT have focused on treating psychopathology in targeted clinical patient populations. In sum, all four treatments incorporate the use of labeling or noting of thoughts and feelings to facilitate an awareness of and decentering from thoughts, emotions, desires, and other phenomena that arise. The importance of regular out-of-class practice in establishing the capacity for mindfulness has also been clearly stated.

Although methodological rigor varied in applied practice (e.g., lack of high quality randomized controlled studies), overall available studies provided preliminary evidence for the clinical usefulness of such interventions (Baer, 2003; Bishop, 2002; Grossman et al., 2004), including depression (Hofmann et al., 2010; Ma & Teasdale, 2004; Segal et al., 2002; Teasdale et al., 2000), anxiety (Evans et al., 2008; Hofmann et al., 2010; Roemer, Orsillo, & Salters-Pedneault, 2008), substance abuse (Keng, Smoski, & Robins, 2011; Zgierska et al., 2009), chronic pain (Chiesa & Serretti, 2011), eating disorders (Wanden-Berghe, Sanz-Valero, & Wanden-Berghe, 2010), fibromyalgia (Grossman, Tiefenthaler-Gilmer, Raysz, & Kesper, 2007), as well as insomnia (Shapiro et al., 2003). Furthermore, mindfulness-based training has also been applied to healthy participants and shown to produce positive effects on psychological well-being (Chiesa & Serretti, 2009; Keng, Smoski, Robins, 2011). Despite various research concerns on poor control groups and small sample sizes in previous studies, moderate to good effect sizes have been reported in the meta-analyses (e.g. Hofman et al, 2010; Strauss, Cavanagh, Oliver, & Pettman, 2014). Empirical findings have clearly indicated that regular mindfulness practice and its associated enhanced awareness and attention resulted in increased immune functioning (Davidson et al., 2003) as well as enhanced alertness and improved orienting of attention (Jha et al., 2007). With accumulating evidence for the physical and mental health benefits, mindfulness has become increasingly accepted subject in the mainstream psychology.

Mindfulness- and Acceptance- Based Interventions in Sport Context

In sport context, mindfulness-based approaches to performance enhancement and general well-being of athletes have been developed (e.g., Gardner & Moore, 2004, 2007;

Kaufman, Glass, & Arnkoff, 2009; Si, Zhang, Su, & Zhang, 2014) built on the widely-used mindfulness therapies (e.g., Hayes et al., 1999; Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). In these sport-specific mindfulness-based programs, the ability of self-regulate attention to the present performance, awareness of the internal and external experiences of bodily sensations, emotions, and cognitions, and with an accepting and nonjudgemental attitude towards these experiences were emphasized and cultivated. For example, in the Mindfulness-Acceptance-Commitment (MAC, Gardner & Moore, 2004, 2007) approach, the awareness and acceptance of thoughts and emotions are targeted, especially the emotional clarity and distress tolerance (Moore, 2009). As the Mindfulness Sports Performance Enhancement (MSPE; Kaufman, Glass, & Arnkoff, 2009) is consisted of various mindfulness meditation and mindfulness movements along with introductions, the present-moment attention and awareness of bodily sensations and thoughts are repeatedly practiced. Along with the introduction of mindfulness training in sport context for over a decade (Gardner & Moore, 2012), there is a growing interests applying mindfulness training for Chinese athletes (Zhang, Bu, & Si, 2012; Chung, Si, & Zhang, 2013). The development of mindfulness skills is important for Chinese athletes. This is because the concept of accepting and co-exist with the experiences, especially the adversities, has long been emphasized and is viewed as an important component in Chinese culture (Si, 2006). Based on the well-developed sport-specific training program MAC (Gardner & Moore, 2004, 2007), a mindfulness training program for Chinese athletes has been developed by integrating the concept of insight and the adversity coping framework (Si, Zhang, Su, & Zhang, 2014).

Preliminary evidence of the effectiveness of mindfulness interventions for athletes has been revealed on the enhancement of sport performance (Bernier, Thienot, Codron, & Fournier, 2009; Jouper & Gustafsson, 2013; Thompson, Kaufman, DePetrillo, Glass, & Arnkoff, 2011; Zhao & Zhang, 2013), the increase of mindfulness states (i.e., attention, awareness and acceptance) as well as positive states such as flow, sport confidence and well-being (Aherne, Moran, & Lonsdale, 2011; Bernier et al., 2009; De Petrillo, Kaufman, Glass, & Arnkoff, 2009; Jouper & Gustafsson, 2013; Kaufman et al., 2009; Schwanhausser, 2009; Thompson et al., 2011), and the decrease of negative affect such as anxiety, burnout, worries and perfectionism (De Petrillo et al., 2009; Jouper & Gustafsson, 2013; Thompson et al., 2011; Zhao & Zhang, 2013). Moreover, correlational studies have revealed the associations between mindfulness and flow (Kee & Wang, 2008), and between mindfulness awareness and task-orientation (McCarthy, 2011). Regression-based studies have revealed that more mindful people are showing higher satisfaction (Denny & Steiner, 2009), and levels of mindfulness significantly predict athletes' performances (Gooding & Gardner, 2009).

Assessments of Mindfulness

With increased interest in mindfulness-based and mindfulness-integrated interventions, the importance of assessing mindfulness has been widely recognized (Baer, 2003; Brown et al., 2007). It is also believed that the definition and measures must be developed; otherwise the basic scientific principles of mindfulness could not be studied (Brown & Cordon, 2009). Several self-report instruments, varying considerably in dimensionality, have been developed to measure a general tendency of mindfulness in daily life (Baer, Smith, & Allen, 2004; Baer et al., 2006; Buchheld, Grossman, & Walach,

2001; Brown & Ryan 2003; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007). Those instruments have shown promising psychometric characteristics and clinical utility (Baer, 2011). Based on the uni-dimensional conception of mindfulness (Brown & Ryan, 2003, 2004), the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) was developed. The MAAS was initially generated the items based on two components, namely, present-moment attention and awareness. Based on the proposition of Bishop and colleagues (2004), both the Toronto Mindfulness Scale (TMS, consist of curiosity and decentering factors; Lau et al., 2006) and the Philadelphia Mindfulness Scale (PMQ, consist of present-moment awareness and acceptance factors; Cardaciotto et al., 2008) were developed to assess the state and dispositional mindfulness, respectively. Moreover, other multidimensional scales have developed, such as the four-dimensional Cognitive and Affective Mindfulness Scale–Revised (CAMS-R, consist of awareness, attention, focus on the present, and acceptance/nonjudgment factors; Feldman et al., 2007) and Kentucky Inventory of Mindfulness Skills (KIMS, consist of observe, describe, act with awareness, and accept without judgment factors; Baer et al., 2004), as well as the Five Facet Mindfulness Questionnaire (FFMQ, consist of observing, acting with awareness, describing, nonreactivity, and nonjudging factors; Baer et al., 2006). Except the TMS, other scales have more or less explicitly included the components of present-moment attention, awareness, and acceptance/non-judgement. Measures of the multiple facets of mindfulness may help determine the hypothesized mechanisms of change in mindfulness-based therapies and practices (Baer et al., 2004; Baer et al., 2006; Brown et al., 2007; Cardaciotto et al., 2008).

Assessments of Mindfulness in Sport Context

Despite the preliminarily promising results of mindfulness-based interventions for athletes, one major limitation is that the evidences from these results have not been built on measurements that were specifically developed for athletes training and competing at the sports context. Given that the sport context is quite different from daily life's context, sport specific mindfulness scales are needed in order to be more accurately assessing the dispositional mindfulness among athletes (Chung et al., 2013; Thienot et al., 2014). In order to adequately inform conceptual and intervention considerations in sport context, the psychometric evidence of mindfulness scales in athletic populations should be provided (Hagger & Chatzisarantis, 2009). Thienot and colleagues (2014) developed a Mindfulness Inventory for Sport (MIS), via three stages, to overcome the limitation of lacking a sport-specific mindfulness scale for evaluating the effectiveness of mindfulness training on athletes. In stage one, an initial pool of context-specific items were developed using an open-ended questionnaire investigation with 98 athletes and content validity was assessed by seeking feedback from six external experts. In stage two, exploratory factor analysis (EFA) was conducted and a three-factor 19-item was confirmed with satisfactory internal consistency reliabilities for each subscale. In stage three, confirmatory factor analysis (CFA) was further conducted to refine the items, examining the factorial validity and measurement invariance of the MIS, and finalized a 15-item three-factor measurement, including awareness, non-judgmental attitude, and refocusing.

Although satisfactory psychometric properties of the MIS has been demonstrated, one limitation is that the conceptualization of mindfulness indicated a sequential order of the components in which athletes need to become aware of the experience first, and then refocus on or taking non-judgmental attitude toward the present performance. As the

present-moment attention and awareness are two closely-related components, individual can only become aware of the experience when his or her attention is presently focused (Brown & Ryan, 2003). In addition, in the original conceptualization of mindfulness (Kabat-Zinn, 2003) and mindfulness practice (Kabat-Zinn, 1990; Segal et al., 2002), the refocusing capability is comprised within the component of the present-moment attention. As such, the sole assessment of the refocusing skills by neglecting the capability of sustaining attention on the present-moment performance might cause the missing of important information. Moreover, the contents of items on both subscales of non-judgmental and refocusing are based on the factor of awareness, with each item begins with “When I become aware that” and followed by “I criticise myself for” and “quickly refocus”, respectively. Taken together, it seems necessary to reexamine an alternative definition of the mindfulness components in a new sample of athletic population. Building on the conceptualization of mindfulness in previous studies (Baer et al., 2004, 2006; Brown & Ryan, 2003; Cardaciotto et al., 2008; Feldman et al., 2007), the construct of mindfulness can be defined in terms of three components: present-moment attention, awareness, and acceptance. In contrast to Thienot et al (2014), the attentional component is defined as present-moment attention comprising (a) sustained attention on the present-moment experience, and (b) bring the attention back to the present moment, rather than the sole use of refocusing. In addition, the acceptance/non-judgmental is viewed as an independent component of mindfulness that happens simultaneously with other two components, instead of viewed as a component happens subsequent to awareness.

In summary, there is a need to develop and further validate a sport-specific mindfulness measure for Chinese athletes, given the growing interests in applying

mindfulness for performance enhancement and athlete's well-being (Gardner & Moore, 2012) and the development of mindfulness-based training programs for Chinese athletes (Si et al., 2014). In addition, a further examination of the three-dimensional conceptualization of mindfulness in sport context would provide some theoretical contributions, by including the ability of sustaining attention to the present moment into the attentional component. Furthermore, it seems that the three components (i.e., present-moment attention, awareness and acceptance) should be viewed as three parallel concepts under the mindfulness umbrella rather than three components that happen before and after each other.

Conceptualization of Decentering

Decentering has been defined as “the ability to observe one’s thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true” (Fresco, Moore et al., 2007, p.234; Safran & Segal, 1990). Traditionally, decentering has been described as a central change process in many cognitive therapy traditions that helps clients experientially realize that their own minds play in constructing the reality (Safran & Segal, 1990). As such, clients must be trained to have the tangible experiences of observing oneself in the process of interpreting the situation. Based on the description of Safran and Segal (1990), two interdependent processes that are common to a variety of forms of psychotherapy shall be included “...stepping outside one’s immediate experience and observing oneself in the process of constructing that experiences”(p.117). Specifically, to promote awareness of ways in constructing reality, clients might be repeatedly required to observe and identify their thoughts through writing them down. In Buddhist tradition, mindfulness meditation is

used specifically for this purpose. Given that the mindfulness-based cognitive therapy (MBCT; Segal, Williams, & Teasdale, 2002) is heavily relied on formal mindfulness meditation, a decentered perspective on depressive thoughts, sensations, and emotions was cultivated. The description of decentering in MBCT is viewed as different from that of the traditional cognitive therapy, given that it is explicitly cultivated through adopting the openness, acceptance and curiosity attitude (Sauer & Baer, 2010).

Similar Concepts to Decentering

There are three existing concepts that are very similar to decentering, including distancing (Beck, 1970; Beck, Rush, Shaw, & Emery, 1979), re-perceiving (Shapiro, Carlson, Astin, & Freedman, 2006) and cognitive defusion (Hayes, Strosahl, & Wilson, 2011). Distancing is described as the process of gaining objectivity towards people's idiosyncratic cognitions (pictorial or verbal) or "automatic thoughts" (Beck, 1970). Beck (1970) stated that "it is essential to train him to make a distinction between thought and external reality, between hypothesis and fact." (p. 189). Ingram and Hollon (1986) emphasized that the process of distancing help individuals switch from the automatic mode to a metacognitive mode that is more deliberately controlled. They further suggested that "instead of 'reacting' to life events, patients who successfully develop this cognitive coping ability switch to metacognition to vitiate their negative effects" (p. 272). To propose a model of mindfulness, Shapiro et al. (2006) defined re-perceiving as meta-mechanism underlying mindfulness-based intervention, through which individual can "disidentify from the contents of consciousness (i.e., one's thoughts) and view his or her moment-by-moment experience with greater clarity and objectivity..... stand back and simply witness it." (p. 377). Shapiro and colleagues (2006) further stated that

reperceiving (and also decentering) “involves a fundamental shift in perspective” (p. 377). In the acceptance and commitment therapy (ACT) model, cognitive defusion is described as distancing from thoughts, literally experiencing thoughts as mental events that not necessarily needing to be acted on (Hayes et al., 2011). The counter process, cognitive fusion, refers to thoughts are taken literally true. Gillanders and colleagues (2014) claimed that cognitive defusion is a more narrowly defined and behaviorally oriented process than decentering, which is defined as facilitating the action that is taken to be consistent with individual’s values rather than changing metacognitive beliefs.

Assessment of Decentering

Although the concept of decentering has been raised by researchers long time ago (Safran & Segal, 1990), it could only receive more and more attention since the recent development of instruments assessing the construct of decentering. The Measure of Awareness and Coping in Autobiographical Memory (MACAM; Moore, Hayhurst, & Teasdale, 1996) was first developed to measure metacognitive awareness, which is also a construct closed to decentering. The MACAM uses a semi-structured interview method to present eight mildly depressed situations via audiotape, in which participants were asked to imagine themselves in such situations (Moore et al., 1996; Fresco, Moore et al., 2007). When participants’ specific memories and feelings have been elicited by the vignettes, their memories and feelings were taped and coded for the degree of decentering by the interviewer (trained rater) from 1 (minimal discrimination of different thoughts and feelings) to 5 (persistent distancing from thoughts and feelings). The construct validity of the MACAM was preliminarily demonstrated by Teasdale and colleagues (2002), showing that never-depressed people consistently possess higher levels of

decentering than the depressed group. Although the MACAM is superior on its ecological validity, it is time-consuming and labor-intensive for use in most practical situations (Forman et al., 2012). To overcome these limitations and measure decentering using an alternative approach, the items of Experiences Questionnaire (EQ) were initially generated by Teasdale and colleagues (2002). The EQ was further developed and examined by Fresco, Moore and colleagues (2007). The original EQ was designed to consist of two subscales, namely, decentering and rumination. The items of decentering factor consists of three facets, including the ability to view one's self as not synonymous with one's thoughts, the ability not to habitually react to one's negative experiences, and the capacity for self-compassion. Subsequent analyses did not support the two-factor model, and an 11-item unifactor EQ was therefore confirmed after removing the rumination factor. However, recently researchers explicitly stated that it is not clear how items of the self-compassion facet are related to the core construct of decentering (Forman et al., 2012; Gillanders et al., 2014). Moreover, Gecht and colleagues (2014) examined the psychometric properties of a German version of the EQ and found that two factors existed, including accepting self-perception and distanced perspective. They further suggested that decentering might be a multidimensional construct and therefore, further research is needed.

Assessment of Cognitive Defusion and Cognitive Fusion

Grounded on the model of acceptance and commitment therapy (ACT, Hayes et al., 1999, 2011), several measures were developed to assess cognitive defusion/or decentering. The Believability of Anxious Feelings and Thoughts Scale (BAFT; Herzberg et al., 2012) was specifically designed to measure fusion with anxiety disorders,

namely, the tendency to believe in anxiety-related thoughts and feelings. Although sound psychometric properties were reported, some of its items might be redundant with the construct of experience avoidance (Forman et al., 2012). Likewise, the Avoidance and Fusion Questionnaire for Youth (AFQ-Y; Greco, Lambert, & Baer, 2008) was developed to measure both avoidance and fusion in children and adolescents, with satisfactory reliability and validity has been established, and was further extended to adult population (Fergus et al., 2012). Another two newly developed measures, Drexel Defusion Scale (DDS; Forman et al., 2012) and Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014), were viewed as distinct measures of cognitive fusion in both clinical and non-clinical samples. The DDS has a long introduction illustrate the defusion concept and 10 items describing various scenarios that individuals can possibly be defused from (e.g., feelings of anger, thoughts of hopelessness, and feelings of sadness). The limitation of DDS is that individuals might not be able to differentiate the understanding of the concepts with their actual responding, and the specific contents lack of generality (Gillanders et al., 2014). More recently, the CFQ was developed to measure cognitively fused thoughts under a strict multi-study approach. The limitations of the CFQ are twofold: (a) only the items regarding thoughts were included; and (b) it is behaviorally oriented that the outcome of cognitive defusion was assessed rather than cognitive fusion itself. Taken together, although these four measures manifestly declared measuring cognitive defusion, a large part of overlap in concepts with the construct of decentering, which emphasized that individuals possess a decentered perspective of one's own thoughts and feelings. However, according to Skinner (1996) and Hagger (2014), more

guides are needed to classify and synthesize the concepts/constructs of decentering, cognitive defusion, reperceiving and distancing.

Application of Decentering

Along with the recent development of psychometrically sound measurements of decentering/cognitive defusion (e.g., EQ), more and more evidence-based studies have been conducted to investigate the role of decentering/cognitive defusion in traditional cognitive behavioral therapy (CBT) as well as in mindfulness-based therapy. In line with the statement that decentering can also be improved through traditional cognitive therapy (Ingram & Hollon, 1986; Moore, 1996; Safran & Segal, 1990), two recent studies demonstrated that receiving CBT can produce more gains of decentering in depressed patients. For example, Teasdale and colleagues (2002) found that the depressed patients who were at the stage of partial remission of depression with antidepressant medication received additional 16 sessions of CBT exhibited significant gains in metacognitive awareness (i.e., decentering) than the control group who just received 20 weeks of continued medication management. Similarly, Fresco, Segal, Buis, and Kennedy (2007) revealed that patients who were treated to remission through CBT showed significant gains in decentering compared with those who were treated through antidepressant medication. In addition, Fresco, Segal and colleagues (2007) found that post-treatment decentering together with cognitive reactivity were related to most durable treatment response, especially for patients who received CBT. Further, Mennin, Ellard, Fresco, and Gross (2013) stated that decentering/defusion is one of the specific intervention components in CBT and researchers should examine its relationship to some core CBT change principles, such as context engagement, attention change and cognitive change.

Decentering was revealed to be significantly related to meditation experience (Orzech, Shapiro, Brown, & McKay, 2009; Soler et al., 2014) and can be significantly increased through intensive mindfulness training (one-month daily formal mindfulness practice, 10-12 hours per day) from the pre-training to one-month follow-up period (Orzech et al., 2009). In addition, Bieling and colleagues (2012) revealed that levels of decentering in depressed patients increased in MBCT but did not change in either antidepressant medication (ADM) group or placebo (PLA) group, and changes in decentering can also predict the depressive symptoms at the 6-month follow-up. The ability of defusion/decentering from negative internal experiences was revealed among participants in an ACT intervention to promote physical activity (Butryn, Forman, Hoffman, Shaw, & Juarascio, 2011). All these training effects might be supported or explained by neuropsychological and experimental evidence. Consistent with the experiential mode of decentering that thoughts, feelings and bodily sensations are treated as transient mental events rather than self-related truths or facts (Shapiro et al., 2006), neuroimaging evidence supported that the extended self-reference linking experiences across time and momentary self-reference centered on the present can be uncoupled through an 8-week mindfulness meditation training (Farb et al., 2007). This finding can be supported by experimental studies that cognitive defusion/decentering significantly reduced the emotional discomfort and believability of self-referential thoughts (Masuda, Hayes, Sackett, & Twohig, 2004; Masuda et al., 2010). Furthermore, qualitative findings support the key role of decentering in mindfulness-based interventions. Kerr, Josyula, and Littenberg (2011) conducted a qualitative study, with 8 health individuals, examining their daily diaries of home practices in an 8-week mindfulness-based stress

reduction (MBSR; Kabat-Zinn, 1990). The findings of this study supported the process of re-perceiving/decentering in mindfulness training that individuals step back to re-perceive their internal experiences nonjudgmentally and less reactively (Shapiro et al., 2006). Kerr and colleagues (2011) described it as “developing an ‘observing’ attitude and relationship towards the illness rather than changing the illness itself” (p. 91). Another qualitative investigation of the effectiveness of MBCT training on 20 people with recurrent depression in primary care revealed the increase of decentering by help participants developing the ways of stepping out of self-devaluative thinking and not identifying with their depression (Allen, Bromley, Kuyken, & Sonnenberg, 2009).

The close relation between enhanced mindfulness and greater levels of decentering was revealed in mindfulness-based interventions. For example, in a brief mindfulness-based preventive intervention, Tanay, Lotan, and Bernstein (2012) found that increasing decentering was strongly related to the development of dispositional and state mindfulness, and higher levels of decentering were also related to reduced levels of depression-related dysfunctional attitudes. However, given the small sample size used (n=19 in experimental condition), the mediating effect of decentering cannot be estimated. Carmody, Baer, Lykins, and Olendzki (2009) examined the mediating effect of re-perceiving/decentering on the relationship of mindfulness and self-regulation, value clarification, cognitive and behavioral flexibility, and exposure in a 7-week MBSR program. Although re-perceiving/decentering was significantly increased, the mediating effect was not supported. Carmody and colleagues (2009) explained it might be caused due to high constructs overlapping given the very high correlations between them, and called for further definition and clarification on these two constructs. Taken together,

although decentering had been proposed as one of the mechanisms of change in the interventions (Sauer & Baer, 2010), its mediating effect has not been established yet. Furthermore, decentering has been proposed as a mechanism of action between stress appraisal and positive reappraisal, entitled the Mindful Coping Model (Garland, Gaylord, & Park, 2009). That is, individual decenter from the overwhelming stress appraisal through a process of mindfulness, and the broadened attention and increased cognitive flexibility can facilitate the reappraisal of circumstances more easily and positively. Likewise, Hayes-Skelton and Graham (2013) found that decentering may function as a common mechanism (mediator) for both mindfulness and cognitive reappraisal on reduced trait social anxiety. Although this finding is exciting, more research is needed to elucidate these relationships, in particular with some well-designed experiments and interventions. Taken together, it seemed that a cross-lagged model may be needed to examine the reciprocal relationship between decentering and cognitive reappraisal.

Application of Decentering in Sport Context

Athletes in sports context might face an overwhelming pressure from time to time. If athletes can decenter themselves from stressful situation, they may view it as challenge or just a psychological event rather than threat (Jones, Meijen, McCarthy, & Sheffield, 2009), and might eventually avoid the performance being sabotaged. For example, when pre-competition anxiety occurs, an athlete engaged in decentering would say, “I am thinking that I feel nervous right now” instead of “I am nervous”. When facing a verbally aggressive coach, an athlete adopted decentering would choose to respond based on the interaction itself rather than his or her perceived rule (e.g., negative experiences) of the coach (Gardner & Moore, 2007). Decentering therefore enables

athletes distinguish what the mind is and what the mind tell them it is (Gardner & Moore, 2007). Further, the lack of decentering is thought to cause psychological and social dysfunction in clinical context, and it might cause the anxiety and choking of athletes in sport context. Along with the introduction of mindfulness- and acceptance- based therapy into sports context, sport-specific training programs have been developed accordingly, including the Mindfulness-Acceptance-Commitment (MAC; Gardner & Moore, 2004, 2007) and the Mindful Sport Performance Enhancement (MSPE; Kaufman, Glass, & Arnkoff, 2009). In the MAC approach, helping clients to develop the ability of decentering from previously formed automatic connections between thoughts, feelings, and behavioral choices is emphasized (Gardner & Moore, 2004). In particular, of the 7-module step-by-step approach, decentering/cognitive defusion was introduced in Module 2 entitled “Introducing Mindfulness and Cognitive Defusion” (Moore, 2009). In this module, the decentering/cognitive defusion is described as one of the salutary proximal processes developed by the mindfulness exercises, which further stresses the importance of daily mindfulness practice. With some relevant exercises (e.g., Brief Centering Exercise), the clients are expected to form a new way of thinking about his or her thoughts as simply passing events which may or may not accurately reflect the realities around. Gardner and Moore (2007, p.91) described it as “...learn to distinguish between what *is* and what the mind *tell us* it is”. Given the concept of cognitive defusion/decentering can be puzzling, the clients are required to present some personal examples of successful applying cognitive defusion (Gardner & Moore, 2007). Moore (2009) called for mediational and component analyses should be conducted to examine which modules of the MAC are actually in effect. As decentering/cognitive defusion has

been proposed as a potential mediator of mindfulness and acceptance-based training (Sauer & Baer, 2010), investigating the mediating role of decentering/cognitive defusion in sport context would allow for the development of a true evidence-based interventions. Given the lack of the psychometrically sound sport-specific self-report inventory of the components in the MAC or MSPE such as decentering, the systematic investigation of the mechanism of mindfulness-based interventions in athletes cannot be established. Furthermore, Mahoney and Hanrahan (2011) examined the effectiveness of a adapted 4-session ACT intervention in addressing the injured athletes' adherence to rehabilitation protocols, and the concept of cognitive defusion/decentering was taught in the first session. During the post-intervention interview, all athletes mentioned the usefulness of cognitive defusion/decentering skills in dealing with frustration, boredom or anxiety as well as promoting value-driven behaviour. Given that the lack of reliable and valid measure, self-reported scores of cognitive defusion cannot be received. More recently, the MAC program has been adapted into Chinese, in which a 7-module mindfulness-acceptance-commitment program for Chinese athletes was established (Si, Zhang, Su, & Zhang, 2014). The insight of Chinese culture has been included, and more importantly the component of decentering has been introduced in the mindfulness training programs for Chinese athletes.

In summary, decentering is an important concept in both the traditional CBT and mindfulness-based interventions, and is viewed as a mediator of the mechanisms of the changing process in mindfulness training (Sauer & Baer, 2010). Although self-report measures have been developed for both clinical and general populations (e.g., Fresco, Moore et al., 2007), a sport-specific decentering measure is lacking, which limits a

further examination of decentering in sport context. In addition, decentering is introduced as a key component in mindfulness-based training in sport context (Moore, 2009; Si et al., 2014), which should be evaluated to examine the effectiveness of mindfulness training for athletes. Moreover, a further exploration of decentering in sport context can provide evidence for whether it is a unidimensional or multidimensional measure (Gecht et al., 2014).

CHAPTER 3

Development and Initial Validation of the Athlete Mindfulness Questionnaire and the Decentering Scale for Sport

In Chapter 3, the development and initial validation of the Athlete Mindfulness Questionnaire (AMQ) and the Decentering Scale for Sport (DSS) are described in two parts, Part I and Part II, respectively. In Part I, the researcher aimed to develop and preliminarily validate a mindfulness scale, the AMQ, which assesses the dispositional mindfulness of Chinese athletes, via following five studies. Study 1 was to (a) gather relevant views and experiences on athletes' mindfulness and gauge how applicable the descriptions of mindfulness adapted from existing self-report instruments would be to the sport context; and (b) create and provide the content validity of a pool of items designed to tap athletes' mindfulness in training and competition. Study 2 was to examine the factorial composition of the mindfulness items identified in Study 1 via exploratory factor analysis (EFA) in order to avoid misspecification of the number of factors and to maximize the convergent and discriminant validity of the items for each underlying factor of the AMQ (Gerbing & Hamilton, 1996; Hurley et al., 1997). Study 3 was to conduct the confirmatory factor analysis (CFA) to (a) validate the findings of the EFA; (b) further refine the structure of the AMQ identified in the EFA analysis; and (c) examine the convergent, discriminant and concurrent validities of the AMQ. Study 4 was to cross-validate the three-factor measurement model of the AMQ supported in Study 3 via CFA using another independent sample. Study 5 was to conduct the confirmatory factor analysis (CFA) to (a) validate and further refine the structure of the modified AMQ with some newly added items; (b) examine the concurrent and convergent validities of the

AMQ; and (c) assess whether measurement invariance is exist across gender and sport type.

