An Investigation into the Nature of Psychological Resilience in Junior Athletes

Hollie Elizabeth Fountain

May 2017

Abstract

Psychological resilience has been described as a multidimensional, context specific concept, and has been defined in numerous ways that attempt to encapsulate the *process* by which individuals positively adapt following stress or significant adversity. Research within competitive sport has highlighted several components that influence this process, which include; meta-cognitions and challenge appraisals, coping strategies, personal risk and protective factors, and sociocultural influences (Brown et al., 2015; Galli & Vealey, 2008; Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014a). Significantly, resilience is described as a dynamic process that is developed through exposure to challenge within the competitive environment (Galli & Vealey, 2008); however, little is known about the nature of psychological resilience at a junior level. The understanding of how resilience is conceptualised at this level is important as this knowledge can help to foster the appropriate protective and promotive factors required to thrive in a competitive junior environment, and best equip athletes for future periods of unrest.

The aims of the current research program were to investigate the nature of psychological resilience within a junior sport context, and to explore appropriate measures or methodological approaches by which to achieve this. To achieve these, eight research objectives are presented. To address these objectives, five research investigations were proposed:

Study 1. This study aimed to explore the psychometric qualities of the original 25-item CD-RISC (Connor & Davidson, 2003) amongst a sample of junior athletes. Three hundred and forty seven athletes (*M* age=15.42, *SD*=1.72) completed the original CD-RISC questionnaire. Participants represented a range of individual and team sports. Internal consistency and factor structure were analysed using confirmatory factor analysis (CFA) and exploratory factor analyses (EFA). CFAs did not support the original 5-factor or unitary factor structure of the 25-item CD-RISC, but did support a unidimensional shortened 10-item measure (Cambell-Sills & Stein, 2007). Subsequently, an EFA and CFA also supported a valid and reliable 2-factor sport specific version of the CD-RISC, which was favoured based on stronger conceptual and theoretical support. This study supports the contention that resilience is not consistent across all populations and context specific measures may be required e.g., sport specific. The emergent 2-factor measurement model suggests an underlying structure of resilience in sport that represents an individual's *control through adversity* and *growth mindset.*

Study 2. The aim of this study was to explore the nature of resilience within junior sport, with a specific focus on sport type, gender and age differences, and the association between resilience and sensation seeking characteristics. Participants completed the modified version of the CD-RISC, which emerged in the previous study and the Brief Sensation Seeking Scale (BSSS; Hoyle at al., 2002), which measures dispositional risk taking behaviours. The results suggested that male and team athletes have significantly higher resilience scores than their female and individual sport counterparts. In general, protective factors associated with resilience positively relate to sensation seeking characteristics. Specifically, feelings relating to 'control through adversity' more broadly relate to tendencies leading to greater risk exposure. These findings may suggest that those with a greater perception of control take more calculated risks and set goals that are more challenging. This may offer the opportunity to increase personal mastery through developed interpersonal relations, emotional expression, problem solving skills and coping resources. Nevertheless, our understanding of resilience seems limited by the capacity of a psychometric questionnaire to encapsulate such a complex construct.

Study 3. This study aimed to provide a review of the literature concerning resilience in athletes, with a specific focus on identifying the differing methodological approaches to examine the nature of the construct in sport. Fourteen research articles that attempted to directly measure psychological resilience with an athlete sample were identified using both quantitative (n=8) and qualitative (n=6) approaches. Quantitative research has increased conceptual understanding of resilience in sport, relating to its positive associations with similar constructs (e.g., mental toughness), and its moderation qualities. This approach permits statistical analyses to track development, however is unlikely to offer sufficient depth to understanding given the complexities surrounding both the construct of psychological resilience and the nature of an elite sporting environment. Qualitative studies have helped to develop theoretical understanding of psychological resilience amongst athletes through adopting phenomenological methodologies, however, the application of knowledge relies on user generalisability alone and does not offer an objective measure of the construct. The review proposes an exploration of novel methodological approaches that consider the positive elements of both qualitative and quantitative research, but does not consolidate their pitfalls.

Study 4. The purpose of this study was to develop a novel tool to measure psychological resilience using a Q-method approach. Specifically, this study aimed to construct a Q-set, by identifying the subjective viewpoints of junior rugby league players, associated with how they would respond to stress or adversity and their perceptions of the

resilience process. Twenty-nine junior rugby league players (aged 13-14) were recruited to take part in one of two focus groups designed to generate statements relating to responses to adversity. Thirty statements emerged following inductive thematic analysis, and were retained for the Q-set. There are commonalities between these statements and characteristics of theoretical models and previous research concerning psychological resilience in sport.

Study 5. The purpose of this study was to use the Q-set developed in the previous study to explore the nature of psychological resilience in the context of junior Rugby League, using a novel Q-sort method. Sixty junior rugby league players (aged 13-14) completed a standard Q-sort protocol, ranking the previously developed 30-item Q-set using a fixed quasi normal distribution, with anchors of +5 (most like me) to -5 (least like me). PQ Method statistical analysis software was used to analyse the data. Principle component analysis with varimax rotation identified four distinct subgroups that explained 72% of the total variance. These groups were distinguished through patterns relating to: social support, emotional control, unpleasant emotions, personal resources, and cognitive strategies. Shared qualities across the four subgroups were also identified, and included low ratings for evasion strategies, and seeking support, whilst generally high ratings for perseverance. The results from this study showed that junior rugby league players display a range of psychological responses when experiencing adversity and four subgroups with both defining and shared characteristics emerged. This study provides preliminary evidence for the potential usefulness of a Q-method approach for understanding the process of resilience in junior sport. Q-methodology provides an alternative to previous research designs attempting to understand the nature of resilience, and offers an engaging activity to participants, encouraging analytical reflections of their experiences.

In summary, the data collected within the current research program has presented an original contribution to knowledge concerning the nature of psychological resilience in junior sport. The thesis has delivered the first study of its kind, by employing Q-methodology to understand psychological resilience, revealing previously untapped complexities associated with the construct. This approach offers future researchers and practitioners the depth of insight and level of objectivity associated with qualitative and quantitative measures respectively, and recommends this as a viable alternative to psychometric measures of resilience.

Presentations and Publications Generated by this Research

Fountain, H. E., Martindale, R. J. J., Lafferty, M. E., & Westbury, T. (2016). Exploring the nature of resilience in junior athletes. Poster session presented at BASES Conference 2016, Nottingham – Programme and Abstracts, *Journal of Sport Sciences*, 34: sup1, i-s85, doi:10.1080/02640414.2016.1260807

Fountain, H. E., Martindale, R. J. J., Lafferty, M. E., & Westbury, T. (2016). Exploring the nature of resilience in junior athletes: A Q-method approach. Poster session presented at the meeting of the Division of Sport and Exercise Psychology (DSEP), British Psychological Society (BPS), Cardiff.

Author Declaration

Edinburgh Napier University, November 2016

I hereby declare that:

a) I have composed this thesis,

b) This thesis is my own work, and

c) This work has not been submitted for any other degree or professional qualification except as specified

Hollie E. Fountain

Acknowledgements

First, I would like to sincerely thank Russell Martindale, my director of studies, for the unparalleled support, guidance, and confidence he has provided me with throughout my time at Napier. Thanks for keeping me going, for knowing all my faults, and for helping me bring out the best in my work.

My thanks also go to Moira Lafferty, my supervisor, for guiding and encouraging me, and for not despairing with my obvious lack of focus! Without you, these pages would have been very different. I would also like to acknowledge Carmel Triggs for supporting me through the early stages of this thesis, and Tony Westbury who helps me more than he knows.

I would like to thank my colleagues and friends for their encouragement, for sharing their experiences with me, and for giving me strength- you know who you are! With a special thanks to Heather for making this journey a little less lonely.

I will forever be thankful to my parents for always believing in me, and for their unconditional support- I am proud to be your daughter.

Finally, Jon- I could not have done this without you. Thanks to you, Bruce and Loki for being by my side throughout everything.

Table of Contents

List of Figures

List of Tables

Chapter 1

Introduction

The study of human behaviour and underlying psychological processes in the face of challenging situations or severe trauma has been of increasing interest to researchers over the last few decades (Wagstaff, Sarkar, Davidson, & Fletcher, 2016). Psychological resilience is commonly considered to be a fundamental requisite to positive adaptations under such conditions (Simpson & Jones, 2013; Windle, 2011), and by understanding this concept, developmental frameworks to foster resilience can be explored (e.g., Fergus & Zimmerman, 2005).

There are numerous terms that refer to constructs closely related to psychological resilience, but which are inherently different, causing problems with conceptual clarity within the area (Fletcher & Sarkar, 2013). The most common of these are 'mental toughness', 'coping' and 'hardiness' which each describe qualities that protect against the negative effects of stress in sport. In brief, coping refers to strategies or efforts made to overcome stress or adversity following appraisal (Lazarus & Folkman, 1984), whereas psychological resilience influences the initial appraisal of the challenging event (Fletcher & Sarkar, 2013). Mental toughness and hardiness refer to dispositional qualities or personal protective factors that can be present despite an encounter with adversity (Gucciardi, Gordon, & Dimmock, 2009), whereas the stressor or challenge plays a vital role in the process of psychological resilience (Sarkar & Fletcher, 2014). Overall, psychological resilience refers to more of a global process, where an individual who is good at coping, and is considered a mentally tough or hardy person, is likely to be resilient in the face of adversity. Conversely, because of the complexities of engaging with and negotiating challenge which go beyond the three alternative constructs outlined above, not everyone who is psychologically resilient would rely these characteristics, and instead may show other behaviours and metacognitions akin to positive adaptation. Psychological resilience is contextualised within a sport context below, and the conceptual overlap is discussed in detail in section 2.2 of this thesis.

The concept of psychological resilience has been explored within a number of different populations, including; clinical patients (Hou, Law, Yin, & Fu, 2010; Yi, Vitaliano, Smith, Yi, & Weinger, 2008), victims of humanitarian or environmental crisis (Riolli, Savicki, & Cepani, 2002; Stratta et al., 2013), the military (Masten, 2013), and

those experiencing abuse (Gonzales, Chonister, Linville, & Knoble, 2012). Considering the extensive pressures and challenges faced by competitive athletes from numerous sources, there has also been a growing body of research concerning psychological resilience amongst this population, in an attempt to distinguish the processes which define how an individual develops on route to success or failure (Brown, Lafferty, & Triggs, 2015; Cowden, Mayer-Weitz, & Asante, 2016; Fletcher & Sarkar, 2012; Galli & Vealey, 2008; Martin-Krumm, Sarrazin, Peterson, & Famose, 2003; Sarkar & Fletcher, 2014b).

1.1 Conceptualisations of resilience

Media reports of 'resilient athletes' are plentiful, and coverage relating to athletes overcoming the odds to emerge victoriously offer the general public insight into the arduous nature of competitive sport and the characteristics associated with excellence. Two such examples that have graced the world's media in this Olympic year (2016) are the stories of professional athletes Gordon Reid and Kendra Harrison. Reid, from Scotland, had been involved in the sport of tennis since he was six years of age and was described as a "fit and keen tennis player" (http://paulregan.org/promotion/our-athletes-and-clients/gordon-reid/). At age 14, he contracted a rare neurological disorder (Transverse Myelitis) which causes inflammatory attacks on the central nervous system (http://www.myelitis.org.uk/). This significant adversity resulted in paraplegia, and unsurprisingly caused considerable changes to Reid's life. Nevertheless, only two years following his illness, Reid was chosen to represent Team GB at the Beijing Paralympic games in wheelchair tennis, aged 16. He is currently the reigning Wimbledon, Australian Open, and Olympic men's wheelchair singles champion, and holds the number one ranking in the world for both singles and doubles.

Kendra Harrison is an American athlete who, on the 22nd of July 2016 at the London Anniversary Games, became the World record holder of the 100m track hurdles in a time of 12.20, toppling a record that had stood for 28 years. Exactly two weeks earlier, Harrison had competed in the US Olympic team trials, finishing in sixth, missing the opportunity to represent her country. The unanticipated outcome of the trials, and the astonishing world record that followed, have raised questions about the efficacy of team USA's strategy for selecting teams, and the intensity of pressure placed on athletes at such an event. Regardless of the political viewpoints, Kendra Harrison is a worthy example of an athlete who has persevered through significant setbacks to overcome the odds and whose performance has blossomed.

These accounts offer heart-warming and inspiring descriptions of those whose lives could seemingly have taken very different trajectories. Nevertheless, by labelling individuals as 'resilient' because of their seemingly positive response to challenge, the conceptualisation of the construct aligns only with an *outcome* or *trait* approach. This has the potential to over simplify their experiences, and does not consider the conceptualisation of resilience as a *process*. The following sections have outlined these differing conceptualisations.

1.1.1 Resilience as an outcome.

When resilience is characterised as an outcome of adaptation, this refers to "particular patterns of functional behaviour despite risk" (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003, p.2). Numerous psychosocial outcomes have been associated with resilience, including social competence (Byrne et al., 1986), psychiatric symptoms (Cambell-Sills, Cohen, & Stein, 2006), and life satisfaction (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Nevertheless, there has been considerable criticism of the conceptualisation of psychological resilience as an outcome, because of the large number of possible outcome variables that constitute positive adaptation, and thus its resultant definitional ambiguity (Olsson et al., 2003). In addition, instances of outcomes that do not always align with positive adaptation have emerged within the literature. For example, maintenance of emotional well-being has been considered a marker of psychological resilience. Research has suggested that individuals who appear to function better following stressful events also demonstrate higher levels of emotional distress (Luthar, Doernberger, & Zigler, 1993). Indeed, it is unlikely that individuals facing negative events will be entirely safeguarded from experiencing any negative emotions, or is able to rapidly adapt to these emotions in a positive manner. Instead, emotional distress may be considered to be more of an indicator of highly demanding or stressful events (Olsson et al., 2003), with Garmezy (1991) suggesting that instead resilience should be conceptualised as "the maintenance of competent functioning despite interfering emotionality" (p.463).

Consequently, although positive outcomes appear to be an important consideration of the resilience construct, specific adaptations alone are unlikely to provide the depth of understanding required to fully encapsulate the resilience of competitive athletes (Olsson et al., 2003).

1.1.2 Resilience as a trait.

The conceptualisation of resilience as a trait suggests that success or failure following challenge can be defined by a person's disposition or inherent qualities. This approach was described by Rutter (1987) as "the positive role of individual differences in people's response to stress and adversity" (p.316). These individual differences relate to the characteristics that protect an individual from the negative effects of stress, and promote positive adaptation (Garmezy, Masten, & Tellegen, 1984). Understanding the permutations of what are commonly referred to as 'protective factors' has been a major interest of researchers seeking to determine the personal characteristics that distinguish resilient individuals from those who struggle to adapt following exposure to significant challenge (Bonanno, Galea, Bucciarelli, & Vlahov, 2007; Luthar, 2006).

Conceptualising resilience as a trait can however be problematic as the interaction between individuals' protective factors and their vulnerability qualities, and their dynamic nature is often overlooked. Specifically, a trait approach does not consider the role of the specific adversity encountered in the recovery process (Fletcher & Sarkar, 2013a), and neglects to explain how, on one occasion, a person may respond positively to an adversity or challenge, but respond differently to others (Davydov, Stewart, Ritchie, & Chaudieu, 2010; Rutter, 1981). Instead by combining what is understood by resilience as both an outcome (positive adaptation) and trait (protective factors), with challenge or adversity in specific contexts, one can begin to appreciate resilience as an interactive process by which situational and personal aspects moderate positive adaptation and development (Truffino, 2010).

1.1.3 Resilience as a process.

Resilience has also be conceived as a process, with Richardson (2002) describing the construct as "the process of coping with adversity, change, or opportunity in a manner that results in the identification, fortification, and enrichment of resilient qualities or protective factors" (p. 308). The conceptualisation of resilience as a process, encapsulates the dynamic and interactional nature of resilience not afforded by trait or outcome approaches (Luthar, Cicchetti, & Becker, 2000). Most importantly the characterisation as a process considers how resilience develops over time, modifying the potential impact of future exposure to risk or challenge (Olsson et al., 2003; Richardson, 2002; Rutter, 1999), ultimately increasing an individual's capacity to maintain their previous or a superior level of functioning (Carver, 1998).

In their reference to resilience as a "dynamic process encompassing positive adaptation within the context of significant adversity" (p. 543), Luthar et al. (2000) make it clear that the context in which the adversity occurs plays an important role in an individual's reaction. Within the sporting literature, Fletcher and Sarkar (2012) have most recently defined resilience as "the role of mental processes and behaviour in promoting personal assets and protecting an individual from the potential negative effect of stressors" (p. 675). This encapsulates the 'trait' conceptualisation of resilience by incorporating personal characteristics of mental processes and behaviour. Nevertheless, by considering their role in promoting personal assets the importance of these elements goes beyond their mere existence, and is suggestive of their functional relevance or interactions in a process of resilience (Fletcher & Sarkar, 2013). Whilst these different approaches have been acknowledged, it is important to identify to which one researchers are aligned, as this undoubtedly shapes the research design, and ultimately the impact of potential findings.

1.2 Understanding the role of challenge during athlete development

Within each of the above conceptualisations of psychological resilience, the role of challenge is a key component. Within the literature, there is considerable debate about the nature of challenge, and how this affects athlete development. There are a large number of potential challenges that a young athlete might experience. Within the literature, research commonly refers to these as; trauma (Collins & MacNamara, 2012), stressors (Sarkar & Fletcher, 2014), or risk and adversity (Galli & Vealey, 2008; Luthar & Cicchetti, 2000), which are commonly used in an interchangeable manner. In the context of psychology, trauma can be defined as "naturally occurring life stressors", which can include extraneous pressures both in and out of sport, injury, and developmental challenges (Collins & MacNamara, 2012, p.907), whereas adversity can be simply defined as "a difficult or unpleasant situation" (The Oxford English Dictionary, 2013). In addition, stressors are considered environmental, physical or psychological sources that cause individuals stress through a perceived imbalance of personal resources, and can include: competitive, organisational, and personal stressors (Sarkar & Fletcher, 2014) as well as trauma and abuse (Clauss-Ehlers, Yang, & Chen, 2008).

It is important to consider the impact of challenges that go beyond competition within the context of long-term athlete development. In particular, the biopsychosocial model of child and adolescent development recognises adolescents need to cope with the demands of psychological (cognitive and emotional), biological, and social challenges during this time (Cicchetti & Rogosch, 2002; Sales & Irwin, 2013). For most junior athletes, these challenges are faced both within and outside of a sporting context. Social challenges may include those related to peer relationships, and changes in family

relationships as an athlete becomes more independent, but may also include challenges such as socioeconomic status and where they live. Biological challenges might include rapid physiological change (Sales & Irwin, 2009), and for some their body shape (or body dissatisfaction) may even inadvertently constitute trauma throughout adolescence. Finally, psychological challenges such as cognitive and emotional maturation, self-esteem, and coping skills also have the potential to create turmoil for an athlete. The complex and integrative nature of these challenges are reviewed in detail in the context of adolescent sport in section 2.5.

The similarities or differences between the meanings of the terms relating to challenge are not often recognised, and where referred to in the current thesis relates to an experience appraised by an individual as difficult or challenging, where efforts must be made to overcome it. As well as the numerous terms used, there are various approaches to understanding the role of challenge/adversity during development, which have been succinctly reviewed by Collins, MacNamara, and McCarthy (2016) and are summarised below.

