INVESTIGATING PSYCHOLOGICAL STRESS IN ELITE INDIAN PERFORMERS USING THE THEORY OF CHALLENGE AND THREAT STATES IN ATHLETES

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**Abstract**

This program of research investigated psychological stress in a hitherto unexplored population of Indian sport performers, using the Theory of Challenge and Threat States in Athletes (TCTSA) as a theoretical framework. First, using thematic analysis, stress experiences of Indian elite athletes were explored and are presented in chapter two. This chapter presents one of the initial studies in sport psychology literature that reports the stressors of elite Indian athletes. The demands and resources of Indian elite athletes across various sports were found to be in line with the postulations as outlined by the TCTSA, however culturally specific demands and resources also emerged. Second, a cross-cultural study developed based on the cultural findings of chapter two. The study thus presented in chapter three, compared the stress responses of cricketers from India with cricketers from the UK. This is also the first study to consider cross-cultural responses to stress. Data were similar in the way elite athletes from both countries respond to stress. For example, Indian as well as UK cricketers perceived high self-efficacy, high perceptions of control, had an approach goal orientation and perceived to be in a challenge state before competition, thus supporting predictions made by the TCTSA. However, Indian cricketers seemed to experience higher emotions before competition. Social identity was measured and data illustrated that Indian cricketers did not identify with their teams as strongly as UK cricketers. Finally, the program of research provides a unique contribution to sport psychology literature by conducting intervention studies using single-case research designs to reduce threat and enhance a challenge state in Indian performers. No previous single-case research design studies have been found that manipulate challenge and threat states using interventions. The multimodal interventions presented in chapter five and six helped reduce the threat state and increased the challenge state of an elite Indian badminton player and an elite Indian squash player respectively. While in the final study that included the Indian tennis coaches presented in chapter seven, the researcher developed an innovative theoretically driven intervention that proved to be effective in helping the elite coaches appraise their stressors positively (i.e., as a challenge). This is also the first study that uses the TCTSA framework in the context of sports coaching. The program of research adds to the scant literature regarding the stress experiences of Indian performers. It also extends the limited literature regarding intervention strategies that may reduce threat and enhance a challenge state in performers. The thesis revealed that the TCTSA is a useful framework to understand stress experiences of athletes not only in the Western countries, but also in the Eastern part of the world. The thesis thus offers new knowledge to researchers and applied practitioners however is not without limitations. The limitations associated with the program of research are identified and directions for future researchers are recommended.

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**Structure and Organisation of the Program of Research**

The program of research is divided in two parts. The first part includes chapters two and three and focuses on investigating psychological stress in Indian athletes, while the second part includes chapters five, six and seven and focuses on determining the effectiveness of interventions to help Indian performers respond to stress positively. In this thesis, athletes and coaches together are termed as ‘performers.’ Chapter one that is included in the first part, presents a review of the literature, which relates to the thesis’ line of enquiry, and thus research and theory relating to stress is critically evaluated. The theoretical framework used (i.e., the theory of challenge and threat states) is detailed, and the rationale and the specific aims for the program of research are then outlined. Chapter two focuses on a qualitative enquiry of stressors amongst Indian athletes involved in various sports. Chapter three emerges from the cultural findings of chapter two and focuses on a cross-cultural study that investigates the responses of Indian and UK cricketers to stress.

From the second part, that is chapter four onwards, the focus of the thesis turns to exploring the effectiveness of the interventions (using single-case research designs) to reduce threat and enhance challenge states. Chapter four provides a justification for the use of single-case research methods in this thesis. Chapters five and six documents a multimodal intervention with an elite badminton player and an elite squash player respectively. While, chapter seven presents a multiple-baseline (across participants) design with a group of three Indian tennis coaches. Chapter eight offers a general discussion and summarises the main findings of the chapters in relation to the aims of the thesis. Finally, the main conclusions are drawn; limitations of the research program and recommendations for future researchers based on the findings of this program of research are presented.

**Part 1:** **Investigating psychological stress in elite Indian athletes**

Chapter 1

**Introduction**

**1.1 Stress and stressors in athletes**

“To be a champion, you have to learn to handle stress and pressure…when you wake up every day you have two choices, you can either be positive or negative.” Mackay (2011, p. 48, 32).

Athletes experience stress and pressure on their turbulent and dynamic pathway to athletic excellence, where ability is publicly tested, scrutinized and evaluated. Achievement and performance is influenced by stressful factors such as committing a mental or physical fault, pain and inconvenience, seeing rivals cheating or succeed, getting a penalty from a referee, or being rebuked by a trainer (Bahramizade & Besharat, 2010). As Mackay (an author and a columnist) suggests, an individual can choose to respond positively or negatively to such stressful situations. At the highest level in sport, stress is a very large factor and performers are placed under extremely demanding situations, and are required to cope positively with stressors to succeed as sport professionals (Holt & Dunn, 2004; Jones & Hardy, 1990).

Stressors in sport have been differentiated between three main categories that include competitive, organisational, and personal stress (Fletcher, Hanton, & Mellalieu, 2006). Fletcher and colleagues defined competitive stress as “an ongoing transaction between an individual and environmental demands associated primarily and directly with competitive performance” (Hanton, Fletcher, & Coughlan, 2005, p. 1130). Therefore, stressors directly related to competition are called competitive or performance stressors. For example, injuries, opponents and preparation for competition, and technique issues (Hanton et al., 2005; Nicholls, Holt, Polman, & Bloomfield, 2006; Thelwell, Weston, & Greenlees, 2007). Organisational stress is defined as “an ongoing transaction between an individual and the environmental demands associated primarily and directly with the organizations within which he or she is operating” (Hanton et al., 2005, p. 1130). Evidence suggests that organisational stressors such as unfair selection criteria, monotonous training, and incompatible coaching style have a strong influence upon athletic performance (Fletcher, Hanton, Mellalieu, & Neil, 2012; Fletcher, Hanton, & Wagstaff, 2012) and thus it becomes imperative to understand athletes’ organisational stressors. To illustrate how these stressors are important, in the XXXI Olympiad at Rio de Janeiro over 10,500 athletes competed in 42 different sports and the quadrennial competitive event has been readily accepted as an acute stressor for athletes. This comprises both competitive stressors (Nicholls & Levy, 2016; Schinke, McGannon, Parham, & Lane, 2012) and organizational stressors (Fletcher et al., 2012). Early research by Greenleaf, Gould, and Dieffenbach (2001) who interviewed US Olympians reported that departing from normal routine, coach issues and injury were among the major factors that were perceived to have negatively influenced performance. According to Fletcher, personal stress has been defined as an ongoing transaction between an individual and the environmental demands associated primarily and directly with personal life events (D. Fletcher, personal communication, as cited in Mckay*,* Niven, Lavalle, & White, 2008). Although personal stressors have been least cited, it encapsulates every day stressors that affect the athlete, which include lifestyle issues and financial issues (Noblet & Gifford, 2002; Thelwell et al., 2007). Overall, sport psychology research that distinguished and classified between the specific origins of the demands enhanced psychologists’ understanding of stress in sport.

Stress experienced by athletes can hinder their performance, reduce the enjoyment and also hamper the overall sport experience and well-being (e.g., Burton, 1998; DiBartolo & Shaffer, 2002; Gould, Petlichkoff, Simons, & Vevera, 1987; Humphrey, Yow, & Bowden, 2000; Noblet, Rodwell, & McWilliams, 2003; Tabei, Fletcher, & Goodger, 2012). Stress can affect athletes in several ways such as cause burnout or drop out because they find athletic competition to be threatening (Gould, Feltz, Horn, & Weiss, 1982; Smith 1986), stress can also lead to overtraining syndrome and dysfunctional psychological health (Meehan, Bull, Wood, & James, 2004; Noblet et al., 2003). Due to the debilitating effects that stress can have, this topic has received much attention in the field of sport psychology.

Stress can affect athletes negatively however; stress could also be a positive experience, both in terms of actual response and its effects upon performance (Jones & Hardy, 1990). Amongst US Olympians, positive performance factors included Olympic housing and team unity (Greenleaf et al., 2001). Also a particular event (e.g., performing in front of an audience) can produce stress for some athletes and enjoyment for others (Scanlan, Stein, & Ravizza, 1989). Thus stress can also be perceived positively and can be facilitative to sport performance. In psychology, Selye (1964) was the first to use the term “stress” and provided a distinction by coining the term ‘eustress’ for when an individual perceives a stressor as positive, while the term ‘distress’ when a stressor is perceived as negative (Le Fevre, Kolt, & Matheny, 2006). In summary, stress research informs us about the origins and the effects of stress on athletes, and that stress can be categorised as positive or negative.

Exploring effective ways to enable performers to deal with stressors and help them perceive stress positively is also an important consideration for the literature. Athletes have been recommended to “fine tune their mental preparation to suit the special demands of the Games environment to minimize the stressors” (Hodge, 2010, p. 411), and many variables beyond the individual athlete have been explored, including optimizing the role of sport psychologists consulting at the Olympic Games (Arnold & Sarkar, 2014). Constructs such as resilience and adaptation have been explored to elucidate how athletes thrive with the competitive pressure (Fletcher & Sarkar, 2012; Schinke et al., 2012). However, the culture in which the sport occurs and the athlete is involved in have not been subject to the same level of scrutiny. An area of the sport psychology stress literature that continues to need additional research, concerns the influence of culture. Also, it has been noted that sport psychology has typically been received with lower levels of sport as opposed to elite levels (Cruickshank & Collins, 2013; Fletcher & Wagstaff, 2009) and that for research purposes, elite environments may be hard to access (Eubank, Nesti, & Cruickshank, 2014; Nesti 2010). Thus, there has been a minimal focus upon the elite athletic population. In sum, culturally relevant research in stress with an elite sample is needed.

**1.2 Defining stress**

A number of researchers have defined stress as a negative feeling or emotion. Lazarus and Folkman (1984) defined stress as the negative feeling that occurs when an individual feels unable to cope with the demands placed upon them by their environment. Further, Scanlan, Stein, and Ravizza (1991) defined stress or pressure for athletes as, the negative emotions, feelings, and thoughts that they might have had with respect to their sport. While, Jones (1990) defined stress as a state in which some demand is placed on the individual, who is then required to react in some way to be able to cope with the situation. In addition, Stein, Cutler, and Cutler (2002) defined stress as a total response to one's environmental demands and pressures. Also, Jones and Hardy (1990) suggested that stress responses are likely to be strongly influenced by a complex interaction between the individual and task by situational demands. Aldwin (1994) formulated a definition after incorporating most of the elements of various stress definitions that she believed researchers used to identify with the purpose to study stress and its effects. She defined stress as a psychological and physiological distress resulting due to the “quality of experience, manufactured by a person-environment interaction caused by either over arousal or under arousal” (p.22). While stress can differ in the way it is defined, a common principle that can be observed is that an individual who is experiencing stress will cope with that stress in a certain way, based on how that particular individual interprets the stressor (White, 2008).

**1.3 Psychological stress, appraisal and coping**

Several conceptual models and frameworks guide sport and exercise psychology work on stress. Namely, the early work of Selye (1974), Lazarus (1966), McGrath (1970), and Spielberger (1966) guided sport psychology research. Spielberger’s (1989) work captures the key aspects of most psychological models (Gill, 1994). According to his model, first a stressor is encountered (e.g., competition), then comes the perceived threat, or the appraisal process. Without this perception (e.g., I think I am stressed) there is no stressor. This appraisal is neither automatic nor as simple as it appears, but this perceived threat is what elicits the stress response. State anxiety is the response Spielberger (1989) highlights and it is one of the most researched areas in the field of sport psychology. McGrath’s (1970) conceptual model also had a strong influence on studies and research in sport and exercise psychology. He proposed that stress occurs in a four-stage process, consisting of the situational demand, a cognitive appraisals, a stress response, and behavioural results. Appraisal is also the key element in Lazarus's stress model (e.g., Lazarus, 1990, 1993; Lazarus & Folkman, 1984).

The application of stress models in sport and exercise by various researchers incorporates key features of Lazarus’s model. To illustrate, Smith (1986) adopted the stress model to fit the particular constructs and relationships that are prominent for burnout. While, Anderson and Williams (1988) applied the stress model to injury in sport. These models also highlight cognitive appraisal in a multidimensional system (Gill,19994). The Theory of Challenge and Threat States that has been used a framework in the current thesis has also been guided by Lazarus’s work on stress.

From a theoretical perspective, Lazarus and Folkman (1984) proposed a transactional model of stress and coping. The transactional model addressed psychological stress as an umbrella term that encompasses stressors, appraisals, coping, and strain, and defined stress as a “relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus & Folkman 1984, p. 19). The transactional model emphasized that an individuals’ appraisal of a potentially stressful situation is influenced by an interaction between personal and situational or environmental factors. Pivotal within the stress and coping process are an individual’s cognitive appraisals, which are underpinned by the notion of relational meaning which refers to the meaning a person construes from their relationship with the environment (Lazarus, 1998). Individuals are constantly evaluating the events they encounter and that these evaluations involve primary and secondary cognitive appraisals (Lazarus & Folkman, 1984). Rossato (2014) explained the primary and secondary appraisals as follows:

1. In the primary appraisal the person evaluates whether he or she has anything at stake in the encounter (a potential stressor). When a situation is appraised as stressful four alternative appraisals can be made: challenge, benefit, harm**/**loss, or threat.
2. In the secondary appraisal the person evaluates what if anything can be done to overcome or prevent harm or to improve the prospects for benefit (i.e., coping resources and options). The secondary appraisal activity is a crucial feature of every stressful encounter because the outcome depends on what, if anything, can be done, and what is at stake (Lazarus & Folkman, 1984).

If an individual does not believe that they have the resource appraisals to deal with the demands encountered in the competitive environment, the individual will likely experience negative emotions, such as anger and possibly suffer from negative behaviour such as physical tension. However negative emotions may not always lead to negative consequences. Moreover, an individual’s appraisals of a stressor may not just influence the stress experienced but also their emotional reaction (Neil, Hanton, Mellalieu, & Fletcher, 2011). Appraisal can be either deliberate and conscious or automatic and largely unconscious (Lazarus, 1999). Unconscious appraisals are intuitive and automatic whereas conscious and deliberate appraisals are usually a slow search for information on which to predicate an appropriate reaction. Appraisals become automated through previous experiences of the same appraisal process (Lazarus, 1999). This provides a basis for a decision about how to respond to a situation.   
 Several studies with athletes have found that primary cognitions of players have a negative connotation due to unexpected stressors such as uncertainty, novelty, ambiguity (Dugdale, Eklund, & Gordon, 2002; Thatcher & Day, 2008). However, the secondary appraisal that demonstrate a form or rationalization and/or restructuring of thoughts and emotions appear to facilitate the interpretation as positive that can help the actual behaviour of the performer (Neil et al., 2011). With the knowledge that appraising is at the heart of psychological stress, interventions and strategies that aid restructuring of thoughts and emotions may help performers cope with their demands and respond to stress positively.  
 In sport psychology literature, it has been established that athletes who cope successfully with stressful events are likely to produce high performance, and perceive sport as a satisfying experience (Anshel, Sutarso, & Jubenville, 2009; Nicholls & Polman, 2007). The perspective of Lazarus (Lazarus, 1999; Lazarus & Folkman, 1984) is the most widely adopted model of coping within the sport literature (Nicholls & Polman, 2007). Lazarus and Folkman (1984) defined coping as “constantly changing cognitive and behavioural efforts to manage specific external and/ or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). This perspective distinguishes between problem-focused and emotion-focused coping strategies. Specifically, problem-focused coping refers to cognitive and behavioural efforts aimed at identifying, solving, or minimizing the effects of a stressful relationship between the individual and the environment (i.e., a threatening or harmful situation). For example, Jones (2003) presented a number of strategies based on Lazarus’ cognitive motivational relational theory of emotions, which comprised of self-statement modification, imagery, socratic dialogue, corrective experiences, self-analysis, didactic approach, story-telling metaphors and poetry, reframing, cognitive paradox and use of problem solving skills to enhance emotional control amongst athletes. While, emotion-focused coping refers to efforts to control thoughts of emotions while remaining in the situation that caused the stress/anger. Avoidance coping is a third dimension of coping often proposed, and is sometimes considered a form of emotion-focused coping (see Folkman & Moskowitz, 2004). It is characterized by an effort to remove oneself from the situation that caused the stress/anger (Kowalski & Crocket, 2001). Thus coping includes efforts (a) to solve the situation that caused stress, (b) to deal with one’s emotions, or (c) to escape, avoid, or distract oneself from the situation (Bolgar, Janelle, & Giacobbi, 2008). Overall, it can be understood that stress is an internal state caused by the demands that are placed on an individual and that stress is appraised as negative when the demands exceed one’s resources for coping or can also be evaluated as positive when the available resources may exceed the demands. One theoretical framework that encapsulates and integrates many of these ideas is the Theory of Challenge and Threat states in Athletes (Jones, Meijen, McCarthy, & Sheffield, 2009).   
 The TCTSA builds on the work of Lazarus, and specifically extends the biopsychosocial (BPS) model of challenge and threat (Blascovich & Mendes, 2000). While the BPS model brought together cognitive and neuroendocrine stress reactions within an integrated theory, the TCTSA provides specific cognitive and emotional elements that inform and occur as a result of the cognitive appraisal and reappraisal process. The cognitive appraisal is an important component of the Theory of Challenge and Threat states in Athletes (TCTSA) and the framework takes a transactional stress perspective and supports the notion that appraisals are made based on evaluations of demands compared to resources. To illustrate, sport performers could appraise a situation as a challenge or a threat dependent on their primary and secondary appraisal, that is, if an individual appraises insufficient resources to deal with the demands encountered, then he or she will experience a threat state. In contrast, if an individual appraises sufficient resources to deal with the demands encountered, then he or she will experience a challenge state. Understanding how individuals respond to stress is important for several reasons. For instance, a relationship has been observed between stressors and depression and anxiety (Schneiderman, Ironson, & Siegel, 2005) and also upon sport performance (Wagstaff, Fletcher, & Hanton, 2012). The TCTSA offers an in depth explanation of why and how athletes may respond differently to stress and the theory is detailed and critically evaluated in the subsequent section.

**1.4 The Theory of Challenge and Threat States in Athletes**

The TCTSA is an extension of the BPS model of challenge and threat and it also builds on the model of adaptive approaches to competition (Skinner & Brewer, 2004) and the debilitative and facilitative competitive state anxiety model (Jones, 1995). The TCTSA draws from other related contemporary approaches to understanding athletes’ perceptions and experiences of an upcoming competition (e.g., achievement goal theory). The TCTSA proposes that athletes can respond positively to a competition (challenge), or negatively (threat). The TCTSA provides an understanding of psychological and emotional factors that underpin an athlete’s performance in motivated performance situation. In the TCTSA it is proposed that an athlete will experience a challenge state if they have high self-efficacy, a perception of control and a focus on approach goals. While a threat state is associated with low self-efficacy, low perceived control and a focus on avoidance goals. In the TCTSA it is suggested that all the three constructs are inter-related and are essential for a challenge state. For instance, an athlete needs to have high perception of control to experience high self-efficacy and to be focused on demonstrating competence during competition. Also, during competition the demands and the resources that are appraised by an athlete keep fluctuating (Jones et al., 2009). As stated earlier, individuals experience challenge when appraisals of per­sonal resources exceed situational demands. Alternatively, threat manifests when perceptions of demands exceed resources. Thus, whether a player appraises a situation as a challenge or threat is dependent on their primary and secondary appraisals (Rossato, 2014). According to the TCTSA, the demand appraisals include perception of danger, uncertainty and required effort in a situation.

The TCTSA also proposes two distinct patterns of cardiovascular reactivity and neuroendocrine responses in challenge (adaptive responses to stress) and threat states (maladaptive response to stress) based upon two specific existing models within literature. The first is the Arousal and Physiological Toughness model (Dienstbier, 1989) and second being the Biopsychosocial model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996). Along with contrasting physiological patterns, the emotional patterns in both states is also said to differ. A negative performance effect (threat) is suggested to be accompanied by negative valence of emotions (e.g., anger) and a positive performance effect (challenge) is suggested to be accompanied by positive valence of emotions (e.g., happiness). However the theory suggests that emotions such as anxiety can be experienced in both states, but a player in a challenge state might perceive this as positive, while an individual in a threat state might perceive this as negative (Jones et al., 2009; Rossato, 2014). As stated earlier, the TCTSA also draws from the theoretical approach of the model of debilitative and facilitative state anxiety (Jones, 1995), which supports that positive interpretation of anxiety symptoms results from an athlete’ s perception of control over the environment and the self, and sufficient positive belief to cope, and that the goal can be achieved. The TCTSA thus gives an encompassed understanding of why athletes perceive challenge or threat in performance situations. Figures 1a and 1b illustrate the mechanisms of the challenge and threat state respectively. The cognitive resources and the emotional and physiological aspects of challenge and threat states are further described, followed by presenting the potential performance consequences.

**Dispositional Style**

**Performance**

**Consequences**

Decision making is improved

Effectiveness of cognitive functioning maintained

Increased task engagement

Decreased likelihood of reinvestment

Less resources devoted to self regulation

Increased anaerobic power

**Emotional & Physiological consequence**

Increased heart rate

Increased SAM activation

Epinephrine & non epinephrine released

Decreases TPR

Typical emotions of a positive valence are experienced

Emotions perceived as helpful for performance

**Competition**

**Resource Appraisals**

High self- efficacy

High perceived control

Approach Focus

**Demand Appraisals**

**Performance outcome**

Performance is positively affected

**Figure 1.1: TCTSA – The Challenge State (taken from Jones et al**.**, 2009, p.175)**

**Dispositional Style**

**Emotional & Physiological consequence**

Increased heart rate

Increased SAM & PAC activation

Cortisol released

Stable or increasing TPR

Typical emotions of a negative valence are experienced

Emotions perceived as unhelpful for performance

**Performance**

**Consequences**

Efficiency &

effectiveness of cognitive functioning decreased

Use of avoidance strategies &

decreased task engagement

Increased likelihood of reinvestment

Greater resources devoted to self regulation

Anaerobic power is less than that in a challenge state

**Resource Appraisals**

Low self- efficacy

Low perceived control

Avoidance Focus

**Performance outcome**

Performance is negatively affected

**Demand Appraisals**

**Competition**

**Figure 1.2: TCTSA – The Threat State (taken from Jones et al., 2009, p.176)**

**1.5 Cognitive Resources in the TCTSA**

**1.5.1 Self-efficacy**

Self-efficacy beliefs are judgments of what an individual can accomplish with his/her skills (Bandura, 1986). Self-efficacy is a key aspect of the cognitive aspect as the belief to perform a task contributes to the perception of being able to cope with the demands of the situation (Lazarus, 1999). High levels of self-efficacy can increase the available coping options that can help individuals perceive a motivated performance situation as a challenge (Williams, Cumming, & Balanos, 2010). In addition, for self-efficacy to develop individuals must perceive that they are in control (Bandura, 1997) and can intentionally execute their actions or can display their skills. Control also forms a central component of the resource appraisal outlined in the TCTSA.

**1.5.2 Control**

Control is central to the debilitative and facilitative competitive state anxiety model (Jones, 1995), is mentioned as a dispositional factor in the BPS model, and is an essential part of self-efficacy (Jones et al., 2009). Individuals can perceive a situation as within (controllable) or outside personal control (uncontrollable). This influences their perception of the situation as a challenge or a threat. For example, a bowler in cricket may feel confident in making accurate decisions to set the field during his over, but may not believe that his captain will let him take those decisions. Not only does the athlete need to feel able to perform the skill but also required to perceive control to execute as well. Past research (e.g., Bandura, 1977; Pensgaard & Ursin, 1998) has also emphasized on the importance of constructs such as perception of control and self-efficacy in relation to coping and subsequently performance.

Several aspects in sport are out of the player’s control. For example, in cricket, the toss, weather conditions, umpire’s decision are outside the player’s control, however this does not mean the player will experience a threat state. A threat state will occur only when an athlete fixates on those factors which cannot be controlled, leading to a low level of perceived control. On the other hand, if an athlete accepts that there are aspects of the situation that cannot be controlled but chooses to focus on aspects that can be controlled, a challenge state may follow (Jones et al., 2009). Thus, what an athlete’s goals are and what he is striving to attain is also important for challenge and threat states.

**1.5.3 Goals**

Achievement goal theory explains how goals play an important part in athletes’ responses to competitive sport settings. The TCTSA uses the 2 x 2 model of achievement goals (Elliot & McGregor, 2001) which has four types of achievement goals: mastery-approach goals (MAp) that focus on the attainment of task or self-referenced target; mastery-avoidance goals (MAv) that reflect a motivation focusing on avoiding task incompetence; performance-approach goals (PAp) that reflect a motivation to attain normative competence; and performance-avoidance goals (PAv) that reflect the motivation to avoid normative competence. Based on research in academic (McGregor & Elliot, 2002) and athletic settings (Adie, Duda, & Ntoumanis, 2008), the TCTSA contends that approach goals, in particular mastery, are related to a challenge state and avoidance goals to a threat state. In a challenge state it ensures that the high self-efficacy and feelings of control are directed towards a more purposeful outcome than simply avoiding incompetence (Jones et al., 2009).

* 1. **Physiological changes in challenge and threat states**

The physiological changes associated with challenge and threat states are a key aspect of the Arousal and Physiological Toughness model (Dienstbier, 1989) and the Biopsychosocial model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996). The first model is the Arousal and Physiological Toughness model (Dienstbier, 1989), which suggested that appraising a situation as a challenge results in an increase in adrenaline and noradrenaline release, whereas a threat results in the release of cortisol and adrenaline and noradrenaline (Rosatto, 2014). The second model is the Biopsychosocial model (BPS; Blascovich & Mendes, 2000). This model suggested that dependent on the appraisal, different cardiovascular reactivity will occur. In particular, an increased cardiac output (CO) is suggested to be associated with challenge and threat (albeit there is less of an increase in the CO in threat). No increase or little increase in total peripheral resistance (TPR) is associated with threat, whereas a decrease in TPR is associated with challenge. With regards to the emotional responses during challenge and threat states, there have been two main points. First, whether the emotional state is facilitative (helpful) or debilitative (unhelpful) and second, the difference in the valence of the emotions.

* 1. **Emotional changes in challenge and threat states**

The interpretation of emotions as facilitative (helpful) or debilitative (unhelpful) to performance plays a role in challenge and threat states. How an individual interprets emotions directs their behaviour (Lazarus, 1999; Lazarus, 2000) and although emotions are often defined as being positive or negative in terms of valence, this does not mean that a negative emotion only influences performance negatively, or that a positive emotion only influences performance positively (Hanton, Neil, & Mellalieu, 2008; Jones & Uphill, 2004; Mellalieu, Hanton, & Fletcher, 2006). Consistent with Jones’ (1995) control model of debilitative and facilitative anxiety, the TCTSA proposed that athletes can experience negative emotions in a challenge state but these are interpreted as helpful to performance provided the athlete feels in control and believes the goal can be achieved (Jones et al., 2009).

The TCTSA also outlines for the affective component that positive emotions are normally, but not exclusively, related to a challenge response, whereas negative emotions are normally, but not exclusively, associated with a threat response. The notion that positive emotions are related to challenge appraisals and negative emotions are related to threat appraisals has been previously proposed in sport (Skinner & Brewer, 2004). However, because some high intensity emotions with a negative valence, like anger or anxiety, can serve motivational functions, they can occur in a challenge state (Mendes, Major, McCoy, & Blascovich, 2008).

* 1. **Performance consequences**

Cognitions, emotions, neuroendocrine and cardiovascular responses associated with a challenge state are said to be advantageous to sport performance, and those in a threat state are detrimental to sport performance (Jones et al., 2009). The interplay between the demands and resources may fluctuate over the competition period however the cognitions associated with a challenge state are positive for performance and ensures anxiety does not influence performance negatively. Previous evidence suggests that depending on how one perceives the psychological demands his or her responses may hamper performance or it may also result in improved performance (e.g., Kamlesh, 2009; Skinner & Brewer, 2004; Wilson, Raglin, & Pritchard, 2002). The neuroendocrine and the cardiovascular responses which are the key component of the BPS model and the TCTSA demonstrate that a challenge state is associated with better decision making, greater involvement in competition and with shorts bursts of energy (i.e., increased anaerobic power).

Several studies in psychology across a range of tasks and contexts have shown that a challenge state facilitates performance whereas a threat state hinders performance (Gildea, Schneider, & Shebilske, 2007; Mendes, Blascovich, Hunter, Lickel, & Jost, 2007; Seery, Weisbuch, Hetenyi, & Blascovich, 2010; Turner, Jones, Sheffield, & Cross, 2012). A recent review that includes 38 published studies that conceptualised challenge and threat states in a manner congruent with the BPS model revealed support for the performance benefits of challenge state (Hase, O’Brien, Moore, & Freeman, 2018). A challenge state was related to better performance than a threat state in 74% of studies. Further, a recent meta-analysis (Behnke & Kaczmarek, 2018) that included 17 articles covering 19 studies scrutinized the body of evidence for the role of challenge and threat responses in predicting performance quality. The results of this study also supported the general validity of the BPS model in the prediction of behavioural outcomes (i.e., performance quality). Studies that examined the relationship between challenge and threat and performance using physiological indexes illustrated that players who experienced a challenge state performed better relative to those who experienced the threat state. For example, Blascovich, Seery, Mugridge, Norris, and Weisbuch (2004) found that baseball and softball players who displayed cardiovascular markers of challenge during a 3-min sport-relevant speech 4 to 6 months prior to the start of the season performed better during the subsequent season than players who displayed markers of threat. Moore, Vine, Wilson, and Freeman (2012) examined the immediate effects of challenge and threat on a motor task performance of golf putting. The results suggested that the challenge group performed more accurately, reported more favourable emotions, and displayed more effective gaze, putting kinematics, and muscle activity than the threat group. Moore, Wilson, Vine, Coussens, and Freeman (2013) also examined the immediate impact of challenge and threat states on golf performance in both real competition and a laboratory-based task. Evaluating the competition as a challenge (i.e., sufficient resources to cope with demands) was associated with superior performance. Also, challenge and threat states were successfully manipulated and the challenge group outperformed the threat group. Furthermore, the challenge group reported less anxiety, more facilitative interpretations of anxiety, less conscious processing, and displayed longer quiet eye durations. Turner, Jones, Sheffield, Slater, Barker, and Bell (2013) and Turner, Jones, Sheffield, and Cross (2012) assessed whether cardiovascular (CV) reactivity patterns indexing challenge and threat stated predicted batting performance in cricketers and female netballers respectively. They found that challenge CV reactivity predicted superior performance in the batting test and the netball shooting task, compared with threat CV reactivity. Thus research till date supports the main postulations of the TCTSA. In addition, there has been some suggestion that personality has an association with challenge and threat. For example, Allen, Frings, & Hunter (2012) suggested a link in personality and coping in sport and that an assessment of cardiac output (CO) and total peripheral resistance (TPR) may be sufficient to predict personality and sport-related coping. It can be stated that several recent studies have tried to encompass suggestions made within the TCTSA framework regarding challenge and threat within a sport context. However several gaps are found in the challenge and threat literature, some of which are considered in the thesis.

**1.9 Identified gaps in challenge and threat literature**

First, research encompassing the TCTSA across cultures is limited and it has mainly been conducted in the West. It is suggested that our understanding of challenge and threat would benefit from further studies on more diverse populations. Several propositions within the TCTSA are suggestions regarding the possible antecedents and consequences of challenge and threat and implementing the framework across various cultures may provide further empirical evidence for the propositions. Second, most studies have examined challenge and threat via manipulation using instructions or speech tasks (e.g., Meijen, Jones, Sheffield, & McCarthy, 2013b; Moore et al., 2013). It could be suggested that these results may not be applicable to a ‘real world’ scenario as manipulating individuals into challenge or threat may not transferable to a sporting domain. For example, a coach will not be allowed to provide instructions to manipulate a tennis player into a challenge state during a match, as on court coaching is not permissible in tennis (although they could before a game). A coach would also not use instructions to manipulate an athlete into a threat state at any time, as evidence suggests it would be detrimental to performance. It is also suggested that speech tasks are not effective to induce challenge and threat responses (Allen et al., 2012). Thus, similar to the use of imagery to facilitate an adaptive stress response (e.g., Williams et al., 2010), other psychological skills need to be considered to create a challenge state and researchers should develop challenge-promoting interventions to optimise the performance of athletes.

Third, studies that have been carried out within a laboratory environment may lack in ecological validity. The protocols within a sporting context lacked a social evaluative element (e.g., Meijen, Jones, McCarthy, Sheffield, & Allen, 2013a; Williams et al., 2010), which is also considered beneficial when eliciting challenge and threat (Feinberg and Aiello, 2010). Fourth, findings from studies highlight that challenge and threat do not appear to be at opposite ends of the continuum, as different patterns of challenge and threat appear to elucidate distinct responses (e.g., Meijen et al., 2013a). Thus, the dichotomous approach proposed by the TCTSA may be too simplistic in a sport setting and further examination in an applied sport setting will be valuable. Fifth, it can be highlighted that in studies where cardiovascular reactivity was recorded, this was typically done before a task performance and thus cardiovascular reactivity was understood only for a particular time. The participant could be challenged after the task instruction but could be threatened while performing the task. Therefore, is it not certain that the cardiovascular reactivity recorded is a true reflection of what the participant may be experiencing during the actual task. Further, the review of challenge and threat literature also illustrates that challenge and threat has been measured using various self-report questionnaires (e.g., Primary & Secondary Appraisal Scale, Gaab, Rohleder, Nater, & Ehlert, 2005; Cognitive Appraisal Ratio, Tomaka, Blascovich, Kelsey, & Leitten, 1993) and also that self-report constructs were not typically examined alongside performance. Future research would benefit from a more consistent approach to challenge and threat measurement (e.g., using the recently developed Challenge and Threat Scale in Sport (CAT – Sport), Rossato, Uphill, Swain, & Coleman, 2018) to reduce ambiguity and aid the synthesis of results across studies. Finally, limited research examining emotions and their associations with challenge and threat exists, however recent research (e.g., Meijen et al., 2013a; Meijen et al., 2013b; Moore et al., 2013; Turner et al., 2012) show some support for the hypothesis made within the TCTSA regarding positive emotions being association with challenge and negative emotions being associated with the threat state.

In this program of research, the TCTSA framework is implemented across a novel athletic population. The thesis includes one of the first cross-cultural study that investigates the determinants of the TCTSA along with emotions and self identity across Indian and UK cricketers. Mutlimodal interventions that have not been previously implemented with athletes to reduce threat and enhance challenge are considered in an applied sport setting thus providing ecological validity. The author has also developed a unique challenge promoting intervention based on the TCTSA framework. Thus the thesis attemps to address certain areas in challenge and threat research that have not yet been explored or are under-explored.

In conclusion, the TCTSA provides a method for practitioners as well as researchers to classifying athletes’ approaches and responses to stress into either challenge or threat states. It provides a more accurate way to examine stress, allowing stress to be assessed as a multidimensional construct, rather than a unidirectional construct, in-line with contemporary theory and research (Jones et al., 2009). It is considered that the TCTSA will offer a conceptual and theoretical grounding for understanding stress experiences of athletes in India. The TCTSA offers a frame to guide interventions and will provide an organising structure for implementing psychological interventions and discussing emergent research examining Indian performers.

* 1. **Rationale of the Thesis**

India is a nation with highly talented players but those who have not learnt to deal with their nerves and thoughts, which are essential to focus and perform in sport (Sridhar, 2010). Countries from the West the like UK and USA often have a sport psychologist attached to their teams to help them with the psychological aspects of the sport. Evidence suggests that mental skills interventions are an integral component to achieve peak performance (e.g., Omoregie & Adegbesan, 2010; Weinberg & Comar, 1994; Zakrajsek & Blanton, 2017). With yoga, which exists for centuries in the Indian culture and demonstrates the importance of mental states, one might expect that sport psychology would be well established in India. This is not the case. Some reasons why sport psychology is still in its infancy in India is due to the lack of awareness and following traditional methods of coaching with little emphasis on sport psychology (Sridhar, 2010). More importantly, there is a dearth of research and knowledge about the psychology of Indian athletes and coaches.

To date, personality and sport performance has been the commonly studied topic for Indian investigators in the field of psychology (e.g., Khan & Panchal, 2017; Tripathi, 2013). Stress is inevitable in sport and the relationship between stress and performance is vastly researched in the West, however not in Eastern countries such as India. Stress can either get the better of athletes, or propel them to accomplish that which would not be possible in the absence of stress. The experiences of stress remain unexplored within Indian performers and thus the interventions to be applied also remain unidentified with a lack of systematic research.

Contemporary methodical approaches in cultural and cross-cultural psychology help develop more contextually sensitive research and assistance to athletes (Stambulova & Alfermann, 2009). Culture represents a socialization environment that teaches its citizens how to structure and process incoming information and also, how to weight this information (Chelladurai, Imamura, Yamaguchi, Oinuma, & Miyauchi, 1988). Thus, cultures may differ in their emphasis on competition and on motivational climate also in the world of competitive sport. From this view, one could expect different reactions of athletes to the demands of competitive sport, depending on the socialization and the values of their culture.

A cross-cultural study (Asghar, Wang, Linde, & Alfermann, 2013) that looked at a comparison between athletes on goal orientation found that Chinese and Pakistani players that represented collectivist countries, reported higher ego and lower task orientation compared to German players that represented an individualistic country. The cultural environment of the athlete also has an important role to play in the way emotions are regulated and the emotion regulation strategies used by an athlete (Uphill, McCarthy, & Jones, 2008). According to the TCTSA, factors such as goal orientation and emotional changes play a role in challenge and threat and differences may be expected amongst athletes across cultures. It is argued that cultural differences may have a profound impact on the way people conceptualise the world, the meaning they ascribe to events, and how they react to common life events (Owusu-Bempah & Howitt, 1994; Marsella, 1998; Triandis, 1999). Duda and Allison (1990) urged the field of sport and exercise psychology to expand its scope of research and practice to include more diverse populations as they highlighted ethnic/racial differences in motor performance, physical activity levels, and recreational sport participation. A recent cross-cultural investigation (Mohd Kassim & Boardley, 2018) between athletes from UK and Malaysia illustrated that athletes perceptions of their coach have important implications for athletes’ sport experiences in team and individual sports even in divergent cultures. While another recent study (Arnold, Ponnusamy, Zhang, & Gucciardi, 2017) that examined the cross-cultural validity of the Organisational Stressors Indicator for Sport Performers (OSI-SP) across three countries confirms the cross-cultural validity for the British and the Malaysian sample, however not for the Chinese sample. Cultural differences are also found between Australian and Indonesian athletes in the perceived effectiveness of coping strategies (Hoedaya & Anshel, 2003). Similarly, a difference was seen in the manner in which Australian and US (United States) student-athletes coped with stress (Anshel, Williams, & Hodge, 1997). Despite the indications that culture influences the psychology of athletes, the field has not consistently conducted research that is generalizable to people from diverse cultural backgrounds or include these constructs into theoretical approaches (Ram, Starek, & Johnson, 2004). Along with cross-cultural research, cultural research is also valuable in the field of sport psychology.

Cultural sport psychology offers rewarding outcome for researchers who embrace human differences and similarities in the pursuit of unified vision and shared growth within the auspices of sport (Schincke, Michel, Danielson, Gauthier & Pickard, 2005). The new cultural psychology understands culture in a very different way to the conventions within traditional cross-cultural work. Cross-cultural research views culture as an external factor that has an impact on psychological processes and human behaviour (Berry & Triandis, 2004), while cultural psychology was launched in response to the dissatisfaction with the universalism and decontextualized methodology of cross-cultural studies (Stambulova & Alfermann, 2009). Therefore, the main concern of cultural psychology is how culture underpins the psychological processes and is embedded in socio-historical contexts (Miller, 2002). The term culture is complex and can include all aspects of human lives and products (O’Dell, Abreu & O’Toole, 2004) and its consideration within the fold of sport psychology is undoubtedly daunting given the quantity of perspectives to reconcile, however for the purpose of this thesis culture will be used primarily with reference to different race, ethnicity, religion, norms, values, beliefs, goal directed behaviour, and collectivism, and individualism. In sport psychology, the multicultural research that has been conducted indicates that culture influences a variety of psychological variables. To illustrate, Schinke and Hanrahan (2009) suggested that the majority of the athletes, who come from individualistic countries such as USA, UK will interpret both success and failure primarily in terms of their own effort. On the other hand, collectivist societies such as China, Japan may evaluate success in relation to their peers, and attribute success to group related factors. They also found that although participants from both East Asian and European American backgrounds engaged in the use of psychological techniques such as self-talk, their cultures influence how self-talk related to performance. As East Asians’ proportion of negative to positive self talk increased, their dart throwing performance impoved. In contrast, European Americans larger proportion of negative to positive self talk were associated with poor performance. The characteristic of self-critical orientation amongst East Asians contributed to this finding. Thus, treatments and intervention implemented across athletes from various cultures may vary. In-light of these findings, as well as the expansion of the field of sport psychology, it seems appropriate to conduct cross-cultural as well as cultural research while taking into account the novel Indian athletic population. The majority of the studies included in the thesis (chapters 2, 5,6, & 7) can be considered as cultural research, while chapter 3 can be considered as a cross-cultural research study.

It was also thought appropriate to conduct the cultural research due to cultural background of the researcher. It seemed advantageous that the researcher and the participants came from the same cultural background which would help develop knowledge of the Indian athletes’ worldvidew and culture, and develop interventions in a manner that were culturally relevant. For example, the researcher would consider the impact of within country language differences from athletes and would better understand how culture impacted athletes’ development and informed their actions and responses to stress, attain specific knowledge about family systems and organisational heirerchies that affected the stress experiences. Researchers and practitioners are at a risk of misinterpreting emotional expression, verbal styles, or mannerisms if they are unfamiliar with cultural norms, which in turn can affect the intervention outcome (Barona & Santos de Barona, 2003). An applied researcher or practitioner’s credibility can be reduced if the client’s problem, treatment plan and therapeutic goals are communicated in a way that are inconsistent with the client’s culture (Bernal & Saez-Santiago, 2006). If a psychologist conceptualizes a problem, formulates solutions for the problem and sets goals for treatment in a manner that is incongruent with a client’s worldview, the potential for an effective relationship is also impaired (Sue & Sue, 1999). Thus it seems necessary to associate interventions with ethnically and socially diverse groups of individuals (Sue, Bingham, Porche-Burke & Vasquez, 1999). However, due to limited research in cultural sport psychology, there is little understanding among sport psychologists regarding how to work with clients of different cultures (Ram, et al., 2004). Attention needs to be given to develop more sensitive understandings of culture and to incorporate these understanding in the psychological contructs (Miller, 1999). Thus further research in cultural sport psychology is needed to increase our understanding of theories and sport psychology interventions that we previously thought to be universal. As Gill (2004) stated, “We can only make important contributions to the real world of developing sport and exercise participants when we incorporate and gender and *culture* analyses” (p. 497).

As proposed by Jones and colleagues, the TCTSA outlines more fully than other approaches of how athletes respond to stress, that is, why athletes perceive an upcoming competition as either challenge (positively) or threat (negatively), how they respond emotionally and physiologically when they do, and how challenge and threat states can influence performance. The TCTSA is a contemporary framework based on Western psychology and exploring the translation of this to the Indian athletic population will be valuable. With the knowledge that the demands and interpretation of the demands in sport could vary depending on culture (e.g., Asghar et al., 2012), it will be useful to investigate them in a previously unexplored Eastern population. This may provide further scientific evidence for the propositions within the TCTSA regarding the demand and resource appraisals. Finally, the thesis used the TCTSA as its theoretical framework to extend the limited knowledge in the area of challenge and threat about effective intervention strategies to reduce threat and enhance challenge in a ‘real world’ sport context. Thus as a result of the literature reviewed regarding the TCTSA, areas for investigation regarding challenge and threat in sport were identified and taken into consideration in the current program of research.

**1.11 Aims of the Thesis**

The thesis uses the TCTSA as its theoretical framework to:

1. Explore the sources of, and responses to stress amongst elite Indian athletes.
2. Investigate the responses to stress of elite Indian athletes compared to elite UK athletes.
3. Determine the effectiveness of interventions to reduce threat and enhance a challenge state amongst elite Indian performers.

**1.12 Anticipated Outcome from the Thesis**

The findings of this thesis will be novel as it investigates the experiences of a previously unexplored athletic population. The thesis will be one of the initial programs of work to present sources and responses to stress of elite Indian sport performers. Thus the contribution of the thesis will lie in adding to the inadequate literature regarding psychological stress amongst Indian performers. From these data, it will be possible to compare and contrast stress responses of athletes in an Eastern culture and a Western culture. Again, this will be one of the first cross-cultural studies illustrating how athletes respond to stress. The thesis will extend the limited knowledge in the area of challenge and threat about effective intervention strategies that may reduce threat and enhance a challenge state in athletes as well as coaches. The thesis may also provide preliminary evidence for the applicability of the TCTSA in a unique cultural context. Thus it is anticipated that the program of research will provide important implications to researchers and sport psychologists globally.

**1.13 The Program of Research**

To address the above aims, the program of research is organised into two parts. The first part of the thesis investigates psychological stress amongst elite Indian athletes, that is, exploring their demands, understanding how they respond to stress and also compare their responses to elite athletes from the U.K. Therefore, chapters two and three address the first two aims of the thesis. Subsequently, the second part of the thesis builds on the first as it centres on implementing interventions to help elite Indian performers cope with their demands and to help them respond to stress positively. Chapters five and six determined the effectiveness of intervention strategies in reducing threat and facilitating a challenge state in athletes. Therefore, these chapters use single-case research designs and address the third aim of the thesis.

Finally, chapter seven builds upon the emanating culture specific demands of Indian athletes from the first part of the thesis. To illustrate, Indian athletes’ demands included lack of support from Indian coaches or controlling nature of the coaches. During the applied work that the author was engaged in, it was observed that Indian coaches also experienced stress that was impacting their ability to provide appropriate support to their athletes. Research in samples from the West has shown that coaches are also susceptible to a wide range of stressors (e.g., Fletcher, Rumbold, Tester, & Coombes, 2011), however the assessment of the interventions with coaches is limited. Following the evaluation of the stressors of Indian coaches, chapter seven addresses the final aim of the thesis by focusing on implementing a unique theoretically guided intervention with a group of three high performance tennis coaches using a multiple-baseline design.

Chapter 2

**An exploration of Indian elite athletes’ sources of, and responses to psychological stress**

**2.1 Introduction**

To be the best in India, an athlete's skills must extend beyond the athletic. He must hurdle over shortages, wrestle with indifference and trade punches with adversity. He must be a fighter and survivor. All this even before he can dream of pulling on a tracksuit with the Olympic rings on it. (Ugra, 2004, p.5).

Many such anecdotes and narratives have been presented in the Indian media and press over several years which indicate shortages, indifferences, and adversities of Indian athletes and suggest that stress is a serious issue for Indian athletes. However, very little is known and understood about the sources of their stress, how they respond to it, the impact that stress has on their well-being and performance, and the strategies to help them cope with the stress. Culture underpins the psychological process and it is argued that variations in-group and their environmental demands can give rise to groups of individuals interpreting the same event differently (Lazarus, 1999; Miller, 2002). Thus it is important to understand how athletes from an Eastern culture experience their sport.

A search of the stress in sport literature revealed that athletes from the Eastern part of the world are under represented and the aim of this study is to identify the sources of and responses to stress of elite Indian athletes and therefore add to the current body of literature. This study will thus address the first aim of the thesis and will provide a comprehensive insight into the range of competition, organisational and personal sources of stress experienced by elite Indian athletes, irrespective of the sport they play. Investigation is also required to understand whether theories and constructs such as the TCTSA used in this program of research, emanating mainly from West are universal in nature. This research study traces the experiences of athletes’ through a cultural lens and maps any social and cultural factors that may impact their sources and responses to stress. Without this knowledge and understanding about Indian athletes, consultation and practice in sport psychology are likely to be ineffective (Ram et al., 2004). This chapter will therefore provide a basis to implement interventions with Indian athletes, which is another main aim of the thesis.

**2.2 Sources of Stress**

Children across the globe are encouraged to participate in sport, as physical activity is said to serve as a buffer to stress (e.g., Kimball & Freysinger; 2003). However, for the ones that excel as young athletes and perform at the elite level, sport participation itself can become a stressor (e.g., Kimball & Freysinger, 2003; Papanikolaou, Nikolaidis, Patsiaouras, & Alexopoulos, 2003). Early studies focused on competition stressors, which included stress experiences of athletes prior to, during or immediately following competition (e.g. Feltz, Lirgg, & Albrecht, 1992; Madden, Kirkby,Mc Donald, Summers, Brown, & King, 1995; Pargman, 1986). With the understanding that a comprehensive understanding of an elite athlete’s stressors requires consideration of the totality of his or her sport experience, both competition and non-competition sources of stress are now being considered in studies and while developing stress management interventions (Scanlan, Stein, & Ravizza, 1991; Noblet & Gifford, 2002). Studies predominantly emanating from the West have focused on understanding what athletes perceive to be their sources of stress and what are the demands placed on them. These studies have been conducted within various sporting disciplines including ice skaters (Scanlan et al., 1991), figure skaters (Gould, Jackson, & Finch, 1993), professional Australian rules footballers (Noblet & Gifford, 2002), wheelchair basketball players (Campbell & Jones, 2002), elite track athletes (Mckay, Niven, Lavallee, & White 2008), professional cricket batsmen (Thelwell, Weston, & Greenlees, 2007), South African non-elite athletes (O'Neil & Steyn, 2007), professional rugby players (Nicholls,Holt, Polman, & Bloomfield, 2006), skilled Mexican and U.S. tennis players (Puente-Diaz & Anshel, 2005), Canadian skaters (Vredenburg, 2007), college athletes (Anshel & Sutarso, 2007; White, 2008). From these studies, a large number of sources of stress have been identified and several appear to be common across sports, suggesting that there could be a core group of stressors experienced by all athletes (Mckay et al., 2008). The common stressors included expectations and relationship issues, pre-event concerns such as seeing opponents just prior to the competition, demands and costs of the sport, career development and life direction concerns, pressure to perform at a high standard.

Despite finding common sources of stress, there are also certain stressors that are unique to different sporting disciplines, environments and populations. For example, studies have been conducted amongst Australian footballers (Noblet & Gifford, 2002), and Mexican tennis players (Puente-Diaz & Anshel, 2005). Additionally research has been conducted with elite Chinese athletes (Anshel & Si, 2008), Jordanian student athletes (Abedalhafiz, Altahayneh, & Al-Haliq, 2010), and Chinese college athletes (Gan & Anshel, 2009) that are a part of the Eastern world. Some unique stressors that were reported include opponents cheating among Mexican tennis players, job insecurity among Australian footballers, and verbal abuse and culture specific environmental sources of stress among Chinese athletes. There are obvious applied benefits from understanding sources and responses to stress in a unique cultural context. Such knowledge would provide useful information to how, and why some individuals adapt to stressful situations, while others find it difficult, and in some cases impossible to do so (Abedalhafiz, Altahayneh, & Al-Haliq, 2010). As stated earlier, there is a dearth of research that provides insight into the stress experiences of Indian athletes and this chapter will help us understand any societal influences on the experience of stress and will further aid the efforts to apply findings from theoretically driven research.

**2.3 Stress in Indian athletes**

**2.3.1 Culture**

India has a rich cultural diversity and has had an impact on sports in the country. Various cultural sports which suit the environment of a particular culture and are promoted informally in that culture from one generation to another. These traditional sports include kabaddi, khokho, kushti, gulidanda, while cricket was borrowed from the British during the pre-independence period. Post-independence (1947), there was political and economic crisis and poverty amongst the people was looming large. In the 1950’s and 1960’s the focus of attention was on the development of the economy and the promotion of sports culture was a remote concept (Daily Excelsior, 2013, July 17). However with the high economic growth in the last two decades and an ever-increasing middle class population with disposable income and leisure time, together with rapid expansion of TV- owning households and a strong passion for sports, modern sports such as badminton, tennis, and football have gained popularity (The Diplomat, 2016, July 27). In the 1970’s and 1980’s, a few Indian athletes such as Prakash Padukone in badminton and the Amritraj brothers in tennis carved a niche for themselves and the Indian youth had role models to look up to. It was during this time, that young Indian athletes considered taking up sport as a profession. Also with the success of the Indian Premier League (IPL) over the last decade, India has gained it’s position as the new nerve centre and financial capital of world cricket (Majumdar, 2011). As Johri (former CEO of BCCI) stated, it has changed cricket in India by, “providing a tremendous platform for upcoming players” (Janardhan, 2018). The formation of newer leagues inspired from the IPL across various sports such as Hockey India League, Indian Badminton League, Pro Kabaddi League and the Indian Super League (Football) are changing the face and identity of Indian sports (The Diplomat, 2016, July 27).