In Part II, the researcher aimed to develop a psychometrically sound self-report questionnaire of decentering, the DSS, to measure the decentering of elite Chinese athletes, via the following four studies. In addition, the researcher further examined the dimensionality of the construct of decentering so as to confirm whether decentering is uni-dimensional (Fresco, Moore, et al., 2007) or multidimensional (Gecht et al., 2014). Study 1 was to (a) gather relevant views and experiences on dispositional decentering of athletes and gauge how applicable the descriptions of decentering would be to the sport context which were adapted from the Experiences Questionnaire (EQ; Fresco, Moore et al., 2007) and literature review; and (b) create and provide the content validity of a pool of items designed to tap athletes' decentering in training and competition. Study 2 was to examine the factorial composition of the decentering items identified in Study 1 via exploratory factor analysis (EFA) in order to avoid misspecification of the number of factors and to maximize the convergent and discriminant validity of the DSS (Gerbing & Hamilton, 1996; Hurley et al., 1997). Study 3 was to conduct the confirmatory factor analysis (CFA) to (a) validate the findings of the EFA; (b) further refine the structure of the DSS identified in the EFA analysis; (c) explore the concurrent validity of the DSS; and (d) assess whether measurement invariance exist across gender and sport type. Study 4 was to cross-validate the single-factor measurement model of the DSS supported in Study 3 via CFA using another independent sample.

Given that the same samples of participants, procedure, criterion-related measures and data analysis method used in Study 1 to Study 4 of both Part I and Part II (except

Study 5 of Part I), the methods of these two parts were introduced simultaneously in the following section, whereas the subsequent results and discussions of these two parts were presented separately.

Method

Participants

In both Study 1 of Part I and Part II , the participants were 27 Chinese athletes and 8 Chinese coaches who both were involved in competitive sports during the data collection. The coaches were drawn from five sports: diving ($n=2$), gymnastics ($n=1$), synchronized swimming ($n=1$), table tennis ($n=1$), and wushu ($n=3$). Their coaching experiences ranged from 1 to 25 years ($M=10.13$; $SD=9.28$). The athletes were 16 males and 11 females aged between 18 and 27 years old ($M=20.93$; $SD=2.29$). These athletes represented four sports, diving ($n=4$), gymnastics ($n=9$), synchronized swimming ($n=6$), and wushu ($n=8$), and the highest levels at which they had competed were at national ($n=15$) or international ($n=12$). Their competitive experiences ranged from 7 to 23 years ($M=13.37$; $SD=4.34$). A panel of seven Chinese academics and applied experts in mindfulness-based research (i.e., who published in sport and clinical literatures) and practice (i.e., who conducted mindfulness-based workshops or sessions, as well as do meditation practice in a long-term) was also invited to review the content validity of the items from both applied and theoretical perspectives.

Please refer to Table 1 for participant details of Studies 2 - 4 of Part I and Part II , as well as Study 5 of Part I .

Table 1

Participant Characteristics (Studies 2, 3, 4, and 5 of Part I and Part II)

	Study 2	Study 3	Study 4	Study 5 ^a
<i>N</i>	271	357	295	379
Male	135	208	158	217
Female	136	148	137	162
Unknown Gender	-	1	-	-
<i>M</i> _{age} (<i>SD</i>)	21.55 (3.15)	21.28 (3.94)	21.34 (3.19)	19.59 (3.47)
Age Range	18-33	17-45	17-37	16-35
Number of Sports	18	27	20	20
Sport Type				
Team ^b	62	103	102	97
Individual ^c	209	254	193	282
Competitive Level				
National	176	238	195	285
International ^d	95	119	97	94
<i>M</i> _{time} Competing (<i>SD</i>)	9.03 (4.29)	6.91 (4.13)	7.33 (3.83)	6.33 (3.95)
Range of Time Competing	1-22	1-27	1-23	1-20
Number of Data Collection Venues ^e	2	6	4	4

Note. ^a The data is only collected for Part I ; ^b team sports including basketball, handball, soccer, synchronized swimming, volleyball, water polo, and so on; ^c individual sports including archery, athletics, badminton, boxing, diving, fencing, gymnastics, judo, shooting, swimming, taekwondo, weight lifting, wrestling, wushu, and so on; ^d currently or used to compete at international level; ^e Venues refer to the regional training centers in Mainland China or Chinese national championships competition venues.

Measures

In Study 2 of Part I and Part II, the items of the AMQ and DSS generated in Study 1 were placed in questionnaire format, and a 5-point scale ranging from 1(*never true*) to 5(*always true*) was assigned. At the beginning of each questionnaire, written instructions requested that athletes should indicate the extent to which they agree with each statement in a way that reflects their own experiences in training and competition.

In Study 3 of Part I and Part II, in addition to the 16-item three-dimensional AMQ as described in Study 2 of Part I and the 13-item one-dimensional DSS as outlined in Study 2 of Part II, the following four instruments were used to test the concurrent and convergent validities of the AMQ and DSS, respectively. The dispositional mindfulness measured by MAAS was used to establish the convergent validity of the AMQ. Given that the associations among mindfulness, decentering, experiential avoidance, flow and well-being have been preliminarily established in previous studies (e.g., Aherne, Moran, & Lonsdale, 2011; Briegel-Jones et al., 2013; De Petrillo et al., 2009; Kaufman, Glass, & Arnkoff, 2009; Kee & Wang, 2008; Thompson et al., 2011), they were used to build the concurrent validities of both AMQ and DSS.

Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The MAAS is a unidimensional scale with 15 items measuring lack of awareness or attention. These items are rated on a 6-point Likert scale from 1 (*almost always*) to 6 (*almost never*); higher scores indicate more mindfulness, and the total score can range from 15 to 90. The MAAS has good internal consistency ($\alpha = .82$) and good test re-test reliability over a one-month time period ($r = .81$). A translated version

of the MAAS demonstrated adequate reliability and validity among a Chinese student sample (Deng et al., 2012) and a Chinese athletic sample (Chung, Si, Liu, & Zhang, 2013).

Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011). The AAQ-II is a 7-item self-report measure used to assess experiential avoidance as conceptualized in acceptance and commitment therapy (ACT; Hayes et al., 1999). Items are rated on a 7-point Likert scale, from 1 (*never true*) to 7 (*always true*). A total score, ranging from 7 to 49, was computed by summing the scores on the individual items. Higher scores indicate higher levels of experiential avoidance. The AAQ-II has been translated by the author and colleagues demonstrated adequate reliability and validity in Chinese students and athletes (Zhang, Chung, Si, & Liu, 2014).

The Short Dispositional Flow Scale (SDFS; Jackson, Martin, & Eklund, 2008) is a 9-item scale, with one item measures of each of the nine flow dimensions. The SDFS requires respondents to rate the frequency with which they experience the flow characteristics within a specified activity in general. The rating scale for the SDFS is a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*). A translated version of the SDFS demonstrated adequate reliability and validity among a Chinese athletic sample (Liu, 2010).

The Training and Competition Well-being Scale (TCWS; Zhang & Liang, 2002) is a 6-item scale used to assess Chinese athletes' subjective well-being in their training and competition. All items on the TCWS are scored on 7-point Likert

scale (1 = *strongly disagree* to 7 = *strongly agree*). The internal consistency (coefficient alpha) of the TCWS is .75.

In Study 4 of Part I and Part II, in addition to the 12-item AMQ as designed in Study 3 of Part I and the 12-item one-dimensional DSS as outlined in Study 3 of Part II, the following five instruments were used to test the concurrent and convergent validities of the AMQ and DSS, respectively. Given that previous studies have preliminarily demonstrated the associations among mindfulness, decentering, athletic burnout, vitality, positive and negative affect, enjoyment, and anxiety (e.g., De Petrillo et al., 2009; Gardner & Moore, 2012; Joupper & Gustafsson, 2013; Thompson et al., 2011), they were used to establish the concurrent validities of both AMQ and DSS.

Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). The ABQ is a 15-item self-report instrument tapping three burnout subscales: emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation.

Respondents were asked to indicate how often they felt or thought a certain way during the current season using a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). Internal consistency on the subscales had been reported ranging from .85 to .91, with test-retest reliability ranging from .86 to .92 (Raedeke & Smith, 2001).

Subjective Vitality Scale (SVS; Ryan & Frederick, 1997). The SVS is a 7-item unidimensional instrument used to measure athletes' levels of subjective vitality in sport. The 6-item scale was used with Item 2 eliminated as it worked even better than the 7-item version (Bostic, Rubio, & Hood, 2000). Responses were

provided on a 7-point Likert scale ranging from 1 (*not at all true*) to 7 (*very true*).

The reliability of the 6-item scale was .89 (Bostic et al., 2000).

International Positive and Negative Affect Schedule Short Form (IPANAS-SF; Thompson, 2007). The IPANAS-SF is a short form of PANAS used to measure athletes' positive and negative affect. The IPANAS-SF included 10 items, 5 items each for PA and NA subscales. Respondents were requested to rate the statement on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*) by comparing themselves during the past week with their 'usual selves'.

Sport Enjoyment Scale (Scanlan et al., 1993). The SES is a 4-item unidimensional instrument used in this study to measure athletes' positive affective response to the sport experience that reflects generalized feelings such as pleasure, liking, and fun. Responses were provided on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*).

Sport Competition Anxiety Test (SCAT; Martens, Vealey, & Burton, 1990). The SCAT is a 15-item self-report instrument measuring one's tendency to perceive competitive situations as threatening, which can lead to increased intensity of one's state-based reaction to competitive situations. The instrument utilized a 3-point Likert scale (*hardly ever, sometimes, and often*). The SCAT displayed an internal consistency of approximately 0.89 for females and 0.88 for males (Ostrow & Ziegler, 1978). A translated version of the SCAT demonstrated adequate reliability and validity among a Chinese athletic sample (Zhu, 1993).

In Study 5 of Part I, a modified 17-item AMQ was administered to athletes, together with six measures, including: the 15-item MAAS, the 7-item AAQ-II, the 9-item

SDFS, the 6-item TCWS as outlined in Study 3 of Part I and Part II, as well as the 15-item ABQ and the 10-item IPANAS-SF as described in Study 4 of Part I and Part II.

Procedure

Study 1 of Part I and Part II: Item generation and content validity. Ethical approval was obtained from the ethics committee of the investigator's university for each of the following studies. At the first stage, the items relating to mindfulness and decentering in sport context were developed. Mindfulness is defined as maintaining one's complete attention to the internal and external experiences occurring in the present moment, with awareness of what is taking place in a nonreactive, nonjudgmental stance. Within this definition, three components were included: (a) present-moment attention is defined as sustaining attention in the present moment and refocusing to the present moment while distracted; (b) awareness refers to be aware of both internal and external experiences while paying attention to the present moment; and (c) acceptance is described as an openness and nonjudgmental attitude towards the experiences. Decentering is, on the other hand, defined as stepping outside one's immediate experience and observing oneself in the process of constructing that experience. Two facets from the original definition of decentering by Fresco, Moore and colleagues (2007) were included, except the facet of self-compassion which is viewed as an independent construct: (a) the ability to view one's self as not synonymous with one's thoughts, and (b) the ability not to habitually react to one's negative experiences. As decentering is proposed as one of the mediators in the changing mechanisms of mindfulness practice, the development of the sport-specific mindfulness and decentering scales can help

determine whether decentering mediates the relationship between mindfulness and salutary outcome variables in mindfulness training for athletes.

The feasible items was selected and modified to form the candidate items of the initial item pool. To maximize the clarity, specificity, and shortness of items, guidelines for item wording suggested by DeVellis (2012) were closely followed. For Part I , some of the well-established self-report instruments measuring mindfulness as a general tendency to be mindful in daily life (e.g., Baer, Smith, & Allen, 2004; Baer et al., 2006; Buchheld, Grossman, & Walach, 2001; Brown & Ryan 2003; Chadwick et al., 2008; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007) were used as references in the development of sport-specific items. For Part II , the Experiences Questionnaire (EQ; Fresco et al., 2007) was used as reference in the development of sport-specific items of decentering. In addition, based on a review of the relevant literature on decentering, some sport-relevant decentering items were developed.

At the second stage, the coaches and athletes were recruited via sport psychology consultants who were working with them at the time of data collection. The purpose and nature of the study were explained and the oral consent of coach and athlete were obtained before participation. Five semi-structured interviews and one focus group (with three wushu coaches) were conducted for the coaches. The duration of coach interview lasted approximately 30 minutes to 60 minutes. A semi-structured interview guide was used with the lay definition of mindfulness and its three dimensions, as well as the lay definition of decentering and its two dimensions. The coaches were asked, by considering their own sporting and coaching experiences, to identify as many such mindfulness and decentering characteristics of athletes as possible. Five focus groups were conducted for

the athletes for approximately 90 minutes to 110 minutes. They were also provided with a semi-structured interview guide with lay definition of mindfulness and its three dimensions, as well as the lay definition of decentering and its two dimensions. The athletes were asked, based on their own sporting experiences, to identify as many such mindfulness characteristics as possible. The purpose of these interviews was to identify and generate mindfulness and decentering characteristics occurring in the sport environment.

At the third stage, a list of items from the first two stages was completed by the same sample of athletes in focus group to collect quantitative data concerning the applicability and clarity of items. The items were presented to athletes using a dichotomous scale (*applicable* versus *inapplicable*), in which they were instructed to assess the relevance of each item to the sport context. Items deemed inapplicable by 33% or more of the athletes were eliminated. The athletes were also asked to rate the clarity of the applicable items using a 7-point scale (1 = *not at all clear* to 7 = *extremely clear*). Items being rated below 5 were taken as problematic items, and the athletes were encouraged to suggest alternative wordings of these problematic items (see also Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010).

At the final stage, a reduced pool of items, which were established following the quantitative review, were sent out to seven experts nationwide via email for inviting expert opinions. Two steps were used in this stage. In the first step, the experts were provided with instruction and definitions of the mindfulness and its three dimensions, as well as the definition of decentering and its two dimensions. They were asked to rate how representative each of the items to tap the components of mindfulness, using a 4-point

Likert-scale from 1 (*not relevant*) to 4 (*highly relevant*). They were also asked to make suggestions for alternative or additional items. After some necessary modifications, four of these seven experts were further asked to rate the representation of each item using the same scale in the second step.

Studies 2, 3, and 4 of Part I and Part II as well as Study 5 of Part I. Coaches and team managers were contacted directly and the purpose and nature of the study were explained to get the permission for approaching their athletes. Upon receiving oral approval, the researcher approached the athletes for distributing the questionnaires and collecting the data before or after their normal training sessions. Standardized instructions were given and athletes were asked to complete the questionnaires honestly. All participants were clearly informed that they were volunteering and anonymously participating in the study. For athletes who were not available at the time of completing the questionnaires, they were allowed to take home and return them to the researcher, team sport psychology consultants, or team managers the next one or two days. For Study 2, all athletes are required to complete the mindfulness and decentering scales distributed by the researcher. For Study 3, 38.94% athletes completed a package of questionnaires distributed by the researcher, and the rest of them completed the same package of questionnaires distributed by their team sport psychology consultants or team managers. For Studies 4 and 5, all athletes completed a package of questionnaires distributed by their team sport psychology consultants or team managers. Once finished, all completed questionnaires were returned to the researcher.

Data Analysis

Exploratory factor analysis. In Study 2 of Part I and Part II, data was analyzed using an exploratory factor analysis (EFA) using Mplus 7 (Muthén & Muthén, 1998-2012), to identify the underlying dimensions of the AMQ with 38 items and the DSS with 24 items. Owing to documented shortcomings associated with maximum likelihood (ML) for estimating factor analysis models for ordinal data (Schmitt, 2011), a polychoric correlation matrix using weighted least squares mean- and variance- adjusted (WLSMV) estimation procedure with an oblique Geomin rotation was carried out. Given that the percentages of missing data for both the AMQ (i.e., 0.165%) and the DSS (i.e., 0.154%) were negligible, all missing data were treated using pairwise deletion to produce unbiased estimates for the parameters and their standard errors. The Geomin rotation was selected given that it was designed to minimize cross-loading while producing statistically significant factor loadings on the primary factors, which was likely to generate a cleaner factor structures that are similar to confirmatory factor analysis (CFA) (Browne, 2001; Sass & Schmitt, 2010; Schmitt & Sass, 2011).

Following the recommendation of Schmitt (2011), the number of items was determined with parallel analysis (PA) in Mplus 7, and then evaluated using the model fit indices. Although multiple fit indices such as the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Bollen, 1989), the standardized root mean square residual (SRMR; Hu & Bentler, 1999), and the root mean square error of approximation (RMSEA; Steiger, 1990) were only validated for CFA models and had not been formally determined for EFA (Norberg, Wetterneck, Sass, & Kanter, 2011), they were used to provide additional support for the initial EFA model we obtained. In general, a cut-off value of CFI and TLI greater than .90 are considered as adequate model fit, greater

than .95 and above has been suggested to indicate an excellent fit. For the SRMR and RMSEA, values closed to or less than .08 and .06 are indicative of adequate model fit, respectively (Hu & Bentler, 1999).

In terms of interpreting the extracted factors, items were removed in the following order: (a) items with large factor pattern loadings on the incorrect factor (i.e., $\geq .40$); (b) items with high cross-loadings, namely, secondary loadings $> .30$; and (c) items with primary factor loadings $\leq .40$, indicating that items did not load on any factor. Items were removed independently based on the item severity following a sequence of factor analyses until an approximate simple structure was obtained.

Once the underlying dimensions of mindfulness and decentering in sport had been determined, item analysis was carried out to assess homogeneity of the items representing each factor (DeVellis, 2012). In line with the previous study (Bartholomew et al., 2010), three criteria were used to assess the internal reliability: (a) an inter-item correlation between $r = .20$ and $r = .70$; (b) a minimum corrected item-total correlation of $r = .30$; and (c) a minimum internal reliability of each factor using composite reliability (CR; Raykov, 1997) was set as .70. Bivariate correlations between the subscales were also examined and small-to-moderate relationship value would indicate that the subscales are measuring related but distinct constructs.

Confirmatory factory analysis. In Study 3 of Part I and Part II, the 16-item AMQ and the 13-item DSS were analyzed via CFA using Mplus 7 (Muthén & Muthén, 1998-2012) using the polychoric correlation matrix and the WLSMV estimator, in order to cross-validate the findings of the EFA. When estimating the CFA model, the residuals of items were assumed to be uncorrelated, all latent factors were intercorrelated, and the

first unstandardized factor loading on each factor was fixed to 1.0 for latent factor scaling and identification. The adequacy of the model to the data was evaluated based on the model fit statistics (i.e., multiple fit indices) and the estimated standardized factor-loading magnitudes. The fit statistics (i.e., χ^2 , CFI, TLI, SRMR, and RMSEA) outlined in Study 2 for the EFA and the weighted root mean square residual (WRMR) were employed to evaluate model fit for the CFA. Value of WRMR closed to or less than 1.0 has been suggested as indicative of adequate model fit (Yu, 2002). Given the percentages of missing data for both the AMQ (i.e., 0.193%) and the DSS (i.e., 0.151%) were negligible, all missing data were treated use pairwise deletion. In line with previous research (Myers, Feltz, Guillen, & Dithurbide, 2012; Norberg, Wetterneck, Sass, & Kanter, 2011), the low cell count of “*not at all*” response option of the AMQ data was recoded from a one to a two to create a more symmetrical distribution, increase model stability, improve threshold estimation, and eliminate convergence problems. In addition, the modification indices, standardized factor loadings, and standardized residuals were examined. Items with factor loadings below .40 and large absolute values of standardized residuals (>2.00) were considered for removal.

Descriptive statistics and internal consistency reliabilities of the DSS and subscales of the AMQ using composite reliability were calculated. Discriminant validity of the AMQ was examined through the inspection of the factor correlations, as well as the existence of an alternative one-factor model. Concurrent and convergent validities of both the AMQ and DSS were examined through the IBM SPSS Statistics 21.

The data analysis methods in Study 4 of Part I and Part II as well as in Study 5 of Part I were identical to those of the Study 3. Given that the percentages of missing

data for both the AMQ (i.e., 0.282%) and the DSS (i.e., 0.198%) in Study 4 of Part I and Part II and the AMQ (i.e., 0.543%) in Study 5 of Part I were negligible, all missing data was treated using pairwise deletion. Same as Study 3 of Part I, the low cell count of “not at all” response option of the AMQ data was recoded from a one to a two in both Study 4 and Study 5 of Part I.

Measurement invariance. To examine whether the AMQ in Study 5 of Part I as well as whether the DSS in Study 3 of Part II displayed invariance across gender and sport type (team and individual), a sequential model testing approach was employed via multisample CFA using the weighted least squares mean and variance (WLSMV) estimation on a polychoric matrix in Mplus 7. Given that the data were ordinal likert-type, the thresholds were modeled, instead of intercepts or means. Given that there were five response options for each item of the DSS, the number of thresholds for each item was four. As there were four response options for each item of the AMQ after recoding, the number of thresholds for each item was three. The invariance testing for ordinal data consists of two steps (Muthén & Muthén, 1998-2012). The first step is to test configural invariance (CI), which is to confirm whether the same items are indicators of the same factor across groups. The second step is to test the measurement invariance was tested by constraining factor loadings and thresholds to be equal across groups. In line with previous studies (Carrola, Yu, Sass, & Lee, 2012; Forbush et al., 2013), the factor loadings and thresholds were constrained in tandem given that the item characteristic curve is influenced by both parameters (Millsap & Yun-Tein, 2004).

To assess the degree of invariance, differences in chi-square values ($\Delta \chi^2$) were examined using the DIFFTEST procedure in Mplus 7. Statistical significance of *the* $\Delta \chi^2$ after a Bonferroni adjustment was considered (Sass, 2011). In addition, changes in the invariance model-fit indices (Δ CFI, Δ RMSEA, and Δ TLI) were compared between a less restrictive model and more restrictive models. The cut-off criteria for acceptable invariance model fit recommended by Chen (2007) were followed: Δ CFI \leq .01, Δ RMSEA \leq .15, and Δ TLI \leq .01. However, it should be noted that greater emphasis should be placed on the $\Delta \chi^2$ because the WLSMV estimator does not allow for a direct comparison between models based on Δ CFI, Δ RMSEA, and Δ TLI (Sass, 2011).

Results and Discussions

Part I : Development and Initial Validation of the Athlete Mindfulness

Questionnaire

Study 1: Item Generation and Content Validity

Sixty-four items were firstly generated by adapting the items of the existing instruments into sport context, namely training and competition. The coaches and athletes who were interviewed in this study believed that all three dimensions of mindfulness (i.e., present-moment attention, awareness, and acceptance) are important in the sport context. A total of 23 new items were added to reflect additional mindfulness descriptions suggested by coaches and athletes, and subsequently an initial pool of 87 items was obtained. The relevance and clarity of each item was also evaluated by the athletes, and as a result, 41 items were deemed inapplicable to the sport context and were thus eliminated, whereas 18 items were slightly modified to improve their clarity and broaden their applicability across sports. The resultant pool of 46 items was then examined by 7

academic and applied experts. Based on their ratings, the item-level content validity index (I-CVI; Lynn, 1986; Polit & Beck, 2006; Polit, Beck, & Owen, 2007) was calculated for each item by dividing the number of experts who rate the item as a *quite relevant* or *highly relevant* (i.e., the rating 3 and 4 given by experts) by the total number of experts (i.e., 7 in the current study) taking part in the rating. When the expert panel consists of six or more reviewers, I-CVIs over the .78 criteria are believed to be excellent (Lynn, 1986). Ten items that displayed a CVI of .71 (5/7) or below were thus deleted. All of the remaining items which exhibited CVIs ranging from .86 (6/7) to 1.00 (7/7) and were retained. However, based upon the expert reviewers' qualitative feedback, minor modifications were made to the wording of seven items. In addition, two new items that were suggested by reviewers were added. These modifications produced a reduced pool of 38 items that tapped the construct of mindfulness from both in theoretical and applied perspectives, and were deemed to be clear and applicable to the athletes. Following the recommendation by Polit, Beck and Owen (2007), four out of these 7 experts were invited again to rate the relevance of the reduced pool of items as the second-round rating. By using the scale-level content validity index averaging calculation method (S-CVI/Ave; Lynn, 1986; Polit & Beck, 2006), all the I-CVIs were averaged out, from which a satisfactory S-CVI/Ave of 0.96 was obtained.

Study 2: Examining the Factor Structure of AMQ

The initial EFA with 38 items revealed that a three-factor solution was existed based on the parallel analysis (mean eigenvalue) using Mplus 7, although ten eigenvalues were greater than one. Factors 1, 2 and 3 explained 21.26, 9.07 and 4.32 percent of variance, respectively. Additional support for the three-factor model was obtained using

the model fit statistics, the three-factor model indicate an adequate fit, where $\chi^2 (592) = 874.02, p < .001, CFI = .94, TLI = .93, SRMR = .05, RMSEA (90\%CI) = .04(.036, .048)$.

By employing the aforementioned criteria to examine the factor loading matrix, 22 items were removed in a sequence of factor analyses. The final EFA solution contained 16 items that loaded on to three factors, with Factors 1, 2 and 3 explaining 31.96, 10.93, and 7.54 percent of variance, respectively. Analysis of item content and using constructs previously identified in the literature, Factor 1 was labeled as Present-moment Attention (consisted of 6 items), Factor 2 was labeled as Awareness (consisted of 5 items), and Factor 3 was labeled as Acceptance (consisted of 5 items). The interfactor correlations were moderate to large in magnitude (see Table 2), indicating that these three factors share a fair amount of variance. The two negative correlations between Factor 1 and Factor 3 as well as between Factor 2 and Factor 3 may suggest that in athletes with limited meditation experience, the tendency to attend to and be aware of the present-moment experiences is associated with a tendency to be judgmental of them.

No items were identified as problematic in item analysis based on the aforementioned criteria assessing the homogeneity of the items representing each factor. The composite reliability (rho [ρ]; Raykov, 1997) was calculated based on the standardized factor loadings of the final set of items (Table 2), and the factors of present-moment attention, awareness, and acceptance all displayed low to moderate reliabilities ($\rho = .79, \rho = .73$ and $\rho = .67$, respectively). Despite the low to moderate reliability, the three extracted factors appeared to represent mindfulness identified in the literature.

Table 2

Factor Loading Matrix, Factor Loadings (λ), Error Variances (θ), Item Means (M), Standard Deviations (SD), Factor Correlations, and Internal Consistency of the AMQ Items (Studies 2, 3, and 4)

AMQ Subscale and Item Content	Study 2			Study 3				Study 4			
	F1	F2	F3	<i>M</i>	<i>SD</i>	λ	θ	<i>M</i>	<i>SD</i>	λ	θ
F1. Present-moment attention											
1. I can maintain my attention on the training.	.68*	-.12	-.03	4.01	.74	.51	.74	3.96	.67	.60	.64
4. When I find myself distracted, I gently bring the attention to the training.	.49*	.12	.00	3.53	.88	.73	.47	3.58	.92	.65	.58
9. When I am about to win the competition, I still focus on the things I am doing.	.69*	-.17	.03	-	-	-	-	-	-	-	-
20. I can easily sustain my attention on the competition.	.70*	.02	.08	3.82	.87	.56	.68	3.91	.89	.54	.71
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	.56*	.08	-.03	3.70	.91	.56	.69	3.64	.86	.60	.64
33. My mind wandering flashed by, I quickly get back to the training or competition.	.59*	-.02	-.07	3.51	.92	.61	.62	3.56	.90	.71	.45
F2. Awareness											
14. When something unexpected happens during training or competition, I am aware of my emotion state.	.04	.52*	-.05	3.54	.87	.61	.62	3.48	.80	.50	.75
15. I can be aware of the changes inside my body in competition, for example my heart beat faster or my muscle becomes stiff.	-.02	.52*	-.13	-	-	-	-	-	-	-	-
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	.00	.82*	.14	3.57	.91	.64	.60	3.43	.89	.58	.67

27. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.	.01	.60*	.04	3.51	.99	.48	.77	3.46	.93	.52	.73
38. In training or competition, I can immediately be aware of emotional changes.	.15*	.48*	-.02	3.67	.91	.65	.58	3.60	.88	.59	.66
F3. Acceptance ^a											
13. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that.	.02	-.25*	.46*	3.37	.93	.60	.64	3.46	.94	.66	.57
16. I try to get rid of annoying thinking and ideas in training or competition.	-.08	.02	.66*	3.38	.97	.58	.66	3.41	.93	.65	.57
19. In training or competition, I tell myself that I should not have some thinking.	-.02	.00	.70*	3.24	.99	.82	.33	3.29	.94	.61	.63
22. When there are unpleasant emotions in training or competition, I try to control or eliminate it.	-.30*	-.05	.42*	-	-	-	-	-	-	-	-
23. I try to distract or divert attention to make the bad memories in training or competition to disappear.	-.01	-.21*	.44*	-	-	-	-	-	-	-	-

Factor Correlations and Internal Consistency	Study 2			Study 3			Study 4		
	F1	F2	F3	F1	F2	F3	F1	F2	F3
F1. Present-moment attention	.79			.73			.76		
F2. Awareness	.49	.73		.45	.69		.35	.63	
F3. Acceptance	-.48	-.58	.67	-.29	-.45	.71	-.31	-.53	.68

Note. ^a = Reverse-worded items. Numbers in bold face indicate primary loadings of Study 2. Statistically significant ($p < .05$) loadings of Study 2 are marked with an “*”. All factor loadings of Studies 3 and 4 are statistically significant at $p < .05$. Composite reliability coefficients are presented on the diagonal of the factor correlation matrix.