Duckworth, Peterson, Matthews, and Kelly (2007) suggest that it is individual differences or attitudes that help to predict success over a number of vocations. The most prominent attitude shared across these different domains is 'grit', which can be defined as "perseverance and passion for long-term goals" (Duckworth et al., 2007, p.1087). Grit is characterised by working hard over long periods to approach challenges with both effort and interest despite adversity or failure. In their study on the success rates of military cadets, Duckworth et al. (2007) found that grit predicted the successful completion of a rigorous training programme, over other attributes such as physical and academic aptitude, or personality factors. This approach to understanding challenge suggests that there are personal qualities (e.g., grit) that an athlete 'brings' to a challenge that ultimately shapes their subsequent development and success.

Another similar approach to understanding the role of challenge in athlete development is a skills approach, which suggests that rather than personal attributes/attitudes, it is the psychological skills of an individual that predicts development following challenges. Examples of these skills that support successful progression include; self-regulation (Toering, Elferink-Gemser, Jordet, & Visscher, 2009), psycho-behavioural and coping skills (Collins et al., 2016). This approach suggests that developing athletes should be taught these skills, which are further refined by supporting the athlete through, and reflecting on, challenges (MacNamara, Button, & Collins, 2010).

The life experience approach takes a slightly different stance, and suggests that the *process* of negotiating expected or unexpected challenges has the greatest impact on positive development (Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014). This perspective is supported

by numerous retrospective qualitative studies with successful athletes, which show that experiencing 'impactful trauma' or challenges in sport has been critical to their success and development (Howells & Fletcher, 2015; Rees et al., 2013; Sarkar, Fletcher, & Brown, 2015). This perspective is not without criticisms, in particular, Collins et al. (2016) raise a concern about the nature of the challenge (i.e., the strength, duration and type of stressor encountered), and suggest that this is a potentially problematic view given the lack of differentiation between the different types of challenge. Nevertheless, a positive characteristic of employing this approach is the emphasis on the integrative processes that help to understand or explain concepts such as psychological resilience. This highlights resilience as a 'layered' process, as opposed to a stand-alone construct, by means of alternative constructs occurring in parallel to one another (e.g., individual's characteristics/skills, experiences, environmental, and social components) which ultimately leads to positive adaptation (Fletcher & Sarkar, 2012; Galli & Vealey, 2008; Walsh, 1996). Consequently, this is a perspective adopted by the majority of researchers interested in the study of psychological resilience in athletes.

In addition to those reviewed by Collins et al. (2016), Jones, Meijen, McCarthy, and Sheffield (2009) offer an alternative approach to understanding the role of challenge specifically within athletic competition. Within their literature review Jones et al. (2009) draw upon the biopsychosocial (BPS) model of challenge and threat (Blascovich & Mendes, 2000), the model of adaptive approaches to competition (Skinner & Brewer, 2004), and other relevant sporting literature in the development of the Theory of Challenge and Threat States in Athletes (TCTSA). The TCTSA poses that "athletes' psychophysiological states before competition will predict, at least partly, performance levels in competition" (Jones et al., 2008, p.3). Specifically, those athletes who appraise athletic competition as a challenge (through consideration of cognitive, affective, and physiological components) will respond positively, and those who perceive the competition as a threat will respond negatively. This approach suggests that it is the 'challenge state' or 'threat state' involving perceptions of self-efficacy, control, and goal orientations, as well as emotional states and cardiovascular response patterns, that define athlete development following a stressful or challenging event.

1.3 Reported versus actual growth

One key issue to consider when reviewing the literature concerning athletes experiences of challenge or trauma, are the differences between participants reported growth and their actual growth. It is worth raising caution to the reader in relation to numerous studies (e.g., Fletcher & Sarkar, 2012; Galli & Vealey, 2008; Howells & Fletcher, 2015) that recruit only extremely successful athletes (e.g., Olympic medal

winners). As within these mostly qualitative studies, it would not be easy to admit or demonstrate that an individual did not somehow grow from a traumatic experience or challenge. Additionally, qualitative data from athletes who dropped out are often not considered, making the differences between reported (subjective perception of growth) and actual (objective positive changes) growth difficult to test.

The literature seems to support this. In their review on post-traumatic growth, Cho and Park (2013) indicated that growth from stressful events has been reported by the majority in several populations and across various cultures (values over 50%). A proposed reason for this is that studies have measured self-reported growth, which not necessarily the same as actual growth. Therefore, it has been suggested that researchers may need to distinguish between reported and actual growth following stressful events.

Given as only a few studies have examined both actual and reported growth (e.g., Frazier et al., 2009; Yanez, Stanton, Hoyt, Tennen, & Lechner, 2011), and that these studies provide interesting if inconclusive results, many methodological issues remain unsolved, and many questions concerning growth following stressful events remain unanswered (Cho & Park, 2013). Therefore, the caution for the reader when reviewing papers where the sole focus is on individual retrospective resilience data (particularly with those deemed highly successful) is that personal experiences of challenge are very individual and it is difficult to justify using this as general recommendations for those looking to develop resilience. Instead, it may be more important to take into consideration the experience of those on the 'journey' to success reflecting on experiences where one might have 'succeeded' to different degrees.

1.4 Statement of the problem

The career of an elite athlete is full of a range of different pressures and stressful instances, which have the potential to define their future success or failure (Arnold & Fletcher, 2012; Mellalieu, Neil, Hanton, & Fletcher, 2009; Thelwell, Weston, & Greenlees, 2007). There has been a change in focus from viewing critical events as having a specific negative effect on an athlete's career, to adversity as an opportunity for athlete's growth and development (Howells & Fletcher, 2015; Tamminen, Holt, & Neely, 2013). As a response, there has been increasing trend amongst sport psychology researchers wishing to understand the process of resilience for competitive athletes on both an individual and a team level (Brown et al., 2015; Galli & Vealey, 2008; Morgan, Fletcher, & Sarkar, 2014; Mummery, Schofield, & Perry, 2004; Secades et al., 2016; White & Bennie, 2015).

Within this thesis, resilience was generally conceptualised as the process by which personal protective factors and sociocultural influences interact with the circumstances within which adversity occurs, resulting in positive adaptation. It is suggested that this dynamic construct is developmental in nature, and that exposure to risk or challenge in sport can increase personal assets, skills or resources associated with positive outcomes (Bonanno, Westphal, & Mancini, 2011; Collins & MacNamara, 2012). Interestingly, aside from a single qualitative research article aiming to investigate athlete and coach perceptions of how resilience can be developed through gymnastics participation (White & Bennie, 2015), there has been little interest within the research to date concerning how psychological resilience is operationalised within a junior athlete context with developing athletes. Exploring this will allow both practitioners and researchers to understand the nature of resilience prior to the full exposure to the stressors and challenges inherent within the elite adult environment. Such an inquiry will also help to identify the protective and vulnerability factors that require development within this phase, helping to design interventions aiming to equip young athletes with the skills or resources required to get to, and succeed at an elite level.

In addition to the limited attention received concerning psychological resilience within a junior sport context, a number of problems associated with the measurement of construct have been identified (Sarkar & Fletcher, 2013). As a sport specific questionnaire aiming to measure psychological resilience in athletes has not yet been developed, previous research has been reliant upon existing measures developed in different contexts (e.g., Secades et al., 2016). Nevertheless, the context specific nature of psychological resilience (Luthar & Cicchetti, 2000), means that utilising psychometric questionnaires developed outside of a sporting context may be problematic. Whilst generally unfruitful attempts have been made by some to confirm the factor structure of existing measures (Gonzalez, Moore, Newton, & Galli, 2016; Gucciardi, Jackson, Coulter, & Mallett, 2011), none have endeavoured to *explore* emergent structures of such scales within sport.

Additionally, a number of qualitative approaches to exploring resilience amongst athletes have offered depth to our understanding (e.g., Galli & Vealey, 2008), however, these studies are not without their own inherent problems. For example, issues associated to limited generalisability constrains what we understand of the construct to the single individuals studied. There is a clear need to explore innovative research designs that go beyond a solely qualitative or quantitative approach, and that permit a holistic understanding of how psychological resilience operationalises and develops in athletes, but can also generalised to a wider population of athletes.

9

1.5 Aims of the thesis

With psychological resilience deemed by many researchers to be a pre-requisite for sporting excellence (Wagstaff et al., 2016; Holt & Dunn, 2004), the importance of understanding the construct is clear. With a comparative dearth of literature aiming to understand the nature of resilience in an adolescent phase in athletes' careers or evidencing how it is developed through this stage, there is an obvious need to explore how resilience operationalises at a junior level. In response, the current research program sought to address the following aims:

1. To investigate the nature of psychological resilience within a junior sport context.
2. To explore appropriate measures or methodological approaches by which to examine resilience in junior athletes.

1.6 Objectives of the thesis

The aims of the thesis were achieved by targeting the following objectives. Specifically Aim 1 was achieved through Objectives 1, 3, 5, 7 and 8, and Aim 2 was achieved by meeting Objectives 1, 2, 4, and 6.

1. To review and highlight gaps within the literature concerning the nature of psychological resilience in junior athletes
2. To explore the validity and dimensionality of the original Connor Davidson Resilience Scale CD-RISC (Connor & Davidson, 2003) amongst a sample of junior athletes
3. To explore the nature of resilience and challenge seeking in junior athletes using an appropriate quantitative scale
4. To review current approaches to the assessment of psychological resilience in athletes
5. To gather subjective viewpoints of junior athletes, representing their perceptions of how they might respond when faced with stress or adversity
6. To explore an alternative, novel approach to stimulate the understanding of psychological resilience within a junior setting
7. To explore junior athletes' perceptions of their own protective and/or vulnerability qualities and their effectiveness in the resilience process
8. To examine how responses to adversity interact and group junior athletes

1.7 Overview of the research program

The current research program includes seven chapters subsequent to this introduction, which address all of the objectives outlined above.

Within Chapter 2, Objective 1 was achieved through a theoretical and empirical overview of the current literature concerning psychological resilience in athletes, aligning with both aims of the thesis. Literature from both within and outside of a sporting context were considered for review. Current understanding of the processes and characteristics of psychological resilience, and the approaches or methods employed were of major interest in this chapter

This chapter offers conceptual clarity and outlines the existing models concerning resilience in athletes. A critical review of this information and the empirical evidence offered by the literature highlighted two clear gaps in previous research: 1) the limited knowledge concerning psychological resilience in a junior sport setting, and 2) measurement issues associated with the study of resilience. These gaps form the basis of the five studies that followed, further targeting both aims of the thesis, and has facilitated their original contribution to knowledge within the area.

Given the context specific nature of psychological resilience, and the lack of a sport specific measure developed for use with athletes, within Chapter 3 the psychometric properties of the original 25-item CD-RISC (Connor & Davidson, 2003) is explored with a sample of junior athletes. Akin to other research using sporting samples (Gonzalez et al., 2016; Gucciardi et al., 2011), it was first considered if the original and abridged factor structures, at both a unidimensional and a multidimensional level, could be confirmed with data collected with junior athletes. Within Chapter 3, an original contribution to the literature is also offered by exploring and confirming an underlying factor structure of the CD-RISC when employed with junior athletes. Within this chapter the author addressed Aim 2 of this thesis (t*o explore appropriate measures or methodological approaches by which to examine resilience in junior athletes*), by achieving Objective 2. Specifically this accomplished by:

- Exploring the structural validity of the originally proposed multidimensional 5-factor model using the 25-item CD-RISC amongst a sample of junior athletes
- Exploring the unidimensional and multidimensional factor structure of the CD-RISC
- Permitting an emergent factor structure that offers new information concerning the dimensional nature of resilience in a junior sample

- Comparing the quality of a priori and emergent models of the CD-RISC when used with a sample of junior athletes.

Within Chapter 4, the author addressed Aim 1 of this thesis (t*o investigate the nature of psychological resilience within a junior sport context*). This was achieved through Objective 3, by employing the modified version of the CD-RISC, which emerged in the previous study. This appropriate quantitative measure was used to explore any differences in characteristics associated with resilience across gender, age, and sport type (team or individual) in a sample of junior athletes. Additionally, as the nature of challenge in sport has been distinguished from that experienced in other contexts by the fact that athletes are considered to be active in seeking out inherently stressful environments (e.g., competitive sport; Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014b). This chapter adds to the previous literature by also assessing the association of resilience with dispositional risk taking behaviours, and the possible cyclical nature of risk seeking, challenge exposure and resilience development (Brief Sensation Seeking Scale; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002).

As a consequence of the findings that are revealed in Chapters 3 and 4, Chapter 5 provides a review of the literature to identify and critique the variety of methodological approaches that have been applied with athletes. This chapter was designed to target Aim 2 of this thesis. Specifically, a thorough systematic style review aimed to examine current approaches to assessment, and study how methodological approaches align with psychosocial features of psychological resilience (Objective 5). Within Chapter 5, the author identified and critiqued previous methodologies and offers some alternative techniques for collecting, collating, and analysing data in this area.

Subsequently, within Chapters 6 and 7 the author took a novel Q-method approach to understanding the nature of psychological resilience in junior rugby league players. This approach is an approach which, to date has not been used to assess psychological resilience (either within or outside of a sporting context), and has been employed on only a small number of occasions within the sporting literature to assess athlete-coach relations and perceptions of coach behaviours (e.g., Moen, 2014). This method provided an alternative to the current approaches to understanding psychological resilience in sport, and attempted to exploit its qualiquantilogical characteristics and enabled a holistic view of the construct. Specifically, within Chapter 6 the author targeted Aim 1 of this thesis, by gathering subjective viewpoints of junior athletes, representing their perceptions of how they might respond when faced with stress or adversity (Objective 5). Using the data from focus groups with junior rugby league players, the author sought to develop a Q-set of

appropriate statements reflecting these responses. The Q-set intended to be broadly representative of the junior players' experiences of challenge and resilience competitive sport, and was a central component of the tool. Within Chapter 7, both Aims 1 and 2 of this thesis were targeted. Using the Q-set developed in the previous chapter, three objectives were targeted to achieve these aims:

- Objective 6 was accomplished through deployment and critique of the use of Q-method within this context, with a focus on applied and research implications

- Objective 7 was achieved through gathering the subjective viewpoints among junior athletes about their resilience process, and identifying how junior athletes' perceive the effectiveness of their responses to adversity.

- Objective 8 was realised through examining how resilience operationalises, with shared and distinguishing characteristics of the players resilience processes grouping individuals within the sample

Within Chapter 8, the author presents the general discussion and conclusion of the program of research, highlighting key limitations, practical applications, and future recommendations.

Chapter 2

Theoretical and empirical overview

2.1 Introduction

In brief, within this chapter the aim was to review the current theoretical understanding of psychological resilience in sport, and critically review the empirical studies of the construct amongst athletes. This chapter specifically targets both thesis aims through reviewing and highlighting gaps within the research studying of the nature of psychological resilience in junior athletes (Objective 1). First, this overview gives a brief insight into the progression of research within the area, and offers some conceptual clarity concerning psychological resilience in sport, distinguishing the construct from other seemingly similar areas. Some of the key models from outside of the sporting literature that have shaped what is understood about resilience in sport, as well as those theories that have emerged within a sporting context have been outlined, with a particular focus on the conceptual model of sport resilience (Galli & Vealey, 2008) and the grounded theory of psychological resilience and optimal sports performance (Fletcher & Sarkar, 2012). Third, this review has incorporated an overview of previous empirical research and literature concerning psychological resilience, stress, and challenge in competitive adolescent sport.

2.2 Conceptual clarity

The term resilience can be literally interpreted as the elastic property of a substance or organ (Harriman, 1958), and its ability to resume to original shape after bending, stretching or compressing (Strümpfer, 1999). The Oxford English Dictionary (2013) offers two definitions, which encapsulate human, organisational, and structural properties:

1. The capacity to recover quickly from difficulties; toughness.
2. The ability of a substance or object to spring back into shape; elasticity.

Different types of resilience have been described and examined across research domains. These have included: seismic resilience (the ability of a structure or system to reduce/absorb seismic shock from earthquakes, and recover quickly; Bruneau et al., 2003), molecular resilience (the capacity of a molecule "to restore functionality after a mutational event"; Chaumot et al., 2012, p.12), and physical resilience ("the ability of the body to use physiological resources to build, maintain, and repair itself"; Resnick, Galik, Dorsey, Scheve, & Gutkin, 2011, p.644). Psychological resilience refers specifically to the mental processes or characteristics that effect cognition, emotions and behaviours following

stressful events (Windle, 2011). Nevertheless, due to the vast implications of psychological resilience research across a large number fields, including: education and child development (Engle, Castle, & Menon, 1996), health promotion (Blum, 1998), and sport (Galli & Vealey, 2008), there is no agreed conceptualisation of psychological resilience, and definitions described within such studies are often inconsistent.

Interest in psychological resilience evolved from psychiatric research attempting to detail the characteristics associated with invulnerability or invincibility in children (e.g., Anthony, 1974). These early investigations highlighted complex interactions between these invulnerable and vulnerable characteristics, and focussed on how the combination of biological, social, and psychological factors could predict an outcome in response to serious stress (Werner & Smith, 1982). In their early longitudinal study of 698 Hawaiian children, Werner and Smith (1982) found that those who were considered to be 'invulnerable' were more likely to live with families that had consistent and enforced rules, were more responsive in social situations. In addition, these children received more attention from others, were less likely to have spent prolonged periods without their mothers at an early age, and tended to be the first born within a family. The notion of invulnerability in this context has been heavily criticised, as there is no consideration of the relative nature of resistance to stress, dependant on both dispositional (constitutional) and environmental characteristics (Masten & Garmezy, 1985; Rutter, 1985). Instead, another wave of investigation became of interest, which sought to understand the effects of different types of negative life experiences on children, adolescents, and adults (Cohen & Hoberman, 1983; Goodyer, Kolvin, & Gatzanis, 1985; Rutter, 1971). In general, this wave of inquiry suggested that the broad range of negative experiences that are encountered throughout one's life differ in terms of their potential risk, and the cognitive, socio-emotional, and behavioural development they provide for individuals (Rutter, 1985).

As a response to these early approaches, research then began to shift towards seeking to understand individual differences in terms of peoples' specific competencies that protect them from the negative consequences of risk, often termed 'protective factors' (Rutter, 1987). The understanding of how the interactions between these protective factors and a challenging life event can facilitate positive adaptation is what is now considered the process of resilience (Dyer & McGuinness, 1996).

However, due to the differences in individual researcher's conceptualisations of resilience as either outcome, trait or process, and the "contextual specificity of resilience", researchers across domains have continually offered alternative definitions to explain the construct (Fletcher & Sarkar, 2012, p.670). Within sport in particular, misinterpretations

can occur when considering phenomena like mental toughness or posttraumatic growth, and other components that underpin high-level performance or functioning like coping or hardiness (Olsson et al., 2003).

2.2.1 Psychological resilience defined.

A familiar definition within psychiatry and psychology papers is that of Garmezy (1991, p.463), whom describes resilience as: "functional adequacy… (the maintenance of competent functioning despite interfering emotionality)… as the benchmark of resilient behaviour under stress". Nevertheless, numerous authors have challenged this definition and suggested that returning to a previous level of functioning does not distinguish the concept of resilience from merely a resistance to illness or adaptation to stress (Carver, 1998; Masten, 2001; Smith et al., 2008). Carver (1998) proposed that a more adequate definition should reflect an individual's successful adaptation to stress resulting in a superior level of functioning.

With these differing conceptualisations, alongside the trait, outcome and process approaches to understanding the construct (discussed in the previous chapter), it is unsurprising that definitional and conceptual incongruence occurs within the literature. Despite this, there appears to be a growing consensus that two key features must be evident: adversity and positive adaptation (Fletcher & Sarkar, 2013; Wagstaff et al., 2016).