Sports in India are now entering a new phase in its life cycle. A total of hundred and seventeen athletes across 15 disciplines participated in the Rio 2016 Olympics, which has been the country’s largest ever delegation to the Olympics, while a total of eighty-three athletes competed in 13 sports at the London 2012 Olympics. This was India’s most successful Olympics in terms of total medal tally, having won a total of six medals and doubling the nation’s previous record of three medals at the 2008 Beijing Olympics. Sports in India are in its initial phase of boom. A historical milestone was set for the female athletes who won two Olympic medals – Mary Kom in boxing and Saina Nehwal in badminton in 2012 and P.V.Sindhu in badminton and Sakshi Malik in wrestling in 2016. This record suggests that Indian athletes may do credit to themselves and the country but do not exactly come back with medals dangling on their chests. Medals in single digits should hardly be satisfying for a nation with over a billion people to choose its athletes from. Inability to handle the demands of the environment and pressure of the big stage has been cited as one of the key reason for why Indians have not been able to deliver at the Olympic Games (e.g., The New Indian Express, 2016, August 22). Thus identifying and understanding stressors of the Indian athletes and helping them cope effectively has become an important area in sport psychology.

**2.3.2 Stressors**

This study is of importance, particularly as the demands placed on Indian athletes are now increasing. In India, the Ministry of Youth Affairs and Sports hold the political responsibility to promote and develop sport in the country. In many developing countries, sport is not the top priority of the government and has thus resulted in limited provisions for training facilities, limited funding, and limited technical knowledge and continued professional development of the coaches (Andreff, 2006). This gives rise to a different range of stressors than those encountered by the sports performers in major sporting nations. Traditionally, the focus of sport psychology in India has been on improving performance. As such it will be beneficial to understand athletes’ sources to stress and how Indian athletes respond to the stress.

A report in the Economic and Political Weekly argued that there are certain factors that limit effective participation of individuals in sport in India (Krishna and Haglund, 2008). These factors they say are, health, education, public information and physical connectedness. In electronic news report, a sport psychologist, Kulkarni (2012) said, “Sport has always taken a back seat to studies for young Indians, or in any case the parents of young Indians.” She also continued to say that athletes do not receive proper support services in India and that the country does not have athlete friendly sports policies. Other factors such as the high carbohydrate Indian diet that leads to Indian athletes having a high fat percentage have also been cited as an issue (Gupta & Ranjan, 2012). A recent study (Sohal, Gervis, & Rhind, 2013) that explored organisational stressors amongst female Indian athletes identified several stressors, the most common being, perceived bias and lack of support from the sport organizations, limited access to support staff and lack of basic training necessities. Stressors specific to the Indian sports climate, such as, perceived gender discrimination and limited scope for a career in sports for female athletes were also identified. The stressors resulted in feelings of low environmental mastery and personal growth. There are some reports about the organisational stressors but none about the performance or personal stressors experienced by Indian athletes. Furthermore, a literature review showed that there is scarcity of knowledge and awareness about Indian sport performers amongst the international sport professionals and academies and there is also a need for extending knowledge about sports in developing nations (Hernandez, 2002).

**2.4 Summary**

To date only scant research has examined sources of stress with currently competing senior elite athletes at the top of their sport. There is a need to investigate the stressors that may operate in the Eastern culture and exploring interventions would be beneficial for practitioners from the Eastern part of the world to assist athletes to deal with the identified sources of stress. As detailed in chapter one, the TCTSA provides a conceptual and theoretical grounding for exploring stress experiences of athletes and the framework is used in this study to understand the demands and the resources of Indian athletes. The study will enrich the existing literature on stress by considering it in a different cultural context. The aim of the current study is to use TCTSA as a framework to explore demands of elite Indian athletes and understand how they manage their responses to stress and will thus address the first aim of the thesis. The study will evaluate whether the demands such as effort, uncertainty and perception of danger are perceived by Indian athletes and whether self-efficacy, perception of control and approach goals help athletes manage and cope with stress positively. It will determine whether these determinants of challenge and threat states are relevant to the novel context and will provide preliminary evidence if the theory is valid and applicable across cultures.

**2.5 Methods**

**2.5.1 Participants**

Ten Indian senior elite athletes from a range of sports currently participating at the international level were selected as participants for the study. This study aligned with the recommendations of Hanton et al. (2005) who stated that elite athletes include those that are current national squad members and/or performat the highest level in their sport. All elite athletes were selected through the access that the author had based on her applied work in India. The athletes were involved in cricket (n = 1), badminton (n = 3), tennis (n = 1), chess (n = 2), table tennis (n = 1), and athletics (n = 2). Typically the training week of these athletes consisted 24 hours of training per week. The age range of the ten participants was 19 to 30 years (*M* = 25.2, *SD* = 3.82) including 3 male players and 7 female players. The details of the players can be seen in appendix 2.1.

**2.5.2 Procedure**

Institutional ethical approval was gained prior to the interviews, an information sheet was given to the players and informed consent was obtained. It was emphasized that the involvement of the participants in the study was voluntary and anonymity and confidentiality was ensured. All participants were interviewed individually and they were reminded that they could withdraw from the study at any point. The information sheet, consent form can be seen in appendix 2.2 and the institutional ethical approval can be seen in appendix 2.3.

**2.6 Data Collection**

**2.6.1 Interviews**

The interviews were conducted by a female researcher with previous sport experience in India, which was useful and helpful in developing rapport with the participants as they felt comfortable sharing their experiences and stressors. A pilot interview was initially conducted with an elite badminton player, which was reviewed and discussed with the supervisor that allowed changes and development in the interview guide. The pilot interview helped establish the feasibility of the questions in the interview guide and also served as a training function. The interviews were then conducted within a six to eight week period. The interviews lasted between 45 to 60 minutes. The interview guide informed by the TCTSA, was developed with open ended questions with prompts and follow-up questions employed in order to elicit a breadth and depth in responses (Breakwell, 1995). The players were asked questions about their sporting experiences and were given an opportunity to tell their own stories. This helped articulate the stressors they have experienced in their sporting career. The interview guide can be seen in appendix 2.4.

**2.6.2 Design**

To achieve the answers to the research question a qualitative methodology was adopted to explore the stressors of Indian elite athletes. Thematic analysis was conducted to understand the sources and responses to stress. Thematic analyses through its theoretical freedom, provided to be a flexible and useful research tool for this broad and exploratory study. The thematic analysis allowed summarizing the key features of a large body of data and aided in highlighting the similarities across the data set. The thematic analysis worked to reflect the reality of the participants and the themes to be identified at the semantic level (Braun & Clarke, 2006).

**2.7 Data analysis**

Data analysis commenced immediately after the interviews were conducted. The interviews of the players were transcribed verbatim and the transcripts were read and reviewed in order to get familiarised with the data and raw themes were identified. Thematic analysis was conducted where the data was organised into themes using colour coding, which assisted in the coding and management of all the data. The data from the 10 transcripts were then analysed into first order themes and second order themes. With the emerging themes a deductive thematic analysis was conducted to organize raw data using a predetermined set of categories based on the TCTSA framework. Along-side this deductive analysis, inductive analysis was allowed to fit in themes such as organizational and societal demands that may not fit in the categories based on TCTSA framework.

**2.8 Validity and Reliability**

Given that the process of data collection, management, and analysis was completed by a single researcher working alone, it was deemed important to incorporate a number of checks into the research design to reduce researcher bias and maintain rigour. Throughout the data collection and analysis processes the researcher maintained a reﬂexive journal to help ensure that her personal experiences of sport in India are not unduly biasing her view of the data. During the data analysis the researcher engaged in sessions with a critical friend where they discussed coding decisions. This helped the interviewer become more aware of her own perspective as well as being aware of the perspective of the participants’ voice (Patton, 2002) assisting with self-correction during the process of research (Morse, Barrett, Mayan, Olson, & Spiers, 2002).

Validity was checked using respondent validation technique (Patton, 2002) where the participants checked the report to ensure the accuracy of the content, and satisfaction of the veracity of the overarching themes and constructs. The interviewer met with each participant after the interview individually and provided him/her with a copy of his/her transcribed responses to each question. Once data collection was completed and all data was initially analysed, the categorizations were e-mailed to the supervisor who played the role of a critical friend to check whether or not he agreed with the categorization decisions. Overall, the supervisor agreed with the manner in which the data was conceptualised. After discussing with the supervisor, the themes of ‘emotions of a positive valence’ and ‘positive cognitive appraisal’ were categorised into the umbrella theme of managing responses to stress. Thus commonly used methods of member checking and inter-rater reliability were used to demonstrate rigour (Smith & McGannon, 2018).

**2.9 Results and Discussion**

The purpose of this study was to explore the psychological stressors and demands perceived by elite Indian athletes. The study also investigated how athletes respond to their stress and thus identified the resources Indian athletes perceived as important to respond to stress positively. The higher order themes are thus categorised into two umbrella themes – sources of stress and managing responses to stress. A player makes a demand appraisal when it is recognized that it will take considerable amount of physical and mental effort to succeed. While a resource appraisal relates to a player’s ability to cope with the demands of a situation and include skills, knowledge, abilities, dispositional factors such as self-efficacy, perception of control, approach goals and external support available to the player (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003; Jones et al., 2009). Data was analysed in-line with the TCTSA framework and the demands and resources highlighted by the participants are presented in Table 2.1. Players however, also elicited some other culture specific organizational and societal demands and emphasized on some psychological skills they perceived as resources to cope with the pressures they faced which are presented in Table 2.2. For convenience and clarity, the themes from Table 2.1 and 2.2 are italicised in the text. In the following section the themes are discussed using the players’ ‘voice’ wherever possible. The ten participants are referred to as P1, P2, P3 and so on and the details of each participant are presented in appendix 2.1.

**Table 2.1: Sources of, and responses to stress of Indian athletes as supported by the TCTSA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Umbrella Themes** | **First Order Themes** | **Second Order Themes** | **Raw Data Themes** |
| Sources of Stress | Demands | Required Effort  Uncertainties in sport  Perception of danger  (Physical & Psychological) | Hard work and effort without the surety of results and guarantee of a win  Giving in equal effort everyday, every week, every month, every year over several years  Selections  Maintain rankings  Financial insecurity and uncertainty  Uncertainty of the performance and result  Uncertainty due to the possibility of injuries  Perception of danger from competitors or opponents  Individual performance harming team performance  Potential for harm from injuries |
| Managing responses to Stress | Resources | Self-Efficacy  Perceived Control  Mastery Goals  Emotions of a positive valence  Positive cognitive appraisal | Feeling confident in your strokes and abilities  Self-confidence  Belief in preparation and practice  Past performance and achievements  Vicarious experiences  Self-belief in tough situations  Feel in control of the mind  Focus on the process and not the result  Focusing on oneself  Comparing oneself and ones’ performances with opponents from other countries is detrimental  Being able to stay calm  Calm mind leads to better decision making  Perceiving pressure as positive |

**Table 2.2: Culture specific sources of, and responses to stress of Indian athletes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Umbrella Themes** | **First Order Themes** | **Second Order Themes** | **Raw Data Themes** |
| Sources of Stress | Demands | Organisational demands  Societal demands | Lack of support & perceived bias from the sport federations and coaches  Poor coach-athlete relationship  Lack of funds for training & inadequate competitive exposure  Poor sports infrastructure compared to Western countries & lack of adequate training facilities  Indian coaches authoritative leadership style / controlling coaches  Lack of available specialist coaching & sports science support compared to Western countries  No support during the developmental stage but only when an athlete becomes elite  Lack of financial rewards and recognition for athletes by the federations  Stringent participation rules of the federations compared to other countries  Long and monotonous training hours compared to training in USA  Favouritism & unfair selections  Unconducive Indian culture and environment for sport  Perceiving pressure from parents to win  Emphasis on professional academic education  Gender discrimination & pressure from fathers  Handling criticism by the media and public and pressure of what other’s will think  More recognition for cricket compared to any other sport  Traveling often due to less tournaments in India and staying alone during the  travel |
| Managing responses to Stress | Resources | Psychological skills techniques  Social support | Breathing exercises  Visualization  Journaling  Listening to music  Sport psychology sessions  Objective analysis  Rationalizing  Setting realistic goals and evaluating them  Energizing exercises  Belief in you shown by others  Support by coaches and team mates |

**2.9.1 Sources of, and managing responses to, stress amongst Indian athletes as supported by the TCTSA (see Table 2.1)**

In line with the BPS model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996) and the TCTSA (Jones et al.*,* 2009), the interviewees in this study suggested that their psychological demand appraisals included the *effort and hard work* required in sport, dealing with *uncertainties in sport*, and the *perception of danger*.

P 3 (age 27, female): you have to work hard you have to give your 100% everyday or 200% everyday but there is no guarantee that you will get success, or you will win that tournament, or you will win that year. You have to keep on working and keep on *giving that equal effort everyday, every week, every month, every year* no matter how many years.

P 6 (age 27, female): Uhh very stressful as first of all *no matter how much hard work you put in, it’s not guaranteed that you will win* the tournament or that you will be better than everyone else…

A high demand such as intense physical effort that outweighs the resources available to athletes has been previously cited as a stressor that may have negative consequences such as burnout (Smith, 1986). The effort-reward imbalance model (Siegrist, Siegrist, & Weber, 1986) posits that a failed reciprocity between high efforts spent and low rewards received elicits stress reactions. Similarly, participants suggested that often they perceived stress due to the *amount of effort* they are required put into practice which may not be proportionate to the results and rewards they may achieve in sports. Players thus associate the significant amount of effort that they need to put in with the *uncertainty of the results* and outcome in sports. A demand appraisal is also made when a player feels unsure and *uncertain of how he or she may perform in competitions*.

P1 (age 19, male): Firstly I wanted to win badly..I just used to think that I have to win this match somehow…so when I’m down when I’m trailing it used to increase my pressure..so that used to happen it used to increase my pressure. It never used to let me play my game.

P2 (age 28, female): Well I don’t know if it’s specific to chess or not but it’s the pressure of performing..like you have to win something.

Past research has demonstrated a link between social uncertainty and cardiovascular reponses associated with threat (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). The uncertainties that the players in this study perceived as threatful included the *financial insecurity and uncertainty*, whether the player is able to *maintain rankings* and ratings, whether he or she is able to *perform during selection matches* and tournaments and also the uncertainty perceived due to the *possibility of injuries*.

P 10 (age 30, male): Well one of the things is that you never have is money being an athlete in India, unless you know you play cricket or something, which is very well funded. So for most of the while many players are earning money week by week…you know they get a weekly salary and often you’re playing a match thinking about how much money you’re going to make even though that’s not the right way to do it. This (tennis) is a game of rankings..the money comes with rankings so you’ll always think about that.

P 4 (age 28, male): As a player it is definitely uncertain because you never know when you’re going to get injured..because even like in my junior days when I was the favourite to win the junior nationals two weeks before that I injured my knee so I couldn’t play the junior nationals which was my last year so in that sense it’s very uncertain..

P 7 (age 24, female): so yeah it is very uncertain with the injuries part..may be some athletes don’t even get that financial support..it is very uncertain..because I have read about so many people who went to world championships being national record holders and now doing something..like selling…groceries at grocery store...like there’s a volleyball player who does that..so it is very uncertain if you don’t have a real strong team it is very hard to get to that level..

Along with causing uncertainty, injuries are also *perceived as dangerous* to the sporting career. P5 (age 23, female) said, “the basic thing is that you need to be really careful about injuries and things..mainly hamstring injuries because to get out of it takes a lot of time so injuries is the main thing that stresses me.” Along with physical harm such as injury, a demand appraisal is also made if a player perceives his opponent to be imposing psychological threat.

P1 (age 19, male): And another thing is..you see an opponent and when you see him dressed well, he’s strong, he’s tall that also is stressful. You think he’s a good player, you see he has a good racket..before even playing a match its stressful so a lot more factors like that..you know we discussed about stereotypes.

P3 (age 27, female): playing matches and playing tournaments is a different pressure..the way we compete, the different opponents who…by seeing we get irritated or we feel these are the opponents who we can never beat.

Research suggests that an athlete in a threat state is less likely to involve himself in competition, as he would adopt an adaptive behaviour (such as freezing) which allows him to monitor whether a potential demand is dangerous (Blanchard, Flannelly, & Blanchard, 1986; Jones et al., 2009). The participants indicate that strong opponents can be perceived as dangerous and similar evidence is found in martial arts where performers freeze while fighting higher belts (Kesting, 2016). Players also perceived danger and felt vulnerable due to the stress and *pressure felt while playing for a team*. Players illustrated through the following quotes:

P8 (age 19, female): challenge is that I’m playing in this team means I have to perform well because I’m chosen for this team..that means I have to perform well..so that time I think that ..I need to..means if my particular scores goes up then my team score is also going up but that time little bit pressure it will be there because I’m playing first time for India team..there will be pressure I know that.

P9 (age 27, female): even though I played an individual sport..if I was playing a team championship and you are playing a decider match or if you are playing a match which made importance or was of importance to the tie as a whole then of course it would put a lot of pressure.

P 2 (age 28, female): the 5th person wasn’t confident enough but I was also not confident enough because I had to play the same opponent I had played the day before and had lost with her.. and since I had lost 2 games in a row I didn’t know how I would play because I had blundered at a certain point so I was not really sure..but the other girl was 100% sure she did not want to play so it was almost like I was forced to paly and the night before I was in a dilemma if I can give my best for the country because I was playing for India and I just thought I have to give my best I have to play and I slept off ..

A common theme within the quotes of the players above is that they link the pressure they perceive to the fact that they are playing as a part of a team. It can also be observed that athletes from individual sports (e.g., chess) when perform at team events feel increased pressure during competition. Similar observations are recorded by Chidley (n.d.) in her applied work with golfers. Participants thus emphasized on their demand appraisals posited by the TCTSA, which include required effort, uncertainty and perception of danger. Players recognised the amount of physical and mental effort they needed to put in to their sport (effort), without any guarantee of success (uncertainty). They also perceived injuries (physical danger) and strong opponents (psychological danger) as harmful. An interesting observation was that the demand appraisals were at times inter-linked. For example, the players are required to put in significant amount of effort with the knowledge that the results they will achieve are uncertain. Perhaps, the amount of effort is perceived as a demand owing to the uncertainties in sport. Another finding was that certain factors (such as injuries) may lead to appraising multiple demands. To illustrate, the possibility of injuries was perceived as a demand due to the uncertainty of getting injured at any point and also because it was perceived as dangerous as it would impede their progress in sport. It is noteworthy that the TCTSA has been applied in this study in a manner that was not intended by Jones and colleagues (2009). They described challenge and threat as anticipatory states, however it can be observed that the components of the TCTSA apply across the sport experience for the athletes involved in this study. The TCTSA suggests that self-efficacy, perception of control, and goal orientation determine challenge and threat states and the interaction of the three constructs help us understand athletes’ responses to pressure situations. The participants highlighted the importance of *having* the *confidence in executing skills (self-efficacy), self confidence,* and also having *belief in one’s own preparation,* drawing upon their *past performances and achievements*, *vicarious experiences*, having *self-belief in tough situations*.

P1 (age 19, male): First of all you need to put 100% effort in practice because that’s when you know you’re able to play the stroke properly and you have the confidence…confidence is the main thing..you have that confidence that I’ve played this stroke I’m perfect at it..whatever the situation is I’ll be able to play that stroke..whatever the situation is. That helps. And one more thing that you just need to have belief in yourself that I can do it and I’m the best and I can do it. However bad the situation is I can still do it. So you shouldn’t give up even if you’re trailing or whatever..there’s always a chance.

He also said that, during matches I used to think I have trained, I have put everything in practice..pressure doesn’t matter I just need to play my game. He added, having confidence in myself, my strokes, my abilities, my past performance, the games I play, the situation where I’ve come back, the tournaments I’ve won..all that helps.

P2 (age 28, female): I had faith on my preparation and I saw some of the best games I had played before.. and what my mind-set was then and how I felt and I tried to do the same.. so I saw some TV shows something that will have a good effect on me and I’ll be happy and I just went with that mind-set in the game and I think that was one of the best game I played in that tournament.

Self-efficacy is described as judgments of what an individual can accomplish with his/her skills (Bandura, 1986). Self-efficacy is said to be an important aspect of the resource appraisals because an athlete’s belief that they have the skills necessary to execute the courses of action required to succeed clearly contributes to a perception of being able to cope with the demands of the situation (Lazarus, 1999). Past research also demonstrated that high self-efficacy buffers the experience of stress and individuals are expected to feel challenged, whereas low self-efficacy puts the individual at a risk for an increase in threat (Jerusalem & Schwarzer, 1992). Similar to previous research (e.g., Watson, Binks, & Kawycz, 2011; Wurtele, 1986), the participants state some of the sources of self-efficacy such as performance accomplishments, vicarious experiences, and verbal persuasion.For example, P1 states that saying, “I can do it and I’m the best” which illustrates the use of verbal persuation, while P2 states that watching the best games (i.e., performance accomplishment) created a sense of self-efficacy. Thus the results extend previous conceptualisations to self-efficacy beliefs within athletic settings. Considerable research highlights how confidence and self-belief along with self-efficacy are an important of successful sport performance (e.g., Besharat & Pourbohlool, 2011; Cox, Shannon, McGuire, & McBride, 2010). However, it is not enough for an athlete to believe that he has sufficient skills to cope with the demands of the situation. An athlete must also perceive she has sufficient control to display those skills. Self-efficacy is associated with *perceived control* because individuals need to believe that they are in control, and can intentionally execute their actions, for self-efficacy to develop (Bandura, 1997). In this study, players highlighted that it was important for them *to be able to feel in control of their mind* and *focus on the process (focus on what is in control)* during crucial situations in games and matches.

P 6 (age 27, female): I got really excited and I just thought I just need to draw I don’t even need to win so…and then everything was like completely out of control..even my mind..I just couldn’t think properly..because suddenly I lost my focus and I started making mistakes and I could not concentrate properly because I was only thinking that just a draw is enough..

She continues to say, so I think you should not think of the end result is what I feel..what I feel the difference in both the situations was..like in Olympiad I was not thinking of whether I am winning or not but I believed what I was calculating is right..I need to hold this position and from there I need to play..but here I was thinking Oh I need to make a draw..somehow I need to make a draw and I was not calculating..

P2 (age 28, female): So I stopped thinking about the result and I was thinking I should play a good game and I should not bother about the result anymore..I had already lost so many games that the result didn’t matter anymore at that point. That was the key that I was then able to play really good games and the results came automatically.

Players indicated that thinking about factors that are in one’s control are helpful while thinking about factors that are not in one’s control such as the result of the game was detrimental to their performances. Previous research also suggests that athletes whose emphasis gets weighted towards the uncontrollable outcomes (e.g., medals, podium, finishing order, comparative standings) experience heightened anxiety, tension and pressure (Hermansson & Hodge, 2011). Athletes with an internal locus of control (similar to perceived control) viewed their competitive anxiety as positive for performance (Ntoumanis & Biddle, 1998) and competitive swimmers have reported symptoms to be under control as positive for performance (Hanton & Cannaughton, 2002). Research also supports that perception of control is positively correlated to coping, and subsequently satisfaction of performance (Pensgaard & Ursin, 1998). The TCTSA also supports this as it suggests that if an athlete accepts that there are aspects of the situation that cannot be controlled (e.g., the outcome of the match – wining or losing) but chooses to focus on aspects that can be controlled (e.g., focusing on the process of how to play - calculating), a challenge state may follow. However if he or she fixates on aspects that are out of his or her control (such as the result) it will lead to a low level of perceived control and a threat state will occur. Thus what an athlete is striving for and the types of goals is clearly important for challenge and threat states (Jones et al., 2009). The players spoke about being able to *focus on oneself* to perform well and how *comparing oneself and ones’ performances with opponents from other countries* was harmful and affected their sport performances negatively.

P7 (age 21, female): we had two jumps so yeah both of us had 2 jumps left..so I did 5:31 and the other one did 5:30 so it was just a 1cm difference and for a jump in the sand ..1cm is just like moving your feet may be at an ants length..that small..and then she jumped 5:32 with her next jump..so I just had a jump left and that pressure..I just thought my head is going to burst right now right there and then I just thought.. can I even jump?!! I was like I can right? So ya but then I did it so aggressively that I jumped 5:50 but then I fouled..

She was asked if she felt the pressure and doubted herself because she was competing with someone at that stage in the athletic event meet.

She answered, “Yeah because I was thinking that I have to go further than her..I should’ve focused on myself.”

P1 (age 19, male): So yeah in badminton, you start comparing with other countries.. If you take China you start thinking he’s too quick, he’s too fast, I don’t even stand a chance. That’s what every Indian athlete faces. Before you even see the draw if you are playing a tournament, you know the Chinese are playing, the pressure is there.

Theoretically, it has been proposed that emphasis in task involving or *mastery goals*, which are, self referenced are related to enhanced sport performance (Duda, Chi, Newton, Walling, & Catley, 1995). Similarly P7 communicates that focusing on herself and her own goal may have helped her perform better. On the other hand, a focus on ego/performance goals where players’ sense of competence depends on demonstrating superior performance to others (as explained by P7 and P1) has been linked to debilitated performances. Research that examines the relationship between achievement goals and challenge and threat appraisal illustrated that mastery approach goals are associated with challenge appraisals (e.g., Adie, Duda, & Ntoumanis, 2008; McGregor & Elliot, 2002). Thus it can be suggested that for successful performances, mastery goals should be encouraged. The TCTSA also suggests that individuals with mastery goals will view an upcoming competition as a challenge and when competence is determined by self-referenced standards, it is more likely for a player to view a demanding and potentially stressful event as a challenge.

**2.9.2 Positive emotional states and positive cognitive appraisal**

Two other themes that emerged in order to manage responses to stress were having *emotions of a positive valence* and a *positive cognitive appraisal of stress*. The participants mentioned the importance of emotional states in their interviews.

P 2 (age 28, female) said, when I’m calm and I think okay there will be some unexpected moves and then when I think calmly I am able to find a solution even after that but, if I just panic during the game it happens that I have an alternative and I choose the wrong one.

P6 (age 27, female) said, so uh I was a little over excited I wouldn’t say stressed but a little over excited and in (difficult) situations like this it’s important to be calm.

The interviewees suggested that possessing the *ability to stay calm* made it easier for them to win matches under pressure as it helped them stay focused and think clearly so they could make the *right decisions during a match*. This is supported by Saarni (2004) who suggested that emotional self-regulation is the functional capacity necessary for an individual to reach their goal (winning a match) after an emotional eliciting encounter (pressure situation). The TCTSA also proposes that a positive physiological and emotional state will lead to improved decision-making. Players also stated that *perceiving pressure as positive* helps them perform better. P3 (age 27, female) said, “times when I’m under pressure I try to think positive, uhh I keep on telling my self it’s okay I can do it..there’s no problem in having pressure, I just have to focus on one point at a time.” Athletes who perceive their anxiety symptoms as helpful to performance report more positive feelings (e.g., excited, relaxed) and less negative feelings (e.g., tense, angry) than athletes who perceive their anxiety symptoms as unhelpful to performance (Jones & Hanton, 2001; Mellalieu, Hanton, & Jones, 2003). Similarly, the TCTSA proposes that athletes who perceive their emotions as helpful for performance will experience a challenge state. Perceiveing a competitive situation as a challenge is helpful as it means that there is need for less regulation as this is an adaptive approach for competition. Perceiving pressure as positive can be said to be a challenging cognitive appraisal following which positive emotions are likely to occur and is likely to be perceived as beneficial to performance (Skinner & Brewer, 2004). This reflects that emotions play a central role in sport performance (Jones, 2003) and that it may be important for athletes to be able to draw on a range of strategies to enhance emotional control and manage physiological states, which can contribute to, improved performance levels. Past reasearch suggests that performance routines and cognitive interventions can be effective in changing the intensity of an individual’s emotional state (e.g., Uphill & Jones, 2005; Uphill & Jones, 2007). In this study, players illustrated various psychological skills that they use to respond to stress, which are highlighted followed by the culture specific demands communicated by the participants in the subsequent section.

**2.9.3 Culture specific sources of, and managing responses to stress amongst Indian athletes (see Table 2.2)**

Certain stressors such as perceived unfairness in the selection process, limited support from organizations have been discussed in previous research and thus may not be completely unique to Indian athletes, however the data has been collected in a unique setting and the culture influences the unique experiences of Indian athletes and shows a difference compared to previous research. For instance, research in the West (e.g., Arnold & Fletcher, 2012) illustrates sports governing bodies as stressors for athletes due to lack of organisation after the resignation of a coach, while Indian athletes state stressors such as lack of financial rewards and recognition for athletes by the federations. Therefore, these *organisational demands* are categorized as culture specific sources of stress of Indian athletes. *Societal demands* specific to the Indian sports climate are also highlighted in this section (see Table 2.2).

Several players reported experiences of various stressors resulting from the *lack of support and* *perceived bias from the sport* *federations* *and coaches*. Interestingly, the sports federations were repeatedly identified as a major organizational stress almost by all participants. Players mentioned about *stringent participation rules of the federations compared to other countries, lack of financial rewards and recognition for athletes by the federations and lack of support during the developmental stage* of an athlete*.* A selection of quotations has been provided to highlight the complexity of the organizational demands.

P2 (age 28, female): you have to go through the federation to give your entry and things so you have to be good with the federations, you have to follow their rules..like you have to play certain tournaments like nationals..only then you qualify..now its changing but earlier it used to be a big problem because there’s a very huge gap in Indian women chess…apart from the top 6 or 7 players the rest of the players are 200 to 300 rating points down so I don’t see any sense in playing and competing some 2-3 tournaments.. compulsorily.. and now I’m already playing 8 to 9 tournaments a year so playing 3-4 tournaments there I don’t see any point or any progress in that for me.

P5 (age 23, female): So when we have selections there is a lot of politics, they will select students that belong to a certain state..or a certain academy.

P4 (age 28, male):..so if you take the example of CWG (CommonWealth Games) I should have been there but it didn’t happen because I wasn’t part of a certain academy…that is the only pressure..

P9 (age 27, female): There’s no support in the development phase per se..its only when you start doing well that the support starts to come in..so that’s one of the biggest factor’s ..

P7 (age 24, female): So yeah even if you qualify for a particular meet you don’t go there because there is so much politics up there at the federation and everything that if you don’t have a Godfather up there its not possible for you to go and even if you didn’t qualify and if you have a Godfather and even if you have jumped crap you would still make it to the team and get an India colour to go and represent there..

These results corroborate with previous research as these organisational stressors have emerged amongst female Indian athletes (Sohal et al., 2013). Male participants in this study also perceived lack of support and perceived bias from sport organisations. Scarce resources, misallocation of resources, and lack of transparency have eluded sports in India (Mynkosh, 2016). Popular media in India have documented various other organizational stressors that elite athletes encountered within the organizations. These included*, lack of funds for training and inadequate competitive exposure, and poor infrastructure compared to Western countries and lack of adequate training facilities* (e.g., Bhatia, 2011, September 17; Kahn 2010, September 29). Players illustrated these as stressors when interviewed about their demands.

P6 (age 27, female): the federation also needs to be active and conduct more tournaments in India and promote the players..they don’t even think about all of this..somehow the federation has no aims for winning anything and it really affects

P3 (age 27, female): Uhh off table, actually playing in India for so many years you are accustomed to these facilities that you get, so there are no more complaints now..so even if the hall is small, there are no sufficient tables, no sufficient lights…we are okay..we just want to play because we have been doing that since we were children..but ofcourse when we go out to play international tournaments we find that change, but we are happy playing in that surrounding..we don’t complain that..here it is so good everything is so perfect, why can’t it be like that in India? Because we know the truth, we know the reality so it’s okay.

P2 (age 28, female): There’s not really very good support I would say as sports is not considered up to that standard in India..as there is more importance given to academics and in 8th or 9th grade you’re asked to decide whether you want to do academics or sport..and everyone prefers to stop any sports and choose academics…and apart from cricket I don’t think any sport is given much recognition ..so I think that plays an important part..because if you work so hard then there should be some kind of recognition for the hard work you have done..so I think that plays an important role.

*Lack of funding* is an important source of stress for elite athletes reported even by athletes in the West (Hanton & Fletcher, 2005; Arnold & Fletcher, 2012). Indian players that participated in this study felt that other than cricket no other sport is well funded. However, research with elite athletes in the West has seldom, if ever, reported a lack of basic training facilities such as an indoor swimming pool for training in the winter (e.g., Fletcher et al., 2012). Another major demand was the *coaches’ authoritative leadership style and controlling nature.* Participants’ quotes below, effectively shows that due to lack of say in the decision-making, the participants experienced low autonomy and *monotonous training routines*. A study amongst Indian athletes showed that repetition of the same movements with the same intensities may not improve performance all the time, it could plateau the performance due to the adaptation of the central nervous system which results in lack of stimulation (Sankar, 2016). Traditionally, India is a collectivist nation with a preference for hierarchical organization of power and respect for seniority (Yadav & Katiyar, 2012). Consequently, there is still centralization of decision-making power and high dependence on the senior coaches and officials (Kumar, 2007). Participants seemed to have a *poor coach- athlete relationship* due to perceived *favouritism* and additionally seemed to be frustrated by the organizational climate as they had *limited or no access to specialist* *coaches* *and sports science support compared to Western countries.*

P4 (age 28, male): The thing here is that people are not free to do what they want..the coaches, the associations they want to control all the players which I feel for the growth of the game is very bad..

P7 (age 24, female): whole training thing..so in India I train twice a day..so it is like after a point.. 3 – 4 years I did this..train twice a day..and got so monotonous that I got bored and one fine day I was like I just don’t want to do this..because its so boring..5 o’clock get, up 5 o’clock eat, go training, come 9 o’clock, eat, sleep, get up, eat, sleep, train, come back tired, eat, sleep..that was from Monday to Saturday and Sunday I didn’t do anything because Sundays is the only day I didn’t have to do anything like this..but there (in USA) it was so nice..

She continues to say, And then the coaches in India are .. like you have to be very..on the tip on toes to be answerable to him..and the coach works? ..no we actually we work for the coach..the coach doesn’t work for the athlete..so when he is going to come, we have to go that time..

She also says, If you’re talking about India, it’s the coaches because every coach has many athletes he wants to see the one who is his favourite, he wants him to get better and have better conditions. So I have been to a couple of coaches and I have had that bad relationship with the coach and a bad experience.

P5 (age 23, female): Yeah like I train at Deccan so the coach which we have..he just concentrates on one person and ignores everyone else so that did affect my work-out and my performance in some way and I never even really came out of any of my injuries because he never really guided me with any of my injuries so that did affect my performance a lot.

The athlete also says, in India it’s like one coach teaches all the events so like..I have been doing so much of stamina work which is not needed for a 100, 200 athlete. It’s high time we need specialist coaches.

P9 (age 27, female): I missed out on a point of support systems when you asked me the challenges as an Indian athlete. So the sports science support per se which is still not as developed in India as would be in Western countries so I think that is one of the things that I would like to add.

Difficulty in gaining access to serious sports training in India has been a root problem for ineffective participation (Krishna & Haglund, 2008). Elite players have a limited access to specialists coaches and support staff perhaps due to the non-existence of graduation degree in sports coaching in India and wide spread unawareness, among departments and institutions of higher education in physical education and sports (Kansal, 2010).

Players in this study also illustrated *societal demands* such as *perceiving pressure from parents and emphasis on professional education in India*.

P 2 (age 28, female): I don’t know may be its more in India or our families or something..but you know that you have to win each and every game..

She continuous to say, I think its just the parents mind-set in India..I don’t think there’s any other reason for this..like everyone wants to be a doctor or an engineer or a lawyer. Because its not given enough importance..if you give sports enough encouragement I am sure there will be more people to get into sports from a young age… That’s why at 7th or 8th the marks are given importance and the Indian mind-set is to focus on your studies and you have to get good grades…in my home luckily even though my parents are dentists they never forced me to, but I’ve seen people around me and even the society around me.. the first thing they ask you is what is your qualification and have you graduated and what is your degree.

P3 (age 27, female): more than you, your parents need to have patience…my parents didn’t have that patience and they still don’t have that patience..so I find that quite stressful and quite demanding..

A popular Hindi saying translates to, “if you study hard you will live like a king but if you play sports you will ruin your life.” For parents from an average Indian household, education tends to be the highest priority. Investigations of the social support experiences of sport performers show that social support is associated with better performance while stressors are associated with worse performance (Rees, Hardy, & Freeman, 2007). The perception of parents and their behaviours interpreted by their children as either supportive or stressful has consistently been reported as a significant predictor of children's affective reactions in sport (e.g., Fredericks & Eccles, 2002; Leff & Hoyle, 1995). Previous researchers have demonstrated that players who reported higher pressure from parents were worried about meeting their parent's expectations and experienced higher levels of state anxiety (Scanlan & Lewthwaite, 1984). Similarly, past research has reported that pre-competition anxiety, perceived competence, and internal control was directly linked to parental expectations, involvement, and perceived pressure (Gould, Eklund, Petlichkof, Peterson, & Bump, 1991; Weiss, Weise, & Klint, 1989). As a parent's level and intensity of involvement in their child's sport increases, children tend to report feeling "trapped" and may experience sport burnout (Coakley, 1992). A very strong family bond exists among Asians and generally lasts a lifetime. In times of emergency and hardship, a person can fall back upon his or her family for emotional and material support. The downside of such strong family bonds is that one sometimes has to sacrifice his or her own interests for the sake of family. India is a typical Asian country with a strong sense of family values. Respect for elders and heeding their advice are considered sacrosanct. Indians hold professional education, especially medicine and technical education in very high esteem. Parents who cannot fulfil their dreams of professional education try to fulfil it through their children. In many cases, the children are forced by their parents to pursue a career that is not of their choice. Parents’ willingness to finance their children’s higher education contributes to this phenomenon (Acharya, 2003; Lamis, 2001).

Parents also believe that sport can be an inappropriate career option for females in India and the players reported to feel pressure particularly from the father. The following quotes illustrates female participants’ perception of *gender discrimination and pressure from father*:

P8 (age 19, female): that time I used to pull the ball and most of the uncles used to say you are a girl..playing cricket?!..oh my god! And hitting a boy for a sixer and that time one of our coach who took me in this field..he saw me playing with the boys..he talked to our family..my father was first against this..he was not allowing me..

P3 (age 27, female): so I never actually enjoyed going with my dad for the tournaments, there was pressure..but then when he decided not to go for the tournament that was like a relief for me..since then I’m enjoying it more..

Previous researchers in sport have shown that perceived pressure from fathers was negatively associated with the child’s feelings about their sport involvement (Kanters & Casper, 2008). A possible explanation is the lack of involvement that mothers play in sport, as sport is predominately masculine with less opportunity for both girls and women to be involved (Theberge, 2003). Along with giving academic studies the upper hand over sports and many families that believe that sports is just for those who are not good at studies. Gopalkrishnan (2015) eloquently points out in an interview, restrictions on Indian women playing sports can range from “don't play with boys, how can you wear shorts, there is no future in this, you should learn how to manage the house”, or the classic “sport is not meant for girls, it spoils their character, or affects their chances of marriage.” The *Indian culture and environment is not conducive* for professional sports persons for several other reasons. The demands expressed by the players include *criticism by the media and the public* and the *pressure of what other’s will think* and hence wanting to be at the top, *traveling often due to less tournaments in India* and *staying alone* while they travel for tournaments throughout the year.

P10 (age 30, male): And another thing is you always want to be on the top so the moment you..the Indian media and Indian people..a lot of mentality is such where if somebody wins we always say the other person plays bad or if somebody loses we find ten faults in why he is not a good player. So yeah always plays on the back of your mind because people are direct in pointing out mistakes in you rather than praising you when you do something right.

He continues to say, no matter how much you don’t want to play for the crowd. You’re always thinking what the next person is thinking about you, what the old players are thinking, what the press is thinking about you. So yeah it does, it does play on you’re mind.

He also says, P10 (age 30, male): we have to travel a lot, our tournaments are never in the same country and they are never in the same place..so some of them are but most of them are not..so you’re out about 30 -35 weeks a year..you’re always on the road, your always alone..very few people have the luxury of travelling with somebody so that’s really tough.

P7 (age 24, female): we think what will people think..what will that particular coach think..we don’t do it for ourselves..we try to like you know impress this coach or may be some senior official there or a manger or may be some president of the athletics federation..really at the end nobody’s going to come with us..even if we go to the Olympics..everyone will take the credit that yeah she ..I knew her..but you know its your hardwork.

P9 (age 27, female): I think in India everybody is always judging you..there’s no scope for errors per se..you’re either good or you’re bad..it isn’t like you’re developing..

Recent evidence suggests that exposure to social-evaluative threat (SET) can elicit a physiological stress responses (Woody, Hooker, Zoccola, & Dickerson, 2018). The demands mentioned above led to participants experiencing a lowered sense of personal growth as they posed hindrance to the athletes reaching their full potential. India does not have a sports culture and Indian athletes who have achieved international success are exceptions rather than products of the country’s sports systems, explained Boria Majumdar, an Indian sports scholar. He added that unless there is a synergized sports culture, India will never win a string of medals (Chandran, 2016). Although athletes perceived that the mind-set of Indian public, media or the environment in general is not conducive for professional sports persons to succeed, it is important to note that these stressors may not necessarily be unique to India. However, the *lack of recognition for athletes from sports other that cricket* appears to be a demand faced by Indian athletes. For instance P2 said, “and apart from cricket I don’t think any sport is given much recognition..so I think that plays an important part. Because if you work so hard then there should be some kind of recognition for the hard work you have done.” An article by Kapoor (Indiatimes, 2015, April 10) reports that cricket maintains an iron grip on India’s sporting landscape and that cricketers get more fame than an Olympic medalist in India. The report also corroborates with the results observed in this study. Kapoor stated that due to the lack of funds and facilities, inferior quality training equipment and not much support from sporting federations, the country is lagging behind in non-cricketing sports. Several culturally relevant organisational demands and societal demands are existent for elite athlete in Indian across various sports that may not fit into the TCTSA framework. This study has thus identified the unique sources of stress that Indian athletes encounter.   
 The participants in this study elicited that implementing psychological skills helped them respond to stress in a positive manner. To enhance the psychological component of physical movement, mental skills training has been recognised as an effective method (Driskell, Copper, & Moran, 1994; Feltz & Landers, 1983). Primarily, mental skills training has developed from the necessity of the athlete to learn more about their individual mental life to allow a degree of control in coordinating effective movement through various psychological states of performance (Martens, 1987; Rushall, 1992). The ability of the individual to conduct mental and emotional elements assists task performance as well as creating a psychological foundation for confidence and well-being (Boyd & Zenong, 1999). The TCTSA posits that an athlete who believes he or she has the necessary skills to cope with the demands of the situation and execute the strategies required to succeed will experience a challenge state in competition. Research has investigated the use of imagery as a strategy in creating a challenge state (e.g., Williams et al., 2010; Williams & Cumming, 2016). In one study, athletes who followed a threat imagery script perceived the task to be significantly more of a threat and their cognitive anxiety symptoms to be more debilitative towards performance compared to athletes who followed a challenge imagery script. Moreover, they felt significantly less in control than the challenge group and believed they would perform significantly worse. While in the other study, no differences were found in the physiological response intensities for both stress-evoking scripts, however these responses, along with anxiety symptoms, were interpreted as facilitative during the challenge script and debilitative during the threat script. Thus overall, results support the use of imagery to facilitate an adaptive stress appraisal. Participants in this study emphasized on some *psychological skills* they perceived as resources to manage and cope with pressures they faced (presented in Table 2.2). A technique that several players illustrated they used to stay calm was *breathing technique:*

P3 (age 27, female): I have to remind myself (of) my game and try to play the next point and do my breathing exercise between the points because that helps me to calm down.

P9 (age 27, female): Breathing techniques – because they help you stay in the present and they help you keep your mind in control.

When P7 (age 24, female) was asked: Okay and what are the things or what ways have you found most effective in reducing pressure or reducing the stress that you feel? She replied, “Breathing.”

Breathing technique is a somatic approach to improve performance which helps increase the level of self-awareness, that contributes to enhanced self-monitoring and self-regulation (Prentice 1998). Several studies in sport and exercise psychology suggest that, breathing techniques are a central component in stress and anxiety reduction (e.g., Berger & Motl, 2008; Peden, 2007). Players used other techniques such as *setting realistic goals,* *visualization, energizing exercises, and listening to music* before matches to cope with the demands of competition. P4 (age 28, male) said, “ In a match, before getting onto the court I have my own preparation. I just visualize the whole situation because I’ve played so much.” Imagery control is a cognitive approach that also correlates to better performance (Annett, 1995). Psychological interventions can have an influence on physiological states and research has also shown that energizing exercises (i.e. physiological arousal) and music can have an effect on the arousal regulation (Barwood, Dalzell, Datta, Thelwell, & Tipton, 2006; Jones 2003; Nilsson, Unosson, & Rawal, 2005) and help enhance athletic performance (Dorney & Goh, 1992; Gould & Udry, 1994; Karageorghis & Terry, 1997; Krumhansl, 2002). P10 (age 30, male) describes the same by saying,

And another thing is, pre match I think listening to music and I do a lot of explosive exercises which helps me reach that mental level because you know I’m generally very aggressive on court so I need to be at that when I get on. Yeah it’s fast and it’s very selective..like I listen to the same song a 100 hundred times. I don’t change the song. So I just try to relate myself with that song I try to be the hero within that song and come out on top.

Ness (1997) suggested that a way to train an athlete’s mind and help him or her to develop a habit of mental toughness was through “*journaling*.” By writing down thoughts in an organized and systematic way, an athlete is said to actively train his mind. P9 (age 27, female), said writing diaries helped because, “ it gives you an *objective analysis* and uhmm..basically *rationalizing* or sticking as close to reality as much as possible so *evaluating your goals* more often.” Past research with athletes also shows that journaling allows individuals to develop a toolbox of coping options for different situations (Reed & Giacobbi, 2004). Players also reported that seeking *sport psychology services* helped them cope with stress and pressure and guided them with the psychological skills training that they should follow.

When P7 (age 27, female) was asked, “Okay so what do you feel an athlete requires to cope with pressures or to cope with the stressful aspects that they face?” She responded saying, “A psychologist! ..Yeah because like you can’t go and talk all this with your parents because they are not really into all this and after a point their patience level is out.”

While P6 (age 27, female) said,” a psychologist..doing sessions has definitely helped and uhh meditation..breathing has helped..focus-defocus has helped.”

A sport psychologist is one who looks at how sports performance is affected by the athlete’s emotional well-being as well as how to increase motivation and help an athlete keep focused (Undiyaundeye & Ukwayi, 2015). Sports persons face enormous pressures, and while coaching enhances individual sporting competence, the assistance provided by a sport psychologist provides the individual’s emotional competence (Anderson & Williams-Rice, 1996). Like the participants suggest, sport psychologists equip the athletes to handle the pressure on the field and cope with other human faults in the game of sports (Blocher 2006). Thus, similar to past research (e.g., Arnold & Sarkar, 2014; Gould, Eklund & Jackson, 1993; Gould, Finch & Jackson, 1993; Spriddle, 2004;), the participants in this study also used variety of strategies and techniques to manage and cope with the on field and off field demands in sports. Finally, the Indian participants also perceived that *social support* helped them manage their stress effectively. P6 (age 27, female) said, “ when *someone believes in you* that also helps..like your *team mates and coach*.” Several studies indicate the importance of social support as a resource for athletes to be able to cope with life stressors and also appears to be central in their success (e.g., Blascovich et al., 2003; Feltz, 1984; Holt & Dunn, 2004; Rees & Hardy, 2000). Social support provided by coaches, teammates are said to make a unique contribution by typically providing support requiring expertise in sports, while parents and friends were identified as providing complementary types of support not requiring expertise, such as providing opportunities for participation and role modelling appropriate sporting engagement (Knight, Berrow, Harwood, 2017; Rosenfeld, Richman, & Hardy, 1989). Social support is said to promote a positive reappraisal of stress, however it is important that the support provided needs to be offered by people that the athlete shares a strong social identification with (Slater, Evans, & Turner, 2016). This is essential so that the social support provides a valued resource at a personal level and the athlete can make use of the support being offered, subsequently facilitating the reappraisal of stress. In turn, social identification and support play a positive role in promoting an adaptive psychophysiological response (i.e. a challenge state) to stress (Slater et al., 2016).

The use of psychological skills training and social support have emerged as factors that help athletes manage their responses to stress. Although these two factors are not considered to directly determine challenge and threat according to the TCTSA, psychosocial factors such social support and social identity have been suggested to enhance resource appraisals and/or reduce demand appraisals. That is, reducing perceptions of danger, uncertainty and required effort, and/or enhancing self-efficacy, perceptions of control, and approach goals, will enhance the likelihood of approaching stressful situations in a challenge state rather than a threat state (Slater et al., 2016). Although research is very limited, some evidence (e.g., Williams et al., 2010) suggests that psychological skills (such as imagery) may be effective in enhancing self-efficacy and the perception of control to create a challenge state in athletes. It can be argued that cultural differences may have an impact on the way athletes conceptualize demands and resources to manage stress. Elite Indian athletes attributed social support and the use of psychological skills as their resources to cope with their demands and manage their responses to stress.

**2.10 General Discussion**

Very limited research has been conducted with Indian elite athletes, specifically to the context of stress. This is a novel study that qualitatively explores the sources of, and responses to, stress amongst male and female Indian elite athletes. It is also one of few studies conducted with Indian elite athletes, by an Indian, in India. This combination allowed for in depth exploration of the stressors because the researcher had first-hand experience and understanding on the Indian sports climate and the researcher had an established rapport with the participants developed during her applied consulting work, which helped the participants feel comfortable sharing their experiences.

The results of the study suggest that the demands of uncertainty, effort and perception of danger were perceived by Indian athletes. Demand appraisals such as a player perceiving danger due to the possibility of an injury, feeling uncertain about the way he may perform and a player recognising the large amount of physical and mental effort to succeed in sport has been revealed in previous research about the TCTSA. The inter-related resource appraisals of self-efficacy, perception of control and goal orientation were also found to be relevant amongst Indian athletes. The determinants of challenge and threat states that arose from research in the West also emerged from a sample from an Eastern culture suggesting that the TCTSA may translate across cultures. The importance of emotional states and the cognitive appraisal in perceiving stress either positively or negatively also emerged within the themes. The study provides preliminary cross-cultural validity and generalizability of the TCTSA framework and establishes its applicability in a different cultural context. As the TCTSA may translate across culture, researchers and practitioners can be suggested to use the framework to investigate psychological stress amongst athletes from an Eastern culture.

The deductive analysis led to the emergence of stressors that fit into the TCTSA framework, while the inductive analysis allowed culture specific stressors to emerge. Thus, the culturally sensitive approach also offers an understanding of the demands and resources that are not built-in in the TCTSA framework. The organizational stressors that emerged from a sample of Indian athletes were lack of support from sport federations, lack of adequate training facilities and inadequate competitive exposure, coaches authoritative leadership style, lack of available specialist coaching and sports science support, poor coach-athlete relationship, poor sports infrastructure compared to Western countries and a lack of adequate training facilities, lack of support during the developmental stage of an athlete, lack of financial rewards and recognition for athletes by the federations, stringent participation rules of the federations compared to other countries, long and monotonous training hours compared to training in USA, and favouritism and unfair selections. While the culture specific societal stressors included parental pressure and emphasis on professional academic education, gender discrimination and pressure from father and unfavourable culture and environment for sports in India, handling criticism by the media and the public, frequent travel due to less tournaments in India and staying alone during the travel. The lack of recognition perceived by athletes other than cricket players in India is also specific to the Indian sports environment. The cricket player (P8) that participated in the study described threat and danger she perceived while playing for team “India.” It could also be that cricket players perceive more competitive stressors due to the highly competitive nature of the sport in India, however the organisational stressors may be less owing to an established and developed federation.