Study 3: Validating the Factor Structure and Providing Validity Evidence of AMQ

Confirmatory Factor Analysis

Results of CFA suggested a marginal good fit to the data, but indicated room for improvement: $\chi^2 (101) = 301.43, p < .001, CFI = .90, TLI = .88, WRMR = 1.22, RMSEA (90\%CI) = .08(.065, .084)$. Although none of the items exhibited low standardized factor loadings ($< .40$) or large absolute values of standardized residuals (> 2.00), large modification indices (MIs) suggested that several items have secondary pattern coefficients (a nonzero loading on a factor that an item was not initially intend to measure) that should be addressed. Four items (two tapping the acceptance, one tapping the present-moment attention, one tapping the awareness) were excluded sequentially based on the magnitudes and degrees of MIs. Excluding these four items improved the fit of the model to the data: $\chi^2 (51) = 123.14, p < .001, CFI = .95, TLI = .93, WRMR = .94, RMSEA (90\%CI) = .06(.049, .077)$. The model included one 5-item factor (Present-moment attention), one 4-item factor (Awareness) and one 3-item factor (Acceptance). In addition, a one-factor model was tested, which produced a very poor fit to the data: $\chi^2 (54) = 277.83, p < .001, CFI = .83, TLI = .80, WRMR = 1.47, RMSEA (90\%CI) = .11(.095, .120)$.

Based on the final 12-item three-factor model, all factor correlations remained significant, and all three factors demonstrated adequate internal consistency with composite reliability that ranged from .69 to .73. Table 2 shows item means, standard deviations, standardized factor loadings and residuals, as well as factor correlations and internal consistency reliabilities.

Convergent and Concurrent Validities

Person's correlations were employed to examine the relationships between the AMQ factors and measures of mindfulness, experiential avoidance, flow, and subjective well-being (see Table 3). With regard to convergent validity, both subscales of the present-moment attention and awareness correlate significantly with mindfulness measured by MAAS. Surprisingly, the correlation between acceptance subscale and mindfulness measured by MAAS was non-significant and very weak. With regard to the concurrent validity, all three subscales of AMQ correlated significantly with flow assessed by the SDFS, but again acceptance subscale has a negative association with flow. In addition, the present-moment attention significantly and negatively correlated with experiential avoidance, but the correlations between awareness and experiential avoidance, as well as between acceptance and experiential avoidance were non-significant and weak. Moreover, both the present-moment attention and awareness correlated positively and significantly with subjective well-being measured by TCWS, but the correlation between acceptance and subjective well-being was non-significant (with $p=.053$) and weak. Taken together, the convergent and current validities of present-moment attention and awareness have been established, except the acceptance subscale which more evidence is needed.

Table 3

Means (M), Standard Deviations (SD) and Cronbach's α Coefficients of All Other Measures, and Pearson's Correlations Between the subscales of the AMQ and Other Measures (Study 3)

Scales	M	SD	Cronbach's α	Subscales of the AMQ		
				Present-moment attention	Awareness	Acceptance
MAAS	4.18	.69	.85	.25**	.13*	-.06
AAQ-II	21.02	7.91	.85	-.26**	-.10	.00
SDFS	30.76	4.65	.68	.43**	.30**	-.16**
TCWS	24.88	6.65	.70	.37**	.15**	-.10 ^a

Note. AAQ-II = Acceptance and Action Questionnaire-II; MAAS= Mindful Attention Awareness Scale; TCWS= Training and Competition Well-being Scale; SDFS= Short Dispositional Flow Scale.

* $p < .05$; ** $p < .01$. ^a $p = .053$

Study 4: Cross-Validating the Factor Structure of AMQ and Obtaining Additional Validity Evidence

Confirmatory Factor Analysis

The 12-item three-factor solution was analyzed via CFA using Mplus 7 (Muthén & Muthén, 1998-2012) and using the polychoric correlation matrix and the WLSMV estimator. The model displayed an excellent fit to the data: $\chi^2(51) = 101.13, p < .001$, CFI=.95, TLI=.94, WRMR=.86, RMSEA (90%CI) =.058(.041, .074), confirming the validity of the factorial model. All three factors demonstrated acceptable to good internal consistency, with composite reliability ranging from .63 to .76. Table 2 displays item means, standard deviations, standardized factor loadings and residuals, as well as factor correlations and internal consistency estimates. In addition, a one-factor model was also

tested, and this produced a very poor fit to the data: $\chi^2(54) = 259.89, p < .001, CFI = .81, TLI = .76, WRMR = 1.46, RMSEA(90\%CI) = .114(.100, .128)$. These findings provide further support to the factor structure of the AMQ.

Concurrent Validity

Table 4 shows the correlations between the AMQ subscales and other variables. As predicted, there was a significant and negative association between present-moment attention and burnout, negative affect and anxiety, while there was a significant and positive association between present-moment attention and vitality, positive affect, and enjoyment. There was a significant and positive correlation between awareness and positive affect. However, no significant correlations were revealed between awareness and other scales. Surprisingly, there were no significant correlations between acceptance subscale with all of the criteria-related scales. Taken together, the current validities of present-moment attention and awareness were further established, especially the present-moment attention subscale. However, the concurrent validity of the acceptance subscale cannot be established and more evidence is needed.

The Formation of New Items in the Modified AMQ

The low reliabilities of both the awareness and acceptance subscales might be caused by the small numbers of items per scale, in which only 4 and 3 items in the awareness and acceptance subscales, respectively. In addition, the small numbers of items per scale might fail to provide adequate support for concurrent validity. Further, van Sonderen, Sanderman, and Coyne (2013) demonstrated that reverse-worded items did not prevent response bias, but instead scores were contaminated by respondent inattention and confusion. It is possibly the scores of the reverse-worded acceptance items were

contaminated. Therefore, it may be necessary to include more items to both the awareness and acceptance subscales, as well as changing the reverse-worded items back to the direct-worded items. Two items, with high factor loadings in the EFA of Study 2, were adapted into the new subscale of awareness. For the acceptance subscale, two reverse-worded items, with high factor loadings in the EFA of Study 2, were changed into direct-worded items. Four direct-worded items, with high factor loadings in the EFA of Study 2, were directly adopted. As such, a 17-item modified AMQ was formed.

Table 4

Means (M), Standard Deviations (SD) and Cronbach's α Coefficients of All Other Measures, and Pearson's Correlations Between the subscales of the AMQ and Other Measures (Study 4)

Scales	<i>M</i>	<i>SD</i>	Cronbach's α	Subscales of the AMQ		
				Present-moment attention	Awareness	Acceptance
ABQ-RSA	13.28	3.50	.73	-.34**	-.07	.06
ABQ-EE	14.67	3.78	.80	-.16**	.02	-.03
ABQ-D	12.37	4.18	.83	-.27**	.05	-.00
SVS	28.65	7.73	.89	.37**	.07	-.01
PA	17.78	3.73	.68	.24**	.12*	-.04
NA	12.06	4.12	.70	-.20**	-.03	.02
SES	15.60	3.70	.89	.25**	.01	-.04
SCAT	18.61	3.42	.71	-.15**	-.05	.02

Note. ABQ = Athlete Burnout Questionnaire; RSA= Reduced Sense of Accomplishment; EE= Emotional/Physical Exhaustion; D=Devaluation; SVS = Subjective Vitality Scale; PA = Positive Affect; NA = Negative Affect; SES = Sport Enjoyment Subscale; SCAT = Sport Competition Anxiety Test. * $p < .05$; ** $p < .01$.

Study 5: Further Validating the Factor Structure and Providing Validity Evidence of Modified AMQ with New Items

Confirmatory Factor Analysis

The 17-item three-factor solution was analyzed via CFA using Mplus 7 (Muthén & Muthén, 1998-2012) and using the polychoric correlation matrix and the WLSMV estimator. The model displayed a satisfactory fit to the data: $\chi^2(116) = 267.54, p < .001$, CFI=.93, TLI=.92, WRMR=1.10, RMSEA (90%CI) =.059(.050, .068), confirming the validity of the factorial model. However, one item (i.e., item 5) was found having a low factor loading (<.30). After removing this item, the model fit indices have been greatly improved: $\chi^2(101) = 221.28, p < .001$, CFI=.95, TLI=.94, WRMR=1.04, RMSEA (90%CI) =.056(.046, .066). All three factors demonstrated acceptable to good internal consistency, with composite reliability ranging from .64 to .76. Table 5 displays item means, standard deviations, standardized factor loadings and residuals, as well as factor correlations and internal consistency estimates. In addition, a one-factor model was also tested, and this produced a poor fit to the data: $\chi^2(104) = 359.87, p < .001$, CFI=.89, TLI=.87, WRMR=1.35, RMSEA (90%CI) =.079(.070, .088). These findings provide support to the factor structure of the modified AMQ.

Table 5

Item Means(M), Standard Deviations(SD), Factor Loadings (λ), and Error Variances (θ) of the AMQ (Study 5)

AMQ Subscales and Item	<i>M</i>	<i>SD</i>	λ	θ
Present-moment attention				
1. I can maintain my attention on the training.	3.93	.82	.65	.58
4. When I find myself distracted, I gently bring the attention to the training.	3.65	.90	.52	.73
20. I can easily sustain my attention on the competition.	3.84	.92	.58	.66
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	3.66	.93	.62	.62
33. My mind wandering flashed by, I quickly get back to the training or competition.	3.56	.90	.69	.52
Awareness				
2. I can be aware of that my emotion in training or competition influences my thinking and behavior.	3.68	.92	.57	.67
14. When something unexpected happens during training or competition, I am aware of my emotion state.	3.60	.87	.64	.59
21. When the training or competition doesn't go well, I can be aware of my inner frustration and restlessness.	3.71	.85	.41	.83
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	3.49	.88	.64	.59

27. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.	3.52	.96	.56	.69
38. In training or competition, I can immediately be aware of emotional changes.	3.62	.93	.71	.50

Acceptance

3. I can accept the unpleasant thoughts and feelings in training or competition.	3.69	.88	.70	.52
7. In training or competition, no matter good or bad, I can accept myself.	3.58	.99	.32	.90
26. In training or competition, I can let go the emotions brought by negative events in life.	3.57	.90	.57	.68
29. In training or competition, no matter each thought and feeling is comfortable or not, I will accept all of them.	3.46	.91	.44	.81
31. Even though some thinking and feelings in training or competition are unpleasant or miserable, I can get along with them peacefully.	3.40	.97	.52	.73

Factor Correlations and Internal consistency Reliabilities	1	2	3
1. Present-moment attention	.75		
2. Awareness	.48	.76	
3. Acceptance	.56	.38	.64

Note. All factor loadings and inter-factor correlations are statistically significant at $p < .01$. Composite reliability coefficients are present on the diagonal of the factor correlation matrix.

Convergent and Concurrent Validities

Table 6 shows the correlations between the AMQ subscales and other variables. As predicted, there was a significant and negative association between present-moment attention and experiential avoidance, and burnout, including, reduced sense of accomplishment, emotional/physical exhaustion, and devaluation; while there was a significant and positive association between present-moment attention and mindfulness measured by MAAS, positive affect, dispositional flow and well-being. Interestingly, there was no significant association between present-moment attention and negative affect. There was a significant and negative correlation between awareness and burnout, including, reduced sense of accomplishment, emotional/physical exhaustion, and devaluation; while there was a significant and positive association between awareness and mindfulness measured by MAAS, positive affect, dispositional flow and well-being. Interestingly, no significant correlations were revealed between awareness and experiential avoidance, negative affect. As predicted, there were significant and negative associations between acceptance and experiential avoidance, positive affect, and burnout, including, reduced sense of accomplishment, emotional/physical exhaustion, and devaluation; while there was a significant and positive association between acceptance and mindfulness measured by MAAS, positive affect, dispositional flow and well-being. Taken together, the convergent and current validities of the subscales of present-moment attention, awareness and acceptance were established.

Table 6

Means (M), Standard Deviations (SD) and Cronbach's α Coefficients of All Other Measures, and Pearson's Correlations Between the subscales of the AMQ and Other Measures (Study 5)

Scales	<i>M</i>	<i>SD</i>	Cronbach's α	Subscales of the AMQ		
				Present-moment attention	Awareness	Acceptance
AAQ-II	21.41	8.09	.86	-.24**	-.05	-.26**
ABQ-RSA	13.75	3.27	.65	-.40**	-.18**	-.32**
ABQ-EE	13.11	4.14	.84	-.31**	-.16**	-.22**
ABQ-D	12.34	4.50	.85	-.32**	-.23**	-.23**
PA	17.02	4.23	.71	.38**	.22**	.17**
NA	11.84	4.30	.75	-.09	-.01	-.13*
MAAS	4.17	.73	.83	.46**	.21**	.30**
SDFS	30.29	4.96	.70	.48**	.38**	.37**
TCWS	26.16	6.78	.71	.35**	.13**	.34**

Note. AAQ-II = Acceptance and Action Questionnaire–II; ABQ = Athlete Burnout Questionnaire; RSA= Reduced Sense of Accomplishment; EE= Emotional/Physical Exhaustion; D=Devaluation; PA = Positive Affect; NA = Negative Affect; MAAS= Mindful Attention Awareness Scale; SDFS= Short Dispositional Flow Scale; TCWS= Training and Competition Well-being Scale.

* $p < .05$; ** $p < .01$.

Incremental Validity of the AMQ

Results from the hierarchical multiple regressions, examining the incremental validity of the AMQ, are presented in Table 7. The three subscales of the AMQ explained a significant portion of variance, beyond the contribution of MAAS, in positive affect,

training and competition well-being, dispositional flow, reduced sense of accomplishment, emotional/physical exhaustion and devaluation. The reversed hierarchical analyses mainly revealed the same results, in that, the MAAS adds unique explained variance, beyond three subscales of the AMQ, in explaining dispositional flow, reduced sense of accomplishment, emotional/physical exhaustion and devaluation. However, in well-being, the MAAS did not explain additional variance beyond three subscales of the AMQ, in explaining positive affect and training and competition well-being. Therefore, results suggest that the MAAS and the AMQ are both uniquely related to dispositional flow, reduced sense of accomplishment, emotional/physical exhaustion and devaluation. Nonetheless, the incremental validity of the AMQ was established, on positive affect and training and competition well-being.

Table 7

Hierarchical Regression Analysis for Positive Affect (PA), Well-being (SWLS), Dispositional Flow (SDFS), Well-being (TCWS), Reduced Sense of Accomplishment (ABQ-RSA), Emotional/Physical Exhaustion (ABQ-EE), and Devaluation (ABQ-D) With Mindfulness (MAAS) and Subscales of the Athlete Mindfulness Questionnaire (AMQ) (Study 5)

Dependent variables and predictors	Step 1		Step 2	
	Beta	Adjusted R^2	Beta	Adjusted R^2
PA				
MAAS	.25***		.10	
Present-Moment Attention			.34***	
Awareness			.07	
Acceptance			-.08	
		.06***		.15***
SDFS				
MAAS	.32***		.12*	
Present-Moment Attention			.27***	

	Awareness		.18**	
	Acceptance		.12*	
			.10***	.27***
TCWS				
	MAAS	.25***	.10	
	Present-Moment Attention		.21**	
	Awareness		-.07	
	Acceptance		.22***	
			.06***	.15***
ABQ-RSA				
	MAAS	-.33***	-.17**	
	Present-Moment Attention		-.27***	
	Awareness		.04	
	Acceptance		-.13*	
			.11***	.19***
ABQ-EE				
	MAAS	-.31***	-.21***	
	Present-Moment Attention		-.19**	
	Awareness		-.00	
	Acceptance		-.05	
			.09***	.13**
ABQ-D				
	MAAS	-.32***	-.22**	
	Present-Moment Attention		-.15*	
	Awareness		-.10	
	Acceptance		-.04	
			.10***	.14***

Note. ABQ = Athlete Burnout Questionnaire; RSA= Reduced Sense of Accomplishment; EE= Emotional/Physical Exhaustion; D=Devaluation; PA = Positive Affect; MAAS= Mindful Attention Awareness Scale; SDFS= Short Dispositional Flow Scale; TCWS= Training and Competition Well-being Scale. * $p < .05$. ** $p < .01$. *** $p < .001$.

Tale 8

Model-Fit Indices for Invariance Analysis of the AMQ Measurement Model (Study 5)

Model	χ^2	<i>df</i>	$\Delta \chi^2$	Δdf	CFI	ΔCFI	TLI	ΔTLI	RMSEA	$\Delta RMSEA$
Gender										
Male	159.486	101			.956		.948		.052	
Female	191.224	101			.891		.871		.074	
CI	352.303	202			.930		.917		.063	
MI	381.015	260	53.266 ^a	58	.944	.014	.948	.031	.050	-.013
FVI	375.126	263	2.453	3	.948	.004	.952	.004	.047	-.003
FCI	369.885	266	.193	3	.952	.004	.956	.004	.045	-.002
Sport Type										
Individual	201.543	101			.940		.929		.059	
Team	156.401	101			.887		.866		.075	
CI	351.454	202			.930		.917		.062	
MI	431.689	260	103.375 ^{*b}	58	.920	-.010	.926	.009	.059	-.003
PMI(i6)	410.150	256	8.029 ^c	54	.928	-.002	.933	.016	.056	-.006
FVI	417.537	259	9.051	3	.926	-.002	.931	-.002	.057	.001
FCI	404.400	262	2.310	3	.934	.008	.939	.008	.054	-.003

Note. CFI= comparative fit index; TLI=Tucker-Lewis index; RMSEA=root mean square error of approximation; CI=configural invariance; MI=measurement invariance; PMI= partial measurement invariance; FVI= factor variance invariance; FCI=factor covariance invariance. Item numbers (i13 and i3) in the parenthesis refers to partial measurement invariance with their factor loadings and thresholds were estimated to be equal across sport type. ^a $p=.65$; ^{*b} = statistically significant $\Delta \chi^2$ statistic ($p=.0002$) after a Bonferroni correction ($\alpha=.05/58=.00086$); ^c = $\Delta \chi^2$ statistic ($p=.0101$) after a Bonferroni correction ($\alpha=.05/54=.00093$). Given that $\Delta \chi^2$ tests were conducted using DIFFEST procedure, the $\Delta \chi^2$ is not equal to the difference in χ^2 between two models.

Invariance Testing

The goodness-of-fit indices for all multigroup measurement models of gender invariance and sport type invariance were displayed in Table 8. Fit indices indicated the scale's factorial invariance across gender was supported. Fit indices indicated that the factor loadings and thresholds varied across sport type. The factor loadings and thresholds of item 6 between sport type were relaxed to improve model fit, which resulted in an invariant measurement model. Factor variance and covariance was invariant across gender and sport type. These analyses provide support for the partial factorial invariance of the AMQ measurement model.

Discussion

Given that the growing interest and effectiveness of applying mindfulness practice into sport field (Gardner & Moore, 2012), development of psychometrically sound sport-specific mindfulness scales is needed (Thienot et al., 2014), especially for Chinese athletes (Chung, Si, & Zhang, 2013). The purpose of the current study was to develop and validate a self-report measure of mindfulness for Chinese athletes through five related studies. Based on the definitions of mindfulness on existing self-report mindfulness scales (e.g., Baer et al., 2004; Brown & Ryan, 2003; Feldman et al., 2007) and mindfulness training programs in sport context (e.g., Gardner & Moore, 2007; Si, Zhang, Su, & Zhang, 2014), the AMQ is consisted of three subscales, namely, present-moment attention, awareness and acceptance. In Study 1, evidence for the content validity of the AMQ was provided. Although the initial evidence of the dimensional structure of the AMQ was established in Study 2 and further confirmed in Studies 3 and 4 using two independent samples, the convergent and concurrent validities of the subscale

acceptance of the AMQ cannot be established in Studies 3 and 4. As the reverse-worded items might contaminate scores rather than prevent response bias (van Sonderen et al., 2013), the researcher adopted the direct-worded items for the acceptance scale together with adding new items were adopted from the item pools of Study 1, the items of the AMQ were therefore modified. In Study 5, the factorial, convergent, concurrent and incremental validities of the modified AMQ were established, even though the internal consistency reliability of the acceptance subscale was still marginal. Measurement invariance across gender and partial measurement invariance across sport type were established. Collectively, the findings of Study 5 suggest that the modified AMQ is a reliable and valid measure of dispositional mindfulness for Chinese athletes.

The present research found that the mixed items used in Studies 3 and 4 might cause confusion to the Chinese athletes, from which the athletes might misinterpret the items that were in the reversed-worded format (Herche & Engelland, 1996; van Sonderen et al., 2013). Chinese athletes might be more familiar and accustomed to the direct-worded items of acceptance and coexist with the experiences, especially the adversities and negative experiences (Si, Duan, Li, & Jiang, 2011). Another possible explanation is that in sport context, some athletes are normally trained to make judgments directly about experiences and ideas, for example those sports with attack and defense characteristics. In Studies 2, 3, and 4, the correlations between present-moment attention and acceptance, as well as between awareness and acceptance, are negative. This is in line with the findings of previous studies (e.g., Baer et al., 2006; Thienot et al., 2014), demonstrating that clinical and normal people as well as athletes are more likely to make judgments when paying attention to the present-moment experience. It should be noted that without using

of mixed items, athletes might agree all statements of the items regardless of the contents that may cause problem of response acquiescence (Nunnally, 1978). However, van Sonderen and colleagues (2013) also indicated that reverse-worded items cannot prevent response bias, but instead cause confusion. Taken together the above considerations, the researcher decided to use only direct-worded acceptance items in the final modified AMQ.

Regarding to the factorial validity of the mixed-items model and non-mixed items AMQ, evidence was provided from both the exploratory factor analysis and confirmatory factor analyses, in which adequate model fit indices supported a three-factor measurement model across four independent samples of athletes. However, in the final 16-item AMQ, only the subscales of present-moment attention and awareness demonstrated adequate internal consistency reliabilities, whereas the subscale of acceptance displayed marginal internal consistency reliability. It is suggested that future research should be conducted to provide evidence for the reliability of the acceptance using another sample of athletes as well as by adding more items to the scale. Taken together, preliminary evidence of the factorial and internal consistency reliabilities of the AMQ are provided, even though a further refinement of the scale is needed.

Despite the lack of convergent and concurrent validities of the AMQ in Studies 3 and 4, the convergent and concurrent validities of the three subscales of the final 16-item AMQ were achieved in Study 5 after converting the reversed-worded items into direct-worded items. The convergent validity of the AMQ was established, through building the positive associations between mindfulness measured by Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003; Chung, Si, Liu, & Zhang, 2013) and mindfulness

measured by three subscales of the AMQ. The negative associations between the present-moment attention and experiential avoidance, as well as between acceptance and experiential avoidance indicate that higher level of mindfulness is related to lower level of experiential avoidance (attempt to avoid unpleasant thoughts, images, feelings, sensations, and emotions). As experiential avoidance is an important component in mindfulness-based training for athletes, such as the Mindfulness-Acceptance-Commitment (MAC, Gardner & Moore, 2004, 2007) and the mindfulness training program for Chinese athletes (Si et al., 2014), the sport-specific measure of mindfulness AMQ, together with the measure of experience avoidance AAQ- II (Bond et al., 2011; Zhang, Chung, Si, & Liu, 2014) can be used to capture the complex and ongoing changing mechanism of mindfulness training. Specifically, in opposite to experiential avoidance, experiential acceptance is cultivated in these mindfulness training programs. The negative associations between mindfulness and three components of athletes' burnout were revealed (i.e., reduced sense of accomplishment, emotional/physical exhaustion, and devaluation). Given the importance of burnout in athletes' subjective well-being in training and competition (Cui & Zhang, 2008), mindfulness training can be used to alleviate and prevent the occurrence of burnout in athletes. The positive associations between mindfulness and well-being as well as between mindfulness and positive affect further corroborate the statement that mindfulness can be used to improve athletes' subjective well-being and positive affect. Interestingly, no significant associations were found between present-moment attention, awareness and negative affect. The positive associations between the three subscales of mindfulness and flow revealed in the current study are in line with the findings of previous studies (Aherne et

al., 2011; Kee & Wang, 2008; Thienont et al., 2014). It is believed that increase of mindfulness state might facilitate the experience of flow in training and competition. However, it should be noted their relationships are built on the cross-sectional data, where casual relationships can only be supported by strictly experimental design (Birrer & Morgan, 2013; Chung, Si, & Zhang, 2013). Given that the final 16-item AMQ provides additional contribution to predicting positive constructs, such as the positive affect and subjective well-being, it is suggested that the multidimensional, rather unidimensional definition of mindfulness might be more appropriate in sports context.

The evidence of measurement invariance of the 16-item AMQ across gender and partial invariance across sport type has been demonstrated. The baseline model for team sport displayed marginal fit compared to the individual sport, which is in line with the finding of Thienot and colleagues' study (2014). However, the baseline models for females displayed marginal fit in comparison to the male baseline model is contrary to the study of Thienot et al. (2014). The consistent finding on the marginal fit of the measurement model of team sport indicates that the team sport athletes may pay attention and aware of the situation differently when comparing with individual sport athletes, which may also affect their understanding of the items of mindfulness scale. It seems that team sport athletes are less accustomed to the description of mindfulness items. It makes sense that when compare to individual sport athletes who more frequently pay their attention and awareness to the present-moment experiences, team sport athletes tend to pay more attention to the team cooperation and tactics. Therefore, future research could consider developing a mindfulness scale specifically for individual or team sports. Researchers can also further develop mindfulness scales for different sports, for example,

the self-expression sports (e.g., diving, wushu, and gymnastics), the combat sports with attack and defense (e.g., fencing, table tennis, and soccer), and the fitness-related sports (e.g., swimming, cycling, and rowing). Furthermore, it might be useful to develop mindfulness scales separately for training and competition. The reason is that some sports, such as gymnastics and wushu, the time of each routine in competition is normally within five minutes, during which the levels of their present-moment attention and awareness are very high. Moreover, as indicated by Thienot et al. (2014), it is important to distinguish the mindfulness awareness from the self-focused attention in both conceptual and measurement levels, to avoid misleading the athletes but accurately assess this construct.

Although the AMQ with direct-worded items demonstrated psychometrically sound properties, some limitations in studies should be noted. Firstly, the current research relied on self-report data. Like other self-report instruments, such as the measure of stressors (e.g., Arnold, Fletcher, & Daniels, 2013), self-reported data can be confounded by other personal factors (e.g., attitudes and habitual responses). It should also be cautioned that semantic confusion might be caused for athletes who are with or without mindfulness experiences; this is because some items might be more easily and accurately understood by individuals with mindfulness experiences (Grossman, 2008; Thienot et al., 2014). Therefore, future research validating the AMQ should consider adopting more accurate indicators such as the working memory test (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). Secondly, given that the AMQ is developed using five samples of athletes in various sport training centers in Mainland China, caution should be exerted on extrapolation of the findings to other populations, for example the western counterparts.

In the future, the AMQ can be further validated in samples of Western athletes to examine its generalizability. Thirdly, although the construct validity and internal consistency reliability have been built using cross-sectional design, the test-retest reliability has not been established. Given the importance of mindfulness training and intervention to athletes, future research should adopt longitudinal and intervention designs to better capture the dynamic change progress of mindfulness.

In conclusion, the five related studies of the present research have developed and initially validated the AMQ that assesses the mindfulness in sport context (i.e., training and competition). The development of the AMQ has not only addressed the issues of lacking a psychometrically sound mindfulness inventory for Chinese athletes, but also demonstrated the importance of eliminating reverse-worded items to avoid confusion caused to Chinese athletes. After going through the five studies, a final 16-item AMQ that assessing three subscales, namely, the present-moment attention, awareness, and acceptance was supported. The AMQ provides a psychological measure that researchers and practitioners can use to accurately assess dispositional mindfulness of Chinese athletes and to better understand the mechanism of mindfulness training in sport context.