Based on these emerging commonalities within the literature, and their qualitative investigations into psychological resilience in an elite sporting context, Fletcher and Sarkar (2012, p.675; 2013a, p.16) have defined resilience as "the role of mental processes and behaviour in promoting personal assets and protecting an individual from the potential negative effect of stressors". This definition aims to capture both the 'trait' and 'process' conceptualisations of resilience, but also challenges the use of the term 'adversity' in previous definitions due to it negative connotations, and replaces this term with the more neutral 'stressors' (Wagstaff et al., 2016). This is an important alteration as adversity is generally associated with "negative life circumstances that are known to be statistically associated with adjustment difficulties" (Luthar & Cicchetti, 2000, p. 858), and, with research evidencing adversity as an opportunity for growth and development this is clearly not always the case (Fletcher & Sarkar, 2013; Neff & Broady, 2011). Fletcher and Sarkar (2012, 2013) instead state the "potential negative effect of stressors", emphasising the role of individuals' stress interpretation (i.e., potential effect) and expanding the process of resilience to include responses to minor challenges or hardships faced. Nevertheless, the

16

historical inconsistencies and debates, inherent in the study of such a comprehensive concept remain amongst sporting and adolescence literature.

2.2.2 Conceptual overlap

As previously mentioned, within the sporting literature there are a number of commonly used terms that refer to concepts related to the study of psychological resilience. For example mental toughness, coping, and hardiness are erroneously described as psychological resilience. Although each explain underlying characteristics or desirable qualities of elite athletes, it is important to differentiate between the meanings of these, as by targeting the development of their often subtle discrete differences, the desired outcome may not be achieved.

2.2.2.1 Resilience and coping.

Richardson (2002) define resilience as "the process of coping with stressors, adversity, change, or opportunity in a manner that results in the identification, fortification, and enrichment of resilient qualities or protective factors" (p. 308). This definition follows the traditional view of resilience that it is in itself is a successful way of coping with negative events or stressors (Leipold & Greve, 2009). Because of this, the terms coping and resilience are often used interchangeably, and there has been consistent confusion between these two concepts (Fletcher & Sarkar, 2013). Nevertheless, numerous authors are committed to evidencing their conceptual distinctions (e.g., Cambell-Sills et al., 2006; Fletcher & Sarkar, 2013).

Lazarus and Folkman (1984) define 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). Whereas, if one is to take the definition of resilience proposed by Windle (2011, p.12), one might consider emotional coping, or adaptive coping behaviours to be a single personal resource, which amongst other protective and vulnerability factors influences the resilience process:

> Resilience is the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma. Assets and resources within the individual, their life, and environment facilitate this capacity for adaptation and 'bouncing back' in the face of adversity. Across the life course, the experience of resilience will vary.

When viewed as a dynamic process, psychological resilience can be explained as the interaction between risk appraisal, protective coping styles, and situational/external

characteristics that influences the stress process (Cambell-Sills et al., 2006; Fletcher & Sarkar, 2013). To simplify, individuals who possess personal protective characteristics associated with resilience are less likely to appraise a challenging event as stressful, which ultimately guides the subsequent coping behaviours. In their study with elite athletes, Galli and Vealey (2008) determined that athletes use a range of different emotional and behavioural coping strategies in response to a process of agitation whereby one experiences mental struggles and unpleasant emotions. These coping strategies help to define the positive outcomes (well-being and performance) and subsequently affect the personal growth and development of athletes when facing adversity (Galli & Vealey, 2008).

Another key difference between coping and psychological resilience highlighted by Fletcher and Sarkar (2013) is that by definition resilience is associated with positive outcomes or adaptations, whereas coping strategies can be either positive/adaptive or negative/maladaptive. Importantly, it is the appraisal of a stressor, which is shaped by resilience factors (e.g., self-esteem, perceived support), that affects our coping response and its subsequent effectiveness.

2.2.2.2 Resilience and mental toughness.

Contemporary literature concerning mental toughness in sport has begun to refine the definitional features of the construct; however, an agreed definition has not yet been established (Tibbert, Andersen, & Morris, 2015). Indeed like psychological resilience, there has been similar debates over the dispositional (personality), outcome or process conceptualisation of the construct (Jones, Hanton, & Connaughton, 2002). Clough, Earle, and Sewell (2002) suggested four central components of mental toughness that have been consistently cited by subsequent authors (Gucciardi et al., 2009; Jones, Hanton, & Connaughton, 2007). These components represent positive personality attributes that enable athletes to successfully deal with difficult situations in sport, and consist of four C's: control (feeling influential within one's environment), commitment (being involved rather than isolated within a group), challenge (viewing events as challenging as opposed to threatening), and confidence (belief in one's ability to succeed). Jones et al. (2002, p. 273) attempted to refine these macro components, and identified three key outcome attributes of a mentally tough athlete that are underpinned by mental skills:

1) Having an unshakeable self-belief in your ability to achieve your competition goals
2) Bouncing back from performance setbacks due to increased determination to succeed

3) Having an unshakeable self-belief that you possess unique qualities and abilities that make you better than your opponents.

In their recent paper, Cowden et al. (2016, p.2) argue that the most noteworthy similarities between the concepts of psychological resilience and mental toughness is the "notion of effectively overcoming and dealing with pressure, challenges, and stressors". In addition, numerous authors have identified common themes that are resembled within both constructs, such as optimism, positive personality, confidence, and achievement motivation (Clough et al., 2002; Fletcher & Sarkar, 2012; Nicholls, Polman, Levy, & Blackhouse, 2009). Because of this conceptual overlap, it is unsurprising that resilience has been proposed as a subcomponent of mental toughness (cf. Loehr, 1995), and has subsequently been included as a factor within mental toughness scales and models (e.g., the Cricket Mental Toughness Inventory; Gucciardi & Gordon, 2009).

One of the more obvious differences between mental toughness and psychological resilience is their differentiated association with adversity and stressful events. As previously stated, one of the key definitional qualities of resilience is 'adversity', and mainly applies to negative contexts where an individual is exposed to challenge or significant stress (Fletcher & Sarkar, 2013). Whereas mental toughness is also applicable within positive situations, enabling an individual to thrive when experiencing occasions perceived as 'positive pressure' (Gucciardi et al., 2009).

However, because mental toughness is mainly concerned with the personal attributes that lead to best performance irrespective of challenge or stress, it can also be considered to be maladaptive capacity or goal fixation that can be risky in situations such as injury recovery (Andersen, 2011). This might mean an individual possessing mental toughness qualities might ignore feelings of pain or not adhere to rehabilitation if it were thought to be getting in the way of competition goals (Mahoney, Gucciardi, Ntoumanis, & Mallett, 2014). On the other hand, psychological resilience is less likely associated with negative responses; as an ability to be adaptive, creative, and having a stronger sense of reality when experiencing adversity are key attributes with the resilience process (Lindström, 2001).

Finally, the key difference between the two concepts is that mental toughness describes a personal capacity to deal with stress or challenge in an effective manner, and to perform to the best of one's ability despite the circumstances (Gucciardi et al., 2009). Whilst resilience is associated with a more global process by which an individual negotiates the interactions between numerous protective and vulnerability factors which

are influenced on multiple levels (Cicchetti, 2010), and includes personal and "influential qualities from outside of the self" (e.g., community, family; Cowden et al., 2016, p.2).

2.2.2.3 Resilience and hardiness.

The term 'hardiness' is often used to describe the qualities possessed by individuals that maintain healthy functioning despite exposure to significant stress (Kobasa, 1979), and so, once again can cause confusion in terms of the level of differentiation from psychological resilience. Similarly to mental toughness, but unlike psychological resilience, hardiness is measured at an individual level, and is a personality characteristic which includes three inter-related stable tendencies or dispositions: commitment, control, and challenge (Kobasa, 1979). Hardiness is considered to have both cognitive and behavioural aspects which moderate the effects of stress on an individual (Beasley, Thompson, & Davidson, 2003), and has consistently shown positive associations with psychological resilience (Karamipour, Hejazi, & Yekta, 2015; Nezhad & Besharat, 2010). Similarly to mental toughness, hardiness can be considered an individual component or protective factor within the resilience process, but one that does not define successful adaptation in face of adversity alone. Once again, if an individual displays hardiness qualities this will likely facilitate psychological resilience, but, requires the consideration from other protective factors e.g., positive relations with others and social support, to explain the process more fully.

In light of reviewing the conceptualisations of psychological resilience alongside those of coping, mental toughness and hardiness, it has become clear that although efforts are not always made to refine the terms within the literature, there are some clear conceptual differences that warrant understanding. In summary, psychological resilience can be considered much more of a global process that is explanatory in nature, and which explains how an individual can successfully negotiate and adapt to manage stress (Windle, 2011). This means that other conceptually similar attributes can often be considered as key contributors to the global resilience process linking adversity to positive adaptation, but are distinctly different from adversity as they can also be displayed outside of this (e.g., without adversity or adaptation). These attributes include; mental toughness (Jones et al., 2002), coping (Gillespie, Chaboyer, & Wallis, 2007), hardiness (Kobasa, 1979), self-efficacy (Blum, 1998), self-determination and pro-social attitudes (Dyer & McGuiness, 1996), intelligence (Wolff, 1995), and communication skills (Werner, 1995). The following sections aimed to introduce how the interplay between these attributes is thought

to protect individuals from the negative effects of stress, and promote positive adaptation and personal development, by reviewing some relevant theories within the area.

2.3 General models of psychological resilience

In this section, a small number of relevant theories and models concerning the understanding of psychological resilience in adolescent sport have been presented. There are many of resilience theories that aim to explain the dynamic process of resilience, with most viewing resilience in a specific context e.g., the nursing model of resilience (Polk, 1997), the theory of risk and resilience factors in military families (Palmer, 2008), the adolescent resilience model (Haase, 2004) and the conceptual model of sport resilience (Galli & Vealey, 2008). There are also theories that attempt to explain resilience alongside other similar psychosocial constructs such as coping (Leipold & Greve, 2009) and burnout (Dunn, Iglewicz, & Moutier, 2008). In addition, there are models of psychological resilience that are more generic, and can be applied across contexts, such as the resiliency model (Richardson, Neiger, Jensen, & Kumpfer, 1990) and the metatheory of resilience and resiliency (Richardson, 2002), which have informed many of the more context specific theories (e.g., the conceptual model of sport resilience). These two general resilience theories are discussed in the subsequent section, followed by those specifically relevant to sporting populations.

2.3.1 The resiliency model.

Richardson et al. (1990), who attempted to capture how promoting resilient qualities rather than risk reduction efforts can be of more benefit in relation to health promotion, developed the resiliency model (Figure 2.1). In particular, Richardson et al. (1990) emphasise the value of what they term 'disruptive experiences' not only on an increase in abilities and competencies required to negotiate them, but also the perspective gained through the experience. The model constituted of a number of linked components, which aim to track an individual's path from psychological homeostasis (controlled/normal state) through the process of disruption and disorganisation to reintegration. Biopsychospiritual protective factors are required to maintain homeostasis and include biological coping factors such as health and fatigue, and psychospiritual protective processes like self-mastery and hardiness. Importantly, these protective processes mediate the interaction between an individual's coping strategy and the disruptive effect of the negative life events or stressor. If homeostasis is disrupted by this interaction, the person would enter the disorganisation state where they would begin develop new perspectives

21

and formulate resolutions to the imbalance in an attempt to regain their normal level of functioning.

Figure 2.1. The resiliency model (Richardson et al., 1990)
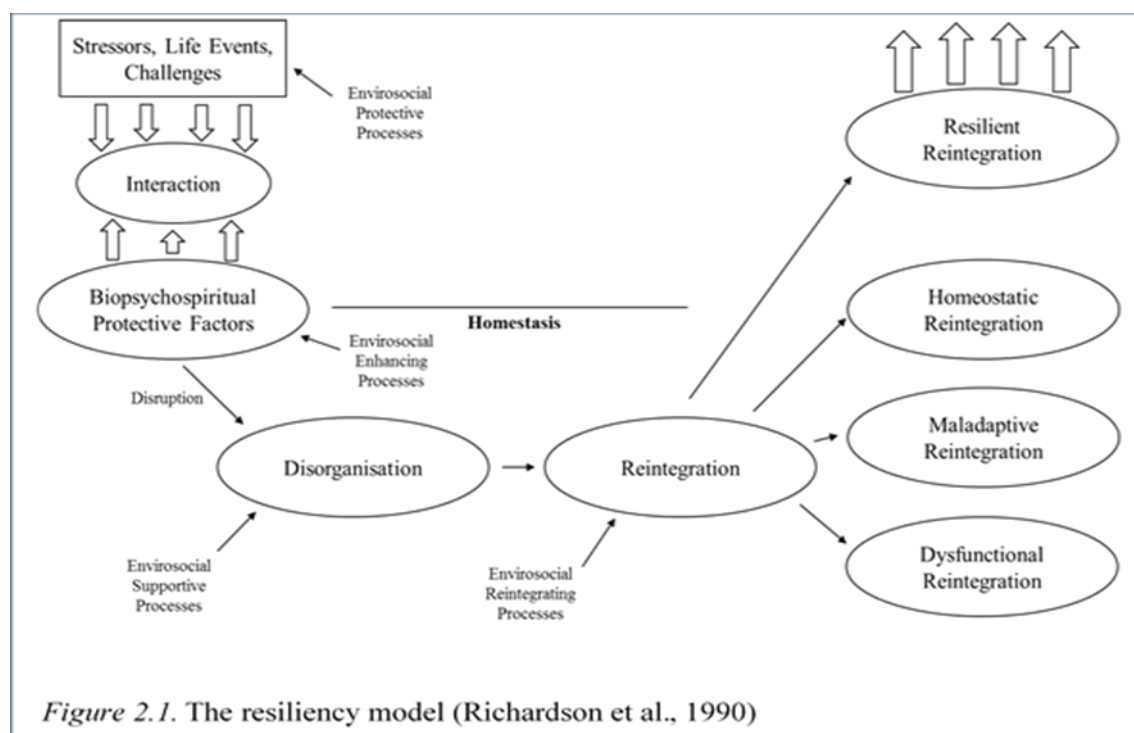
The model distinguishes four reintegration outcomes following stress experiences: dysfunctional reintegration (where an individual reintegrates via dysfunctional means e.g., drug taking), maladaptive reintegration (at a lower level of functioning than prior to the stress encounter e.g., lowered self-esteem), homeostatic reintegration (at the same level of functioning, with little or no learning), and resilient reintegration (at a higher level of functioning e.g., development of skills, self-awareness, and knowledge).

Richardson et al. (1990) developed the resiliency model for use in health promotion. Their guiding theoretical framework displays four points throughout the process whereby a practitioner could facilitate the acquisition of skills and characteristics required for resilient reintegration in the form of "envirosocial resiliency enhancing facilitators" (p.37). It is suggested that protective, enhancing, supportive, and reintegrative envirosocial processes should promote active learning and problem solving whilst avoiding overprotection.

The resiliency model has received support within the health promotion literature (Dunn, 1994; Neiger, 1991), and specifically, this model provided the framework for sport specific approaches, including the development of the conceptual model of sport resilience (Galli & Vealey, 2008) and athletes recovering from spinal cord injuries (Machida, Irwin, & Feltz, 2013). Fletcher and Sarkar (2013) are critical of the linear stage structure of the

model, in that it only accounts for an individual's experience of a singular event rather than the considering the more realistic negotiation processes of multiple stressors. In addition, the resiliency model has been challenged for its bias toward coping-orientated processes, particularly as there is an increasing body of research that maintains that resilience and coping be approached as different constructs (Campbell-Sills et al., 2006; Fletcher & Sarkar, 2013; VanVliet, 2008).

2.3.2 The metatheory of resilience and resiliency.

To explain how the resiliency model can be interpreted for future research and applied interventions, Richardson (2002) proposed that resilience should be examined using a three wave framework of inquiry. The first wave relates to the phenomenological description of resilience qualities an individual possesses (either internal or external to the individual) that protect against severe stressors and facilitate positive adaptation. The outcome of this type of investigation is likely to expose qualities such as coping strategies, social support, and self-esteem that aid personal growth through stress exposure (Galli & Vealey, 2008). The second wave aims to investigate the process resilience in terms of disruption and reintegration following adversity, and specifically intends to outline how the resilient qualities identified in the first wave inquiry are gained or enhanced through this process. This second wave is based on Richardson and colleagues' resiliency model (2002). The final wave of inquiry comprises a multidisciplinary approach to exploring the "spiritual source or innate resilience" that individuals' possess, which motivates them to seek self-actualisation in their lives and create experiences that foster resilient qualities (Richardson, 2002, p.313). Richardson (2002) suggested that most resilience research has focussed on the first wave of inquiry, although as suggested, research has begun to concentrate more on the process of acquisition of resilient qualities rather than their mere identification (Danish, Petitpas, & Hale, 1993). Within sport in particular, research has begun to target specific understanding of how athletes can enhance their resilience through experiencing critical events, and build upon the notion of adversity as opportunity for personal growth (Galli & Vealey, 2008; Machida et al., 2013; Mummery et al., 2004). Although this is the only metatheory of resilience that combines theoretical ideas from areas such as physics, medicine and psychology (Fletcher & Sarkar, 2013), Windle (2011, p. 165) queries that "the suggestion by Richardson that resilience may be the driving force that controls the universe may be a little overstated".

2.4 Context specific models of resilience

There are two sport specific models of psychological resilience in sport, which have been developed within the last decade to conceptualise athletes' resilience process of recovery and reintegration into sport following adversities. The conceptual model of sport resilience (Galli & Vealey, 2008) and the grounded theory of psychological resilience in Olympic champions (Fletcher & Sarkar, 2012) were both based on qualitative data with elite athletes. In turn, the sport specific model and grounded theory describe and explain the negative psychological effects experienced because of the challenges faced by athletes. Nevertheless, both emphasise the positive outcomes or adaptations resulting from challenge negotiation and misfortune experienced in sport.

There are also a small number of models concerning psychological resilience specifically in adolescents and youths. These include the adolescent resilience model (ARM; Haase, 2004), the conceptual model for community and youth resilience (Brennan, 2008), and the risk and resilience framework (Hawkins, Jenson, Catalano, & Lishner, 1988). Although these models are context specific in the way that they relate to the experiences and resources of the younger generations, they are based around specific encounters of risk, which attempt to guide and develop empirically based social policy for youths and adolescents to protect them in these circumstances. For example, the ARM was developed to explain the complex and integrative process and outcomes of both psychological resilience and quality of life in adolescents with cancer (Hasse, 2004), and the risk and resilience framework attempts to guide practice associated with preventing academic failure, delinquency and substance abuse (Hawkins et al., 1988). Without a specific link with resilience in adolescent sport, only the two sport specific models have been discussed in the sections following.

2.4.1 Conceptual model of sport resilience.

Galli and Vealey (2008) developed the conceptual model of sport resilience (Figure 2.2) following a qualitative investigation into athletes' experiences and perceptions of resilience. Using the resiliency model of Richardson et al. (1990) as a guiding framework, ten high level (college or professional) athletes representing nine different sports were interviewed regarding an adversity that they had overcome within their career. A range of adversities were identified, including: injury, illness, performance slump, burnout and transition into college. Following inductive analysis, five general dimensions of sport resilience emerged, including; adversity breadth and duration, athletes' agitation (or anxieties) of negotiating both mental struggles and coping strategies, sociocultural

24

influences including social support, personal resources such as passion and determination, and finally positive outcomes.