Along with culture specific stressors, the inductive analysis also brought out the psychological skills such as breathing techniques, visualisation, journaling, objective analysis, rationalizing, setting realistic goals and evaluating them, energizing exercises and listening to music, that the players reported as resources to manage the demands of sport. Past researchers have provided evidence for the use of these psychological techniques and its benefits in performance enhancement (e.g., Birrer & Morgan, 2010; Kuan, Morris, Kueh, & Terry, 2018; Sorenson, Czech, Gonzales, Klein, & Lachowetz, 2008). The players also mentioned that doing sessions with a sport psychologist and social support also helped them to cope with their demands. This highlights the importance of considering research from other cultures and countries in order to develop more comprehensive frameworks in sport psychology. Similar coping strategies have been identified among athletes from another Easter country (i.e., Korea) that included psychological training, somatic relaxation, and social support (Park, 2000). This chapter adds to the current literature on stress in sport by exploring the sources of, and responses to, stress amongst elite Indian athletes using the TCTSA framework and addressed the first aim of the thesis.

Some key points that emerged from this study are that, perhaps similar to the resource appraisals, the demand appraisals may be inter-linked and also that a single factor (such as injury) may lead to appraising more than one demands appraisal. Also, that the components of challenge and threat apply across the sports experience for athletes and thus challenge and threat may not be only ancipatory states. The demands placed by the society and need for social support to cope with the demands emphasize the importance of the social context and that it is a part of an individual’s environment which must be considered as part of the transactional approach to approaching stressful situations (Haslam, O’Brien, Jetten, Vormedal, & Penna, 2005). Based on the excerpts of the participants, it may be also suggested that the demands placed on the athletes may differ from one sport to another. Specifically, participants differentiated between cricket and other sports. This study thus provides certain novel findings, some of which are considered to build the subsequent studies.

**2.11 Limitations and future recommendations**

Various stressors that fit in-line with the TCTSA emerged, however it is not an exhaustive list. In the culture specific stressors, several organisational demands emerged. Organisational stress is said to be by its nature, negative in content (Woodman & Hardy, 2001). The present study sought out stressors amongst athletes, which were perceived to be negative. Thus the study may not present a balanced view of Indian sports. The study explored the stressors and collectively resulted in presenting frustration and helplessness in players. There are various positive characteristics of the sports organizations in India, which can be explored to get an understanding of what helps the athletes cope with the pressures.

A qualitative methodology was adopted and thus the study was limited by a small sample size of senior elite Indian athletes. Studies can be conducted to explore the demands of junior performance players in India to get a holistic understanding of the stress experiences. It can be suggested that the TCTSA that has emenated from the West, be tested in other diverse cultural settings (e.g., China) with participants from a wide array of backgrounds. Cultural research will contribute in testing the validity of the TCTSA in an Eastern sample. It should be noted that the results of the study show that the group of elite Indian players perceived the demands of uncertainty, effort and perception of danger, however the study does not establish if each individual player reports all the demands. The study also presented a list of psychological skills that players felt they could use as a resource along with the support of a sport psychologist and also social support from others such as the coach or teammates. This provides an indication for sports organizations and federations in India to appoint sport psychologists and other sports science experts to aid athletes. Sport psychologists also work on developing a positive coach-athlete relationship and building cohesion amongst teams, which may help athletes perceive support from coaches and teammates. However, further research needs to be conducted to help establish the use of psychological skills training in promoting a challenge state in athletes.

The demands and resources as proposed by the TCTSA were found be relevant amongst elite Indian athletes, however the way they understood the terms “challenge” and “threat” was different and not as defined by Jones et al (2009). Although, the players though of challenge as positive and threat as negative, they did not identify with the term challenge as appraising sufficient resources or threat at perceiving insufficient resources to meet the demands. For instance, P10 thought of challenge as working on aspects in his sport that he was not able to execute to his best and thought of threat as threat of losing to other competitors. When he was asked the following question, “In some countries the terms challenge and threat are used to describe how individuals respond to stress. What do you understand those terms to mean? He answered,

A challenge would be if I’m capable of doing something and doing something better..so if I can serve 3 out of 4 serves where I want them to be or I need a 100% service record in a particular game..its very difficult to do that in a set..but if I want improve on my service percentage I would take it as a challenge and say every day every week I would maintain a log and try and get better at that. And if I would say threat the first thing that comes to my mind is threat from people who I compete with.

The first language of Indians being Hindi and not English, there could be differences in semantics and how the terms are understood. Thus the applicability of the terms challenge and threat across cultures may need to be examined.

A variety of sports were considered in this study, which allowed for the identification of stressors in different organizations, however it did not provide sufficient levels of detailed information on each sport and each organization. Further research could be conducted with a large number of athletes from one particular sport, highlighting the stressors specific to a sport organization in India. This study suggests that interventions and policies should focus on reducing socio-economic inequalities to increase participant in sports (Kamphuis,Lenthe, Giskes, Huisman, Brug, & Mackenbach, 2008) other than cricket in India. The present study also includes both male and female Indian athletes and future researchers may consider identifying gender differences as stressors such as gender discrimination emerged from this study. Considering the inherent nature of the stressors in the culture, and the limited say of the sport performers in India to actively improve their environment and surrounding contexts, stress management interventions should focus on empowering the individuals function optimally within the stressful environment and flourish (Seligman, 2011). The present study adopted a holistic approach to the sources of stress, a further consideration for future researchers is exploring the distinction between the varying categories of stress sources amongst Indian athletes. This would further aid researchers to examine how athletes will respond to varying form of stress, which has been lacking.

**2.12 Conclusion**

This is the first study in sport psychology literature to explore the stressors of Indian athletes using the TCTSA as a framework and to understand its applicability across an eastern culture. The study adds to the current literature in two main ways (i) it helps identify the sources of stress and the responses to stress of elite Indian athletes and thus addresses the first aim of the thesis (ii) it also helps establish that the TCTSA translates across cultures and that understanding challenge and threat in sport is important empirically and practically.

This study highlights that elite Indian athletes perceive the determinants of the challenge and threat states as proposed by the TCTSA. Thus similar to athletes in the West, Indian athletes’ demand appraisals are made when they perceive physical or psychological danger, uncertainty and when they recognise that it will take much physical of mental effort to succeed at the task. Their resource appraisals include self-efficacy, perception of control and focus on approach goals. The TCTSA framework was thus found to be relevant to the novel context and may be applied across cultures and practitioners from other cultures may use the framework to inform their work. However, culture specific demands and resources also emerged. Based on these findings, the subsequent cross-cultural study developed to gain an insight into any similarities and differences in how athletes from the West (UK) and the East (India) respond to stress. This cross-cultural study will address the second aim of the thesis. The present study demonstrates the importance of the social context and establishes that the role of psychosocial factors (such as social support or social identity) during a stressful situation should not be overlooked. Thus, in the next chapter social identity and its relationship with challenge and threat and its determinants is also investigated. It is also suggested that the demands of each sport may differ and that particularly cricketers may perceive stressors that vary from other athletes in India. Thus cricketers were considered in the following study.

The emergence of other stressors that do not fit into the TCTSA framework suggests that researchers and practitioners from other Eastern countries must explore the players’ demands that will also help develop other culturally applicable interventions. The experiences of Indian athletes help us understand that more effective strategies must be explored to help Indian athletes cope with their stressors and increasing demands. They help us understand that the interventions for the Indian players may need to be flexible depending on the needs of the players and the sport they are involved in. Thus, the single-case research design studies will follow the cross-cultural study and address the final aim of the thesis.

The culture specific demands that emerged also provide sport psychologists, coaches, parents and sport organizations in India an insight into the stressors of Indian athletes. This study also suggests that along with high self-efficacy, high perception of control and focus on approach goals, proving social support and support through sport psychology sessions or mental training and implementing psychological skills interventions may also promote a positive stress response amongst Indian athletes. It is hoped that this study will further research and applied practice in sport psychology in India, particularly using the TCTSA as a framework.

Chapter 3

**The challenge of elite sport: A cross-cultural study in Indian and British Cricketers**

**3.1 Introduction**

M.S. Dhoni (member of the Indian cricket team) described stress as, “having 100 kgs put over you. That’s good enough to weigh you down. After that even if you put a mountain, it will not make a difference.” (Firstpost, 2014, March 31)

Data from chapter two suggests that the stress experiences of Indian athletes may vary depending on the sport they are involved in. Particularly, participants reported differences in cricket and other sports in the country and stated that cricket is better recognised and funded in India. The cricket player who participated in the previous study, seemed to experience competitive stressors, while the other athletes seem to perceive more organisational stressors. Cricket by its very nature is said to expose players to a diversity of stressful situations before and during competition (Miles, Neil, & Barker, 2016). This study considers cricketers and investigates how they respond to stress (i.e., as challenging or threatening) prior to competition, using the TCTSA as a framework. The previous chapter provides some indicative evidence about the responses to stress amongst Indian athletes and the current chapter builds on it by further investigating responses to stress amongst Indian cricketers and comparing it with cricketers from the West. The current chapter thus includes a cross-cultural study and forms an important study in the program of research.

The aim of the study is to investigate how elite cricketers from India respond to psychological stress and compares the responses to elite cricketers from the UK. This chapter will thus address the second aim of the thesis. This study will establish any similarities or differences that may be present in the way elite cricketers across cultures respond to stressful situations. This will be the first cross-cultural study involving athletes to investigate psychological stress using the TCTSA framework and therefore will add to the current literature on stress and challenge and threat states. The previous study illustrated the important role of psychosocial factors during a stressful situation and the participants included in this study came from socially and culturally diverse backgrounds and thus social identity was also examined. That is, whether there is a difference in the way Indian cricketers identify with their team compared to the British cricketers. The chapter will also provide a preliminary investigation of the relationship between social identity and challenge and threat states and its determinants. The introduction is further structured in four parts. First a theoretical background to the study is outlined, second psychological stress is discussed, followed by a discussion of social identity. The final part details the need for cross-cultural research.

**3.2 Theoretical background to investigating the psychological responses to stress**

Competition offers challenging situations, which gives rise to intense responses from sport performers. Athletes and teams are required to exert effort to attain their goal or goals in competition (Seery, 2011). As stated in chapter one, a key approach is the dichotomous conceptualization of stress that explains how players respond in situations by considering whether the situation is perceived as a challenge or threat. The TCTSA offers an insight into how athletes have a negative or a positive response to stress. The theory proposes that in performance situations, demands and resource evaluations are made as a result of the appraisal process (Jones, et al., 2009; Seery, 2011). Thus, appraisals are fundamental to understanding the manner in which athletes respond to competitive demands (Holt & Dunn, 2004; Thatcher & Day, 2008). The demands of the situation might not differ for challenge and threat states; instead it is the evaluation or the appraisal of the available resources in relation to the demand that leads to a challenge or a threat state (Meijen, Jones, McCarthy, Sheffield, & Allen, 2013a). Again as outlined in chapter one, the resource evaluations comprise three interrelated constructs: self-efficacy, perceptions of control, and achievement goals. High levels of self-efficacy, perceived control, and a focus on approach goals underpin a challenge state, while low levels of self-efficacy, perceived control, and a focus on avoidance goals underpin a threat state. Several studies provide evidence for the link between the resource appraisals to challenge and threat states (e.g., Chalabaev, Major, Cury, & Sarrazin, 2009; Quested, Bosch, Burns, Cumming, Ntoumanis, & Duda, 2011). It is essential to understand the way in which an athletes appraises the competition situation as it can influence the emotional and behavioural response to it and thus have implications for sport performance (Joneset al., 2009; Neil, Fletcher, Hanton, & Mellalieu, 2007). An investigation of sub elite cricketers’ experience of competition stress and emotions highlighted self- confidence and perception of control as variables that influence the emotive and behavioural outcomes of a stressful transaction (Neil, Bowles, Fleming, & Hanton, 2016). In addition, the findings illustrated that individuals’ progress through a continuous cycle of appraisal that is closely attached to their personal values, beliefs, and commitment to achieving personal goals (Lazarus, 1999; Uphill & Jones, 2007). The data revealed that these cricketers’ appraisals were linked to their perception of goal attainment that, if seen as endangered, led to a situation being appraised as threatening (Holt, 2003; Holt & Dunn 2004), and resulting in emotional and behavioural responses capable of disrupting performance. Thus research that considers the resource appraisals and its impact on athletes’ psychological responses to stress is essential and valuable.

Based on the TCTSA framework, the current study investigates whether Indian and British cricketers perceive high/low levels of resource evaluations, that is, high/low self-efficacy and perception of control, whether their focus is on avoidance or approach goals, if their emotions are perceived as helpful to performance and finally if they perceive they have the available resources to cope with the demands of competition. Considering cricketers from India that represents a collectivist culture and cricketers from the UK which is more of an individualistic culture, the study investigates if any cultural differences exist in how cricketers respond to stress. The present study contributes to the extant literature in two ways. First, it explores the responses to psychological stress in elite cricketers. Examining the resource evaluations will provide an indication of whether elite cricketers respond to stress positively (i.e., as challenging) or negatively (i.e. as threatening). Second, it determines any cross-cultural differences and or similarities in the responses of stress associated between elite cricketers from India and the UK.

**3.3 Stress in cricket**

Every sport has a unique nature and previous literature has reinforced the need to examine the psychological requirements of specific sports (e.g., Mckay et al., 2008; Thelwell, Weston, & Greenlees, 2010). Cricket has been chosen as the sport for this study due to its unique demands, its popularity and competitive nature in India and the UK. Cricket as a sport, has a large mental component (Bull, Shrambrook, James, & Brooks, 2005; Sanctuary, Smith, & Thombs, 2010). Cricket is played over long periods (test matches last for 5 days) and teams can spend a long time together for weeks or even months, thus increasing the demands on the cricketers (Smith, Arnold, & Thelwell, 2017). Also, much of the stress and coping research has been directed towards individual and predominantly closed skill sport and cricket by contrast is an interactive, open skill, team sport where stressful situations frequently occur (Thelwell, Weston, & Greenlees, 2007). The sport also has varying distinctive challenges. Cricket is considered to be both a team and an individual sport (Cotterill, 2011). For example, while operating as a team sport is it composed of very discrete passages of play, which involves the bowler bowling the ball to the batsman. While, a batsman has to take on the entire opposition team, which includes the 10 fielders, and bowler with only one team-mate for company. Cricket batting in particular is a very difficult skill, with minimum error tolerance and severe time constraints (Muller & Abernethy, 2006). Cricketers may thus face numerous stressors and are required to respond effectively to the challenges of the game.

Previous researchers have highlighted that stress can influence athletes’ well-being as well as performance and has emphasized the stressful nature of elite and professional sport (e.g., DiBartolo & Shaffer, 2002; Humphrey, Yow, & Bowden, 2000; Noblet & Gifford, 2002). Research lacks formal exploration of psychologically demanding environments for elite Indian cricketers, however chapter two provides a number of reasons for why sport is psychologically demanding in India. Some of the culturally specific organisational and societal sources of stress that emerged in chapter two included lack of support from associations and federations, lack of funds for training, lack of sports science support, excessive pressure from parents and emphasis of professional academic education and gender discrimination. Indian cricketers often speak about their performance pressures in the media (e.g., Press Trust of India, 2017, September 26). For instance, Manish Pandey (a member of the national team) speaks about his pressure of holding on to his spot in the Indian team and says the only way he can beat stiff competition is by scoring runs. Good performances in tournaments are perceived as crucial, as players do not get too many opportunities due to competition for places. Players thus feel the pressure to perform to get selected in teams. Even for elite cricketers in England, performance scrutiny is unremitting even in training, where the athlete is compared with others for team selection under conditions of high expectation, requiring a continuous investment of substantial effort in the pursuit of successful performance (Turner et al., 2013). An autobiographical study that investigated sources of stress amongst elite cricket captains from across the world recognized stressors such as team stressors, multiple roles, interaction with other players, selection, interaction with other personnel, the media and extreme situations (Smith et al., 2017). While another qualitative study from the UK that investigated sources of stress amongst cricket batsmen reported stressors such as match specific issues, current playing status, relationship with important others, perceptions of self, external influences, views of others, opponents, and technique (Thelwell et al., 2007). In sum, arguably the biggest challenge to a cricketer is not the learning of the skills (most players have reasonable techniques), but being able to deal with the many psychological factors that can affect thinking and ultimately performance during a game (Barker & Slater, 2015). Therefore, in terms of the present study, it can be suggested that a greater empirical insight into how elite cricketers respond to stress is necessary. One factor that may have an impact on the stress response is social identity.

**3.4 Social Identity**

Given that it is the interaction between demand and resource appraisals that determine challenge and threat states (Blascovich & Mendes, 2000), it is clear that any psychosocial factor (e.g., social identity or social support) that may produce a positive reappraisal is highly valuable (Slater et al., 2016). As stated earlier, social identity may enhance resource appraisals and/or reduce demand appraisals (i.e., reduce perceptions of danger, uncertainty and required effort, and/or enhance self-efficacy, perceptions of control, and approach goals) and increase the likelihood of approaching a stressful event as a challenge rather than a threat. Thus relationship between social identity and challenge and threat states and its determinants is investigated in this study. The previous study as well as past research (e.g., Haslam et al., 2005) suggests that the social context that is a part of an individual’s environment must be considered as a part of the transactional approach to approaching stressful situations.

According to the social identity theory, the individual defines him or herself partly in terms of salient group memberships. Identification is the perception of oneness with or belongingness to a group, involving direct or vicarious experience of its successes and failures (Tajfel & Turner, 1979). Identification induces the individual to engage in, and derive satisfaction from, activities congruent with the identity, to view him or herself as an exemplar of the group, and to reinforce factors conventionally associated with group formation, such as, cohesion and interaction (Ashforth & Mael, 1989). Support provided by other members that an athlete shares a strong social identification with is said to promote a positive reappraisal of stress (Slater et al., 2016). This study investigates whether both groups (i.e., Indian cricketers and UK cricketers) identify with their teams.

The participants in this study were included from socially and culturally diverse backgrounds and their demographic differences included ethnicity, nationality and even gender as the Indian group had female respondents. These categories intersect in novel and interesting ways. For example, the women cricketers from India, which were typically not given importance, now challenge traditional stereotypes and create new hybridized identities (see Crisp et al., 2001). These changes have the potential to impact how individuals conceptualize the self (Crisp & Hewstone, 2007). A growing body of research suggests that multiplicity of the self is generally a good thing (Sonderlund, Morton, & Ryan, 2017). For example, membership in multiple groups has been associated not only with improved emotional well-being (Binning, Unzueta, Huo, & Molina 2009; Jetten, Haslam, Pugliese, Tonks, & Haslam, 2010), but also mental and physical resilience (Jones & Jetten, 2011), quality of life and coping (Haslam, Holme, Haslam, Iyer, Jetten, & Williams, 2008) and stress and social adaptation (Iyer, Jetten, Tsivrikos, Postmes, & Haslam, 2009). These positive effects are commonly attributed to the idea that identifying with multiple social groups grounds people more firmly in their social world, and provides them with multiple connections to similar others (Haslam et al., 2008; Jetten, Haslam & Haslam, 2012). The meaning and social support that follow from these connections, in turn, provide resources from which individuals can draw personal strength, resilience, and guidance in terms of values, attitudes, and behavior (e.g., Chang, Jetten, Cruwys, Haslam, & Praharso, 2016; Jetten et al., 2015; Steffens, Jetten, Haslam, Cruwys, & Haslam, 2016). Because of these properties, the greater the number of group memberships one has access to, the better one is likely to function (Sonderlund et al., 2017). This study will primarily examine whether there is a difference in the way Indian cricketers identify with their team compared to the British cricketers. The study will also provide a preliminary investigation of the relationship between social identity and challenge and threat states and its determinants.

**3.5 Cross-cultural differences and the need for cross-cultural research**

Researchers have often argued for the innumerable theoretical and practical benefits of comparative studies across cultures. According to Duda and Allison (1990), cross-cultural research provides a basis for comparisons with the mainstream culture, helps understand the structure and values of a society, and is especially useful for multicultural societies. Such studies are consistent with the nature and goals of scientific inquiry and often reveal theoretical knowledge that goes beyond the limited and sometimes biased view of research that examines a single group of individuals or behaviours. They assert that a more systematic examination of the influences of the racial or ethnic factors in sport behaviour is needed as people from different cultural backgrounds perceive and respond to life events differently.

The area of athletic career development has traditionally been dominated by a Western perspective, an imbalance which has had a considerable influence on studies in sport psychology (Stambulova & Ryba, 2013). Theories and constructs have mainly emanated from Europe and North America and close inspection of Euro-American theories, constructs, models and paradigms reveals their limits in accurately depicting the lives and the worldviews of Non-Western population (Parham, 2005). The multicultural research that has been conducted indicates that culture influences a variety of psychological variables. Despite the evidence that culture influences the psychology of athletes, the field has not consistently conducted research that is applicable to people from diverse cultural backgrounds or included these constructs in their theoretical approaches (Ram et al., 2004). Investigators have examined, personality traits, stress, coping responses and psychophysiological symptoms among individuals of different ethnic backgrounds. For example, individuals from a range of contexts other than sports (e.g., work place, academics, military, etc.) are also often required to perform important tasks under extreme stress. Cross-cultural studies have been conducted amongst American, Chinese and Japanese high school students and results showed that Chinese and Japanese students reported less stress than American students (Crystal et al.*,* 1994). In the area of sport psychology, a cross-cultural study has been conducted among Australian and Greek basketball referees where cultural differences were found in the perceived intensity of stress and their personal dispositions (Kaissidis, 1994). Differences and similarities have been noted between ethnic groups in achievement motivation and task/ego orientations in sport contexts (Hayashi, 1996; Kim & Gill, 1997). The first part of the research program that included Indian athletes provides evidence for some common sources of stress that have been also reported by Western athletes. The common stressors included required effort without surety of the results, uncertainties in sport – financial uncertainty, uncertainty about the results, maintaining rankings and perception of danger from competitors and potential harm from injuries. However it is not known if such results can be seen due to cultural similarities as the stressors have been explored in different cultures but not explored across cultures. There is also support that certain stressors are unique to different sporting disciplines, environments and populations.

To date no published research exists that investigates the cross-cultural differences in how athletes respond to stress. Also very little research has specifically studied the Indian population and compared and contrasted to the Western world. The Indian culture is unique and complex. A social scientist of modern India, Mukerjee described India as, “a museum of cults and customs, creeds and cultures, faiths and tongues, racial types and social systems” (Jayapalan, 2008, p.6). India presents diversity in its cultural and social patterns. It is a land of many languages and professes all the major religions of the world. The elite cricketers in India that play together as team also present endless varieties. It is suggested that a group of individuals may respond to stress in a uniform manner and therefore for a full understanding of how a group of individuals respond to stressors, their unique perceptions require consideration. Without the knowledge and understanding of how culture can affect sport experiences, motivation, meaning of achievement and other psychological processes, consultation and interventions are likely to be ineffective.

Sports governing bodies and academies in India have been hiring foreign coaches and sports professionals (Press Trust of India, 2018, July 5) and evidence based recommendations will help sport psychologists and coaches support Western as well as Eastern cricketers while keeping in mind the cultural differences. There is a need to understand who the athletes are, where they come from, how they are socialize and what is important to them and how they deal with their experiences of stress and pressure in sport. This study will help explore and understand any similarities and differences in the way elite cricketers in the East (i.e., Indian cricketers) respond to challenging and performance situations compared to those in the West (i.e., British cricketers).

**3.6 Summary**

The game of cricket presents its players with several obstacles and challenges, which elite players need to respond effectively to. The aim of this study is to investigate the responses to stress of Indian cricketers compared to cricketers from the UK and will thus address the second aim of the thesis. No such cross-cultural study that examines the responses to stress amongst elite cricketers has been found in sport psychology literature. The TCTSA classifies players into those who respond positively to stress and perceive competition as a challenge and those who respond to stress negatively and perceive competition as a threat. Similar to chapter one, the TCTSA provides the theoretical framework for this study as it specifies the resource appraisals underlying challenge and threat states. Results from chapter one suggest that along with athletes from the West, Indian athletes also perceive the resource appraisals of self-efficacy, perception of control and goal orientation to be relevant. Given that cricket is a developed and a well supported sport in both countries, it can be hypothesized that both groups will perceive sufficient resources to cope with the demands of the sport.

**3.7 Methods**

**3.7.1 Participants**

A total of one hundred and twenty elite cricketers that included 60 participants from India (40 males, 20 females) between the ages of 19 and 26 years (M = 20.43, SD= 1.73) took part in the study and 60 male participants from the UK between the ages of 19 and 36 years (M = 25.83, SD = 4.75) were included in the study. Based on Cohen (1992), 60 participants were recruited in each group, which is required to detect a medium effect size (Chuan & Penyelikidan, 2006). Participants from India competed at levels ranging from first class domestic cricket to international cricket with an average of 6.3 years (SD = 1.62) years competitive experience. The Indian participants played cricket an average of 44.13 (SD = 7.42) hours per week. Whereas, participants from the UK competed at levels ranging from first class county to international cricket with an average of 8.7 (SD = 4.09) years competitive experience and the participants played cricket an average of 38.65 (SD=8.81) hours per week. The sample from both groups are considered to be comparable as participants from India as well as the UK had participated in first class cricket which is an official classification of highest standard matches in the sport of cricket.

**3.7.2 Measures**

A number of self-report measures were used to assess participants’ psychological response to competition and players were asked to complete all measures as if they were about to play in an upcoming important competition. The instructional set and the directions given to the participants were adapted from Jones and Uphill (2004). The instructions included, “we would like you to imagine that you are about to compete in the most important competition of the season. Recall and focus on the thoughts and feelings you experience before an important match. Now imagine you are completing the questionnaire 30 minutes prior to the start of the match and we request you to complete this questionnaire as honestly as possible.” The questionnaire pack for Indian participants and British participants can be seen in appendix 3.2 and 3.3 respectively.

*Self Efficacy and Control.* The measure for Self Efficacy and Control (SEC; Turner, Jones, Sheffield, Barker, & Coffee, 2014) includes 7 items which were adapted to cricket such as, "raise the level of your performance if you have to?" and "Maintain the intensity when batting/bowling? ". Bandura (2006) emphasized the importance of tailoring scales of perceived self-efficacy to the particular domain of interest in order to maximize explanatory and predictive value. The SEC Scale used in this study is developed according to the suggested guidelines of Bandura (2006). The new measure of Self-Efficacy and Control was chosen due to the limitations of the existing measures and the way they relate to the theory of challenge and threat states. For example, Meijen et al. (2013) in their study suggested that the control measure they used posed problems due to its low internal consistency. While, Cumming, Turner, and Jones (2017) indicate the measure of Control used in this study has acceptable to excellent reliability as the Cronbach’s Alpha for Control ranged from 0.68 to 0.94 across the measurement points.

*Achievement Goals.* Achievement goals were measured using the 12-item Achievement Goal Questionnairefor Sport (AGQ-S; Conroy, Elliot, & Hofer, 2003).The participants indicated the extent to which itemswere true of them in relation to how they feel justbefore an important competition, on a scale rangingfrom 1 (not at all true) to 7 (very true). The scores for Mastery Approach (MAP) and Performance Approach (PAP) weresummed for an overall score for approach goals, and Mastery Avoidance (MAV) and Performance Avoidance (PAV) were summed up for an overall scorefor avoidance goals (Meijen et al., 2013). The internal consistency reliability coefficient was a = 0.70 for approach goals and a = 0.84 for avoidance goals.

*Emotions.* Emotions were measured using the 22-item Sport Emotion Questionnaire (SEQ; Jones,Lane, Bray, Uphill, & Catlin, 2005). The SEQidentifies five emotions: anger; anxiety; dejection;happiness; and excitement. The participants wereasked to indicate on a scale ranging from 0 (not atall) to 4 (extremely), how they feel just before animportant competition (a = 0.84 for anxiety, a = 0.92 for dejection, a = 0.66 for excitement,a = 0.82 for anger, and a = 0.86 for happiness). Interpretation of emotional state was measured using a single item, ‘‘How helpful do you feel your emotional state is for your performance?’’ Participants rated it on -3 being very unhelpful, 0 being neutral and +3 being very helpful.

*Demand and resource evaluations.* Demand and resource evaluations were assessed using two items from the cognitiveappraisal ratio (Tomaka, Blascovich, Kelsey & Lietten, 1993) so that challenge or threat responses to an upcoming important match could be determined. Demand evaluations were assessed by asking: **“**How demanding do you expect the upcoming match to be?**”** and resource evaluations by asking: **“**How able are you to cope with the demands of the upcoming match?**”** These items are rated using a 6-point likert scale anchored between 1 (not at all) and 6 (extremely). A Demand Resource Evaluation Score (DRES) was calculated by subtracting demands from resources, with a more positive score reflecting the match being evaluated as more of a challenge and less of a threat (Vine, Freeman, Moore, Chandra-Ramanan, & Wilson, 2013). The scales from the cognitive appraisal ratio have been adopted in a number of studies (see Seery, 2011 for a review) and have been shown to correlate with more objective measures of challenge and threat states (Moore et al., 2013).

*Social identity.* A single measure item, “I identify with my cricket team.” was used to measure the social identity of the players and item was rated using a 7-point likert scale anchored between 1 (do not agree at all) and 7 (agree completely). This single item measure of group identification by Postmes, Haslam, and Jans (2013) has been shown to be a valid and a reliable measure of identification across a broad range of groups (e.g. Reysen, Katzarska-Miller, Nesbit, & Pierce, 2013).

*Manipulation check*. To verify if participants were able to imagine if they were just about to take part in an important match, they were asked to indicate how able they were to complete the task that was asked of them by ticking one out of three options (Jones & Uphill, 2004): option one ‘‘I was able to complete the questionnaire as if I was just about to compete in an important match accurately’’; option two ‘‘I was able to complete the questionnaire as if I was just about to compete in an important match with some degree of accuracy’’; or option three ‘‘I was unable to complete the questionnaire as if I was just about to compete in an important match with any degree of accuracy’’. Participants who ticked option three or who failed to indicate how able they were to recall the match were removed from the data analysis (n = 3).

**3.7.3 Procedure**

Participants were recruited from a high-performance training centre for elite cricketers in India, using non-probability convenience sampling. Participants were asked during their summer camp training sessions (held in the year 2016) if they were willing to take part in the study and this allowed the author to get responses from elite cricketers who were available and willing to take part. The questionnaire booklet were filled by participants using pen and paper at the training centre. Participants in the UK were recruited from various county cricket clubs (in the years 2016 and 2017) through the assistance of the author’s supervisors. Some participants filled in the questionnaire booklet using pen and paper, whilst other provided their responses digitally via qualtrics. Institutional ethical approval was obtained and written permission was sourced from the academies and clubs prior to data collection. All of the participants volunteered to take part in this study and provided written informed consent before completion of questionnaires. As mentioned earlier, participants completed the questionnaires in relation to how they typically feel just before an important match or competition. They were asked to imagine that they were about to take part in an important game and then respond to the questions in the booklet. The ethical approval can be seen in appendix 3.1. The consent form and information sheet, for Indian participants and the British participants can be seen in appendix 3.2 and 3.3 respectively.

**3.8 Data analysis**

An cross sectional design was used to investigate cross-cultural differences between the Indian cricketers and UK cricketers and data was analysed using SPSS. First, gender differences within the Indian sample were checked using an independent samples t-test. Second, parametric and non-parametric difference tests were used to compare both groups on the variables of self-efficacy/confidence, control, achievement goals, sports emotions and interpretation of emotional states, and demand and resource evaluations. Third, independent samples t-test was conducted to examine the difference between social identity amongst both groups. Finally, parametric and non-parametric correlation analysis was used to examine the association between social identity and self-efficacy/confidence, control, achievement goals, emotional states and demand and resource evaluations for cricketers from India as well as the UK.

**3.9 Results**

The data were screened for missing values, outliers and normal distribution. Descriptive statistics for each of the variables are shown in Table 3.1. No missing values were found and some of the data were normally distributed. However the data for the variables of MAP and PAV achievement goals, dejection, interpretation of emotional state and challenge and threat appraisals were not normally distributed, demonstrating both skewness and kurtosis. Accordingly, it was not possible to analyse these variables using parametric techniques. Addressing this through deletion of outliers would have resulted in a substantial reduction in data points and while transforming the data was considered, the varying distributions of the data sets meant there was no single transformation that could be applied to the data set as a whole. Thus, the Mann-Whitney U test was considered to be most appropriate for the non-normally distributed data. While, an Independent Samples T test was conducted for the data that was normally distributed.

Multiple tests were used to investigate whether the Indian cricketers and British cricketers differed in their responses to stress. Because multiple T tests and Mann Whitney U tests were conducted a conservative criterion of P = 0.01 was adopted per hypothesis, so that the risk of Type I error was reduced (Cohen, 1992). With the more conservative alpha, the total number of participants involved in the analysis meant that tests still had sufficient power (> 0.8) to detect a medium effect size (Cohen, 1992).

Participants in India had both male and female responders while participants in the UK had only male responders. Thus to check gender differences between male (N = 40) and female (N = 20) respondents in India an Independent Samples T test was conducted. No significant difference was seen for any of the dependent variable as *p* > 0.01. Thus, there was no significant difference in the responses by males and females in India and thus gender was not required to be included as a covariate.

**Self-Efficacy**

The participants from India (*M* =  89.29, *SD* = 7.96) did not differ in their self-efficacy [*t* (118) = 1.370, *p* > 0.01] compared to participants from the UK (M = 79.24, SD = 10.79).

**Control**

Indian cricketers (M = 71.95, SD = 12.13) did not differ in their perception of control before competition [*t* (118) = .00, *p* > 0.01] compared to cricketers from the UK (M = 72.17, SD = 12.12).

**Achievement Goals**

*Approach Goals*

Indian cricketers did not differ in mastery approach goals compared to British cricketers, U = 1608.5, *ns* (p > 0.01). Cricketers from India (M = 4.76, SD= 2.11) also did not differ in their performance approach goals [*t* (118) = 2.37, *p* > 0.01] compared to participants from the UK (M = 3.84, SD = 2.03). [[1]](#footnote-1)

*Avoidance Goals*

Indian cricketers (M = 4.23, SD = 1.77) did not differ in their mastery avoidance goals [*t* (118) = .64, *p* > 0.01] compared to English cricketers (M = 4.00, SD = 1.70). Both the groups of cricketers also did not differ in performance avoidance goals, U = 1711.5, *ns* (p > 0.01).

**Sports Emotions and Interpretation of Emotional State**

Indian cricketers (Mdn = 1.40) felt more dejected compared to UK cricketers (Mdn = 1), U = 1144.0, p < 0.01, r = - 0.32. Although a signficant difference can be observed on how dejected Indian cricketers felt compared to UK cricketers, the descriptive statistics indicate that the scores are very low for both groups (see Table 3.1). The results also revealed that the Indian players (M = 3.88, SD =.63) felt more excited [*t* (118) = 3.39, *p* < 0.01, r = 0.13] before a match compared to British players (M= 3.39, SD = .77). While, there were no significant differences in the emotions of anxiety [*t* (118) = 1.95, *p* > 0.01], anger [*t* (118) = .151, *p* > 0.01], and happiness [*t* (119) = .619, *p* > 0.01] between both the groups. The results also showed that there was no significant difference in how helpful Indian cricketers (Mdn = 2.00) and UK cricketers (Mdn = 2.00) perceived their emotional state to be towards performance, U = 1602.50, *ns* (p > 0.01). The descriptive statistics indicate that both groups interpreted their emotional state to positively help their performance.

**Demand and Resource Evaluations**

Indian cricketers (Mdn = .00) did not differ with UK cricketers (Mdn= .00) in how demanding they perceive their competition to be and the perception they have about the resources available to cope with those demands, U = 1770.00, *ns* (p > 0.01). The descriptive statistics reflect that both groups perceived to have sufficient resources to cope with the demands and thus competition was evaluated by both groups as more of a challenge and less of a threat.

**Table 3.1: Summary of means, median and standard deviation for scores of Indian and UK cricketers on self-efficacy, control, approach goals, avoidance goals, emotions, interpretation of emotions, demand and resource appraisals.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | M | Mdn | SD |
| 1. Self-Efficacy | India  UK | 81.29  79.24 | 80.36  80.78 | 7.96  10.74 |
| 2. Control | India  UK | 71.95  72.17 | 72.85  72.85 | 12.13  12.12 |
| 3. MAP | India  UK | 6.41  6.25 | 6.66  6.46 | 0.57  0.79 |
| 4. MAV | India  UK | 4.23  4.00 | 4.16  3.83 | 1.77  1.70 |
| 5. PAP | India  UK | 4.74  3.84 | 4.66  4.00 | 2.11  2.03 |
| 6. PAV | India  UK | 3.44  3.39 | 3.00  2.83 | 2.14  2.18 |
| 7. Anxiety | India  UK | 2.53  2.30 | 2.50  2.20 | 0.73  0.58 |
| 8. Anger | India  UK | 2.16  2.13 | 2.00  2.00 | 0.92  0.89 |
| 9. Excitement | India  UK | 3.88  3.39 | 3.75  3.43 | 0.63  0.77 |
| 10. Dejection | India  UK | 1.42  1.17 | 1.40  1.00 | 0.37  0.27 |
| 11. Happiness | India  UK | 3.52  3.43 | 3.50  3.50 | 0.84  0.86 |
| 12. Interpretation of emotions | India  UK | 1.41  1.74 | 2.00  2.00 | 1.28  0.84 |
| 13. Demand & Resource evaluations | India  UK | -.20  -.05 | .00  .00 | 1.75  1.49 |

\*Note: MAP = Mastery approach goals, MAV = Mastery avoidance goals, PAP = Performance approach goals, PAV = Performance avoidance goals.

**Social Identity**

The results from the independent samples t test shows that there is a significant difference between the social identity of the Indian cricketers (M = 3.37, SD = 1.34) compared to British cricketers (M = 4.93, SD = 1.19), *t* (118) = -6.768, *p* < 0.01. The descriptive statistics presented in table 3.2 indicate that the British cricketers better identified with their team compared to the Indian cricketers

However, no significant correlation (p > 0.01) was found between social identity and confidence, control, achievement goals, emotional states and challenge and threat states for players from India as well as the UK.

**Table 3.2: Descriptive statistics for social identity**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Mean | SD |
| Social Identity | India | 3.37 | 1.34 |
|  | UK | 4.93 | 1.19 |

**3.10 Discussion**

This study examines the responses of Indian cricketers to stress in comparison with the responses of cricketers from the UK. It assesses self-efficacy, perceived control, approach and avoidance goals, emotions, interpretation of emotions and demands and resource evaluations before competing in an important competition. It also assesses social identity of the players from both groups. In this sample of elite cricketers, the results indicate that overall there is similarity in the way athletes from both countries respond to stress. However, Indian athletes seem to experience more intense emotions, particularly excitement before competition as the descriptive statistics indicated relatively high scores. While a significant difference was also observed on how dejected Indian cricketers felt compared to UK cricketers, the descriptive statistics indicate that the scores were very low for both groups. A rare study in the area of coping that examined cultural differences among US and Australian student-athletes (Anshel et al., 1997) also found that cultural background may influence the affective responses to stress. The results also supported some predictions made by the TCTSA. Indian cricketers as well British cricketers perceived high self-efficacy, high perception of control and an approach goal orientation. Both groups also perceived more positive emotions before competition and also perceived their emotional state to be beneficial. The TCTSA predicts that positive emotions will typically be associated with a challenge state. Thus, supporting the hypothesis and in line with the prediction, both groups of cricketers appraised sufficient resources to cope with the demands of the competitive situation and are likely to experience a challenge state.

The TCTSA proposes that self-efficacy, perception of control and achievement goals are the resource appraisals that determine challenge or threat states in response to competition. There were no differences in how these psychological constructs were perceived by both the groups just before an important competition. Both groups reported the belief to cope with the demands of competition and execute the strategies required to perform well. Indian cricketers as well as British cricketers also perceived to be in control to intentionally execute their skills and actions during competition. Thus both groups perceived to have the resources of self-belief and perception of control to cope with the demands of competition and thus are likely to respond to stress positively.

Achievement goals also play an important part in athletes’ responses to competitive sport settings and is also a key determinant of challenge and threat states in the TCTSA. Approach goals reflect striving for competence and there was no difference seen in both the groups of cricketers. Although there was no significant difference, the means for PAP goals indicate that the Indian cricketers reflected a motivation to be seen as more competent (e.g., more talented cricket player) than British cricketers. This approach could be attributed to the immense competitiveness to make it into the elite and first class teams in India. During the time of data collection, players were also aware that they were being assessed, judged and compared with one another on their technical, physical and psychological attributes during the selection trials by the selection committee, coaches and administrators at the high performance cricket academy. Avoidance goals reflect a drive to avoid incompetence and there was no difference seen amongst both groups. Also, Indian and British cricketers had lower scores for avoidance goals compared to approach goals. Results indicate that there is similarity in the achievement behaviours and the motives for participation between players from both the countries as both groups had an approach goal orientation. Indian cricketers as well as British cricketers perceived the three inter-related resource appraisals of high self-efficacy and control and an approach goal orientation. Thus, as predicted by the TCTSA, it can be expected that Indian as well as British cricketers will view competition as a challenge.

The study also examined how the valence of the emotional state differs between both groups and whether the emotional state is perceived as helpful or unhelpful for performance. The results suggested that Indian cricketers feel more excited before an upcoming competition compared to the cricketers from the UK. While emotions are universal, they show cultural differences in the way they are experienced. Individualistic culture that includes Europe considers emotions as personal, experienced internally and independently, while collectivistic culture that incudes Asia promote interdependence and emotions such as shame or dejection, which promote interconnectedness, are predominant in Asian culture (Markus & Kitayama, 1991). This may explain why a significant difference was observed with excitement and dejection with Indian cricketers experiencing heightened emotions compared to the British cricketers. There were no statistical differences found between the groups on the other emotions of anxiety, anger and happiness. However the means indicate that overall the Indian cricketers experienced heightened emotions compared to the UK cricketers before competition. The data from the Indian cricketers were collected during a national selection camp which was an extremely competitive environment perhaps that may have lead to a greater emotional responses.

The descriptive statistics also indicated that in both groups positive emotions (happiness and excitement) occur more before competition compared to the negative emotions (anger, anxiety, dejection). Both groups (including the Indian cricketers who perceived more dejection compared to the British cricketers) interpreted their emotional state as helpful towards their performance. Also evidence suggests that high intensity emotions with a negative valence can also serve motivational functions and can occur in a challenge state (Mendes et al.*,* 2008). With regard to pre-competition affective states, previous studies in various sport activities have shown that in high level athletes, pleasant emotion levels in the pre-competition period were consistently higher than unpleasant ones, whatever the subsequent performance (Cerin & Barnett, 2006; Kerr & Pos, 1994; Legrand & Le Scanff, 2003). Both the BPS model (Blascovich & Mendes, 2000; Blascovich & Tomaka, 1996) and the model of adaptive approaches to competition (Skinner & Brewer, 2004) propose that athletes’ emotional states will be more positive in challenge than in a threat states. In a study by Turner et al (2013) higher total peripheral resistance (characterising a threat state) was related to less helpful perceptions of emotional states amongst elite cricketers prior to their test. Consistent with previous findings, it can be suggested that elite cricketers will perceive competition as a challenge situation as they experience more pleasant emotions than unpleasant ones in the pre-competition period. This is also possibly due to the athletes’ experience at the elite level (Alix-Sy, Le Scanff, & Filaire, 2008).

Both groups of cricketers also perceived that they had nearly sufficient resources to meet the demands of the competition and thus we may speculate that their psychological response to competition was facilitating. These positive interpretations are also possible due to their experience of sport competition at this level, which is associated with the familiarity of the situation to the individual (Cerin, Szabo, Hunt, & Williams, 2000; Mellalieu, Hanton, & O’Brien, 2004).

Environmental and cultural difference (e.g., the conditions of competition, the importance of competitions in different countries) may influence the degree of stress experienced by individuals of various nationalities and the response to the stress (Duda & Alison, 1990). The study shows that there were differences in the affective component between both groups, however there were no differences in the cognitive resources appraised to cope with the demands of the competition. Thus Indian cricketers in comparison with the British cricketers respond to stress in a similar way. Indian cricketers along with British cricketers also perceive the three interrelated resources- high self-efficacy, perception of control and approach goals that help them to respond to their stressors positively. This study adds to the preliminary evidence provided in chapter two, that the TCTSA may be applied across different cultures.

An interesting finding was that there was a significant difference between the social identity scores of the cricketers from both countries (i.e., there was a difference in how much they identified with their respective teams). The British cricketers better identified with their team compared to the Indian cricketers. In a study with youth cricketers in the UK, similar levels of social identity (M = 4.80) were found (Barker, Evans, Coffee, Slater, & McCarthy, 2014) and so it seems that the Indian cricketers reported lower levels of social identity.

British players could have higher social identity scores as they had been competing for a longer duration (average of 8.7 years) compared to the Indian players (average of 6.3 years) so they possibly have spent longer time with their teams or clubs. It is more likely though that the Indian players had low social identity scores due to the diversity in the Indian culture, for instance, members from one team may speak various languages. The social identity may be lacking, as Indian cricketers are typically a part of several teams due to the nature of competition in India. There are inter-state matches, inter-state leagues, as well as players could be a part of the national team and play international leagues such as the IPL. Thus Indian cricketers compete for a number of teams and have multiple team membership that may be reducing the extent to which they identify with each team. While the UK cricketers only mainly compete for their county or country. Although recent research suggests that multiplicity of the self is generally a good thing (Sonderlund et al., 2017), the exact mechanism through which they contribute towards the psychological value remains unclear. Given the number of groups to which an Indian cricketer might belong, his or her social identity is likely to consist of an amalgam of identities, identities that could impose inconsistent demands upon that person and also lead to role conflict (Ashforth & Mael, 1989).

No significant correlation was found between social identity and confidence, control, achievement goals, emotional states and challenge and threat states for players from India as well as the UK. These results are novel and in contrast to the social identity literature that focuses on group memberships. The social identity approach posits that both primary and secondary appraisals are structured by social identity and self-categorization processes (Gallagher, Meaney, & Muldoon, 2014; Haslam, 2004). This is because whether or not a stimulus is perceived as threatening to self depends in part on how the self is defined (Rees, Haslam, Coffee, & Lavallee, 2015). For example, whether or not one perceives the poor performance of a cricket team as a source of stress depends on the degree to which one identifies with that team (Burnett, 2002; Wann, Culver, Akanda, Daglar, De Divitiis, & Smith, 2005).

**3.11 Limitations and future research considerations**

Despite providing a novel contribution to the extant stress literature, it is important to identify this study’s limitations for future researchers to address. A limitation is that the participants were asked how they felt in general before an important match and the environment of the British cricketers was not controlled as some of the data was collected electronically while some was collected after their training sessions. Thus for the British players who were not in a competitive situation we may have assessed the players disposition to perceive a motivated situation as a challenge or threat rather than assessing actual appraisals in competition with the latter being more sensitive to the demands to the situation (cf. Roesch & Rowley, 2005). Also in a non-competitive setting, where it can be expected that the athletes perceive to have the resources to cope with the demands of competition rather than succumb under the demands, the use of the words demands or resources in self-report measures may not accurately reflect how athletes psychologically describe competition. All the players involved in the study played only at the senior elite level and thus due to their richer experience, repertoire of coping responses, they could have perceived a greater availability of resources to cope with the demands of competition (Billings & Moos, 1981). It has been suggested that skill level moderates sources of acute stress that are peceived as negative by athletes (Gan & Anshel, 2009). Although examination of gender differences was not an objective of this study and no statistical differences were seen in the responses between Indian women cricketers and the Indian men cricketers, only a small sample was included of the women cricketers and understanding stress responses of female athletes could be an avenue for future researchers as evidence suggests that the biobehavioural responses to stress in females may vary from those of males (Taylor, Klein, Lewis, Gruenewald, Gurung, & Updegraff, 2000).

One of the biggest challenges in cultural research is also the lack of diversity on the sample. The Eastern population is only represented by Indian cricketers, while the Western population is represented only by British cricketers. This limits the understanding of how responses to stress may vary and future culture studies should include athletes from various Eastern and Western countries while making comparison. In addition to the methodological limitations, the present study does not include the cardiovascular indexes and measurements associated with the challenge and threat states which forms and important part of the TCTSA. The valence and the arousal of emotion keywords differ significantly between Europeans and Asians and emotional differences between Western and Eastern cultures can be inferred through their language style (Bann & Bryson, 2013). Although the participants included in the study were well versed with English, the list of words presented to the athletes across different cultures can be interpreted differently. For example, the word ‘excitement’ might be interpreted differently by both the groups. Previous researchers have shown that Americans compared with Asians are reported to prefer high arousal emotional states such as excitement and the conception of emotions such as happiness is also different in arousal level by culture (Izard, 1971; Lu & Gilmour, 2004). Thus future cross-cultural researchers should include measures of cardiovascular reactivity along with self-report measures to completely outline the nature of challenge and threat states in athletes.

Applied practitioners from India as well as the UK may also build their athletes’ resources by helping them enhance their self-efficacy, perception of control and approach goals when they are faced with demands. However, practitioners should be cautious using the findings of the present study and carefully considered in terms of the extent to which they might inform other populations. This study concerned elite cricket players only and the role of cricketers is quite unique so further studies need to be conducted on different competitors and events. Despite adding richness into understanding of stress, it has not been considered how these responses may change during a performance. Future research may also consider measuring the performance of the athletes. Researchers could identify the factors and sources that contribute towards developing high self-efficacy, perception of control and an approach goal orientation amongst athletes across cultures. This will further enable practitioners to develop appropriate interventions. Researchers may also investigate the association of the responses to the specific stress sources.

Another limitation of this study is that it included only a single measure of social identity was included. The single item social identification measure provides a simple, reliable and a short way of assessing identification, however does not allow the researcher to make any subtle distinctions among different aspects of social identification (Postmes, Haslam, & Jans, 2013).

**3.12 Conclusion**

This chapter presents the first cross-cultural study that investigates similarities and differences in how athletes respond to stressful situations. The findings of the present study provided insight into how Indian cricketers and British cricketers typically respond to the stressors of an upcoming competition and thus addressed the second aim of the thesis. Overall, there are similarities in how players from both countries respond to stress as both Indian and British cricketers perceived competition as a challenge as they evaluate sufficient resources to cope with the demands of competition, perceive high self-efficacy, high percepeption of control and a focus on approach goals and also perceive positive and helpful emotions.

The findings present some interesting applied and research issues worthy of consideration. First, the study provides preliminary evidence for practitioners to use the TCTSA framework in Eastern cultures to understand and categorize the stress responses of athletes. Thus sport psychologists and mental trainers in India can use the TCTSA as a framework to understand how athletes respond to stress. Second, both Indian as well as British cricketers have positive responses to competition. Thus, federations from other sports may learn from the Board of Control for Cricket in India (BCCI), which has been able to build a positive environment and a facilitative ecosystem for Indian cricketers. Third, Indian cricketers experience heightened emotions compared to the British cricketers. Athletes from collectivist countries from East may perceive higher emotions (of positive and negative valence) compared to athletes from the West. An important perspective that applied practitioners must consider is the perception of the emotion (i.e., harmful vs. beneficial). Individuals are not just passive victims of their emotion, but rather, emotion such as excitement can be used to enhance preparation and performance (Skinner & Brewer, 2004). Given that emotions may play a significant role in affecting performance in sports competition, practitioners may develop strategies and techniques to help Indian athletes gain emotional control. Finally, the study shows country differences in how players identify with their cricket teams. Indian cricketers showed lower level of social identity. Sport psychologists may consider strategies such as personal disclosure mutual sharing (PDMS) intervention to elevate social identity in team sports (Evans, Slater, Turner, & Barker, 2013). Cross-cultural research that compares characteristics of members of different countries has been well established in scientific literation. However, this chapter adds to the current literature in sport psychology being the initial cross-cultural study that provides a detail of responses to competition stress between the Western and Eastern athletes using the TCTSA as its theoretical framework.