PART II : Development and Initial Validation of the Decentering Scale for Sport

Study 1: Item Generation and Content Validity of the DSS

Twenty-eight items were firstly generated by adapting the items in the Experiences Questionnaire (EQ; Fresco et al., 2007) and items in the existing documents into sport context (i.e., training and competition). The coaches and athletes who were interviewed in this study believed that both two dimensions of decentering (i.e., view

one's self as not synonymous with one's thoughts, and not to habitually react to one's negative experiences) are important in the sport context. A total of 21 new items were added to reflect additional descriptions of decentering suggested by coaches and athletes, and subsequently an initial pool of 49 items was obtained. The relevance and clarity of each item has also been evaluated by the athletes, and as a result, 21 items were deemed inapplicable to the sport context and were thus eliminated, whereas 14 items were slightly modified to improve their clarity and broaden their applicability across sports. The resultant pool of 28 items was then examined by seven academic and applied experts. Based on their ratings, the item-level content validity index (I-CVI; Lynn, 1986; Polit & Beck, 2006; Polit, Beck, & Owen, 2007) was calculated for each item by dividing the number of experts who rate the item as a quite relevant or highly relevant (i.e., the rating 3 and 4 given by experts) by the total number of experts (i.e., 7 in the current study) taking part in the rating. When the expert panel consists of six or more reviewers, I-CVIs over the .78 criteria believed to be excellent (Lynn, 1986). Five items that displayed a CVI of .71 (5/7) or below and were thus deleted. All of the remaining items which exhibited CVIs ranging from .86 (6/7) to 1.00 (7/7) and were retained. However, based upon the expert reviewers' qualitative feedback, very minor modifications were made to the wording of six items. In addition, one new item that was suggested by reviewers was added. These modifications produced a reduced pool of 24 items that tapped the construct of decentering from both in theoretical and applied perspectives, and were deemed to be clear and applicable to the athletes. Following the recommendation by Polit, Beck and Owen (2007), four out of these seven experts were invited again to rate the relevance of the reduced pool of items as the second-round rating. By using the scale-level content

validity index averaging calculation method (S-CVI/Ave; Lynn, 1986; Polit & Beck, 2006; Polit, Beck, & Owen, 2007) was calculated by averaging across all the I-CVIs were averaged out, from which a satisfactory S-CVI/Ave of 0.98 was obtained.

Study 2: Examining the Factor Structure of the DSS

The initial EFA with 24 items revealed that a three-factor solution existed based on the parallel analysis (mean eigenvalue) using Mplus 7, although six eigenvalues were greater than one. However, the three-factor solution model fit was marginal, where $\chi^2(207) = 435.81, p < .001, CFI = .90, TLI = .87, SRMR = .056, RMSEA(90\%CI) = .064(.055, .072)$, and a number of items had either small primary factor loadings ($\lambda < .40$) or large cross-loadings ($\lambda > .30$). Based on the criteria outlined in data analysis, eight items were thus removed in a sequence of factor analyses. After removing these items, a two-factor solution was supported based on the parallel analysis, although four eigenvalues were greater than one. The eigenvalues were 4.37 and 1.74 for Factors 1 and 2, which explained 27.31 and 10.88 percentage of variance, respectively. However, only two reverse-worded items (i.e., Item 15 and 16) had large primary factor loadings ($\lambda > .40$) on Factor 2 and item 21 had small primary factor loading ($\lambda < .40$) but large cross-loading ($\lambda > .30$) (see Table 9). In addition the inter-factor correlation was very low in magnitude ($r = .09$). Therefore, the decision was made to remove Factor 2 through removing Items 21, 15, and 16. After removing these three items, another EFA was conducted and a unidimensional factor solution was supported by the parallel analysis. The final set of items (see Table 9) with one factor explained 32.92 percent of variance. Although two factors had eigenvalues larger than one with 4.28 and 1.10 for factor 1 and 2 respectively, factor 2 only explained 8.46 percent of variance. Additional support to the single-factor

model was received from the model fit statistics, where $\chi^2 (65) = 144.57, p < .001$, CFI=.95, TLI=.94, SRMR=.055, RMSEA (90%CI) =.067(.052, .082), with two-factor model only providing a modest improvement in model fit, $\chi^2 (53) = 106.59, p < .001$, CFI=.96, TLI=.95, SRMR=.045, RMSEA (90%CI) =.061(.044, .078). The estimated factor pattern loadings for the one-factor final EFA model revealed that each item had large and significant factor loading on the decentering factor (Table 9).

The composite reliability (rho [ρ]; Raykov, 1997) was calculated based on the standardized factor loadings of the one-factor final set of items (Table 9), and a moderate to high reliability ($\rho = .85$) was achieved. Based on the aforementioned criteria in item analysis assessing the homogeneity of the items representing decentering factor, Items 7, 14 and 23 showed low inter-item correlations with several other items ($r < .20$). Despite the low estimate of inter-item correlations for a few items, the extracted single factor decentering appeared to represent an overarching decentering factor. The finding is consistent with the result of Fresco, Moore et al (2007).

Table 9

Factor Loading Matrix, Factor Loadings (λ), Error Variances (θ), Item Means (M) and Standard Deviations (SD) of the DSS Items (Studies 2, 3, and 4)

Items	Study 2: EFA			Study 3: CFA				Study 4: CFA			
	Two-factor		One-factor	M	SD	λ	θ	M	SD	λ	θ
	F1	F2									
2. I can pull myself out of the annoying thinking or images without being controlled.	.64*	.24*	.68*	3.07	.89	.69	.52	3.23	.89	.59	.65
5. I can distinguish the thoughts which are objective reflections from those which are my personal thinking.	.53*	.03	.54*	3.45	.87	.63	.61	3.53	.85	.42	.82
4. I will not be easily taken away by my thinking and emotions.	.61*	.18*	.64*	3.15	.96	.60	.65	3.18	.88	.64	.59
7. I notice that all kinds of thoughts and feelings are temporary, not the truth.	.49*	-.14	.47*	3.25	.95	.49	.76	3.26	.88	.52	.73
9. I can observe but not immersed in the unpleasant emotions.	.52*	.15*	.55*	3.29	.94	.60	.64	3.38	.93	.64	.60
6. I can just be aware of the annoying thoughts or images, without show any reactions immediately.	.48*	-.12	.46*	3.34	.98	.47	.78	3.21	.95	.47	.78
11. I remind myself that although I can feel the good or bad state, the truth situation might not be like this.	.54*	-.08	.52*	3.36	.90	.52	.73	3.22	.94	.47	.78
12. When the annoying thoughts or images appear, I will calm down soon.	.52*	.23*	.55*	3.16	.93	.57	.68	3.17	.89	.50	.75

14. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person.	.51*	.00	.51*	3.57	.97	.59	.65	3.53	1.03	.52	.73
18. I can be aware of the annoying thoughts or images without becoming entangled in them.	.66*	-.03	.65*	3.22	.95	.74	.45	3.29	.96	.69	.52
19. I notice that the agitated mood or negative thinking is not who I am or what it really looks like.	.62*	-.03	.61*	3.54	.99	.66	.57	3.46	.97	.63	.60
20. I can react to difficulties with calm.	.57*	.16*	.60*	3.48	.86	.57	.67	3.47	.89	.41	.84
23. I notice that what I think that I cannot hold on is just a thinking and idea, and this is not necessarily the truth.	.50*	-.28*	.43*	-	-	-	-	-	-	-	-
21. I realize that conjecture and analysis of the competition result is just my thinking and ideas, which will make the competition more complicated.	.34*	-.38*	-	-	-	-	-	-	-	-	-
15 ^a . I lose control of being affected by the negative thoughts and ideas on my emotions.	-.11*	.48*	-	-	-	-	-	-	-	-	-
16 ^a . Although I am aware of the negative thinking and ideas, I still cannot refrain from being affected.	.00	.79*	-	-	-	-	-	-	-	-	-

Note. ^a = Reverse-worded Items. Numbers in bold face indicate primary loadings of EFA, with statistically significant ($p < .05$) loadings are marked with an “*”. All factor loadings of Studies 3 and 4 are statistically significant at $p < .05$.

Study 3: Validating Factor Structure and Providing Validity Evidence of the DSS

Confirmatory Factor Analysis

Results of CFA suggested a very good fit to the data, but indicated room for improvement: $\chi^2 (56) = 211.95, p < .001, CFI = .94, TLI = .93, WRMR = 1.10, RMSEA (90\%CI) = .08(.068, .092)$. One item (Item 13) exhibited low standardized factor loadings ($\lambda = .359$), suggesting that it should be removed. Excluding item 13 improved the fit of the model to the data: $\chi^2 (54) = 156.97, p < .001, CFI = .96, TLI = .95, WRMR = .97, RMSEA (90\%CI) = .07(.060, .087)$. The final 12-item unidimensional model demonstrated adequate internal consistency, with a composite reliability of .88. Table 9 shows its item means, standard deviations, standardized factor loadings and residuals.

Invariance Testing

The goodness-of-fit indices for all multigroup models of gender invariance and sport type invariance were displayed in Table 10. Given that there are only four item responses (i.e., 2, 3, 4, and 5) of the last item DSS12 for male athletes, and the configural invariance was not able to be established between male and female athletes. Therefore, Item 12 was removed from further invariance test for gender. Fit indices indicated that the factor loadings and thresholds varied across gender and sport type. The factor loadings and thresholds of Item 2 and Item 11 between male and female athletes were thus relaxed to improve model fit, which resulted in an invariant measurement model. In addition, the factor loadings and thresholds of Item 3 between individual and team athletes were relaxed to improve model fit, which also resulted in an invariant measurement model. Taken together, these analyses provided initial support for the partial factorial invariance of the DSS measurement model.

Tale 10

Model-Fit Indices for Invariance Analysis of the DSS Measurement Model (Study 3)

Model	χ^2	<i>df</i>	$\Delta\chi^2$	Δdf	CFI	ΔCFI	TLI	ΔTLI	RMSEA	$\Delta RMSEA$
Gender										
Male	126.397	44			.960		.950		.073	
Female	99.540	44			.954		.943		.092	
CI	201.753	88			.950		.937		.085	
MI	276.351	141	101.633* ^a	53	.940	-.010	.953	.016	.074	-.011
PMI(i2)	263.869	136	88.753* ^b	48	.956	.006	.965	.028	.064	-.021
PMI(i2 and i11)	244.252	131	69.665	43	.950	.000	.958	.021	.070	-.015
FVI	222.298	132	2.047	1	.960	.010	.967	.009	.062	-.008
Sport Type										
Individual	131.035	44			.935		.919		.088	
Team	89.653	44			.944		.929		.100	
CI	219.574	88			.938		.922		.092	
MI	280.089	141	96.013* ^c	53	.934	-.004	.949	.027	.074	-.018
PMI(i3)	249.768	136	66.631	48	.946	.008	.957	.035	.069	-.023
FVI	223.450	137	1.543	1	.959	.013	.967	.01	.060	-.009

Note. CFI= comparative fit index; TLI=Tucker-Lewis index; RMSEA=root mean square error of approximation; CI=configural invariance; MI=measurement invariance; PMI= partial measurement invariance; FVI= factor variance invariance. Item numbers (i2, i3 and i11) in the parenthesis refers to partial measurement invariance with their factor loadings and thresholds were estimated to be equal across sport type. *^a = statistically significant $\Delta\chi^2$ statistic ($p=.0002$) after a Bonferroni correction ($\alpha=.05/53=.0009$); *^b = statistically significant $\Delta\chi^2$ statistic ($p=.0003$) after a Bonferroni correction ($\alpha=.05/48=.001$); *^c = statistically significant $\Delta\chi^2$ statistic ($p=.0003$) after a Bonferroni correction ($\alpha=.05/53=.0009$). Given that $\Delta\chi^2$ tests were conducted using DIFFEST procedure, the $\Delta\chi^2$ is not equal to the difference in χ^2 between two models.

Concurrent Validity

Person's correlations were employed to examine the relationships between the DSS and measures of mindfulness, experiential avoidance, flow, and subjective well-being (see Table 11). With regard to concurrent validity, the DSS correlated positively and significantly with mindfulness measured by MAAS, flow assessed by the SDFS, subjective well-being measured by TCWS. In addition, the DSS significantly and negatively correlated with the experiential avoidance measured by AAQ-II. Taken together, the current validity of the DSS has been established.

Table 11

Means (M), Standard Deviations (SD), and Cronbach's α Coefficients of All the Measures, and Pearson's Correlations Between the DSS and Other Criteria-related Measures (Study 3)

Scales	<i>M</i>	<i>SD</i>	Cronbach's α	DSS
DSS	39.89	6.68	.84	-
AAQ-II	21.02	7.91	.85	-.24**
TCWS	24.88	6.65	.70	.30**
MAAS	4.18	.69	.85	.23**
SDFS	30.76	4.65	.68	.45**

Note. AAQ-II = Acceptance and Action Questionnaire-II; MAAS= Mindful Attention Awareness Scale; TCWS= Training and Competition Well-being Scale; SDFS= Short Dispositional Flow Scale. * $p < .05$; ** $p < .01$.

Incremental Validity of the DSS

Results from the hierarchical multiple regressions, examining the incremental validity of the DSS, are presented in Table 12. The DSS explained a significant portion of

variance, beyond the contribution of MAAS and AAQ-II, in training and competition well-being and flow. The reversed hierarchical analyses mainly revealed the similar results, in that, the MAAS and AAQ-II add unique variance beyond the DSS, in explaining training and competition well-being; while only the MAAS adds unique variance beyond the DSS, in explaining flow. Taken together, results suggest that the DSS, MAAS, and AAQ-II are all uniquely related to training and competition well-being, and flow.

Table 12

Hierarchical Regression Analysis for Training and Competition Well-being (TCWS), and Flow (SDFS) With Mindfulness (MAAS), Experiential Avoidance (AAQ-II), and Decentering (DSS) (Study 3)

Dependent variables and predictors	Step 1		Step 2	
	Beta	Adjusted R^2	Beta	Adjusted R^2
TCWS				
MAAS	.54***		.53***	
AAQ-II	.05***		.05***	
DSS			.05***	
		.18***		.22***
SDFS				
MAAS	.38***		.32***	
AAQ-II	-.09		-.02	
DSS			.37***	
		.18***		.30***

Note. AAQ-II = Acceptance and Action Questionnaire–II; MAAS= Mindful Attention Awareness Scale; TCWS= Training and Competition Well-being Scale; SDFS= Short Dispositional Flow Scale. *** $p < .001$.

Study 4: Cross-Validating the Factor Structure of DSS and Obtaining Additional Validity Evidence

Confirmatory Factor Analysis

The 12-item uni-factor solution was analyzed via CFA using Mplus 7 (Muthén & Muthén, 1998-2012) and using the polychoric correlation matrix and the WLSMV estimator. The model displayed a satisfactory fit to the data: $\chi^2(54) = 136.78, p < .001$, CFI=.94, TLI=.93, WRMR=.95, RMSEA (90%CI) =.072(.057, .087), confirming the validity of the factorial model. The DSS demonstrated acceptable to good internal consistency, with a composite reliability of .83. Table 9 displays item means, standard deviations, standardized factor loadings and residuals.

Concurrent Validity

Table 13 shows the correlations between the DSS scales and other criteria-related variables. As predicted, there were significant and positive associations between the DSS and vitality, positive affect, and enjoyment. The correlation between the DSS and reduced sense of accomplishment, negative affect and anxiety were significant and negative. In addition, the correlation between the DSS and emotional/physical exhaustion and devaluation was negative but not significant. In sum, the current validity of the DSS was established.

Table 13

Means (M), Standard Deviations (SD), and Cronbach's α Coefficients of All the Measures, and Pearson's Correlations Between the DSS and Other Criteria-related Measures (Study 4)

Scales	<i>M</i>	<i>SD</i>	Cronbach's α	DSS
DSS	39.96	6.31	.81	-
ABQ-RSA	13.28	3.50	.73	-.16**
ABQ-EE	14.67	3.78	.80	-.042
ABQ-D	12.37	4.18	.83	-.047
SVS	28.65	7.73	.89	.22**
PA	17.78	3.73	.68	.15**
NA	12.06	4.12	.70	-.12**
SES	15.60	3.70	.89	.17**
SCAT	18.61	3.42	.71	-.13*

Note. ABQ = Athlete Burnout Questionnaire; RSA= Reduced Sense of Accomplishment; EE= Emotional/Physical Exhaustion; D=Devaluation; SVS = Subjective Vitality Scale; PA = Positive Affect; NA = Negative Affect; SES = Sport Enjoyment Subscale; SCAT = Sport Competition Anxiety Test. * $p < .05$; ** $p < .01$.

Discussion

The primary purpose of the present set of studies was to develop, and then to examine the psychometric properties of a questionnaire measure developed to assess athletes' decentering under the context of training and competition in sport. Given the debate on the dimensionality of the decentering construct, the secondary purpose of this research was to examine whether decentering is a uni-dimensional or multidimensional

construct in athletic population. A series of four related studies provided support for the validity and reliability of a uni-dimensional measure of decentering, the Decentering Scale for Sport (DSS), using independent samples of Chinese athletes. Although the one-factor model of DSS is confirmed and the uni-factorial nature of decentering is demonstrated, more research should be conducted to support this claim. Also, the concurrent validity of the DSS was demonstrated by showing associations with theoretically meaningful criteria-related measures. Given that only partial measurement invariance of the DSS was established across gender as well as across individual and team athletes, the generalization of findings across these subpopulations should be cautioned. Nonetheless, along with the growing application of mindfulness- and acceptance- based interventions in sport context, it is believed that the DSS provides a sport-specific and psychometrically sound inventory for researchers and practitioners to assess the psychological construct of decentering.

Although the German version of the EQ measures a two-dimensional construct of decentering (i.e., accepting self-perception and distanced perspective), the findings of the current series of studies support that the DSS also assesses a unidimensional construct of decentering in sports context, which is in line with the construct dimension of decentering in the Experiences Questionnaire (EQ; Fresco, Moore et al., 2007). Given the concerns raised by researchers about the including the self-compassion facet into the composition of the EQ (Forman et al., 2012; Gillanders et al., 2014), the initial pool of items were developed based on two facets of decentering, namely, the ability to view one's self as not synonymous with one's thoughts and the ability not to habitually react to one's negative experiences. Further, both the exploratory factor analysis (EFA) and

confirmatory factor analysis (CFA) provide evidence for the uni-factorial nature of the decentering construct measured by the DSS, with adequate model fit indices for a single-factor measurement model. In addition, satisfactory internal consistency reliability of the DSS was obtained across three independent athletic samples. Similarly, three instruments (i.e., the AFQ-Y, the DDS, and the CFQ) measure a single factor construct of the cognitive fusion which is the opposite construct of the decentering/cognitive defusion. Although the anxiety specific instrument of cognitive defusion BAFT measures three dimensions, including the somatic concerns (i.e., fuse with the physical concerns), emotion regulation (i.e., fuse with the emotional controls), and negative evaluation (i.e., fuse with negative evaluation of thoughts and feelings), they are related to the construct of anxiety, rather than the construct of cognitive fusion itself. Taken together, it seems that decentering is more likely a uni-factorial construct, compared to the multi-dimensional nature. Nonetheless, future research should further examine the dimensionality of the decentering construct through validating the EQ using different samples and populations or developing a new measurement based on the conceptualization of decentering (Safran & Segal, 1990).

Researchers try to differentiate the measurements of decentering and similar concepts, in particular the instrument of cognitive defusion. For example, Gillanders and colleagues (2014) argued that the CFQ serves as a better predictor of behavioral responses to cognitive events while EQ superior in predicting depressive disorders. Based on the findings of the current study, we believe that this might not be the case, in which the decentering shall also measure and serve as a better predictor of a wide range of cognitive events, such as anxiety, subjective well-being and rumination. At least, the DSS

is a reliable and valid measurement of decentering in the sports context. Future research should test the assessments of decentering and cognitive defusion/cognitive fusion together using both clinical and health populations, to examine whether both of them uniquely predict the outcome variables, or whether either of the two measurements can provide additional contribution over the other. However, it might be that the concept of decentering, cognitive defusion, metacognitive awareness and re-perceiving are essentially conceptualized under the same construct, and further research are needed to clarify the and synthesize this construct (Hagger, 2014). Future research should focus on solving the similarities and differences of these concepts regarding the conceptual, semantic and measurement levels. Furthermore, decentering measured by the mindfulness scale TMS (Lau et al., 2006) is conceptualized in a very similar way to the definition of Teasdale et al. (2002) that decentering was described as “awareness of one’s experience with some distance and disidentification rather than being carried away by one’s thoughts and feelings” (Lau et al., 2006, p. 1452). However, it should be noted that decentering is conceptualized as an independent construct rather than a component of mindfulness. Given mindfulness and decentering are two closely-related concepts, their difference and similarity should be further investigated.

As the single-factor nature of the DSS has been demonstrated, a further examination of its correlational relationships with criterion measures would provide much useful information related to the usefulness of DSS in sport context. Positive correlation between decentering and mindfulness further corroborate their close relationship. In addition, negative association between decentering and experiential avoidance was revealed. As the decrease of experiential avoidance (the opposite of

experiential acceptance) on discomfort thoughts and emotions is stressed in mindfulness-based interventions for athletes (e.g., Gardner & Moore, 2004, 2007; Si et al., 2014) and preliminary evidence has been provided (Schwanhausser, 2009; Hasker, 2010; Lutkenhouse, Gardner, & Moore, 2007; as cited in Gardner & Moore, 2012), a further investigation of the reciprocal relationship between decentering and experiential avoidance in a mindfulness-based intervention is necessary. The positive association between decentering and flow indicates that the ability to adopt decentering in sport context might be strongly related to the experience of flow in training and competition. Given the preliminary evidence on the relationship between mindfulness and flow (e.g., Aherne et al., 2011), future research can examine whether decentering plays the mediating role between mindfulness and flow in the sport context using the DSS. Moreover, positive associations between decentering and subjective well-being, enjoyment, vitality, and positive affect, as well as the negative associations between decentering and negative affect, and anxiety indicate that interventions that targeted improving the decentering capability might help improving these positive constructs and decrease these negative constructs. However, future research should examine their relationships in a strict experimental or intervention design to build more robust evidence.

In line with the finding of Fresco and Moore et al (2007), decentering in sport context is also viewed as an individual difference variable that is dispositional in nature. In other words, some athletes might show higher levels of decentering compared to other athletes, while the levels of decentering might be improved after mindfulness-based training, especially after formal mindfulness meditation. The DSS was therefore developed based on a general time frame. However, it might be useful to develop an

alternative version of the DSS with a shorter and specific time frame, which will make it useful for laboratory context such as brief decentering training. In addition, the questions stems of the DSS were developed using the phrase of “In training and competition” to provide contextual cues for responding. Although the items of DSS were generated and confirmed by athletes in sports context, it could also be adapted as a broad, general measure of decentering by removing the questions stems, or in to other contexts by providing an alternative questions stems. For example, the DSS can possibly be adapted to measure decentering in anxious thoughts and feelings by providing the context of “when having anxious thoughts and feelings”. The development of a measure of decentering for specific thoughts and feelings can be more useful by providing adequate information of research focus. Nonetheless, before adapting the DSS for use with other populations and contexts other than athletes and sports context, a rigorous process of psychometric validation is required.

As the DSS is developed as a sport-specific measure of the decentering, it can be used to examine the effectiveness of mindfulness-based training for Chinese athletes (Si et al., 2014) as well as whether decentering is a changing mechanism of mindfulness training. Given that decentering has been proposed as one of the changing mechanism in mindfulness-based interventions (Sauer & Baer, 2010) and cognitive behavioural therapy (Sanfran & Segal, 1990), it is necessary to capture this hypothesized mechanism of change in these interventions/therapies. Future research can use the DSS to examine whether the decentering is a proximal or distal variable of mindfulness based therapies for flow, mood, anxiety and other psychological variables (e.g., Tanay et al., 2012). However, given the multifaceted nature of most existing mindfulness training programs

for athletes, such as the mindfulness-acceptance-commitment therapy (Gardner & Moore, 2004) as well as the mindfulness training program for Chinese athletes (Si et al., 2014), several training components or processes of change are targeted simultaneously, it is difficult to dismantle the contributions from concrete processes. Future studies might design interventions that target to improve only the decentering skills, in order to examine the unique contribution of decentering on some salutary effects. Furthermore, as the cognitive behavioural therapy (CBT) has been proposed being able to facilitate decentering (Sanfran & Segal, 1990), it would be interesting to examine whether traditional CBT interventions in sports context can improve the athletes' decentering ability. By applying the DSS in these different types of interventions can clarify the similarities and differences when utilizing these different programs into athletes' mental training. Most important, the predictive validity of the DSS can possibly be established by applying these programs in increasing positive psychological states and decreasing negative psychological states.

Given that decentering has been proposed as a mechanism of change (i.e., mediator) in mindfulness- and acceptance- based therapy (Sauer & Baer, 2010), which including the mindfulness training for athletes (e.g., Gardner & Moore, 2004; Si et al., 2014), the DSS provide a useful tool for testing the hypothesized mediating model in the near future. In addition, the DSS can be used to track changes in intervention along with the progress of the intervention. Future intervention studies can use the DSS to establish more evidence for the mediating role of decentering in the relationship between mindfulness and other psychological outcomes, such as between the increase of

mindfulness and the increase of flow, subjective wellbeing and positive affect, as well as the decrease of negative affect.

Despite the satisfactory psychometric properties of the uni-factorial DSS, a number of limitations should be acknowledged. In terms of the study samples, we collected data from adult athletes in Mainland China, who competed in national and international levels. Future research can test it in adolescent athletes and athletes from other Chinese-speaking regions, such as Hong Kong and Taiwan. Secondly, the test-retest reliability has not been examined. As the capability of decentering is more likely to be improved in mindfulness and acceptance-based interventions, future study should examine the test-retest reliability of the DSS in a longitudinal study. Thirdly, we didn't examine the relationship between DSS and rumination measures. Given that the rumination and decentering are two closely-related concepts, it is necessary to examine the relationship and make distinction between decentering and ruminative thinking in training and competition. Fourthly, a comparison of the DSS with other formats of decentering measures was lacked, such as the MACAM. Future study should consider build the convergent validity of the DSS, by examining the relationship of the DSS with a sport-specific MACAM.

In conclusion, the current set of studies develop and initially validate a sport-specific self-report measurement of decentering using three samples of Chinese athletes. The unidimensional nature of the decentering construct has been confirmed, and satisfactory internal consistency reliability as well as concurrent validity has been established. Given the increasing attention in sport-specific mindfulness- and acceptance-based interventions (e.g., MAC), the DSS provide a reliable and valid measure of

decentering in sport context. However, a further investigation of the psychometric properties of the DSS is needed. Future research can pursue examining the effectiveness of mindfulness and CBT training on decentering as well as confirming the dimension of the decentering construct.

Chapter 4

General Discussion

The current thesis comprises a series of studies which aims to develop and provide initial validations of a sport-specific self-report measure of mindfulness, the Athlete Mindfulness Questionnaire (AMQ), and a sport-specific self-report measure of decentering, the Decentering Scale for Sport (DSS), using four samples of Chinese athletes. In Part I of Chapter 3, the psychometric evidence suggests that the 16-item AMQ is an adequate measure of mindfulness in sport context, which consists of three key constituents, namely, present-moment attention, awareness and acceptance. In Part II of Chapter 3, the psychometric evidence indicates that the 12-item DSS is a psychometrically sound measure of decentering in sport context. Content validations of both the initial pool of mindfulness and decentering items by experienced researchers and applied practitioners yield high ratings on the decentering and the three constituents of mindfulness. A three-factor solution of the AMQ and a single-factor solution of the DSS have been demonstrated in both of their initial exploratory factor analyses (EFA) and subsequent confirmatory factor analyses (CFAs) using different independent samples of athletes. Furthermore, acceptable internal consistency reliabilities as well as convergent and concurrent validities of the AMQ and DSS have been achieved.