The conceptual model of sport resilience highlights the interactions between the person and the environment, and substantiates the notion of resilience as a process rather than a trait that an individual possesses (Galli & Vealey, 2008). Importantly, the authors suggest that an individual's resilient qualities (e.g., social support, coping, and passion) are not the exclusive predictors of resilient outcomes; instead, it is the influence and interactions of these components on the process of agitation. In this comprehensive exploration of resilience in elite athletes, Galli and Vealey (2008) therefore proposed that an athlete's engagement with the process of agitation and their struggles in the face of adversity are equally as important as their resilient qualities. This also supports resilience models from outside of sport psychology literature that emphasise the role of coping strategies and cognitive appraisals as mediators between personal resources and environmental influences that ultimately result in an individual's psychological response (Galli & Vealey, 2008; Park & Fenster, 2004).

Figure 2.2. The Conceptual Model of Sport Resilience (Galli & Vealey, 2008).
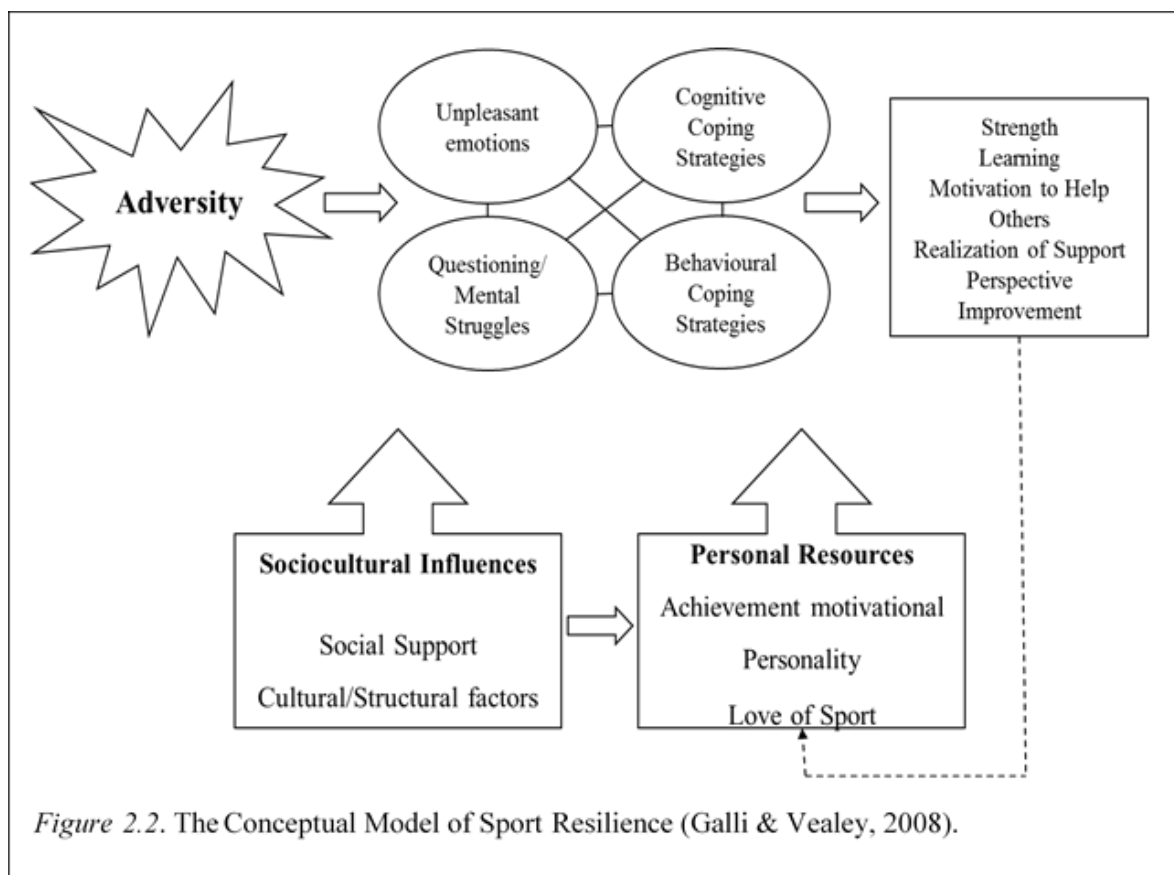
This was the first study specifically targeting resilience in sport that aims to conceptualise the construct of psychological resilience within an athletic population, and it can be commended for establishing an initial theoretical framework of resilience in sport,

however there are a number of criticisms that need highlighting. In particular, as Galli and Vealey (2008) highlight, their research was based heavily on Richardson et al's. (1990) model of resilience, and as a response, the problems with this model (as previously discussed) are transmitted into the conceptual model.

Further criticism of this model targets the sources of adversities experienced by the athletes used to develop the model. As personal resources and behavioural patterns are central to the resilience process, the negotiation of adversities experienced outside of sport that are inherent within the life of any person (e.g., divorce, family issues, and money worries), cannot be viewed as independent from the process. Specifically, issues faced outside of the sporting arena also have the potential to impact functioning within an athletic career, and the absence of such challenges faced within this sample means that no explanations or distinctions are made between the sources of stress experienced by athletes.

2.4.2 Grounded theory of psychological resilience and optimal sports performance.

The grounded theory of psychological resilience and optimal sports performance is the most recent sport specific theory developed to explain the resilience process amongst the highest-level athletes (Fletcher & Sarkar, 2012). Specifically, this grounded theory aimed to explore the concept of psychological resilience and its relationship with optimal sports performance in Olympic champions (Fletcher & Sarkar, 2012). Specifically, the authors used the emergent data from interviews with 12 Olympic gold medal winners, representing a number of different sports and resilience experiences, to elucidate their experiences of withstanding adversity faced throughout their careers. The grounded theory model presents psychological resilience as "an overarching concept that encapsulates stressors, cognitive appraisal and meta-cognitions, psychological factors…, and facilitative responses" that precede optimal sport performance (Fletcher & Sarkar, 2012, p.672). The model is presented in Figure 2.3.

Stressors were classified into three categories: competitive stressors (e.g., performance slumps), organisational demands (e.g., selection) and personal demands (e.g., family), and ranged from day to day stressors to major life events. The authors emphasised the importance of the stressor on the resilience-performance relationship, as most of the Olympic champions interviewed expressed the role of stress exposure as fundamental in realising their subsequent sporting achievements. In emphasising the process in relation to different stressors both within and outside of sport, this grounded theory addresses one of the key criticisms of the previously reviewed conceptual model of sport resilience.

Similar to the conceptual model, challenge appraisals and meta-cognitions form the central element of the grounded theory, highlighting the importance of individual perceptions and assessment of the threat or challenge a stressor poses, and the cognitive processes this involves. From their investigation, Fletcher and Sarkar (2012) suggested that successful athletes who perceived a challenge as an opportunity for personal growth have an advantage over their competitors, and it is the mediation of meta-cognitions using cognitive strategies, reflecting of previous experiences and goal awareness that facilitates positive responses.

Figure 2.3. A grounded theory of psychological resilience and optimal sports performance (Fletcher & Sarkar, 2012).
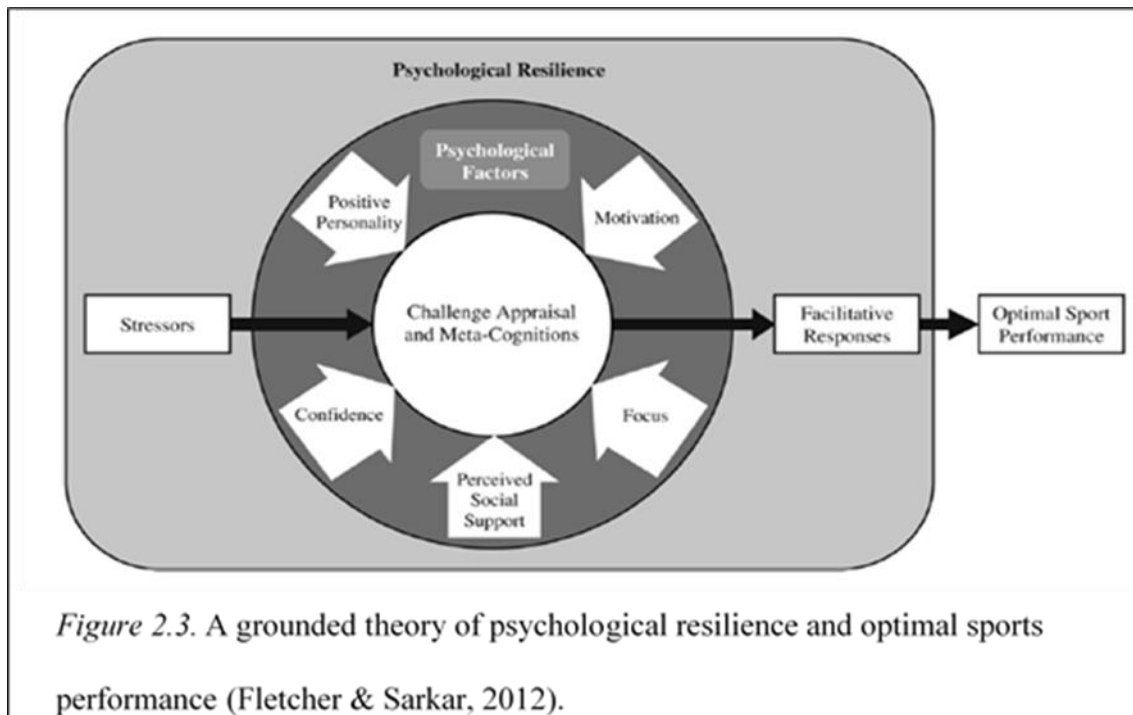
There are a number of noteworthy limitations in relation to the methodology employed by Fletcher and Sarkar (2012). Similar to the resiliency model (Richardson et al., 1990) that Fletcher and Sarkar (2012) had themselves criticised for its linear stage framework, the grounded theory suffers the same design limitation. This means that the model only considers a single sequential process, rather than one that shows multiple, parallel processes (such as biological and neurological perspectives; Curtis & Cicchetti, 2003) which would arguably be more ecologically valid.

In addition, although a number of means were employed to minimise it effects (e.g., allowing time for responses, reassurance, and contextual cueing), the retrospective nature of the study may have negatively influenced participant recall in relation to the detail and accuracy of their perceptions of experiences as an athlete (Fletcher & Sarkar, 2012). The nature of this data also means that actual objective growth following challenge

has not been assessed, and instead the sole focus was on self-reported perceptions of growth, which may be very different (Cho & Park, 2009).

A particular limitation worth noting within qualitative research like this, is that the perspectives participants provide are likely to be influenced by the situation they ultimately find themselves in at the point of interview. In the case of those included within Fletcher and Sarkar's study, the successful/supra-elite nature of the participants means that their accounts reflect a journey to maximum success. Importantly this means that the perspective of those with a less successful career are overlooked, resulting in a message that suggests those who haven't made it in some way may 'lack' the factors or skills required to be fully successful. This means that by searching for factors explaining athletes' success, the model may have overlooked other important variables outside of the athlete's control, for example sport-specific, life, cultural, and societal factors as well as luck (Collins et al., 2016).

In their ground breaking examination of psychological resilience in Olympic champions, and the stress-resilience-performance relationship that constitutes their grounded theory, Fletcher and Sarkar (2012) were able to give an indication of the resilience process amongst the highest-level sport performers. This study provides a foundation on which to understand how psychological resilience and skills to deal with stressors are managed and developed, and in addition, offers recommendations for applied interventions spanning an athlete's career. Nevertheless, further research is required with samples of both junior and senior athletes for comparisons in terms of the variation of both perceptions and the stressors experienced to inform such intervention studies (Fletcher & Sarkar, 2012).

2.5 Empirical overview of resilience and sport literature

It is widely acknowledged that successful elite athletes experience misfortunes, performance setbacks, and high-pressure situations during their careers (Galli & Gonzalez, 2014; Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015; Morgan et al., 2014). Using a phenomenological approach Howells and Fletcher (2015) and Morgan et al. (2014) have highlighted the subjective first-person evidence gathered by reviewing numerous autobiographies that document the lives of successful athletes. Collectively, these demonstrate that the pursuit of the sporting excellence is littered with adversities of differing intensities and durations. It is clear from these accounts, that in addition to the life challenges faced by those outside of sport, the developmental pathway of an athlete requires and challenges them to endure numerous transitions to be successful, and

ultimately tests an athlete's ability to cope with adapting competitive environments (McKay, Niven, Lavallee, & White, 2008). Past research into the psychological resilience of athletes has consistently supported its link with both superior sports performance (Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014a), and its positive mediating qualities and relationship with factors such as stress and burnout (Lu et al., 2016), serious injury and motivation to adapt (Machida et al., 2013), and mobilization of collective resources within a team setting (Morgan, Fletcher, & Sarkar, 2013), amongst others. It is therefore important that sport psychologists and practitioners working with athletes striving for excellence recognise the sources of stress and challenge they encounter, and understand the nature of resilience amongst athletes to provide a competitive climate that fosters success more holistically. Such applied enhancement opportunities may include teaching psychological skills (e.g., goal setting), and providing opportunities to develop and promote peer engagement and problem solving.

Research into resilience outside of a sporting context has included individuals' experiences of, and responses to significant adversities and trauma. These have included; earthquakes, nuclear disasters and tsunamis (Fu, Leoutsakos, & Underwood, 2014; Kukihara, Yamawaki, Uchiyama, Arai, & Horikawa, 2014), spinal cord injuries (White, Driver, & Warren, 2010), bereavement (Bonanno et al., 2011; Lin, Sandler, Ayers, Wolchik, & Luecken, 2004), and both psychological and physical trauma including neglect and abuse (Carli et al., 2014). Within sport, the nature of the demands or challenges encountered may be deemed of lesser significance than those previously stated, and because of this the conceptualisation of resilience in sport is likely to be different from that of other contexts, whereby significant adversity may have a greater potential to result in permanent life limiting consequences (Wagstaff, Sarkar, Davison, & Fletcher, 2017). Although early conceptualisations of resilience in sport have followed Luthar et al's. (2000, p.435) definition of resilience as "a dynamic process encompassing positive adaptation within the context of *significant adversity*", a later sport specific definition proposed by Fletcher and Sarkar (2012, p.675) focussed on the process of dealing with the "potential negative effect of *stressors*", encompassing the challenges and encounters of relatively minor stressors experienced by athletes.

2.5.1 Challenges in sport.

The challenges faced by elite athletes, which are in many ways specific to this niche population, have been well documented (cf. McKay et al., 2008; Sarkar & Fletcher, 2014b), and include a wide range of stressors of varying intensity and duration, requiring

complex psychosocial and behavioural processes in order overcome and potentially thrive. Unavoidable stressors for any competitive athlete are the changes and adaptations in environmental demands experienced as a consequence of the development pathway. The changes that an athlete faces within their career go beyond simply transitioning *into* and *out* of sport (Wylleman & Lavallee, 2000). Although these are the most clearly identifiable changes an athlete must adapt to, and have been widely documented concerning the challenges they present, there are additional 'normative' transitions that define a change between stages or levels of performance. These are generally predictable, anticipated changes, which are often the outcome of stable and standardised development criteria, for example progressing from junior to senior, or national to international levels (Wylleman & Lavallee, 2000). Although, this type of transition is expected and often strived for within the progression pathway, they create numerous challenges for an individual, such as; elevated expectations by others and new team dynamics. There is a potential for these transitions to disrupt an athlete's normal functioning, but also offer an opportunity for development (Collins & MacNamara, 2012), ultimately distinguishing between those who flourish and those who flounder.

Due to the inherent unpredictability of competitive sport, there are also a large number of 'non-normative' transitions that an athlete may encounter. These are characterised by their unanticipated and involuntary nature, and may include changes associated with; injury, coach and/or support staff, and deselection (Schlossberg, 1984; Podlog, Lochbaum, & Stevens, 2010; Wylleman & Lavallee, 2000). Although generally unpredictable, these are not rare occurrences within competitive sport, which makes psychological resilience amongst athletes a highly desirable characteristic (Fletcher & Sarkar, 2012; Galli & Vealey, 2008; Hosseini & Besharat, 2010). Importantly for developing athletes, successful developers are also characterised by being able to overcome or even thrive through these idiosyncratic challenges (Collins & MacNamara, 2012). Using injury as an example, research has shown that the agitation phase that occurs following injury often includes the mental struggles associated with guilt and loss, and can be further disrupted by external pressures to return to pre-performance levels (Bianco, 2001; Brown et al., 2015; Galli & Vealey, 2008). This can ultimately lead not only to performance decrements and to potential dropout, but also impact self-esteem, feelings of isolation, and re-injuries anxieties (Bianco, 2001; Charlesworth & Young, 2004). In addition to this, Podlog, Wadey, Stark, Lochbaum, Hannon, and Newton (2013) suggested that there are clear age-related differences in the way that adult and adolescent athletes experience injury. For example, adolescents with a strong athletic identity have been

shown to be at a particular risk of displaying depressive symptoms following injury (Manuel, Shilt, Curl, & Sinal, 2002). Additionally, when compared to injured adult athletes, adolescents show heightened pre-operative mood disturbances (Udry, Shelbourne, & Gray, 2003), and greater post-operative pain, anxiety and catastrophizing (Tripp, Stanish, Reardon, Coady, & Sullivan, 2003). From their original research, Tripp et al. (2003) showed that rumination and helplessness were contributors to adolescents' catastrophizing following anterior cruciate ligament surgery. Psychological resilience or at least the ability to grow in the face of non-normative challenges such as injury is desirable, and may facilitate both physical and emotional development, preparing adolescent athletes for adult competition.

An athlete may also experience what are termed 'non-events' which are changes that are expected by the athlete but that do not occur, e.g., not making the first team or not being selected as captain (Wylleman & Lavallee, 2000). Arguably, it is the nature of non-normative and non-events that are the most impactful challenges faced by athletes, and which differentiate the undulating and volatile career of an elite athlete from the challenges faced by the general population. It is the successful or unsuccessful negotiation of these, which best define the route an athlete takes to the top.

Aside from transitions, there are additional stressors encountered by athletes due to the competitive, demanding, and ruthless nature of the sporting environment (Mellalieu, Hanton, & Fletcher, 2006). The stressors faced by sports performers have been the target of numerous studies (e.g., Gould, Jackson, & Finch, 1993; Holt & Hogg, 2002; Weston, Thelwell, Bond, & Hutching, 2009), and have been extensively reviewed by Sarkar and Fletcher (2014b). This review considers the findings of previous exploratory and systematic approaches to the study of stressors in sport, and discusses these findings under three main categories, which have been consistently supported by the literature: competitive, organisational, and personal. Mellalieu et al. (2006, p.3) define competitive stressors as "the environmental demands associated primarily and directly with competitive performance". Sarkar and Fletcher (2014b) provide a number of examples of competitive stressors including; underperforming (Dugdale, Eklund, & Gordon, 2002), pressure to perform (McKay et al., 2008), rivalry (Thelwell et al., 2007), and self-presentation (James & Collins, 1997). An athlete's ability to deal with and overcome each or all of these stressors associated with the competitive environment, and in particular their ability to use these opportunities to elevate their performance, would be reflective of their psychological resilience (Fletcher & Sarkar, 2012). Alternatively, an individual who is not able, or does not have the resources or characteristics to emerge positively from even a brief period of

unrest within their athletic career, is unlikely to be successful. In their study of (former West) German female track-and-field athletes, Bussmann and Alfermann (1994) reported that only 29.5% of athletes starting competitive sport in childhood continued through to an adolescent stage. Moreover, from this point only a further 10.4% successfully transitioned into an elite adult career. This demonstrates that although there are a small number of people whom may transition easily both up and down developmental stages, there remains a proportion of athletes whom simply discontinue their pursuit of sporting excellence. Although this cannot be solely credited to a lack of protective factors associated with resilience, this raises concerns regarding some athletes' readiness in terms of both approaching transitions and exposure to an increasing intensity of competitive environments. This makes understanding the nature of psychological resilience in response to context specific stressors at a junior athlete level paramount, as the development of appropriate recourses and protective factors at this level has the potential to guard against dropout during these continuing periods of unrest.