The single-case research intervention studies that form the second part of the thesis are built on the findings of the present chapter as well as the previous chapter. With the preliminary evidence of the applicability of the TCTSA framework in an Eastern culture, the single-case research design studies use the TCTSA framework to understand the stressors of Indian performers and implement interventions with them. Similar to past research (e.g., Uphill, et al., 2008), the current study asserts the importance of emotional regulation and the intervention studies aim to implement strategies to help Indian athletes effectively control their emotions. Finally, the results of chapter two illustrated that implementing psychological skills may help athletes respond to stress positively. Thus, identifying strategies towards developing the resources (e.g., self-efficacy, control) and investigating the effectiveness of the psychological skills in enhancing challenge and reducing threat is the final aim of the thesis.

**Part 2:** **Determining intervention effectiveness in creating a challenge state**

Chapter 4

**The use of Single Case Research Designs in Sport Psychology**

A review of literature indicates that very little research in stress has been conducted with Indian performers. Data from chapter two revealed that in line with the TCTSA framework, the elite Indian athletes across various sports appraised their psychological demands as the amount of effort required, dealing with uncertainties in sport and the perception of danger. The participants also highlighted the importance of self-efficacy, perception of control and goal orientation and identified these as resources to cope with the demands. Thus the data from chapter two indicates that the determinants of challenge and threat as proposed by the TCTSA have also emerged within athletes from an Eastern country. It provides evidence that sport is demanding for athletes in India and the emergence of culture specific organisational and societal stressors suggests that researchers must explore and develop culturally relevant interventions to help Indian athletes cope with their stressors.

Chapter three highlighted that, Indian cricketers similar to British cricketers perceived self-efficacy, perception of control and an approach goal orientation. They felt that they possess the resources required to cope with their demands and thus may appraise a challenge state prior to competition. Both groups also perceived more positive emotions before competition and identified this state to be beneficial to performance. Thus the results of chapter three also support the predictions of the TCTSA. However, differences were seen in the affective component (i.e., Indian athletes seem to experience higher emotions). This study also helps us understand that strategies relevant to the needs of the Indian athletes may be required to be implemented, for instance to help them control and manage their emotions more effectively before competition, as they may be experiencing higher levels of emotion. There is also very limited research regarding interventions that may bring about challenge responses. Thus exploring interventions that may reduce threat and enhance challenge is needed.

The experiences of Indian athletes across various sports and within cricket indicate that the interventions may need to be flexible depending on the needs of the Indian player and the sport that they play. For instance, the cricket player that participated in the study included in chapter two highlighted on her individual competitive stressors while athletes from other sports emphasized on the demands placed on them due to the federations. Results from chapter three also suggest that elite Indian cricketers respond positively to stress and also perceive more positive emotions before competition. In-line with the predictions made by the TCTSA, the cricketers appraised sufficient resources to cope with the demands of the competitive situation. A similarity is observed in the author’s applied work in India where cricketers are more confident of coping with their demands compared to athletes from other sports. A reason could be that cricket is the most developed sport in India with more matches and high-level tournaments, better structured competitions and pools, better support and pay for the cricketers (Pradhan, 2018). Another reason for differences amongst Indian athletes is due to the geographic, religious, and social diversity and thus a sustainable, coherent approach to sport has been lacking. For instance, when it comes to geography, athletics is strong in Kerela, but in Haryana wrestling is stronger and in Delhi shooting prevails (Chadwick, 2015). Thus stress experiences of athletes across India across sports may vary and interventions that need to be implemented need to be tailored.

Cognitions play an important role in determining emotional responses and traditionally cognitive behavioural approaches were used to modify the cognitions, emotions and behaviours. Interventions such as imagery, self-talk, relaxation techniques were combined in a cognitive behavioural intervention to help athletes cope with stress and maintain or improve performance in competition. However in the last few years, there has been a shift towards a case-study approach, with specific interventions being used on a more idiosyncratic basis (e.g., Jones, 1993). Here techniques aimed at changing individual’s cognition’s are specifically tailored to suit individual needs. However, in case-studies, observations are made under uncontrolled and unsystematic conditions (Brossart, Meythaler, Parker, McNamara, & Elliot, 2008; Goode & Hatt, 1952). For example, case-studies may lack pre and post-intervention data and it may not be possible to determine the effectiveness of an intervention. On the other hand, single-case reaseach design brings control and rigour to the research and this is essential as it provides accountability in applied sport psychology as well as applied research. The further part of the research program focuses on implementing interventions using a single-case design approach with Indian athletes and coaches. A single-case design ensures a personalized approach and chapters five, six and seven included in this program of research explore the demands of performers from racket sports that include badminton, squash and tennis and interventions are implemented with the participants using the TCTSA as a framework. This chapter details the role of the single-case research in sport psychology and the benefits of the single-case research design in this program of research.

**4.1 The Role of Single-Case Research Designs in Sport Psychology**

A large body of past research in sport psychology determined the effectiveness of psychological interventions through the use of group-based designs, where typically the performance of the control group was compared to the performance of the treatment group (e.g., Brown & Fletcher, 2017; Röthlin, Birrer, Horvath, & Grosse Holtforth, 2016; Zakrajsek & Blanton, 2017). Several strengths of group-based designs have been established in determining intervention efficacy (Clark-Carter 2004), however a limitation of this design is that it does not consider individual demands and preferences. It is difficult to obtain a group of participants with the exact same stressors and group based designs also do not consider the ability of individuals to use and benefit from tailored interventions. It can be argued that an intervention may lose its effectiveness when applied uniformly to a group. The results of group-based controlled studies may be misleading as, in traditional between subjects experiment, the positive effect on half the participants in the treatment condition can be cancelled out by the negative effect on the other half and thus the mean for the treatment group would then be the same as the mean for the control group, making it seem as though the treatment had no effect when in fact it can have a strong effect on individual participants (Price, Jhangiani, & Chiang, 2015). A single- case research design also does not require a large number of participants and enables the sport psychologist or the researcher to implement tailored interventions that are suitable for the needs of the participant and measures the effectiveness of the intervention, which is relevant to the individual participant.

Single-case designs are preferable to group designs in sports setting when dealing with small populations such as the elite or the injured as it is difficult to obtain large number of participants who are homogenous on the relevant characteristics, particularly skill level (Barker, McCarthy, Jones, & Moran, 2011). Specifically recruiting a large numbers of high performance or elite athletes, given that only a few make it to the top, and thus many studies in sport psychology include novice participants. Evidence suggests that expert athletes differ consistently from the novice and therefore there are limitations in generalizing the results to elite athletes (Swann, Moran, & Piggott, 2016). Similarly, it is challenging to obtain a large number of elite coaches given that coaches need go through several trainings and examinations to be accredited as elite coaches. In this thesis, single-case research designs provide a method to investigate intervention effectiveness amongst elite athletes and elite coaches in an applied sport setting. Finally, a single-case design brings rigour by collecting repeated measurements from the participant at several time points (Barker et al., 2011). For example, the participant’s level of challenge and threat is measured and a baseline is established. Once the treatment is introduced, measurements can be taken during the intervention to examine and observe trends in data. Post intervention and follow-up data helps in establishing the effectiveness of the intervention. The participant thus acts as his or her own control by comparing changes following the intervention to the baseline or the control phase (Kazdin, 2011). Whereas, in the multiple-baseline across participants design, the level of challenge and threat state is repeatedly measured and a baseline is established. The intervention is then introduced at different time intervals to each of the participant and thus the control is attained through successive implementation of the intervention across participants. The repeated measurement during the intervention and the social validation data across participants provides valuable information about individual differences in treatment effectiveness (Hrycaiko & Martin, 1996; Wolf, 1978). The current program of research benefits from the single-case research designs and the advantages are detailed in the next section.

**4.2 The benefits of** **Single-Case Research Designs in the program of research**

The following three chapters five, six, and seven, presented in this program of research have emerged as a consequence of the applied sport psychology consulting work that the author has engaged in with athletes and coaches in India. These studies present data demonstrating the application of various psychological strategies and techniques used in an applied sport setting to reduce threat and enhance challenge. The program of research uses the TCTSA as its theoretical framework and considering the infancy in application of interventions to decrease the threat state and increase the challenge state, single-case designs are considered an important aspect in the early stages of scientific data collection as they provide guidance for the development of hypotheses and areas of research (Gardner & Moore, 2006).

Several research studies in sport and exercise psychology have applied the single-case research design. A review by Martin, Thompson, and Regehr (2004) from sport psychology and behavioural journals that examined single-case designs to assess interventions for enhancing performance of athletes and coaches demonstrates that a variety of intervention can be implemented for improving a variety of athletic behaviours across various sports. The interventions implemented in a single-subject design include goal setting, self-talk, imagery, hypnosis, self-monitoring, instructions, modelling, feedback and several other interventions. The review suggests that a large number of participants (222) have been involved in single- subject designs and clear effects were observed in most instances. The interventions implemented at practices and measured performances at practices and competitions provided strong evidence of generalisation of treatment effects. Generally, single-case methods include a rigorous in depth analysis of between one and five participants and each participant’s data is analysed individually (Kazdin 1982; Kazdin, 2011). It is recommeneded to use single-subject research designs to understand how well an intervention works for elite athletes (Kinugasa, 2013).

In the current program of research, multimodal interventions are implemented to reduce threat and enhance a challenge state with a single elite badminton player in chapter five and a single elite squash player in chapter six, while an innovative mental activity was developed and implemented with a group of three Indian tennis coaches in chapter seven. A multiple-baseline across participants design was used to assess the effectiveness of the intervention in creating a challenge state within the group tennis coaches. No prior systematic research has been conducted with Indian coaches and this design allowed the inclusion of more than a single participant. Using single-case research designs in the following three studies in this program of research is seen as a strength, as they provide data on many aspects of intervention effectiveness such as repeated measurement over-time, measurement and trends across participants, individual participant feedback about tailored interventions, social validation and follow-up data that provide a detailed understanding of the intervention, accompanying issues and limitations, and directions for future research (Barker et al., 2011; Kazdin, 1982).

The individualised approach that single-case design allows is essential as the subsequent studies in this thesis considers stress experiences and each individual responds to stress in a distinctive manner (Ellis, Jackson, & Boyce, 2006; Sapolsky,1994). As stated earlier, the following studies have emerged as a result of the applied work of the researcher and a major benefit of the single-case research is that it promotes naturalistic applied settings and the effectiveness of the intervention can be observed in ecologically valid tasks (e.g., actual sport performance or coaching activity; Barker et al., 2011). Thus, single-case research design was thought of an appropriate tool for this applied program of research.

Commonly, a single-case research study uses an AB design, which is used in this program of research. In the AB design the variables of interest (i.e., the psychological constructs of challenge and threat) are recorded during the baseline phase (A) and compared to that recorded after the intervention (B) (Lane, Wolery, Reichow, & Rogers, 2007; Uphill & Jones, 2005). An advantage of this design is that it can be implemented in an applied sport setting where consulting psychologists working on “emergency problems” such as helping an athlete recover from an injury in which spending large amount of time gathering baseline would be unacceptable or where withdrawing an intervention may not be possible to check whether there is a decrease in the variable (e.g., threat) without the intervention (Crocket, 2014). It is also more robust than a case-study as it involves the collections of pre and post intervention data as opposed to examining without these phases (e.g., McGregor & Winter, 2017). However a limitation of using an AB design is that it is possible that any observed differences may be the result of normal development and not due to the intervention (Kazdin, 1982). More rigorous designs where the intervention is withdrawn (ABA) or withdrawn and then reintroduced (ABAB) can also be used, although it may not appear ethically appropriate to withdraw an intervention that an athlete is finding useful and thus the “withdrawal approach” may have its limitations (Crocket, 2014; Kazdin, 1982). Within this program of research AB designs were used so as not to disrupt the routines or performances of the participants following their specific interventions. Researchers have urged applied sport psychology researchers to obtain data on athletes’ long-term behaviour or performance in the form of follow-up data (Gardner & Moore, 2006). Therefore, within the program of research, the post-intervention (B) phase was extended to include a follow-up period, where data revealing maintenance or long-term changes in challenge and threat states could be obtained. The multiple-baseline design used in the study with Indian coaches involved collecting baseline data of challenge and threat across three participants concurrently, following the introduction of the intervention sequentially to each coach. Thus, if differences in variables (i.e., challenge and threat) are observed it is likely that they are due to the intervention and not other factors. The multiple-baseline design across participants has been the most widely used design in sport and exercise literature because it lends itself well to the issues and demands that practitioners face (Kinusaga, Cerin, & Hooper, 2004). It is a key method used for determining intervention effectiveness in applied research.

**4.3 Data analysis in single case designs**

In single-case research, the researcher manipulates a particular intervention (independent variable) and examines its effect on the target variable (dependent variables, e.g., challenge and threat). This casual attribution logic of single-case research designs resembles that of the group design, however the data analysis strategy differs. In single-case design, we observe, measure and record the target variable under baseline and treatment conditions (Cooper, Heron, & Heward, 2007). When the conditions are compared, conclusions are drawn about the effect of the independent variable (i.e., the intervention). Visual analysis of graphic displays of data is the hallmark for identifying change and interpreting effects of an intervention during studies using a single-case experimental design (Barton, Lloyd, Spriggs, & Gast, 2018; Lane & Gast, 2014). The data presented in chapters five, six and seven is analysed using visual analysis. The pictorial illustration of data makes this system of data analysis manageable and self-explanatory (Barker et al., 2011). In this program of research, the challenge and threat scores are graphed for the participants prior to the intervention, during intervention, post intervention and also during the follow-up stage. This allowed the author to evaluate the participants’ scores as data was collected for all conditions and also assisted the author in modifying or implementing a particular intervention strategy if limited or no change in the score was observed, specifically after analysing the data collected during the intervention phase.

**4.3.1 Determining change using visual analysis**

Cooper, Heron, and Heward (2007) highlight the impact of graphic displays by indicating “an intervention that produces dramatic, replicable changes in behaviour that last over time are readily seen in a well-designed graphic display” (p. 149). The three interpretive principles that are used for the graphic analysis of the single-case data, which include the components of trends, level and the stability of the data were considered (Barker et al., 2011; Lane & Gast, 2013). Trend is explained as the progress over time, level as the magnitude of the data and stability as the similarity of the scores in a given condition (Gast, 2005; Wolery & Harris, 1982). While considering the trend and level, trend is considered more important while conducting visual analysis of the data (Gast & Spriggs, 2010). To determine if the intervention had an effect on the level of threat and challenge, the five commonly used guidelines based on the three components provided by Hrycaiko and Martin (as cited in Barker et al., 2011) were considered. The guidelines observed are as follows:

1. The final few data points in the baseline should be stable, or in a direction opposite to that predicted by the effects of the treatment.
2. More times that an effect is replicated; the greater our confidence can be that an effect has been observed.
3. Few overlapping data points between adjacent baseline and treatment phases also enhances our confidence that we have observed an effect.
4. The sooner the effect is observed, the greater our confidence that an effect has been observed.
5. Finally, if the effect is large we are most confident that a change has occurred. The size of the effect relates to the scientific and clinical assessment. With scientific assessment we are interested in the level of performance in the intervention compared with that in the baseline, but in clinical assessment we are interested in the aspects of social validity.

visual analy-

sis involves evaluation of (a) trend, (b) level, and (c) stability of data.

The above stated guidelines were adhered to as much as possible, however as with applied research it was unrealistic or unethical to adhere strictly to these criteria at all times (Barker et al., 2011). For instance, the length of baseline depends on stability as well as time, however to spend time to collect several data points at baseline or to wait until the baseline stabilizes could potentially contravene the needs of the athlete (e.g., the injured athlete who participated in chapter five).

**4.4 Summary**

visual analy-

sis involves evaluation of (a) trend, (b) level, and (c) stability of data.

In summary, the single-case research design offers a rigorous approach for data collection during early stages in an area of research and can provide data on several aspects of intervention effectiveness. The studies presented in this program of research will be among the first studies in sport psychology research that attempt to reduce threat and create a challenge state using a single-case research design and will thus add to the limited literature regarding interventions in the area of challenge and threat. Stress experiences of athletes and coaches are unique and the single-case design takes an individualised approach where interventions are tailored. Through all the three studies, the intervention was implemented based on the needs of the participant and detailed information was collected from them regarding the effectiveness of the intervention. Visual analysis provides to be a useful method in observing the effectiveness of the intervention. Single-case research design is a useful method for an applied research as it promotes implementing an intervention in a naturalistic applied setting and the single-case research designs presented in this program of research are compiled using applied sport settings. In this thesis, the single-case research design was considered the most appropriate method to examine the use of psychological techniques to reduce threat and develop a challenge state in elite Indian athletes and coaches.

Chapter 5

**An intervention based approach to develop a challenge state towards competition post a sports injury - A single-case design study in Badminton**

**5.1 Introduction**

The present study examines the effect of an intervention conducted with an elite Indian badminton player to help him cope with his demands and respond positively (i.e., as a challenge). Given that there are individual differences in appraising stressors and an idiosyncratic pattern of responding to pressure situations, a single-case design approach was used where by the psychological intervention was tailored to meet the individual player’s needs. Evidence suggests that psychology and socioculture of different sports, countries and among varying ethnicities and philosophic traditions is influential in sport injury risk, response and recovery in elite athletes (Weise-Bjornstal, 2010). Considerations amongst athletes from the East have received relatively minimal research attention and efforts in psychological research and professional practice are needed to protect athletes’ physical and mental health and contribute towards performance excellence and career longevity.

The TCTSA that is used as a framework guides the intervention in helping the athlete psychologically cope with his injury and also have an adaptive approach to coping with the demands of competition. Appraising a situation as a challenge can lead to better performance over individuals appraising the situation as a threat (Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004). Thus the aim of the study is to implement and determine the effectiveness of psychological interventions in reducing threat and enhancing a challenge state amongst Indian athletes. The study will thus address the third aim of the thesis and will extend the limited literature in the area of challenge and threat states about effective strategies that may reduce threat and enhance challenge. The introduction first presents the importance of psychological factors during injury, followed by the role of interventions in injury recovery and offers details about interventions used to manipulate athletes’ appraisals and finally provides a framework used to facilitate an effective intervention.

**5.2 The Importance of Psychological Factors in Injury**

The TCTSA indicates that a demand appraisal is made if an athlete perceives psychological or physical danger such as an injury (Jones et al., 2009). Chapter two also supports that players perceived danger and uncertainty due to injuries that may occur in sport. Sport injuries despite being physical in nature, also have psychological facets. It is believed that psychological skills or mental abilities of athletes can assist athletes in the rehabilitation process, for instance, by helping them deal with their negative emotions or by helping them stay motivated. These skills can be facilitated and enhanced through the use of psychological techniques. Injury is an experience that typically evokes negative emotions such as anxiety, tension, fear, depression, feelings of anger and loss and a decrease in self-confidence and self-esteem (Tracey, 2003; Walker, Thatcher, & Lavallee 2007) and can temporarily or permanently impede sport participation (Taylor & Taylor, 1997). Players become concerned about recovering back to their pre-injury level of play and may also experience re-injury anxiety. The overall injury outcome and return to sport is also attributed to psychological consequences and psychological coping and these factors have a significant impact on the emotional and behavioural responses to injury (Clement, Granquist & Arviven-Barrow, 2013; Wiese Bjornstal, Smith, Shaffer, & Morrey, 1998).

Eleven studies that evaluated 983 athletes and 15 psychological factors were included in a review of psychological factors associated with returning to sport following injury (Ardern, Taylor, Feller, &Webster, 2013). Positive psychological responses including motivation, confidence and low fear were associated with a greater likelihood of returning to the pre-injury level of participation and returning to sport more quickly. Fear was a prominent emotional response at the time of returning to sport despite the fact that overall emotions became more positive as recovery and rehabilitation progressed. Thus there is preliminary evidence that positive psychological responses are associated with a higher rate of returning to sport following athletic injury, and should be taken into account by practitioners during rehabilitation. A review by Brewer (2010) examined correlational studies (*N*=26) in which significant relationships between psychological factors have been found and experimental studies (*N*=14) in which the effects of psychological factors on sport injury rehabilitation outcomes have been assessed. A variety of personal, cognitive, affective, and behavioral factors associated with sport injury rehabilitation outcomes were identified and more importantly several interventions were also found effective in enhancing sport injury rehabilitation outcomes. Therefore, implementing psychological interventions to facilitate positive psychological responses (such as a challenge state) may be beneficial during sports injury rehabilitation.

**5.3** **Role of Psychological Interventions in Injury Recovery**

There are several models that try to establish the connection between psychological antecedents and the occurrence of sport injuries. Two of them that are widely used by researchers are Williams and Andersen's (1998) “stress injury model” and Rogers and Landers (2005) “stress - coping model.” The most promising component is the usefulness of psychological interventions for injury prevention and recovery (Johnson, 2007; Williams & Andersen, 2007), yet it continues to be an area, which is not investigated greatly (Appaneal & Habif, 2013). However the research conducted suggests that psychological interventions have the potential to facilitate injury recovery and several sport injury rehabilitation programs are beginning to integrate psychological interventions into the treatment regimens in order to expedite both physical and psychological recovery from injury (Clement & Shannon, 2009; Reese, Pittsinger, & Yang, 2012). The interventions facilitate injury recovery (Ievleva & Orlick, 1991), help reduce negative psychological consequences (Evans & Hardy, 2002) and re-injury anxiety (Cupal & Brewer, 2001). The interventions also reduce athlete injury susceptibility (Williams & Andersen, 1998), enhances rehabilitation adherence (Flint 1998), and also increases communication between the athlete and the medical professional (Ray & Weise-Bjornstal, 1999). Essentially, the interventions provide a sense of control (Flint, 1998) and an increase in self-efficacy (Evans & Hardy, 2002; Wesch, Callow, Hall, & Pope, 2016). A study that investigated psychological intervention programs for reduction of injury in ballet dancers also shows that autogenic training, imagery and self-talk gave the dancers the feeling of confidence and achievement motivation (Noh, Morris, & Andersen, 2015). Therefore, it can be expected that interventions may influence the resource appraisals and thus enhance the challenge state of the athlete.

Psychological interventions can help athletes gain a greater insight into the injury, the injury process and possible recovery outcomes (Heaney, 2006). A better understanding of the injury can also affect treatment compliance which also believed to have an effect on the athletes coping skills and injury recovery (e.g., Arvinen-Barrow, Hemmings, Weigand, Becker, & Booth, 2007). In conclusion, athletes who engage in psychological interventions, which enable them to perceive themselves as active agents in their recovery, are more likely to have better physical recovery outcomes (Durso-Cupal, 1998). Researchers have found that athletes who used psychological interventions recovered faster than athletes who did not use these interventions in the rehabilitation process (Ievleva & Orlick, 1991). The most popular psychological interventions used with injured athletes are goal setting, imagery, relaxation, positive self-talk (Brown, 2005). However, other psychological techniques such as counseling, written disclosure, stress management, acceptance and commitment theory have also demonstrated effectiveness in reducing negative psychological consequences, improving psychological coping and reducing re-injury anxiety (Reese et al., 2012). Employing social support has also been identified as important and beneficial for athletes (Brown, 2005). The use of self-talk and having a game plan are some strategies that aid in gaining control and benefit performance (e.g., Miles & Neil, 2013). Post match reflection is said to help players become more proficient at acknowledging what they are thinking and feeling during performance and, accordingly, why they are thinking and feeling in that way. In turn, this may help them to identify what actions to take to improve or maintain performance during a stressful event (Neil, Cropley, Wilson, & Faull, 2013; Wagstaff, Hanton, & Fletcher, 2013). Thus, based on previous literature it can be suggested that there are numerous intervention approaches that may be beneficial to assist athletes in dealing with stressful situations. However, as with any psychological interventions, these should be designed and implemented with an individual athlete in mind to ensure a personalised approach. Although it is widely accepted that the psychological interventions are extremely useful in assisting athletes to overcome injury and achieve performance gains they are reported to be underused as a part of injury rehabilitation (e.g, Arvinen – Barrow, Penny, Hemmings, & Corr, 2010). A recent study by Keilani, Hasenöhrl, Gartner, Krall, Fürnhammer, Cenik, & Crevenna (2016) that included 191 professional athletes across sports suggested that, 67 % of participants not using mental techniques in preparation before competitions and 88 % using them before competitions reported to believe in the effectiveness of mental techniques in the regeneration after sport associated injuries (SAI). Nevertheless, only a minority of the study population reported the use of mental techniques for either recovery after SAI (7 %) or for preparation for competitions (25 %). A possible reason for these contradictory results might be that these professional athletes seem to have insufficient access to sports psychology and coaching in mental techniques and this lack of access to mental techniques might be due to limited awareness for psychological issues of the athletes. In in this study, a multimodal intervention is implemented considering an individual athlete’s psychological demands. Further, its effectiveness in assisting the athlete to overcome injury and manipulating challenge and threat sates is examined.

**5.4** **Interventions used to manipulate athletes’ appraisals**

Limited research studies have investigated psychological strategies or interventions that could manipulate athletes’ appraisal of stress evoking situations (i.e., challenge or threat). The TCTSA suggests a challenge state is developed by targeting self-efficacy, perceived control, and approach goals. Jones et al. (2009) explain that by manipulating an athlete’s perceptions of situational characteristics previously evaluated to be a threat, the athlete can reappraise the situation as a challenge. This would lead to more adaptive behavioral tendencies associated with successful performance (Blascovich et al., 2004). For example, Turner, Jones, Sheffield, Barker, & Coffee (2014) illustrated that challenge task instructions lead to challenge CV reactivity and threat task instructions lead to threat CV reactivity and also that participants who received challenge instructions performed better at a competitive throwing task compared to those who received threat instructions. Thus task instructions can be used to manipulate CV indices of challenge and threat using the resource appraisals (i.e., by promoting self efficacy, perceived control and focusing on approach goals). Other studies also suggest that interventions aimed at promoting a challenge state should include instructions that help individuals perceive that the task is not difficult and requires less effort to perform (e.g., Moore, Vine, Wilson, & Freeman, 2014).

A psychological skill that has been examined to modify cognitions and to change undesirable emotional responses is imagery (e.g., Williams & Cumming, 2016; Williams et al., 2010). Mental imagery reduces performance stress and increases self-efficacy (Jones, Mace, Bray, MacRae, & Stockbridge, 2002). To illustrate, William and Cumming (2016) investigated the effect of using imagery to manipulate stress appraisal of a dart throwing task. While, Williams et al (2010) investigated whether physiological and psychological responses and interpretations varied according to cognitive appraisal of the imagery scripts: challenge, neutral, threat. Results of both studies support using imagery to facilitate adaptive stress appraisal.

However no other psychological interventions have been investigated using the TCTSA as a framework to manipulate threat appraisals. Previous research has used multimodal intervention to increase self-confidence, self-belief and other psychological attributes (e.g. Barker, Jones, & Greenlees, 2013; Hanton & Jones, 1999b). Therefore, this study uses a multimodal intervention to influence the resources (e.g., self-efficacy) and thus reduce threat and enhance the challenge state of the athlete. The study will therefore contribute in adding to inadequate research in the area of challenge and threat states about effective intervention strategies.

**5.5 Injury rehabilitation framework used to facilitate an effective intervention**

A framework suggested by Hamson-Utley (2010) was used as a guideline by the physical therapist and the author (sport psychologist) to facilitate an effective intervention and challenge approach of return to sport and competition. The framework recommends to breakdown the rehabilitation process into three phases: reaction to injury, reaction to rehabilitation and reaction to return to play and also recommends the psychological intervention that may be applied in each phase. The intervention was thus implemented using the guidelines in conjunction with the participant’s feedback and needs during the rehabilitation process.

**Phase 1: Reaction to Injury**

Phase 1 encapsulates the athlete’s response to the injury, including physical and psychological factors. The participants responses were as suggested by Hamson-Utley (2010). Physically, the participant became immobile and forced to become inactive. As a result of the physical aspect, the athlete also experienced negative emotions such as anger and frustration along with anxiety about the recovery. Psychologically, the athlete formed a negative cognitive appraisal of the injury occurrence and was consumed with pain. Also the athlete became more reliant on others, so less independent. Highly useful psychological intervention that is recommended in this phase is imagery as it facilitates pain management (Arvinen-Barrow & Walker, 2013).

**Phase 2: Reaction to Rehabilitation**

This phase is characterised by the physical factors of strength, balance and mobility, and the psychological factors of motivation and hardiness. This phase tends to be most challenging as it is the longest phase and athletes can spend 3 to 4 months in this phase. Strategies that motivate athlete to work hard and highlight qualities of resilience are best suited in this phase. Goal setting is suggested be the most relevant intervention to use with the athlete to address these psychological concerns.

**Phase 3: Return to Play**

Reaction to return to play: Psychologically in this phase the athlete deals primarily with self-confidence issues and managing their fears of re-injury. Self-talk, goal setting, performance imagery are recommended to be the most effective strategies. Performance imagery through mental rehearsal can help increase injured athletes’ confidence in their ability to return to sport and compete as it helps decrease stress and anxiety that athletes may experience in the lead up to their return to sport and competition (Walsh, 2005). Thus pain management imagery, goal setting, self-talk and performance imagery are some of the techniques used in this study as the player progressed with his rehabilitation program.

**5.6 Aims of the study**

The present chapter focuses on an intervention conducted with an elite badminton player who experienced a number of stressors due to a sports injury. These included concerns related to lack of self-efficacy and control, having avoidance goals, and unhelpful thoughts and emotions towards the recovery of the injury and an upcoming competitive performance. The psychological intervention was implemented to enable the participant to cope with the stressors experienced through out the rehabilitation period and to prevent the stressors from having a negative impact on training and competition. The major aims of the study are:

1. To determine if the psychological interventions can help build self-efficacy, control, an approach focus, and can develop positive and helpful emotions towards recovering from the injury and performing in a tournament.
2. To assess if the player feels that he has the necessary resources available to cope with the demands of competition and is not negatively affected by the stressors placed due to the injury.
3. To establish if the threat state perceived by the participant can be reduced and the challenge state can be enhanced using the multimodal psychological intervention.

The previous chapters established the relevance of the TCTSA in the Indian context and also the need for interventions with elite Indian athletes. The current study thus extends from the earlier chapters as it uses the TCTSA framework to guide an intervention in an applied sport setting. The wider contribution of this study will be that it will add to the limited literature in the area of challenge and threat states about effective intervention strategies that may reduce threat and enhance a challenge state in performers. The current study as a part of the thesis will be instrumental in providing an emperical base upon which applied sport psychologists from Eastern, as well as the Western world, can draw to aid performers to reduce threat and increase the challenge state.

* 1. **Background Information**

The first session and a need for intervention was initiated by Jay (a pseudonym is used to maintain confidentiality) when the author visited his training centre while she worked at the academy. The participant was a 20-year-old elite badminton player ranked in the top 10 in the country who trained at a high performance badminton academy in Bangalore in India. The participant got an ankle injury while training on court three weeks before the initial contact with the author. The participant was training and preparing himself for a tournament when the injury occurred. Jay mentioned to the author that he was “stressed out” and that he needed help to overcome his stress.

* 1. **Description of the problem**

The stressors identified by the participant can be classified under two main headings:

1. The psychological demands perceived by the player necessary to recover from injury.
2. The psychological demands perceived by the player to perform in practice and at a competitive tournament.

The major stressors associated with the recovery of the injury included feeling loss of control due to frequent injuries and having doubts regarding the reoccurrence of the injury and the pain. The player also did not feel confident about recovering from his injury until others reassured him. While, the main stressors associated with performance include low self-belief due to lack of training and competition experience and perceived low self-efficacy to execute the strokes he could play before injury. He also perceived the fear of making mistakes and losing to weaker opponents, as the player believed the opponents’ would explore and identify his weaknesses during competition. The player believed his game was not up to the mark and thus also feared playing difficult opponents. The player also developed an avoidant thought process towards working on his weaknesses in training. For example, the player believed that his attack was weak so he rather focus and work only on his defence game. He felt confused about his own goals and expectations from the tournament. The participant also expressed feeling tensed about what the crowd will expect from him as he was going to play a tournament after a long time. As stated in chapter two, social-evaluative threat is also suggested to elicit a stress response (Woody et al., 2018). It can be suggested that the participant perceived several demands and challenges due to his injury and an upcoming competition.

**5.9 Design**

A single-case (A-B) design was used within this study. One strategy (injury-healing imagery) was implemented in the first session due to the immediate need of the player. Baseline data was collected prior to the rest of the intervention and two data points post intervention. In total, data were collected at three time points. The AB design was selected because this has been the preferred method used in recent research involving sport performance (e.g., Barker et al., 2013). It was also not possible to withdraw or disrupt the routines or intervention of the player as he was coping with an injury and was required to improve and progress to compete in a national level tournament.

The work described in this study is covered over eight months. Evidence indicates that benefits can be achieved with limited contact over a relatively brief period of time. For example, studies have involved seven sessions over three and a half weeks (Perna, Antoni, Baum, Gordon, & Schneiderman, 2003), six sessions and two follow up phone calls (Johnson, Ekengren, & Andersen, 2005), and six sessions over a four-week period (Maddison & Prapavessis, 2005). In this study, eight sessions were conducted followed by a match observation within a period of six months. Post intervention self-report data and follow-up data via interview was collected and a further follow-up data using self-reports was collected at eight months to examine the effectiveness of the intervention and a telephonic session was conducted to collect social validation data. Each session lasted for approximately 45 to 60 minutes.

**5.10 Follow-up data**

Follow-up data was collected via interview at post intervention (i.e., at the end of six months). The participant gave information about the extent to which each of the intervention was useful. More importantly, he also described how the interventions helped him (i.e., which of the psychological resources did the intervention address).

**5.11 Social validation data**

Social validation is used to determine satisfaction with an intervention and has been utilized in many single-case studies within sport and exercise psychology research and consultancy (Page & Thelwell, 2013). For example, social validation procedures have enabled researchers to demonstrate that increases in rugby performance as a result of a goal setting intervention were perceived as effective by the players and that the changes in performance were viewed as useful to the team (Mellalieu, Hanton, & O’Brien, 2006). A consequence of the data being available is that they can help guide research and applied work (Storey & Horner,1991a; Storey & Horner 1991b).

Social validation data was collected (via telephonic interview) post the follow-up phase of the study (i.e., eighth month) to ascertain the participant’s perceptions and feelings of the intervention and its procedures (Hanton & Jones, 1999b; Kazdin, 1982). The participant gave information about the extent to which each of the intervention was useful. He also described how the interventions helped him in competition. Questions were also based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations and related to whether the participants: (a) perceived the intervention to be important, (b) thought the procedures of the intervention were acceptable, and (c) felt satisfied with the results. Previous studies (e.g., Pates, Cummings, & Maynard; 2002; Pates & Maynard, 2000) have also preferred to ask these three verbal questions, based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations. The flowchart below illustrates the procedure followed while conducting this study.

**Figure 5.1: Flowchart of Study Procedures**

**Pre – study**

Information sheet provided

Consent form was completed

Initial interview with the player and coach

**Intervention & baseline data collection**

Imagery was implemented prior to collecting data from self-report measures

Measures of Self-Efficacy & Control, SEQ, AGT and Challenge and Threat appraisal completed in session 2

**Intervention to create challenge state**

8 Sessions included:

Imagery

Confidence shield

REBT worksheet

Improving perception of control

Goal setting

Self-Talk

Post-match analysis

**Post Intervention Data Collection (8th month)**

Self-Efficacy & Control, SEQ, AGT and Challenge and Threat appraisal completed

Social validation data collected

**Post Intervention Data Collection**

**(6th month)**

Self-Efficacy & Control, SEQ, AGT and Challenge and Threat appraisal completed

Match Observation Session

Follow-up data collected

**5.12 Measures**

Data were collected from interviews with the player and the coach along with four self-report measures. First, the measure for Self-Efficacy and Control (SEC; Turner et al.*,* 2014) included 7 items that were adapted to badminton. The measure aims to understand how confident and how much in control the participant feels typically just before a match. For instance questions include, how confident and in control does the player feel to be able to focus throughout a match or how confident and in control does the player feel about responding well to mistakes. Second, the Achievement Goal Questionnairefor Sport (AGQ-S; Conroy, Elliot, & Hofer, 2003) that included 12 items. The questionnaire includes statements reflecting on several aspects of sport performance that assess approach and avoidance goal orientation of the player. Third, the 22 item Sport Emotion Questionnaire (SEQ; Jones,Lane, Bray, Uphill, & Catlin, 2005) that include range of feelings the performer may experience in relation to the important situations. And finally, the Demand and Resource Evaluations were collected using two items from the cognitiveappraisal ratio (Tomaka et al., 1993) so that challenge or threat responses to an important situation could be determined. These measures were used as they relate to the challenge and threat states. Also a manipulation check (Jones & Uphill, 2004) was done to verify if the player was able to imagine if he was just about to take part in the important upcoming tournament. Copies of the questionnaires along with the consent from the participant can be seen in appendix 5.1.

**5.13 Problem description and data from self-report measures**

Jay had a number of demands. He perceived danger due to the injury and felt that the injury and pain could reoccur, he recognized the amount of mental effort he would have to take to overcome from his injury and felt uncertain of how he may perform in an upcoming competition. The initial interview and sessions helped determine that the player perceived the stressful situation as a threat and thus the four chosen self-report measures were used to assess the participant’s level of self-efficacy and control, his achievement goals, his emotional state and to evaluate whether he felt he had the necessary resources to cope with the demands placed on him towards the upcoming competition. The data from the questionnaires completed before the intervention illustrated that, the player scored 71.10% on self-efficacy and 67.10% on control, he had a high score for mastery approach, however also scored high on performance approach. The sports emotions questionnaire showed that the participant scored high for emotions of anxiety and dejection while a low score for excitement towards the upcoming competition. The Demand Resource Evaluation Score (DRES) was -1, which indicated that the participant felt that he did not perceive to have the necessary resources to cope with the demands of the tournament. The baseline data that are reported in Table 3 in the data collection and analysis section (i.e., section 5.17) presents the results from the questionnaires along with the results after the intervention.

**5.13.1 Sessions with Jay and the coach**

In the initial interview, Jay highlighted that he was unable to mentally cope with the ankle injury he got while training for an upcoming international tournament. He was asked to withdraw from the tournament, rest and undergo physiotherapy. He discussed the approach he had been asked to take towards his injury rehabilitation, training and competition. The table below outlines his approach.

**Table 5.1: Rehabilitation schedule of the participant**

|  |  |
| --- | --- |
| Activity | Duration |
| Complete Rest | 4 weeks |
| Rest + Physiotherapy | 2 weeks |
| Physiotherapy + Physical training under supervision | 4 weeks |
| Physiotherapy + physical training + standing strokes on court | 2 weeks |
| On court training to slowly progress | 4 weeks |
| With improved movement on court he can start playing practice games | 8 weeks |
| Tournament | At the end of the 6th month |

While he explained the plan of action advised by the physiotherapist he seemed disappointed, frustrated and also angry. He said, “ I have just recovered from one injury few months back..and now it’s this one again..what if I don't get better? How am I supposed to train and prepare for tournaments?” Later in the sessions, he also expressed feeling unsure and anxious about how it would be like to face an opponent after six months and was worried that others would keep training while he would miss out. He said, “I will be resting while others will be training, their game will improve by the time of the tournament, they will play other matches too..so they’ll also get match practice.” The player experienced and expressed several such negative and unhelpful thoughts through out the interviews and sessions. The coach had a limited interaction with the author during the sessions however he mentioned that:

He’s doing well but I’ve seen that while playing matches if he makes one mistake he goes on to make couple more and loses consecutive points. He’s not recovering quickly and it’s very apparent from his body language. It drops. You can look at him and tell he’s frustrated and that definitely needs to be worked on.

The stressors communicated by the player and concerns expressed by the coach corroborated with the results from the self-report questionnaires and suggested that the player perceived his situation of coping with the injury and the upcoming competitive tournament as more of a threat.

**5.14 Summary**

The pre-intervention assessment of the problem relied mainly on the data gathered from the initial interview and the first session with Jay and the self-report measures. The data showed that Jay experienced a number of stressors related to his injury and his upcoming performance in competition. The injury caused the player to reduce his self-efficacy, which also further affected his mental approach towards training and competition. Jay had doubts, felt anxious and perceived the tournament as a threatful situation. The interviews and the pre-intervention self-reports of the participant show that the participant scored low on self-efficacy and control, scored high on mastery approach but also had a high score for mastery avoidance as well as performance approach goals. The athlete also felt very anxious and angry and did not feel excited about the upcoming tournament. The Demand Resource Evaluation Score was also negative, which supported that Jay perceived the competition as threat.

**5.15 Problem Formulation**

Jay communicated a number of stressors and unhelpful emotions in his interview, sessions, and pre-intervention self-report measures, towards his injury recovery and more importantly his upcoming competition. While the coach provided limited information. The TCTSA posits that self-efficacy, perception of control and achievement goals determine challenge or threat states (Jones et al., 2009). The TCTSA provided as a framework to the author to help understand that Jay perceived his situation as a threat and that developing a challenge state would support the participant to cope with his injury and thus further approach competition as more of a challenge.

The stressors are outlined under three main themes in Table 2 – stressors causing lack of self-efficacy and loss of control, performance (ego) oriented goals and approach of the player towards practice and competition, and negative emotions experienced by the player towards the injury and competition.

**Table 5.2: Participant’s stressors**

|  |
| --- |
| a. Lack of self-efficacy & control   * Low confidence due to lack of training and having missed out on several international tournaments and training camps. * Lack of self-efficacy: Not feeling confident about executing all the strokes the player could earlier. * Loss of control over his body due to frequent injuries and doubts regarding the reoccurrence of injury. * Low self-belief as the player constantly felt dependent on others feedback to feel confident. |
| b. Performance goals   * Fear about other players progressing while they continue to train, play matches and improve, while he would be out of practice for several months. * Worried about losing to a weaker opponent after being out of practice. * Worried about opponents exploring and identifying his weaknesses during competition, as he believed his game was not up to the mark. * Avoiding working on his weaknesses: He said that since his smashes and attack were not good anymore, he rather work only on his defense. * Worried about playing tough opponents as he felt he could only defend and return the shuttle and that would not be good enough to play strong players. * Avoiding training as the player felt every time he would lunge he would worry the injury will reoccur.   c. Unhelpful emotions and thoughts   * Anxious about playing a tournament after 6 months. * Fear of making mistakes and losing. * Feeling frustrated and not recovering after making a mistake. * Feeling dejected due to repetitive injuries and worrying about its reoccurrence. * Confused about his own expectations and goals from the tournament, as he would be playing a tournament after 6 months. * Tense about what the crowd will expect from him, as he would be playing after long. |

**5.16 Data collection, planning and implementation of intervention**

The author of this chapter worked as sport psychologist at the badminton academy where the participant practiced. As a part of the participant’s contract with the author, the participant had completed and signed a consent form giving permission for the information shared in the sessions to be used for publication (appendix 5.1). The author collected the data from the participant, conducted the analysis and also planned the implementation of the intervention. Usually long baseline measures are required before staring an intervention, however it was important that the participant could start coping with his injury and also approach the upcoming competition more positively for him to perform well. To monitor the effectiveness of the interventions used, data were collected via self-report measures pre and post-intervention. The data using self-report measures was collected on two occasions post intervention, the first time before a national tournament (i.e., in the sixth month) and the second time (i.e., in the eighth month) before the start of a state tournament that the player participated in. The multimodal intervention was also monitored and directed based on the feedback gained through the dialogues with Jay in the sessions. The sessions were conducted face to face with the player at the badminton academy in Bangalore (India). Follow-up data and social validation data were collected towards the end during the sixth and the eighth month respectively, to assess the effectiveness of the intervention.

The initial interview was followed by the first session and data were collected using self-report measures before the start of the second session (i.e., in the first month). The post intervention data was gained using questionnaires before a tournament that the player participated in (i.e., in the sixth month) and this was followed by a match observation, and a follow-up interview. The intervention was also evaluated by collecting data using self-report measures and social validation data during the eighth month before the player participated in another tournament. Following the information gathered from the initial interview and sessions and the pre-intervention questionnaires, the immediate objective was to implement an intervention and examine its effectiveness in reducing threat and helping Jay cope with his injury positively and also approach the competition as more of a challenge.

Interventions such as imagery (to facilitate pain management), rational emotive behaviour therapy (REBT), strategies to build confidence and pre-match routines were planned based on the initial interview and the injury rehabilitation framework used to facilitate an effective intervention. Theoretical rationale is provided for interventions used, which are discussed in detail as they are introduced throughout the sessions.

**5.16.1 First interview and sessions with the participant**

The participant approached the author three weeks after he got his injury. He mentioned that he would like to do sessions and work on feeling better and said was losing his confidence and feeling stressed. He briefly explained how he got his injury and shared thoughts and emotions that he was experiencing since his injury. He was worried about his injury recovery. He was also told that if he recovered and progressed well, he would then prepare and play a national level tournament after six months. He also expressed feelings of doubt towards playing the tournament with confidence. The participant mentioned some stressors in his initial interview that are included in Table 5.2. While several stressors were brought up as the sessions progressed. Thus a part of the intervention was planned after the initial interaction and the data collected from the self-report measures, however certain strategies and techniques were introduced to participant as the sessions evolved and progressed.

SESSION 1

Outline of session:

1. Player presented his concerns and issues discussed in the first interaction were discussed

2. Introduce imagery as a part of injury healing and rehabilitation

Summary of session:

In the first session, the badminton player highlighted that he was stressed and unable to cope with the ankle injury he got while training for an upcoming international tournament. The participant had been asked to rest and undergo physiotherapy. His physiotherapist and doctor recommended that he should train on court only after three months and was also adviced not to play a tournament for six month. The participant had been getting recurrent injuries and was very disappointed that he would have to miss the upcoming tournament and expressed feelings of frustration and anger. He was feeling low on confidence, experiencing self-doubt and also felt loss of control as he was asked to rest and refrain from playing a tournament for a period of six months.

As suggested by Hamson-Utley (2010), imagery was thought of as an appropriate mental exercise for the player to begin with to help increase feelings of personal control and potentially enhance the rate of healing. Athletes not only appreciate the usefulness of visualisation or imagery in enhancing performance (Hall, 2001) but also during sport injury rehabilitation (Walsh, 2005). When applied to sport injury rehabilitation, imagery can be seen as an activity in which the athlete can create images of the healing process, the injured body part getting healed and restored to normal levels of functioning, dealing with pain and any emotions associated with the injury and recovery process. Past research suggests that imagery facilitates athletes’ ability to better cope with their injury and pain (Gould, Bridges, Udry, & Beck, 1997b; Hamson-Utley & Vazquez, 2008), help manage emotions of anxiety, worry, and stressors associated with injuries and the rehabilitation process (Hamson-Utley & Vazquez, 2008; Monsma, Mensh, & Faroll, 2009) and prepare athletes for successful return back to pre-injury level of performance (for example assist in increase levels of confidence and decrease levels of re-injury anxiety; Walsh, 2005). The literature indicates that athletes who recovered faster have reported using significantly more healing imagery during the rehab process than those who recovered more slowly (Arvinen- Barrow & Walker, 2013). As stated earlier, research supports using imagery to facilitate adaptive stress appraisal (e.g., Williams et al., 2010). The first imagery script based on “healing” was thus generated for the participant. Imagery was implemented based on the need and the urgency expressed by the player in the initial interview. He was asked to follow this imagery for a period of 8 weeks till he started his on court training. This imagery script can be seen in appendix 5.2.

SESSION 2

Outline of session:

1. Data collection using self-report questionnaires

2. Working on building confidence and overcoming self-doubt

Summary of session:

Before the beginning of the second session the participant was given the four self-report questionnaires to complete (reported in Table 3 in the data collection and analysis section, i.e., section 5.17). During the second session, the participant was also asked to report on whether the injury healing imagery was helping him. He mentioned that it helped him feel relaxed and that the imagery helped him believe that he was recovering from injury and that his ankle was getting better. However, the participant also mentioned that he was scared and felt low on confidence and doubted his ability to execute all the strokes again effectively as he was not allowed to play on court for 10 weeks and was missing out on his training camps while others continued to train and improve. He was worried that once he started playing, he may lose to weaker opponents. He also mentioned that his physiotherapist’s presence helped him feel confident during his rehabilitation but was feeling unsure about his own progress while his physiotherapist was going to be on leave for 4 weeks even after the physiotherapist had charted out his program and the player was well aware of the rehabilitation program that he was supposed to follow.

To help him focus on himself, cope with the anxieties and build confidence, he was asked to make a “confidence shield” where he was asked to write down all his technical, physical and mental strengths he believed he possessed as a player, and his personal strengths that he could rely upon during the rehabilitation process, followed by the on and off court improvements he felt he had in the last six months and also some of his best achievements from the previous season. The most effective way of creating a strong sense of confidence is through mastery experiences as these experiences affect self-efficacy judgments through cognitive processing of information (Murray, 2008). Thus it was expected that reflecting on mastery experiences such as one’s strengths and accomplishments would help the player enhance his self-efficacy. Beaumont, Maynard, and Butt (2015) also revealed that one potential strategy to build and maintain robust sport confidence was to help athletes become aware of, and develop their own unique strengths. Jay was asked to put up the confidence shield in his room and go through it everyday after his imagery exercise. The contents from the player’s confidence shield can be seen below:

**Table 5.3: Player’s strengths, improvements and achievements**

|  |  |  |  |
| --- | --- | --- | --- |
| My game strengths  technical/physical/  mental | My personal strengths | My improvements | My achievements |
| 1. Good lengths 2. Defence 3. Dribbles 4. Good lifts 5. Drops 6. Half Smashes 7. Attacking tosses 8. Good strokes from overhead 9. Upper body strength 10. Stamina and aerobic capacity 11. Good patience 12. If I give my 100% I can play well | 1. Hardworking 2. Patience 3. Never give up attitude 4. Motivated to do well and succeed 5. Independent | 1. Better confidence 2. Better strengths 3. Strong core 4. Better power in legs 5. Good pushes | 1.Karnataka state ranking tournament – Winner  2. State Championship – Winner  3. All India ranking tournament – Runner Up  4.Indonesia – 2nd round but a good training camp before and helpful international exposure |

SESSION 3

Outline of session:

1. REBT to help him cope with his anxiety of recurring injury and pain

Summary of session:

The participant had been getting recurrent injuries and was very disappointed that he would have to miss the upcoming tournament and expressed feelings of frustration and anger as he had also missed out on training previously due to injuries. He said, “what if I get injured again and my ankle starts hurting again even after my rehab is complete?” By the third session the player had started physical training and he mentioned, “every time I lunge I feel like I’m going to injure my ankle.” He mentioned that this made him feel like he wanted to avoid the training. The participant’s results from the questionnaires also showed that he experienced unhelpful emotions.

Rational Emotive Behavioural Therapy (REBT) was used with the participant to help him cope with his irrational thoughts and beliefs about the ankle injury. He felt scared and anxious, as he believed that the injury and pain would reoccur even when his doctors and physiotherapist reassured him of his progress and recovery. Ellis proposed that it is rarely the adversity (i.e., injury) that causes dysfunctional emotions (i.e., anger, anxiety and frustration) and maladaptive behaviours (i.e., withdrawal, avoidance) alone, rather it is the beliefs about adversity that cause these unhealthy responses (Ellis, 1957). In REBT ‘unhealthy emotions’ refers to emotions that are associated with pain and discomfort, lead to self-defeating behaviour, and impede the individual from taking necessary actions to achieve their goals (Turner, 2014).

In short, irrational beliefs lead to emotional and behavioural reactions that are dysfunctional, maladaptive and therefore inhibit goal achievement. For example, in the case of an injury, irrational beliefs lead the player to withdrawing mentally and physically. In most circumstances this is likely to inhibit peak performance. In contrast, rational beliefs may lead to the individual facing up to the situation and taking constructive action to minimize danger (Dryden & Branch, 2008), which is more likely to facilitate performance. Therefore, the reduction of irrational beliefs and the promotion of rational beliefs, thus changing the way in which an event is cognitively appraised (David, Schnur, & Belloiu, 2002; Hyland & Boduszek, 2012), can be beneficial for the well-being and performance of athletes. REBT can help athletes respond more functionally in uncomfortable situations such as when they are recovering from an injury. Lazarus’ concept of cognitive appraisal has been linked to REBT and REBT strategy for repappraisal training has been suggested in past literature (Ziegler, 2001). Studies suggest that irrational beliefs and cognitive anxiety reduced at the point at which REBT was applied with athletes and remained reduced over a period of time (e.g., Turner & Barker, 2013). The ABCDE framework based on REBT was adopted to help the athlete feel in control and manage his emotions more effectively and to help him have an approach goal orientation.