In Part I of Chapter 3, it is also aimed to examine the operational definition of mindfulness in sport context based on its three constituents. A three-factor solution of the 16-item AMQ further supports the three-dimensional conceptualization of mindfulness, which is in line with the finding of study conducted by Thienot and colleagues (2014). However, the definition of the attention dimension in the current project is slightly

different from that of Thienot and colleagues (2014), in which two facets were included: (a) maintaining attention in the present moment; and (b) returning back to the present moment if distracted. In addition, the dimension of present-moment attention consistently shows good internal consistency reliability and relations with relevant concepts are as expected across studies. Furthermore, mindfulness in the current study is conceptualized as a dispositional construct since individual differences of mindfulness exist and their levels can change over time. As such, the operational definition of mindfulness in sport context is proposed as: The tendency of athletes paying attention to the present moment, being aware of the internal and external experiences, with an acceptance attitude. However, it should be noted that the convergent and concurrent validities of the acceptance subscale using reverse-worded items could not be established in Studies 3 and 4. The direct-worded rather than the reverse-worded acceptance items were therefore used, through which acceptable convergent and concurrent validities were established. This process indicates that Chinese athletes might be accustomed to the use of direct-worded statements of acceptance rather than being asked to be critical towards their experiences in training and competition. Athletes might be also accustomed to make judgment on their experiences in training and competition, and therefore may be confused to the use of the reverse-worded items. Future research should examine whether the direct-wording of the acceptance is a universal option to all athletes or applied only to Chinese athletes probably due to the Chinese cultural tradition that emphasizes the importance of acceptance (Si, 2006).

In Part II of Chapter 3, it is also aimed to examine the dimensionality (unidimensional or multidimensional) of the decentering construct in sport context. Given

that the inclusion of self-compassion facet in the Experiential Questionnaire (EQ; Fresco, Moore et al., 2007) measuring decentering is not in line with original definition of decentering, only two facets were included in the current study, namely, (a) view one's self as not synonymous with one's thoughts; and (b) not to habitually react to one's negative experiences. However, when comparing to the uni-factor solution of the original EQ, the German version of the EQ revealed a two-factor solution in a sample of German participants, including accepting self-perception and distanced perspective. In the present study, the unidimensional conceptualization decentering is further confirmed using exploratory and confirmatory factor analyses in three independent samples of Chinese athletes. The single-factor measures of the cognitive fusion (the opposite of cognitive defusion/decentering) further support to the decentering is a unidimensional construct. Nonetheless, researchers are recommended to further examine the dimensionality of the decentering construct using different populations and in different contexts.

Direction of Item Wording in the AMQ and DSS

Although both the direct-worded (positive) and reverse-worded (negative) items were generated in the initial pool of the AMQ items, only the direct-worded items of the subscales of present-moment attention and awareness as well as the reverse-worded acceptance were retained after exploratory factor analysis as presented in Part I of Chapter 3. This finding is in line with previous studies that only the reverse-worded items of the acceptance/nonjudgmental factor were retained after factor analysis. For example, the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the acceptance without judgment subscale of the four-factor Kentucky Inventory of Mindfulness Scale (KIMS; Baer et al., 2004), the acceptance without judgment subscale of the Five Facets

Mindfulness Questionnaire (FFMQ; Baer et al., 2006), as well as the non-judge subscale of the sport-specific three-dimensional Mindfulness Inventory for Sport (MIS; Thienot et al., 2014). Given that both the direct-worded and reverse-worded items were generated when developing those self-report mindfulness scales, problems might be caused by the use of factor analysis in this regard. That is, factor analysis will generate two factors instead of one factor if the pool of items is comprised of indicator items with two opposite directions of a single underlying factor, one factor is consisted of direct-worded items and the other factor is consisted of reverse-worded items (LLoret & González-Romá, 2000). The reason is that the linear factor analysis model cannot be fitted when the data is comprised of balanced positive and negative items of Likert-type scale (Van Schuur & Kiers, 1994). With regard to this situation, Brown and Ryan (2003) demonstrated that indirect (reverse-worded items) measure of mindfulness was conceptually and psychometrically to the direct-worded mindfulness items. Furthermore, it is found that the statements indicating the states of less mindfulness as well as the reverse-worded non-judgmental attitude is easier for individuals to recognize and rate because they are more accessible to the daily life of normal people (Brown & Ryan, 2003; Baer et al., 2004). In the present project, only the reverse-worded items of the acceptance subscale were retained after exploratory factor analysis (EFA). However, the acceptance subscale indicated low convergent and concurrent validities in two subsequent confirmatory factor analyses (CFAs). It happens in this study may be that the Chinese athletes are more likely getting accustomed to the concept of acceptance, where compared to the opposite concept of being judgmental and critical towards their personal experiences.

On the other hand, making judgment in training and competition might be viewed as a merit than a disadvantage to the athletes. Therefore, the reverse-worded acceptance items could possibly be confusing to the athletes in understanding of the acceptance items. Given this reason, low internal consistency reliability of the acceptance scale of the AMQ was revealed. Similarly, the act of non-judgment subscale of the FFMQ displayed low internal consistency reliability ($\alpha=.66$) in a sample of Chinese college students (Deng et al., 2011) and the acceptance subscale of the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006) also showed a low internal consistency reliability in a sample of Chinese college students (Chen & Zhou, in press). Taken together, it might suggest that there may be a cultural difference on the understanding of the acceptance concept. Future study should examine whether the Chinese people are more likely accustomed to the direct-worded items of mindfulness and its constituents by using experimental design. Another avenue for future research is to conduct the Item Response Theory (IRT) analysis, which does not assume the linear relationships, to examine whether the direct-worded and reverse-worded acceptance items are on a single continuum (Edelen & Reeve, 2007).

Likewise, only the direct-worded items of the DSS were retained after the exploratory factor analysis as presented in Part II of Chapter 3. Similarly, although the Experiences Questionnaire (EQ; Fresco, Moore et al., 2007) was initially designed to measure both factors of decentering and rumination, the factor of rumination was eliminated after subsequent exploratory and confirmatory factor analyses. In contrast, self-report measures of cognitive fusion (e.g., Gillanders et al., 2014) were developed to assess the opposite construct of cognitive defusion/decentering. As such, it seems that

both directions of the items are acceptable to measure the construct of decentering. Future study can further examine whether the direct-worded items or the reverse-worded items are easier to understand and report, as well as whether items from these two opposite directions are conceptually and psychometrically equivalent. In addition, the IRT analysis can be adopted to explore the single continuum of the decentering construct using these two different approaches of conceptualization in two opposite directions.

In short, the theoretical contributions of the present study can be summarized into three-fold: (a) the three-dimensional conceptualization of mindfulness in sport context (Gardner & Moore, 2007) has been confirmed, (b) unidimensional conceptualization of decentering is confirmed (Fresco, Moore, et al., 2007), and (c) the direct-wording of acceptance may be more appropriate and easier for Chinese athletes to understand. Nonetheless, a further examination and replication of the current study is recommended to provide additional evidence, especially from a cross-cultural perspective.

Relationships between the AMQ and Other Related Measures as well as between the DSS and Other Related Measures

Relationships of both the AMQ and DSS with other related constructs are found with as expected in the samples of Chinese athletes. Three subscales of the 16-item AMQ are found positively related to measures of positive affect, dispositional flow and well-being, and negatively correlated with experiential avoidance and burnout. As predicted, the present-moment attention and acceptance subscales of the AMQ are negatively associated with experiential avoidance, but contrary to expectations, the awareness subscale is found not related to experiential avoidance. In addition, contrary to expectations, the present-moment attention and acceptance subscales of the AMQ are

found not related to the negative affect as expected, while only the acceptance subscale is related to negative affect. Future research should examine these relationships using another sample of athletes and in different context, for example, prior to the competition. In addition, the subscales of the AMQ are found positively associated with the unidimensional measure of mindfulness, the MAAS. The incremental validity of the AMQ is established, to explain positive affect and training and competition well-being over the contribution of the MAAS. However, it should be noted that no unique contribution of AMQ over the MAAS were found in the measures of dispositional flow and burnout. Given the importance of establishing the predictive power, future research should examine the predictive validity of the AMQ in a well-designed intervention study.

The DSS is found positively correlated with measures of mindfulness, flow, subjective well-being, subjective vitality, positive affect and sport enjoyment, but negatively associated with measures of experiential avoidance, negative affect and anxiety. Interestingly, the DSS is negatively related to the reduced sense of accomplishment subscale of the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001), but is not related to the emotional/physical exhaustion and devaluation subscales of the ABQ. Taken together, the concurrent validity of the DSS is preliminarily established using the cross-sectional data. Nonetheless, the convergent and predictive validities of the DSS have not been established. Future research should examine the relationship between the DSS and self-report measures of cognitive fusion to build the evidence of convergent validity, for example, with the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014). In order to establish the predictive validity of the DSS in the future, a randomized control intervention study should be applied.

Practical Implications

The AMQ and DSS are developed for both applied and research purposes and findings from the present project do warrant future research to explore their utilities in applied settings in Chinese athletes. Specifically, both higher levels of mindfulness and decentering are found to be associated with higher levels of flow. To be in line with previous studies, future research can apply the AMQ and DSS to investigate the dynamic associated relationships among mindfulness, decentering, and flow in a mindfulness-based training for athletes. It should be noted that several components of flow are very similar to the conceptualization of mindfulness, for example, the action-awareness merging (i.e., there is no awareness of self as separate from the actions one is performing) and loss of self-consciousness (i.e., lack of focus on the information normally used to represent to oneself who one is) (Nakamura & Csikszentmihalyi, 2002). In addition, flow is characterized as intense and focused attention on what one is doing in the present moment (Nakamura & Csikszentmihalyi, 2002). Therefore, it will be interesting for future research to investigate the effectiveness of mindfulness-based training on flow (e.g., Aherne et al., 2011; Bernier et al., 2009), the shared variance between the AMQ and measures of flow, as well as the predictive validity of mindfulness and decentering on flow.

Experiential avoidance refers to people attempt to avoid thoughts, feelings, memories, physical sensations and other internal experiences in the acceptance commitment therapy (ACT; Hayes et al., 1999). In the current study, higher levels of mindfulness and decentering are found to be associated with less experiential avoidance. Given that experiential avoidance is also viewed as an important component that has been

integrated into sport-specific mindfulness training program, such as the MAC (Gardner & Moore, 2004, 2007) and mindfulness training program for Chinese athletes (Si et al., 2014), future research can examine the relationships of mindfulness, decentering and experiential avoidance and the effectiveness of mindfulness training on experiential avoidance in mindfulness-based interventions for athletes. For example, whether decentering is a proximal variable and experiential avoidance is a distal variable, or whether they are two parallel proximal variables can be further examined.

With regard to the issue of burnout in athletes' training, the current study reveals that both higher levels of mindfulness and decentering are related to less burnout, including reduced sense of accomplishment, emotional/physical exhaustion, and devaluation. Chinese athletes normally train harder and longer hours when comparing to their Western counterparts and coaches often adopt controlling rather than autonomy-supported attitude towards their athletes. The situation of athletes' burnout might be more serious in Chinese sport context. As such, the mindfulness training and practice (e.g., mindfulness meditation) may be applied to prevent the occurrence of athletes' burnout (Jouper & Gustafsson, 2013). In contrast, the current study also shows that higher levels of mindfulness and decentering are related to more subjective well-being in training and competition. Therefore, future research can examine the effectiveness of mindfulness training on improving athletes' subjective well-being as well as whether decentering is a mediator of the mechanism of the changing process.

In the current study, higher level of decentering is found to be related to less anxiety. As choking in sport is a serious problem causing catastrophic performance in competition (Hill, Hanton, Matthews, & Fleming, 2010) and the self-consciousness and

trait anxiety is closely associated with choking in sport (Wang, Marchant, Morris, & Gibbs, 2004), future research should investigate the effectiveness of mindfulness training on decentering, anxiety and other choking-related variables, by using the psychometric sound measures of mindfulness and decentering in the current project. For example, a recent single-subject intervention study supported the effectiveness of MAC training on reducing the anxiety and self-consciousness that related to choking, while athletes performed well without showing any choking symptoms in a national competition after the intervention (Zhao & Zhang, 2013). It will also be interesting to further investigate the effectiveness of brief mindfulness training on reducing the state choking-related predictors, for example, the state anxiety and self-consciousness.

Given that the association between mindfulness training and performance enhancement has been preliminarily established (Gooding & Gardner, 2009), the AMQ and DSS can be used to examine the relationships among mindfulness, decentering and performance enhancement. In addition, as mindfulness has been demonstrated to be able to improve individuals' motor skill learning (Kee, Chatzisarantis, Kong, Chow, & Chow, 2012; Kee & Liu, 2011), future research can use the AMQ to further investigate the effectiveness of mindfulness training on the motor skill learning, especially with adolescent athletes when they are learning and improving the core skills in their sports. However, a further investigation of the psychometric properties of the AMQ in the population of adolescent athletes is needed.

The concept of mindfulness can be applied to the competitive sport situation as it actually is not passively resigned or dissociated from, but actively engaged in the observed experience (Gunaratana, 2002). The emphasize of an acceptance and

nonjudgmental attitude is not to give up our own judgments but rather to accept the nature of the experiences and accept them no matter they are good nor bad (Gunaratana, 2002). When applies to the “struggled” competitive sport, athletes were cultivated the capability of accepting both the good or bad experiences and good or bad decisions. Therefore, it is actually in line with the “struggle” nature of competitive sport.

Overall, the findings of the current study can inform the mindfulness training of athletes in applied context. As the direct-worded items of acceptance are found to be more appropriate and easily understood by Chinese athletes, the direct expression of the acceptance attitude should be used in mindfulness training, instead of asking athletes not to make judgments on their private experiences. In addition, when cultivating the present-moment attention and awareness capability, both the components of sustaining attention and awareness in the present moment and quickly refocus to the present moment when distracted should be emphasized. With regard to the cultivation of decentering ability, athletes can be asked to take advantage both the formal (e.g., mindful meditation) and informal (e.g., mindful walking and body scan) mindfulness practice to experience stepping outside their immediate experiences and observing themselves in the process of constructing that experiences. The capability of not to habitually react to one’s negative experiences should be cultivated through the experiences of viewing one’s self as not synonymous with one’s thoughts, given that they two closely-related faces under the same decentering construct. Through utilizing mindfulness and decentering, athletes can replace the attitude of controlling or changing their private experiences in sport context with a more acceptable way without counterproductive effect, which can further help improving sport performance and other salutary psychological variables.

Limitations and Future Directions

A number of limitations and ideas for future research that have been discussed in previous chapter and this chapter will be summarized in this section. The primary limitation of the current study is that both the AMQ and DSS are developed using four samples of Chinese athletes. Therefore, the generalization of the findings to other Chinese-speaking athletes in other regions (e.g., Hong Kong and Taiwan) and other countries with cultures should be cautioned. In this regard, future research is needed to explore the construct of mindfulness and decentering in sport context from a cross-cultural perspective. By incorporating an English translation (or other languages) of the AMQ and DSS into the process of psychometric validation will provide some initial cross-cultural evidence to support their psychometric properties across cultures as well as the conceptualization and dimensionality of both mindfulness and decentering. Further, the AMQ and DSS can also be adapted into other life domains to generalize the findings of the current study.

Although both individual and team athletes as well as both male and female athletes were invited in order to allow the generation of the AMQ and DSS, there are more male athletes compared to the female athletes and more individual athletes compared to the team athletes. Therefore, limitations might be caused in AMQ as its model fit in male and individual athletes is better than female and team athletes, respectively. However, on the other hand, the establishment of partial measurement invariance demonstrated that their measurement model were nearly invariant. Nonetheless, future study should further test the model fit and measurement invariance of the AMQ across male and female athletes as well across individual and team athletes.

The AMQ is a multidimensional measure designed to tap the dispositional mindfulness which occurs during athletes' training and competition. Likewise, the DSS is a unidimensional measure designed to tap the decentering happens during the training and competition. Although both of these two measures have demonstrated good content, factorial, convergent and concurrent validities, as well as internal consistency reliabilities and full and partial measurement invariances across gender and sport type, the temporal stabilities (i.e., test-retest reliability) of both these two measures have not been examined in the current study. Future research should examine the stabilities of these two measures in longitudinal studies, by adopting the latent state-trait analyses (Eid, Notz, Steyer, & Schwenkmezger, 1994) to examine the different contribution from trait and state parts of the construct of mindfulness and decentering.

As decentering has been proposed as a mediator of the mechanism of changing process in mindfulness- and acceptance- interventions (Birrer et al., 2012; Sauer & Baer, 2010), the reciprocal relationship between the mindfulness measured by the AMQ and the decentering measured by the DSS has not been examined in the present thesis. As such, it is important for future study to explore the dynamic, reciprocal relationship between these two constructs in a longitudinal study, using the cross-lagged model (Finkel, 2008). In particular, future experimental work on examining whether decentering is a salutary proximal process in the mindfulness training, and the predictive relationship between mindfulness and decentering can be determined using the cross-lagged model by collecting multi-waves data of the AMQ, DSS and other outcome measures. For example, it will be interesting to examine the reciprocal relationships among mindfulness, mediator (i.e., decentering) and emotional adjustment in sports context, given that emotion is

believed to play an important role in sport performance at any level and be relevant to the quality of the sport experience (Pensgaard & Duda, 2003). It might be able to shed some light on the effectiveness of mindfulness training on emotional regulation and adjustment.

Summary and Conclusion

There is a growing interest in applying mindfulness training in sport context (Gardner & Moore, 2012), along with the development of sport-specific psychological interventions, such as the MAC (Gardner & Moore, 2004, 2007) and the mindfulness training program for Chinese athletes (Si et al., 2014). Given that mindfulness and decentering are integrated into these programs as central components, it is important to evaluate the effectiveness of the mindfulness-based training program on improving these two components. Previous studies normally utilize the self-report scales of mindfulness and decentering to athletic population, even without examining their psychometric properties. However, given the experience in daily life is different from those of athletes' training and competition, sport-specific measures of the mindfulness and decentering are needed. Throughout this study, self-reported measures of mindfulness and decentering, the Athlete Mindfulness Questionnaire (AMQ) and decentering, the Decentering Scale for Sport (DSS), have been developed and initially psychometrically examined, respectively.

With regard to the dimensionality of mindfulness and decentering, it is confirmed that mindfulness a three-dimensional construct, whereas the decentering is a unidimensional construct. The findings of the current study on developing the mindfulness measure have revealed that direct-worded items of acceptance might be more appropriate to be used for the Chinese athletes. In addition, the single-factor nature of the decentering

construct measured by the DSS is also confirmed in the current study. Given that decentering has been proposed as a potential mediator of the changing mechanism of mindfulness- and acceptance- based training, the developments of the AMQ and DSS provide psychometrically sound measures and sets stage for future investigation of these two important concepts in mindfulness training and practice.

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Questionnaire items used in Part I of Chapter 3

Study 1

Open-ended questions on athletes' mindfulness experiences in training and competition

Mindfulness refers to athletes are capable of paying attention to the present moment, be aware of the ongoing experiences, with an attitude of acceptance and non-judgment.

Based on the experiences in your training and competition, please describe the real feelings of your own.

1. Present-moment attention refers to athletes maintain their attention to the present-moment movements or training and competition tasks, and bring attention back to the present moment when distracted. Please describe your attention in training and competition.

1a. In what kind of situation or condition, you can sustain attention to the present moment?

1b. In what kind of situation or condition, you fail to sustain attention to the present moment?

2. Awareness refers to athletes be aware of the external stimulus (e.g., the temperature, venue and audience), physical conditions, thoughts and emotion reactions in training and competition. Please describe your physical condition, thoughts and emotion reaction.

2a. In what kind of situation or condition, you can be aware of your physical condition, thoughts and emotion reaction.

2b. In what kind of situation or condition, you fail to be aware of your physical condition, thoughts and emotion reaction.

3. Acceptance refers to athletes fully accept the external stimulus, physical condition, thoughts and emotion reaction, without judging whether it is right or wrong. Please describe your experience of accepting the physical condition, thoughts and emotion reaction in training and competition.

3a. In what kind of situation or condition, you can fully accept the external stimulus, physical condition, thoughts and emotion reaction, without judging whether it is right or wrong.

3b. In what kind of situation or condition, you fail to fully accept the external stimulus, physical condition, thoughts and emotion reaction, without judging whether it is right or wrong.

Initial Pool of 87 AMQ Items

Based on your applied experiences, please indicate the extent to which you find each statement is applicable or inapplicable to the sport context.

	Applicable ←→ Inapplicable	
1. In training, I often daydreaming or think other things.		
2. I screw up the whole training session because I was thinking things unrelated to the training all the time.		
3. I just want to quickly complete the training session, without really paying attention to the training itself.		
4. In competition, I pay full attention to the goal I want achieve but neglected the things I should do.		
5. In training, I am thinking about other things while I am listening to the instruction of coach.		
6. When I find myself distracted, I gently bring the attention to the training. (R)		
7. When I am about to win the competition, I still focus on the things I am doing. (R)		
8. I am easily distracted in training.		
9. I find it's difficult to focus on the training.		
10. When I feel exhausted in training, I can still sustain my attention on the things I should do. (R)		

	Applicable ←→ Inapplicable	
11. When I feel muscular pain in training, I still can maintain attention on things I should do. (R)		
12. Even the annoying thinking or ideas have gone, I still kept thinking about them.		
13. I can easily sustain my attention on the competition. (R)		
14. I can maintain my attention on the training. (R)		
15. I can highly focus on the competition for a very long period of time.		
16. My mind is occupied by the upcoming competition. (R)		
17. In training, my mind is always occupied by other thinking, for example, the mistake I just made or the subsequent training schedule. (R)		
18. When there is a mistake in training or competition, I kept thinking how I make that happened.		
19. When I feel my physical condition is not good, I cannot focus my attention on training. (R)		
20. My mind begins to wander when the training time is long. (R)		
21. My mind wandering flashed by, I quickly get back to the training or competition. (R)		
22. When I am influenced by outside factors, it will take very long time to get back.		

	Applicable ←→ Inapplicable	
23. The problems I met in daily life cause me lack of attention in training.		
24. In training or competition, I am able to be aware of my emotion influences my thinking and behavior. (R)		
25. In training or competition, I experienced some emotion but only be aware of it later.		
26. I run through the training plan, without being aware of what I experienced in the process.		
27. I complete the training plan automatically, without realizing what I am doing.		
28. When something unexpected happens during training or competition, I am aware of my emotion state. (R)		
29. In training or competition, I can be aware of the ideas flashing through my mind. (R)		
30. In competition, I can be aware of the degree of nervousness in my body. (R)		
31. In competition, I can be aware of the degree of anxiety and excitement. (R)		
32. In training or competition, I am able to be aware of my attention has been distracted.		

	Applicable ←→ Inapplicable	
33. When things are not going well in training or competition, I can be aware of where is the problem immediately.		
34. When things are going very well in competition, I can be aware of the excitement. (R)		
35. When I feel uncomfortable in training, I can clearly be aware of where it is. (R)		
36. I can easily figure out my thinking and emotion in training or competition. (R)		
37. When exchange with coach or teammates, I can be aware of their facial expression and body language. (R)		
38. When the competition process is totally out of expectation, I can be aware of my physical reaction and change. (R)		
39. If others ask my emotion in training, I can easily confirm my emotion state. (R)		
40. When situation changes in the competition, I can be aware of what thinking and ideas flashed across. (R)		
41. I can be aware of the changes inside my body in competition, for example my heart beat faster or my muscle becomes stiff. (R)		
42. In training or competition, I can be aware of my emotion. (R)		
43. Unless the tense or uncomfortable feeling of my body seriously influenced me in competition, I cannot be aware of it.		

	Applicable ←→ Inapplicable	
44. I can be aware of the body feelings when complete my skills. (R)		
45. I can be aware of the stimulus around the competition venue, for example, the shouts and cheers of audience. (R)		
46. In training or competition, I can immediately be aware of emotional changes. (R)		
47. When there is a mistake in training or competition, I can clearly be aware of where the problem is.		
48. When I find that I was thinking about past performance, I criticize myself for not put my attention focus on the competition.		
49. When I realize that I am mad at myself for making low-level mistakes, I criticize myself for having such a reaction.		
50. When I realize that my mind cannot be concentrated, I criticize myself for not putting my attention focused on the training.		
51. When there is annoying thinking or images, I judge my training state good or bad based on them.		
52. In training or competition, I believe that I should not have irrational thinking. (R)		
53. When I feel myself in poor condition before the competition, I believe that my performance will be affected. (R)		

	Applicable ←→ Inapplicable	
54. In training or competition, I judge whether the emerged thoughts are good or bad.		
55. When there is annoying thinking or images, I just keep aware of it and let it go.		
56. In training or competition, I will be aware of the unpleasant thinking or feelings without trying to get rid of them.		
57. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that. (R)		
58. Whether it makes me comfortable or not, I will accept every thinking and feeling in training or competition. (R)		
59. In training or competition, I can accept the self at that moment. (R)		
60. In training or competition, I noticed my mistakes and difficulties without judging them.		
61. In training or competition, I am impatient with myself and others.		
62. Even though some thinking and feelings in training or competition are unpleasant or miserable, I can get along with them peacefully. (R)		
63. In training or competition, I will accept unpleasant thinking and feelings. (R)		

	Applicable ←→Inapplicable	
64. I try to avoid annoying thinking and ideas in training or competition. (R)		
65. I try to just be aware of the annoying thinking and ideas without judging them good or bad.		
66. When there are unpleasant emotions in training or competition, I try to distract my attention to make myself feel better. (R)		
67. There are some respects in training or competition I would rather not to think about. (R)		
68. I try to stop some thinking and emotions come to my mind through monotonous training.		
69. In training or competition, I tell myself that I should not have some thinking. (R)		
70. I try to not thinking about some certain things in training or competition. (R)		
71. I try to distract or divert attention to make the bad memories in training or competition to disappear. (R)		
72. In training or competition, I criticize myself for having negative or inappropriate emotions.		
73. In training or competition, I disapprove myself for having irrational thinking and ideas.		

	Applicable ←→ Inapplicable	
74. In training or competition, I always judge whether my feelings are right or wrong.		
75. I cannot accept myself making some avoidable mistakes in competition.		
76. I cannot accept the unfair or unreasonable decision made by the judges in competition.		
77. In training or competition, I resistant to the critics and instruction of coach.		
78. I train based on the good or bad of my mood.		
79. In training, I feel irritable because I cannot find the right feelings all the time. (R)		
80. When the idea of failure emerged in the competition, I will not make any judgment.		
81. In competition, I will take the judge's decision as an established fact. (R)		
82. In training or competition, I think that I should not be affected by negative emotions. (R)		
83. In training or competition, I can accept the negative emotions brought by coach without being affected.		
84. When I feel down in training or competition, I wouldn't listen to coach's instruction at all.		

	Applicable ←→ Inapplicable	
85. When I feel my physical condition is in bad condition, I think the subsequent training will not be good. (R)		
86. When I feel I am in a bad condition in competition, I think I am over.		
87. When I cannot change the skills in training, I doubt about my capability.		