Organisational stressors are associated with the environmental demands placed on an individual (Fletcher, Hanton, & Mellalieu, 2006). These stressors are specific to the sporting population and in addition, have been reported by athletes as more frequent at an elite level of performance compared to non-elite (Fletcher, Hanton, Mellalieu, & Neil, 2012). An example of such a challenge might include changes in financial support, as many athletes require performance based government bursaries or private sponsorship. Funding from these sources is often unstable and goes beyond the personal control of the athlete. When a problem such as this has the potential to end an athletic career, psychological resilience is important in overcoming both the behavioural elements (such as hard work and support mobilisation) and the associated psychological characteristics such as tenacity and drive to succeed. Challenges and adversities are often reported as pivotal moments, which promote characteristics such as psychological resilience and mental toughness (Collins & MacNamara, 2012).

There are clearly some personal stressors or adversities, which would be unavoidable regardless of being an athlete, or not. This final category of stressors encountered by athletes identified in the literature are labelled 'personal stressors' (Fletcher et al., 2006), and are generally referred to in the medical profession as 'life stressors' (Rutter, 1985). These include challenges borne out of everyday life such as school/work commitments, those relating to socioeconomic status, geographical location, and family issues (Dumont & Provost, 1999). Although not always directly related to the competitive sporting environment, resilience in response to these personal stressors is

important for an athlete as there is potential for these to indirectly impact mental and physical functioning within sport, and may hold the capacity to de-rail an athlete from their competitive goals.

Personal challenges may be of particular pertinence for the junior or adolescent population both within and outside of a sporting context, as this is a notorious transitional period whereby individuals experience a complex interaction of numerous physical changes, parental challenges, complex inter-social interactions, academic changes, self-esteem issues and disordered eating, which often overlap (Dumont & Provost, 1999; Tamminen, Holt, & Crocker, 2012; Wylleman & Lavallee, 2000).

In addition to the challenges faced by the general adolescent population, junior and adolescent athletes have to negotiate specific sport related challenges such as physical and mental errors leading to, and the consequences of poor performance, pressure to perform from numerous sources (e.g., coaches/parents), meeting performance demands, and balancing school and sport (Kristiansen & Roberts, 2010; Reeves, Nicholls, & McKenna, 2011; Tamminen et al., 2012). Such is the competitive nature of the sporting environment, that even at a junior and adolescent level, challenges can be perceived acute enough that they induce maladaptive behaviours such as severe disordered eating, over training, steroid use, and alcohol and substance abuse to meet its demands (Tamminen et al., 2012). Understanding the nature of psychological resilience in sport and the individual differences associated with a person's capacity for positive adaptation at this pre-adult level, would be a good investment of resources, helping to equip athletes with the appropriate protective and promotive factors required to build resilience and thrive in a competitive environment (Fletcher & Sarkar, 2013).

2.5.2 Resilience in sport.

The specific organisational and competitive stressors experienced by athletes make their resilience process unique from that of the general population. Although the sporting environment inherently offers some challenges that the general public are not likely to face, there are also some adversities that are arguably similar within different contexts and which may ultimately reflect similar resilience processes. These generally include personal or life stressors, but might include competitive stressors experienced by those operating within the business sector, and transitions associated with personal trauma, illness, and disease. Nevertheless, the nature of challenge in sport is differentiated from that experienced by those outside of this context, as athletes are proactive in exposing themselves to a competitive environment, often seek challenges as opportunities to

improve performance (Sarkar & Fletcher, 2014a). For example, the challenge of non-normative transitions in sport (such as injury) differs from personal trauma or illness outside of sport, as even though both would be defined by their un-anticipatory nature, it is likely that athletes actively engaging in competitive sport are not naïve to the possibility of being injured at some point within their career. Whereas this is less likely to be the case for a non-athlete. This highlights a potential issue with measuring psychological resilience in a sport specific context without a sport specific measure; as although there may be broad conceptual similarities to those required to thrive when facing challenges outside of sport the process of applying these are likely to be different. This is also reiterated by the context specific models of psychological resilience that have emerged in the literature (e.g., Galli & Vealey, 2008; Hasse, 2014), which appear to show a disparate between psychological resilience in a sporting context and that of the general population, which means measurement should be considered within the context of the specific domain (Galli & Gonzalez, 2014).

Sport specific research in psychological resilience has emerged over the past decade, and in general has taken one of two approaches. First, there has been a focus on sport participation as a vehicle for developing resilience and positive adaptive qualities amongst numerous populations, such as young males (Hall, 2011), children (Bell & Suggs, 1998), and those with spinal cord injuries (Machida et al., 2013). Alternatively, there has been increasing interest in the study of resilience from a performance perspective, for both individuals and within a team context (Morgan et al., 2014; Mummery et al., 2004). Within this performance focussed approach, the majority of authors have concentrated their attention on the enquiry into the psychosocial processes and behaviours that promote a positive adaptation to stress or challenge (cf. Fletcher & Sarkar, 2012; Galli & Vealey, 2008), with only a few studying the concept as an outcome (e.g., resilient individuals are those who perform better following a previous performance setback; cf. Martin-Krumm et al., 2003; Mummery et al., 2004). Galli and Gonzalez (2014) suggested that the latter of these approaches is problematic and was criticised based on the methodological design and the assumption that all participants view a poor performance (real or perceived) in the same way; as an adversity or stressor. As a process, psychological resilience in sport has been identified as complex and dynamic (Fletcher & Sarkar, 2013), and researchers have favoured a qualitative interview approach to generate richer data to explore the behavioural and psychological factors supporting positive adaptation in the face of challenge or adversity.

As outlined earlier, the conceptual model of sport resilience (Galli & Vealey, 2008) and the grounded theory of psychological resilience in Olympic champions (Fletcher & Sarkar, 2012) have been developed to conceptualise the process of athletes' recovery and reintegration into sport following adversities. Both of these sport specific models highlight the negative psychological effects experienced resulting from the challenges and stressors faced by senior athletes, but largely emphasise the positive outcomes from challenge negotiation and misfortune. In their study Galli and Vealey (2008) showed that subsequent to encountering adversity, a period of agitation takes place, which includes unpleasant emotions, coping strategies, questioning and mental struggles. The resultant shows that gained strength, perspective and learning emerged as a product of this agitation phase, and sociocultural and personal resources possessed by an individual such as achievement motivation, love of the sport and social support were also fostered. In their study, which utilised the framework of the conceptualization of sport resilience to explore winter sports athletes' experiences of adversity, Brown et al. (2015) also emphasised the role of previous experience on the acquisition of resources to facilitate positive adaptation. Personal resources contributing to the resilience process included perceptions of social support and passion for the nature of the sport. Overall, acquisition of resilience resources was characterised by increased knowledge concerning adversity negotiation, determination, self-belief and mental strength.

Fletcher and Sarkar (2012) highlighted the importance of the stressor on the resilience-performance relationship, as most of the 10 Olympic gold medal winners interviewed expressed the role of stress exposure as fundamental in realising their subsequent sporting achievements. Similar to the conceptual model, challenge appraisals and meta-cognitions form the central element of the grounded theory, highlighting the importance of individual perceptions and assessment of the threat or challenge a stressor poses, and the cognitive processes this involves. From their investigation, Fletcher and Sarkar (2012) suggested that successful athletes who perceived a challenge as an opportunity for personal growth have an advantage over their competitors. Additionally, individuals' previous experiences and goal awareness, as well as meta-cognitions that mediate their use of cognitive strategies, also facilitate these positive responses.

In addition to the qualitative research outlined above, there are also a small number of correlational studies that have examined associations between psychological resilience and similar constructs in athletes. These have included: coping (Belem, Caruzzo, Nascimento Junior, Vieira, & Vieira, 2014; Secades et al., 2016), mental toughness (Cowden et al., 2016), perceived stress related growth (Salim, Wadey, & Diss, 2015), and

functional components for motivation (Vitali, Bortoli, Bertinato, Robazza, & Schena, 2015). In general, findings have suggested that resilience is positively correlated with task-orientated coping, confidence, achievement motivation, perceived competence, and perceived stress related growth. Specifically, it has been documented that athletes demonstrating higher global resilience use more coping strategies associated with peak performance under pressure, and 'coachability' (Belem et al., 2014). Alternatively, resilience has shown to be negatively correlated with burnout (Vitali et al., 2015), and disengagement and distraction-orientated coping (Secades et al., 2016). Although these studies offer interesting information concerning the nature of resilience in athletes, there are a number of noteworthy issues relating to the conceptualisation of the construct and its subsequent measurement. For example, each of the studies above have employed psychometric questionnaires developed outside of a sporting context to measure resilience. This can be considered problematic in terms of the impact on construct validity bearing in mind the context specific nature of resilience (Gucciardi et al., 2011).

2.5.3 Risk and resilience.

As the sport specific research to date has been clear on the benefits of experiencing adversity or challenge (Brown et al., 2015; Fletcher & Sarkar 2012; Galli & Vealey, 2008), it is not surprising that Sarkar and Fletcher (2014a) stated that "aspiring high performers should be encouraged to actively seek out challenging situations since this will make subsequent demands more manageable" and improve future performance (p. 6). Using an adolescent general population sample, Gordon Rouse et al., (1998) showed that resilient adolescents in a non-clinical setting were less likely to engage in socially risky activities such as dropping out of school, having sex, and being arrested, when compared individuals identified statistically as non-resilient. Contradictory findings also showed at resilient adolescents were more likely to have been suspended from school and to have begun smoking than those identified as normal risk takers. Nevertheless, most of the research within the area of risk and resilience in non-sporting adolescents has focussed on risk-taking as health-endangering or delinquent behaviours (Fergus & Zimmerman, 2005). The majority of literature concerning risk-taking behaviours (mainly health-risk behaviours) in school aged, non-clinical samples propose that risk factors need to be diminished to protect adolescents from harm (Rew & Horner, 2003). Nevertheless, due to the context specific nature of risk-taking behaviours, and the fact that risk taking (as well as psychological resilience) may take different forms within and outside of sport, it is important to consider both the potential positive and negative effects of challenge and risk in relation to

developing athletes. As an example of this, one may consider that in a sporting context there is potentially less of a focus on antisocial health-risk behaviours such as sexual risk-taking, and the use of harmful substances. Instead, there is an increased focus on risk in the form of physical stress, potential for failure, attitudes/norms, decision making and putting oneself out of one's comfort zone (Van Tiggelen, Wickes, Stevens, Roosen, & Witvrouw, 2008). Therefore, the question remains within a sporting context if fostering psychological resilience and promoting positive athlete development can be achieved by both increasing protective factors, and the facilitation of a competitive environment characterised by a combination of systematically reduced competitive stressors and significant risk reduction (like that suggested outside of sport)? Alternatively, should we be providing athletes with opportunities to seek, initiate, and engage in risky behaviours and challenges (not including health-endangering or delinquent behaviours) to promote resilience like Sarkar and Fletcher (2014a) suggested?

Although the proposed link between seeking challenge and increased psychological resilience has not been directly assessed by empirical research within a sporting context, other fields such as those studying stress-related growth (Galli & Reel, 2012; Tamminen et al., 2013), mental toughness (Mahoney et al., 2014), positive change (Linley & Joseph, 2004) and talent development (Collins & MacNamara, 2012), support the notion that exposure to adversity can have positive consequences for athletes. Indeed Collins and MacNamara (2012) go so far as to suggest that challenge *should* be encouraged and included as a part of talent pathways. This work suggests that the psychological skills of an individual are the mechanism by which challenge impacts development, rather than the challenge itself. Specifically, it was suggested that it is the skills an athlete brings to a challenge that are the most important. These skills are tested through challenge negotiation, and subsequently followed by a period of refining and upskilling bringing about positive adaptation.

Howells and Fletcher (2015) conducted an autobiographical study of the adversity- and growth-related experiences of Olympic swimmers, and showed support for theories of posttraumatic growth whereby an individual manages experiences of adversity through a sequence of appraisal, emotions, and coping. The results also showed athletes adversarial growth in terms of performance, enhanced relationships (accepting social support), spiritual awareness (beliefs and soul-searching), and prosocial behaviour (supporting others). Mental toughness as defined by Gucciardi et al., (2015, p. 28) as: "a personal capacity to produce consistently high levels of subjective (e.g., personal goals or strivings) or objective performance (e.g., sales, race time, GPA) despite everyday challenges and

stressors as well as significant adversities" has obvious definitional similarities with psychological resilience. Mahoney et al. (2014) studied the links between mental toughness in sport and basic psychological needs theory (BPNT), which has previously shown associations with challenging-seeking (Standage, Duda, & Ntoumanis, 2003). Findings suggested that mental toughness can be developed though autonomy supportive-environments whereby athletes are encouraged to make guided choices and decisions and challenge learning, by encouraging psychological needs satisfaction. Characteristics reflective of both mental toughness and psychological resilience, such as: effort, sense of personal control, self-efficacy and self-value, were shown to be fostered by a challenging environment where basic psychological needs are satisfied (Mahoney et al., 2014). In addition to this research, findings from numerous studies with children and youths show that problem solving skills (such as those offered by sport and outdoor experiences; Vetter et al., 2010) are strong predictors of sustained resilience and can have a direct impact on the success of facing future challenges (e.g., Alvord & Grados, 2005; Henley, Schweizer, de Gara, & Vetter, 2007).

This suggests that any opportunity that may increase the likelihood of an athlete experiencing appropriate challenge that promotes problem-solving skills should be encouraged. This could be achieved by either; forced or guided engagement (cf. Bull, Shambrook, James, & Brooks, 2005), a personal drive brought about through the links between achievement motivation and challenge appraisal (cf. Elliot & Harackiewicz, 1996), or individuals' innate needs to seek sensations associated with challenge or risk. Sensation seeking is a personality characteristic that has shown to be a key predictor of challenge seeking and risk taking behaviour in sport (Castanier, Le Scanff, & Woodman, 2010; Kerr & Houge MacKenzie, 2012). Zuckerman (1994) defines sensation seeking as an individual's trait desire to achieve high intensity arousal or highly kinaesthetic physical sensations and experiences. Although alluded to, the relationship between this specific personality characteristic and psychological resilience has yet to be examined, and is required within the sporting population to investigate whether individuals with high stimulation needs (i.e., those whom are more likely to choose exposure to risk and adversity, both within and outside of sport) also possess increased protective mechanisms and personal resources characteristic of higher level resilience.

2.5.4 Resilience in adolescents.

Within the limited research on psychological resilience in athletes, there is limited research specifically focussing on the nature of resilience within an adolescent sporting

population. Amongst the limited sport specific research, Mummery et al. (2004) examined resilience as an outcome within a pre-adult sample, and aimed to explain how positive self-concept, social support and coping style act as protective factors against non-resilient performance within age group swimmers (aged 12-18). Resilience was distinguished by three performance related outcomes: non-resilient performance (failure followed by further failure), resilient performance (failure followed by success), and those with initial successful performance. Results showed that a combination of protective factors differentiate between performance levels, with higher self-concept and lower perceived social support associated with resilient performance (Mummery et al., 2004). Whilst it may be argued that there is a certain amount of conceptual overlap between these protective factors (Windle, 2011), without a specific measure of psychological resilience and the assumption of a resilient response based on performance outcomes regardless of individuals' perceptions of adversity, the role of the resilience process in mediating stress responses in adolescent sport is yet to be systematically examined.

Whilst there is little investigation into resilience within adolescent sport, more can be learned about the general nature of resilience at this stage from research out-with of a sporting context. There has been significant and increasing interest into the concept of psychological resilience in children and adolescents, resulting in an extremely large volume of published works in this area. Within the literature, there has been a particular focus on the assessment tools employed to measure or quantify resilience within adolescents (e.g., Ahern, Kiehl, Sole, Lou, & Byers, 2006). Nevertheless, following the comprehensive framework for understanding resilience proposed by Werner (1989) and Garmezy (1991), previous literature has predominantly been focussed within one of three areas; (1) the nature of resilience (e.g., individual differences and personality contributors), (2) understanding the protective factors and critical resources which enable resilience in the face of adversity (e.g., social support and emotional integrations; Luthar, 1991), and (3) interventions for developing resilience (cf. Vetter et al., 2010).

Focussing on the first of these three proposed areas, Stratta et al. (2013) investigated the differences in resilience and coping between males and females aged between 17 and 18 years, following the severe trauma of the Italian L'Aquila earthquake. This study built on the documented differences between males and females in relation to stress responses (Bonanno et al., 2011), and protective factors such as coping strategies (Bernard, 1995), in the face of psychological distress. Findings suggested that non-exposed females reported significantly higher resilience scores in four of the five factors measured by the Resilience Scale for Adolescents (READ, Hjemdal, Friborg, Stiles, Martinussen, &

Rosenvinge, 2006) than non-exposed males, specifically: higher Family Cohesion, Social Competence, Structured Style, and Social Recourses. Within the exposed sample, males showed significantly higher Social Competence, Structured Style, Social Recourses, and Total READ Scores than non-exposed males. Alternatively, exposed females displayed no increases in any resilience factors, and instead demonstrated statistically significant decreases in Social Competence (low-exposure group) and both Family Cohesion and Social Recourses (high-exposure group) when compared to their non-exposed counterparts. This suggests specific gender-related differences in resilience process in response to trauma. Females demonstrated higher resilience without exposure, but appeared more sensitive to the stress responses and a showed a higher likelihood of maladaptive reintegration following exposure than compared to the male group. Males reported lower resilience without exposure, but exposure to trauma facilitated protective mechanisms and increased opportunities for resilience (Stratta et al., 2013). Although this study was an independent groups design, and did not track individuals over the course of their trauma, this research suggests there may be an overall gender effect in the resiliency process.

In another study concerning the nature of psychological resilience in adolescents, Hjemdal et al. (2006) identified no significant age differences in global resilience (13-15 years), although it was acknowledged this might be due to the narrow age range within the study. Nevertheless, some significant gender differences in which males displayed higher personal competencies, and females exhibited greater access to social resources was demonstrated (Hjemdal et al., 2006). These findings are in line with those of Werner (1989), Feingold (1994) and Yancey, Grant, Kurosky, Kravitz-Wirtz, and Mistry (2011) who showed that women are generally more socially sensitive, and are more skilled at mobilising social resources than males. Sun and Stuart (2007) provided further evidence suggesting that females created more positive bonds with significant others such as teachers, parents and peers, and revealed higher scores in females for communication, empathy and other social skills than males (Broderick & Korteland, 2002). Males have showed to have higher resources in the form of self-esteem, role modelling, and problem solving coping strategies that have been shown to discriminate resilient from non-resilient adolescents (Yancey et al., 2011).