The player was guided through the ABCDE framework during the one to one session. The player was given the following example: for an athlete it is not being deselected or rejected by the coach (A) that causes anger alone, it is usually the irrational belief that the coach ‘must be fair to me, and I cannot stand being treated unfairly (B) that leads to the dysfunctional emotional consequence (C). The athlete then learns to dispute (D) their irrational beliefs and is encouraged to form new effective rational alternatives (E).

The participant filled the REBT worksheet with the guidance of the author before writing his effective rational alternative about the situation in the worksheet. He was explained how disputation helps to understand that irrational beliefs are false, illogical and unhelpful, and that rational alternatives are true, logical and helpful (Dryden & Branch, 2008). By the end of the session the participant expressed rational and self helping thoughts, which he wrote down in the anti-evidence and conclusion columns of the worksheet. He reported feeling calmer and more at peace. He was asked to place the worksheet at his bedside table and go through his worksheet if irrational thoughts about the injury reoccurred to him during his rehabilitation process. The REBT worksheet filled in by the participant can be seen below:

**Table 5.4: REBT worksheet of the participant**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Situation | Thoughts | Feelings | Evidence | Anti Evidence |
| My ankle is injured | What if my ankle gets injured  again?  What if the pain comes back?  What if my ankle gets injured again when I lunge or play on court?  What if I get injured somewhere else next time? | Scared  Anxious  Frustrated  and sometimes angry | I have had an injury just 8 months back  I recovered from the injury and now I am injured again | The last injury was not an ankle injury. My left knee was hurt and now it’s actually the right ankle so the two injuries may not be linked  I recovered completely from the previous injuries whenever I had them and don’t feel any pain in my left knee so perhaps the pain won’t recur in the right ankle as well  The last injury was only 8 months back, but the previous ones were quite some time back.  I may get injured again but I’m doing my physical training and rehab well to make my body strong to avoid injuries.  My doctors and physio have told me that I am recovering well so I should believe in that |

Effective Rational Alternative/Conclusion: My conclusion is that I should not feel scared and anxious about the injury and pain recurring as it may actually not recur as I am doing my rehab and training well so I am focused on making sure that it heals well and my anti evidence column now makes me feel that I’m feeling angry and scared for no reason. I should approach my training more positively and confidently.

SESSION 4

Outline of session:

1. Feedback from the player

Summary of session:

The player expressed concern regarding completion of the questionnaires, as he perceived them to be measures that ‘tested’ him. He mentioned that he was continuously being assessed physically and preferred to not be evaluated on any psychological aspects till the end of the intervention as it made him feel nervous. His apprehension was taken into consideration and qualitative feedback was taken during this session. While gaining feedback from the participant he reported that was going through his “confidence shield” every day after his imagery. He reported that it helped him feel confident and that he was a strong badminton player with good skills that he had developed and that he also had the personal abilities to cope with this situation and bounce back. He also said, “reading my list of achievements makes me think that if I have done it before, if I have won before I can win again.” He reported that he would glance through his REBT worksheet every morning and that he felt he was recovering well and did not feel pain in his ankle. He was feeling happy and had a positive approach towards his physical training sessions. He also conveyed that he had started standing stokes and playing on court and was able to play with a free mind and did not feel like avoiding it but infact looked forward to it indicating an approach mind-set towards training.

SESSION 5

Outline of session:

1. Introducing the “match preparation” imagery script as a pre-match routine

Summary of session:

The participant’s on court training had progressed where he was able to play practice games twice a week. He had submitted his entry for a tournament and was expected to participate after 8 more weeks of on-court training. He mentioned that overall he was feeling more confident than before. However, he would have doubts every now and then while he played practice games or matches. He felt anxious about the upcoming tournament and felt the fear of making mistakes. He also felt worried about his opponents’ exploring and identifying his weaknesses during competition, as he believed his game was not completely up to the mark. He felt that he could only defend and return the shuttle and doubted if that will be good enough to play.

A strategy to modify cognitions and to change undesirable emotional responses is the use of imagery (for reviews, see Cumming & Ramsey, 2008; Martin, Moritz, & Hall, 1999). Athletes have described using imagery to overcome negative interpretations of anxiety symptoms both directly, by viewing them as controllable and facilitative to performance, and indirectly through confidence enhancement (e.g., Hanton, Mellalieu, & Hall, 2004; Thomas, Hanton, & Maynard, 2007). For example, Jones, Mace, Bray, MacRae, and Stockbridge (2002) found that imagery, with an emphasis on remaining in control of emotions and feeling confident and focused, led to lower perceived stress and higher levels of self-efficacy during a climbing task. Overall, studies suggest that imagery facilitates an adaptive stress response and that athletes who use imagery feel more in control, perceive the task to be more of a challenge (e.g., Jones et al., 2002; Williams et al., 2010).

Thus it was thought appropriate to introduce to him his second imagery script that included focusing on his badminton skills and match preparation to help create a challenge state. The participant was asked to follow this imagery before practice games or practice matches as part of his pre-match routine. The “match preparation” imagery script can be seen in appendix 5.3.

SESSION 6

Outline of session:

1. Counseling on focusing on aspects within control
2. Self-talk to maintain positive body language

Summary of session:

The participant expressed that he felt scared about losing in the early rounds of the tournament and also that he was tensed about what the crowd will expect from him, as he would be playing after a long time. The participant underwent counseling regarding focusing on aspects within his control through out the tournament. The author aimed to change his result oriented thoughts to helping him focus on the process (i.e., focusing on how to play rather than winning or losing). The author also pointed out that what the crowd or any other person will expect from him was beyond his control and he could do nothing to change other people’s perspectives or expectations about him. Focusing on the aspects of performance(s) that one can control help to focus on the right things, while also facilitates a sense of belief that the performance is achievable (Turner & Barker, 2014). Thinking and acting on factors that one can control helps to eliminate any focus on irrational, illogical and unhelpful thoughts, which are often optimised, by a focus on uncontrollable aspects (Turner & Barker, 2014). Being in control is a crucial resource in the TCTSA.

To help the player focus on himself and aspects within his control he was asked to draw out a chart with two columns. In the first column he was asked to write down aspects outside his control and in the second column he was asked to write down aspects within his control and focus on those. The chart can be seen in below:

**Table 5.5: Outside Control/In Control Chart**

|  |  |
| --- | --- |
| Outside Control | In Control |
| What other’s will think about me or expect from me | My strokes and skills |
| How my opponent is and who it will be | How I want to play |
| Umpire’s decisions | My confidence and my frame of mind |
| Whether I will win or lose | Giving my best |
| The draw and the rankings | Doing my physical and mental warm up well |
| My injury or pain reoccurring again |  |

The participant’s coach joined in for the second half of the session to give feedback about the player. The coach was satisfied with his progress on court and also felt that the player will be prepared mentally to play the tournament. However, he mention to the author that he observed that, during practice games the player was not able to recover quickly after making a mistake. He said that it was quite apparent from his body language that he was getting frustrated after losing a point and sometimes that led him to lose a couple of points in a row. The player mentioned that after he lost a point, he did not feel in very confident and in control to play the next point. He said, “it takes me time to recollect myself physically and mentally.” He also gave himself a low score on the self-efficacy and control measure to the ‘respond well to mistake’ item.

Greenlees, Bradley, Holder, & Thelwell (2005) examined athletes’ perceptions of a hypothetical opponent who varied in body language. Participants rated their perceptions of the likely outcome against various opponents (self-efficacy). Results showed that participants felt less confident in their chances of defeating players displaying positive body language. Thus it is important for players to maintain a positive body language during competition. More importantly, the actions and expressions one engages in can alter thoughts and these thoughts then create emotions. Therefore, if an athlete is able to maintain positive body language, he or she will have positive thoughts and also experience positive emotions. Self-talk has been widely endorsed by athletes and coaches as a performance enhancement strategy (Van Raalte, Vincent, & Brewer, 2016). The use of self-talk to keep self-control when feeling frustrated has been perceived to benefit performance and has been previously been demonstrated as effective in facilitating performance (e.g., Miles & Neil, 2013). The author formed a self-talk statement in conjunction with Jay.

The player was asked to say the statement between two points, particularly when he lost a point. This was to help him correct his body language and help him feel in control and ready to play. While developing the self-talk, the author asked him, “if you had to identify someone with a positive body language who would it be and why?” To this the player answered, “I believe superman always has a strong and a positive body language..because he always holds his head high, his shoulders are strong with his chest pumping up out..it would be good to feel and look like superman while on court!” The player’s self-talk statement was developed as follows: head high, shoulders straight, chest out, stomach in, ready to play. Past research has shown that table tennis and tennis players who approached a serve with a positive body language that included stand and walk erect, shoulders back and chest out, head up, chin level with the ground, their eyes looking directly at the camera (opponent) for prolonged period were perceived as prepared, confident, focused, relaxed, assertive, aggressive, competitive, experienced, fit, and of a higher ability than the opposition (Greenlees et al., 2005; Greenlees, Buscombe, Thelwell, Holder, & Rimmer, 2005).

SESSION 7

Outline of session:

1. Goal setting for practice and tournament

Summary of session:

The participant seemed to have an avoidant thought process a few weeks before the tournament. He mentioned to the author and his coach that he felt his smashes and attack is not good anymore, so he rather work only on his defence. The author explained to him that he should try and cope with the problem and approach it positively and work on his attack and smashes with his coach rather than avoiding his shortcomings. The coach identified specific aspects related to the ‘attack game’ that he needed to focus on during training. His coach asked him to particularly focus on his movement on court, body position and wrist action while hitting smashes during drills. His goal was to correct these aspects. The author asked the player to maintain a record and give himself a rating (on a scale of 1 to 10) on these aspects everyday after training.

Researchers posit that the relationship between achievement goal orientations and performance is mediated by setting specific goals. In particular, they claim that achievement goals do not affect performance directly. Instead, the effect of achievement goals on performance is mediated by specific goals that are set (Brett & VandeWalle, 1999; Latham & Locke, 2007; Stoeber, Uphill, & Hotham, 2009). Goal setting is expected to influence the resource appraisal of approach goals as evidence suggests that personal goal setting is said to mediate the relationship between performance-approach goals and performance (Stoeber, Uphill, & Hotham, 2009). Past research studies also highlight the role of coaches as a vehicle to encourage and support the use of sport psychology (e.g., Gould, Hodge, Peterson, & Petlichkoff, 1987; Sharp & Hodge, 2013). The author and the coach could achieve more for the player by working together. In Jay’s case, the coach recommended practical changes in training which were the player’s goals while working on his attack, based on the author’s explanation of approaching and working on his weaknesses instead of avoiding them. The record that the participant maintained for 2 weeks can be seen below:

**Table 5.6: Goals for attack and smashes**

1 to 3 = ☹ 4 to 6 = Avg, 7 to 8 = good, 9 to 10 = Excellent ☺

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | | **11** | **12** | **13** | **14** |
| Movement - quicker | 4 | 6 | 6 | 5 | 7 | 7 | 7 | 7 | 4 | 7.5 | | 8 | 7.5 | 7 | 7 |
| Wrist - flick | 7 | ☺ | 6.5 | 7 | 7 | ☺ | ☺ | 8 | 8 | | 7 | ☺ | 8 | 7.5 | 7.5 |
| Body position - behind | 6 | 6 | 7 | 6 | 7 | 8 | 7 | 8.5 | 9 | | 7.5 | 8 | ☺ | ☺ | ☺ |

The participant also expressed that he felt confused about his expectations and goals from the tournament, as he was playing a tournament after six months out. To help the participant with this, he was asked to write his outcome goal along with his process goals. It was emphasized that, he should maintain his focus on the process goals throughout the tournament and that these process goals could be evaluated after every match to assess how many of those he could achieve. Having a game plan to keep self- control has been perceived to benefit performance and has previously been demonstrated as effective in facilitating sport performance (e.g., Miles & Neil, 2013). The process goals would help him find clarity about what he could expect himself to implement during his matches at the tournament and also to help him assess himself based on how he performs rather than the outcome of the matches. His outcome and process goals can be seen below:

**Table 5.7: Goal setting of the participant**

Outcome goal (What do I want to achieve in this tournament?):

My goal is to win the tournament.

Process goals (What will help me win?):

1. I want to approach every match with confidence
2. I have recovered well from my injury so I want to enter the matches with a good positive mind-set
3. Maintain good body language during matches
4. My defense is good so I want to return each shuttle back to the opponent
5. I want to make sure I am moving well on court
6. I have been working on my smashes so I want to execute them well
7. I want to play attacking tosses
8. My dribbles are good so I want to play them well
9. I want to be ready to play long matches and fight out every match
10. Keep the focus on myself (not worry about what the crowd or others will think)

SESSION 8

Outline of session:

1. Feedback and mental preparation for the tournament

2. Introducing post-match analysis

Summary of session:

The participant reported that maintaining a chart and rating himself on his attack and smashes helped him to put in conscious effort while working on those aspects during training. He said that seeing his rating get better gradually, helped him feel confident that he could execute his strokes effectively. The participant’s outcome goal for the All India Ranking Badminton Tournament was to win. He said, “What’s more important is if I am able to implement the things I have written down as my process goals. I don’t know what I can achieve after such a break but I don’t want to aim for anything less than a win.”

To help Jay feel confident, the author recommended his coach and physiotherapist to show him evidence of his progress and accomplishments (on and off the court) over 6 months. Past achievements are the most influential source of self-efficacy information (Bandura, 1997). Self-efficacy derived from previous accomplishments determines sustained effort and persistence, which is the key to overcoming occasional obstacles or failures, ultimately improving performance. Self-efficacy is another crucial resource in the TCTSA. With regards to his mental training he was reminded of the routines that he had to follow throughout the upcoming tournament. His routines were built using some of the mental exercises he had been following over the last 6 months.

The player’s pre-match routines included:

1. “Match preparation” imagery
2. Reading his confidence shield that included his strengths

The player’s during match routines included:

1. Focusing on himself and things that are in control (reading the chart if necessary after 11 points or in between games)
2. Self-talk to maintain positive body language and recover from mistakes – head high, shoulders straight, chest out, stomach in, ready to play.

The player’s post-match routine was:

After each match, the player was asked to go through his process goals and put a happy smiley in front the goals he could achieve in the match and think about what he could do differently in the next match to achieve the ones he did not achieve. He was asked to give himself a score in percentage to help him evaluate himself based on his process goals and not the outcome he would achieve. He was asked to think about what helped him achieve his process goals. Post-match reflection and experiential learning can help players become more proficient at acknowledging what they’re thinking and feeling during performance and, accordingly, why they are thinking and feeling in that way. In turn, this may help them to identify what actions to take to improve or maintain performance during a stressful event (Neil et al., 2013). The player completed the post-match analysis after each match during the tournament, however for convenience it is presented below:

**Table 5.8: Post-match analysis of the player**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Process Goal Number | Round 1 | Round 2 | Round 3 | Pre Quarters | Quarters | Semi  Finals | Finals |
| 1. Confidence | ☺ | ☺ | ☺ | ☺ | ☺ | ☹ | ☺ |
| 2. Mind-set | ☹ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| 3. Body language | ☺ | ☹ | ☹ | ☺ | ☺ | ☹ | ☺ |
| 4. Defence | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| 5. Movement | ☹ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| 6. Smashes | ☺ | ☺ | ☹ | ☺ | ☺ | ☺ | ☺ |
| 7. Attacking tosses | ☺ | ☹ | ☺ | ☹ | ☺ | ☺ | ☺ |
| 8. Dribbles | ☹ | ☺ | ☺ | ☺ | ☺ | ☹ | ☹ |
| 9. Stamina & readiness to play long, tough matches | ☺ | ☺ | ☺ | ☹ | ☺ | ☺ | ☺ |
| 10. Focus on self | ☹ | ☺ | ☺ | ☺ | ☺ | ☺ | ☹ |
| Match % score | 60% | 80% | 80% | 80% | 100% | 70% | 80% |

Overall, it was expected that the multimodal intervention would influence and bring about changes in the resource appraisals (i.e., self-efficacy, perception of control, achievement goals) and that the strategies would also help develop positive and helpful emotions towards recovering from the injury and performing in a tournament. Thus it was hypothesized that the multimodal intervention would reduce threat and enhance the challenge state of the badminton player.

**5.17 Data collection and analysis**

The participant filled out the questionnaires post intervention, two days prior to the start of the national tournament. The data was analysed and results are presented below:

**Figure 5.2: Comparison between Participant’s level of Self-Efficacy and Control Pre and Post Intervention**

The graph above show that the player’s level of self-efficacy and control increased post intervention.

**Figure 5.3: Comparison between Participant’s Achievement Goals Pre and Post Intervention**

The graph above show that the player scored high on mastery approach goals, which remained constant post intervention, and a small decline in performance approach goals can be seen post intervention. The intervention helped and aided the player to reduce his mastery avoidance and performance avoidance goals.

**Figure 5.4: Comparison between Participant’s Sports Emotions Pre and Post Intervention**

The graph above show that there was a decrease in the negative emotions (anxiety, dejection and anger) felt by the player after the intervention and the player also perceived an increase in the positive emotions of excitement and happiness. The graph below also shows an improvement in the emotional state of the participant after intervention compared to his emotional state prior to the intervention.

**Figure 5.5: Comparison between Participant’s Emotional State Pre and Post Intervention**

An improvement can be seen through the graph above with regards to the emotional state of the player.

**Figure 5.6: Comparison between Participant’s DRES Score Pre and Post Intervention**

The Demand Resource Evaluation Score (DRES) was -1, which shows that the participant felt that he did not perceive to have the necessary resources to cope with the demands of the tournament before the intervention whereas, the DRES score increased significantly post intervention suggesting that the player perceived to have the resources required to cope with the demands.

SESSION 9

Outline of session:

1. Match Observation

Summary of session:

The participant had kept in contact with the author over the phone throughout the tournament and reported that he was following his mental routines and that they were helping him. He had reached the finals of the tournament and was feeling excited, confident and in control of performing well. The author attended the finals and it was observed that the participant warmed up well and found a quiet corner to listen to his imagery on his phone and go through his confidence shield. During the first game, the player remained calm and maintained focus. He very cleverly used drop shots, which won him a lot of points. He celebrated points through the game. The positive aspects that really stood out in this game of his was his use of the self-talk before a crucial point that helped him maintain positive body language. He also kept saying, “come on” if he lost a point and was seen to recover quickly. He indicated to the opponent if he required time before the opponent served. The game score reached 19-20 and his opponent was at game point. At game point, he took his time to keep his calm and focus, but lost the first game. Before the next game started, it was observed that the player pulled out his sheet of paper, which would remind him to keep the focus on himself and things that are in control. He started the second game by playing in a more offensive manner than the previous game, but he made unforced errors and started trailing. There was one rally in which he dived to receive the shuttle but did not make the attempt to get back up for his opponent’s smash. It was observed on two occasions that the player looked around towards the crowd possibly looking for encouragement, which could have affected his focus. His coach suggested that he should start focusing on the basics of full smashes, and countering the shuttle straight at the opponent. The player tried to implement what the coach told him however lost the second game as well. He remained calm and focused through out the game and maintained a positive body language although he seemed to be annoyed after the game and match was over. However, he quickly went up to his opponent to congratulate him and then towards the umpire to thank him. After the player spoke to the coach, cooled down and finished his stretching he came up to the author and said that he lost 21-19, 21-16 and that it was a close match. He was pleased and happy with his performance overall in the match and the tournament.

**5.18 Follow-up data andinterview with Jay**

Follow-up data was collected via interview to evaluate the effectiveness of the intervention. Jay felt that the intervention was effective and beneficial in helping him overcome his irrational thoughts about the injury and helped him feel more confident and in control before the tournament. He said that going through the REBT worksheet helped him cope with his injury, as he was able to overcome his anxieties related to the injury. He felt that “injury healing” imagery was effective during the first few weeks, however the “match preparation” imagery only had a limited benefit. He said it was difficult to do it at the tournament venue, as he often felt distracted. The confidence shield helped him remind himself of his strengths before the matches and he developed more belief in going through the shield than the imagery. He also said it was, “quick, easy, fun and to the point.” Jay also said that there were occasions when he thought to himself whether he would be able to perform to his potential and felt doubt when people spoke to him and asked him if he was feeling fit to play. However, just before the match he was able to focus on himself and his strengths using the confidence shield. He said, “ the shield had all my resources.” The participant did not seem to enjoy the orthodox mental skills techniques such as imagery or self-talk as much, but liked maintaining and going through the charts and worksheets such as the confidence shield worksheet, REBT worksheet, goals setting sheets for training and competition. Jay said that, “I liked the self-talk because it sounded like a poem, however it felt like an effort to say the statement it didn’t come naturally. May be something shorter would be better.” Jay communicated that the mental training activities and worksheets were more “objective” and that they provided him with evidence that made him aware that he was making progress making him feel more confident.

With regard to the self- report forms, Jay was not keen on completing them during the intervention phase however when he completed them post the intervention found that the Sports Emotion Questionnaire was valuable as it helped him understand the emotions he was experiencing and wanted to work on changing them prior to competition. For example, he realised that his feeling of anger was not going to help him and the author emphasized that he needed to focus on the present and the current tournament rather than feeling annoyed about the past. It also made him realise that he was feeling much happier and excited than before on and off the court. The Demand Resource Evaluation Score (DRES) also helped him think about the technical, physical and mental resources he must draw attention to and develop, to cope with the demands he perceived. Jay believed that he should have approached the author right after the injury rather than waiting for 3 weeks.

Jay finished 2nd in the All India Ranking Badminton Tournament which was slightly lower than what he had aimed for (his goal was to win the tournament), however felt satisfied with the outcome. He said, “it was a close match and I felt quite strong so I’m happy. A win would have been great but after being out for six months, I think this is a good result for me and my team that has worked with me.” He indicated that he had been able to achieve most of his process goals and that helped him feel good about how he had performed in the competition. Overall, he was happy with his performances in the matches and reported being appreciative of the contribution of the author in aiding his recovery from injury and psychologically preparing him for competition. Jay mentioned that he would continue to follow most of the techniques and strategies and believed that they would help him even in the upcoming state tournament. He said he was feeling confident about his performances and winning the tournament. At the end of the interview he was asked to rate how effective he felt each of the technique was on a scale of 1 to 10. A checklist was used to validate if the intervention had addressed the aspects of the TCTSA. The aspects of the TCTSA included the resource appraisals of feeling in control, feeling confident, having an approach goal orientation and being able to manage emotions effectively. This checklist can be seen in appendix 5.4.

**5.19 Evaluation of the intervention**

The intervention was evaluated through interviewing and using self-report measure two months after the end of the national tournament (i.e., in the eighth month). The participant was interviewed and asked to fill in the self-report questionnaires a day prior to a state tournament that Jay was going to participate in. Jay was emailed the questionnaire and the social validation data was conducted over the phone. The results from these questionnaires are compared with the results from the sixth month. These are presented below:

**Figure 5.7: Post Intervention Comparison between Participant’s level of Self-efficacy and Control at 6 and 8 months**

The graph above show that the player’s level of self-efficacy remained constant while the level of control the player perceived had marginally increased.

**Figure 5.8: Post Intervention Comparison between Achievement Goals at 6 and 8 months**

The graph above show that the player scored high on mastery approach and performance approach goals, which remained constant at 6 months and 8 months. The scores for performance avoidance also remained the same. While, a small decline was observed in the mastery avoidance score.

**Figure 5.9: Post intervention comparison between Participant’s Sports Emotions at 6 and 8 months Post Intervention**

The graph above show several differences in the results at 6 and 8 months. The player’s anxiety had reduced significantly, however his levels of anger had increased. The positive emotions of excitement and happiness had also increased in the two months.

**Figure 5.10: Post intervention comparison between Participant’s Emotional State at 6 and 8 months Post Intervention**

An improvement can be seen in the emotional state of the player from month 6 to month 8.

**Figure 5.11: Post intervention comparison between Participant’s DRES Score Post Intervention at 6 and 8 months**

The Demand Resource Evaluation Score (DRES) remained positive before both the tournaments. The results show that the participant felt that he had the resources necessary to cope with the demands of the tournament.

**5.20 Social validation data**

Social validation data was collected with the participant over the phone, which revealed that the participant held the intervention in positive regard. The data was collected based on the following three questions a) did you perceive the intervention to be important and helpful, b) were the procedures acceptable and did you feel the intervention was implemented well, c) are you satisfied with the results of the intervention? Jay reported that overall the psychological intervention played a role in helping him cope with his injury in a positive manner and also that he was able to approach his competition in a positive way. He mentioned that he liked how each strategy was implemented one at a time and how he was given a routine to follow during competition using those interventions. He said that the interventions were simple and such that it was possible for him to implement and adhere to them on a regular basis. He said, “the mental routines helped me feel that I was doing something to keep my mind in control.” The player also said that he was extremely satisfied with how the intervention had helped him with coping with his injury and helped him prepare and approach the competitions positively.

Feedback was also collected via phone from the coach during the eight month and the coach mentioned that Jay has been practicing freely without perceiving any threat regarding the reoccurrence of an injury. The coach mentioned that Jay was approaching his practice sessions with a positive mind-set and looked forward to working on his areas of improvements rather than avoiding them. He said that he observed Jay to have better control over his body language and emotions on court, and that overall he seemed calm and happy. The coach said, “Jay definitely looks much more confident compared to a couple of months back. He was going through a rough patch right after his injury and the sessions have definitely helped him to get to where he has today, both mentally as well as physically.” The interview guide that consisted of five questions can be found in appendix 5.5 along with the coach’s transcribed responses.

**5.21 Discussion**

The present study examined the effects of a multimodal intervention on an elite badminton player experiencing a threat state due to a sports injury. This study extends the findings from chapter one and two as it uses the TCTSA framework to investigate the effectiveness of a multimodal intervention to reduce threat and create a challenge state in an applied sports setting in India. No previous single-case design study had been found in literature that aims to reduce threat and enhance a challenge state in an elite athlete. The participant’s concerns related to the elements of the TCTSA that included lack of self-efficacy and control, having avoidance goals, and unhelpful thoughts and emotions towards the recovery of the injury and an upcoming competitive performance. The multimodal psychological intervention was implemented to help the player cope with the demands of the injury and approach his practice and competition as a challenge.

Baseline data for the psychological variables along with the data collected through interviews and sessions suggested that the participant perceived a high threat state and a low challenge state. Data indicated that overall the multimodal intervention was effective in enhancing the participant’s level of self-efficacy, control, and reducing avoidance goals and unhelpful emotions. The intervention also aided the player to perceive that he had the necessary resources to cope with the demands of competition. The results thus revealed that the multimodal intervention was effective in reducing threat and enhancing a challenge state. In addition, the follow-up data also revealed that the psychological attributes such as the positive emotions and the usefulness of the emotional state had not only been elevated but self-efficacy, the approach goals and the DRES score were observed to be stable, indicating that the multimodal intervention allowed the participant to regulate his thoughts and feelings relative to his injury and performance with greater control. Thus, the maintenance of the psychological attributes after the intervention period supports its long term effectiveness. The results of the competitions were used as the performance indicators within the study. The results highlight an increase in the psychological attributes, which was associated with useful performance gain such as a runner up position in the national level tournament and a win at the state tournament. As stated earlier, although the participant aimed to win the national tournament, he was satisfied with his achievement as he participated in a competition post injury after a period of six months and was content as he had been able to achieve most of his process goals (see Table 5.8). He also attributed his recovery from injury, psychological preparation towards competition and his performances to his sessions with the author and the intervention that was implemented with him.

Results from the self-report questionnaire revealed that the level of self-efficacy and control increased greatly by the sixth month and the same level of self-efficacy was maintained during the eight month along with a slight increase in control. The player in his telephonic interview reported that he felt more in control as he had recovered completely from his injury over the two months and was responding better on court when he made mistakes and was dealing with tough situations better on and off the court. He said that the REBT activity made him feel like his mind was in his control. Similarly, recent research with elite paralympic athletes and elite soccer players supports the efficacy of REBT as an intervention as they indicate greater self-awareness, emotional control and helped players regulate their emotions in training and competition (Turner & Barker, 2013; Wood, Barker, Turner, & Sheffield, 2018). Data also showed that the player had a mastery approach, however the interventions helped him reduce his mastery avoidance, performance approach and performance avoidance goals. The levels of the achievement goals remained constant from the sixth month till the eighth month, only with a further decrease in mastery avoidance goals. The player mentioned over the phone follow up, “setting small performance goals for practice help me feel motivated to work on my weaknesses now and to give my best.”

Post intervention (at the sixth month) a decrease in negative emotions and an increase in positive emotions was seen. There was also an improvement in the emotional state of the participant post intervention. The checklist that the player filled in when the follow-up data was collected shows that the injury healing imagery script, REBT activity, and post-match analysis helped the player manage his emotions and perceive more positive emotions. There were further improvements seen in the eighth month as the positive emotions further increased and the anxiety level had further reduced. Anger was the only emotion that was higher compared to the sixth month data. The player reported that this was mainly because he was told before the competition that he did not get an entry in an international tournament he expected himself to participate in. However, the emotional state of the player was better and more helpful.

The participant prior to the intervention did not perceive that he had the necessary resources to cope with the demands placed on him, however the interventions helped him become aware of his resources and draw upon them when needed. The results show that at six and eight months post intervention the DRES score remained positive and constant. The participant in his interview mentioned that the confidence shield particularly made him feel confident as it reminded him of his resources. Thus, the results from the self-report questionnaires and the feedback from the player shows that the intervention helped build self-efficacy, control and reduce avoidance goals and negative emotions in the player. The results of this study therefore illustrates that changes in challenge and threat states are a result of the changes mainly in the perceptions of resources. Within this study, the participant emphasized low resources (e.g., lack of confidence) rather than high demands and thus the intervention focused on helping the participant build his resources. The intervention did not aim to weaken the demand appraisals. Also, the questionnaires used in the study measured the resource appraisals (i.e., self-efficacy, control and achievement goals) rather than the demands appraisals. Thus it can be suggested that more intervention studies are required to be conducted to establish whether challenge and threat states can be manipulated by changing the perceptions of resources, or perceptions of demands, or both.

In summary, the intervention facilitated positive and helpful emotions and thoughts in the player towards recovering from the injury and performing in the tournament. Post intervention the player felt that he has the necessary resources available to cope with the demands of the tournament and was not negatively affected by the stressors placed due to the injury. Thus, it can be established that the threat state perceived by the participant was reduced and a challenge state was created using the multimodal psychological intervention. Previous research has also successfully used challenge and threat instruction sets to manipulate challenge and threat states using demand and resource appraisals (e.g., Alter, Aronson, Darley, Rodriguez, & Ruble, 2010; Feinberg & Aiello, 2010; Moore et al., 2014; Tomaka, Blascovich, Kibler, & Ernst, 1997; Turner et al., 2014).

A number of practical issues emanated from this study. Development of a close rapport with the player (via sessions and telephone calls) was thought to aid the participants’ adherence to the intervention, which may have facilitated a successful outcome. Regular contact with the participant also helped the author understand the needs of the participant from time to time and aided in developing the intervention specifically as per the needs of the participant. Being available for discussions over the phone prior to each match was also important in the outcome of the intervention and the development of the participant (Bull, 1995, 1997; Gordon, 1990). As the participant revealed concerns relating to the physical, technical and psychological issues, the physiotherapist, and coach were involved and communicated with the author during the intervention period (Collins, Morriss, & Trower, 1999). Past research supports using imagery to facilitate adaptive stress appraisal (e.g., Williams et al., 2010). However the participant in this study did not perceive the strategy to be as effective. This study indicates that individual differences exist relative to the use of interventions to reduce threat and enhance the challenge state.

Limited data points and getting the participant to fill in the questionnaires during the intervention phase may be considered a limitation. This issue highlights one of the challenges sport psychologists face when working with athletes in applied situations. Athough a two part design that includes a baseline and intervention is used in this study, due to the applied nature of the research it was not possible to collect repeated measurements and was considered unethical as the participant perceived the data collection to be intrusive. Thus the study may not represent a true AB design but more of a multiple-probe design. A probe design is characterised as a single discrete measurement of a target variable, which is often random with no predetermined time (Barker et al., 2011). Probe designs are considered less intrusive and applied researchers in the field of sport and exercise are thus encouraged to use probe designs.

The follow-up data collected (via the checklist) from the participant provides an indication of which part of the intervention had a greater impact upon the participant and with which particular psychological variable (i.e., confidence, control, approach focus and emotions). This data releaved that the interventions that helped the participant feel confident included imagery, confidence shield, REBT, and goal setting. While the interventions that helped the participant feel in control included self-talk, post-match analysis, in control and outside control chart, goal setting, REBT and the confidence shield. Further the strategies that helped the participant have an approach focus involved using REBT, goal setting and post- match analysis. The athlete also reported that imagery (injury healing), confidence shield, REBT, goal setting, self-talk and post-match analysis helped him manage him emotions effectively and/or feel more positive emotions. It can be observed that REBT and goal setting influenced all the resource appraisals. However, it is important to further understand the underlying mechanisms behind the change. For example, it is possible that the level of self-belief and control the player was able to maintain during the eighth month was due to his complete physical recovery or the performance accomplishment he had in the sixth month or even because the level of competition was easier during the eighth month (state level) compared to the competition in the sixth month (national level). Despite the limitations of a multimodal intervention, this approach was selected to cater for the needs of the participant.

A potential limitation of the study is the inability to state that the intervention was the only contributory factor in reducing the threat and facilitating a challenge state. It could be that participant may have experienced increase in self-efficacy, control and positive emotions as he became physically fit through his rehabilitation program and began his technical training. To ensure that the observed difference is caused by the intervention used and not a consequence of maturation (i.e. normal development), the intervention was evaluated at 8 months (Barker et al., 2011). Another design such as ABAB was not possible due to nature of the problem of the participant where the intervention could not been withdrawn. However, visual analysis suggested that the intervention was helpful in reducing threat and creating a challenge state. Another limitation of this study is that it relies on a single participant. As a result, we cannot be entirely certain that the successful outcome is attributable to the specific effects of the intervention and not to nonspecific factors, such as enhanced hope or a beneficial therapeutic relationship. There are, however, clear visual differences between the participant’s pre- and post-intervention status. In addition, triangulation of data from self-report measures, objective and subjective indicators of injury recovery and performance levels, and the participant's positive perception of the treatment all argue for the effictiveness of the multimodal intervention. Nevertheless, future research is needed to ascertain that the change in challenge and states can be attributed specifically to the use of the multimodal intervention. One more limitation is the possibility of the response bias on the psychometric questionnaires. The minimal amount of fluctuation between the data points post intervention would possibly support this (Barker, 2011). Response bias is difficult to guard, however the author tried to be present at the performance environment at one occasion. Objective indicator of performance was that the player came runners up in the first tournament and won the second tournament and the player subjectively also reported about his full recovery from injury. Throughout the study, every effort was made during the sessions and telephone conversations to reinforce social desirability instructions and the instructions of the questionnaires. Further, the study would have benefited from collecting more data points at baseline, during intervention and post intervention to quantify the long-term efficacy of the multimodal intervention on the participant (Gardner & Moore, 2006). Finally, a measure of psychological responses to injury (e.g., Psychological Responses to Sport Injury Inventory, PRSII; Evans, Hardy, Mitchell, & Rees, 2008) may have been useful in further determining the effectiveness of the intervention in helping the participant positevely cope with the demands placed by the injury.

The participant reported a positive perception towards the intervention and attributed the multimodal intervention for him being able to cope with the demands and perceived to recover from the injury and to perform in practice and competition. The player also successfully incorporated the interventions into his badminton training and competitions and was able to adhere to it two months after the study. Generally, this study provides evidence supporting the effectiveness of the multimodal intervention in reducing threat and enhancing a challenge state in an ecologically valid setting. Importantly, the evaluation of the intervention revealed a consistency in the changes in the challenge and threat state of the player. Future researchers should consider the use of more robust single-subject designs to collect data in ecologically valid settings, explore alternative methods of collecting social validation data and assess the impact of other interventions in decreasing threat and increasing the challenge state. More evidence is needed until strong conclusions can be made about the effectiveness of the multimodal intervention in reducing threat and enhancing the challenge state.

**5.22 Conclusion**

While the study has certain limitations it provides some promising findings. The results show that the intervention was successful in altering the participant’s psychological state. The multimodal intervention improved his confidence and control and helped him overcome his injury and approach competition more positively. Post intervention, his avoidance goals decreased and the player felt that he had the available resources to cope with the demands of the tournament. His perception of a threat state reduced and challenge state increased after the intervention. The use of self-report assessment via the booklet was a valuable and important tool in monitoring the effectiveness of the intervention. Given that individual differences will be present in a player’s reaction to stress, a single-case design approach was utilized. This study reveals the effectiveness of a multimodal intervention (developed for this program of research) in reducing threat and increasing a challenge state in an applied setting. The study indicates that similar to imagery (Williams et al., 2010), strategies such as goal setting and REBT may influence the resources (e.g., confidence, control) and facilitate an adaptive stress appraisal. Also similar to past research (Hardy 2006; Martin et al., 1999), interventions such as imagery and self-talk helped athletes manage emotions effectively. This is an initial study to investigate the effectiveness of psychological interventions in a single-case design using the TCTSA as a framework to manipulate challenge and threat states. The study thus extends the limited literature in the area of challenge and threat states about effective intervention strategies that may reduce threat and enhance a challenge state. Sport psychologists from the West as well as the East, may use multimodal interventions to manipulate athletes’ appraisals of stressful situations.

This study arose as a result of the applied work the author was engaged in and the applied research reflects the real world of doing sport psychology. The findings of this study are supportive of the TCTSA literature concerning the relationship between self-efficacy, control, achievement goals and emotions with challenge and threat states. High levels of self-efficacy, control, approach goals and positive emotions are associated with a challenge state and higher levels of sport performance (Jones et al., 2009). The study addresses the first and the third aim of the program of research as it helps understand the sources of stress of, and responses to, stress of an elite Indian badminton player and determines the effectiveness of a multimodal intervention to reduce threat and increase the challenge state amongst an Indian athlete in an applied setting. Similar to the current study, previous research has also suggested the use multimodal interventions to bring about changes in behaviour and performance (e.g., Barker & Jones, 2013; Hanton & Jones, 1999b). Single-case research designs have an important role to play in determining intervention effectiveness in sport psychology research (e.g., Barker, 2011; Turner, Ewen, & Barker, 2018) and while this study has revealed a positive effect of the multimodal intervention on reducing threat and creating a challenge state, more research is needed to document whether such effects are consistent. Finally, the current chapter also provides some evidence for the use of the TCTSA framework in implementing an intervention and categorising stress responses of Indian athletes as challenge and threat. Thus, chapter six builds upon the current study by reporting the effectiveness of a multimodal intervention using a recently proposed guide called the “MAPP for Success” (based on the TCTSA) to reduce threat and create a challenge state in an elite squash player experiencing performance stressors.

Chapter 6

**Threat state to a challenge state: An application of the “MAPP for Success” with an elite Indian squash player**

**6.1 Introduction**

The current chapter extends from the previous chapter as it implements a multimodal intervention based around the TCTSA to reduce threat and help create a challenge state in an Indian elite athlete to enhance performance. The previous chapter illustrates that strategies may influence the resource appraisals and multimodal interventions could manipulate athletes’ appraisals of stressful situations (i.e., challenge or threat). This study will further add to the limited research regarding intervention studies in the area of challenge and threat. It has been suggested that the origins of stress needs to be considered when developing interventions (e.g., Woodman & Hardy, 2001). The current study builds on the previous chapter with a stronger focus on implementing an intervention to help an athlete cope with competition stressors. This chapter includes a female elite squash player from India and the demands placed on the player participating in this study include multiple performance stressors leading the player to underperform in competition. The single-case design used in this study has also been driven by the applied work of the author and explores the demands placed on the squash player and how she responds to the demands. The study further investigates the effectiveness of the intervention implemented to help the athlete cope with her performance demands more positively. Thus the current chapter addresses the first and third aim of the thesis, which is to understand the sources of, and responses to stress amongst Indian elite athletes and to investigate the effectiveness of the intervention to reduce threat and enhance a challenge state using the TCTSA respectively. What makes this study unique is the application of the MAPP (Map to Achieving Peak Performance) that is used as a guide to formulate the athlete’s demands, to deliver the intervention and also assess the progress of the squash player. The MAPP is research informed and is mainly based on the TCTSA and thus used in this study. This is the first study to apply the ‘MAPP for Success’ developed by Turner and Barker (2014) and to document its effectiveness in reducing threat and creating a challenge state in an athlete.

The single-case design allows investigating unique experiences of an athlete, which is vital. For instance, Neil et al., (2011) reported uncertainty as a performance stressor, however the cognitions of each performer differed (i.e., “am I going to make the same mistakes” and “what am I meant to be doing?”). Thus the intervention that may have to be implemented may differ with each athlete based how the demands are cognitively appraised. Some performers are able to manage their stressors, while several others struggle, resulting in severe impairments to their performance and health causing burnout, depression or even illness (Rumbold, Fletcher, & Daniels, 2012). Thus individually tailored interventions are essential to facilitate athletes’ experiences and performances in their sports setting (Jones, 2003). Squash being a high impact, fast sport that relies on consistency, strength and skill, players often experience stress and this stress is mainly due to the intensity of the matches and the short duration of the tournament which places a lot of pressure on the participants to do well (Montanus, 2016). This chapter reports the use of a multimodal intervention guided by the MAPP for Success with an elite squash player having low self-confidence, lack of control and a performance (ego) oriented approach in a performance setting. Based on the MAPP for Success (Turner & Barker, 2014) and the TCTSA (Jones et al., 2009), it was hypothesized that the intervention would reduce threat and facilitate a challenge state in the elite squash player.

**6.2 Competition Stressors in Sport**

Elite athletes may be the most vulnerable to experiencing high demands and stress in their competition arena. Issues directly related to sports performance (e.g. opponents, preparation, results) are known as competition or performance stressors (Mellalieu, Neil, Hanton, & Fletcher, 2009). Performance stressors are inherent and unavoidable in elite sport. As stated in chapter one, Fletcher and colleagues defined competitive stress as “an ongoing transaction between an individual and environmental demands associated primarily and directly with competitive performance” (Hanton, Fletcher, & Coughlan, 2005, p. 1130). The identification of the demands placed on the athletes is important in the understanding of competition stress, as it provides insight into factors that initiate cognitive, emotional and behavioural responses, which subsequently influence performance (Hanton, Neil, & Mellalieu, 2008). In this study, this is achieved by using the MAPP for Success that is based on the TCTSA framework. The MAPP for Success is outlined in the subsequent section.

Several studies have focused their attention on the stressors encountered by sport performance within the actual competition environment. For instance, Mellalieu et al (2009) identified performance stressors that included dimensions of preparation, injury, expectations, self-presentation and rivalry. The dimensions included themes such as competing while injured, watching other competitors, needing to perform well, large crowds, times of performance changing, and various weather conditions. Although their findings also revealed some emphasis on the occurrence of organisational stressors, the participants reported encountering more performance stressors. It is suggested that while considering competition stressors, it must be understood whether the competition stressor originates from the performance or also from the organisational related sources (Neil, Fletcher, Hanton, & Mellalieu, 2007). This is essential as mentioned earlier, there may be differences in cognitive processes underpinning the responses to these demands, and thus suitable interventions may be designed to manage the competition stressors (Hanton et al., 2005; Mellalieu et al., 2009). Another study conducted with international athletes illustrated competition stressors similar to those that were identified by Mellalieu and colleagues. These included preparation, injury, pressure, opponents, self, event and superstitions (Hanton et al., 2005). A study conducted with Norwegian elite athletes identified competition stressors such as high level of competitors, more audience watching and cheering, unable to stick to pre-competitive routines, pressure to perform well from others, inner pressure to perform well, lost routines because of size of venues, bad planning, bad luck and coach made technique change (Kristiansen & Roberts, 2010). Examples of other competition stressors are mental and physical errors (Nicholls, Holt, Polman, & Bloomfield, 2006) and negative thoughts (Dugdale, Eklund, & Gordon, 2002), congested fixtures and competing on a regular basis (Keaney, Kilding, Merien, & Dulson, 2018), injury related pressures such as the risk of being deliberately injured due to an opponent’s action and missing important competitions (Evans, Wadey, Hanton, & Mitchell, 2012) and, rivalry experienced as a part of competition (Thelwell, et al., 2007). Thus several competition stressors have been identified in literature.

Various cognitive strategies and interventions have also been identified within sport psychology literature that focuses on stress and performance outcomes. Relaxation based, cognitive restructuring programs, cognitive behavioural based multimodal programs have had positive effects for athletes (Greenspan & Feltz, 1989, Martin, Vause, & Schwartzman, 2005). Techniques such as positive self-talk, following a routine, planning, and imagery were also found effective for performance enhancement (Kristiansen & Roberts, 2010; Nicholls et al., 2006, Nicholls, Polman, Levy, Taylor, & Cobley, 2007). Other techniques used during performance, include cognitive strategies such as reappraising and blocking distractions and emotion-focused coping techniques such as venting of emotions and the use of humour (Giacobbi, Foore, & Weinberg, 2004; Holt & Hogg, 2002). Thelwell, Weston, and Greenlees (2007) showed that their sample used social support and self-reflection to cope with identified stressors, emphasizing the importance of understanding the unique experiences of individuals across different sports. Multimodal interventions are said to be the most effective to manage the stressors of competitive athletes as these programs may serve the purpose of optimizing various components of the stress process (e.g., appraisals, affect, coping) in succession (Rumbold, Fletcher, & Daniels, 2012). For example, a multimodal program may be effective in enabling a performer to appraise competitive stressors in a challenging way, which acts as a condition for more adaptive emotional responses, and facilitative coping (Rumbold et al., 2012). One approach proposed to help athletes deal with the stress of competition is the MAPP for success approach. This is utilized in the present chapter.

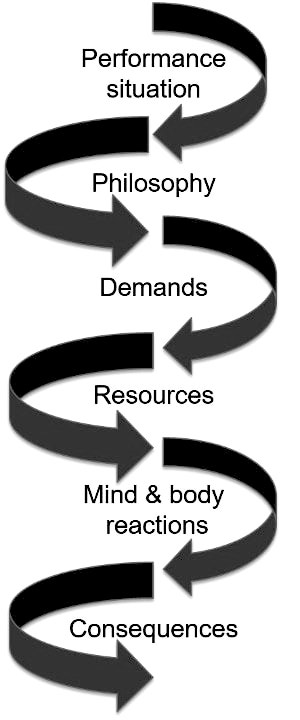
**6.3 What is the MAPP for Success?**

The “MAPP for Success” is a step by step guide developed by Turner and Barker (2014) mainly based on the TCTSA (Jones et al., 2009) which provides a direction to what causes challenge and threat states in athletes. It essentially illustrates how an athlete can reduce threat and get into a challenge state. The MAPP suggests that an athlete must see a performance situation as a challenge to be overcome, rather than a threat to be avoided. Although the MAPP has been proposed by Turner & Barker (2014), no previous research that draws on the MAPP has been found. This study will thus be novel and will contribute the current literature in the area of challenge and threat. The step by step process of the MAPP is detailed further.

The MAPP begins with the performance situation that an athlete is faced with in his or her sport. For instance, performing in a final match of an important tournament. The second step concerns the philosophy of the athlete surrounding success and failure. For instance, for an athlete in the threat state success may be a “must” or failure may be “terrible.” While for an athlete in the challenge state success may be preferable and failure may be bad, but not terrible. In the third step, the demands of the situation are processed and this involves an evaluation of the uncertainty, required effort, and perception of danger (both physical and psychological) present in the performance situation. The fourth step comprises of an evaluation into the resources available to the athlete in the situation and is made up of three important factors: self-confidence, perception of control and achievement goals. These four steps are vital precursors of challenge and threat states (Turner & Barker, 2014). These steps determine the mind and body reactions and the performance consequences depending on whether a challenge or threat state is perceived. A challenge state occurs if the resources meet the demands, while a threat state occurs if the resources do not meet the demands (Jones et al., 2009).

The MAPP is used in this study to consider an important and a meaningful sport situation faced by the squash player. Step 2 and 3 are used to understand and formulate the problems and demands of the squash player in her performance situation that is deemed important by her. Step 4 is used to develop and deliver an intervention to the player. The strategies used to help the player reduce threat and get into a challenge state was by enhancing her resources; in particular, to increase her ability to feel confident, be in control and remain focused on what can be achieved so that she is able to meet the demands of her performance situation. The mind and body reactions and the performance consequences of the participant are also recorded. Thus the MAPP provides a useful approach to understand the player’s competition stressors, how she responds and then implement an intervention to help the athlete cope with her competition stressors. A diagrammatic representation of the MAPP is presented below.

**Figure 6.1: Diagrammatic representation of the MAPP for Success taken from Turner & Barker (2014), pg.24.**

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*Self-Confidence*: Belief in the athlete to perform well in a given task.

*Control*: The extent to which performance is in the athlete’s control.

*Achievement Goals*: Striving to achieve or trying to avoid failure.

**6.4 Aims of the study** The aim of this study was to understand the psychological stressors and investigate the effectiveness of the intervention with an elite squash player using the MAPP based on the TCTSA and thus address the first and the third aim of the thesis. The objectives of the study were:

1. To identify the demands or the stressors of the squash player.
2. To implement an intervention to reduce threat state and enhance the challenge state of the player.
3. To assess the effectiveness of the intervention in reducing threat and increasing the challenge state.

Similar to the previous chapter, the wider contribution of this study will be that it will add to the limited literature in the area of challenge and threat states about effective intervention strategies that may reduce threat and enhance a challenge state in athletes.

**6.5 Case History and Methods of Assessment**

**6.5.1 Participant**

The participant named Pooja (a pseudonym is used throughout the study) was a female squash player ranked in the top five in India before the start of the intervention. The intervention lasted for a period of 10 months. Pooja trained six times a week for two to three hours each day at a squash academy in Chennai, India. During her initial interviews she described herself as mentally weak and was found to speak negatively about herself. She described herself as a weak player and mentioned that other players on the international circuit were more superior to her. Specifically, she compared herself to her cousin who has been India’s first squash player to be in the top ten in the world. She mentioned during her interaction that her coach has taught her imagery and it helped her stay positive at times, but not consistently. During her initial interviews it was noted that she had placed a great deal of emphasis on the results, which made her nervous and anxious on most occasions before and during her matches. Pooja felt that she had not been able to achieve the results in her tournaments that she is capable of achieving. She said, “ I do not play to my potential in the crucial matches and tournaments.” She also said, “ I’m worried how much more I need to do.” When Pooja was asked what she needed to work on to become mentally stronger she mentioned, “not getting disturbed by others before, during and after my matches, being confident, believing in my skills and playing to my potential, thinking more positively before and during matches, getting over my worry if I will ever make it to the top in the world.” The MAPP was used as a guide to formulate her case and the overall analysis of the case history and intake sessions suggested that the participant was dissatisfied with her performances in important tournaments. She lacked belief in executing her skills on court and also lacked the confidence to reach her goals. The athlete used the term self-confidence to describe her belief in her ability to be successful, the author refers this to the construct of self-efficacy. Pooja felt unsure and uncertain about the amount of effort she is required to put in. Finally, the success of her cousin also made Pooja feel threatened as she often compared her cousin’s achievements to what she *must* achieve.

**6.5.2 Design**

A single-case (AB) design was used within this study to assess the effectiveness of the intervention. The work described in this study is covered over one year. Each session with Pooja lasted for approximately 60 minutes. Baseline data was collected prior to the intervention and one data point during the intervention phase (i.e., at mid point) and two data points post intervention were taken (i.e., one data point at the end of the intervention and another data point during the follow-up period). In total, seven data points were gained (four times using a self-report measure and the MAPP protocol was used at three time points). The AB design was selected because this has been the preferred method used in research studies with a typical application to athletes in real world applied settings and furthermore the AB design is also applied to reflect consultancy work with individual athletes (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013a).

T here were eight appearances of the A-B (Baseline-Treatment) design in the selected

studies with a typical application to athletes in real-world applied settings (e.g., Annesi, 1998;

Mellalieu, Hanton, & O’Brien, 2006; Thelwell & Maynard, 2003; Scott, Scott, & Howe, 1998).