Study 2

Revised Pool of 38 AMQ items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5			
never true	rarely true	sometimes true	often true	always true			
1. I can maintain my attention on the training.			1	2	3	4	5
2. In training or competition, I am able to be aware of my emotion influences my thinking and behavior.			1	2	3	4	5
3. In training or competition, I accept unpleasant thinking and feelings.			1	2	3	4	5
4. When I find myself distracted, I gently bring the attention to the training.			1	2	3	4	5
5. In training, I feel irritable because I cannot find the right feelings all the time.			1	2	3	4	5
6. If others ask my emotion in training, I can easily confirm my emotion state.			1	2	3	4	5
7. In training or competition, I can accept the self at that moment.			1	2	3	4	5
8. In training or competition, I can be aware of the ideas flashing through my mind.			1	2	3	4	5
9. When I am about to win the competition, I still focus on the things I			1	2	3	4	5

am doing.					
10. In competition, I will take the judge's decision as an established fact.	1	2	3	4	5
11. I can be aware of the stimulus around the competition venue, for example, the shouts and cheers of audience.	1	2	3	4	5
12. In training, my mind is always occupied by other thinking, for example, the mistake I just made or the subsequent training schedule.	1	2	3	4	5
13. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that.	1	2	3	4	5
14. When something unexpected happens during training or competition, I am aware of my emotion state.	1	2	3	4	5
15. I can be aware of the changes inside my body in competition, for example my heart beat faster or my muscle becomes stiff.	1	2	3	4	5
16. I try to get rid of annoying thinking and ideas in training or competition.	1	2	3	4	5
17. When I am distracted in training or competition, it will take very long time to get back.	1	2	3	4	5
18. In training or competition, I can be aware of my emotion.	1	2	3	4	5
19. In training or competition, I tell myself that I should not have some thinking.	1	2	3	4	5
20. I can easily sustain my attention on the competition.	1	2	3	4	5
21. When things are going very well in competition, I can be aware of	1	2	3	4	5

the excitement.					
22. When there are unpleasant emotions in training or competition, I try to control or eliminate it.	1	2	3	4	5
23. I try to distract or divert attention to make the bad memories in training or competition to disappear.	1	2	3	4	5
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	1	2	3	4	5
25. My mind is occupied by the upcoming competition.	1	2	3	4	5
26. Even the training or competition has already started, I still cannot let go the problems I met in daily life.	1	2	3	4	5
27. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.	1	2	3	4	5
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	1	2	3	4	5
29. Whether it makes me comfortable or not, I will accept every thinking and feeling in training or competition.	1	2	3	4	5
30. I can easily figure out my thinking and emotion in training or competition.	1	2	3	4	5
31. Even though some thinking and feelings in training or competition are unpleasant or miserable, I can get along with them peacefully.	1	2	3	4	5
32. When exchange with coach or teammates, I can be aware of their facial expression and body language.	1	2	3	4	5

33. My mind wandering flashed by, I quickly get back to the training or competition.	1	2	3	4	5
34. In training or competition, I think that I should not be affected by negative emotions.	1	2	3	4	5
35. In training or competition, I am able to immediately be aware of my attention has been distracted.	1	2	3	4	5
36. I can be aware of the body feelings when complete my skills.	1	2	3	4	5
37. When I feel my physical condition is not good, I cannot focus my attention on training.	1	2	3	4	5
38. In training or competition, I can immediately be aware of emotional changes.	1	2	3	4	5

Study 3

Revised Pool of 16 AMQ items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5			
never true	rarely true	sometimes true	often true	always true			
1. I can maintain my attention on the training.			1	2	3	4	5
14. When something unexpected happens during training or competition, I am aware of my emotion state.			1	2	3	4	5
13. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that.			1	2	3	4	5
4. When I find myself distracted, I gently bring the attention to the training.			1	2	3	4	5
15. I can be aware of the changes inside my body in competition, for example my heart beat faster or my muscle becomes stiff.			1	2	3	4	5
16. I try to get rid of annoying thinking and ideas in training or competition.			1	2	3	4	5
9. When I am about to win the competition, I still focus on the things I am doing.			1	2	3	4	5
27. When the competition process is totally out of expectation, I can be			1	2	3	4	5

aware of my physical reaction and change.					
19. In training or competition, I tell myself that I should not have some thinking.	1	2	3	4	5
20. I can easily sustain my attention on the competition.	1	2	3	4	5
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	1	2	3	4	5
22. When there are unpleasant emotions in training or competition, I try to control or eliminate it.	1	2	3	4	5
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	1	2	3	4	5
38. In training or competition, I can immediately be aware of emotional changes.	1	2	3	4	5
23. I try to distract or divert attention to make the bad memories in training or competition to disappear.	1	2	3	4	5
33. My mind wandering flashed by, I quickly get back to the training or competition.	1	2	3	4	5

Acceptance and Action Questionnaire – II (AAQ-II; Bond et al., 2011)

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7					
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true					
1. My painful experiences and memories make it difficult for me to live a life that I would value.					1	2	3	4	5	6	7
2. I'm afraid of my feelings.					1	2	3	4	5	6	7
3. I worry about not being able to control my worries and feelings.					1	2	3	4	5	6	7
4. My painful memories prevent me from having a fulfilling life.					1	2	3	4	5	6	7
5. Emotions cause problems in my life.					1	2	3	4	5	6	7
6. It seems like most people are handling their lives better than I am.					1	2	3	4	5	6	7
7. Worries get in the way of my success.					1	2	3	4	5	6	7

Training and Competition Well-being Scale (Zhang & Liang, 2002)

The following statements relate to your experiences in training and competition. You might agree or disagree, please rate how true each statement is for you by circling a number next to it. 1 represents you totally disagree with the statement, while 7 represents you totally agree, other numbers represent different degrees between them.

1	2	3	4	5	6	7
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2. I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
3. I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
6. I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
7. It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
8. I rush through activities without being really attentive to them.	1	2	3	4	5	6
9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
10. I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
11. I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6
12. I drive places on "automatic pilot" and then wonder why I went there.	1	2	3	4	5	6
13. I find myself preoccupied with the future or the past.	1	2	3	4	5	6

14. I find myself doing things without paying attention.	1	2	3	4	5	6
15. I snack without being aware that I'm eating.	1	2	3	4	5	6

Short Dispositional Flow Scale (SDFS; Jackson, Martin, & Eklund, 2008)

Please answer the following questions in relation to your experience in training and competition. These questions relate to the thoughts and feelings you may experience during training and competition. You may experience these characteristics some of the time, all of the time, or none of the time. There are no right or wrong answers. Think about how often you experience each characteristic during your training and competition and circle the number that best matches your experience.

1	2	3	4	5	
never	rarely	sometimes	frequently	always	
When participating in training or competition:					
1. I feel I am competent enough to meet the high demands of the situation.	1	2	3	4	5
2. I perform automatically, without thinking too much.	1	2	3	4	5
3. I know clearly what I want to do.	1	2	3	4	5
4. It is really clear to me how my performance is going.	1	2	3	4	5
5. I am completely focused on the task at hand.	1	2	3	4	5
6. I have a sense of control over what I am doing.	1	2	3	4	5
7. I am not worried about what others may be thinking of me.	1	2	3	4	5
8. Time seems to alter.	1	2	3	4	5
9. The experience is extremely rewarding.	1	2	3	4	5

Study 4

Revised Pool of 12 AMQ items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5			
never true	rarely true	sometimes true	often true	always true			
1. I can maintain my attention on the training.			1	2	3	4	5
14. When something unexpected happens during training or competition, I am aware of my emotion state.			1	2	3	4	5
13. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that.			1	2	3	4	5
4. When I find myself distracted, I gently bring the attention to the training.			1	2	3	4	5
16. I try to get rid of annoying thinking and ideas in training or competition.			1	2	3	4	5
27. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.			1	2	3	4	5
19. In training or competition, I tell myself that I should not have some thinking.			1	2	3	4	5
20. I can easily sustain my attention on the competition.			1	2	3	4	5

24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	1	2	3	4	5
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	1	2	3	4	5
38. In training or competition, I can immediately be aware of emotional changes.	1	2	3	4	5
33. My mind wandering flashed by, I quickly get back to the training or competition.	1	2	3	4	5

Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001)

We want to understand some of your personal feelings in your sport. Please answer according to what really reflects your experience by circling a number next to it.

Remember, there are no right or wrong answers.

	almost never	rarely	sometimes	frequently	almost always
1. I'm accomplishing many worthwhile things in sport.	1	2	3	4	5
2. I feel so tired from my training and I have trouble finding energy to do other things.	1	2	3	4	5
3. The effort I spend in sport would be better spent doing other things.	1	2	3	4	5
4. I feel overly tired from my sport participation.	1	2	3	4	5
5. I am not achieving much in sport.	1	2	3	4	5
6. I don't care as much about my sport performance as I used to.	1	2	3	4	5
7. I am not performing up to my ability in sport.	1	2	3	4	5
8. I feel "wiped out" from sport.	1	2	3	4	5
9. I'm not into sport like I used to.	1	2	3	4	5
10. I feel physically worn out from sport.	1	2	3	4	5
11. I feel less concerned about being successful in sport than I used to.	1	2	3	4	5
12. I am exhausted by the mental and physical demands of sport.	1	2	3	4	5

- | | | | | | |
|---|---|---|---|---|---|
| 13. It seems that no matter what I do, I don't perform as well as I should. | 1 | 2 | 3 | 4 | 5 |
| 14. I feel successful at sport. | 1 | 2 | 3 | 4 | 5 |
| 15. I have negative feelings toward sport. | 1 | 2 | 3 | 4 | 5 |
-

Subjective Vitality Scale (SVS; Ryan & Frederick, 1997)

Please carefully read the following statements. Please answer according to what really reflects your experience by circling a number next to it. Remember, there are no right or wrong answers.

- | | never true | | | | | | very true |
|---|------------|---|---|---|---|---|-----------|
| 1. In my sport, I feel alive and vital. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. In my sport, I look forward to each day. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. In my sport, sometimes I am so alive I just want to burst. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. In my sport, I have energy and spirit. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. In my sport, I nearly always feel awake and alert. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. In my sport, I feel energized. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
-

International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007)

The following statements relate to the way you have felt in general over the past week.

Please indicate the extent to which you have experienced the following emotions over the past week.

		Never				Always
1	Upset	1	2	3	4	5
2	Hostile	1	2	3	4	5
3	Alert	1	2	3	4	5
4	Ashamed	1	2	3	4	5
5	Inspired	1	2	3	4	5
6	Nervous	1	2	3	4	5
7	Determined	1	2	3	4	5
8	Attentive	1	2	3	4	5
9	Afraid	1	2	3	4	5
10	Active	1	2	3	4	5

Sport Enjoyment Scale (SE; Scanlan et al., 1993)

Please carefully read the following statements. Please answer according to what really reflects your experience by circling a number next to it. Remember, there are no right or wrong answers.

		not at all	very much

- | | | | | | |
|--|----------|----------|----------|----------|----------|
| 1. Do you enjoy playing your sport? | 1 | 2 | 3 | 4 | 5 |
| 2. Are you happy playing your sport? | 1 | 2 | 3 | 4 | 5 |
| 3. Do you have fun playing your sport? | 1 | 2 | 3 | 4 | 5 |
| 4. Do you like playing your sport? | 1 | 2 | 3 | 4 | 5 |
-

Sport Competition Anxiety Test (SCAT; Martens, Vealey, & Burton, 1990)

Read each statement below, decide if you "Rarely", "Sometimes" or "Often" feel this way when competing in your sport, tick the appropriate box to indicate your response.

- | | Rarely | Sometimes | Often |
|---|----------------------------|----------------------------|----------------------------|
| 1、Competing against others is socially enjoyable. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 2、Before I compete I feel uneasy. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 3、Before I compete I worry about not performing well. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 4、I am a good sportsman when I compete. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 5、When I compete, I worry about making mistakes. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 6、Before I compete I am calm. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 7、Setting a goal is important when competing. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 8、Before I compete I get a queasy feeling in my stomach. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 9、Just before competing, I notice my heart beats faster than usual. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 10、I like to compete in games that demand a lot of physical energy. | | | |

- | | | | |
|--|----------------------------|----------------------------|----------------------------|
| | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 11 、 Before I compete I feel relaxed. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 12 、 Before I compete I am nervous. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 13 、 Team sports are more exciting than individual sports. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 14 、 I get nervous wanting to start the game. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |
| 15 、 Before I compete I usually get uptight. | A <input type="checkbox"/> | B <input type="checkbox"/> | C <input type="checkbox"/> |

Study 5

Final Revised Pool of 16 AMQ items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5			
never true	rarely true	sometimes true	often true	always true			
1. I can maintain my attention on the training.			1	2	3	4	5
3. I can accept the unpleasant thoughts and feelings in training or competition.			1	2	3	4	5
2. I can be aware of that my emotion in training or competition influences my thinking and behavior.			1	2	3	4	5
14. When something unexpected happens during training or competition, I am aware of my emotion state.			1	2	3	4	5
4. When I find myself distracted, I gently bring the attention to the training.			1	2	3	4	5
21. When the training or competition doesn't go well, I can be aware of my inner frustration and restlessness.			1	2	3	4	5
7. In training or competition, no matter good or bad, I can accept myself.			1	2	3	4	5
26. In training or competition, I can let go the emotions brought by			1	2	3	4	5

negative events in life.					
20. I can easily sustain my attention on the competition.	1	2	3	4	5
28. When I feel muscular pain in training, I still can maintain attention on things I should do.	1	2	3	4	5
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	1	2	3	4	5
27. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.	1	2	3	4	5
29. In training or competition, no matter each thought and feeling is comfortable or not, I will accept all of them.	1	2	3	4	5
33. My mind wandering flashed by, I quickly get back to the training or competition.	1	2	3	4	5
38. In training or competition, I can immediately be aware of emotional changes.	1	2	3	4	5
31. Even though some thinking and feelings in training or competition are unpleasant or miserable, I can get along with them peacefully.	1	2	3	4	5

Questionnaire items used in Part II of Chapter 3

Study 1

Open-ended questions on athletes' decentering experiences in training and competition

Decentering refers to athletes are capable of viewing the thoughts and emotions emerged in training and competition as transient, objective events, rather than a true reflection of self. Specifically, decentering comprised two components: (a) the capacity for viewing one's self as not synonymous with one's thoughts; and (b) the capacity for not to habitually react to one's negative experiences.

Based on the experiences in your training and competition, please describe the real feelings of your own with regard to the following two aspects.

1. Viewing one's self as not synonymous with one's thoughts refers to athlete is capable of distinguish of his or her thoughts from the self, viewing thoughts as temporary, objective events in mind. In other words, you are able to realize that thoughts are not the fact, thoughts are just thoughts, and "your thoughts" does not represent "yourself". Please describe your experiences of distinguishing your thoughts from yourself in training and competition.

1a. In what kind of situation or condition, you can distinguish your thoughts from yourself.

1b. In what kind of situation or condition, you fail to distinguish your thoughts from yourself.

2. Not to habitually react to one's negative experiences refers to athlete not to react to negative experiences (i.e., negative thinking and emotions) in a habitual way. Please describe your experiences of not to habitually react to the negative experiences in training and competition.

2a. In what kind of situation or condition, you are able to not to habitually react to the negative experiences.

2b. In what kind of situation or condition, you fail to not to habitually react to the negative experiences.

Initial Pool of 49 DSS Items

Please indicate the extent to which you find each statement clear in terms of its meaning and wording.

In training or competition.....	Not at all clear			Neutral			Extremely Cleary
1. I remind myself the thinking and ideas are not truth.	1	2	3	4	5	6	7
2. I notice that I do not take the difficulty personally.(R)	1	2	3	4	5	6	7
3. I can clearly distinguish myself from the thinking and emotion. (R)	1	2	3	4	5	6	7
4. I feel that I can fully be aware of all activities happened around me and inside my body.	1	2	3	4	5	6	7
5. I actually can realize that the thoughts and ideas are not equal to myself.	1	2	3	4	5	6	7
6. I consciously experience the physical feeling as a whole. (R)	1	2	3	4	5	6	7
7. I view the emerged things from a wilder perspective.	1	2	3	4	5	6	7
8. I clearly realize that myself is independent	1	2	3	4	5	6	7

from all kinds of thoughts and feelings.							
9. I notice that all kinds of thoughts and ideas are just how my mind thinks, not the true reflection the situation. (R)	1	2	3	4	5	6	7
10. I notice that all kinds of thoughts and feelings are temporary, not the truth. (R)	1	2	3	4	5	6	7
11. I notice that I felt overwhelmed to some situations just because of my thoughts and feelings, not how I am. (R)	1	2	3	4	5	6	7
12. I think my thoughts are the truths or what I think is right.	1	2	3	4	5	6	7
13. I experience the feeling of a thought or idea stayed in my mind for a short moment and then disappears. (R)	1	2	3	4	5	6	7
14. Failure makes me repeatedly thinking what the problem with me is. (R)	1	2	3	4	5	6	7
15. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person. (R)	1	2	3	4	5	6	7
16. I notice that the agitated mood or negative thinking is not who I am or what it really look	1	2	3	4	5	6	7

like. (R)							
17. I realize that conjecture and analysis of the competition result is just my thinking and ideas, which will make the competition more complicated. (R)	1	2	3	4	5	6	7
18. When there is thinking on win or lose, I can immediately put it aside and realize that it's just how I think this way.	1	2	3	4	5	6	7
19. I can easily be caught in the negative thinking and cause myself unhappy.	1	2	3	4	5	6	7
20. When consecutively making the same or similar mistakes, I will strongly doubt my real skill and ability. (R)	1	2	3	4	5	6	7
21. I notice that what I think that I cannot hold on is just a thinking and idea, and this is not necessarily the truth. (R)	1	2	3	4	5	6	7
22. When the training performance is bad all the time, I cannot distinguish whether I am supposed to be like this or I do not do well on some aspects.	1	2	3	4	5	6	7
23. I remind myself that although I can feel the good or bad state, the truth situation might not	1	2	3	4	5	6	7

be like this. (R)							
24. I have a feeling of useless when I cannot practice it right no matter how I try.	1	2	3	4	5	6	7
25. Although I am aware of the negative thinking and ideas, I still cannot refrain from being affected. (R)	1	2	3	4	5	6	7
26. I can be aware of the negative thinking and ideas and jump off from it.	1	2	3	4	5	6	7
27. When I feel down, I don't know why others cannot understand me.	1	2	3	4	5	6	7
28. When there is a divergence between my judgment and coach's judgment, I will follow my own thinking and ideas. (R)	1	2	3	4	5	6	7
29. I can clearly distinguish the truth from the suddenly emerged thinking, and let it quickly pass away. (R)	1	2	3	4	5	6	7
30. When the critics of coach make me feel uncomfortable, I think coach belittle me all the time and take it personally against me.	1	2	3	4	5	6	7
31. When the judge makes wrong decision on my/our side, I think the judge is deliberately against me/us.	1	2	3	4	5	6	7

32. When making mistakes or being embarrassed because of making a fool of myself, I am immersed in the idea that I can never be an outstanding athlete.	1	2	3	4	5	6	7
33. When confronting pressure, I can slow down my thinking.	1	2	3	4	5	6	7
34. I will not be easily taken away by my thinking and emotions. (R)	1	2	3	4	5	6	7
35. I can react to difficulties with calm. (R)	1	2	3	4	5	6	7
36. I can observe but not immersed in the unpleasant emotions. (R)	1	2	3	4	5	6	7
37. I can pull myself out of the annoying thinking or images without being controlled. (R)	1	2	3	4	5	6	7
38. When difficulties arise, I can let myself not immediately show any emotion reactions.	1	2	3	4	5	6	7
39. I can just be aware of the annoying thoughts or images, without show any reactions immediately. (R)	1	2	3	4	5	6	7
40. I can step back to view the annoying thoughts or images, without being rolled away. (R)	1	2	3	4	5	6	7

41. I can be aware of the annoying thoughts or images without becoming entangled in them. (R)	1	2	3	4	5	6	7
42. When the annoying thoughts or images appear, I will calm down soon. (R)	1	2	3	4	5	6	7
43. When facing the unfair or unreasonable decisions of the judge, I cannot refrain from the anger.	1	2	3	4	5	6	7
44. When coach makes some instructions that seem incorrect or unreasonable, I will feel uncomfortable immediately. (R)	1	2	3	4	5	6	7
45. When lose the game, I am very disappointed with myself.	1	2	3	4	5	6	7
46. When negative emotions appear, I will automatically follow it.	1	2	3	4	5	6	7
47. When major problems happen, it takes me a long time to get over.	1	2	3	4	5	6	7
48. I lose control of being affected by the negative thoughts and ideas on my emotions. (R)	1	2	3	4	5	6	7
49. Even in the competition full of pressure, I can feel the peaceful moment. (R)	1	2	3	4	5	6	7

Study 2

Revised Pool of 24 DSS Items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5	
never true	rarely true	sometimes true	often true	always true	
In training or competition					
1. I notice that I do not take the difficulty personally.	1	2	3	4	5
2. I can pull myself out of the annoying thinking or images without being controlled.	1	2	3	4	5
3. I notice that all kinds of thoughts and ideas are just how my mind thinks, not the true reflection the situation.	1	2	3	4	5
4. I will not be easily taken away by my thinking and emotions.	1	2	3	4	5
5. I can distinguish the thoughts which are objective reflections from those which are my personal thinking.	1	2	3	4	5
6. I can just be aware of the annoying thoughts or images, without show any reactions immediately.	1	2	3	4	5
7. I notice that all kinds of thoughts and feelings are temporary, not the truth.	1	2	3	4	5
8. I experience the feeling of a thought or idea stayed in my mind for a	1	2	3	4	5

short moment and then disappears.					
9. I can observe but not immersed in the unpleasant emotions.	1	2	3	4	5
10. Failure makes me repeatedly thinking what the problem with me is.	1	2	3	4	5
11. I remind myself that although I can feel the good or bad state, the truth situation might not be like this.	1	2	3	4	5
12. When the annoying thoughts or images appear, I will calm down soon.	1	2	3	4	5
13. When consecutively making the same or similar mistakes, I will strongly doubt my real skill and ability.	1	2	3	4	5
14. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person.	1	2	3	4	5
15. I lose control of being affected by the negative thoughts and ideas on my emotions.	1	2	3	4	5
16. Although I am aware of the negative thinking and ideas, I still cannot refrain from being affected.	1	2	3	4	5
17. I notice that I felt overwhelmed to some situations just because of my thoughts and feelings, not how I am.	1	2	3	4	5
18. I can be aware of the annoying thoughts or images without becoming entangled in them.	1	2	3	4	5
19. I notice that the agitated mood or negative thinking is not who I am or what it really look like.	1	2	3	4	5

20. I can react to difficulties with calm.	1	2	3	4	5
21. I realize that conjecture and analysis of the competition result is just my thinking and ideas, which will make the competition more complicated.	1	2	3	4	5
22. I can step back to view the annoying thoughts or images, without being rolled away.	1	2	3	4	5
23. I notice that what I think that I cannot hold on is just a thinking and idea, and this is not necessarily the truth.	1	2	3	4	5
24. I can clearly distinguish the truth from the suddenly emerged thinking, and let it quickly pass away.	1	2	3	4	5

Study 3

Revised Pool of 13 DSS Items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5	
never true	rarely true	sometimes true	often true	always true	
In training or competition.....					
2. I can pull myself out of the annoying thinking or images without being controlled.	1	2	3	4	5
5. I can distinguish the thoughts which are objective reflections from those which are my personal thinking.	1	2	3	4	5
4. I will not be easily taken away by my thinking and emotions.	1	2	3	4	5
7. I notice that all kinds of thoughts and feelings are temporary, not the truth.	1	2	3	4	5
9. I can observe but not immersed in the unpleasant emotions.	1	2	3	4	5
6. I can just be aware of the annoying thoughts or images, without show any reactions immediately.	1	2	3	4	5
11. I remind myself that although I can feel the good or bad state, the truth situation might not be like this.	1	2	3	4	5
12. When the annoying thoughts or images appear, I will calm down	1	2	3	4	5

soon.					
14. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person.	1	2	3	4	5
18. I can be aware of the annoying thoughts or images without becoming entangled in them.	1	2	3	4	5
19. I notice that the agitated mood or negative thinking is not who I am or what it really look like.	1	2	3	4	5
20. I can react to difficulties with calm.	1	2	3	4	5
23. I notice that what I think that I cannot hold on is just a thinking and idea, and this is not necessarily the truth.	1	2	3	4	5

Study 4

Final Revised Pool of 12 DSS Items

The following statements relate to your general experiences in training and competition.

Please indicate how much you agree or disagree with each statement based on your true feelings. Remember, there are no right or wrong answers, and just be honest. Please use the following scale to make your choice.

1	2	3	4	5	
never true	rarely true	sometimes true	often true	always true	
In training or competition.....					
2. I can pull myself out of the annoying thinking or images without being controlled.	1	2	3	4	5
5. I can distinguish the thoughts which are objective reflections from those which are my personal thinking.	1	2	3	4	5
4. I will not be easily taken away by my thinking and emotions.	1	2	3	4	5
7. I notice that all kinds of thoughts and feelings are temporary, not the truth.	1	2	3	4	5
9. I can observe but not immersed in the unpleasant emotions.	1	2	3	4	5
6. I can just be aware of the annoying thoughts or images, without show any reactions immediately.	1	2	3	4	5
11. I remind myself that although I can feel the good or bad state, the truth situation might not be like this.	1	2	3	4	5
12. When the annoying thoughts or images appear, I will calm down	1	2	3	4	5

soon.					
14. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person.	1	2	3	4	5
18. I can be aware of the annoying thoughts or images without becoming entangled in them.	1	2	3	4	5
19. I notice that the agitated mood or negative thinking is not who I am or what it really look like.	1	2	3	4	5
20. I can react to difficulties with calm.	1	2	3	4	5

Content Validity Indexes

Part I of Chapter 3: AMQ

46 items rated by academic experts

	I-CVI	S-CVI/Ave
	-	0.96
1. When I find myself distracted, I gently bring the attention to the training. (M)	1.00	1.00
2. When I am about to win the competition, I still focus on the things I am doing.	1.00	1.00
3. When I feel exhausted in training, I can still sustain my attention on the things I should do. (E)	0.71	-
4. When I feel muscular pain in training, I still can maintain attention on things I should do.	0.86	1.00
5. I can easily sustain my attention on the competition.	0.86	1.00
6. I can maintain my attention on the training.	1.00	1.00
(reversed)7. My mind is occupied by the upcoming competition.	1.00	0.75
(reversed)8. In training, my mind is always occupied by other thinking, for example, the mistake I just made or the subsequent training schedule.	0.86	1.00
(reversed)9. When I feel my physical condition is not good, I cannot focus my attention on training.	1.00	1.00

(reversed)10. My mind begins to wander when the training time is long. (E)	0.71	-
11. My mind wandering flashed by, I quickly get back to the training or competition. (M)	1.00	1.00
12. In training or competition, I am able to be aware of my emotion influences my thinking and behavior.	0.86	1.00
13. When something unexpected happens during training or competition, I am aware of my emotion state.	1.00	1.00
14. In training or competition, I can be aware of the ideas flashing through my mind.	1.00	1.00
15. In competition, I can be aware of the degree of nervousness in my body. (E)	0.71	-
16. In competition, I can be aware of the degree of anxiety and excitement. (E)	0.71	-
17. In training or competition, I can immediately be aware of my attention has been distracted.	1.00	1.00
18. When things are going very well in competition, I can be aware of the excitement.	0.86	1.00
19. When I feel uncomfortable in training, I can clearly be aware of where it is. (E)	0.71	-
20. I can easily figure out my thinking and emotion in training or competition.	1.00	0.75

21. When exchange with coach or teammates, I can be aware of their facial expression and body language.	1.00	1.00
22. When the competition process is totally out of expectation, I can be aware of my physical reaction and change.	0.86	1.00
23. If others ask my emotion in training, I can easily confirm my emotion state.	1.00	1.00
24. When situation changes in the competition, I can be aware of what thinking and ideas flashed across.	1.00	1.00
25. I can be aware of the changes inside my body in competition, for example my heart beat faster or my muscle becomes stiff.	1.00	1.00
26. In training or competition, I can be aware of my emotion.	1.00	1.00
27. I can be aware of the body feelings when complete my skills.	1.00	1.00
28. I can be aware of the stimulus around the competition venue, for example, the shouts and cheers of audience. (M)	0.86	0.75
29. In training or competition, I can immediately be aware of emotional changes.	1.00	1.00
(reversed) 30. In training or competition, I believe that I should not have irrational thinking. (E)	0.71	-
(reversed) 31. When I feel myself in poor condition before the competition, I believe that my performance will be affected. (E)	0.57	-
(reversed) 32. When some thinking and ideas emerged in training or competition, I will tell myself I should not think that.	0.86	0.75

33. Whether it makes me comfortable or not, I will accept every thinking and feeling in training or competition. (M)	1.00	1.00
34. In training or competition, I can accept the self at that moment.	1.00	1.00
35. Even though some thinking and feelings in training or competition are unpleasant or miserable, I can get along with them peacefully.	1.00	1.00
36. In training or competition, I will accept unpleasant thinking and feelings.	1.00	1.00
(reversed) 37. I try to avoid annoying thinking and ideas in training or competition.	1.00	1.00
(reversed) 38. When there are unpleasant emotions in training or competition, I try to distract my attention to make myself feel better.	1.00	1.00
(reversed) 39. There are some respects in training or competition I would rather not to think about. (E)	0.57	-
(reversed) 40. In training or competition, I tell myself that I should not have some thinking. (M)	1.00	1.00
(reversed) 41. I try to not thinking about some certain things in training or competition. (E)	0.57	-
(reversed) 42. I try to distract or divert attention to make the bad memories in training or competition to disappear.	0.86	1.00
(reversed) 43. In training, I feel irritable because I cannot find the right feelings all the time. (M)	1.00	0.75

44. In competition, I will take the judge's decision as an established fact. (M)	1.00	0.75
(reversed) 45. In training or competition, I think that I should not be affected by negative emotions.	0.86	1.00
(reversed) 46. When I feel my physical condition is in bad condition, I think the subsequent training will not be good. (E)	0.57	-
(suggested by experts)(reversed) When I am distracted in training or competition, it will take very long time to get back.	-	1.00
(suggested by experts)(reversed) Even the training or competition has already started, I still cannot let go the problems I met in daily life.	-	1.00

Note: Ten items displayed CVIs of .71 or below and were thus deemed to be invalid, and they were eliminated (E) in the reevaluation by part of experts. All the remaining items exhibited CVIs ranging from .86 to 1.00 and were thus retained. In line with suggestions made by the experts, the wording of 7 items was slightly modified (M) to ensure that the items clearly tapped mindfulness in sport context. In addition, two items were added based on the suggestions of experts.