Research focussing on the second area within the framework for understanding resilience proposed by Werner (1989) and Garmezy (1991) has revealed numerous protective factors as being positively related to psychological resilience in adolescents. In their study assessing the protective factors that differentiate between well adjusted, resilient, and vulnerable adolescent groups, Dumont and Provost (1999) found that the

principal predictor between these groups was personal resources such as self-esteem, confidence, and an increased perception of control. This suggests that adolescents who have increased belief in their ability and feel comfortable in their capacity to deal with challenging situations are likely to respond in a more adaptive manner when confronted with significant stressors. These findings are in line with those revealed by Herman-Stahl and Petersen (1996) who showed greater perceived mastery, social competencies and optimism with resilient and well-adjusted teens. In addition to this, protective and vulnerability characteristics including intelligence, locus of control, ego development, and temperament have also shown significant links with psychological resilience in both healthy and un-healthy adolescents (Kesebir, Gündoğar, Küçüksubaşı, & Yaylacı, 2013; Luthar, 1991).

Finally, understanding ways in which resilience can be promoted amongst this population has been of key interest because of the increasingly poverty stricken, hostile and challenging environments to which today's children are exposed (Condly, 2006; Masten & Coatsworth, 1998). Vetter et al. (2010) studied the effectiveness of a resilience-enhancing program for Beslan school siege survivors (hostages and non-hostages) in Russia aged between 10 and 16 years. Their intervention was based on four protective factors that have been shown to facilitate the development and sustainability of resilience processes of youths outside of sport. These were: (a) fostering relatedness with older adults, (b) promoting healthy peer relationships, (c) community involvement and (d) developing coping strategies and problem solving skills (Dumont & Provost, 1999; Garmezy, 1985). Although the problems relating to the lack of a control group, and the use of a psychometric scale developed outside of a sporting population must be acknowledged, their results showed a positive impact of the resilience-building intervention. Resilience was shown to have significantly increased from the baseline measure before the intervention up to six months following, particularly within those hostages who experienced the highest number of losses and injuries. Although the sample within this study cannot be directly compared to a junior sample in sport due to the nature of adversity experienced, the principles on which the resilience intervention are based are not alien within sporting practice. Indeed, community involvement and positive peer relationships are characteristic of an effective development environment for junior athletes (Fraser-Thomas, Côté, & Deakin, 2005).

2.6 Summary

In summary, this theoretical and empirical review of psychological resilience in sports performers has highlighted what we know about the nature of the construct within a sporting context. The key concerns relating to definitional inconsistencies and conceptual overlap have been discussed, and research which helps to differentiate seemly similar areas from psychological resilience has been presented. The consensus within contemporary literature is that two key definitional features must be evident within a resilience process: adversity, and positive adaptation (Fletcher & Sarkar, 2013; Wagstaff et al., 2016). Previous research has attempted to explore the mechanisms by which one achieves positive adaption following adversity, revealing an interplay of both personal protective factors (e.g., coping, positive personality, motivation and confidence) and envirosocial protective factors (e.g., social support, cultural influences).

However, this review has also highlighted some key problems concerning what we understand specific to resilience within an adolescent sporting population. Specifically, although research into the nature of psychological resilience is prevalent in adolescent counselling, health promotion and child development literature (Blum, 1998; Short & Russell-Mayhew, 2009), there is a dearth of research exploring the nature of resilience in junior or adolescent athletes. Applying findings based on research on psychological resilience in at-risk youths (Theron, 2012) and trauma sufferers (Bonanno & Diminich, 2013) to an athletic population is problematic as there is a distinct and crucial difference between children at risk and juniors in sport. Specifically, the sporting population are more active in exposing themselves to the potential adversities inherent in competitive sport, whereas clinical populations are arguably forced to demonstrate resilience qualities (Fletcher & Sarkar, 2012).

Understanding resilience within an pre-adult population should be of particular interest to sport psychologists and practitioners alike, considering that elite junior athletes are negotiating complex social interactions and often volatile personal changes and struggles inherent within adolescence, alongside progressive career transitions and sport specific stressors (Olsson et al., 2003; Wylleman & Lavallee, 2000). In addition to this, and likely most importantly, it is the junior and adolescent stage of elite sport that is the most key developmental phase which acts as the foundation on which resilience is built. It is likely that any positive outcomes (such as strength, learning and realisation of support; Galli & Vealey, 2008) resulting from of stress and challenge negotiation within this phase,

would facilitate the resilience process when inevitable stressors are encountered later in an athlete's career.

The final problem highlighted by this review has been the context specific nature of psychological resilience and often lack of conceptual clarity, and the subsequent impact this has on measurement of the construct. Without a specific psychometric measure designed for use with adolescent athletes, the validity and reliability of data collected using alternative measures developed outside of sport would certainly come into question. Therefore, before a quantitative study designed to examine the nature of resilience in junior athletes can be conducted, an appropriate measurement tool must be explored.

Chapter 3

Study 1- Preliminary assessment of the measurement dimensionality of the CD-RISC 25-item scale (Connor & Davidson, 2003)

3.1 Introduction

Measuring psychological resilience is heavily dependent on an agreed definition, and has been hindered by the lack of consensus regarding either a universal or sport specific definition (Truffino, 2010; Windle, 2011). Sport specific resilience researchers have consistently supported two key definitional components: adversity and positive adaptation (Fletcher & Sarkar, 2013; Gucciardi et al., 2011; Sarkar & Fletcher, 2013). In terms of quantifying resilience, Luthar and Zelazo (2003) argued that resilience cannot be assessed directly, and instead can only be inferred quantitatively by the measurement of these two discrete components. In addition, protective factors (e.g., perseverance, tenacity, optimism, tolerance of negative effect, perceived social support and an internal locus of control) that serve to safeguard an individual from the negative effects of stress have also been targeted in the assessment of resilience (Connor & Davidson, 2003). A number of qualitative researchers have highlighted the ways in which adversity, positive adaptation and protective factors interact when athletes are faced with significant stressors (Fletcher & Sarkar, 2012; Galli & Vealey, 2008). Findings from these qualitative approaches have suggested that to achieve an accurate representation when quantitatively measuring resilience in sporting populations, each of these three components must be assessed separately (Fletcher & Sarkar, 2012). Nevertheless, a criterion measure for quantifying resilience amongst sports performers has yet to be developed.

Developing resilience in an applied sporting setting would most likely target individuals protective factors (or psychological skills), and because of this the measurement of protective factors or personal qualities possessed by sports performers is desirable. Particularly as identifying and exploring the characteristics that facilitate positive adaptation following severe and persistent stressors in an athletic career can facilitate talent development (Holt & Dunn, 2004) and expertise (Collins & MacNamara, 2012). Sarkar and Fletcher (2013) discussed a number of key issues concerning the measurement of protective factors associated with resilience including: a limited evidence base informing measurement tools, specific contextual measures of resilience, validity, and measuring resilience on an individual level. In addition, Windle (2011) expressed the

necessity of rigorous evidence based practice when informing the choice of resilience measures appropriate for both the population and context.

A number of inventories have been developed to assess individual's resilience in a number of different contexts such as: clinical practice, (Connor & Davidson, 2003), older adults (Windle, Markland, & Woods, 2008) and youths at risk (Ungar et al., 2008), most of which target the assessment of resilience in terms of the presence of personal assets and resources that lead to a resilient outcome following stress or trauma (Windle, Bennett, & Noyes, 2011). The Brief Resilience Scale (BRS; Smith et al., 2008), the Resilience Scale for Adolescents (READ; Hjemdal et al., 2006), and the Connor-Davidson Resilience Scale (CR-RISC; Connor & Davidson, 2003) were amongst 12 others included in a recent systematic review conducted by Windle et al. (2011). The measures were reviewed using a comprehensive quality assessment strategy to evaluate their psychometric properties and address criteria such as; content validity, internal consistency, criterion validity, construct validity, reproducibility, responsiveness, floor and ceiling effects, and interpretability (Windle et al., 2011). Although not exempt from the conceptual and theoretical inadequacies highlighted across the majority of instruments, the Connor-Davidson Resilience Scale original 25-item 5-factor version (CD-RISC; Connor & Davidson, 2003) received the highest rating along with the 33-item 6-factor Resilience Scale for Adults (RSA; Friborg, Hjemdal, Rosenvinge, Martinussen, 2003) and the unidimensional 6-item Brief Resilience Scale (Smith et al., 2008). The 10-item modified version of the CD-RISC (Cambell-Sills & Stein, 2007) emerged with a slightly lower score amongst the mid-ranking scales based on the assessment criteria. The CD-RISC was originally developed for use with adults and has been used to assess psychological resilience across a number of age ranges, including adolescents and children both within (Gucciardi et al., 2011) and outside of sport (Fu, Leoutsakos, & Underwood, 2014). Liu, Fairweather-Schimdt, Burns, & Roberts (2014) found that resilience, when measured as a single-factor using the CD-RISC, was invariant across both age and gender. These findings, as well as an appreciation of the pitfalls of using population specific measures (e.g., the RSA) out of context, and employing oversimplified psychometric self-report measures (e.g., the Brief Resilience Scale), have highlighted the CD-RISC as the most appropriate existing tool in which to measure resilience amongst a junior sporting sample.

The CD-RISC is not a sport specific measure of resilience, and was developed to measure personal recourses possessed by individuals that promote a positive response to adversity, and has received a considerable amount of research attention since its development (Connor & Davidson, 2003). The CD-RISC has been widely distributed

across a variety of clinical and general populations (Connor & Davidson, 2003). This multidimensional instrument measures five factors (personal competence/ tenacity, trust/ tolerance/ strengthening effects of stress, acceptance of change and secure relationships, control, and spiritual influences). The scale's consistency, reliability, and convergent and divergent validity have been supported by general population, clinical and psychiatric samples (Connor & Davidson, 2003).

The factor structure of the original 25-item CD-RISC emerged from data collected with post-traumatic stress disorder sufferers, and the content itself derived from numerous theories relating to stress, coping and adaptation. Since its development, a number of authors have attempted to validate the factor structure within additional populations, including Chinese adolescents (Yu et al., 2011), women experiencing infertility (Sexton, Byrd, & von Kluge, 2010), and the previously introduced study aiming to explore its measurement invariance in cricketers (Gucciardi et al., 2011). These studies have demonstrated varying degrees of success, and numerous factor structures have emerged, which has raised concerns relating to the development of scale, and particularly its distribution amongst differing populations.

The psychometric properties, factorial structure, and age related variance of the CD-RISC have recently been examined within a large athletic population (Gucciardi et al., 2011). Gucciardi et al. (2011) aimed to confirm the originally proposed factor structure of the CD-RISC and the abridged 10-item structure (Cambell-Sills & Stein, 2007) with a sample of adult (aged 20-36) and adolescent (aged 12-18) Australian Cricketers. Goodness-of-fit indices demonstrated superior model fit for the 10-item unidimensional measure within both adult and adolescent athletic samples over the original 25-item five-factor model. Gucciardi and colleagues did not aim to explore the factor structure outwith of the a priori models.

The 10-item measure was developed by Cambell-Sills and Stein (2007) to address several weaknesses with the multidimensional concept proposed within the original CD-RISC such as; the grouping of different concepts within factors (i.e., acceptance of change and secure relationships); inappropriate factor extraction methods; and, assumptions that latent resilience factors are unrelated (Burns & Astey, 2010; Lamond et al., 2008; Cambell-Sills & Stein, 2007). Gucciardi et al. (2011) found that correlations between resilience and hardiness were positive and moderate, and between resilience and burnout were negative and moderate, verifying the convergent validity of the unidimensional model within an athletic sample (Gucciardi et al., 2011). This was consistent with previous research, and although 15 of the original 25 items from the CD-RISC were deleted, resulting in a number

of constructs of resilience not being measured (e.g., social support and self-efficacy), the convergent validity with hardiness and burnout still represent an individual's ability to maintain stable psychological and physical functioning, or positively adapt to adversity exposure within sport (Cambell-Sills & Stein, 2007; Luthar, 2006; Gucciardi et al., 2011). Similarities were shown between resilience in adolescent and adult samples, suggesting that the concept of resilience in sport maintains meaning across age groups and does not vary significantly. Gucciardi et al. (2011) concluded that the 10-item CD-RISC (CD-RISC 10) is a robust measure of resilient qualities within adolescents and provided support for its use in a sporting context. Nevertheless, the scope of a shortened 10-item unidimensional measure must be queried, as it could be argued that such a condensed global measure is oversimplified and may miss the complexities of the interactions of behavioural and cognitive components such as positive adaptation, protective factors, and stress negotiation that underlie the resilience process within sport (Sarkar & Fletcher, 2014a).

The main concerns with the CD-RISC are in line with those previously raised by Ahern et al. (2006), Windle et al. (2011) and Gucciardi et al. (2011), and highlight four key issues. First, the original authors made reference to only three sources (Kobasa, 1979; Lyons, 1991; Rutter, 1985) from which the resilience attributes measured in the scale were developed (Windle et al., 2011). Windle et al. (2011) suggested that the work from additional authors available at the time of publication could have been included, and may have led to greater theoretical clarification. In addition to this, the authors refer to the accounts of Sir. Edward Shackleton's Antarctic expedition, and note that the explorer "possessed many personal characteristics compatible with resilience" (Connor & Davidson, 2003, p.77). It was suggested that these accounts informed the inclusion of a spiritual component of resilience, however, the details of how this information was used alongside the additional three sources, and which information was included/excluded, were not apparent.

A second critique of the original 5-factor structure concerns the use of factor labels that reflect somewhat ambiguous clustering of items, with a single-factor constituting up to three independent components. The original authors offered no explanation or rationale (aside from statistical loading patterns) for the grouping of these items, and do not discuss the consequential implications of this on the measurement of resilience. The original scale includes a diverse selection of characteristics, which aimed to reflect an individuals' ability to cope with stress, from seeking the support of others to adaptability to change. Nevertheless, considering the key definitional features of sport specific resilience (adversity, positive adaptation, and protective factors; Fletcher & Sarkar, 2013), it is not

surprising that this original structure did not operationalise with a sample of athletes (Gucciardi et al., 2011).

Third, the inclusion of factors within the original multidimensional model labelled 'control' and 'spirituality', which contained only 2- and 3-items respectively can be problematic, and may be suggestive of a more complex underlying factor structure (Guadagnoli & Velicer, 1988). Comrey (1988) and Floyd and Widaman (1995) state that latent variables containing less than three items are not adequately defined, with factors containing a larger number of items being preferable and showing greater stability. Finally, the fourth issue that numerous authors have identified when seeking to confirm the original factor structure of the CD-RISC was the choice of an orthogonal rotation method in the EFA procedures (Gucciardi et al., 2011). By employing this method, the emergent factors are not permitted to correlate with one another. Arguably, this may be an appropriate rotation method when developing questionnaires that aim to measure aspects of a construct that are wholly distinct or mutually exclusive. Nevertheless, considering the nature of resilience (as well as the majority of other constructs within psychology) and the interrelatedness of resilient characteristics and protective mechanisms outlined by authors such as Galli and Vealey (2008) and Sarkar and Fletcher (2014a), it is unsurprising that this method has been harshly critiqued.

Data derived from Chinese adolescent trauma survivors supported the original 5-factor structure (Yu et al., 2011), whereas Turkish earthquake survivors obtained only a 3-factor structure (Karaırmak, 2010). Burns and Anstay (2010) found extensive overlap between the latent variables when extracting 5-factors in their study using an Australian community sample, and instead supported Cambell-Sills and Stein's (2007) unidimensional 10-item model. Consequently, there remains a significant debate over measurement invariance and interdependence of the latent structures emerging from different populations (Oberski, 2014). There remains an ongoing debate as to whether resilience should be assessed using a unidimensional (Cambell-Sills & Stein, 2007) or multidimensional (Connor & Davidson, 2003) measurement model, and the extent to which this can be achieved using the CD-RISC.

The following four studies (1a, 1b, 1c, and overall model comparison) were designed to align with Aim 2 of this thesis: To explore appropriate measures or methodological approaches by which to examine resilience in junior athletes. This was achieved in this chapter through Objective 2: To explore the validity and dimensionality of the original Connor Davidson Resilience Scale CD-RISC (Connor & Davidson, 2003)

amongst a sample of junior athletes. Each of the following studies has a specific aim to fulfil this research objective, which are presented prior to each study.

3.1.1 Study 1(a) Aims.

The aim of the present study was to explore the structural validity of the originally proposed multidimensional 5-factor model using the 25-item CD-RISC (Connor & Davidson, 2003) amongst a representative sample of junior athletes.

3.2 Study 1(a) Methods

3.2.1 Participants.

Junior athletes (N=373) representing both individual and team sports participated in this study. Data from 26 respondents were excluded (listwise) from data analysis due to omissions in the reporting of key demographic information (n=20), or missing data (n=6). The final sample (N=347) consisted of 152 male (43.8%) and 195 female (56.2%) athletes aged 12 to 18 years inclusive (*M* age=15.42, *SD*=1.72). Participants represented 16 different sports, these comprised of: 10 individual sports, including swimming, table tennis, gymnastics, and equestrian (n=151, 43.5%); and six team sports including football, rugby, netball, and handball (n=196, 56.5%). All athletes were current junior sports performers, competing at regional level or above and/or were part of an elite academy or regional training program. Ethical approval was sought from the Faculty of Life Sciences Research Ethics Committee prior to the commencement of the study. Verbal and written informed consent was obtained from all participants and guardians (where participants were under 16 years of age) after receiving information about the study and their involvement.

3.2.2 Measures.

The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) is a psychometric questionnaire designed to assess resilience in a variety of envirosocial contexts, such as community samples (Lamond et al., 2008) and psychiatric/clinical patients (Connor & Davidson, 2003; Sexton et al., 2010). Recently the CD-RISC has also been employed as a measure of resilience for both adult and adolescent athlete samples (Gucciardi et al., 2011). The CD-RISC is a 25-item five-factor multidimensional measure, which is answered on a 5-point Likert scale, with anchors of: '0' not true at all to '4' true nearly all of the time (Connor & Davidson, 2003; factors are reported in Table 3.1). Global resilience scores are expressed as a value on a range of 0 - 100, with greater scores reflecting higher resilience. Reliability estimates have been reported at α=.88 (global

resilience), and internal consistency of factors have been reported ranging from α=.53 and α=.83, indicating adequate to good reliability (Gucciardi et al., 2011).

Table 3.1

CD-RISC factors (Connor & Davidson, 2003)

CD-RISC Factor	No. of items	Factor label	Example Question
1	8	**Personal competence, high standards, and tenacity**	I work to attain my goals
2	7	**Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress**	I make unpopular or difficult decisions
3	5	**Positive acceptance of change, and secure relationships**	I can deal with whatever comes
4	3	**Control**	I am in control of my life
5	2	**Spiritual influences**	Things happen for a reason

3.2.3 Data collection.

The recruitment process involved contacting a number of squad coaches, governing body administration assistants, and club directors within a range of sports. All participants and their guardians (where participants were under 16 years of age) were required to provide verbal and written informed consent. An information pack explaining the nature of the study and what participation would involve, was available for all participants and guardians.

All participants completed a demographic questionnaire targeting information regarding their age, sport, and level of participation within the first section of a questionnaire package. This also served as a method for coding data to preserve anonymity. The 25-item CD-RISC formed the second section of the questionnaire package. Questionnaire packages were distributed by the author in paper form, and completed by participants at their training or event facility where possible. The time required for the participants to complete the questionnaire package ranged from 10-20 minutes, with the younger athletes requiring more time. Athletes returned the completed questionnaires to the lead researcher in a sealed envelope. Participants were informed that their involvement was voluntary and that they could withdraw at any stage of the study without consequence.