Furthermore, the A-B design was also applied to reﬂect consultancy work with individual

athletes (e.g., Barker & J ones, 2005, 2006, 2008)

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athletes (e.g., Barker & J ones, 2005, 2006, 2

**6.5.3 Measure**

The Challenge and Threat in Sport (CAT – Sport) scale developed by Rossato et al (2018) that includes 12 items was used in this study (see appendix 6.1). The participant had to respond on a 1 (totally disagree) to 6 (totally agree) likert scale. The questionnaire included statements such as, “I am worrying about the kind of impression I will make,” “I am looking forward to the rewards and benefits of success,” and “I feel this task is a threat.” During the time of data collection, measures that relate to challenge and threat states in sport psychology literature were reviewed and the CAT–Sport scale was chosen as it provides with a good internal consistency (threat, *α* = .90; challenge, *α* = .83) and criterion validity to measure athletes’ experiences of challenge and threat (Rossato et al., 2018). To explore the criterion validity, emotions were measured and a significant positive association was observed between challenge and excitement intensity (*r* = .22, *p* < .05) and a significant negative correlation with anxiety (*r* = −.16, *p* < .05). Threat had a positive correlation with anxiety (*r* = .39, *p* < .05). These findings are in the direction of relationships hypothesised with the TCTSA. The scale can be seen in appendix 6.1 along with the information sheet and the consent form of the participant.

The MAPP for Success protocol was also used at three time points, i.e., at the beginning, at mid-point and at the end of the intervention to assess the progress of the player. It uses the qualitative feedback provided by the player during the interviews and the key statements are used which reinforce each element of the MAPP.

**6.5.4 Social Validation**

Similar to chapter five, social validation data was collected (via interview) over the phone at the end of the intervention and the follow-up interview, to ascertain the participant’s perceptions and feelings of the intervention and its procedures (Hanton & Jones, 1999; Kazdin, 1982). The participant was asked, “Did you feel you were able to tell your experiences fully?” and “Did you find the intervention useful?” Questions were also based on Hrycaiko and Martin’s (1996) and Wolf’s (1978) recommendations and related to whether the participant: (a) perceived the intervention to be important, (b) thought the procedures of the intervention were acceptable, and (c) felt satisfied with the results. Previous studies (e.g., Pates et al, 2002; Pates & Maynard, 2000) have also preferred to ask these three verbal questions, based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations. It is also suggest that collecting social validation using an interview technique gives participants and clients the opportunity to expand on answers that could influence the delivery of the interventions (Page & Thelwell, 2013). The study uses all encompassing questions that are delivered verbally.

**6.5.5 Data collection**

Data were collected using interviews and the measure of CAT-Sport. Collecting data using complementary methods can help in outlining a more complete picture of the issue to be addressed and the intervention that needs to be delivered (Barker et al., 2011). Prior to the data collection, an information sheet was provided to the participant and she was fully debriefed about the nature of the study. Consent was also provided by the participant to the author who worked as a sport psychologis at her academy. The information sheet and the consent form can be seen in appendix 6.1. The participant completed the questionnaire at four time points over a period of twelve months (baseline, time 1 – before the intervention in the first month; time 2 – during the intervention, i.e., after five sessions in the fifth month; time 3 – at the end of the intervention in the tenth month, time 4 – during the follow-up period in the twelfth month). The case history, intake session and the questionnaire at time 1, was conducted and collected in person during the author’s visit to her academy in Chennai, while the other data was collected over phone, skype or email. Validity was checked using the respondent validation technique (Patton, 2005) where the participant was presented a list of demands from each of her session and was asked if they represented “exactly what she meant.” She was also provided with quotes from the interviews that were noted to check the accuracy of the content. An overview of the procedures followed in the study is presented below in figure 6.2.

**Figure 6.2: Flowchart of study procedures**

**Pre – study**

Information sheet provided

Consent form was completed

The player contacted the author during her visit to the squash academy

Background information and initial discussion

**Baseline data collection**

Interviews with the player

Using the MAPP for Success to organise the player’s demands

Collection of baseline measure using CAT- SPORT

**Intervention to create challenge state**

Implementing various mental routines and activities through the sessions

**Post Intervention Data Collection**

Post Intervention CAT – SPORT scores were collected

Using the MAPP for Success as a guide to assess the progress post the intervention

**Follow-Up**

Follow-up CAT- SPORT scores were collected

Follow up data and social validation data collected via interview

**During Intervention Data Collection**

Data was collected during the interview sessions

Collection of during intervention measure using CAT-SPORT

Using the MAPP for Success as a guide to assess the progress of the intervention

**Intervention**

**Result**

**6.6 Problem formulation and sessions with the player**

The concerns discussed by Pooja during the intake interviews related to the theoretical postulations of the TCTSA. Pooja had lost in the semi-finals in a national level tournament just before she met the author and felt low in confidence and lacked the belief of executing and implementing her skills during matches. She also focused on aspects outside her control and thus felt distracted by others before, during and after performances. Pooja felt uncertain about the intensity and direction of effort she required to put in. She also had a performance (ego) goal orientation as she compared her achievements and performances to a family member who had achieved significant national and international success. As stated by the MAPP, her philosophy about success also determined that she was in a threat state. Pooja felt what she *must* achieve must be comparable to her cousin’s achievement and also said, “it’s high time, I *have to* win.” Finally, the pre intervention CAT – Sport score for threat which was high (5.42 out of 6) and a low score of challenge (2.8 out of 6) confirmed that the participant perceived a threat state. Overall, it was observed that some stressors were felt directly before performance, while other were experienced through the preparation phase and into performance. Based on the case formulation, the multimodal intervention would attempt to reduce the threat state and enhance the challenge state of the player. The MAPP informed by the TCTSA was used to formulate the problem of the player based on the initial conversations and information shared in the initial sessions. Each section in the flow diagram is completed with a few key phrases that reinforce each element of the MAPP.

**Figure 6.3: The** **MAPP for Success used for problem formulation**

**Step 1: Performance Situation**

Player’s performance situation: Playing to potential in matches and achieving results in tournaments

“My goal is to achieve the results I feel I deserve in the important national and international tournaments.”

“ I do not play to my potential in the crucial matches and tournaments.”

**Step 3: Demands of the situation**

Player’s demands: Uncertainty, effort, and perception of danger

“It worries me how much more I have to do to get there.”

“The amount of effort I may put in may not suffice.”

“What if I never make it?”

“Will I be able to make it to the top in the World?”

“Sometimes I feel like a fool amidst the others. “

“Will I be able to achieve what my sister has achieved?”

**Step 2: Philosophy about success and failure**

Player’s philosophy: Unhelpful thinking style

“It’s high time, I *have* to win.”

“I feel like I *must* achieve what Anisha (pseudonym used) has.”

**Step 4: Evaluation of the resources**

Player’s resources: The player did not perceive too many resources at this point. She also lacked self-efficacy.

“I know I am in control of my game but my expectations are too much.”

“I am often compared to my sister and I have to keep up to what is expected of me by everyone.”

“Sometimes I cannot believe the game I play, its horrible,”

**Step 5: Mind and Body reactions**

Player’s reactions (self report and match observation using video recall of a semi final match during a national level tournament):

Player reported that her legs felt stiff when she entered the court for her match and her heartbeat became faster. In the video analysis it was seen that her face tightened up after she lost the first two points at the beginning of the match. The player reported that she often feels panic when she loses the first few points in a match. She said that since was she not getting any results, she felt nervous and anxious even while she warmed up for her game.

**Step 6: Consequences**

Consequences reported by the player: poor decision making, poor co-ordination, negative self talk, lacked resilience and effort, underperform in competition.

“I was not able to take the right decisions on court. I was trying to hit the ball harder instead of floating it.”

“I was not able to move well and I also miss hit a couple of times. It felt like a disaster that too while everyone was watching me.”

“I kept saying to myself nothing is working.”

“I felt like giving up. I felt like I don't have it in me.”

“I lose matches that I know I can win.”

**6.7 Proposed intervention**

Evaluating factors within control and outside of control, empty your head strategy, goal setting, and cue words/triggers were interventions that were were planned to be implemented with the athlete in the initial sessions based on the case formulation. The interventions were planned based on the results of the self-reports, the feedback and qualitative data obtained from the participant. The theoretical rationale is provided for the interventions used as they are introduced in each session.

SESSION 1

Outline of session:

1. Player presented her concerns and issues discussed in the first interaction were understood in detail.

2. Data collection using self-report questionnaire

3. Controllable/Uncontrollable activity

Summary of the session:

In this session, the author intended to identify why Pooja thought of herself as a mentally weak player and why she felt she was not able to play to her potential. It was understood that she called herself mentally weak because she believed she was technically, tactically and physically strong but lost matches as she was not able to handle the pressure of winning and also achieving what her cousin has achieved in the sport. Pooja focused on her uncontrollables. The researcher planned on helping Pooja understand and become aware of various aspects that are in her control versus those that are outside her control and counselled her as to why she must focus on the factors that are in her control. This intervention was implemented after Pooja completed the CAT – Sport self report questionnaire. The results from the questionnaire are presented below and the details about the intervention are provided thereafter:

**Table 6.1: Pre intervention results for challenge and threat**

|  |  |
| --- | --- |
|  | Pre Intervention  (Session 1) |
| Challenge | 2.80 |
| Threat | 5.42 |

The results above show that Pooja’s score for challenge is low (i.e., 2.8 out of a maximum of 6), while her score for threat is considerably higher (5.42 out of a maximum score of 6). Pooja placed a great deal of value in what other people thought of her and also felt motivated or demotivated by the judgment of those significant people. However, the player cannot control what others think and can do very little to change their opinions if they are negative and are demotivating her. She also focused on the outcome of a match and competition and also attributed poor results due to external distractions such as the audience. The locus of control is a psychological construct, which reflects whether an individual perceives the cause of behaviour to be within his/her personal control. It is defined as the perceptions one holds regarding personal responsibility for success or failure (Wood & Olivier, 2004). When the locus of control is internal, it is said to be autonomous, while external causality can be controlled (by others) or it can be impersonal (e.g., under the influence of a coincidence or luck; Marijana, 2010). Locus of control focuses on the ability to cope with uncertainty and internal control beliefs are said to provide an ability to handle stress (Kishore, 2016). Being in control is also a key resource in the TCTSA and the tool used with Pooja has been recommended by Turner and Barker (2014) to help athletes recognize what they can control and to help them focus on the aspects that are internal to them (i.e., the controllables). Specifically the player was asked to focus on *what can be achieved* and on the aspects that are *internal* to her. The list that the player put down has been presented in Table 6.2. The player was asked to revisit the list in the table and add to it or remove points as she progressed in her sporting career and to keep it up to date. She was also asked to revisit the column on the right (in my control) whenever she had thoughts about the uncontrollable aspects to reinforce what she should be thinking about (i.e., the controllables).

**Table 6.2: Uncontrollables and controllables of the participant**

|  |  |
| --- | --- |
| Uncontrollables  (not in my control) | Controllables  (in my control) |
| What another person says/thinks/ does | Working smartly for the next few days especially i.e more time working on my shots |
| How they treat me | Approach every training session with a positive thought |
| Result | Focus on shot selection |
| Politics | Constructing the rally before trying to hit a winner |
| Everything (not that I am a control freak generally) but when it comes to squash I am | I can control my mind and choose what to take in |
|  | How well I play |
|  | Emotions |

SESSION 2

Outline of session:

1. Discussion of thoughts related to an upcoming tournament

2. Empty your head strategy

Summary of the session:

The player was going to participate in an international tournament and was concerned, as she had not achieved the results as per her expectations in the previous recent international tournaments. The player mentioned in this session, “it worries me how much more I have to do to get there.” Before and during international tournaments she would feel that the training and opportunities available to international athletes are better than what she gets in India and that leads her to feel threatened and lose confidence in her game. She seemed to have a lot of negative thoughts, feelings and emotions regarding the upcoming tournament. She mentioned feeling frightened, anxious, nervous and stressed about the tournament.

Written disclosure also known as emotional expression or expressive writing is an intervention where participants are typically asked to write about emotionally upsetting experiences. To illustrate, Hudson and Day (2012) have previously explored athletes’ experiences of expressive writing about competitive sport stressors and suggested that the technique is a cost effective and approachable way of helping athletes reframe stressors and manage emotions. Other studies in sport psychology literature report use of written disclosure technique to help athletes recover from injury where elite athletes were asked to write about their negative thoughts and feelings and have found the strategy to improve mood, self esteem and reduced the level of stress (e.g. Mankad & Gordon, 2010; Makand, Gordon, & Wallman, 2009). Mankad et al. (2009) discuss that writing may act as a vehicle for emotional and cognitive processing necessary for psychological adjustment required to cope with a stressful situation. The “empty your head” strategy used with the player is a form of written disclosure or emotional expression and was used to help the player express her worries and concerns related to the upcoming competition. She was asked to write down what she was feeling or thinking. She wrote down her fears, concerns and the negative consequences and then read what she had written. Pooja was asked to rip the paper apart and throw it in the bin after she had read it. She immediately said, “I already feel better..a little less burden.” Turner and Barker (2014) recommend this technique to combat the feelings of anxiety as expressing one’s thoughts instead of suppressing them which means that the individual is not wasting time and mental energy trying to battle the negative thoughts. Pooja’s thoughts and feeling that she wrote for the “empty your head” activity can be seen below in Table 6.3.

**Table 6.3: Empty your head activity**

|  |
| --- |
| What do you feel?  I feel weak and heavy. I feel so stressed that the thought of the tournament does nothing but scares me. I feel like all the pressure is on my shoulders and I need to perform. Anxious, nervous scared and not confident, lost, stressed, troubled! All the things that didn’t work is just playing in my head and I am frightened. I am scared to go for this tournament all alone and I just feel I am going to be extremely blank on court. What scares me the most is the thought of going so blank that the match gets over before I even realize I am in it. |

SESSION 3:

Outline of session:

1. Reinforcing the player to focus on the controllables

2. Setting goals for the tournament

Summary of the session:

Pooja was preparing for an international tournament and her concern of feeling the pressure to perform was not fully addressed in the previous session. This session was thus a continuation from the previous one. When Pooja wrote down her thoughts she was asked what she meant by, “All the pressure is on my shoulder and I need to perform.” It was identified that Pooja felt overwhelmed as her focus was on winning the tournament, that is, her outcome goal. She lacked clarity and had not given a conscious thought to what particularly she needed implement in her upcoming important performance situations. Goal setting plays a significant role in positively influencing an athlete’s self-efficacy and confidence and past research suggests that athletes who set and work towards specific goals also show greater increase in performance (Kingston & Hardy, 1997; Locke & Latham, 2002). In chapter five, the participant stated that goal setting positevely influenced the resource appraisals (i.e., self-efficacy, perceived control and approach goals). In sport and exercise settings, the types of goals set by participants vary in their degree of specificity depending on what they are trying to accomplish. Process goals are usually concerned with how an athlete performs a particular technique, displays a certain technique or carries out a specific strategy (Weinberg, 2013). Research suggests that athletes who use process goals exhibit greater levels of confidence, concentration, satisfaction, flow and improved athletic performance compared to those who use outcome goals, which usually refer to winning or losing (Kingston & Hardy, 1997; Pierce & Burton, 1998; Röthlin, Birrer, Horvath, & Holtforth, 2016; Seijts, Latham, Tasa, & Latham, 2004; Swann, Crust, Jackman, Vella, Allen, & Keegan, 2017).

Pooja often thought about the outcome of the match or the tournament which made her nervous, so to help Pooja stay focused on her process and what she needs to implement in her matches, she was asked to put down her technical, physical and psychological process goals. This tool would help Pooja feel confident about her skills and also help her understand where she needed to direct her effort to help fulfil her potential. The guidelines presented by Zimmerman (2002) were used while the player completed the goal setting worksheet (Taylor & Wilson, 2005). First, the player was asked to put down the technical, physical and mental skills important for her success in the tournament and those, which she believed she is capable of learning and performing. She was then asked if mastering these skills and executing the strategies would result in achieving her outcome goal, which was to win the tournament. Finally, while she put down her process goals the researcher helped her ensure that her goals were focused on self-improvement and were self-referenced. After the goal setting activity, the player was also counseled and reminded about keeping the focus on her controllables. Pooja’s goals are presented below in Table 6.4.

**Table 6.4: Participant’s process goals**

|  |  |  |
| --- | --- | --- |
| Technical | Physical | Mental |
| Have been working on my swing so it should be more smooth | Economize my movement | I have been working on my confidence by doing visualization (imagery) so I can get myself to play confidently and fearless squash |
| Implementing the change in pace | My stamina is good so to pull the rallies | I understand the things that I can and cannot control so I can remember that! |
| Use the diagonals | Get to the ball by taking an extra step when it is away and not by stretching too much. |  |
| Go for the drop only when you know your opponent is behind and blocked.  I go to play the drop way too early and when the person picks up I try to get it tighter and hit the tin. Correcting this. |  |  |

SESSION 4

Outline of session:

1. Cue Words to trigger positive thoughts

Summary of the session:

Pooja mentioned that she loses confidence during her games in crucial matches, especially during international tournaments. To help her stay positive and maintain her confidence while she plays, she was taught to use cue words or triggers. Cue words are words that one can think about to induce a response and are allocated to specific thoughts that act as a quick reminder to aid positive thoughts. Past studies have illustrated the use of cue words or triggers to develop and maintain positive psychological momentum, control behaviour and enhance performance (e.g. Broomhead, Skidmore, Egget, & Mills, 2012; Jones & Harwood, 2008; Pates, Maynard, & Westbury, 2001;). Many athletes can recognize the general feeling state they need to perform the best, along with a few key emotions that associated with that state. This state can be summarized with a few cue words (Gould, Flett, & Bean 2009). For example, Hanton, Thomas, & Mellalieu (2009) suggest that practitioners can advocate the use of words such as “explode”, “charge” or “power” to help facilitate the process of energizing the athlete’s pre-performance activation level.

The cue words used by Pooja included instructional words that related to her technique or tactics and also positive thoughts that related to the emotional state. For instance, to remind her self to keep her drives and crosscourt deep her cue word was, “basics,” while to help her stay patient her cue word was, “stay.” The player was instructed to reaffirm these cue words as often as possible during practice and competition. This technique has also been recommended by Turner and Barker (2014) to help elite athletes create positive and helpful thoughts in order to enhance the challenge state. Pooja’s list of cue words is presented below in Table 6.5.

**Table 6.5: Participant’s cue words**

**Cue words**

Taking the ball early- VOLLEY

Increasing your pace- HIT THE BALL

Move back to the T and be ready- ON YOUR FEET

Concentrate on your serve and return- TAKE YOUR TIME

Keeping the drives and crosscourts nice and deep- BASICS

Be patient- STAY

Make the effort to get to every ball no matter where- FIGHT

Even if you are down/ up don’t think it’s over- BELIEVE

SESSION 5

Outline of session:

1. Post tournament feedback

2. Plan B Worksheet

Summary of the session:

Pooja finished runner-up at the international tournament she participated in. She was asked if the psychological tools had helped her in anyway during the tournament. She said, “the sessions have definitely helped me and the techniques helped me stay focused and positive throughout the tournament.” She mentioned that reading the controllables before the match helped her feel in control before her matches and the cue words helped her feel confident and in control while she played on court, (i.e., during her matches). She also stated that the empty your head strategy helped her feel relaxed and approach the tournament more positively. She reported to have done the activity the night before her matches in the competition. She also said that reading her goals the night before each match helped her feel confident of what she had to implement.

Pooja also mentioned during the session that, she felt distracted while playing the final match even though she tried to focus on the controllables, she said that she thought about whether she would win the tournament as she was close to achieving the outcome. She also felt that there were certain challenging situations in the final match, where she could have reacted in a better manner. The rest of the session focused on understanding the player’s challenging situations and to help her find an alternative manner in which she could respond to those situations. A “Plan B worksheet” was used to aid this process where the player was asked to write down the situations when she lost her focus or confidence, followed by how she reacted in the situation and how it may have affected her performance and finally the player was asked to put down how she would like to react and choose her reaction and plan her focus. This strategy has been recommended by Cheadle (2013) to help athletes change the way they react in challenging situations. It is suggested that an athlete may not have control in every performance situation, but will have control over their reaction to it. This activity also helped the player understand where she can direct her effort in the near future, (i.e., additional training of mental and tactical skills). Recognising the areas in which a player’s effort should be invested is central to achieving all that the player wants to achieve (Turner & Barker, 2014). The worksheet filled by the player is can be seen below in Table 6.6.

**Table 6.6: Plan B worksheet**

|  |  |  |
| --- | --- | --- |
| **Situation** | **Reaction** | **Plan B** |
| Shots were not deep enough and my opponent was able to get me to the corners and I would be stuck. | I tried to hit the ball lower or harder | Should have floated the ball to get the flow and then start hitting |
| Moving very slowly because my legs felt heavy | Kept worrying about how slow I was | Should have thought of the shot and getting it tighter |
| Times when I didn’t have any idea what to do and felt like a robot | Didn’t think it through and kept worrying about why I felt that way | Should have just taken a deep breath and taken my time with tying my shoelace or wiping my glasses and then continued |
| Low on confidence because it was not working according to my plan | Kept saying nothing is working | Think about one shot at a time |

SESSION 6:

Outline of session:

1. Data collection using self-report questionnaire

2. Breathing procedure

Summary of the session:

The player completed the self report measure of CAT –Sport during this session. The results analysed can be seen below:

**Figure 6.4: Comparison between the challenge and threat scores taken during the first session (pre intervention) and during the sixth session (during intervention).**

It can be observed that there is slight increase (by 14.28%) in the challenge score from the first session compared to the sixth session and a considerable decrease (i.e., by 18.45%) in the threat score suggesting that the intervention has been effective in helping the player feel more challenged and less threatened about her performance situations. The feedback taken during the fourth session also indicates that Pooja has been feeling more confident and in control.

In the previous session, the player emphasized on her legs feeling stiff, not moving well on court and feeling worried during crucial situations. She said, “ I felt like a robot.” If the player learnt to control her breathing it would impact on her physiological stress response. Breathing practice also known as diaphragmatic breathing or deep breathing is defined as an efficient integrative body mind training for dealing with stress and psychosomatic conditions (Zou et al., 2018). A significant amount of research has been conducted on the use of relaxation techniques and its benefits for athletes by enhancing self confidence, concentration, reduce anxiety, stress and muscle tension (e.g., Humara 1999; Martens, Vealey, & Burton, 1990; Parnabas, Mahmood, Parnabas, & Abdullah, 2014; Richards, 2004; Parnabas & Mahamood, 2012; Weinberg & Gould, 2011). Research has indicated that most successful athletes used relaxation techniques compared to less successful athletes and the higher the usage of breathing techniques, the higher the level of sports performance (Gould, Eklund, & Jackson, 1993; Orlick & Partington, 1988; Parnabas et al., 2014). Focused and controlled breathing has a direct impact on the cardiac output, meaning less variability in heart rate and blood pressure and regulated oxygen uptake (Turner & Barker, 2014). The breathing procedure would help Pooja have a positive or a helpful stress response and help her stay calm during crucial performance situations. Pooja was taught the diaphramic breathing procedure and as recommended by Turner and Barker (2014) she was encouraged to practice the technique for 10 minutes everyday. The step by step process of the breathing procedure can be seen in appendix 6.2.

The first MAPP (Figure 6.3) was used as a guide to inform certain interventions (such as using the within control/outside of control worksheet, empty your head startegy, goal setting, and cue words) implemented in the first six sessions. For instance, the MAPP provided an indication of the player’s focus being on the outcome such as winning and losing and thus the charting out of controllables and uncontrollables was implemented. The empty your head strategy was encouraged to be used the night before competition and was implemented to help the player further express her worries that were illustrated in the MAPP. The MAPP also indicated that the participant felt unsure about the amount of effort she was required to put in and setting process goals helped the player understand where she needed to direct her effort and also helped her feel confident as goals set were self referenced. The MAPP presented below in figure 6.5 was used to assess the player’s progress, understand the existing demands of the player and thus inform the subsequent sessions with the player. It also provides an outline to the player’s approach.

**Figure 6.5: The** **MAPP for Success used for assessing player’s progress**

**Step 1: Performance Situation**

Player’s performance situation: Playing to potential in matches and achieving results in tournaments

“I have the national championship coming up soon..you know if I play my best I can win.”

**Step 2: Philosophy about success and failure**

Player’s philosophy: Helpful thoughts

“I need to focus on what is in my control, which is, how to play. Everything else – even winning or losing is beyond my control.”

“Winning or losing is something that’s going to happen in the future. I now understand that if I keep thinking about that it’s going make me nervous.”

**Step 3: Demands of the situation**

Player’s demands: Uncertainty and perception of danger

“I know what the right things to think are, but I’m still not a 100% sure if I’m going to be able to do it and where this is going to take me. “

“See I’m not thinking about what the world is going to think about me, for that matter even what my coach will think about me. But I’m still concerned about how my family will judge me. Anisha has achieved so much. She is India number 1. I need to achieve something. I want to become a professional player”

“When I looked at the draw I still felt some jitters.”

**Step 4: Evaluation of the resources**

Player’s resources: Self efficacy, perception of control.

“I am calmer, I can now think about the process and how to play.”

“I know my game is good, I just need to learn to implement it when it matters.”

“I’m more confident than what I felt a couple of weeks back.”

**Step 5: Mind and Body reactions**

Player’s reactions (self report and match observation using video recall of a club match):

The player reported that she felt slightly calmer during her warm up as she tried to keep the focus on the controllables and followed her breathing procedure. She said, “this time I didn't wait to win the first few points to feel the confidence. I actually did something about it. I was more in control of my confidence.” She also mentioned that she felt like she was moving better and connecting to the ball better.

**Step 6: Consequences**

Consequences reported by the player: better co-ordination, improved self talk. A more helpful response to stress.

“I was feeling in sync while playing.”

“I was more aware of what I was saying to myself so even if I got a negative thought I would use my cue words.”

“I did not panic even when I lost points so that’s probably why I did not feel like running away from that match at any point.”

SESSION 7:

Outline of the session:

1. Building a pre-performance routine

2. Discussion about upcoming national level tournament

Summary of the session:

Pooja was following several psychological techniques on and off the court to help her feel more confident, in control and also to help her approach competition more positively. She had mentioned in her previous session that she found the techniques helpful and it was thought that building a consistent routine and being more strategic in her psychological preparation prior to her national tournament would foster confidence and bring her more control. The dominant function of a pre-performance routine is the control and also the manipulation of attentional resources and focus (Cotterill, Sanders, & Collins, 2010; Turner & Barker, 2014). The development of pre-performance routines is a widely accepted technique to enhance preparation for performance in sport and have been cited in numerous publications (Cotterill, 2010, 2011). For instance, several pre-performance routine components have positively influenced performance under pressure such as deep breathing, cue word utilization, time duration, time consistency or a combination of them (Mesagno, Marchant, & Morris, 2008).

An important step while developing a pre-performance routine was to identify key time points (Turner & Barker, 2014). During the session, we identified the key time points and her reason for engaging in that thinking or behaviour to ensure the routine is meaningful and has an impact on performance. Table 6.8 illustrates the key time points, the routine which is followed at the time point and the reason for following it. Pooja was asked to follow her pre-performance routine during her practice matches as this process may allow for refinement and reflection of the routine so that it definitely aids her sport performance.

**Table 6.7: Pre-performance routine**

|  |  |  |
| --- | --- | --- |
| **Time Point** | **Routines followed** | **How it helps** |
| Prior to tournament | Write down process goals | Provides clarity and focusing on the process helps me feel confident about my skills and also approach the tournament positively |
| Night Before match | Empty your head | Helps me relax and approach the match positively |
| Morning of the match | Read the controllables and process goals | Helps me feel in control |
| At the venue | Breathing procedure and visualisation | Helps me feel relaxed, in control and confident |
| During the match | Cue words | Helps me feel in control and confident |
| Post match | Plan B worksheet | Helps me feel in control even after a poor performance |

SESSION 8

Outline of the session:

1. Overcoming fear of particular opponents

Summary of the session:

Overall Pooja felt confident and in control and had a positive approach towards playing the upcoming national tournament. However, she perceived a psychological danger and felt threatened due to certain opponents who challenged her. As included in the MAPP she had also mentioned, “ I still feel some jitters when I see the draw.” She mentioned that these certain players had beaten her a couple of times and she felt scared to play against them. Pooja also mentioned that when her coach is available to speak to her before her matches she may not feel as threatened because he is able to instruct her about how she must play. It was understood that Pooja felt unsure and lacked clarity about what her strategy could be to play against these players, particularly when her coach is not available during her tournament. She felt low in confidence and did not feel prepared to play these players. She said, “I’m not sure what to think and how to plan when especially my coach isn’t there.” She also seemed to focus more on the strengths of these opponents and felt the pressure to win against them. She was reminded about her controllables.

Further, to address Pooja’s concern of feeling unsure and uncertain about “what to think and how to plan,” the author provided Pooja with a worksheet that would help her feel more prepared and also aid her to think more objectively. That is, to not only focus on her opponent’s game and strengths but to also think about her own strengths while she strategized for her matches. Going through this worksheet would help Pooja feel more prepared to play against these particular opponents. Preparation is a key source of confidence and thinking strategically about what one needs to do will allow the player to maximise his or her potential (Turner & Barker, 2014). Preparation is uniquely tailored to each player and the worksheet was developed by the author based on the three subthemes that preparation and strategy typically include, which consist of physical, tactical and mental aspects (Simpson, Post, Young, & Jensen, 2014).

The worksheet would aid the player to prepare for the opponents, by thinking about and logging their physical and tactical strengths and weaknesses and the mental profile, and draw confidence by thinking about and noting her own strengths, her secondary strengths and also her own psychological strengths. After writing this down, Pooja was asked to read it again and consider these aspects while she planned her strategy to play the opponent. Pooja added this technique to her pre-performance routine and said that she would go through this activity the night before the match incase she felt nervous about playing a certain opponent. The worksheet filled in by Pooja during the session can be seen below in Table 6.9.

**Table 6.8: Preparation and strategy worksheet**

|  |  |  |
| --- | --- | --- |
| **Opponent’s strengths** | **Opponent’s weaknesses** | **Opponent’s mental profile** |
| T control  Steady  Drops | Movement (front corner)  Forehand (less control) | Calm  Confident  Fights well |

|  |  |  |
| --- | --- | --- |
| **My strengths** | **My secondary strengths** | **My mental profile** |
| Drops  Drives  Movement | Crosscourt  Volley  Deception | Ability to fight  Determined  Calm |

|  |
| --- |
| **Strategy Plan A**  Play slightly more on the forehand with good pace  Use boasts smartly to keep her moving  Make sure the shots are deep to keep her from volleying and ensuring you are at the T  **Strategy plan B**  More drives than crosscourts  Slightly high even though she picks it all up  Keep moving and pick up every ball no matter what |

SESSION 9

Outline of the session:

1. Process goals for the tournament

Summary of the session:

This was a short session conducted telephonically the day prior to Pooja’s departure for her national tournament. As Pooja believed that writing down her process goals would bring more clarity and help her feel confident, she was asked to put them down. She said, “I feel I’m thinking about the right things now, I used to think I *should* win..this time I’m just feeling prepared to win.” The goals written down by Pooja are presented below in Table 6.10.

**Table 6.9: Participant’s process goals**

|  |
| --- |
| **Process goals** |
| * Drives to be deep * Drop to be straight and not to touch the sidewall * Wide crosscourts * Using the boasts and lob with a purpose * Be on my feet and at the T as quick as possible * Pull the rallies (be patient, use the cue word “stay”) * Stay calm and inhale before every crucial point * Fight till the very end |

SESSION 10

Outline of the session:

1. Post tournament evaluation and reflection

Summary of the session:

Pooja won the national squash championship. Being able to reflect on what the player has done well would make her aware and demystify what has helped her thrive and also develop a bank of moments in which she has done well (Turner & Barker, 2014). Reflective practice interventions have provided to be valuable to enhance self-efficacy, performance, and develop self awareness required to understand aspects of performance that are limiting as well those that facilitated positive performance (e.g., Neil et al., 2013). The post tournament evaluation worksheet was structured for the athlete using recommendations from Cheadle (2013) and Turner & Barker (2014). The structure of the post tournament evaluation was tailored considering the purpose of the players’ reflection in order to ensure efficacy of the process and to promote the motivation required for an effective reflection (Cropley & Hanton, 2011; Telfer & Knowles, 2010). The player was asked to reflect in a way that recognises all the good aspects she did during competition and also assess for key developmental aspects. Further, she was also asked to put down her thoughts and feelings post her success at the tournament, how confident and in control she felt and also how she would approach her next tournament, which she was supposed to play in two week’s.

Pooja’s reflection also helped the researcher assess her psychological progress. First, it was observed that the player was able to put down several aspects that she did well which demonstrated positivity. Second, the player also had an approach focus as she looked forward to train and play the next tournament, which she believed would be more challenging. The player also mentioned that she felt in complete control of her game and the aspects in the reflection, which related to her areas of improvement, were all controllable by the athlete. However, it was observed that the player did not seem to feel confident about the next competition owing to the different format of the tournament, which included team events. The above stated points were used to debrief the post tournament evaluation and to also conclude the sessions. She was made aware of her positivity, approach goal orientation, and the feeling of being in control. She was counselled that her philosophy about approaching various competitions may differ, for example, approaching a final will be different to a trial, similarly approaching a team event will have its unique demands and therefore the strategies she may choose to increase her resources (self-efficacy, control and approach goals) may also differ. The reflection of the player can be seen in Table 6.11.

**Table 6.10: Post tournament evaluation and reflection**

|  |
| --- |
| *1. What do you feel you did well in the previous competition?*  10 aspects that I did well   1. Stayed calm 2. Stuck to my game plan 3. Believed in myself 4. Thought only about the present and made sure I stayed 5. Visualized myself getting the victory 6. Discipline (followed my diet. Slept and ate on time) 7. Moving well 8. Used the mental workout well 9. Fought very well 10. Set out to do my best on court and emphasized on that   *2. How does the win make you feel?*  The day I won my tournament was an unexplained feeling of joy. I was in shock and took some time to believe what had happened. A day after I couldn’t wait to just get back and train for my next event which is uncountable number of times more intense.  *3. How confident do you feel about your upcoming competition?*  I would like to feel confident because going into this tournament I have zero level of confidence. I would like to feel useful for the team because there is vast difference between the standards of our top 2 players and the next 2. They have to win all their matches for us to survive the event.  *4. How much in control do you feel?*  I do feel in complete control of my game.  *5. What are you planning to work on to prepare better for the next competition?*  I am trying to improve the following things-   * Backcourt game * Pressure on volleys * Drops * Speed and movement * Service return |

SESSION 11

Outline of the session:

1. Data collection using self-report questionnaire

Summary of the session:

Three days after the end of the intervention (i.e. three days after the tenth session), the player completed the self-report measure of CAT –Sport. The results analysed can be seen below:

**Figure 6.6: Comparison between the challenge and threat scores taken during the first session (pre intervention) and during the sixth session (during intervention) and the eleventh session (post intervention).**

It can be observed that there is a further decrease (by 22.62%) in the threat scores of the player from the sixth session compared to the data collected post intervention. However, the challenge score remains constant suggesting that overall the intervention was effective in reducing the threat scores significantly, however the increase in the challenge scores from pre intervention to post intervention was only marginal (i.e., 14.28%). The feedback and reflection during the tenth session also indicates that the player felt in control, had an approach focus but did not necessarily feel very confident about playing a tournament in a team event format. The MAPP for success was used again to assess the player’s progress post intervention.

**Figure 6.7: The** **MAPP for Success used to assess the player’s progress post intervention**

**Step 1: Performance Situation**

Player’s performance situation: Playing to potential in matches and achieving results in tournaments

“I need to keep going and work on having such performances consistently.”

**Step 2: Philosophy about success and failure**

Player’s philosophy: Helpful thoughts

“I need to keep putting in the effort and focus on the processes and the tasks at hand. This should help me achieve success at some point.”

**Step 3: Demands of the situation**

Player’s demands: perception of danger

“ I have zero level of confidence. I would like to feel useful to the team because there is a vast difference between the standards of our top 2 players and the next two.”

**Step 4: Evaluation of the resources**

Player’s resources: Confidence, perception of control, approach focus.

“I do feel in complete control of my game.”

“A day after I couldn't just wait to get back and train for my next event which is uncountable number of times more intense.”

“I feel in control of my mind and emotions.”

**Step 6: Consequences**

Consequences reported by the player: more control and better focus, realistic goals for self and a positive state of mind, playing to potential and better performances. The player also had moved up a rank after winning the national championship.

“I haven’t had this feeling too much earlier – to feel in control. It’s a great feeling.”

“I’m also able to pay attention to the right things on and off the court.”

“I still want to continue to win and not lose..but I’m not as worried about winning or losing, my focus is on playing the best game possible. Also I think I’m not trying to play the perfect game all the time.”

“At the National Championship I was able to play to my potential and that’s what helped me win!”

**Step 5: Mind and Body reactions**

Player’s reactions (self report and match observation using video recall of a match from the national championship):

The player reported that she felt calm and composed during her warm up for the match. It was observed that even after she lost a point she did not panic. She looked coordinated and did not lose her focus or patience during a long match.

SESSION 12

Outline of the session:

1. Phone follow-up

2. Data collection using self-report questionnaire

Summary of the session:

The follow-up data collected is an important aspect as it provides information about the long-term benefits of the intervention (Gardner & Moore, 2005). A follow-up session was conducted over the phone two months after the end of the intervention and the previous data collection time point (i.e., after session 11). This follow-up session was conducted to understand if Pooja continued to adhere to the intervention and whether she continued to implement the techniques that were taught to her. Pooja mentioned that she continued to follow all the strategies and found it particularly helpful to follow the pre performance routine and cue words during tournaments. She said, “these things seem easier and more natural as I have spent a couple months doing them now.” Pooja mentioned that she did not feel as threatened to play stronger players anymore. She said that she knew a way to prepare against them and also mentioned that after having won the national championship she moved up a rank which helped her feel confident and strong. She also said,” I am so much better mentally…the way I thought before there was so much negativity…I’m generally more positive now and it shows in my game.” When she was asked about her experience of playing a team event she said that she performed well but more experience of playing in that format would help her feel more confident. Pooja filled in the CAT –Sport self report questionnaire and submitted it electronically. The results analysed can be seen below.

**Figure 6.8: Comparison between the challenge and threat scores taken during the first session (pre intervention), during the sixth session (during intervention), the eleventh session (post intervention) and the twelfth session (follow-up stage).**

It can be observed that the challenge score continues to remain constant, while the threat score shows a further marginal decline (i.e., a decline by 4.09% from session 11 to session 12). The follow-up interview with the player suggested that the player did not feel as threatened as before to play other challenging players and this could have perhaps led to the marginal decline in the threat scores.

**6.8 Social validation data**

To assess the effectiveness of an intervention researchers are recommended to assess the participants’ perception of and satisfaction with a specific program via post intervention interviews (Greenspan & Feltz, 1989; Rumbold, Fletcher, & Daniels, 2012; Vealey, 1994). Social validation data was collected (via interview) with the participant over the phone a day after the follow-up session (i.e., session 12). The interview revealed that the participant held the intervention in positive regards and believed that the intervention helped her progress. The participant was asked, “Did you feel you were able to tell your experiences fully?” and “Did you find the intervention useful?” The squash player said that she has been able to express her concerns fully and found the intervention useful to address her concerns. Questions were also based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations related to the importance and acceptibality of the intervention and the satisfaction with the results. The player mentioned that the intervention was important and she liked the manner in which various activities and techniques were introduced to her. She felt satisfied with the results as she could implement the techniques successfully and felt that it helped her feel more positive.

**6.9 Discussion**

The present study examined the effects of a multimodal intervention on an elite squash player experiencing a threat state caused mainly due her performance stressors. The study extends the findings from the previous chapters as it uses the TCTSA as a framework to reduce threat and create a challenge state in an applied performance setting of an Indian elite athlete. It builds on the previous study as it considers the origin of the athlete’s stressors. Considering her competitive stressors allowed the use of the “MAPP for Success” as the performance situation that the athlete faced with was taken into account and further the MAPP protocol was used as a guide to reduce threat and enhance the challenge state. In this study, the performance situation of the athlete was to be able to perform to potetial during crucial matches. Similarly, it can be suggested that the MAPP can be used for athletes with other performance situations such as performing at a trial, a penalty shoot-out, or an Olympic final. This is a novel study that uses the MAPP for Success based on the TCTSA as a guide to create a challenge state in an athlete. The squash player lacked confidence and control and had a performance (ego) goal orientation where she compared herself and her training to other international players. The multimodal intervention was implemented to help the participant cope with her performance demands and approach competition positively (i.e., to reduce threat and increase the challenge state).

Baseline data for challenge and threat and the initial MAPP used for problem formulation using the data collected through interviews suggested that the participant perceived a low challenge and a high threat state. Data indicated that overall the multimodal intervention was effective in creating a marginal increase in the challenge scores and a significant decrease in the participant’s threat scores thus creating a moderate challenge and a low threat state. The results show that there was no increase in the challenge score after the sixth session (i.e., after mid point), while a decline in the threat score was observed post intervention and also during the follow-up stage. Thus the results reveal that the multimodal intervention does not change direction of the threat state to a challenge state however is effective in altering the pattern to a moderate challenge and a low threat state which helps the participant rise to the demands of competition and perform well. Results from another study also indicated that moderate challenge and low threat had a more facilitative performance in a shooting task compared to all other combinations of challenge and threat patterns (Rossato, Uphill, & Basevitch, 2016). Thus, the challenge and threat patterns illustrate that challenge and threat do not appear to be at the opposite ends of a continuum but are dichotomous states as proposed by the TCTSA. Similar findings have been seen in previous literature and it is suggested that challenge and threat can be experienced simultaneuously (e.g., Meijen et al., 2013). This may allow the researchers to examine absolute (rather than relative) differences in challenge and threat. This is also supported by earlier views of Lazarus and Folkman (1984) and other researchers (Skinner & Brewer, 2004), who considered challenge and threat as independent cognitive appraisals that can occur simultaneously. Thus it can be argued that challenge and threat are fluid dichotomous states and that individuals can experience both simultaneously and therefore future research should examine a more complex model in which the dynamic and precise nature of challenge and threat states is taken into consideration (Moore et al., 2013). Given the fluid and dynamic nature of challenge and threat, more consistent and regular measurements and monitoring would have been useful and strengthened the results of this study. Practical and logistical contraints were presented due to the applied nature of this research and thus limited data points were collected. One consideration might be that similar to chapter five, this study would have also been better designed as a multiple-probe design.

The results achieved by the player and her ranking were used as the performance indicators within the study. The decline in the threat state throughout the intervention can be seen to coincide with useful performance gains such as winning the national championship and moving up her national ranking. During the follow-up telephone interview, the player mentioned that she felt in complete control of her game and also had an approach focus, as she did not feel threatened to play challenging opponents and tough competitions. She also mentioned that she used to feel very negative and the intervention had caused a change, which led her to feel more positive. Establishing the effectiveness of an intervention through post intervention interviews assists sport psychologists in assessing if treatments are effective for performers of particular age groups and competitive levels (Rumbold et al., 2012). The follow-up interview and social validation data suggests that the intervention was effective in increasing the challenge state and moreover reducing the threat state within the senior elite Indian squash player.

The MAPP is a framework that provided a systematic approach to reduce threat and increase challenge and could be revisited to assess the progress in altering the states. The first MAPP for success (see figure 6.3) demonstrated that the initial cognitions and emotions reported by the participant were negatively termed and were interpreted as debilitative to performance. The player was found to experience several negative emotions such as pressure, anxiety, nervousness, low confidence, lost, stressed, troubled, scared and frightened. The player had overly high and unrealistic expectations of herself as she compared herself to her cousin. Such thoughts and feelings experienced prior to competition were interpreted as debilitative towards an upcoming performance, due to the constant self-doubt. Consequently the athlete suggested that she could not perform to her potential. Whereas, a restructuring process can be observed in the MAPP for success (see figure 6.5) which was used to assess the player’s progress. Although the athlete reported to feel jitters, the participant used the psychological interventions such as cue words, empty your head strategy, breathing technique and was able to think about the process and how to play, which made her feel calmer and confident. This process is further associated with the athlete’s mind and body reactions and the performance consequences, which induced better co-ordination and movement on court, improved self-talk and a more positive response to stress, that is, being able to manage the anxiety even after losing a point and an increased approach focus as the player did not feel running away from the match even when she made mistakes. To illustrate, Neil et al. (2011) reported a similar finding for a performer who experienced cognitions related to competing poorly in previous matches, the negative feelings experienced were interpreted as positive to upcoming performance. This was also suggested to be due to a restructuring process whereby, although the athlete was nervous and worried about making mistakes or performing at a high level, the participant used imagery and self-talk to alter the visual description of previously poor skill executions into an accomplishment that was perceived to be beneficial to confidence. This process was linked to the athletes’ behaviour prior to performance in that it was reported to induce an increased task focus.

In the final MAPP for success (see figure 6.7), which was used to assess the progress post intervention, positive interpretations of responses to stress were seen, similar to those seen in figure 6.5. Even when the player made errors, her cognitions were associated with more relaxed and comfortable state. The desire to win and not lose was still present, however these cognitions, were interpreted as facilitative and increased the athlete’s motivation and she also had a more positive approach. The MAPP also aided in the assessment of the demands of the player at various time points (i.e., prior, during and post intervention). It was observed that the demands of the participant also changed. For example, the participant’s demands prior to the intervention included her concern about the amount of effort she is required to put in, while post intervention her demand was feeling low in confidence to play a team event. It is proposed that challenge and threat states may reflect changes in demands rather than simply changes in the resource appraisals (Wright & Kirby, 2003).

The MAPP for Success proves to be a suitable framework to be used in a single-case research design used to understand a players experience of stress. Several recent investigations examining competition stress have adopted qualitative research designs in an attempt to illuminate the appraisals, emotions and coping strategies of performers (e.g., Nicholls, Holt, & Polman, 2005; Uphill & Jones, 2007). The purpose of this study was to add to this body of research by illuminating the stress process using self-report meausres as well as a qualitative approach that integrated the MAPP for Success by considering the player’s philosophy about success and failure, initial appraisals of the performer regarding his or her demands and the available resources, subsequent mind and body reactions and consequences. From an applied perspective, the findings of this study highlight the importance of sport psychologists effectively preparing performers for the variety of demands that they may face either prior, during or after a competition. As previously established (e.g., in chapter five; Mellalieu et al., 2009), the current study also demonstrates that an emphasis on the performer’s focus on what can and cannot be controlled is vital when such a range of stressors could be experienced at any one time, and when some of these demands are due to external factors that the performer has no influence or control over. When performance stressors are encountered, sport psychologists may assess the demands at regular intervals and focus on interventions and strategies that facilitate the appraisal of relevant resources.

The limitations of this study give rise to a number of avenues that could further enhance our understanding about challenge and threat states within performers. The present study did not investigate the cardiovascular indexes associated with challenge and threat states, which forms a significant part of the TCTSA. Measuring cardiovascular reactivity will provide better insight into the body reactions of the athlete that also a key component in the MAPP for Success. Although the study illustrates that the multimodal intervention helped in manipulating the challenge and threat states, the exact mechanisms of how interventions influence the resource appriasals and the motivational states is not examined. Future studies may also explore whether demands characteristics and resource appraisals fluctuate and the impact it has on challenge and threat states. Another research endeavour that is lacking is the assessment of interventions for other performersin the sport environment (e.g., coaches, parents, and support staff). The studies in the research program have focused on stress management in competitive athletes, but researchers have also shown that coaches, parents, and sport psychology practitioners are prone to a wide range of competitive and organizational stress (Fletcher & Scott, 2010; Fletcher, Rumbold, Tester, & Coombes, 2011; Harwood & Knight, 2009b). The subsequent study thus focuses on this research consideration by implementing a novel theoretically guided intervention with elite Indian coaches. The subsequent study aims to address a major methodological gap outlined in the single-case research study with the badminton player as well as the squash player. Limited data posed several limitations such as it did not allow the researcher to observe the trend of the data and it cannot be determined whether the intervention is the only reason for the change in the challenge and threat states. Therefore, the subsequent study will use a multiple-baseline design. Only a single particpant has been included in the previous chapter as well as this chapter, while the across participants design used in the next chapter will allow the inclusion of more than a single participant.

**6.10 Conclusion**

In summary, the multimodal intervention was effective in positively altering the challenge scores of the participant, however was more successful in altering the high threat state to a low threat state. The MAPP for success supports these results as it helped identify that the player had extremely negative emotions and an overall negative connotation to her thoughts regarding her performance. Contrasting to chapter 5, the results of this study reflect not only changes in the perceptions of resource appraisals, but also changes in the demand appraisals. The study provides some initial support for the MAPP in bringing about positive increases in challenge responses and reducing threat. The intervention strategies, such as written discolure reduced the negative emotions while strategies such as cue words helped identify the negative thoughts and replaced them with affirmative ones thus helping the player feel positive. Post intervention, the elite squash player felt less threatened due to the amount of effort required to put in and the uncertainty of making it to the top. She also did not fear playing other tough competitors. However, it was observed that post intervention she perceived psychological danger to play team events demonstrating a change in her demands. In line with the TCTSA perspective, the study suggests that it is essential that performers must manage their range of demands and psychological responses to enhance their sport performance. Along with the self-report measure, the MAPP for Success was a valuable and an important tool. The MAPP not only assisted in assessing the demands and resources of the player at different time points, but also aided in the implementation and monitoring the effectiveness of the strategies and intervention.

The current chapter extends support for the TCTSA to be used as a framework to understand how elite Indian athletes respond to stress. The study addressed the first aim of the thesis by illustrating that the squash player perceived several performance stressors and had a negative response (i.e., low challenge and high threat). The results of this single-case research design study corroborate with the results of the previous chapter as it establishes the positive effects of a multimodal intervention in creating a challenge state and also significantly reducing an athletes’ threat state, thus addressing the third aim of the thesis. Finally, the current study adds to the literature as it provides evidence that challenge and threat states are dichotomous. This is the first research study that uses the MAPP based on the TCTSA to guide an intervention. This study provides an emperical base and extends the knowledge that the MAPP may be an effective framework to address performance demands and that multimodal interventions may be used to reduce threat and enhance a challenge state. Thus, the current chapter provides important implications for researchers as well as applied practitioners in India as well as other foreign countries.

Chapter 7

**A novel intervention to enhance a challenge state among elite Indian tennis coaches**

**7.1 Introduction**

To teach an academic subject is certainly not easy, but compared to coaching, it is. We can say ‘two plus two is four’ and be sure we are right. But in coaching we have to literally get to the soul of the people we are dealing with. (Joe Patton, American Football coach; Posnanski, 2012, p 1).

Coaching is central to optimizing performance in competitive sport and the profession has evolved into a recognizable occupation that has advanced towards professionalism (Lyle, 2002; Olusoga, Maynard, Hays, & Butt, 2012; Woodman, 1993). Like the athletic population, coaches have been classified as performers in their own right and research has well documented the stressful nature of sports coaching at the elite level in the past (Gould, Greenleaf, Guinan, & Chung, 2002; Olusoga, Butt, Maynard, & Hays 2010; Thelwell, Weston, Greenlees, & Hutchings, 2008a). With the increase in number of studies exploring the phenomenon of stress in elite coaching in the recent years, coaches’ responses to stress and consequences of stress for them and their athletes have also been explored (Olusoga et al., 2010;Olusoga et al., 2012). Various organisational, competitive, and personal stressors including significant health costs of the psychological stress experienced by coaches have been identified (Fletcher & Scott, 2010; Olusoga, Butt, Hays, & Maynard, 2009; Thelwell et al., 2008a). Stress can negatively affect coaches’ moods, emotions, thoughts and behaviours (Frey, 2007). Studies that have explored coaches’ stress experiences from the point of view of the coaches as well as the athletes, have found that coaches’ experience of stress negatively affects the coaching environment and also the athletes (e.g., Olusoga et al., 2010; Thelwell, Wagstaff, Rayner, Chapman, & Barker, 2016). Research suggests that the support from coaches is of critical importance for athletes to cope with stress (e.g., Cosh & Tully, 2014). However, when coaches themselves perceive high amounts of stress, the support they can provide to the athletes can be limited. Coaches have said to benefit from developing the ability to stay focused, handle crises, and stay cool under pressure (Gould & Maynard, 2009). Thus, considering the consequences of the coaches’ stressors for coaches themselves and athletes, further research that identifies how coaches may be able to appraise the stress positively is warranted.