Part II of Chapter 3: DSS

28 items rated by academic experts

	I-CVI	S-CVI/Ave
In training or competition.....	-	0.98
1. I notice that I do not take the difficulty personally. (M)	1.00	1.00
2. I can clearly distinguish myself from the thinking and emotion. (E)	0.71	-
3. I consciously experience the physical feeling as a whole. (E)	0.43	-
4. I notice that all kinds of thoughts and ideas are just how my mind thinks, not the true reflection the situation. (M)	0.86	1.00
5. I notice that all kinds of thoughts and feelings are temporary, not the truth.	1.00	1.00
6. I notice that I felt overwhelmed to some situations just because of my thoughts and feelings, not how I am.	1.00	1.00
7. I experience the feeling of a thought or idea stayed in my mind for a short moment and then disappears.	1.00	1.00
(reversed)8. Failure makes me repeatedly thinking what the problem with me is.	0.86	0.50
9. I notice the passive thinking style when I confront the difficulty and pressures, while at the same time understand that I am not a passive person.	1.00	1.00

10. I notice that the agitated mood or negative thinking is not who I am or what it really look like. (M)	0.86	1.00
11. I realize that conjecture and analysis of the competition result is just my thinking and ideas, which will make the competition more complicated.	1.00	1.00
(reversed) 12. When consecutively making the same or similar mistakes, I will strongly doubt my real skill and ability.	1.00	1.00
13. I notice that what I think that I cannot hold on is just a thinking and idea, and this is not necessarily the truth.	0.86	1.00
14. I remind myself that although I can feel the good or bad state, the true situation might not be like this. (M)	1.00	1.00
(reversed) 15. When there is a divergence between my judgment and coach's judgment, I will follow my own thinking and ideas. (E)	0.43	-
16. I can clearly distinguish the truth from the suddenly emerged thinking, and let it quickly pass away.	1.00	1.00
(reversed) 17. Although I am aware of the negative thinking and ideas, I still cannot refrain from being affected. (M)	1.00	1.00
18. I will not be easily taken away by my thinking and emotions.	1.00	1.00
19. I can react to difficulties with calm.	1.00	1.00
20. I can observe but not immersed in the unpleasant emotions.	1.00	1.00
21. I can pull myself out of the annoying thinking or images without being controlled.	1.00	1.00

22. I can just be aware of the annoying thoughts or images, without show any reactions immediately.	1.00	1.00
23. I can step back to view the annoying thoughts or images, without being rolled away.	1.00	1.00
24. I can be aware of the annoying thoughts or images without becoming entangled in them.	1.00	1.00
25. When the annoying thoughts or images appear, I will calm down soon.	1.00	1.00
(reversed) 26. When coach makes some instructions that seem incorrect or unreasonable, I will feel uncomfortable immediately. (E)	0.71	-
(reversed) 27. I lose control of being affected by the negative thoughts and ideas on my emotions. (M)	1.00	1.00
28. Even in the competition full of pressure, I can feel the peaceful moment. (E)	0.71	-
(suggested by experts) I can distinguish the thoughts which are objective reflections from those which are my personal thinking.	-	1.00

Note: Five items displayed CVIs of .71 or below and were thus deemed to be invalid, and they were eliminated (E) in the reevaluation by part of experts. All the remaining items exhibited CVIs ranging from .86 to 1.00 and were thus retained. In line with suggestions made by the experts, the wording of 6 items was slightly modified (M) to ensure that the items clearly tapped decentering in sport context. In addition, one item was added based on the suggestions of experts.

APPENDICES (Chinese Version)

第 3 章第 1 部分中所使用的問卷

研究 1

運動員訓練和比賽中的正念訪談提綱

正念，指的是運動員能夠在訓練和比賽中將自己的注意力維持在當下，能夠意識到正在發生的事情，並且抱著一種接受及不加評判的態度。

請根據你在訓練和比賽中的經驗，針對下面三個方面描述你個人的真實感受。

1. 當下的注意力，是指運動員將注意力維持在當下的技術動作或訓練、比賽任務中，並且能夠在注意力出現遊離的時候讓注意力重新回到當下。請描述一下你在訓練和比賽時自己的注意力情況。

1a. 你能夠將注意力維持在當下是在什麼樣的情況或條件下。

1b. 你沒有辦法將注意力維持在當下是在什麼樣的情況或條件下。

2. 覺知，指的是運動員能夠意識到訓練和比賽中外界的刺激（即，氣溫、場館以及觀眾等）以及自己的身體狀況、出現的想法以及情緒反應。請描述一下你在訓練和比賽時意識到的身體狀況、出現的想法和情緒反應的情況。

2a. 你能夠意識到自己的身體狀況、出現的想法和情緒反應是在什麼樣的情況或條件下。

2b. 你沒有辦法意識到自己的身體狀況、出現的想法和情緒反應是在什麼樣的情況或條件下。

3. 接受，指的是運動員能夠全然接受外界的各種刺激以及自己的身體狀況、各種念頭和情緒反應，不評判它們的好壞對錯。請描述一下你在訓練和比賽時自己能夠接受自己的不同身體狀況、各種念頭或任何情緒反應，不去評判它們的好壞對錯的情況。

3a. 你能夠全然接受自己的不同身體狀況、各種念頭或任何情緒反應，不評判它們的好壞對錯是在什麼樣的情況或條件下。

3b. 你沒有做到全然接受自己的身體狀況、各種念頭和情緒反應，有去評判好壞對錯是在什麼樣的情況或條件下。

運動員正念量表題目庫 87 條

請根據你的實際經驗，評價以下表述是否適用於競技運動中的情況。

	適用 ←————→ 不適用	
1. 訓練時，我常常會做白日夢或想其他的事情。		
2. 我由於一直在想跟訓練無關的事情把整堂訓練課都給搞砸了。		
3. 我只是想趕緊結束訓練，並沒有真正將注意力放在訓練上。		
4. 比賽時，我將自己的全部注意力集中在想要達到的目標上以至於忽略了當下最應該做的事情上。		
5. 訓練時，雖然自己的耳朵在聽教練的指導但是腦子裡卻想著其他的事情。		
6. 當發現自己心不在焉時，我輕輕地將注意力重新集中在當下的訓練上。(R)		
7. 當快要贏得比賽時，我還是會專注於自己正在做的事情上。(R)		
8. 我在訓練時很容易分心。		
9. 我發現自己很難對當下的訓練保持專注。		
10. 當訓練中感覺特別疲勞時，我還是能夠將注意力維持在自己該做的事情上。(R)		

	適用 ←————→ 不適用	
11. 當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。(R)		
12. 即使訓練或比賽時讓人心煩的想法和念頭已經沒有了，我還是會不停地思考它們。		
13. 我能夠很容易地將注意力集中在當下的比賽上。(R)		
14. 我能夠將注意力集中在當下的訓練上。(R)		
15. 我能夠在很長一段時間都高度集中注意力在自己的比賽上。		
16. 我的心思會被即將到來的比賽給佔據了。(R)		
17. 在訓練中，我的一部分心思總是被其他想法佔據，比如剛才的失誤或接下來的訓練安排。(R)		
18. 訓練或比賽失誤時，我會一直在想自己剛才是怎麼失誤的。		
19. 當訓練中感到身體狀態不好時，我的注意力會不太集中。(R)		
20. 每當訓練時間比較長時，我就會開始出現走神的情況。(R)		
21. 注意力走神的情況一閃而過，我會很快回到當下的訓練或比賽中。(R)		

	適用 ←————→ 不適用	
22. 在訓練或比賽中受到外界影響後，我要很久才能回過神來。		
23. 我在生活中遇到了一些問題，以至於在訓練場上不能集中注意力。		
24. 訓練或比賽時，我能夠意識到情緒在影響自己的想法和行為。(R)		
25. 訓練或比賽時，我可能有時會體驗到一些情緒但直到後來才意識到。		
26. 我只是想趕緊完成訓練計畫，而沒有意識到在過程中體驗到了什麼。		
27. 我好像只是自動化地完成訓練計畫，而沒有意識到我究竟正在做什麼。		
28. 當訓練或比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。(R)		
29. 訓練或比賽時，我能夠意識到在腦海中掠過的念頭。(R)		
30. 我能夠意識到比賽時的身體緊張程度。(R)		
31. 我能夠意識到比賽時的焦慮或興奮程度。(R)		
32. 訓練或比賽時，我會意識到我的注意力被分散了。		

	適用 ←————→ 不適用	
33. 當訓練或比賽進行的不太順利時，我能夠立即意識到哪裡出了問題。		
34. 當比賽進行的很順利時，我能夠意識到內心的興奮。(R)		
35. 當在訓練中感到身體不適時，我能夠清楚地意識到具體是哪裡不舒服。(R)		
36. 我很容易就能搞清楚訓練或比賽時自己的想法和情緒。(R)		
37. 當在訓練中跟教練或隊友交流時，我能夠覺察到他們的面部表情和身體語言。(R)		
38. 當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。(R)		
39. 當他人在訓練中問我的心情時，我很容易就能夠確定自己當時的情緒狀況。(R)		
40. 當比賽中的情況發生變化時，我能夠意識到自己當下有哪些想法和念頭閃過。(R)		
41. 我會覺察到比賽時體內的變化，例如我的心跳變快或肌肉變得僵硬。(R)		
42. 訓練或比賽時，我能夠覺察到自己當下的情緒。(R)		

	適用 ←————→ 不適用	
43. 除非比賽時的身體緊繃或不舒服的感覺嚴重影響到了我，否則我不太容易察覺到。		
44. 我會覺察到訓練中完成技術動作時的身體感覺。(R)		
45. 我會意識到比賽場地周圍的刺激，例如觀眾的呼喊聲和加油聲。(R)		
46. 訓練或比賽時，我能夠立即意識到情緒的變化。(R)		
47. 每當我在訓練或比賽中出現失誤時，我當時就能夠清楚地意識到問題所在。		
48. 當發現我在思考之前的表現時，我批評自己沒有將注意力集中在當下的比賽上。		
49. 當我意識到自己因為在比賽中犯低級錯誤而生自己氣的時候，我會批評自己為什麼有這樣的反應。		
50. 當我意識到自己思想不集中時，我責備自己為什麼沒有將注意力放在當前的訓練上。		
51. 每當訓練中有讓自己心煩的想法或畫面時，我會根據它們是什麼來判斷自己訓練狀態的好壞。		
52. 訓練或比賽時，我認為自己不應該有非理性的想法。(R)		
53. 當比賽前感覺狀態不太好時，我覺得自己的運動表現會因此受影響。(R)		

	適用 ←————→ 不適用	
54. 訓練或比賽時，我會判斷所出現的想法的好與壞。		
55. 每當在訓練或比賽中出現讓自己心煩的想法或畫面時，我只是保持覺察並能夠放下。		
56. 訓練或比賽時，我會意識到讓人不快的想法和感受但不試圖去擺脫它們。		
57. 訓練或比賽中出現某些想法和念頭，我會告訴自己不應該這樣想。(R)		
58. 無論是否令自己感到舒服，我都會去接納訓練或比賽中的每一個想法和感受。(R)		
59. 訓練或比賽時，我能夠接受此刻的自己。(R)		
60. 訓練或比賽時，我注意到自己的錯誤和困難但不去判斷它們。		
61. 訓練或比賽時，我會對自己和其他人不耐煩。		
62. 訓練或比賽時，即使一些想法和感受是不愉快的或痛苦的，我也能夠與它們和平共處。(R)		
63. 訓練或比賽時，我會接受不愉快的想法和感受。(R)		
64. 我試圖回避訓練或比賽中讓自己心煩的想法和念頭。(R)		
65. 我嘗試僅僅去覺察訓練或比賽中讓自己心煩的想法和念頭而不去判斷好壞。		

	適用 ←————→ 不適用	
66. 當在訓練或比賽中有不愉快的情緒時，我會試圖通過分散自己的注意力來讓自己感覺好一點。(R)		
67. 訓練或比賽中的有些方面是我不願意去思考的。(R)		
68. 我試圖通過悶頭訓練的方式來阻止一些想法和情緒在心中有出現。		
69. 訓練或比賽時，我告訴自己我不應該有某些想法。(R)		
70. 我嘗試不在訓練或比賽中思考某些特定的事情。(R)		
71. 我嘗試通過分散或轉移注意力來讓自己在訓練或比賽中不好的記憶消失。(R)		
72. 訓練或比賽時，我會因為有負面的或不恰當的情緒而批評自己。		
73. 訓練或比賽時，我會因為有非理性的想法和念頭而否定自己。		
74. 訓練或比賽時，我常常會判斷自己的感覺是對的還是錯的。		
75. 我無法接受自己在比賽中出現一些可以避免的失誤。		
76. 對比賽時裁判做出的不公平或不合理的判罰，我會沒有辦法接受。		
77. 訓練或比賽時，我會對教練的批評和指導有抵觸心理。		

	適用 ←————→ 不適用	
78. 我會根據自己心情的好壞來進行訓練。		
79. 訓練時，我會因為一直找不到正確的感覺而煩躁。(R)		
80. 當我在比賽中會出現失敗的念頭時，我不會去做出任何判斷。		
81. 比賽時，我會把裁判的判罰當作既定的事實來接受。(R)		
82. 訓練或比賽時，我認為自己不應該感受到負面情緒。(R)		
83. 訓練或比賽時，我能夠接納教練帶給我的負面情緒並不受其影響。		
84. 每當在訓練或比賽中情緒低落時，我就會對教練的指導一點都聽不進去。		
85. 當訓練中身體狀態不太好時，我認為自己接下來的訓練也會練不好。(R)		
86. 每當在比賽中感覺狀態不好時，我就認為自己肯定不行了。		
87. 每當在訓練中改不好技術動作時，我就會懷疑自己的能力和水準。		

研究 2

修訂後的運動員訓練和比賽正念量表題目庫（38 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5				
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣				
1.我能夠將注意力集中在當下的訓練上。			1	2	3	4	5	
2.訓練或比賽時，我能夠意識到情緒在影響自己的想法和行為。			1	2	3	4	5	
3.訓練或比賽時，我會接受不愉快的想法和感受。			1	2	3	4	5	
4.當發現自己心不在焉時，我將注意力重新集中在當下的訓練上。			1	2	3	4	5	
5.訓練時，我會因為找不到正確的感覺而煩躁。			1	2	3	4	5	
6.當他人在訓練中問我當時的心情時，我很容易就能夠確定。			1	2	3	4	5	
7.訓練或比賽時，我能夠接受此刻的自己。			1	2	3	4	5	
8.訓練或比賽時，我能夠意識到在腦海中掠過的念頭。			1	2	3	4	5	
9.當快要贏得比賽時，我還是會專注於自己正在做的事情上。			1	2	3	4	5	
10.比賽時，我能夠做到接受裁判的判罰。			1	2	3	4	5	
11.在比賽中，我會意識到比賽場地周圍的刺激，例如觀眾的呼喊聲和加油聲。			1	2	3	4	5	
12.在訓練中，我的一部分心思總是被其他想法佔據，比如剛才的			1	2	3	4	5	

失誤或接下來的訓練安排。					
13.訓練或比賽中出現某些想法和念頭，我會告訴自己不應該這樣想。	1	2	3	4	5
14.當訓練或比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。	1	2	3	4	5
15.我會覺察到比賽時體內的變化，例如我的心跳變快或肌肉變得僵硬。	1	2	3	4	5
16.我試圖擺脫訓練或比賽中讓自己心煩的想法和念頭。	1	2	3	4	5
17.當在訓練或比賽中受到幹擾而分心時，我很難調整回來。	1	2	3	4	5
18.訓練或比賽時，我能夠覺察到自己當下的情緒。	1	2	3	4	5
19.訓練或比賽時，我告訴自己不應該有某些想法。	1	2	3	4	5
20.我能夠很容易地將注意力集中在當下的比賽上。	1	2	3	4	5
21.當比賽進行得很順利時，我能夠意識到內心的興奮。	1	2	3	4	5
22.當在訓練或比賽中有不愉快的情緒時，我會嘗試去控制或消除它。	1	2	3	4	5
23.我嘗試通過分散或轉移注意力來讓自己在訓練或比賽中不好的記憶消失。	1	2	3	4	5
24.當比賽中情況發生變化時，我能夠意識到自己當下有哪些想法和念頭閃過。	1	2	3	4	5
25.我的心思總是被即將到來的比賽給佔據著。	1	2	3	4	5

26.即使已經開始訓練或比賽了，我仍然無法放下一些生活事件帶來的情緒。	1	2	3	4	5
27.當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。	1	2	3	4	5
28.當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。	1	2	3	4	5
29.在訓練或比賽中，無論每個想法和感受是否令自己感到舒服，我都會去接納它們。	1	2	3	4	5
30.我很容易就能搞清楚訓練或比賽時自己的想法和情緒。	1	2	3	4	5
31.訓練或比賽時，即使一些想法和感受是不愉快的或痛苦的，我也能夠與它們和平共處。	1	2	3	4	5
32.當在訓練中跟教練或隊友交流時，我能夠覺察到他們的面部表情和身體語言。	1	2	3	4	5
33.注意力分散的情況一閃而過，我會很快回到當下的訓練或比賽中。	1	2	3	4	5
34.訓練或比賽時，我認為自己不應該感受到負面情緒。	1	2	3	4	5
35.當在訓練中的注意力被分散時，我能夠立刻意識到。	1	2	3	4	5
36.我會覺察到訓練中完成技術動作時的身體感覺。	1	2	3	4	5
37.當訓練中感到身體狀態不好時，我的注意力會不太集中。	1	2	3	4	5
38.訓練或比賽時，我能夠立即意識到情緒的變化。	1	2	3	4	5

研究 3

修訂後的運動員訓練和比賽正念量表題目庫（16 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5				
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣				
1. 我能夠將注意力集中在當下的訓練上。			1	2	3	4	5	
14. 當訓練或比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。			1	2	3	4	5	
13. 訓練或比賽中出現某些想法和念頭，我會告訴自己不應該這樣想。			1	2	3	4	5	
4. 當發現自己心不在焉時，我將注意力重新集中在當下的訓練上。			1	2	3	4	5	
15. 我會覺察到比賽時體內的變化，例如我的心跳變快或肌肉變得僵硬。			1	2	3	4	5	
16. 我試圖擺脫訓練或比賽中讓自己心煩的想法和念頭。			1	2	3	4	5	
9. 當快要贏得比賽時，我還是會專注於自己正在做的事情上。			1	2	3	4	5	
27. 當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。			1	2	3	4	5	

19. 訓練或比賽時，我告訴自己不應該有某些想法。	1	2	3	4	5
20. 我能夠很容易地將注意力集中在當下的比賽上。	1	2	3	4	5
24. 當比賽中情況發生變化時，我能夠意識到自己當下有哪些想法和念頭閃過。	1	2	3	4	5
22. 當在訓練或比賽中有不愉快的情緒時，我會嘗試去控制或消除它。	1	2	3	4	5
28. 當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。	1	2	3	4	5
38. 訓練或比賽時，我能夠立即意識到情緒的變化。	1	2	3	4	5
23. 我嘗試通過分散或轉移注意力來讓自己在訓練或比賽中不好的記憶消失。	1	2	3	4	5
33. 注意力分散的情況一閃而過，我會很快回到當下的訓練或比賽中。	1	2	3	4	5

接納與行動問卷(AAQ-II; Bond et al., 2011)

下面你將看到一系列的句子。請根據你最真實的感受來評估每個句子，並圈上其旁邊的數字。請使用下列的等級來做出你的選擇。

1	2	3	4	5	6			7			
從來沒有	極少這樣	很少這樣	有時這樣	經常這樣	幾乎總是這樣			總是這樣			
1. 痛苦的經驗和記憶讓我很難去過一種我覺得有價值的生活。					1	2	3	4	5	6	7
2. 我自己的感覺讓我感到害怕。					1	2	3	4	5	6	7
3. 我擔心無法控制自己的憂慮和感受。					1	2	3	4	5	6	7
4. 痛苦的記憶阻礙我擁有充實的生活。					1	2	3	4	5	6	7
5. 情緒給我的生活帶來問題。					1	2	3	4	5	6	7
6. 好像大多數人都能夠比我更好地處理自己的生活。					1	2	3	4	5	6	7
7. 憂慮阻礙我的成功。					1	2	3	4	5	6	7

訓練比賽滿意感量表(張力為 & 梁展鵬, 2002)

以下句子，與您對訓練比賽的感受有關，您可能同意或不同意，請在每一題旁圈一數字以表示你贊成的程度。1 代表你完全不同意該句，7 代表你完全同意該句，其他數字代表 1 與 7 之間的不同程度。

1	2	3	4	5	6	7
---	---	---	---	---	---	---

完全不同意								完全同意		
1. 在很多方面，我的訓練和比賽情況都接近理想。				1	2	3	4	5	6	7
2. 我的訓練和比賽在各方面都很好。				1	2	3	4	5	6	7
3. 我對訓練和比賽感到滿意。				1	2	3	4	5	6	7
4. 現在我已得到了訓練和比賽中最重要的東西。				1	2	3	4	5	6	7
5. 總的來說，到現在為止，我的訓練比賽遭透了。				1	2	3	4	5	6	7
6. 如果可以再選擇一次，我仍希望像現在一樣繼續訓練和比賽。				1	2	3	4	5	6	7

正念意識注意量表(MAAS; Brown & Ryan, 2003)

下面 15 題，是關於你每天經驗的描述。用 1-6 數值來代表通常情況下每個經驗的發生頻率，請按照你真實的體驗來回答而不是你認為應該是什麼體驗，任何答案都沒有好壞對錯之分。但要按照順序依次回答每個問題，不能前後參考。

1	2	3	4	5	6				
幾乎總有	非常頻繁	有點頻繁	不太頻繁	很不頻繁	幾乎沒有				
1. 我有時可能正體驗到一些情緒但直到後來才意識到。				1	2	3	4	5	6
2. 由於粗心沒注意或想別的事情，我把事情弄糟了。				1	2	3	4	5	6
3. 我很難集中在當下正在發生的事情。				1	2	3	4	5	6
4. 我傾向於快速到達要去的地方，而沒有注意到路上的體驗。				1	2	3	4	5	6

5. 我傾向於不關注身體緊張或不舒服的感覺，除非它真正佔據了我的注意力。	1	2	3	4	5	6
6. 別人第一次告訴我名字，我幾乎就忘了。	1	2	3	4	5	6
7. 我好像是“自動化地運轉著”，沒有特別意識到我正在做的事情。	1	2	3	4	5	6
8. 我趕緊做事，沒有真正注意到正在做的事情。	1	2	3	4	5	6
9. 我非常專注在我想達到的目標上以至於忽略了我現在正在做的事情，儘管這些事情能幫我達到目標。	1	2	3	4	5	6
10. 我自動化式地工作或完成任務，沒有意識到我正在做什麼。	1	2	3	4	5	6
11. 我發現自己用一個耳朵聽別人說話，同時還在做別的事。	1	2	3	4	5	6
12. 我好像自動駕駛到了某地，然後很驚訝為什麼來這兒。	1	2	3	4	5	6
13. 我發現自己被未來或過去佔據了。	1	2	3	4	5	6
14. 我發現自己做事不專心。	1	2	3	4	5	6
15. 我吃零食時沒有意識到我正在吃。	1	2	3	4	5	6

簡化特質流暢量表(SDFS; Jackson, Martin, & Eklund, 2008)

請根據你在訓練或比賽中的體驗回答下列問題。這些問題與你在訓練或比賽中可能體驗到的想法和感受有關。你可能有時、總是或者從未體驗到過這些特徵。答案無

對錯之分。回想一下你在訓練或比賽中體驗每一特徵的頻率，在與你的體驗最匹配的數位上畫圈。

1	2	3	4	5	
從未	很少	有時	經常	總是	
一般而言，當訓練或比賽時：					
1. 我感覺自己的能力足夠滿足情境的要求。	1	2	3	4	5
2. 我的行動是出於本能和自動的，而不必去想。	1	2	3	4	5
3. 我清楚地意識到自己想要做什麼。	1	2	3	4	5
4. 從事任務/活動時，我很清楚自己的表現如何。	1	2	3	4	5
5. 我全神貫注於當前的任務。	1	2	3	4	5
6. 我對正在進行的活動有完全的控制感。	1	2	3	4	5
7. 我不擔心別人可能會怎樣看待自己。	1	2	3	4	5
8. 時間過得和平常不一樣。	1	2	3	4	5
9. 這種體驗是一種最好的獎勵。	1	2	3	4	5

研究 4

修訂後的運動員訓練和比賽正念量表題目庫（12 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5					
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣					
1. 我能夠將注意力集中在當下的訓練上。			1	2	3	4	5		
14. 當訓練或比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。			1	2	3	4	5		
13. 訓練或比賽中出現某些想法和念頭，我會告訴自己不應該這樣想。			1	2	3	4	5		
4. 當發現自己心不在焉時，我將注意力重新集中在當下的訓練上。			1	2	3	4	5		
16. 我試圖擺脫訓練或比賽中讓自己心煩的想法和念頭。			1	2	3	4	5		
27. 當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。			1	2	3	4	5		
19. 訓練或比賽時，我告訴自己不應該有某些想法。			1	2	3	4	5		
20. 我能夠很容易地將注意力集中在當下的比賽上。			1	2	3	4	5		
24. 當比賽中情況發生變化時，我能夠意識到自己當下有哪些想法			1	2	3	4	5		

和念頭閃過。					
28. 當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。	1	2	3	4	5
38. 訓練或比賽時，我能夠立即意識到情緒的變化。	1	2	3	4	5
33. 注意力分散的情況一閃而過，我會很快回到當下的訓練或比賽中。	1	2	3	4	5

運動員倦怠問卷 (ABQ; Raedeke & Smith, 2001)

我們想要瞭解，在你從事的運動專項中，你的一些個人感受。請仔細閱讀以下題目，根據你自己的真實感受圈出最適合你的數字，回答無對錯之分。

	從 來 沒 有	很 少	有 時	經 常	總 是
1. 在我的運動中，我正在完成一些有價值的事情。	1	2	3	4	5
2. 訓練使我感到很疲倦以至沒有精力去做其他的事。	1	2	3	4	5
3. 我花在運動上的努力如果用來做其他的事可能會更好。	1	2	3	4	5
4. 我的運動讓我感到極度疲勞。	1	2	3	4	5
5. 我的運動成績不佳。	1	2	3	4	5
6. 我不再像以前那樣關心我的運動表現了。	1	2	3	4	5
7. 我無法展現我的運動水準。	1	2	3	4	5
8. 我感覺我快要垮掉了。	1	2	3	4	5
9. 我不像以前那樣投入了。	1	2	3	4	5
10. 我感覺體力不支。	1	2	3	4	5
11. 我不再像以前那樣關注我在運動方面的成功與否了。	1	2	3	4	5
12. 我感到運動使我身心疲憊。	1	2	3	4	5
13. 好像不管我做什麼，我都無法表現出我該有的水準。	1	2	3	4	5

- | | | | | | |
|---------------------|---|---|---|---|---|
| 14. 我在運動方面是成功的。 | 1 | 2 | 3 | 4 | 5 |
| 15. 對我的運動專項，我有抵觸情緒。 | 1 | 2 | 3 | 4 | 5 |
-

主觀活力量表 (SVS; Ryan & Frederick, 1997)

請仔細閱讀以下題目，根據你的真實感受圈出最適合你的數字，回答無對錯之分。

	完						非
	全						常
	不						真
	真						實
	實						實
1. 在我的運動中，我覺得充滿活力和生機。	1	2	3	4	5	6	7
2. 在我的運動中，我覺得充滿活力並想要釋放它。	1	2	3	4	5	6	7
3. 在我的運動中，我覺得精力充沛。	1	2	3	4	5	6	7
4. 在我的運動中，我幾乎時刻都保持著機警和清醒。	1	2	3	4	5	6	7
5. 在我的運動中，我感覺能量十足。	1	2	3	4	5	6	7
6. 在我的運動中，我很努力的嘗試各種活動。	1	2	3	4	5	6	7