3.2.4 Statistical analysis.

Statistical data analyses were carried out using Analysis of Moment Structures (AMOS) and IBM Statistical Package for the Social Sciences Version 20 (SPSS V-20) software for Windows. Descriptive statistics, where appropriate, were presented as means, medians, and standard deviations.

To ensure a measurement model is appropriate for the intended, construct validation is paramount when exploring a specific concept with a new population than that with which the measure was developed (Harrington, 2009). Both construct validity and discriminant validity can be assessed using a confirmatory factor analysis (CFA), ensuring that the proposed unobserved latent variables are distinct and 'fit' within the context being assessed (Bagozzi, Yi, & Phillips, 1991). Brown (2006) suggests that correlations between latent variables should not exceed .85, which is indicative of the observed variables not distinguishing between factors. A CFA with Maximum Likelihood Estimation (MLE) was applied to examine the construct validity of the a priori 5-factor structure of the CD-RISC (Connor & Davidson, 2003; Figure 3.1) when measuring resilience with a junior athlete sample (N=347). MLE was chosen as the assumption of normality had not been violated. Absolute values of skewness indexes (SI) for each proposed latent variable were beneath the threshold of 3.0 (Kline, 2010), and kurtosis indexes were beneath the lower threshold of 10 (Kline, 2005). Visual inspection of the normal QQ-plots further confirmed data did not violate assumptions of normality. There were no multivariate outliers in the data, as measured by Mahalanobis distance (p > .001).

To test the proposed 25-item 5-factor measurement model, the hypothesized loading of items onto corresponding factors were assigned, and the factors were permitted to co-vary (Figure 3.1). The goodness of fit for the model was assessed based on the following indices: chi-square statistic (X^2/df ratio <3.00); root square mean of estimation (RMSEA <.08), the comparative fit index (CFI ≥.95), the Tucker-Lewis Index (TLI ≥.95), and incremental fit index (IFI ≥.95), based on the guidance of Schreiber, Nora, Stage, Barlow, and King (2006). Standardised regression weights and factor covariance (discriminant validity) were also observed.

Figure 3.1. A priori five-factor model of resilience entered for CFA. *Note*: e = error, regression coefficients fixed to 1, items ordered within factor according to original factor loadings from highest to lowest (Connor & Davidson, 2003)
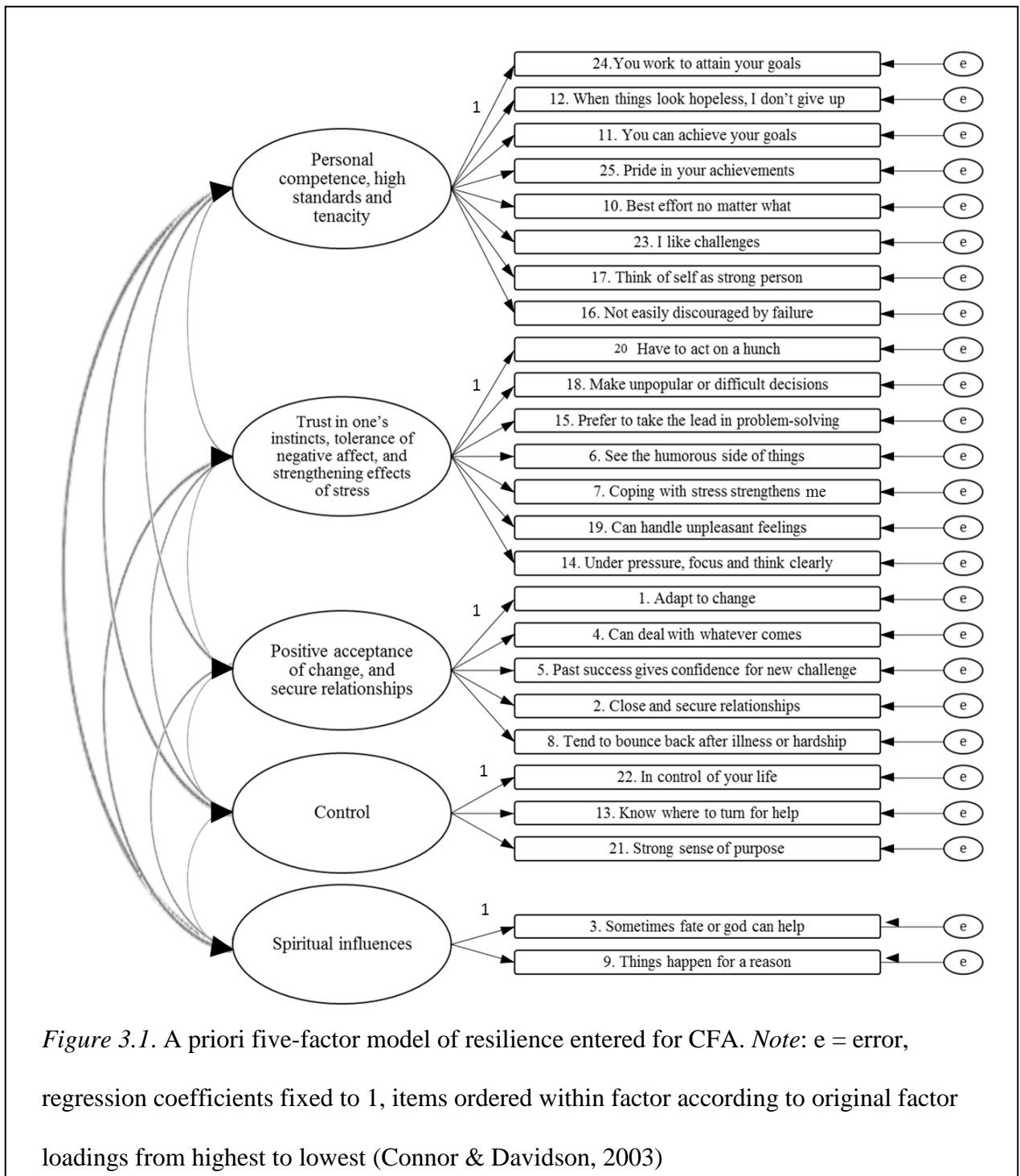
3.3 Study 1 (a) Results

3.3.1 Descriptive statistics and reliability estimates.

Descriptive statistics including means, standard deviations, medians and internal reliability estimates, for the total sample are displayed in Table 3.2. Initial internal reliability estimates of the original five-factor multidimensional model revealed that Factor 1 (personal competence, high standards and tenacity) obtained a satisfactory alpha level,

(Cronbach's α >.70; Nunnally & Berstein, 1994). None of the remaining factors achieved an acceptable level of internal reliability.

Table 3.2

Means, standard deviations, medians and alpha coefficients

Latent variables	1	2	3	4	5
Mean	26.09	13.82	14.93	8.98	3.95
SD	3.31	6.31	2.21	1.76	1.80
Median	26	14	15	9	4
(1st, 4th Q)	(24, 39)	(10.5, 17.5)	(13, 16)	(8, 10)	(3, 5)
α	.70	.61	.52	.48	.39

Note: N=347
   1 CD-RISC Factor 1: Personal competence high standards and tenacity
   2 CD-RISC Factor2: Trust in one's instincts, tolerance of negative affect, strengthening effects of stress
   3 CD-RISC Factor3: Positive acceptance of change, secure relationships
   4 CD-RISC Factor4: Control
   5 CD-RISC Factor5: Spiritual influences

3.3.2 Multidimensional model fit.

Findings indicated that the hypothesised a priori multidimensional five-factor model proposed by Connor and Davidson (2003) did not demonstrate acceptable fit following CFA with the data from the current sample (N=347). The ratio between X^2/df was less than three, suggesting a good fitting model (Kline, 2010), however the chi square of the measurement model was significant (X^2 (265)= 447.48, p<.001). The Modification Indices (MI) were generally high (>.20), and regression weights were low (<.05), suggesting the items did not discriminate between or align with the proposed factors. High correlations between pairs of latent variables indicate significant covariance, which suggests low discriminant validity (Table 3.3). Goodness of fit (GFI) indices were also low, revealing poor model fit (Table 3.4).

Table 3.3

Correlations between the proposed factors from the original multidimensional five-factor model of resilience

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1	.679	.866	.911	.315
Factor 2	.679	1	.712	.717	.242
Factor 3	.886	.712	1	.698	.401
Factor 4	.911	.717	.698	1	.468
Factor 5	.315	.242	.401	.468	1

Note: Factor 1: Personal competence, high standards, and tenacity
Factor 2: Trust in one's instincts, tolerance of negative affect, and strengthening effects of stress
Factor 3: Positive acceptance of change, and secure relationships
Factor 4: Control
Factor 5: Spiritual influences

Table 3.4

Goodness-of-fit indices from CFA of the original a priori five-factor model

Model	X^2	df	X^2/df	p	CFI	IFI	TLI	RMSA	90% Confidence interval of RMSA
Model 1	447.484	265	1.69	.000	.854	.858	.835	.045	.037-.052

Note: Model 1: Original a priori five-factor model (Connor & Davidson, 2003); N=347

3.4 Study 1 (a) Summary

When designing quantitative research, it is easy to assume that data collected using a measurement tool, which was developed to assess a specific construct, will behave in the same way to the original data on which the proposed psychometric structure was based. In fact, many researchers choose to employ psychometric self-report measures with participants without exploring or confirming the underlying factor structure that is directly reflective of the population being studied. The importance of this procedure is emphasised by the emergence of new sample specific measurement structures when these procedures are followed (cf. Karaırmak, 2010; Sexton et al., 2010), and is a key process of developing sample specific measures within behavioural sciences (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Floyd & Widaman, 1995; Ford, MacCallum, & Tait, 1986). Indeed, previous researcher (e.g., Byrd, & von Kluge, 2010; Gucciardi et al., 2011; Yu et al., 2011) shows that when examining a construct such as psychological resilience within a different

population to the original (or a more homogenous sample), the underlying psychometric properties may have different 'meanings'. The nature and characteristics of adversity experienced may be a factor that contributes to these differences as some populations are exposed to enduring challenges of low intensities whereas others may encounter short-lived high intensity adversities. The different characteristics and complexities of these specific challenges would inevitably require different combinations of approaches to negotiate and overcome. In addition, the scale items may cluster differently depending on whether the adversity was anticipated or not, as well as the goals of the individual following adversity. When studying resilience in athletes this may be particularly pertinent as it could be argued that athletes are given opportunities to prepare for adversities relating directly to performance and/or competition by developing particular skills and through experience. Athlete resilience may also be considered unique due to the increased likelihood of striving tendencies following adversity as an individual works hard to not only achieve their previous level of performance but also endeavour to get back on track to achieving career goals. Populations with whom the reaction to adversity would yield a more natural resilience response (i.e., whereby incidences of adversity had not been prepared for), or for those where the goal of resilient reintegration is not critical, the concept of resilience may manifest itself differently, and items within a measure would be expected to load differently.

This is highlighted by the results from the current study, which did not support the multidimensional 5-factor structure of resilience originally proposed by Connor and Davidson (2003). This study found that this previously hypothesised model, which was developed from a general population sample (mean age= 48.3+/-15.3), has problems with construct and discriminant validity when measuring resilience amongst junior athletes.

There have been a number of proposed multidimensional factor structures of the original CD-RISC within the literature. These include; a 5-factor structure with a different loading pattern to the original, amongst women experiencing infertility (Sexton et al., 2010); a 4-factor structure with a sample of Indian students (Singh & Yu, 2010); and, a 3-factor structure emerging with both Turkish trauma survivors and a Chinese general population sample (Karaırmak, 2010; Yu & Zhang, 2007). This variability in item clustering between populations, suggests that the underlying structure of resilience is not stable, and changes according to population specific adversity negotiation. As each of the populations are faced with differing challenges, the protective factors required to manage adversities, and the subsequent interaction between these two elements are likely to differ.

To date, there has been no such exploratory psychometric evaluation with a sample of athletes, or more specifically, junior athletes. As Study 1(a) has shown that the 25-item CD-RISC is not a reliable tool for measuring and exploring resilience characteristics amongst the junior athlete population. Following the procedures of authors including Karaırmak (2010) and Fu et al. (2014), an exploratory approach was taken to investigate the underlying multidimensional factor structure of resilience when using the CD-RISC with this population.

3.5. Study 1 (b) Aims.

To explore the multidimensional factor structure of the CD-RISC when used amongst junior athletes.

3.6 Study 1 (b) Methods

3.6.1 Participants.

Data from the total sample (N=347) collected during the previous study was employed in study 2(b) to explore the multidimensional nature of the CD-RISC amongst junior athletes. For the purpose of exploratory psychometric analysis, data were randomly assigned using SPSS into one of two discrete samples (Table 3.5). Sample 1 (n=163) were used for stage one of the analysis to explore model specification of the 25-item CD-RISC, and Sample 2 (n=184) was used to test the hypothesised factor structure based on stage one analysis.

Table 3.5

Sample characteristics

	N	Mean Age +/-SD	Males/Females (%)	Team/Individual sports (%)
Sample 1	163	15.52+/-1.70	47.9/52.1	48.5/51.5
Sample 2	184	15.21+/-1.82	40.2/59.8	63.6/36.4
Total	347	15.42+/-1.72	43.8/56.2	56.5/43.5

3.6.2 Measures.

As previously introduced in section 3.2.2, the CD-RISC is a 25-item measure that was designed to assess resilience by measuring five distinct factors. These five factors emerged following exploratory factor analysis on data collected with participants from a

number of different subgroups based on a general population sample including; non help-seeking individuals, primary care outpatients, psychiatric outpatients, as well as subjects from a general anxiety or clinical trial (Connor & Davidson, 2003). Nevertheless, following CFA using data from junior athletes, the previous study did not support the loading of observed variables onto the five-factor latent variable structure. This means the originally proposed multidimensional structure was deemed inappropriate. Due to the exploratory nature of the current study, analysis will focus on the individual 25 items (observed variables), and disregard the a priori clusters.

3.6.3 Data collection.

The study did not recruit additional participants, or require further data collection to that of the previous study. Please refer back to section 3.2.3 for the initial recruitment process. All participants and their guardians (where participants were under 16 years of age) were required to provide verbal and written informed consent. An information pack explaining the nature of the study, and what participation would involve was available for all participants and guardians.

3.6.4 Statistical analysis.

Statistical data analyses were carried out using Analysis of Moment Structures (AMOS) and IBM Statistical Package for the Social Sciences Version 20 (SPSS V-20) software for Windows. Descriptive statistics, where appropriate, were presented as means, medians, and standard deviations.

To validate a context specific model specification, and explore the multidimensional model structure using the current CD-RISC 25-item scale with junior athletes, a sequential two-stage approach using two independent samples was followed. During the first stage, an initial exploratory factor analysis (EFA) was chosen to determine an adequate factor structure with Sample 1. Stage 2 consisted of a CFA with Sample 2 to test the hypothesized model that emerged from the EFA.

3.6.4.1 Stage 1.

EFA aimed to explore the underlying structure of resilience as measured by the CD-RISC in junior athletes, without imposing any predetermined loading patterns on the outcome advocated from research with different populations (Child, 1990), for example: Chinese samples (Yu & Zhang, 2007; Yu et al., 2011), Turkish earthquake survivors (Karaırmak, 2010), South African adolescents (Jørgensen & Seedat, 2008) and the original general population sample (Connor & Davidson, 2003). EFA was chosen as a variable

reduction techniques over data reductions techniques such as principle component analysis (PCA), as EFA permits the emergence of unobserved variables (latent constructs) that can be described according to the nature of the loading items (Child, 1990). PCA aims to create principle components that explain maximum variance with the fewest unobserved variables (Truxillo, 2003). PCA has been employed by a number of researchers aiming to determine the factor structure of the CD-RISC (Asante & Meyer-Weitz, 2014; Manzano-Garcia & Ayala Calvo, 2013), however it has been argued that PCA is not a true method of factor analysis and is not concerned with any underlying structure caused by unobserved variables (Costello & Osborne, 2005). EFA was deemed more appropriate to address the aims of the current study, focussing on the combinations/clusters of observed variables on underlying factors.

Initially data from Sample 1 were submitted to EFA with principle axis factoring and direct Oblim oblique rotation without any extraction, to allow factors to emerge with no predetermined expectations, and permit the comparison to the originally proposed 5-factor model proposed by Conner and Davidson (2003). Following this, models with different factor solutions were examined to find the best model fit for the CD-RISC data with junior athletes. A convergence of Keiser's eigenvalue-1 principle and sedimentation graphs (scree plots), were used as the criterion for factor extraction (Cattell, 1966). Emerging patterns in item loadings were also examined. The Kaiser Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were used to assess sampling adequacy and suitability of the factor solution (O'Rourke, Psych, & Hatcher, 2013). As no single techniques for identifying the number of factors to retain have been supported as the most superior within previous research (Ford et al., 1986; Fabrigar et al., 1999), best fitting models were also considered based on obtaining: the simplest solution (rotated pattern matrix), a minimum number of cross-loading items, a minimum number of non-loading items, and a structure including factors with more than three items (Costello & Osbourne, 2005; O'Rourke et al., 2013).

The internal consistency of emergent factors were evaluated using Cronbach's alpha coefficient, and acceptable alpha levels were reported following the guidance of Nunnally and Berstein (1994).

3.6.4.2. Stage 2.

A CFA with Maximum Likelihood Estimation (MLE) was applied to Sample 2 to test the hypothesized model that emerged from the EFA during stage one of analysis (n=184). The assumption of normality had not been violated. Absolute values of skewness

indexes (SI) for each proposed latent variable were beneath the threshold of 3.0 (Kline, 2010), and kurtosis indexes were beneath the lower threshold of 10 (Kline, 2005). Mahalanobis distance suggested there were no multivariate outliers in the data ($p > .001$). As in Study 2, goodness of fit indices were assessed based on the guidance of Schreiber et al. (2006).

3.7 Study 1 (b) Results

3.7.1 Stage 1- Exploring the underlying factor structure of the 25-item CD-RISC amongst junior athletes.

An EFA was conducted on the original 25 items of the CD-RISC, with Sample 1 (n=163). Data were submitted to EFA with principle axis factoring and direct oblim oblique rotation. Initially, the number of factors to extract was not specified. The Kaiser_Meyer-Olkin measure verified the sampling adequacy for the analysis as 'good', KMO=.74 (Hutchinson & Sofroniou, 1999), and KMO item values were above the acceptable limit of .5 (Field, 2013), excluding item six which was marginally lower at .49.