This chapter addresses the final aim of the research program as it investigates the effectiveness of an intervention to reduce threat and increase the challenge state of Indian performers using TCTSA as a framework. The previous chapters illustrated that the TCTSA is a useful framework to understand the sources and responses to stress of Indian athletes and to implement interventions to reduce threat and increase challenge. Coaches being regarded as performers, the TCTSA was considered to be a suitable framework to organise their stressors and to implement an intervention. This chapter will add to the sport psychology literature, as there is dearth of scientific evidence that records an effectiveness of an intervention among sports coaches. The study will also add to scant research regarding the application of the TCTSA in the context of sports coaching. Further, the study will extend to the limited literature in the area of challenge and threat states about effective intervention strategies that may reduce threat and enhance a challenge state. Applied sport psychologists from the Eastern as well the Western world will gain insight regarding a novel intervention strategy to manipulate challenge and threat states.

This will be the first study to report the use of an intervention with elite Indian tennis coaches. The theoretically driven intervention that has been developed by the author to reduce threat and increase challenge amongst Indian elite coaches also makes this study valuable. The intervention aims to help the coaches draw upon resources to cope with the demands they face due to their coaching activities and consequently aid restructuring of their cognitive appraisals. Based upon the TCTSA outlined in chapter one, it was hypothesized that the intervention implemented with the elite Indian tennis coaches would reduce threat and facilitate a challenge state. The subsequent section of the introduction first provides a review of the sources of stress in coaches identified in sport psychology literature, second the sources of stress of Indian coaches, third a theoretical background for the applicability of the TCTSA in the context of coaching and developing an intervention strategy, and finally outlines the novel intervention developed for the coaches.

**7.2 Sources of stress among coaches**

There are a number of sources of stress for coaches. Extant research details the sources of coaching stress and mainly identifies performance related stressors and organisational stressors. Coaches are consistently put to test, as they are responsible for athletes and their performance and thus the performance stressors in coaches mainly include the coaches’ own performance and that of their athlete (e.g., Gould, Greenleaf, Guinan, & Chung, 2002; Thelwell, Weston, Greenlees, & Hutchings, 2008b; Wynd, 2007). Along with performance stressors, organisational stressors that include environmental, leadership, personal and team factors, political interference, overload and administration that emanated from coaching stress have also been identified (e.g., Levy, Nicholls, Marchant, & Polman, 2009; Nguyen & Surujlal, 2011; Thelwell et al., 2008b). Some common issues seem to emerge across an array of studies. One of the stressors common across various studies is the number of roles that coaches have to play. For example, Surujlal (2004) indicated that the complexity and extraordinary demands placed on coaches included performing a myriad of duties, such as assuming the role of educator, motivator, counselor, adviser, trainer manager and administrator. These roles were reportedly stressful and multiple role expectation has been found a major source of stress for high performance coach in other studies as well (e.g., Lyle, 2002; Miller, Salmela, & Kerr, 2002; Olusoga et al., 2012; Tranfield, 2002). Another common theme identified is the stress perceived due to employment contracts. Coaches experience challenges, frustrations, conflicts, and tensions due to the incongruences in qualifications, contracts and employments, and especially for coaches who operate at the elite level as their employment contracts tend to be short, and positions tenuous and highly sought after (e.g., Anshel 2001; Burton & Raedeke 2008; Hjalm, Kentta, Hassmenan, & Gustafsson, 2007; Nguyen & Surujlal, 2011; Olusoga et al., 2012). The stressors and pressures are also most commonly said to emanate and intensify in a result-oriented environment or culture that required investment of time and resources to achieve a competitive advantage (Frey, 2007; Olusoga et al., 2012). A study with South African soccer coaches revealed that the top three sources of stress included lack of resources, fixture backlog, and games where the outcome is critical (Nguyen & Surujlal, 2011). Results of studies also reflect the notion that the strongest stressors are often external and mostly out of the control of coaches (Carson & Kuipers, 1998; Malone & Rotella, 1981; Scantling & Lackey, 2005). McNamara (2007) also revealed that demands and expectations of various external factors (e.g., increased job demands, excessive workloads, conflicting roles, and the pressure to win all competitions as well as handle defeat), especially for those whose careers and livelihoods are dependent on it contributed to increased level of stress amongst sport coaches. The chaotic lifestyle of coaches included travel, being away from family and friends, long and undefined hours that coaches often endure, limited time for oneself and the volatile nature of the elite coaching profession has been well recognised in literature (e.g., Hill & Sotiriadou, 2016; Knight, Reade, Selzler, & Rodgers, 2013). A recent study by Olusoga and Kentta (2017) suggested that for high performance coaching, the importance of role clarity, work home interference, counselling, mentoring and social support is required to facilitate recovery from burn out and for personal growth. Data thus suggests several common sources of stress amongst coaches such as multiple role expectations, employment contracts, result-oriented environment, external factors, and lifestyle issues are found in literature and support is required for coaches to cope with these stressors.

Modern day coaches are said to experience a range of demands that emanate from different sources (Frey, 2007) and several studies reveal a wide range of stressors. For instance, a study with collegiate coaches from USA from various sports identified nine stressor themes that included interpersonal/personal sources; other people; sources that would lead to quitting; task-related sources; recruiting; time demands; being the head coach; outcome of competition; and self imposed stress (Frey, 2007). A study that explored stressors of Olympic and international level coaches identified ten themes that included athlete concerns, coaching responsibilities, expectations, finance, governance, interference, organisational management, performance, preparation, and selection) and that these stressors were underpinned by seven situational properties. Ambiguity, imminence, novelty appeared to be the most pertinent properties that were experienced by the coaches (Didymus, 2017). An investigation with UK coaches revealed a wide range of stressors related to conflict, pressure, isolation, athlete concerns, the competition environment, and competition preparation (Olusoga et al., 2009). Another study with high performance squash coaches from the UK (Tranfield, 2002) identified a diverse range of sources of stress. From the perspective of the coach 12 general dimensions emerged (e.g., political and interpersonal pressures; coaching constraints and barriers; lifestyle concerns; organisational concerns), while from the perspective of the players nine general dimensions for stress emerged (e.g., time pressures; coach evaluation issues; travel concerns; technical issues; organisation and planning issues). Results also revealed that high performance coaches experience more stress as a result of social environments, social interactions and social situations than do elite athletes. The findings from this study also indicate that certain sources of stress are specific to high performance coaches (e.g., team management, political and interpersonal pressures, coaching constraints and barriers, mentoring responsibilities, post match concerns). A noteworthy finding is that Thelwel et al. (2008b) reported 182 distinct demands that were finally placed into the six general dimensions of performance – related – athlete, performance –related- coach, organizational – environmental, organizational – leadership, organizational – personal and organizational – team. These studies provide evidence that similar to the athletes, coaches experience a variety of stressors, however experience different sources of stress to those experienced by players or officials and that coaches’ stressors may be sport specific and context specific (e.g., Nguyen & Surujlal, 2011; Thelwel et al., 2008b; Tranfield, 2002).

Few studies have attempted to explore the ways in which the coaches respond to stress. For example, Olusoga and colleagues (2010) found that stressors can have a negative impact but seven of the 12 coaches that were interviewed felt that in certain situations, stress could result in a positive response. In Tranfield’s (2002) study, certain stressors tended to be appraised as higher in challenge and other higher in threat and/or harm. For instance, lifestyle concerns, coaching constraints and barriers, and political and interpersonal pressures were found to be more threatening than challenging. While coaches in Didymus’s (2017) study also reported challenge and threat appraisals and to a lesser extent benefit and harm/loss appraisals. For instance, a coach called Katherine discussed how she evaluated observation of her coaching as a threat: ‘It was threatening because someone was watching me and judging me on my coaching. Being watched made me tighten up and so my coaching could have been negatively affected by something that I couldn’t control’. Frey’s (2007) study of coaches also reported their responses to stressors in negative and positive ways.

The present chapter collects data from tennis coaches in India and accordingly unique stressors in tennis coaching are now considered. Tennis is one of the several sports where majority of the coaches are predominantly professional (Pearce, Embrey, & Burton, 2003) and thus certain stressors may be exclusive to tennis coaches. In literature, it has been found that several coaching attributes also seem to vary across sports; for instance, Solomon (1999) suggested that coaching styles vary between types of sports (i.e., basketball and tennis). As tennis coaches start to move up the competitive ladder to the elite level, the pressure and strain also increase (Duda, Balaguer, & Crespo, 2003). To illustrate, Anabelle an international level tennis coach who participated in the study by Didymus (2017) said, “‘When you’re losing all the time because players aren’t performing it’s the hardest job in the world being a coach …you’re unhappy and you’ve got to get your players upbeat, you know, it’s really hard.’ Thus the effort to motivate players that are underperforming or losing regularly and the uncertainty of their results and outcome could be the stressors for Anabelle. Tennis coaches from the UK that coach players from the investment stage have also highlighted several stressors concerning parental pressure and involvement (Knight & Harwood, 2009). A study conducted with Australian tennis coaches included a set of stressors such as job security, insurance and liability, provision for resources, parents, player retention, career pathways for tennis coaches, tennis in schools, marketing of tennis programs (Pearce et al., 2003). They also propose that success in tennis coaching is dependent on several variables, which include the resources available for the coaches (e.g., facilities), schedule of the tournament (e.g., whether a coach is able to travel), competence of the coach. A lack of these factors could contribute to the lack of success, which may result in stress experienced by coaches. Overall it can be observed that varied stressors amongst tennis coaches have been identified.

In summary, research indicates that coaching can be rewarding but also a hazardous, frustrating, time consuming and a stressful profession because of the demands from various factors and may also lead to burnout (Nguyen & Surujlal, 2010; Raedeke, 2004; Scantling & Lackey, 2005). The findings also support the notion that coaches appraise their stressors either positively or negatively. Although the number of studies exploring the phenomenon of stress in elite coaching has increased substantially in recent years, calls have been made to expand this research and researchers have commented on the need for sport psychology research tailored specifically towards coach development (e.g., Olusoga et al., 2012; Olusoga et al., 2010; Williams & Kendall, 2007). Several studies have identified the stress experiences of coaches and a vast array of coping strategies (e.g., Levy, Nicholls, Merchant, & Polman, 2009), however very limited research is found which attempts to understand whether the coping attempts are effective. There is certainly a lack of research that attempts to implement strategies to elicit a positive appraisal so that coaches can effectively deal with and coach in the stressful situations.

**7.3 Sources of stress among Indian coaches**

Bawa (2010) observed a lack of motivation, enthusiasm, interest and dedication amongst Indian wrestling and athletics coaches. However, no systematic studies have been conducted and published about the demands of Indian coaches that may lead to a lack of motivation or dedication. A report on the National Coaching Scheme of Sports Authority of India (SAI - a governing body for sport in India) by the institute of development of backward regions (2002) cited major factors contributing to the stressors of Indian coaches, and these are described below.

There are about 15,000 NIS-trained (National Institute of Sport – Academic wing of the Sports Authority of India) coaches in the country. Out of them only 1800 had been employed by the SAI and nearly 3000 were working with States and other organisations such as railways, defence services, para-military forces (refer to forces led by Indian Army officers) and in schools and colleges. At many places, the coaches were found without any work to do. Even where the coaches had been provided, there was no uniform distribution. Many of the Indian coaches were dissatisfied due to the postings in distant places and the inadequate facilities provided to them in regards to housing and other matters. Thus they were always on the lookout for their transfer to the station of their choice which in turn also affected the performance of the players. Another concern raised by the coaches deployed in schools was that they did not have accommodation either in the school premises or anywhere near the school. Since these coaches were required to be present in the ground along with players, both early in the morning and evening, they were not, quite often, able to reach the ground in time.

The report suggested that a number of stressors arose for Indian coaches due to a unique structure of the coaching scheme. There was no uniformity in the service conditions of coaches, including their pay structure and retirement age. As a result of this anomaly, coaches, especially in some States, were put in a disadvantageous position. While some coaches, neither had adequate infrastructure nor sufficient number of trainees at the places they were posted. Thus they were unable to perform their assigned duties efficiently and effectively. Also the role and responsibilities of the coaches were not clearly defined. Thus they did not have anything specific to aim at and no clear output requirement. Hence, the effectiveness and the performance of the coaches was severely affected.

Most private coaches (i.e., those that are not a part of the National Coaching Scheme) tend to be individuals who have at some point played the sport they are coaching at a competitive level, but may not have necessarily have gained any coaching education. Coaching may also be a part time occupation for them where they typically coach in the evenings after work. The material rewards for coaches do not seem to be sufficient for them to have coaching as a full time profession.

This data illustrates that Indian coaches reported certain cultural specific organisational stressors. This reinforces the importance of context and culture specific stress research. Past research compliments these findings as studies illustrate that various coaching constructs vary between cultures. For instance, coaching styles vary between African American and European American individuals (Solomon, 1999) and the coaching process more generally, acknowledge that social and cultural processes may significantly influence coaching efficacy (Horn, 2008). Presently, there is very little known about Indian coaches and in the light of this, the current study explores stress experiences of Indian tennis coaches and specifically assess the effectiveness of an intervention to reduce threat and enhance the challenge state.

Along with variables such as demands, constraints, opportunities and resources, stress appraisals as well as coping are also influenced by culture. Practitioners need to be aware of the stressors experienced by coaches, and attempt to understand the environments in which coaches operate, to be able to identify appropriate coping behaviours (Lazarus, 1999). In sport contexts, it is thought that potentially different appraisals are the main reason why athletes use different coping strategies to deal with different sources of stress (Kim & Duda, 2003). Culture has also been found to have an effect on coping with certain stressors between referees (Anshel & Weinberg, 1995) and athletes (Anshel et al., 1997). Owing to the dearth of studies in the Indian context, this will be the first study to understand coaching related stressors of elite Indian tennis coaches so that an intervention can be implemented to help them cope with their demands and appraise stress positively (i.e., as a challenge).

**7.4 Theoretical background**

Concepts of stress within the coaching literature have been explored (see Fletcher & Scott, 2010), however the relevance of TCTSA to the context of coaching is unknown. This study uses the TCTSA as a framework to implement an intervention with elite Indian tennis coaches to reduce threat and increase the challenge state and the intervention used has also been developed using the TCTSA model. The following section thus provides a rationale for the applicability of the TCTSA framework to understand the stress processes of coaches and second, it explains the use of the framework in developing an intervention to help coaches appraise a challenge threat rather than a threat state.

**7.4.1 Applicability of the TCTSA framework in the context of coaching**

As stated earlier, similar to the athletic population, researchers have predicted opposing styles of appraising potentially stressful situations and a dichotomy in the way coaches respond to stress (e.g., Didymus, 2017; Frey, 2007). Coaches can be classified into those who respond positively and those who respond negatively. Correspondingly, according to the TCTSA, if an individual appraises insufficient resources to deal with the demands encountered, then he or she will experience a threat state (negative response). While, if an individual appraises sufficient resources to deal with the demands encountered, then he or she will experience a challenge state (positive response). The TCSTSA outlines how a unique combination of psychological constructs interact to determine challenge and threat states and is thus used as a framework to understand and organize the stress experiences of Indian coaches and also to develop an intervention to help Indian coaches respond to stress more positively.

It is considered that the TCTSA will offer a conceptual and theoretical grounding for understanding the stress process among sports coaches, and an organizing structure for discussing the emergent research examining coaches’ experiences of stress. To understand the stressors coaches encounter, it is important to consider how they evaluate the demands and respond to them. In the TCTSA, the demand appraisals include the perception of danger, uncertainty and required effort in a situation. For example a tennis coach may experience threat, if his player is regularly losing to lower ranked opponents (danger to self esteem), and this may impact his job security as coach with that particular player (uncertainty), and he may believe that he may need a lot more resources to help the player succeed (effort). While, the resource appraisals include self-efficacy, perceptions of control and goal orientation. The TCTSA distinguishes between four categories of responses: cognitive, emotional, physiological and performance outcomes. In sport psychology literature the responses of athletes are well documented. Although these responses have been identified in coaching stress literature, only little published data to evidence these responses is available in literature (e.g., Fletcher & Scott, 2010; Frey, 2007; Taylor, 1992). A recent study that considered the Biopsychosocial model’s notion of demand appraisal versus resource appraisal, explored the relationship between challenge and threat cognitive appraisals and coaching behaviour (Dixon, Turner, & Gillman, 2016). Results showed that participants with a tendency to appraise a stressor as a challenge are more likely to offer social support to their athletes, while participants who tend to appraise stressors as a threat are more likely to be autocratic in their coaching behaviour and less likely to offer positive feedback. The results indicated that challenge would be associated with positive coaching behaviours, while threat would be associated with negative coaching behaviours. Thus it is important to examine coaching stress as a multidimensional construct and is advantageous for coaches to be able to appraise stressors as a challenge. The TCTSA provides a more accurate way to examine stress, allowing stress to be assessed as a multidimensional construct, rather than a unidirectional construct, in line with contemporary theory and research (Jones et al., 2009). Although a number of studies have attempted to understand the ways in which coaches respond to stress, the area of research has not been extensively explored. Literature that considers interventions with coaches is very limited.

**7.4.2 Using the TCTSA framework to develop an intervention**

Studies provide an understanding of coping as an interpersonal phenomenon that moderates the adaptational processes and moves away of the list of psychological skills such as goal setting, self-talk, relaxation, imagery that relate to the function of coping (e.g., Olusoga et al., 2010, 2012; Thelwell et al., 2008b). Hanton, Fletcher, and Coughlan (2005) argued that it is unlikely that the psychological skills employed for performance related stressors would be appropriate for organisational stressors. Also, coaches’ application of particular psychological skills might be limited and further research is needed to identify the skills and strategies required for effective coaching under pressure (Gould, Guinan, Greenleaf, Medbery, & Peterson, 1999). Evidence in the sports domain supports links between cognitive appraisal and coping (Anshel, Jamieson, & Raviv, 2001; Anshel &Wells, 2000). Threat appraisal was strongly related to avoidance coping (Anshel et al., 2001) and weakly associated with approach coping (Anshel & Wells, 2000). Dias, Cruz, and Fonseca (2012) also suggested that threat appraisal was also positively associated with the use of more emotion focused (e.g. denial, self blame, venting of emotions) and avoidance coping strategies (e.g., behavioural disengagement, self distraction) and inversely related to problem focused coping (e.g., positive reframing acceptance, planning) amongst athletes. It is thus important that interventions are implemented to help coaches appraise more of a challenge in order for them to cope with their stressors in a positive manner.

The cognitive appraisal is an important component of the TCTSA and the framework takes a transactional stress perspective and supports the notion that appraisals are made based on evaluations of demands compared to resources. For example, in coaching literature, it is suggested that autocratic behaviour resulting from threat cognitive appraisals may be due to the depletion of a coach’s psychological resources in situations (Mageau & Vallerand, 2003). The TCTSA integrated the idea that performers appraise a situation as a challenge or a threat dependent on their primary and secondary appraisal (Rossato, 2014). The secondary appraisal demonstrates a form or rationalization and/or restructuring of thoughts and emotions and appear to facilitate the interpretation of stress as positive that can help the actual behaviour of the performer (Neil et al., 2011). Several studies with athletes have found that primary cognitions of players have a negative connotation due to unexpected demands and stressors such as uncertainty, novelty, ambiguity and other such factors (e.g. Dugdale, Eklund, & Gordon, 2002; Thatcher & Day, 2008). Findings from a recent research by Didymus (2017) that explored psychological stress amongst Olympic and international coaches compliments these results as it suggests that ambiguity can provoke a threat appraisal and a possible explanation for this could be that the coaches’ appraisals were largely instinctive and that at least some of part of their appraisal process can occur automatically (Fergusson & Bargh, 2003; Moors, 2010). Similar to the athletic population, coaches felt that experiencing stress was generally negative initially, and that only after a period of reflection could stressful experiences be viewed as positive. However it has been highlighted that while coaches may initially respond negatively to stressors, further cognitive-evaluative processing can occur, enabling coaches to use their responses as a positive incentive to re-focus on the task and reinvest more effort (Fletcher & Scott, 2010). As stated earlier, secondary appraisals are seen as the assessment of resources used to cope with the perceived situation. Therefore, through the process of rationalization, reflection or other similar strategies, if sufficient resources are perceived, an adaptive stress response (challenge) will be elicited. With positive cognitive evaluations, coaches may engage in thoughts and behaviours designed to deal with the situation (Fletcher & Scott, 2010) and these evaluations will further affect subsequent appraisals of stressors and thus the coaches’ coping strategy and responses (Lazarus, 1999).

It is suggested that practitioners should work with coaches to promote a challenge appraisal (Dixon et al., 2016), however there seems to be a void in the published literature where scientific studies are designed to evaluate the effectiveness of interventions with sports coaches. With the knowledge that appraising is at the heart of psychological stress, researchers and sport practitioners should encourage coaches to reflect upon events that cause significant stress and help them develop strategies to cope with the demands of coaching (Olsuga et al., 2010). In this chapter, the TCTSA is used as a framework to develop an intervention and it is predicted that through the process of reflection, coaches will be able to draw upon their resources of self-efficacy, perception of control and approach goal orientation, if they consciously or deliberately reflected upon them. This will help coaches feel capable of conquering their stressors, that is, feel less threatened and more challenged. The intervention is described in detailed in section 7.5.2 of the thesis. Despite the stressful nature of coaching, little is known about how coaches can mange stressful encounters and this chapter aims to implement an intervention with sports coaches using the TCTSA as a framework.

**7.5 Intervention with coaches**

**7.5.1 Past interventions with coaches**

The majority of the sport psychology research has focused on interventions with athletes; therefore working with coaches to manage stress resulting from coaching activities is relatively novel in terms of sport psychology intervention. A coach from Olusoga et al (2009) stated, “there’s nothing there really to back up the coaches when the coaches need someone to talk to. . . . I think sometimes, the coaches are forgotten.” This statement clearly communicates the need for sport psychologists to work with coaches. However lack of empirical support and evaluations that considers competitive standard, sport and culture leads to lack of suggestions for applied practice. The ways in which coaches manage stress is still relatively unknown and it is an on-going problem that needs to be addressed (Fletcher & Scott, 2010; Frey, 2007).

Previous researchers with athletes have successfully used instructional sets (Turner et al., 2014), and imagery (Williams & Cumming, 2012) to promote a challenge state. While previous chapters (i.e., chapters five and six) also provide an indication for multimodal interventions to be effective in reducing threat and enhancing the challenge state. Strategies such as cognitive restructuring (Hanton & Jones, 1999a; Jackson, Mayocchi, & Dover, 1998), diary method where performers are required to complete daily accounts of their experiences relevant to competition stress and emotions (see Nicholls, Holt, Polman, & Bloomfield, 2006) and rational thinking (Gould, Finch, & Jackson, 1993) have been identified as coping strategies amongst elite athletes. A study that emphasized on building resilience within coaches recommended that coaches adopt ‘the glass is half-full’ and solution-focused approach - be optimistic and hopeful (Young, 2014). They suggested that coaches should look for positives in what has happened and then direct their attention to, and energies on, solutions, possibilities, opportunities and positive outcomes that will invariably emerge from any situation however bleak it may appear at the time. Similar strategies have been recommended by other researchers, which include maintaining accurate perspective and instead of focusing on the negative, react proactively towards anxiety, worry, problems and complaints (Malone & Rotella 1981; Yong & Yue 2007). It has also been suggested that strategies such as rationalization (Olusoga et al., 2010) and cognitive restructuring may help in changing the stress appraisal of coaches and provide to be an effective intervention strategy (Tranfield, 2002). Cognitive restructuring techniques are typically more beneficial for the elite performers in comparison with non-elite performers who may find stress reduction treatments more effective (Fletcher & Hanton, 2001). Another strategy identified for coaches in literature were ‘auditing strengths and capabilities’ which includes making a list of strengths and capabilities and regularly updating the list, put things in perspective (i.e., considering the worst case scenario of any difficulty and work from this position forward; Olusoga et al., 2010). Although an extensive list of strategies has been identified, they have not been implemented and recorded with coaches.

**7.5.2 The intervention developed for the coaches in this study**

The strategies suggested in literature will help coaches reflect and become aware of their resources or strengths, or restructure thoughts. Reflection can elicit a greater challenge appraisal and can thus help coaches to effectively coach in stressful situations (Olusoga et al., 2010; Dixon et al., 2016). Coaches described the reflection needed to see stress in a positive light. This reflection was explained by one coach, who said: ‘You learn from the stress, yeah . . . if you can cope with it, learn from it and move on. . . I just think it’s in the environment and it’s an essential part of the environment because I think it’s where most of our learning curves actually take place. . . . And I think sometimes the coaches that actually get there in the end are the ones that get knocked down and get back up again (Olusoga et al., 2010).’ A research that tested a theoretically driven intervention that was designed to manipulate threat appraisal to challenge found that reframing a threatening task as a challenge eradicated the negative effects of stereotype threat (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010). Thus manipulation might also be a useful threat management intervention. Other studies have also suggested the physiological benefits of framing stressors as challenges rather than threats (e.g., Scheepers, 2009; Vick, Seery, Blascovich, & Weisbuch, 2008). Helping coaches deliberately or consciously reflect on their available resources may help them become aware that they possess the resources to overcoming their demands and a challenge state may arise and threat may be reduced. Drawing upon resources is said to promote a more positive outcomes (e.g., Keller, 2007).

Due to its remedial nature and its restructuring component, the mental activity developed in this study, could be classified as a combination of reflection and a restructuring intervention (Greenspan & Feltz,1989). Evidence based stress management recommendations are differentiated by the level of intervention: primary, secondary, and tertiary (cf. Fletcher, Hanton, & Mellalieu, 2006; Murphy, 1995). The intervention used in this study fits in as a secondary intervention as it is a reactive approach that attempts to modify coaches’ responses to stress by increasing their self-awareness about their resources. Secondary intervention enhances the coaches’ resilience to external demands by assisting coaches in in becoming more self aware of their thoughts, feelings, and/or behaviours and teaches coaches to view events as challenges rather than obstacles (Giges, Petitpas, & Vernacchia, 2004). Self-awareness amongst coaches in how they are responding to stress is also essential as it has an influence on their athletes (Olusoga et al., 2010).

The intervention was developed using the TCTSA as its framework and recommendations by Harwood and Steptoe (2013) were considered while designing the intervention and integrating it in the single-case design. Suggestions by Turner and Barker (2014) were also taken into account while implementing the intervention with the coaches. The researcher during her applied work considered her interactions with the coaches, their attitudes, and their responses to different situations. This study with the coaches was possible due to the trusting relationship with the coaches that the author had built over several years while conducting applied work at their tennis academies. For instance, one of the coaches’ shared her diary giving a greater insight to the researcher of her thoughts and feelings, which served as an aid to implement a meaningful intervention.

Through observation during training sessions, questioning and discussion with the coaches, it was identified that the coaches needed assistance in managing their stressors. For instance, the coaches perceived dealing with parents as an “off court” concern to be threatening but not very challenging. Such information was required in order to provide an effective intervention, which was, to change the stress appraisal of the coach. From the perspective of the applied sport psychology practitioner, a challenge lies in the delivery of sport psychology for coaches in a manner that coaches find appealing and engaging (Olusoga et al., 2012). It was understood that the coaches would adhere to the intervention if it were kept simple and quick. By appraising all the available information in the context of a sound theory (i.e., the TCSTA), practical experience and also the researcher’s personal model, ideas for the intervention were formulated. It was also understood that there were several common stressors that the coaches in the study presented, however certain specific stressors were also shared and thus the intervention had to allow each coach to work on their individual stressors as well.

Drawing upon the Theory of Challenge and Threat States in Athletes, the intervention was designed such that the participants could appraise the resources available to cope with the demands they perceived and thus respond to the stress positively. The mental activity comprised of a worksheet that included two columns that the participants were required to fill in. In the first column on the left, the coaches were asked to write down the demands they perceived. The coaches were then asked to assess the available resources to cope with those demands and then write them down in the column on the right. After considering the total number of demands and resources, they were asked to respond to two questions a) do you feel you have the resources available to cope with the demands you will face? b) having weighed your demands and resources, do you feel you will now be able to respond positively? (see appendix 7.2 for a sample worksheet which was also provided to the participants). The aim of the mental activity was to help the coaches to consciously and deliberately appraise their secondary appraisal in a positive manner and thus change the initial or primary appraisal, which may have been negative. Going over through this intervention everyday during the intervention period, may help the appraisals become automated. The intervention would thus facilitate the use of effective appraisal and coping strategy. The stressors experienced and the initial appraisal being different with each case (Neil et al., 2011), the mental activity worksheet was designed such that each of the three coaches could transcribe their own specific or unique demands and resources during the intervention period. Also, unlike the MAPP used in the previous chapter or other cognitive restructuring approaches like cognitive behavioural therapy, this activity would allow the coaches to put down several demands against just one situation or problem.

**7.6 Aims of the study**

This chapter addresses the third aim of the thesis. Keeping in mind the benefits of theoretically informed research, the aim of this study was to use the Theory of Challenge and Threat states in Athletes (TCTSA) as a lens to explore psychological stress to implement an intervention with elite Indian tennis coaches. Consequently the objectives of the study were:

1. To identify and understand the stressors of a samlple of elite Indian tennis coaches from the perspective of the coaches themselves so that an intervention can be implemented.
2. To assess the effectiveness of an intervention implemented with the coaches to reduce threat and enhance challenge.

**7.7 Case History and Methods of Assessment**

**7.7.1 Participants**

Coaches from the sport of tennis were chosen for a number of reasons. First, the researcher was an ex-tennis player and was working with various tennis academies and was thus able to gain regular access to elite tennis coaches. Second, having played tennis at the elite level the researcher understood the language, jargon and the terminology used which was expected to facilitate the interviews and understanding of the perspective of the elite coaches. Third and most importantly, tennis coaches’ work with players on a one to one basis and Indian parents typically hold the coaches responsible for the results the player is achieving thus causing heightened stress. Elite tennis coaches were identified as those who work with players on a regular basis who are current national squad members and/or perform at the highest level in their sport (Thelwel et al., 2008a) and also as per the level of coaching qualification according to the All India Tennis Association (AITA). All three coaches had completed level four or five, five being the most advanced qualification. As mentioned earlier, factors such as result-oriented culture, short employment contracts differentiate elite level coaching from other levels of competitive involvement (Olsuga et al., 2012). There were two male coaches named Joy and Kiran and one female coach named Ria. Pseudonyms are used throughout the study to protect the coaches’ identities.

During the researcher’s applied work, it was observed that coaches across academies perceived their jobs to be demanding and that tennis coaches often communicated that similar to the manner in which the sport psychologist helps athletes with their pressures, it would be helpful if the sport psychologist (author) could also help the coaches cope with their pressures. Three elite tennis coaches (mean age = 47. 3) with 15 to 22 years of coaching experience participated in this study. Preliminary interviews were conducted individually with each coach to understand their demands. These interviews were conducted at their respective tennis academies in Mumbai and Pune and each interview lasted approximately 30 minutes. The preliminary interviews with the participants revealed that they perceived several “on court” and “off court” demands. The on court demands related to the performance stressors while the off court demands related to the personal or organisational stressors. All participants were above the age of 40 and thus communicated that the number of hours they spend on court was demanding and thus felt the danger of their students moving to younger coaches. One of the coaches was a female coach and expressed her inability to be able to balance family life and her coaching profession. She felt she was at a disadvantage compared to male coaches as she had more household responsibilities than males. All the three coaches also perceived pressure from the parents of their athletes. Player retention and parents have been previously cited as stressors by Australian tennis coaches (Pearce et al., 2003) Overall, analysis of the intake interviews suggested the participants perceived a heavy workload and doubted the amount of physical effort they could continue to put in, perceived psychological danger from other coaches (e.g., younger coaches) and also felt uncertain about their future as coaches.

**7.7.2 Design**

Single-case research designs provide an opportunity to consider and sensitively monitor developments in coaching factors. The use of single-case research design in a coaching context within tennis has been documented as beneficial and researchers and practitioners are encouraged to use case-study designs with coaches (Harwood & Steptoe, 2013). A multiple-baseline across participants design is used in this study with coaches. This design has several advantages such as, it can include more than a single participant and as the start of the intervention is staggered one may conclude that the changes that occur are due to the intervention rather than to other factors such as the weather, or the parent (Barker et al., 2011). The multiple-baseline approach achieves experimental control through successive delays of intervention onset across different individuals. A multiple-baseline design across people involves collecting baseline data of variables across two or more people concurrently, followed by the introduction of the treatment sequentially to each person (Virués-Ortega & Martin, 2010). For example, Shambrook and Bull (1996) reports the findings of a multiple-baseline design across individuals examining the impact of an imagery training routine on basketball free-throw performance amongst four female basketball players. Their results suggested that only one subject demonstrated a consistent improvement after beginning the imagery training. Thus their results support the usefulness of single-case research designs for examining individual differences to sport psychology interventions. Another reason for why it has been chosen as a design for this study is that, practitioners are often required to work with elite coaches that operate in a result oriented environment thereby sharing similar stressors and demands. The coaches in this study also shared common culture specific problems such as coaching for numerous hours in the heat. The multiple-baseline design research approach was therefore considered the most appropriate to determine any intervention effects in this study with the Indian tennis coaches. The multiple-baseline design will also provide a more rigourous design compared to the previously used design in chapters five and six, where data was collected in a non staggered fashion.   
 This study included three participants that took part in the study for a total of 30 successive days, with the collection of 8 baseline measures taken from participant 1, 14 baseline measures from participant 2, and 21 baseline measures taken from participant 3 before the intervention was presented to them. It is generally suggested that a minimum of 8 baseline measures be taken before an intervention is presented as this allows data to stabilise and intervention efficacy to be clearly determined (Ottenbacher, 1986). The concurrent measurement controls for threat to internal validity (Barker et al., 2011), which means that the repeated measures of the dependent variable (i.e., challenge and threat) accounts for the changes in the dependent variable as function of the manipulation of the independent variable (i.e., the intervention) only.

**7.7.3 Measures**

Demand and Resource Evaluations using two items from the cognitiveappraisal ratio (Tomaka et al., 1993) were taken so that challenge or threat responses to an important training or competition situation of the coaches could be determined (appendix 7.4). This measures was used as the Demand and Resource Evaluations Score (DRES) relates to and provides an indication of the challenge and threat states. This measure was also chosen, as it was a quick and a simple measure for the coaches to fill everyday prior to their training or competition situations for a period of one month as compared to an exhaustive questionnaire that would be time consuming.

**7.7.4 Social Validation**

Social validation data was collected (via interview) at the end of the intervention and follow-up period to ascertain the participant’s perceptions and feelings of the intervention and its procedures (Hanton & Jones, 1999; Kazdin, 1982). The participants were asked, “Did you feel you were able to tell your experiences fully?” and “Did you find the intervention useful?” Questions were also based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations and related to whether the participants: (a) perceived the intervention to be important, (b) thought the procedures of intervention were acceptable, and (c) felt satisfied with the results. Previous studies (e.g., Pates et al, 2002; Pates & Maynard, 2000) have also preferred to ask these three verbal questions, based on Hrycaiko and Martin’s (1996) and Wolf ’s (1978) recommendations.

**7.7.5 Data collection**

Data was collected using interviews and the measure of Demands and Resources Evaluations. An initial interview was conducted with each coach. Prior to the interview, an information sheet was provided. Consent was provided by all the three coaches (appendix 7.1) to the author as a part of their contract as she worked as a sport psychologist with their academies and often conducted sessions of the athletes in conjunction with the coaches. The coaches were also provided with the definition of stress (by Lazarus & Folkman, 1984, p.19) before the interview (appendix 7.3). This was explained to participants to ensure that they had understood the definition. The participants were then asked, “keeping in the mind the definition of stress, can you think about the various aspects of high performance coaching experience you have had and describe any demands or stressors you perceive?” It was also suggested to the coaches that the demands can take place at any time or any place, for instance, pre, during or post training sessions or competitions, while they are coaching or also during their non-coaching hours, in person or over the phone. During the interview, the interviewer used clarifications and elaboration probes to ensure the correct meaning was understood. Two of the coaches did not want the interviews to be audio recorded, but provided consent to make notes during the interviews. Accordingly, the author made notes during all the interviews conducted with the coaches. Validity was checked using respondent validation technique (Patton, 2005) where the participants were presented a list of demands and stressors from the first interview and were asked if they represented “exactly what they meant.” They were also provided with their quotes from their interviews that were noted to check the accuracy of the content. No content was changed, however the coaches elaborated on some of their quotes in writing.

The researcher listed the stressors of each coach from the initial interview, which were presented to them in the subsequent session. As mentioned, this helped in confirming that the researcher had correctly understood the stressors and also aided in the categorisation of the stressors. Each coach was explained that the stressors may be positive (challenge) or negative (threating). Participants were then asked to identify and group the stressors as challenging or threatful. During this session, the participants were also asked if they wanted to identify any further demands or stressors.

The DRES scores were collected everyday for a period of 30 days, prior to their training sessions or the competition situations that the coaches were involved in. The coaches were asked to electronically (via email or whatsapp) send a copy of their scores prior to their sessions or competition situations during their baseline period. During the intervention period, the coaches went through the intervention and then submitted their DRES scores, before their training or competitive situations. In sum, data collected in the study was prior to training and competition settings of the coaches. Data from the mental activity worksheet that was followed as an intervention was also available for the author. The manner in which the intervention was implemented with the coaches is detailed in section 7.9 of the thesis.

**7.8 Problem Formulation and sessions with coaches**

Interviews were conducted with each coach to understand the nature of the demands and the stressors of coaches. The intake interviews of the three coaches indicated that coaches perceived high levels of stress and dissatisfaction stemming from stressors such as pressure to succeed, travel commitments, dealing with coach competition, managing parents, and the physical strain caused by coaching. These stressors caused them to feel uncertainty, perceive physical and psychological danger and they also felt stressed due to the amount of physical efforts they had to put in. These constructs are indicators of the coaches experiencing threat. The pre-intervention DRES scores across the baseline phase further established that the coaches appraised the stressors negatively (i.e., as threat). Developing an intervention and evaluating its effectiveness to create a challenge state and reduce threat was considered appropriate. After the preliminary interview, another session was conducted where they were asked to categorise these stressors as challenging or threatful. The one’s that were categorised as a challenge were excluded from the demands. For instance, during Joy’s interview he mentioned,

Coaching a new player that comes to my academy can be stressful because a lot of time and effort needs to be spent initially in understanding his game and thought process, why he or she plays in a certain way in matches, correcting or changing technique if needed. I need to put in a lot of thought. I also need to spend time developing a good rapport and relationship with a new player and making sure he sticks with me.

During the categorisation he said, “its stressful but I like the challenge of developing a new player so I don't think about it negatively”.

Overall, the descriptive view and the grouping or categorisation and the DRES score suggested the inequities of demands and resources. Consistent with previous research (e.g. Gould et al., 1999; Olusoga et al., 2010), during the interviews, the coaches somewhat became more aware of their personal stress and reported that their inability to handle stress negatively affected their coaching and their communication with the players, which in turn affected the players.

All three coaches independently participated in two sessions, first that last for approximately 45 to 60 minutes and then second that lasted for approximately 20 to 30 minutes. The on court and off court demands described by the coaches that were categorised as threatening are outlined in the table below under the three main themes of uncertainty, required effort and perception of danger. This provided as a basis to conduct the intervention with the coaches.

**Table 7.1: Demands of elite Indian tennis coaches**

|  |  |  |  |
| --- | --- | --- | --- |
| **Participant** | **Uncertainty** | **Required Effort** | **Perception of Danger** |
| Joy | The players these days choose to go to younger coaches. How long am I going to be able to stand on court? As I get older I am not going to be able to hit so much, so I have my doubts about how long I will last as a coach. | Students drop out of coaching after 9 to 12 months and find another academy or a coach. Sometimes I doubt if it’s worth putting in the efforts. | The parents these days are extremely demanding too and they decide whether the child will play with you or not. So it’s tough to manage them..you have to be sure the quality of your coaching never goes down. |
|  |  |  | Everyone wants to be the Davis Cup coach but finally there’s going to be only one. I’m not sure what exactly they will be looking at other than our achievements. |
|  |  |  | Parents are sitting at the centre and constantly watching us train and often I wonder whether they are judging my coaching..Makes me feel uneasy and conscious. |
| Kiran | You grow as coach or become known when your players do well. But there is never any guarantee that they will so, your growth is also uncertain I believe. | Long hours in sun are extremely tiring and make me feel a lot of fatigue. It’s an effort to get onto the court everyday. | The number of tennis courts in the city are limited and so many players get into coaching nowadays..there’s always competition as to who will get to run the centres. |
|  | Parents constantly want feedback and they want to know how the child is doing almost every two days. That becomes very stressful and I’m not even entirely sure how I should be giving them that feedback. | The players want to do one on ones and court bookings are only available in the afternoon. It’s important I continue to do those because I have make a living from this but it’s grueling sometimes. | You know when I’m stressed out I doubt what I am communicating to my players is correct.. Umm to give you an example I need to speak to them about their strategy before a match but when I’m stressed I’m not sure I’m telling them the best tactics as I’m occupied mentally sometimes. That’s not helpful for me nor them. |
| Ria | As a coach you can only be an academy coach or a travelling coach. It’s impossible to do both because of the number of tournaments the players have to play in the year. So you’re limited. It’s not easy to make money as a coach. | As a coach you have to be physically fit and at the top of your game too as you have to be a role model to the player. So you have to take the efforts to maintain yourself too. | A player may not come to you if you can’t run around on the court and hit with him. |
|  |  | You can have your assistant coaches and markers, but every parent expects that you give some extra attention to their child. But you have limited hours and limited mental and physical energy so there’s only so much one can do. | I’m a woman so I have to give time to family as well. So I can’t give as much time as may be other male coaches can to the players. |
|  |  | So coaching is not only about coaching. You have to mentor the players, motivate them, manage the expectations of parents, plan their tournaments, book courts, and so many other things. | A lot of times parents are dissatisfied because you cant give that extra time and so even the players are dissatisfied. |
|  |  |  | I always want to do better as a coach but I feel the limitations stop me from giving my best..and I’m certain my players must also be affected by my limitations. |

The figure below provides a flowchart of the procedures followed during the study.

**Figure 7.1: Flowchart of study procedures**

**Pre – study**

Consent forms completed. Initial discussion and suggestion by coaches to help them handle their stressors & pressures

Background information, information sheet provided

**Baseline data collection**

Interviews with coaches

Using the TCTSA framework to organise the coaches’ demands

Started collecting baseline measures using Demands and Resources Evaluations

**Intervention to create challenge state**

Explaining the intervention to the coaches

Implementing the intervention progressively with the coaches

**Post Intervention Data Collection**

Demand and Resource Evaluation Scores were collected

Follow-up data and social validation data collected via interview

**Intervention**

**7.9 Implementation of the intervention with the coaches**

After the baseline period of each coach, a session was conducted to explain the mental activity that was used as a strategy to help the coach reduce his/her threats and increase the challenge state. The coaches were explained the analogy of a set of weighing scales, where the resources are weighed against demands. The goal of the mental activity is to try and outweigh the demands with the resources, so that scales tip in favour to create a challenge mind-set (Turner & Barker, 2014). A diagrammatic representation of the analogy was shown to the coaches for better understanding (Figure 7.2). The coaches were also told that they could write the demands they experienced generally (e.g., financial, family, association relevant) or the demands perceived on that particular day. These demands could include the ones they had described in their previous sessions or could also include any new demands that they experienced. When they wrote down their demands the researcher helped them categorise their demands into those, which caused uncertainty, required effort, and perception of danger. This made the coaches aware that typically these psychological attributes were causing them the stress. They were then explained that the resource appraisals to cope with the demands might include self-efficacy, perception of control and approach goals. They were explained what each of these resource appraisals meant. A sample filled worksheet was provided and explained to them, which included the perspective of a badminton coach (appendix 7.2). They were also informed that they could contact the researcher at any point if they wished to withdraw or needed any further support or help with the mental activity.



**Figure 7.2: A diagrammatic representation of the scale that tips in favour of the resources to create a challenge state (Taken from Turner & Barker, 2014, pg.66).**

All three coaches contacted the researcher and mentioned that they would like the researcher to get the activity done from them for a few days. They said they found it difficult to think on their own or thought it was an effort as it was something new that they were doing. On the third day in case of Ria and the fourth day in case of Joy and Kiran during the intervention period, the researcher helped and guided them through the mental activity. This was done either in person or over Skype. An example is given below when each coach and the author went through the mental activity together.

**7.9.1 Examples from the intervention sessions**

One of Kiran’s demands included the limited infrastructure available and feeling danger and threat as there were many coaches competing to use those facilities and infrastructure. Kiran was asked if he could draw on any of the resources to cope with this. The author said to him, can you think about what is in your control about this situation at the moment? What can you do? To this he said, “may be the first thing is that I should focus on the current centre that I am running as it’s in my control at the moment. Also perhaps I can have an approach mind-set by trying my best when I am trying to make an application to run any other centre without worrying about what other coaches will do. I guess I will have to remind my self that that’s all that I can do.”

Another example from Joy’s demands included the uncertainty about their coaching career and feeling threatened due to younger coaches. The researcher asked Joy, leaving aside other coaches, can you think about why you are a good coach? Why do players choose you? When Joy was asked if he could draw upon any of the resources he said, “As a senior coach in tennis I have my strengths too. I have achievements and accreditations that these kids (younger coaches) don’t have. I think the most important aspect that differentiates me is the experience I have as a coach and maturity that the experience has brought. I’m sure parents appreciate that. Now that I think about it I can’t stop getting older so I must believe in these things and coach till I enjoy it.”

Ria, a female coach that participated in the study experienced a threat state as she felt that the effort she had to put in to stay fit and be up to mark with her game was demanding. The researcher asked her, can you look at this situation in a positive manner? Is there anything positive about you having to stay fit and be up to the mark with your game? When she was asked to draw on any resources she could think of she said, “Well yes I can look at it positively and think that being a tennis coach helps me stay fit at an age when you can get quite lazy and disinterested in your physical self. I see that with a lot of my friends my age so may be if it wasn't for the tennis coaching I would also be like one of them.”

The researcher continued to go through the mental activity for the following five days during the intervention period of each coach and it was observed that they were able to draw upon the resources of self-efficacy, perception of control and have approach goals. The coaches said they felt comfortable with activity and had got the “hang of it” and would be able to independently go through it each day. The coaches were instructed that they had to go through the mental activity and fill in the worksheet in a similar way for the rest of the period of their intervention. The aim of the intervention was to get the coaches to consciously think of what resources they had (a secondary appraisal activity), to be able to manage their demands.

**7.10 Data analysis**

Data were first visually inspected to determine whether the novel intervention caused a change in the challenge and threat states over a time-series, with visual analysis being a useful indicator to determine large and small effects (Nourbaksh & Ottenbacher, 1994; Ottenbacher, 1986). Visual analysis for challenge and threat scores took place for each participant, and across-phase mean analysis was also considered for the baseline phase, during intervention and post intervention. Data were visually analysed using the guidelines of Hrycaiko and Martin (1996) that are detailed earlier in section 4.3.1 of the thesis.

To further determine intervention effects, graphical analysis was performed to aid visual analysis (Nourbaksh & Ottenbacher, 1994; Ottenbacher, 1986). The split-middle technique (Kazdin, 1982; White, 1974) is a method of quantitatively analyzing data, which was used in the study to reveal the nature of trend in the data. A celeration line was produced that connected the midpoint of the first and the second half of a phase. The celeration line was constructed for the baseline, intervention phase as well as the post intervention phase. The line allows observing the differences clearly between the phases and thus allows the effectiveness of the intervention to be described.

**7.11 Results**

The aim of this study was to use the TCTSA as a framework to explore psychological stress with a sample of Indian elite tennis coaches so that an intervention could be implemented to reduce the coaches’ threatful appraisals and to enhance the challenge state. During the intervention period the coaches went through the mental activity to appraise the resources available to cope with the demands they perceived on a daily basis. They also provided a daily rating of their challenge and threat states. The results section is presented in three parts, first the samples of the coaches’ worksheets are analysed and are presented below, followed by the results from the Demands Resources Evaluations items and finally results from the post intervention interview and the DRES post intervention are presented.

**7.11.1 Samples of the coaches’ worksheets filled during the intervention period**

**Table 7.2: Joy’s worksheet filled before a competition during the intervention period.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Demands vs. Resource Worksheet  As a coach, please write down the stressors and demands that you perceive (today or generally) and then put down the resources you feel you may have to cope with those demands.  1. Personal reflections on demands and resources:     |  |  | | --- | --- | | Personal/Environmental Demands  What are your sources of stress? | Resources available to cope with the demands | | 1. My player has an important match today. He has been losing from crucial and winning positions quite often in the recent past. I’m also slightly worried if he can pull it off today. | 1. I need to stay confident and show him the confidence I have in him.  2. I have also spoken to him about how he needs to play in those situations and now it’s up to him to execute it.  3. I will stay positive about it. | | 2. The parents of the player are also here and the player has said to me on occasions that he does not like them being around during matches. | 1. I will speak to the player and tell him that he can't control whose watching and whose not and he should just focus on his matches.  2. I will also speak to parents ask them not to say anything to him that will put any pressure. | | 3. Two of my players are playing today and I know one of them needs me to be around a little more but I’m afraid the other one thinks that Arjun (pseudonym is used) is my favourite so I’m not sure what I’m going to do. | 1. I will be fair to both of them  2. I guess I will do what my gut tells me as I know that there’s no favouritism. | | 4. Parents sitting here I feel are watching me and judging my coaching and comparing me with other younger coaches. | 1. Although it makes me uncomfortable, I will just try to focus on my coaching and what I’m supposed to do.  2. With age also comes experience and that’s my strength. | | Total No of demands: 4 | Total No of resources: 9 |     2. Looking back at the worksheet you have filled above, do you feel you have the resources available to cope with the demands you will face?  Yes  Somewhat ☐ No ☐  3. Having weighed your demands and resources, do you feel you will now be able to respond positively?  Yes  Somewhat ☐ No ☐ |

It can be seen that Joy used the resources of self-efficacy, perception of control and approach goals. For instance, when he felt worried about his player being able to perform in crucial situations, he did what was in his control to help himself feel better, which was speak to the player about how to play and he also thought about staying confident and positive. Joy decided to focus on his own coaching when he felt uncomfortable about the parents judging his coaching, thus having an approach mind-set. He also decided to consider that being an elder senior coach had its strengths, which provided self-efficacy.

**Table 7.3: Kiran’s worksheet filled before a training session during the intervention period.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Demands vs. Resource Worksheet  As a coach, please write down the stressors and demands that you perceive (today or generally) and then put down the resources you feel you may have to cope with those demands.  1. Personal reflections on demands and resources:     |  |  | | --- | --- | | Personal/Environmental Demands  What are your sources of stress? | Resources available to cope with the demands | | 1. I’m doing a group coaching today from 10 to 12 and then an individual from 1 to 3. The sun is going to kill me. Playing feels like an effort when it’s so hot. | 1. May be it’s high time I just accept that this is a part of my profession & if I’ve done it for so long I can keep going.  2. I will make sure I keep myself hydrated and take short breaks..sometimes I forget the breaks. | | 2. One of the player’s from the group asked me today if he can take personal coaching from another coach, when players say that a heart beat skips even if I know it’s normal. | 1. I know I cannot control who the players wants to go to so I should focus on my own classes.  2. Players may be learn something that I am good at from me and other things from other coaches so that’s fine. | | Total No of demands: 2 | Total No of resources: 4 |     2. Looking back at the worksheet you have filled above, do you feel you have the resources available to cope with the demands you will face?  Yes  Somewhat ☐ No ☐  3. Having weighed your demands and resources, do you feel you will now be able to respond positively?  Yes  Somewhat ☐ No ☐ |

Kiran also drew upon the resources of self-efficacy, perception of control, and approach goals. He focused on what he could do while he had to coach in the heat which was keep himself hydrated and take short breaks. He reminded himself that players would learn things from him, which he must be good at, and also to focus on his own coaching sessions and not getting stressed if players chose to train with other coaches as well. Another strategy the coach used as a resource was acceptance of the situation.