簡版正負情感量表(I-PANAS-SF; Thompson, 2007)

以下是十條描述個人情感/情緒的形容詞。請回想一下在過去的一周裡，你通常的感覺如何？請根據你的感覺，圈出最適合你的數字。

	從來沒有					經常
1 沮喪的	1	2	3	4	5	
2 敵意的	1	2	3	4	5	
3 警覺的	1	2	3	4	5	
4 羞愧的	1	2	3	4	5	
5 受鼓舞的	1	2	3	4	5	
6 緊張的	1	2	3	4	5	
7 堅定的	1	2	3	4	5	
8 專注的	1	2	3	4	5	
9 害怕的	1	2	3	4	5	
10 活躍的	1	2	3	4	5	

運動享受量表 (SE; Scanlan et al., 1993)

請仔細閱讀以下題目，根據你自己的真實感受圈出最適合你的數字，回答無對錯之分。

	根	非
	本	常

不

1. 你享受你的運動項目嗎？	1	2	3	4	5
2. 從事你當前從事的運動對你來說快樂嗎？	1	2	3	4	5
5. 你覺得你的運動專項有趣嗎？	1	2	3	4	5
6. 你喜歡你當前從事的運動專項嗎？	1	2	3	4	5

運動競賽焦慮量表 (SCAT; Martens, Vealey, & Burton, 1990)

按下列 15 個問題，請描述您參加運動競賽時的自我感覺狀態，其中每一題均有三個答案供選擇其一。假如您選擇的是“幾乎沒有”請在 A 後方框內劃“√”號；假如您選擇的是“有時有”，請在 B 後面方框劃“√”；假如您選擇的是“經常有”，請在 C 後面方框內劃“√”。您所回答的 A，B，C 並無對錯之分，希望您不要對問卷解答花費太多時間，根據您當時的心理自我感覺作認真的回答。

	幾乎沒有	有時有	經常有
1、我與競爭對手競爭時快樂。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
2、我在賽前會感到不安。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
3、我在賽前因擔心而無法好好參賽。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
4、我在比賽時是一名很好的運動員。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
5、我在競賽時會擔心失誤。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>
6、我在比賽前不慌不忙。	A <input type="checkbox"/>	B <input type="checkbox"/>	C <input type="checkbox"/>

- 7、參加比賽制定目標極為重要。 A B C
- 8、我在比賽前有反胃感覺。 A B C
- 9、賽前我發現心臟跳得比來時快。 A B C
- 10、我喜歡身體能量的比賽。 A B C
- 11、賽前我感覺放鬆。 A B C
- 12、賽前我會變成神經質。 A B C
- 13、集體運動項目比個人運動項目使我更興奮。 A B C
- 14、我很神經敏銳地等待比賽的開始。 A B C
- 15、在比賽前我常會過度緊張。 A B C

研究 5

最後修訂後的運動員訓練和比賽正念量表題目庫（17 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5				
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣				
1. 我能夠將注意力集中在當下的訓練上。			1	2	3	4	5	
3. 我能夠接納訓練或比賽中不愉快的想法和感受。			1	2	3	4	5	
2. 我能夠意識到訓練或比賽時的情緒在影響自己的想法和行為。			1	2	3	4	5	
14. 當訓練或比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。			1	2	3	4	5	
5. 訓練或比賽時，我會接納找不到正確的技術動作感覺的挫折和煩躁感。			1	2	3	4	5	
4. 當發現自己心不在焉時，我將注意力重新集中在當下的訓練上。			1	2	3	4	5	
21. 當訓練或比賽很不順利時，我能夠意識到內心的挫折和煩躁感。			1	2	3	4	5	
7. 訓練或比賽時，無論表現好壞，我都會接納自己。			1	2	3	4	5	
26. 訓練或比賽時，我能夠做到放下生活中的負面事件帶來的情			1	2	3	4	5	

緒。					
20. 我能夠很容易地將注意力集中在當下的比賽上。	1	2	3	4	5
28. 當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。	1	2	3	4	5
24. 當訓練或比賽中情況發生變化時，我能夠意識到自己當下有哪些想法和念頭閃過。	1	2	3	4	5
27. 當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。	1	2	3	4	5
29. 訓練或比賽時，無論每個想法和感受是否令自己感到舒服，我都會去接納它們。	1	2	3	4	5
33. 注意力分散的情況一閃而過，我會很快回到當下的訓練或比賽中。	1	2	3	4	5
38. 訓練或比賽時，我能夠立即意識到情緒的變化。	1	2	3	4	5
31. 訓練或比賽時，即使一些想法和感受是不愉快的或痛苦的，我也能夠與它們和平共處。	1	2	3	4	5

第 3 章第 2 部分中使用的問卷

研究 1

運動員訓練和比賽中的去自我中心訪談提綱

去自我中心，指的是運動員能夠將訓練和比賽中出現的各種的想法和情緒看作是頭腦中短暫、客觀的事件，而不是對自我的真實反映。具體來講，去自我中心分為兩個方面：(a) 不把自己的想法等同於自我本身的能力；(b) 不對自己的負性經驗進行習慣化反應的能力。

請根據你在訓練和比賽中的經驗，針對下面兩個方面描述你個人的真實感受。

1. 自己的想法不同於自我本身，指的是運動員能夠將自己的想法跟自我本身區分開來，只是將自己的想法看作是大腦裡的短暫、客觀的事件。換句話說就是，你能夠認識到想法並不是事實，想法只是想法，“我的想法”不代表“我”。請描述下你在訓練和比賽時，將自己的想法跟自我本身區分開來的情况。

1a. 你能夠清楚地將頭腦中的想法跟自我本身區分開來是在什麼樣的情况或條件下。

1b. 你沒有辦法將頭腦中的想法跟自我本身區分開來是在什麼樣的情况或條件下。

2. 不對負性經驗習慣反應，指的是運動員能夠做到不習慣性地對負性經驗（即，負面的想法和情緒）做出反應。請描述下你在訓練和比賽時，對負性的經驗出現時的反應情况。

2a. 你能夠做到不對負性經驗做出習慣反應是在什麼樣的情况或條件下。

2b. 你會地對負性經驗做出習慣反應是在什麼樣的情况或條件下。

運動員去自我中心量表題目庫 49 條

請對以下各個表述在語義和用詞方面的清晰程度給予評價。

在訓練或比賽中.....	非 常 不 清 楚			中 立			非 常 清 楚
1.我提醒自己想法和念頭並不是事實。	1	2	3	4	5	6	7
2.我注意到我不並會將困難看作是針對自己的。(R)	1	2	3	4	5	6	7
3.我能夠清楚地將自己跟想法和情緒區分開。(R)	1	2	3	4	5	6	7
4.我感覺到我能完全意識到自己周圍以及身體內部所發生的一切活動。	1	2	3	4	5	6	7
5.我事實上能夠領悟到想法和念頭並不是自我本身。	1	2	3	4	5	6	7
6.我有意識地將自己身體感覺知覺作為一個整體來知覺。(R)	1	2	3	4	5	6	7
7.我能夠從一個更寬廣的角度看待出現的事情。	1	2	3	4	5	6	7
8.我清楚地知道我自己本身跟我體驗到的各種想法和感受是相互獨立的。	1	2	3	4	5	6	7
9.我注意到各種想法和念頭只是自己腦子裡這樣想，並不是對當時情況的真實反映。(R)	1	2	3	4	5	6	7

10. 我注意到各種想法和感受只是短暫的，而並非事實。 (R)	1	2	3	4	5	6	7
11. 我注意到我對一些情境感到無所適從有時僅僅是自己的 想法和感受，而並非我就是這樣的。(R)	1	2	3	4	5	6	7
12. 我認為我的想法就是事實或者說我所想的就是正確 的。	1	2	3	4	5	6	7
13. 我體會到一個想法和念頭在心中停留短暫的一瞬間然 後消失的感覺。(R)	1	2	3	4	5	6	7
14. 失敗讓我反復不停地思考自己究竟出了什麼問題。 (R)	1	2	3	4	5	6	7
15. 我注意到自己在面對困難和壓力的消極思考方式，但 明白自己並不是一個消極的人。(R)	1	2	3	4	5	6	7
16. 我注意到焦慮不安的心情或負面的想法並不是自己的 真實情況或真實模樣。(R)	1	2	3	4	5	6	7
17. 我意識到對比賽結果的一切猜想和分析只是我自己的 想法和念頭，並且只會讓比賽變得更加複雜。(R)	1	2	3	4	5	6	7
18. 每當有輸贏的想法時，我能夠馬上拋開這種想法並意 識到只是自己這麼想而已。	1	2	3	4	5	6	7
19. 我很容易陷入負面想法中從而導致自己不開心。	1	2	3	4	5	6	7
20. 連續犯同樣或同類型的錯誤時，我會強烈質疑自己的	1	2	3	4	5	6	7

真實能力和水準。(R)							
21. 我注意到認為自己無法再繼續堅持下去只是一個想法和念頭，而事實未必如此。(R)	1	2	3	4	5	6	7
22. 一直練不好時，我會區分不開自己本來就是這樣的還是說某個方面做的不對的想法和念頭。	1	2	3	4	5	6	7
23. 我提醒自己雖然能感覺到狀態的好與差，但實際情況未必如此。(R)	1	2	3	4	5	6	7
24. 我在怎麼練都練不好的情況下會感覺自己很沒用。	1	2	3	4	5	6	7
25. 雖然覺察到了負面想法和念頭，但我還是控制不了不受影響。(R)	1	2	3	4	5	6	7
26. 我會覺察到負面的想法和念頭並能夠跳出來。	1	2	3	4	5	6	7
27. 每當心情低落時，我會搞不清楚別人為什麼不能理解自己。	1	2	3	4	5	6	7
28. 當在訓練中自我的判斷跟教練的判斷出現了分歧時，我會跟著自己的想法和念頭去做。(R)	1	2	3	4	5	6	7
29. 我能夠將突然間冒出來的想法和事實清楚地區分開，並做到一帶而過。(R)	1	2	3	4	5	6	7
30. 每當被教練批評並感到不舒服時，我就認為教練員一直在貶低我並且故意針對我。	1	2	3	4	5	6	7
31. 每當裁判不停地做出對自己/己方錯誤的判罰時，我會	1	2	3	4	5	6	7

認為裁判肯定是故意在針對我/我們。							
32. 每當失誤了或出洋相十分難堪時，我會沉浸在自己永遠成為不了優秀運動員的念頭中。	1	2	3	4	5	6	7
33. 當我面對壓力時，我能夠放慢自己的思維。	1	2	3	4	5	6	7
34. 我不會輕易地被自己的想法和情緒帶走。(R)	1	2	3	4	5	6	7
35. 我能夠對困難做出從容的反應。(R)	1	2	3	4	5	6	7
36. 我能夠只是觀察但不會沉浸在不愉快的情緒之中。(R)	1	2	3	4	5	6	7
37. 我能夠將自己從讓人心煩的想法或畫面中抽離出來，不受其控制。(R)	1	2	3	4	5	6	7
38. 當出現困難時，我能讓自己不立即表現出情緒反應。	1	2	3	4	5	6	7
39. 我能夠只是意識到讓人心煩的想法或畫面，而不立即表現出任何反應。(R)	1	2	3	4	5	6	7
40. 我能夠退一步來看讓人心煩的想法或畫面，而不是被它們卷著走。(R)	1	2	3	4	5	6	7
41. 我能夠意識到訓練或比賽中讓人心煩的想法或畫面，不與其糾纏不清。(R)	1	2	3	4	5	6	7
42. 當出現讓人心煩的想法或畫面時，我很快就會平靜下來。(R)	1	2	3	4	5	6	7
43. 當面對裁判的不公正或不合理判罰時，我會抑制不住自己的怒氣。	1	2	3	4	5	6	7

44. 當教練在訓練或比賽中做出在自己看來不正確或不合理的指導時，我就立刻會感覺很不舒服。(R)	1	2	3	4	5	6	7
45. 每當失敗時，我會對自己非常的失望。	1	2	3	4	5	6	7
46. 每當出現負面情緒時，我會自動跟著負面的情緒走。	1	2	3	4	5	6	7
47. 每當出現重大問題時，我要好久都緩不過來。	1	2	3	4	5	6	7
48. 我會控制不住被的負面想法和念頭影響自己的情緒。 (R)	1	2	3	4	5	6	7
49. 即便是在充滿壓力的比賽中，我也會感受到平靜的時刻。(R)	1	2	3	4	5	6	7

研究 2

修訂後的運動員訓練和比賽去自我中心量表題目庫（24 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5	
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣	
在訓練或比賽中.....					
1. 我注意到所面臨的困難，但我並不把它們看作是專門針對我自己的。	1	2	3	4	5
2. 我能夠將自己從讓人心煩的想法或畫面中抽離出來，不受其控制。	1	2	3	4	5
3. 我注意到很多想法和念頭只是自己腦子裡冒出來的，未必是對當時情況的真實反映。	1	2	3	4	5
4. 我不會輕易地被自己的想法和情緒帶著走。	1	2	3	4	5
5. 我能夠區分出哪些是當時客觀真實情況，哪些是自己內在想法。	1	2	3	4	5
6. 我能夠只是意識到讓人心煩的想法或畫面，而不立即表現出任何反應。	1	2	3	4	5
7. 我注意到各種想法和感受只是短暫的，而並非事實。	1	2	3	4	5

8. 我體會到一個想法和念頭在心中停留短暫的一瞬間然後消失的過程。	1	2	3	4	5
9. 我能夠覺察到自己不愉快的情緒出現，但不會沉浸其中。	1	2	3	4	5
10. 失敗讓我反復不停地思考自己究竟出了什麼問題。	1	2	3	4	5
11. 我提醒自己，所感覺到的狀態好與差未必會發生在實際情況中。	1	2	3	4	5
12. 當出現讓人心煩的想法或畫面時，我很快就會平靜下來。	1	2	3	4	5
13. 連續犯同樣或同類型的錯誤時，我會強烈質疑自己的真實能力和水準。	1	2	3	4	5
14. 我注意到自己在面對困難和壓力時的消極思考方式，但明白自己並不是一個消極的人。	1	2	3	4	5
15. 我控制不住自己的情緒不被負面想法和念頭影響到。	1	2	3	4	5
16. 我雖然覺察到了自己的一些想法和念頭是負面的，但還是控制不了不受影響。	1	2	3	4	5
17. 我注意到我對一些情境感到無法適應有時僅僅是自己的想法和感受，而並非自己就是這樣的。	1	2	3	4	5
18. 我能夠只是意識到讓人心煩的想法或畫面，不與其糾纏不清。	1	2	3	4	5
19. 我注意到焦慮不安的心情或負面的想法只是當下所感受到的，並不能代表全部的自己。	1	2	3	4	5
20. 我能夠從容地對困難做出反應。	1	2	3	4	5

21. 我注意到對比賽結果的一切猜想和分析只是我自己的想法和念頭，並且只會讓比賽變得更加複雜。	1	2	3	4	5
22. 我能夠退一步來看讓人心煩的想法或畫面，而不是被它們卷著走。	1	2	3	4	5
23. 我注意到認為自己無法再繼續堅持下去只是一個想法和念頭，而事實未必如此。	1	2	3	4	5
24. 我能夠將突然間冒出來的想法和事實清楚地區分開，並做到一帶而過。	1	2	3	4	5

研究 3

修訂後的運動員訓練和比賽去自我中心量表題目庫（13 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5	
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣	
在訓練或比賽中.....					
2. 我能夠將自己從讓人心煩的想法或畫面中抽離出來，不受其控制。	1	2	3	4	5
5. 我能夠區分出哪些是當時客觀真實情況，哪些是自己內在想法。	1	2	3	4	5
4. 我不會輕易地被自己的想法和情緒帶著走。	1	2	3	4	5
7. 我注意到各種想法和感受只是短暫的，而並非事實。	1	2	3	4	5
9. 我能夠覺察到自己有不愉快的情緒出現，但不會沉浸其中。	1	2	3	4	5
6. 我能夠只是意識到讓人心煩的想法或畫面，而不立即表現出任何反應。	1	2	3	4	5
11. 我提醒自己，所感覺到的狀態好與差未必會發生在實際情況中。	1	2	3	4	5
12. 當出現讓人心煩的想法或畫面時，我很快就會平靜下來。	1	2	3	4	5

14. 我注意到自己在面對困難和壓力時的消極思考方式，但明白自己並不是一個消極的人。	1	2	3	4	5
18. 我能夠只是意識到讓人心煩的想法或畫面，不與其糾纏不清。	1	2	3	4	5
19. 我注意到焦慮不安的心情或負面的想法只是當下所感受到的，並不能代表全部的自己。	1	2	3	4	5
20. 我能夠從容地對困難做出反應。	1	2	3	4	5
23. 我注意到認為自己無法再繼續堅持下去只是一個想法和念頭，而事實未必如此。	1	2	3	4	5

研究 4

修訂後的運動員訓練和比賽去自我中心量表題目庫（12 條）

以下是一些有關你在訓練或比賽情境中一般經驗的描述。請根據你最真實的感受來評估每個表述，並在其旁邊的數字上打鉤。你的答案沒有對錯之分。只需根據實際情況，如實回答即可。請使用下列的等級來做出你的選擇。

1	2	3	4	5	
從來沒有	很少這樣	有時這樣	經常這樣	總是這樣	
在訓練或比賽中.....					
2. 我能夠將自己從讓人心煩的想法或畫面中抽離出來，不受其控制。	1	2	3	4	5
5. 我能夠區分出哪些是當時客觀真實情況，哪些是自己內在想法。	1	2	3	4	5
4. 我不會輕易地被自己的想法和情緒帶著走。	1	2	3	4	5
7. 我注意到各種想法和感受只是短暫的，而並非事實。	1	2	3	4	5
9. 我能夠覺察到自己有不愉快的情緒出現，但不會沉浸其中。	1	2	3	4	5
6. 我能夠只是意識到讓人心煩的想法或畫面，而不立即表現出任何反應。	1	2	3	4	5
11. 我提醒自己，所感覺到的狀態好與差未必會發生在實際情況中。	1	2	3	4	5

12. 當出現讓人心煩的想法或畫面時，我很快就會平靜下來。	1	2	3	4	5
14. 我注意到自己在面對困難和壓力時的消極思考方式，但明白自己並不是一個消極的人。	1	2	3	4	5
18. 我能夠只是意識到讓人心煩的想法或畫面，不與其糾纏不清。	1	2	3	4	5
19. 我注意到焦慮不安的心情或負面的想法只是當下所感受到的，並不能代表全部的自己。	1	2	3	4	5
20. 我能夠從容地對困難做出反應。	1	2	3	4	5

內容效度指數

第 3 章第 1 部分：運動員訓練和比賽正念量表

專家評估的 46 條目

	I-CVI	S-CVI/Ave
	-	0.96
1. 當發現自己心不在焉時，我輕輕地將注意力重新集中在當下的訓練上。(M)	1.00	1.00
2. 當快要贏得比賽時，我還是會專注於自己正在做的事情上。	1.00	1.00
3. 當訓練中感覺特別疲勞時，我還是能夠將注意力維持在自己該做的事情上。(E)	0.71	-
4. 當訓練中一些肌肉有疼痛感時，我還是能夠將注意力維持在自己該做的事情上。	0.86	1.00
5. 我能夠很容易地將注意力集中在當下的比賽上。	0.86	1.00
6. 我能夠將注意力集中在當下的訓練上。	1.00	1.00
(反向表達)7. 我的心思會被即將到來的比賽給佔據了。	1.00	0.75
(反向表達)8. 在訓練中，我的一部分心思總是被其他想法佔據，比如剛才的失誤或接下來的訓練安排。	0.86	1.00

(反向表達)9. 當訓練中感到身體狀態不好時，我的注意力會不太集中。	1.00	1.00
(反向表達) 10. 當訓練時間比較長時，我會出現注意力走神的情況。(E)	0.71	-
11. 注意力走神的情況一閃而過，我會很快回到當下的訓練或比賽中。(M)	1.00	1.00
12. 訓練或比賽時，我能夠意識到情緒在影響自己的想法和行為。	0.86	1.00
13. 當比賽中發生一些意想不到的事情時，我會意識到自己當下的情緒狀態。	1.00	1.00
14. 訓練或比賽時，我能夠意識到在腦海中掠過的念頭。	1.00	1.00
15. 我能夠意識到比賽時身體的緊張程度。(E)	0.71	-
16. 我能夠意識到比賽時內心的焦慮或興奮程度。(E)	0.71	-
17. 在訓練中注意力被分散時，我能夠立刻意識到。	1.00	1.00
18. 當比賽進行的很順利時，我能夠意識到內心的興奮。	0.86	1.00
19. 當在訓練中感到身體不適時，我能夠清楚地意識到具體是哪裡不舒服。(E)	0.71	-
20.我很容易就能搞清楚訓練或比賽時自己的想法和情緒。	1.00	0.75
21. 當在訓練中跟教練或隊友交流時，我能夠覺察到他們的面部表情和身體語言。	1.00	1.00

22. 當比賽過程完全出乎意料時，我能夠覺察到自己的身體反應和變化。	0.86	1.00
23. 當他人在訓練中問我的心情時，我很容易就能夠確定自己當時的情緒狀況。	1.00	1.00
24. 當比賽中的情況發生變化時，我能夠意識到自己當下有哪些想法和念頭閃過。	1.00	1.00
25. 我會覺察到比賽時體內的變化，例如我的心跳變快或肌肉變得僵硬。	1.00	1.00
26. 訓練或比賽時，我能夠覺察到自己當下的情緒。	1.00	1.00
27. 我會覺察到訓練中完成技術動作時的身體感覺。	1.00	1.00
28. 我會意識到比賽場地周圍的刺激，例如觀眾的呼喊聲和加油聲。(M)	0.86	0.75
29. 訓練或比賽時，我能夠立即意識到情緒的變化。	1.00	1.00
(反向表達) 30. 訓練或比賽時，我認為自己不應該有非理性的想法。(E)	0.71	-
(反向表達) 31. 當比賽前感覺狀態不太好時，我覺得自己的運動表現會因此受影響。(E)	0.57	-
(反向表達) 32. 訓練或比賽中出現某些想法和念頭，我會告訴自己不應該這樣想。	0.86	0.75

33. 無論是否令自己感到舒服，我都會去接納訓練或比賽中的每一個想法和感受。(M)	1.00	1.00
34. 訓練或比賽時，我能夠接受此刻的自己。	1.00	1.00
35. 訓練或比賽時，即使一些想法和感受是不愉快的或痛苦的，我也能夠與它們和平共處。	1.00	1.00
36. 訓練或比賽時，我會接受不愉快的想法和感受。	1.00	1.00
(反向表達) 37. 我試圖擺脫訓練或比賽中讓自己心煩的想法和念頭。	1.00	1.00
(反向表達) 38. 當在訓練或比賽中有不愉快的情緒時，我會試圖通過分散自己的注意力來讓自己感覺好一點。	1.00	1.00
(反向表達) 39. 訓練或比賽中的有些方面是我不願意去思考的。(E)	0.57	-
(反向表達) 40. 訓練或比賽時，我告訴自己不應該有某些特定的想法。(M)	1.00	1.00
(反向表達) 41. 我嘗試不在訓練或比賽中思考某些特定的事情。(E)	0.57	-
(反向表達) 42. 我嘗試通過分散或轉移注意力來讓自己在訓練或比賽中不好的記憶消失。	0.86	1.00
(反向表達) 43. 訓練時，我會因為一直找不到正確的感覺而煩躁。(M)	1.00	0.75

44. 比賽時，我會把裁判的判罰當作既定的事實來接受。(M)	1.00	0.75
(反向表達) 45. 訓練或比賽時，我認為自己不應該感受到負面情緒。	0.86	1.00
(反向表達) 46. 當訓練中身體狀態不太好時，我認為自己接下來的訓練也會練不好。(E)	0.57	-
(專家建議新增條目)(反向表達) 當在訓練或比賽中受到幹擾而分心時，我很難調整回來。	-	1.00
(專家建議新增條目)(反向表達) 即使已經開始訓練或比賽了，有時我仍然無法放下一些生活事件帶來的情緒。	-	1.00

注：10 個條目的 CVI 值小於或等於.71，被認為是無效的，因此在部分專家的再次評估中被刪除，用 E 代表。剩餘條目的 CVI 都是處於.86 到 1.00 之間，並因此得以保留。基於專家的定性回饋，我們對 7 個條目進行了非常小的用詞上的改動。在專家的建議下，新增了 2 個條目。

第 3 章第 2 部分：運動員訓練和比賽去自我中心量表

專家評估的 24 條目

	I-CVI	S-CVI/Ave
在訓練或比賽中.....	-	0.98
1. 我注意到我不並會將困難看作是針對自己的。(M)	1.00	1.00
2. 我能夠清楚地將自己跟想法和情緒區分開。(E)	0.71	-
3. 我有意識地將自己身體感覺知覺作為一個整體來知覺。(E)	0.43	-
4. 我注意到各種想法和念頭只是自己腦子裡這樣想，並不是對當時情況的真實反映。(M)	0.86	1.00
5. 我注意到各種想法和感受只是短暫的，而並非事實。	1.00	1.00
6. 我注意到我對一些情境感到無所適從有時僅僅是自己的想法和感受，而並非我就是這樣的。	1.00	1.00
7. 我體會到一個想法和念頭在心中停留短暫的一瞬間然後消失的感覺。	1.00	1.00
(反向表達)8. 失敗讓我反復不停地思考自己究竟出了什麼問題。	0.86	0.50
9. 我注意到自己在面對困難和壓力的消極思考方式，但明白自己並不是一個消極的人。	1.00	1.00
10. 我注意到焦慮不安的心情或負面的想法並不是自己的真實情況或真實模樣。(M)	0.86	1.00

11. 我意識到對比賽結果的一切猜想和分析只是我自己的想法和念頭，並且只會讓比賽變得更加複雜。	1.00	1.00
(反向表達) 12. 連續犯同樣或同類型的錯誤時，我會強烈質疑自己的真實能力和水準。	1.00	1.00
13. 我注意到認為自己無法再繼續堅持下去只是一個想法和念頭，而事實未必如此。	0.86	1.00
14. 我提醒自己雖然能感覺到狀態的好與差，但實際情況未必如此。(M)	1.00	1.00
(反向表達) 15. 當在訓練中自我的判斷跟教練的判斷出現了分歧時，我會跟著自己的想法和念頭去做。(E)	0.43	-
16. 我能夠將突然間冒出來的想法和事實清楚地區分開，並做到一帶而過。	1.00	1.00
(反向表達) 17. 雖然覺察到了負面想法和念頭，但我還是控制不了不受影響。(M)	1.00	1.00
18. 我不會輕易地被自己的想法和情緒帶走。	1.00	1.00
19. 我能夠對困難做出從容的反應。	1.00	1.00
20. 我能夠只是觀察但不會沉浸在不愉快的情緒之中。	1.00	1.00
21. 我能夠將自己從讓人心煩的想法或畫面中抽離出來，不受其控制。	1.00	1.00

22. 我能夠只是意識到讓人心煩的想法或畫面，而不立即表現出任何反應。	1.00	1.00
23. 我能夠退一步來看讓人心煩的想法或畫面，而不是被它們卷著走。	1.00	1.00
24. 我能夠意識到訓練或比賽中讓人心煩的想法或畫面，不與其糾纏不清。	1.00	1.00
25. 當出現讓人心煩的想法或畫面時，我很快就會平靜下來。	1.00	1.00
(反向表達) 26. 當教練在訓練或比賽中做出在自己看來不正確或不合理的指導時，我就立刻會感覺很不舒服。(E)	0.71	-
(反向表達) 27. 我會控制不住被負面想法和念頭影響自己的情緒。(M)	1.00	1.00
28. 即便是在充滿壓力的比賽中，我也會感受到平靜的時刻。(E)	0.71	-
(專家建議新增條目) 我能夠區分出哪些是當時客觀真實情況，哪些是自己內在想法。	-	1.00

注：5 個條目的 CVI 值小於或等於.71，被認為是無效的，因此在部分專家的再次評估中被刪除，用 E 代表。剩餘條目的 CVI 都是處於.86 到 1.00 之間，並因此得以保留。基於專家的定性回饋，我們對 6 個條目進行了非常小的用詞上的改動。在專家的建議下，新增了 1 個條目。

CURRICULUM VITAE

Academic qualifications of this thesis author, Mr. ZHANG Chunqing:

- Received the degree of Bachelor of Science from Wuhan Institute of Physical Education, June 2007.
- Received the degree of Mater of Education from Wuhan Institute of Physical Education, June 2010.

December 2014