**Table 7.4: Ria’s worksheet filled before a training session during the intervention period.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Demands vs. Resource Worksheet  As a coach, please write down the stressors and demands that you perceive (today or generally) and then put down the resources you feel you may have to cope with those demands.  1. Personal reflections on demands and resources:     |  |  | | --- | --- | | Personal/Environmental Demands  What are your sources of stress? | Resources available to cope with the demands | | 1. I have to plan some international tournaments for two of my players. I need to spend time on that, speak to their parents about it, help them with the entries and bookings and all of that. | 1. I can take help of my assistant coaches’ help in doing this. I should actually train one of them in doing this and taking a lead on it. | | 2. A lot of errands to run today at work and at home. Gets tiring. | 2. Again may be I can ask for some help and may be I also need to learn to manage my time and day better. | | 3. The fitness trainer isn’t coming today so I have to step in and take some fitness for the players today. | 3. I know the routines and drills well. It’ll be something different and may be a good change. That's how I can look at it positively. | | Total No of demands: 3 | Total No of resources: 3 |     2. Looking back at the worksheet you have filled above, do you feel you have the resources available to cope with the demands you will face?  Yes ☐ Somewhat  No ☐  3. Having weighed your demands and resources, do you feel you will now be able to respond positively?  Yes ☐ Somewhat  No ☐ |

Ria had self-efficacy about the routines and drills that she had to conduct for a physical fitness session. Using other human resources and time management and having a positive perspective were seen as the strategies to cope with stress. However, Ria initially felt unsure about how the intervention was to be used and thus her responses in the first few worksheets seemed vague in terms of the terminology used.

Overall, it was observed that during the intervention period when the coaches illustrated their resources, it included the determinants of the TCTSA (i.e., self-efficacy, perception of control and approach goals). However certain other factors were also considered resourceful to cope with the demands. For instance, human resources, time management, and acceptance of the situation were thought as helpful to cope with the demands. In the next section, the results from the Demands and Resources Evaluations Scores that were taken during the baseline and the intervention period are presented.

**7.11.2 DRES scores during baseline and the intervention period**

**Figure 7.3: DRES across 30 successive days. Each data point represents whether the participant perceived challenge or threat on each day.**

Intervention

Celeration lines

y axis = DRES Score x axis = Days

The Demand and Resources Evaluations Score (DRES) were calculated for each coach on each day, which determined whether the coach was in a threat state or a challenge state on each day. The scores are plotted for baseline and post intervention phase in Figure 7.3. The guidelines provided by Hrycaiko and Martin (1996) were used during the process of visual analysis which included the stability or the direction of the baseline scores, number of times the effect is replicated, identifying overlapping data points, the time span in which the effect is observed and the size of the effect. In addition, the study uses celeration lines as a part of data analysis which are used to displaying clear trends and directions of data. The upon visual inspection of graphical data, these lines help observe changes in the body of data across the baseline and intervention pahses, and the changes in slopes and their angles (Barker et al., 2011). Visual analysis of Figure 7.3 indicates that in most instances baseline scores indicated that the coaches were in a threat state. Mean scores of the coaches over their baseline and post intervention period are also represented which indicate a large effect and are supported by the social validity data. For all three coaches the mean baseline scores were negative and mean scores during the intervention period were positive representing a decrease in the threat state and an increase in the challenge state. Overlapping data points between adjacent baseline and intervention phases can also be observed. A basic technique to calculate the percentage of non-overlapping (PND) data was used where a horizontal line was drawn through the lowest point in the baseline phase through points in the intervention phase as the intervention sought to decrease the threat state. PND for Joy and Ria was 100%, while PND for Kiran was 93.75%. Non overlap methods provide meaningful information about the treatment and scores above 90% determine that an intervention is effective (Dallery, Cassidy, & Raiff, 2013). A change in scores can also be observed at four to five days of having introduced the intervention to the coaches. Finally, the interview and follow-up scores provide an indication of the replication of the effect.

Visual analysis clearly shows that Joy was in the threat state through out the baseline period. Although an immediate increase in the scores was not seen in Joy, the data points after the first three days during the intervention period revealed consistently positive scores. The celeration lines further illustrates this trend in data. A similar trend was observed over the first few days during the intervention period in all participants. This was expected while the participants found the mental activity difficult and after the first three to four days the researcher went through the activity with the participants for a total of five days. After which the coaches became accustomed to the intervention where they had to consciously draw upon his resources in the mental activity. Kiran’s scores during the baseline period were generally low determining a threat state, however cyclical dips and peaks can be seen where he perceived neither threat nor challenge and on two occasions a challenge state. The last ten data points reveal a stable increase in the scores with an exception on one day. When the worksheet of the participant was examined, it was observed that one of his demands included a stressor due to a parent. The parent had not paid the professional fees to the coach that he owed for over a month. On that day he communicated to the parents that he would have to stop coaching their child if they failed to do so in the given time frame but he still felt stressed, as this was a recurrent problem with the parents. Ria also showed a slight delay in the increase in her scores during the intervention period. Due to the short intervention period a clear trend cannot be established. Three data points represented a threat state, one data point represented neither challenger nor threat, while five data points showed that the coach was in a challenge state during the intervention period. However a comparison of the average scores during the baseline period and post intervention points revealed small improvements. Joy showed the largest improvements (i.e., from -2.25 during baseline to 0.18 during intervention) of all three coaches. Overall, these data suggest that the scores (DRES) during the intervention were generally higher than the scores during the baseline period.

**7.11.3 Follow-up interview results**

The follow-up data collected is an important aspect as it provides information about the long-term benefits of the intervention (Gardner & Moore, 2005). During the post intervention follow-up, where an interview was conducted after a month, only Joy and Ria indicated that they had been using the mental worksheet on a consistent basis. They mentioned that they were not necessarily doing the mental activity on each day but did it on most days (i.e., about 4 to 5 days in a week). Overall, participants seemed to feel that the intervention helped them cope with the stressors and also perceive stress more positively than before. Kiran mentioned that he was able to adhere to the mental activity until the author was involved which indicated that sport psychology practitioners may also need to work closely with coaches. A recent research indicates that coaches face challenges and that sport psychology practitioners should support coaches by providing one to one coach support as well as group based interventions (Kelly, Thelwell, Barker, & Harwood, 2018). Kiran also mentioned that during the post intervention phase, he often went over his old worksheets and read what he had written previously which helped him stay positive to some extent. Specifically, the coaches reported that the intervention helped them become aware about the aspects that were causing them the stress and also helped them understand that they possessed the ability to cope with stressors by thinking about their strengths and resources. Joy said, “Going through the mental activity made me look at things more positively. The same things didn't seem as stressful.” While, Ria said, “now I am getting used to thinking about what is in my control? Am I focusing on myself? What can I do to feel more confident? This is changing a lot of things for me not only in my coaching but my everyday life.” The coaches also mentioned that they were able to do their job better with a better frame of mind. Overall, the intervention helped the coaches to draw upon their resources to cope with their demands and appraise a challenge state.

**7.11.4 Follow-up DRES scores**

A month after the intervention, follow-up scores were collected electronically (via email or whatsapp) over five days. The figure below represents the scores of the coaches over the last five days during the intervention period and scores collected during the follow-up period.

**Figure 7.4: DRES scores over the last five days during the intervention period and the five days during the follow-up period. Each data point represents whether the participant perceived challenge or threat on each day**.

y axis = DRES Score x axis = Days

Celeration lines

Visual analysis of Joy’s plot indicates stability in his scores during the post intervention follow-up phase, providing indication of a treatment effect. A slight decreasing trend in Kiran’s data points in the follow up period (compared to the intervention period) is seen, however the celeration line illustrates an upward slope for the follow-up phase and the scores remained positive determining a challenge state. Visual inspection of Ria’s scores also show consistent positive scores in the follow-up period. A comparison of average scores made over the last five intervention points and the five post intervention points revealed that Ria showed large improvements and increase in her scores (i.e., from 0.6 to 1.4 post intervention). This is an important finding as Ria was involved in a short intervention phase of seven days but continued to go through the mental activity regularly. This may suggest that the intervention helped Ria cope with her demands and reduce threat and appraise a challenge state. Overall, the visual analysis of the follow-up data corroborated with the follow-up interview results and shows that intervention helped all the participants perceive stress more positively. The social validation data that was collected (via interview) at the end of the intervention and follow-up period further established that the participants found the intervention useful in perceiving stressful situations positively.

**7.11.5 Social Validation data**

Social validation data was collected (via interview) at the end of the intervention and follow up period to ascertain the participant’s perceptions and feelings of the intervention and its procedures (Hanton & Jones, 1999b; Kazdin, 1982). Questiones were asked in line with guidelines noted in previous chapters (section 5.20 and 6.7 of the thesis). All three participants said that they had been able to tell their experiences fully and that found the intervention helpful. One of them said that they found it helpful that the interviewer had played tennis in India as she understood the tennis culture in the country. All three coaches also perceived the intervention to be important and the procedures acceptable. They mentioned that the measure they were asked to fill was relevant and also quick. They were also satisfied with the results, however one of them felt the need for the intervention to be monitored for longer. The coach said, “if I knew you were going to be monitoring it..it would have probably helped me stick to it for a longer time.”

**7.12 Discussion**

The key findings of this study are that Indian coaches experience a range of stressors, the novel intervention helped them deal with those stressors and that the effect of the intervention lasted. The stressors reported by elite Indian tennis coaches in this study support previous research (e.g., Olusoga et al.*,*2009; Thelwell et al., 2008). This highlights that several stressors and various type of stressors are experienced by Indian coaches and also represents the stressful nature of elite level coaching in India. It may also be suggested that stressors of female coaches may vary from male coaches as described by the female coach in this study.

Since this is the first study to investigate stress in elite Indian coaches and implement an intervention with them, the findings are informative to sport psychologists in India who can assist coaches to deal more effectively with the stressors. All the coaches participated in the study because they wanted to manage the stressors they perceived regarding their coaching activities. They believed this would be helpful for them as well as their players. Visual inspection of graphed data, the split-middle technique used to produce celeration lines and across-phase mean analysis provides support for the intervention increasing the score of Demands and Resources Evaluations for Joy, Kiran and Ria. This indicates a change from stress being appraised negatively (i.e., as threat) to more positively (i.e., as a challenge). The consistency in the findings from baseline to the intervention period and followed by the findings from the post intervention period suggests that the intervention may be an effective method to reduce threat state and to enhance a challenge state. Thus, in-line with the previous research, this chapter shows that challenge and threat states can be changed using interventions (e.g., Moore et al, 2012; Turner et al., 2014; Williams & Cumming, 2012)

Comparisons across participants showed that Kiran demonstrated the highest scores followed by Joy, while Ria showed little improvement during the intervention. This could be due to the short intervention period that she was involved in. While, the post intervention comparison demonstrated that Ria was benefitting the most through the intervention as she was regularly using the mental activity. This emphasized the effectiveness of the mental activity. Kiran had positive scores during the post intervention period even though he did not go through the mental activity regularly. Perhaps, this could have been due to the appraisals becoming automated through previous experiences of the same appraisal process (Lazarus, 1999). That is, going over interventions each day may have helped appraisals become automated and thus provided a basis for Kiran to respond positively.

Another strength related to the theoretically driven approach that had been taken to construct the intervention. This is one of the few studies to consider challenge and threat as a part of coaching stress and the first to examine an intervention with coaches. These results of this study are consistent with the findings of earlier research (e.g. Didymus, 2017; Olusoga et al., 2010) as it supports the notion that coaches can have opposing styles of appraising stressful situations, that is, as a challenge or threat. The coaches had negative as well as positive appraisal scores and during the categorization process they were able to distinguish stressors as challenge and threat. Uncertainty, required effort and perception of danger were pertinent factors that underpinned the stressors that the coaches experienced. The mental activity worksheets and the results from the interviews also suggested that the resources of self-efficacy, perception of control and approach goals can help coaches deal with their demands. More importantly, it can also be determined that if the resources of the coaches exceeded the demands a challenge state would occur. Thus, it can be suggested that helping the participants draw upon and focus on their resources, can weaken the perceptions of demands. Similar to chapter 5, the intervention used within this study also focused on enhancing the resource appraisals of the participants.The results of this study provides some support that the TCTSA can be recognised as a framework that can be used in the context of coaching in an Eastern country. Thus, sport psychology practitioners could consider the resources of self-efficacy, perception of control and approach goals to help their coach clients to manage stressful situations effectively.

Similar to chapter two, a noteworthy finding is that although several resources to cope with the stressors identified by the coaches fit into the TCTSA, not all resources fit within the framework and some also lack detail. Strategies such as time management, use of human resources, and acceptance were also considered as resources that can help cope the demands. It has also been hypothesized that stable factors such as personality characteristics predispose people to cope in certain ways in stressful situations (Bouchard, Guillemette, & Landry-Le ́ger, 2004; Carver, Scheier, & Weintraub, 1989; Ferguson, 2001; Folkman & Moskowitz, 2004). For example, the within the coaching stress literature, Kobasa (1979) characterized the ‘‘hardy personality’’ as one that a tendency to view unexpected change as a challenge rather than a threat to well-being. Coaches with this disposition are committed to their work, focused on tasks they can control, and approach obstacles as challenges (Fletcher & Scott, 2010). It is suggested that although the components that are a part of the challenge and threat can aid positive appraisal, these are not the only pertinent components (Cerin, 2003).

Single-subject design research has frequently been employed in experiments designed to establish a functional, cause-and-effect relationship between interventions and observable and meaningful outcomes (Skinner, 2004). The multiple-baseline across participants design used in this study was useful to empirically validate the effects of the intervention. The current results have heuristic value as they suggest that researchers should conduct studies to determine if the intervention used in this study or other similar interventions are effective for coaches with different demographics (such as age, culture, sport). Multiple-baseline design may also allow nuances of the interventions to be explored and thus the design may be used to refine the intervention protocols. During data collection it was recognised that keeping a diary would place an extra demand on coaches and they were thus encouraged to use instantaneous media (email and text messages/whatsapp) to collect data during the intervention period. Using new technology may aid researchers and practitioners gain immediate data from participants in a real world setting.

The study offers ecological validity in terms of studying the coaches in Non-Western countries. The positive changes seen in the coaches provides for planning implications. The results of this study can be disseminated to professional tennis clubs, the governing bodies making them aware of what coaches’ experience. The Sports Authority of India or the All India Tennis Association may consider matching the responsibility given to the coaches with providing support or resources to the Indian tennis coaches that they require to cope with the demands that they face. For instance, they could provide them with human resources such as assistant coaches or financial support so that the coaches do not struggle to run multiple centres and make a living through coaching. Such organisations should strive to provide counseling and psychological support to coaches along with players. Such support may reduce negative stress appraisals of the stress experienced by elite coaches and a preventive measure to manage stress can be taken. The findings of this study may also assist other coaches and help them target their stressors and focus on appropriate methods of coping through this intervention (i.e., problem focused coping).

Future researchers may address the limitations associated with the current study. One limitation may be an element of social desirability. In a recent study (Deen, Turner, & Wong, 2017), the researcher sent social desirability instructions to the participants via text messages twice a week during the data collection phase. Perhaps, a similar strategy could have been used and social desirability could have also been measured. The researcher was actively involved during a certain period during the intervention and although social validation data was collected treatment integrity data was not collected. To ensure that variability in treatment delivery does not confound evaluation of treatment effectiveness, treatment integrity data should be collected to ensure that researchers deliver the intervention consistently across participants and intervention sessions (Skinner, 2004).

Lazarus’ perspective encourages the study of a sequential process that originates with the environmental demands encountered (i.e., stressors), and is followed by cognitive evaluative responses, the associated emotions experienced, and the subsequent behaviour that can include performance (see Lazarus, 2000; Neil, Fletcher, Hanton, & Mellalieu, 2007; Neil, Hanton, & Mellalieu, 2013). The current study furthers knowledge about the coaches’ experiences by focusing on understanding the stressors and changing the cognitive evaluative responses, however it does not examine the latter part of the sequence that includes the emotions experienced, and the subsequent behaviour in detail. Researchers should continue this line of enquiry and consider the intensity of stress, the emotions and also measure subsequent behaviour. Although it is not possible to directly observe a challenge mind-set, it would be useful for future researchers to observe and record behavioural correlates that support the implementation of the intervention.

Cognitive appraisals can occur both consciously and unconsciously (Blascovich & Mendes, 2000) and it is not clear to what extent the participants are can accurately introspect on their cognitive appraisals (Gawronski & De Houwer, 2014). Future researchers may thus include cardiovascular (CV) measurements of challenge and threat during such intervention studies. CV reactivity markers also circumvent the inherent response bias in self-reports measures (e.g., Blascovich & Mendes, 2000). It should also be noted that the findings of the study are based on the completion of one measure taking approximately three minutes to complete, which may not yield an in-depth understanding of the stress appraisal of coaches. Also during the follow-up period, scores were collected only over five days.

A potential disadvantage of the multiple-baseline approach is that the baselines need to be progressively longer which leads to withholding the intervention for a long time with certain participants. This may raise ethical concerns in applied practice. Also, adopting a multiple-baseline design by itself also meant that only one intervention could be implemented, as it does not allow interventions to be compared. Another issue relates to the small sample size, which is commonly the case within single-case research designs. The generalizability of the findings to a wider population is thus limited. With regards to recruitment of the coaches, the criterion for inclusion was for the coaches to be considered “elite” and also that data has been analysed with respect to one sport (i.e., tennis). This might have had a bearing on the demands identified and attributes perceived as resourceful for a challenge state. Future research should focus on interventions with different level of coaches (e.g., college coaches) as the range of stressors that affect coaches at all levels may be different and with coaches from various individual and team sports as the stressors may also vary depending on the type of sport. Future research can also focus on identifying stressors and implementing interventions with Indian female coaches as the results of this study suggests some specific group demands may be present. Finally, the intervention that has been developed has been implemented for the first time and thus should be considered as exploratory in nature and its validity needs to be further established.

**7.13 Conclusion**

To conclude, the findings suggest that the elite Indian tennis coaches operate within a demanding environment. A unique intervention based on the TCTSA was developed by the author for the purpose of this study. Thus, the study constructed new knowledge by devising an intervention that can be implemented with coaches to manage their stressors not only during competition but also practice and training sessions. The intervention may be helpful to address performance stressors as well as personal and organisational stressors amongst performers. Similar to chapters five and six, this sudy extends the limited literature in the area of challenge and threat states about effective intervention strategies that may enhance a challenge state in performers. The theoretically based intervention effectively helped participants consciously appraise the resources of self-efficacy, control and achievement goals to be able to cope with their demands. However, other resources to cope with the demands were also identified. This is the first study to demonstrate an intervention that aims to change the cognitive appraisal of elite Indian coaches during stressful situations. The intervention provided to be effective in reducing threat and creating a challenge state in elite Indian coaches thus the study addressed the final aim of the thesis.

This is the first study to apply the TCTSA framework in the context of an applied interevention within coaching. Theoretically, the results suggest that the TCTSA may provide to be a useful theoretical framework for research into stress in sports coaches. The findings of this study are of applied value to sports psychologists and elite tennis coaches in India in a number of ways, however they must be interpreted with caution. Future research is required to better ascertain how the coaches’ standard or level, culture, and gender moderate coaches’ perception of stressors to implement appropriate interventions. Future researchers should also further examine the findings of the current study using samples across a range of sports, and also use more objective markers of challenge and threat along with self-report measures.

Chapter 8

**General Discussion**

**8.1 Introduction**

This program of research examines psychological stress amongst elite Indian performers and has been informed by the Theory of Challenge and Threat States in Athletes (Jones et al., 2009). The aims of this research program were to: 1) explore the sources of, and responses to stress amongst Indian athletes, 2) investigate the responses to stress of Indian athletes compared to athletes from the UK, 3) determine the effectiveness of interventions to reduce threat and enhance a challenge state among Indian performers. The thesis has addressed these aims and its contribution lies in adding to the limited literature regarding the stress experiences of Indian athletes and coaches, a hitherto unexplored Eastern population. The thesis also extends the limited literature in the area of challenge and threat states about effective intervention strategies that may reduce threat and enhance a challenge state in performers. The program of research thus contributes to the empirical base upon which applied sport psychologists from Eastern, as well as the Western world, can draw to aid performers to reduce threat and increase the challenge state. The purpose of this chapter is to summarise and discuss the main findings presented in part one (i.e., chapters two and three) and part two (i.e., chapters five, six, and seven) and identify the limitations of this research and highlight areas for future research. The chapter concludes with a summary of research presented in this thesis.

**8.2 Summary and discussion of main findings**

The research outlined in the preceding chapters demonstrated several key considerations in relation to the investigation of psychological stress in elite Indian performers. First, sport in India is demanding and a range of stressors and resources emerged that fit in the TCTSA along with culture specific stressors and resources. Second, Indian cricketers experienced higher emotions compared to British cricketers but overall similarity was found in how Indian cricketers respond to stress when compared to cricketers from the UK (i.e., both groups respond to stress positively). A difference was found in the manner both groups identified with their respective teams. Third, psychological interventions helped to reduce threat and enhance challenge states in elite athletes as well as high performance coaches. Finally, the research supporting the use of the TCTSA as a framework has been expanded by establishing its applicability in a novel context. A range of research designs (e.g., qualitative research, cross sectional design, single-case designs) were used to pursue answers to the research questions related to psychological stress amongst Indian sport performers. The main findings from each chapter are discussed briefly and some general issues are considered.

**8.2.1 Summary and discussion of main findings from Chapter 2**

Through the use of a qualitative approach in chapter two, several stressors and resources of elite Indian athletes emerged that fit into the TCTSA, a theory that emanates from the West. Further, it provides insights into the transaction of athletes with their environment and thus culture specific demands and resources are also identified. At a practical level, this study indicates that although there may be stressors commonly experienced by elite athletes across the globe, there may also be sources of stress that are unique to specific populations (e.g., societal demands). Although the stressors were not categorised as per its origins (i.e., performance, organisational and personal stressors), the athletes’ stressors stemmed from all three sources (e.g., pressure of playing for India, lack of support from federations and lack of support from fathers) indicating that both competition and non-competition sources of stress need to be considered when developing interventions (Noblet & Gifford, 2002). Another interesting finding was that a key resource identified by Indian athletes to cope with their demands was the use of psychological skills training. The unique demands of the Indian elite athletes, the need to address and improve their overall sporting experience, and the benefits perceived due to psychological interventions are some factors that form a basis to conduct the single-case design intervention studies with elite Indian athletes that are included in this program of research.

In chapter two, elite athletes from a range of sports were taken into account as this was one of the first studies to explore the stress experiences of Indian athletes, however further research that explores unique experiences in each sport is required as different professional sports are often associated with different behavioural, physical and psychological factors (Herring et al.*,* 2019). The author’s access to elite cricketers in India enabled a focus on cricketers in chapter three, while elite athletes and coaches from racket sports were considered in chapters five,six, and seven. Overall, the thematic analysis offered a valuable approach for developing a comprehensive insight into a range of sources and responses to stress in a previously unexplored athletic population. Some novel points also emerged from this study. The demand appraisals (uncertainty, perception of danger, and amount of effort required) could be inter-linked at times and that a single factor (e.g., injury) may lead to appraisal of more that one demand. More importantly, in this study the components of challenge and threat were applied across the sports experience and thus challenge and threat may not only be anticipatory states as stated in the TCTSA. The significance of the social context as a part of the transactional approach to upcoming stressful situations was also emphasized. Although participants were encouraged to articulate the stressors they experienced through their career, during the interviews few elite athletes reflected more on their recent sources of, and responses to stress rather than experiences at different stages of their sporting journey. Future researchers would therefore be able to undertake a longitudinal study that encapsulates the demands faced and resources used at various time points in their sports career and also consider athletes from various stages in their career.

**8.2.2 Summary and discussion of main findings from Chapter 3**

The cross-cultural research presented in chapter three, is again one of the initial study in sport psychology that provides insight into how elite athletes across cultures typically respond to an upcoming competitive situation. Although cultural differences are found the previous chapter (i.e, chapter two), chapter three demonstrated that there are similarities in the manner athletes respond to stress. Elite cricketers from India as well as the UK perceived high self-efficacy, perception of control and an approach goal orientation. Both groups also perceived more positive emotions before competition and also perceived their emotional state to be beneficial. The TCTSA predicts that positive emotions will typically be associated with a challenge state. Thus, in line with the prediction, both groups of cricketers appraised sufficient resources to cope with the demands of the competitive situation and are likely to experience a challenge state. However, past research (e.g., Cerin, 2003) has shown that participants can cognitively appraise an upcoming competition as both a challenge and a threat, rather than appraising it as one or the other. The self-reported appraisals may be too simplistic in a sports setting (Meijen et al., 2013a). Thus there is a need to consider the way in which athletes’ states of challenge and threat have been assessed and the research methodologies, which have been used. Another clear outcome that can be observed from chapter three is that cultural differences that were seen in the way emotions were experienced as Indian athletes experienced heightened emotions compared to British athletes. This may determine a distinctive manner in which Indian athletes may respond to stress and interventions may need to be tailored accordingly.

The results of chapter three also show a significant difference in the social identity scores demonstrating that British cricketers better identified with their teams compared to the Indian cricketers, however no significant correlation was found between social identity and confidence, control, achievement goals, emotional states and challenge and threat states for players from India as well as the UK. These findings are contrary to previous research in sport and as well as health psychology which illustrates that social identity influences stress appraisals (e.g., Gallagher, Meaney, & Muldoon, 2014; Rees, Haslam, Coffee, & Lavallee, 2015). As mentioned in section 3.10 a single item of group identification was used to assess social identity and future research may consider recording social identity using a wider range of items (For example, see the 6 – item measure used by Rees et al., 2015 and Thomas, Brown, Easterbook, Vignoles, Manzi, D’Angelo, & Holt, 2017) in order to achieve greater confidence in the findings.

Assessing challenge and threat states in participants through physiological measures was not an option in this study or the other studies included in the program of research. This was due to the unavailability of the equipment in India but future researchers may consider using measures of cardiovascular reactivity. Ambulatory equipment (e.g., Finometer Pro) that measure cardiovascular indexes may be used with batsmen in cricket as batting is a closed motor skill performed in a stationary environment. Another limitation of the study is that it does not establish any correlation between the challenge state of the cricketers with increased levels of self-efficacy, control and approach focus. Attempts must also be made to gain an understanding of athletes’ responses prior to an actual competition at a time period when their responses are likely to have an actual effect on performance. Practitioners should be cautious using the findings of the present study for applied practice, as it is does not investigate how the constructs of challenge and threat influence the participants’ cricketing performance. Finally, the research area of stress in sport will benefit by further examining cultural differences in responses to stress amongst other Eastern or authoritarian societies (e.g., China) and Western societies (e.g., USA) and their effect on sport performance.

**8.2.3 Summary and discussion of main findings from Chapter 5, 6 and 7**

An important aspect of this thesis was the use of single-case research design studies to explore the stress experiences and determine the effectiveness of interventions with Indian performers that include elite Indian athletes and high performance Indian coaches from racket sports. Collectively, the single-case research studies provide insight that elite Indian athletes and coaches perceived a range of demands that can be categorised into the perception of uncertainty, amount of effort required, and perception of danger. Lack of self-efficacy, control and a focus on performance (ego) goals also led to appraising a situation as more threatening. Within sport psychology literature, it is acknowledged that intervention research should be of paramount importance to better understand the most appropriate approach to manage performers’ stress (Anshel, 2005; Thomas, Mellalieu, & Hanton, 2008). Aligned with this view the author implemented interventions to optimize different aspects of the TCTSA in the following ways a) reduce threat and increase challenge b) a modification of cognitive appraisals.

The key themes from the single-case research studies that corraborate with past research include the stressful nature of elite sport (e.g., Hanton, Fletcher, & Coughlan, 2005) the individualistic nature of stress and the need for tailored interventions (e.g., Jones, 2003), the TCTSA can be used to guide interventions and that challenge and threat can be manipulated (Jones et al., 2009; Williams et al., 2010). Another key finding was that challenge and threat can be experienced simultaneosly by athletes (e.g., Meijen et al., 2013b; Rossato et al., 2016) and finally the single-case research studies included in the thesis demonstrated that collecting follow-up data was valuable in establishing long-term effects of the intervention (e.g., Gardner & Moore, 2006; Salkind, 2010). Several novel themes also emerged from the single-case studies which are listed and subsquently discussed. First, the studies established that Indian athletes as well as Indian coaches have opposing styles of responding to stress (i.e., negative or positive responses) and the TCTSA can be used to categorize stress as challenge or threat and guide interventions in the novel context. Second, multimodal interventions were found to be effective in reducing threat and enhancing challenge amongst Indian elite athletes. Third, the MAPP provided to be a useful step-by-step guide to reduce threat and enhance a challenge state in an elite athlete. Particularly, it may be valuable to help athletes cope with each of their performance stressors one at a time. Finally, the novel intervention helped coaches appraise their resources to cope with the demands and was thus effective in helping them respond positively to stress (i.e., as a challenge). The aim of the thesis included determining the effectiveness of the intervention, however it can be suggested that chapter seven demonstrated the efficacy of the novel intervention in addition to its effectiveness. To determine that the intervention was effacacious the guidelines by Singal, Higgins, and Waljee (2014) were referred to. The novel intervention provides a strategy to deal with competitive, personal and organisational stressors. The single-case research studies also present the value of applied research as well as the challenges (e.g., ethical concerns, logistical constrains) of doing sport psychology in the real world.

Chapter four provides a rationale for the use of single-case research design and chapters five, six and seven presented an initial implementation of interventions to reduce threat and enhance challenge amongst athletes and coaches. As recognized by Martens (1987), the value of this applied research is that the researcher developed solutions to address the practical problems of the elite Indian performers. The single-case research studies provided a framework to the author that facilitated a way to collect data and to report outcomes of the intervention for each participant, thus determining the accountability of the professional practice through intervention evaluation (Barker et al., 2013; Turner et al., 2018). Having engaged with the participants during the applied work and having an established rapport also helped the research acquire knowledge much more rapidly (Martens, 1987). The badminton player in chapter five perceived lack of self-efficacy and control, had performance (ego) oriented goals, and unhelpful thoughts and emotions towards the recovery of his injury and an upcoming competitive performance. A multimodal intervention was implemented to help the player cope with his demands of injury and approach his practice and competition positively (i.e., more as a challenge). Baseline data illustrated that the participant perceived high threat and a low challenge, while the post intervention data showed low threat and high challenge scores indicating that the multimodal intervention was effective in altering the states. The multimodal intervention was proven to be useful as different mental techniques counteract distress of athletes in enhancing their mental skills and therefore their ability to cope with stressors (Keilani, Hasenohri, Gartner, Krall, Furnhammer, Cenik, & Crevenna, 2016). It was observed that in this study, the intervention was considered successful as it not only aided the athlete’s sport performance but also addressed a critical issue the athlete faced (i.e., psychologically overcoming the injury). A major difficulty was that self-report assessment was perceived to be intrusive by the participant during his recovery and intervention phase, which lead to gaining only limited data. A shortcoming of using self-report measures is that the self-report measure can induce an emotion itself (Harley, 2016). In the case of the badminton player a negative emotion was induced with the thought of completing the questionnaire during the intervention phase.

Chapter six includes a novel single-case design study that uses the MAPP for Success (Turner & Barker, 2014) as a guide to reduce threat and enhance challenge of the squash player. The participant lacked confidence and control and had a performance (ego) goal orientation where she compared herself and her training to other international players. The multimodal intervention was implemented to help the participant cope with her performance demands and approach competition positively. Baseline data for challenge and threat and the initial MAPP used for problem formulation using the data collected through interviews suggested that the participant perceived a low challenge and a high threat state. Data indicated that overall the multimodal intervention was effective in creating a marginal increase in the challenge scores and a significant decrease in the participant’s threat scores thus creating a moderate challenge and a low threat state. An important theoretical implication of the study is that challenge and threat do not appear to be at the opposite ends of a continuum but are dichotomous states as proposed by the TCTSA. Thus sport psychologists may implement interventions that focus on encouraging athletes to think of challenge and threat as different categories. The MAPP also proves to be a suitable to be used by researchers and practitioners to understand the demands of athletes and to be used as a guide to implement an intervention to reduce threat and enhance challenge. However, more studies using the MAPP are required to establish these results.

A main benefit for the squash player involved in the study was to have a set of mental skills and routines that she could call upon prior to competition, during competition and post competition. However, it was explained to the participant that mental skills are like technical or physical skills that need to be practices regularly for them to become effective. A clear theme to emerge from chapters five and six was the individualistic nature of athletes’ stress experiences, which also justifies that the single-case research design was an applicable methodology used to reduce threat and enhance the challenge state and thus aid sport performance of the individual athletes. Nonetheless, research into any area in sport psychology will benefit from the use of various research methodologies. A limitation across the two single-case design studies is that limited performance measures were used and the effectiveness of the interventions has relied mainly on analysis of the data and the follow-up and social validation data from the participants. Another drawback for the researcher was the amount of time spent in person with the participants. The work described in the single-case design studies is over several months (i.e., eight months in chapter five & 12 months in chapter six), however the participants were training in different cities and thus much of the contact was over email, phone and skype, particularly with the squash player. As a result the author was not able to actively reinforce the use of mental training skills in person. A manner in which this issue can be dealt with in the future could be to provide greater ownership of the implementation and reinforcement of the routines to the coaching staff working with the players on an everyday basis. However, during the sessions and the intervention process, the researcher gained feedback to ensure that the participants were satisfied with the mental skills incorporated in their routines and that the participants had understood how and why they were being implemented.

Overall the results would suggest that the multimodal interventions appeared to reduce threat and enhance the challenge state of the players. However, a limitation of chapters five and six is that they do not determine whether or not the interventions were the only reason for the change in the challenge and threat states. Thus within these intervention studies, there remains a possibility that changes in challenge and threat states and performance may be an outcome of the participant or experimenter bias. Although the methodology of follow-up data collection helps determine persistent effect of the intervention and long term changes in athletes’ challenge and threat states, replicating these results with different samples would strengthen the generalisability of using the TCTSA framework to implement interventions to reduce threat and enhance challenge in athletes.

Evidence suggests that along with athletes, coaches are also prone to a range of stressors and that they are required to perform under pressure (e.g., Fletcher & Scott, 2010; Thelwell et al., 2008a). However, research lacks implementing and assessing the effectiveness of interventions with coaches. In chapter seven, a theoretically guided intervention is implemented which aids the coaches to appraise their resources (i.e., self efficacy, control, and approach goals) to cope with the demands they face due to their coaching activities. This novel study has advanced the literature in coaching stress in several ways. First, it represents the stressful nature of high performance coaching in India and illustrates that similar to coaches in the West, Indian coaches experience a range of stressors. Second, the results showed that the new intervention constructed by the researcher helped the coaches deal with the stressors (i.e., stress was being appraised as a threat to being appraised as more of a challenge) and the follow-up data determines that the effect of the intervention lasted. This finding is informative to sport psychologists who can assist coaches to deal with their stressors more effectively. Third, this study is one of the initial studies to consider challenge and threat as a part of coaching stress and supports the notion that coaches can have opposing styles of appraising stress and that TCTSA may be an applicable framework to use for researchers and practitioners working with coaches. However a significant finding was that although several resources to cope with the stressors identified by the coaches fit into the TCTSA, not all resources fit within the framework. Thus similar to previous chapters and past research (e.g., Cerin, 2003), it can be suggested that although the components of the TCTSA can aid a positive appraisal, these may not be the only factors. Contrasting to the single-case design in chapters five & six, the multiple-baseline design used in chapter seven enhances the validity of the study through recruitment of multiple participants and helps conclude that the changes that occur in the challenge and threat states of the participants are due to the intervention rather than any other factor.

Chapter seven explores the applicability of the TCTSA and the effectiveness of an intervention in reducing threat and enhancing challenge within coaches and future researchers may explore the applicability with different samples. That is, using the TCTSA in other performance settings where individuals experience stress and are required to cope with the demands placed on them. For example in the domains of business, at the workplace or other performance fields such as dance, theatre and music.

Research involving elite athletes and high performance coaches in an authentic setting seems important in order to test a conceptual framework and also to obtain ecological validity (Pensgaard & Ursin, 1998). Thus, a unique strength of the thesis is the use of a population of elite athletes and coaches in an ecologically valid and a stressful environment. At the same time, this is one of the limitations as it limits the generalisability of the studies to other sporting populations. Specifically, chapters two, five, six and seven included small sample sizes. The athletes that participated in this program of research were with a minimum age of 18 years. Elite performers are by definition small in number and future studies are needed to increase the knowledge base surrounding the applicability of the TCTSA by including athletes from younger age groups, non-elite groups and also mature or veteran athletes.

**8.2.4 Limitations in Scope of the Research Program**

The program of research addressed the main aims and advanced our knowledge about the applicability of the TCTSA in a unique cultural context, however possesses several limitations. This section provides a synopsis of the limitations based upon the preceding studies. As stated earlier the cardiovascular indexes are not measured which form an important part of the TCTSA. Only the elite athletic population is considered in this thesis, therefore the applicability of the results is limited. Research has demonstrated links between dispositional factors such as personality and challenge and threat states (e.g., Allen, Frings, & Hunter, 2012), however the current program of research does not consider the dispositional styles of the participants. Another limitation in the scope of this research program relates to the generalisability of the studies to other sporting populations. Specifically, data in part two was derived from one elite badminton player, one elite squash player and three high performance coaches. While, data in chapter three from part one was collected only from elite cricketers. Replicating the results with different samples across different sports in India would strengthen the confidence one can have in the generalisability of the results of this thesis. Also within the intervention studies, the author conducted the sessions with the participants and was not blind to the outcome of the studies, and therefore there remains a possibility that the experimenter expectations of the studies would affect the data. Additionally, there is also the issue of a possible observer effect or hawthorne effect. This refers to a type of reactivity in which individuals modify an aspect of their behaviour in response to their awareness of being observed (McCarney, Warner, Iliffe, Van Haselen, Griffin, Fisher, 2007). The AB design used in the single-case research design in chapters five and six seemed more like multiple-probe designs and had its limitations such as it did not allow to the researcher to look at the trend of the data or determine whether the intervention is the only reason for the change in challenge and threat states. The results of the single-case research studies are strengthened by adherence to inspection criteria used to determine meaningful change, however there were occasions and circumstances where they were not observed. The extent to which the guidelines by Hrycaiko & Martin (1996) are discussed in the next section.

**8.2.5 Guidelines of visual analysis**

In the three single-case research design studies that used visual analysis, the five commonly used guidelines by Hrycaiko and Martin (1996) were considered to determine if the intervention had an effect on the level of challenge and threat. These guidelines are detailed in section 4.3.1 of the thesis which include the stability or the direction of the baseline scores, number of times the effect is replicated, identifying overlapping data points, the time span in which the effect is observed and the size of the effect.. The extent to which these guidelines were observed is discussed further. First, the baseline scores observed in all the three single-case research studies were in the opposite direction to that predicted by the effects of the intervention. Second, data from the three chapters suggest that during intervention, post intervention and during the follow-up stage an effect was observed. Third, overlapping data points were considered in the analysis in chapter seven which helped to determine the effectiveness of the intervention. However due to limited data points collected in chapters five and six overlapping data points could not be utilised in data analysis. Fourth, an effect was observed when the ‘during intervention’ data was collected after the fourth and the sixth session with the squash player and the badminton player respectively. While the effects were observed within approximately four days of introducing the intervention to the tennis coaches. Finally, the comparison of scores in chapters five and six indicated a change in the level of the challenge state along with performance gains that the participants experienced. While the level of threat in chapter seven had greatly changed, however the performance of the coaches was not evaluated. Additionaly, in chapter seven the celeration lines allowed observing the differences clearly between phases and thus determined the effectiveness of the intervention. Further, the social validity data collected in all the three single-case research design studies indicated that a change occurred in the motivational states experienced by the participants.

**8.3 Implications for researchers and practitioners**

As discussed in section 2.11, the terms challenge and threat were not understood by the athletes as defined by Jones et al (2009). Thus, researchers and practitioners using the TCTSA as a framework to inform their work with athletes may explicitly be required to explain to the participants what these terms mean. In this thesis, the overall results suggest that the Indian cricketers respond to stress positively, while the performers in racket sports that include a badminton player, squash player and the three tennis coaches seemed to perceive stress negatively. Cricket is the most developed and popular sport in India and research supports the proposition that athletes’ resources such as sports confidence levels may vary depending on the organisational culture of the sport (e.g., Vealey, Garner-Holman, Hayashi, & Giaccobi, 1998). Research into stress in the context of cricket and comparisons with other sports would contribute to this existing literature amongst Indian athletes. It will help determine whether cricketers in India are better able to cope with the demands placed on them compared to athletes from other sports.

Effective strategies to reduce threat and develop a challenge state are presented in the thesis. Some common strategies that were implemented with the badminton player and the squash player included the within control/outside control activity, using positive self instructions, goal setting and the use of post match analysis. Although some of the interventions that were implemented were common, there were differences in how they were offered to the athlete. For instance, the badminton player used self-talk which included a couple of statements while the squash player used short cue words as positive instructions. The post match analysis or the goal setting followed by each of the participant also differed. This emphasizes the unique preferences of athletes’ and the need for practitioners to tailor interventions accordingly.

The use of single-case research designs in the thesis reveals that researchers and practitioners can consider implementing interventions with an individual athlete or small teams or group sharing similar problems. Another theme to emerge from chapters five, six, and seven was that the Indian athletes and coaches held the view that a sport psychologist is to be visited only when there is a problem or an issue to be addressed. For example, when an athlete gets injured or is feeling stressed or is going through a slump. It is perhaps possible that, for instance, in chapter six a great decline in threat and only a small increase in challenge were observed, as the player seemed more focused on overcoming her mental weaknesses rather than looking at a more positive outcomes through the use of mental skills. One of the main reasons being the negative connotation associated with psychology in India (Sridhar, 2010). In such cases it is recommended that education procedures be used to break these barriers down (e.g., Barker, Galloway, & Davies, 2006). For example, practitioners can hold open discussions and educational workshops for Indian athletes and coaches to explain the use of sport psychology towards more positive outcomes such as enhancing performance or life skills (Danish & Nellen, 1997). Based on the interventions delivered in this program of research and some emanating issues, few guidelines are suggested for practitioners working with athletes, specifically Indian athletes. This may help sport psychologists to be more effective in providing routines and implementing interventions to bring about a challenge response and consequently enhance sport performance.

1. Educate athletes and coaches that sport psychology is not only a curative science but also a preventive science and that psychological skills will not only help them address their problems but will also help in performance enhancement.
2. Through education change the reputation of stress. That is, stress may not neccesarily be negative and mental training can help performers respond to stressful situations positively.
3. Educate athletes and coaches that some amount of stress may be essential to help them feel motivated and to perform. For example, it can help them focus and invest more effort. While, the absence of stress may lead them to become indifferent towards a situation and underperform.
4. Help athletes and coaches become aware that the perception of stress is important rather than the absence of stress.
5. The terms challenge and threat may not reflect how athletes and coaches describe stress, thus simple terms such as positive and negative responses may be used.
6. Develop a rapport with the participant prior implementing an intervention. It may be important for practitioners to understand the preferences of athletes while implementing interventions. For example, certain players may prefer mental routines, which are more objective in nature and where players are actively carrying out an activity such as goal setting, while some athletes may prefer more passive activities such listening to relaxation scripts.
7. Educate the athlete that the process of learning the mental skills is through practice and experience and that based on their feedback, the mental skills can be altered or changed.
8. Educate the athlete that mental skills like any other skills need to be practiced regularly for them to have an effect.
9. If the concept of mental skills training is new to the athlete or the coach, merely teaching the techniques may not be sufficient but the practitioner may need to be more actively involved and get the routines done from the participant in the initial stages. The practitioner may also involve the coaching staff to get the routines done on a regular basis.
10. Finally, the sport psychologists may involve the participant while developing certain interventions (for e.g., a visualisation script or cue words) as it is likely to increase the ownership of the intervention for the participant and enhance the motivation to continue with the mental skills training.

**8.4 Reflexivity**

Reflexivity pertains to the “analytic attention to the researcher’s role in qualitative research” (Gouldner, 971, p.16, as cited in Dowling, 2006). This section highlights my active role in shaping the research. This program of research is considered to be applied in nature and applied research can be intensely personal; one’s positionality (i.e., position based on ethnicity, gender, etc) and who we are as a person play a fundamental role in the research process, in the applied research work as well as in the final text of the thesis. Thus sharing my reflexivities is essential and I further present my espitmological reflexivity, personal and cultural reflexivity.

**8.4.1.** **Epistomological reflexivity**

I believe that “stress” is not just a research topic but a feeling that affects Indian athletes. It is a topic that influences me as a researcher due to my own sporting experience in India. During this research, I do not remain a passive observer, I am also an active participant who tries to help Indian athletes who present with this problem. This means that perhaps my perspectives informed the research process and the process may have not been completely neutral. This does not mean the research turned towards subjectivity as I recognized that while conducting the research objectivity was essential. For example, while conducting the first study where elite Indian athletes were interviewed about their stressors, a conscious effort was made by adhering to a reflexive thinking process (presented in section 8.4.2) to ensure that my personal experiences did not influence the interviews. However, a research cannot be entirely value-free and I acknowledge that it may be impossible to remain “outside of” one’s research topic while conducting the research.

**8.4.2 Personal and cultural reflexivity**

As stated in Chapter 2, a reflexive journal was maintained during the first study as well as the single-case research design studies (Chapters 5,6, and 7) to aid the reflexive thinking process. The process recommended by (Wilkie, 2005) was adapted and is presented below:

Figure 8.1: A ‘reflexive thinking’ process adapted from Wilkie (2005)

To illustrate the manner in which this step by step process was used an example from Chapter 5 is presented further.

* Interview with participant: In this initial interaction, Rahul shared that he was injured and was feeling stressed.
* What was I thinking and feeling?: I was a little surprised at first as a severe injury had re-occurred. I was listening to him patiently and trying to understand what had happened and how he is feeling about it.
* Acknowledge your baggage: After the interaction I was feeling empathetic as I could acknowledge how difficult it can be to cope with an injury physically and mentally. Perhaps my own experience of dealing with sports injuries in the Indian sporting culture has also led to the feeling of empathy. s
* What influence might have this had?: I do not think my experience had any influence on the interaction and I was quite objective during the interaction. Although I felt surprised at first, I did not emote it to him.
* Feed reflexive into the next session: Ensure not to project my own feelings in the next session. Understand better what Rahul is experiencing and assess it objectively.

The reflective thinking model helped me become aware of my own values and biases by understanding the cultural context in which I have been a part of. This self-monitoring process also helped me in being aware that I was not imposing my own frame of reference upon the participant. Cultural awareness starts with the researcher’s willingness to embrace a reflective approach and several such models have previously been proposed for organising and considering cultural influences that counselors and researchers need addressing in their work (e.g., six stage model by Gibbs, 1998; ADRESSING model by Hays, 1996). Along with a reflexive thinking process, certain personal insights were recorded in the reflexive journal during the data collected. For instance I recorded, “So much has been said in the media about the pressures and the stressors of Indian athletes, but it is sad and frustrating that not much has been done to help these athletes. I realize that so many of these athletes still face the same issues that may be I did. There needs to be some progress in how today’s athletes are supported. I hope that this research will highlight the stressors and provide solutions to athletes and also coaches and will lead to a positive change.” While conducting the thematic analysis during the first study I also recorded, “During this process of coding I understand how important it is to be accurate in indentifying the themes and categorizing them. Also how vital it is to be consise while naming the themes. During this data analysis, I also had to be mindful that I was not attaching my own interpretations and presenting the data at the semantic level. I learnt to differentiate in selecting the core and important data from those that were not necessary to give due importance to the information provided by the athletes.” Overall, my reflexivity helped me in assessing whether I was working inductively as a researcher, whether I was being a responsive investigator and whether I was acquiring adequate and appropriate data. The process of reflexivity also helped me think critically about what I understood from the participants, how I interpreted it and finally presented it in the final text.

**8.5 Directions for Future Researchers**

This section provides some recommendations for future researchers based upon the five studies. First, despite the program of research indicating the applicability of the TCTSA in the Eastern part of the world, replication of this data in India and other Eastern countries through the use of more group based research designs similar to the one in chapter three is needed. Second, research in sport psychology will benefit from examining and establishing the cross-cultural application of the measures used to measure challenge and threat. For example, investigating whether the challenge and threat in sport questionnaire (CAT – Sport) is valid to be used with athletes from the East. Third, the use of follow-up data in chapters five, six, and seven provide significant information about the persistent effect of interventions on challenge and threat states. Thus, future intervention based research may collect follow-up data to determine long-term changes in psychological attributes of the athletes and coaches. Fourth, very little research has examined the evaluations of resources and demands prior to competition in a team setting. In the current program of research, interventions are implemented with performers from individual sports. However, resource appraisals such as self-efficacy can be collective in nature, that is, similar to individual self-efficacy, collective efficacy of a team can have a strong impact on team performance (Tasa, Seijts, & Taggar, 2007). Thus, implementing interventions that may facilitate high self-efficacy, perception of control and approach goals amongst teams may be considered in the future. An emphasis on the occurrence of organisational stressors within elite Indian athletes was observed. Future researchers may consider implementing interventions and determining its effectiveness with Indian athletes in order for them cope with the organisational stressors experienced by them. Arnold, Fletcher, and Molyneux (2012) conducted a study to elicit recommendations, advice and suggestions that can be used to enhance performance leadership and management in elite sport. The recommendations provided by them seem applicable to the Indian national sports federations as they suggest creating the optimal environment, implementing systems and structures, developing an inclusive culture and providing appropriate support and employing the most appropriate individual. Conducting similar research in India may help Indian sport organisations in effectively addressing issues accompanying leadership and management in elite sport. Overall, this section along with preceding sections of this chapter provides some suggestions for further research.

**8.6 Summary**

Elite performers experience stress and are required to respond positively in highly competitive situations. As a result, finding and implementing effective techniques that facilitate a positive response are worthy endeavours to sport psychology literature. Overall, this thesis provided an in depth analysis of the Indian participants’ stress experiences. The thesis has demonstrated that the TCTSA, which considers stress as a multidimensional construct, may be a useful framework to understand the stress experiences of Indian performers and to implement interventions. Many valuable practical findings for athletes, coaches, sports organizations and sports psychologists were identified in this thesis and this chapter provided some further suggestions for practitioners and future researchers. Although the recommendations are not extensive, the summary illustrates some key developments that may need to be considered to advance the knowledge about stress in Indian sport performers and to gain a more comprehensive understanding about the applicability of the TCTSA. Athletes, coaches, and sports organisations in India have always been intrigued about how one can handle stress and perform optimally in sport. This research program includes five novel studies that have advanced the literature on psychological stress amongst elite Indian performers in several ways:

1. Indian athletes perceive stress due to several demands that include amount of effort required, perception of danger and the uncertainties in sport. They also perceive stress due to several organisational and societal demands.
2. Indian athletes feel they can cope with their demands when they are able to appraise self-efficacy, perception of control and approach goals. They also benefit from psychological skills and social support.
3. Similar to cricketers from the UK, cricketers in India respond to stress positively. However, they experience heightened emotions and may not identify with their teams as well as cricketers from the West.
4. Athletes and coaches from racket sports appear to face several stressors that include the amount of effort required, perception of danger and the uncertainties in sport.
5. Interventions effectively aid the manipulation of challenge and threat and help elite Indian athletes to cope with their stressors positively.
6. Interventions may also aid high performance coaches to cope with the demands they face due to their coaching activities. Other factors such as human resources and effective time management are also considered as resourceful by elite coaches.
7. The TCTSA may provide to be a useful framework to understand stress in Indian athletes and coaches and to implement interventions with them.

In summary, this program of research addressed practical and theoretical questions of interest regarding an underrepresented athletic population. The program of research includes unique studies. Part one of the thesis presented one of the first study to explore psychological stressors amongst elite Indian athletes. Also, no other cross-cultural study has been found in sport psychology literature that investigated responses to stress in elite athletes using the TCTSA framework. Part two of the thesis presented single-case design research studies to determine intervention effectiveness and extends the limited literature regarding interventions in challenge and threat research. Although testing the validity of the TCTSA in an Indian sample was not one of the main aims of the thesis, it does provide some support for its translation across culture. The thesis advances our knowledge about the applicability of the TCTSA and builds on and extends previous stress in sport research. When considered together, this overall body of research provides a comprehensive insight into the stressors of elite Indian performers, the manner in which they respond to stress and recognizes that interventions may help them respond positively to the stresses of competitions and other meaningful situations.

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1. Results from SPSS for the Independent samples T test, Non parametric test and Pearsons Correlation tests are

   included in appendix 3.4 to 3.14. [↑](#footnote-ref-1)