Figure 3.2. Scree plot of factor components of the CD-RISC with Sample 1 (n=163)
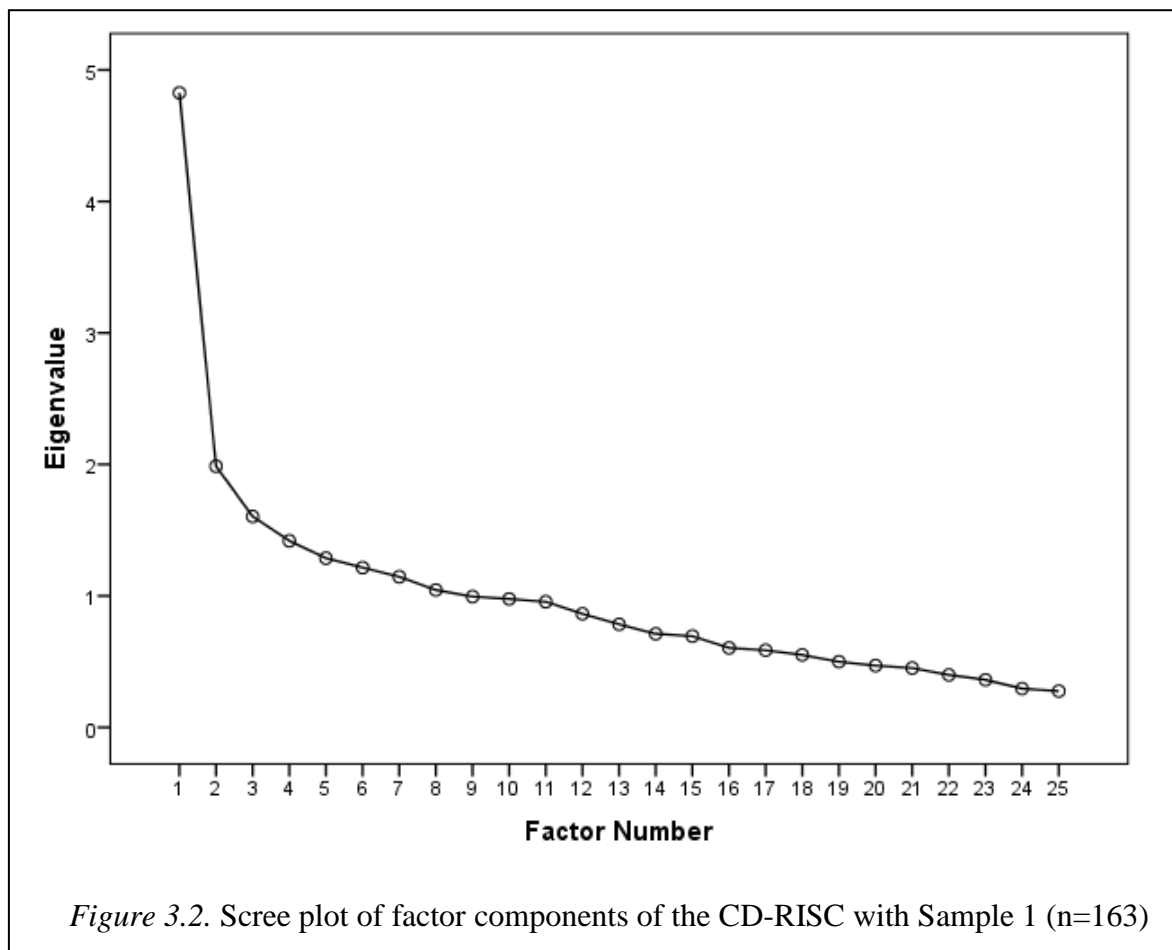
Eight factors had eigenvalues over Keiser's criterion of '1' and in combination explained 39.92% of the total variance, however, only Factors 1 and 2 explained over 5% of variance independently following extraction. Using Kaiser's eigenvalue-1 criterion alone for identifying factors can be problematic, and can substantially misestimate factors (Fabrigar et al., 1999). The model showed a complex loading structure with one cross-loading and six non-loading items. In addition, five of the eight factors consisted of less than three items, and so this model was rejected. The scree plot was ambiguous and showed an inflection that would justify retaining two factors, however no additional obvious inflections were evident (Figure 3.2; Cattell, 1966). In response, 2-, 3-, 4-, 5-, 6- and 7-factor solutions were examined.

The 4-, 5-, 6- and 7-factor solutions were rejected as all displayed multiple cross- and non-loading items, with at least one factor containing less than two items (Costello & Osborne, 2005). The 3-factor solution was explored further as it presented with a simplified structure, with no factors consisting of two items or less. Ultimate removal of 10 items left a 3-factor model comprising of seven, five, and three items. Nevertheless, because of the theoretical importance of the item loading in factor interpretation, the clustering of items onto factors was deemed arbitrary, making the thematic interpretation of factors ambiguous (Gaskin & Happell, 2014).

Following further restriction, a two-component solution explained 22.58% of the total variance. The factor structure showed a simplified loading pattern with 10 items loading onto Factor 1 and 8 items loading onto Factor 2, with no items showing salient cross-loading. Six non-loading items were removed from the model (1, 2, 3, 5, 9, 13), and the EFA was repeated. Following further deletion of one additional non-loading item (22), a two-factor structure explaining 28.01% of total variance was accepted, KMO (136) =.778, p=.000. Item-total correlations and the rotated factor pattern for the emerging 2-factor model are presented in Table 3.6.

Table 3.6

Item-total correlations and rotated factor pattern for the Connor-Davidson Resilience Scale for Sample 1 (n=163).

Item	Item-total correlation*	Factor (Eigenvalue)	
		1 (4.175)	2 (1.905)
14	.75	**.739**	-.163
7	.77	**.599**	-.189
19	.85	**.553**	.072
4	.83	**.525**	.047
15	.79	**.505**	.061
18	.73	**.450**	-.061
17	.80	**.416**	.227
16	.86	**.342**	.067
8	.78	**.339**	.183
20	.82	**.326**	.078
24	.72	-.092	**.806**
10	.75	-.122	**.640**
23	.76	.263	**.473**
12	.78	.188	**.393**
25	.72	-.025	**.372**
11	.72	.147	**.324**
21	.83	.265	**.312**
%age variance		20.49	7.61
Factor α		.75	.70

*Calculated from standardized variables; *Note:* Factor loadings >.30 appear in bold; Overall α=.80

3.7.1.1 Emerging factors.

Due to the restriction of factors and the deletion of cross- and non-loading items, ambiguity concerning factor labelling was minimised. Identifying a single characterisation for each of the two factors was not a challenge, and the characteristics of the highest loading items on each of the factors were used to help shape the factor labelling. Factor 1 constituted 10 items including 'under pressure, I focus and think clearly' and 'I can handle

unpleasant feelings' (see Figure 3.3 for all loading items). Each of the highest loading items as well as the subsequent lesser loading items were deemed to relate to the control an individual perceives to have over the challenge/s they are facing. These included protective mechanisms such as thinking as oneself as a strong person, and personal characteristics including leadership and decision making skills. This first factor was labelled 'control through adversity'.

The second factor was labelled 'growth mindset', and consisted of seven items. Growth mindset has been described by Dweck (1999) as an individual's perspective or implicit theory of the developmental nature of characteristics such as intelligence, social skills, talent, and abilities. For this reason, a person with a growth mindset would be most likely to face challenges, with a view that experience of the setbacks is helpful, and the effort and perseverance involved would facilitate this positive change to come to fruition (Yeager & Dweck, 2012). Growth mindset was deemed an appropriate label, as the items loading onto this factor reflected how a person might respond to adversity with perseverance, challenge, and effort. Examples of items within this factor include 'I work to attain my goals' and 'best effort no matter what' (see Figure 3.3 for all loading items).

3.7.2 Stage 2- Applying CFA to the emergent 17-item 2-factor measurement model.

Using Sample 2 (n=184), the emerging two-factor 17-item structure was submitted to CFA to test the stability of the dimensions amongst junior athletes. The hypothesized loading of items onto corresponding factors were assigned, and the factors were permitted to co-vary, Figure 3.3).

Figure 3.3. A two-factor model of resilience entered for CFA. *Note*: e = error, regression coefficients fixed to 1, items ordered within factor according to factor loadings from highest to lowest.
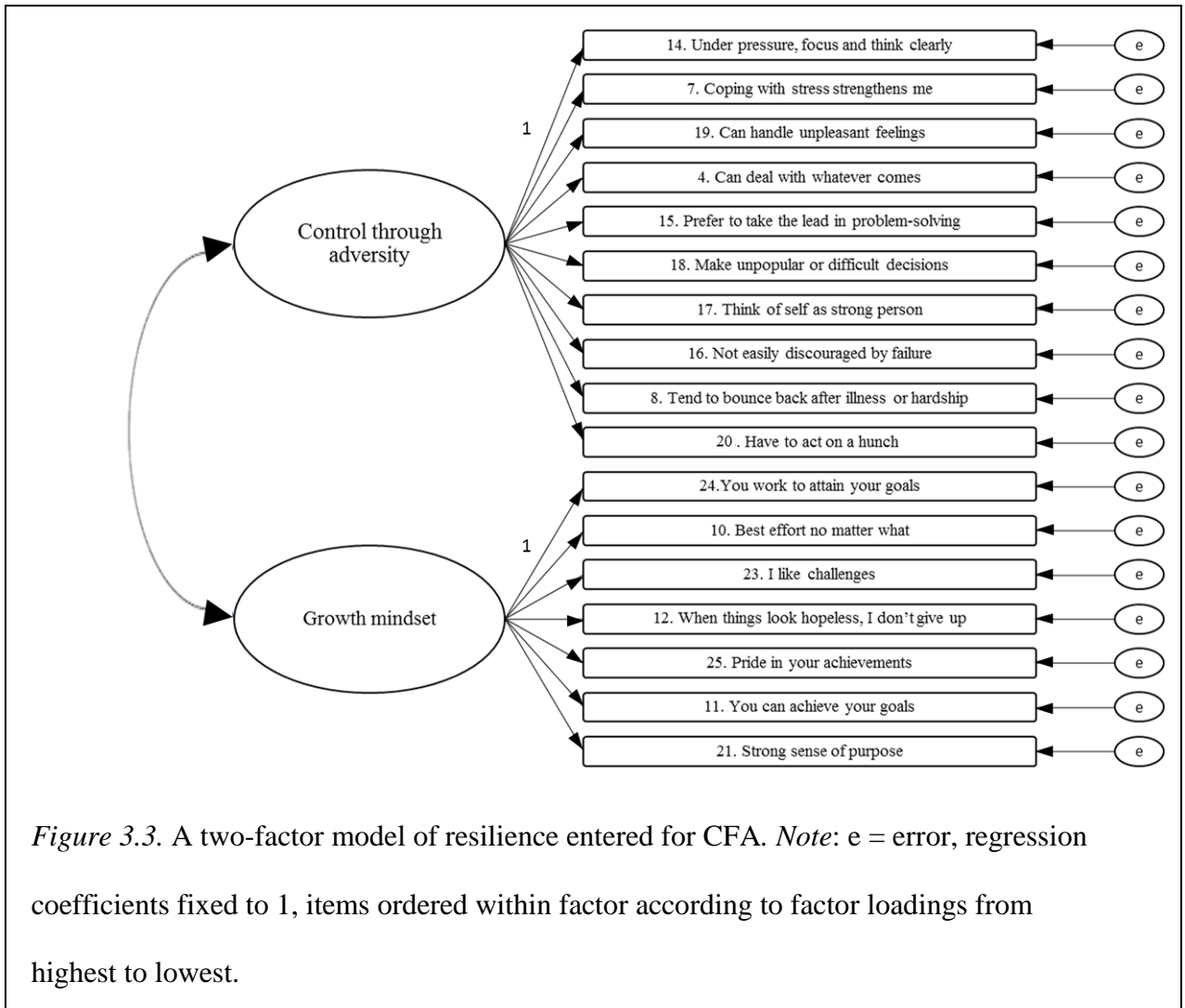
Descriptive statistics including means, standard deviations, absolute skewness and kurtosis scores, and alpha coefficients, for Sample 2 are displayed in Table 3.7.

Table 3.7

Means, standard deviations, absolute normality statistics and alpha coefficients of the 2-factor structure

		Descriptive statistics				
	Item	M +/-SD	Skew	Kurtosis	Corrected item-total correlation	α if item deleted
Factor 1	14	2.67+/-.87	-.32	-.25	.570	.71
(α=.75)	7	2.27+/-1.01	-.27	-.32	.427	.73
	19	2.56+/-.86	-.26	-.00	.499	.72
	4	2.86+/-.73	-.36	-.65	.462	.73
	15	2.62+/-1.06	-.57	-.15	.434	.73
	18	2.06+/-.81	.25	.07	.380	.74
	17	2.88+/-.77	-.55	.74	.457	.73
	16	2.62+/-.96	-.35	-.29	.328	.75
	8	3.02+/-.835	-.49	-.10	.351	.74
	20	2.15+/-.88	-.01	.12	.299	.75
Factor 2	24	3.55+/-.64	-1.42	2.09	.595	.63
(α=.70)	10	3.44+/-.66	-1.01	1.04	.475	.66
	23	3.37+/-.79	-1.36	2.09	.475	.65
	12	3.18+/-.77	-.65	-.05	.388	.68
	25	3.74+/-.53	-2.17	5.20	.275	.70
	11	3.46+/-.63	-.89	.49	.349	.69
	21	2.73+/-.83	-.50	.16	.373	.69

Note: Factor 1; Control through adversity, Factor 2; Growth mindset, n=163

From the CFA, the chi square statistic indicated adequate model fit (X^2 (118) =166.71, p=.002), and the ratio between X^2/df was less three suggesting a good fitting model. The correlations between factors also showed discriminant validity (Table 3.8).

Table 3.8

Correlations between the two factors extracted from EFA

	Factor 1	Factor 2
Factor 1	1.00	.36
Factor 2	.36	1.00

Note: Factor 1: Control through adversity
Factor 2: Growth mindset

Table 3.9

Goodness-of-fit indices (GFI) of the extracted 2-factor EFA structure

Model	X^2	df	X^2/df	p	CFI	IFI	TLI	RMSA	90% Confidence interval of RMSA
Model 2	166.707	118	1.413	.002	.897	.901	.881	.047	.029-.063

Note: Model 2: Proposed two-factor model emerging from EFA; n=184

GFI indices for CFI, TLI, and IFI were marginally lower than those recommended by Schreiber et al. (2006; Table 3.9). Nevertheless, arguments remain concerning the reliance on these goodness-of-fit indices in accepting model fit, as the stringent nature of these indices can result in any model that is less than perfect being rejected (Hox & Bechger, 1998). Instead it can be considered how the proposed multidimensional model represents the true model by focussing on the RSMEA and associated confidence intervals (RMSEA=.047, 90% CI= .029-.063). This value, even if taken at upper bound of .063 is well beneath the suggested .08 for an acceptable fitting model. This 2-factor structure can be deemed the best fitting multidimensional measurement model using a modified version of the CD-RISC with junior athletes. In addition, due to the overt thematic loading of coherent clusters of items onto the two factors (labelled: control through adversity, growth mindset), there is a strong argument to retain the modified model as 'best fitting' multidimensional structure over a 'perfect fitting' model.

3.8 Study 1 (b) Summary

When exploring the clustering of the original 25 items from the CD-RISC, a 2-factor model structure emerged. Eight of the original items were removed to improve the clarity of the rotated pattern matrix, resulting in a 17-item measure. Factor 1 contained 10

items accounted for 20.49% of the percentage variance and was labelled 'control through adversity'. Factor 2 contained the remaining seven items, which accounted for 7.61% of the percentage variance, and was labelled 'growth mindset'. The emergent 2-factor model demonstrated good levels of reliability with an overall alpha coefficient of .80, with the two factors recording alpha values of .75 and .70 respectively.

There is a disparity within the literature concerning the number of factors composing the CD-RISC (Karaırmak, 2010; Yu et al., 2011; Yu & Zhang, 2007), and it is apparent that the dimensions underlying psychological resilience differ between populations. It is likely that the nature of the adversities faced by specific populations plays a vital role in the characteristics and protective factors necessary for individuals' resilient recovery. Out of consideration for concurrent validity and measurement variance across groups, and due to the differentiated conceptualisation of resilience, it is important when measuring and exploring resilience in a sporting sample, not to assume the same underlying structure of resilience as that of trauma survivors or psychiatric disorder groups (Connor & Davidson, 2003; Galli & Vealey, 2008; Taharadoost et al., 2014). Adversity in sport is characterised by choice of exposure, and individuals can be distinguished from 'sufferers' in that they knowingly 'approach' challenge to develop their capabilities, rather than inadvertently encountering it (Nash et al., 2011). In addition, Sarkar and Fletcher (2014a) suggested that athletes should be encouraged to knowingly seek out challenges to develop. Similarly to the points raised by Yu and Zhang (2007), when discussing resilience across cultures, the construct resilience is therefore likely to have a different 'meaning' in sport compared to that of a clinical setting, and thus the factors emerging in the current study may be reflective of a certain level of preparedness in dealing with adversity.

Although the multidimensional factor structure of the original CD-RISC is not stable across domains, a shortened unidimensional measure utilising 10 of the original 25-items developed by Cambell-Sills and Stein (2007) has been consistently supported. The 10-item refined measure of resilience was developed in response to the methodological shortcomings of the original CD-RISC. Cambell-Sills and Stein (2007, p.1020) made three clear criticisms of the original CD-RISC development processes: (1) an obvious criterion for factor extraction was not stated, (2) the orthogonal rotation used in the EFA meant that factors were not permitted to correlate, and (3) the interpretation of factor themes were conceptually unclear. These critiques fuelled the reanalysis of the measure in the search to improve validity, and in doing so established the abridged 10-item scale. This scale includes items that express an individual's ability to bounce back following adversity or challenge, measured using a unitary dimension structure.

Confirmatory factor analyses with numerous populations including: young Spanish adults (*M*age 20.08+/-4.12; Notario-Pacheco et al., 2011), Chinese earthquake victims (Wang, Shi, Zhang, & Zhang, 2010), as well as adult and adolescent Australian cricketers (Gucciardi et al., 2011), have all shown good model fit, high construct validity and reliability. In addition, a shortened version with less than half of the original items is recognised as a more time efficient and user-friendly measurement tool (Burns & Anstey, 2010). Given that the exploratory factor analysis has yielded a theoretically sound factor structure, which empirically falls just short of acceptable model fit criteria, and that a unidimensional measurement model has been supported by previous researchers including those using adult and adolescent cricketers (Gucciardi et al., 2011), the assessment of a unidimensional measure of global psychological resilience amongst a sample of junior athletes is warranted, regardless of the limitations previously discussed.

3.9 Study 1 (c) Aims.

To explore the unidimensional nature of the CD-RISC 25-item and modified 10-item measurement models proposed by Connor and Davidson (2003) and Cambell-Sills and Stein (2007) amongst junior athletes.

3.10 Study 1 (c) Methods

3.10.1 Participants.

Data from the total sample (N=347) collected during the previous study was employed in Study 2(c) to explore the unidimensional nature of the CD-RISC 25-item and 10-item scales amongst junior athletes.

3.10.2 Measures.

3.10.2.1 The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003).

As previously introduced in section 2.2.2, the CD-RISC is a 25-item measure that was designed to assess resilience by measuring five distinct factors (Figure 1). Global resilience (unidimensional) is measured as the sum of the answers to the 25 items, which gives an overall resilience score out of 100. Connor and Davidson (2003) reported a general population mean of 80.4 +/- 12.8 and a global resilience alpha coefficient of .89.

3.10.2.2 The Connor-Davidson Resilience Scale 10-item (CD-RISC 10; Cambell-Sills & Stein, 2007).

The CD-RISC 10 is a unidimensional refined version of the original CD-RISC, and makes use of 10 of the original items (Table 3.10; α=.85). Questions are answered on a 5-point Likert scale, with anchors of: '0' not true at all to '4' true nearly all of the time. This unidimensional measure calculates global resilience by summing the answers to the 10 items (maximum score = 40). The 10-item unidimensional model has been supported by a number of researchers, who endorse its use over that of the much larger 25-item unidimensional model (Burns & Anstey, 2010; Cambell-Sills & Stein, 2007). The use of this 10-item scale has also been supported amongst a sample of adult and adolescent cricketers (Gucciardi et al., 2011).

Table 3.10

CD-RISC 10-item unidimensional measure of resilience

Item	Description
1	Able to adapt to change
4	Can deal with whatever comes
6	Tries to see the humorous side of things
7	Coping with stress can strengthen me
8	Tend to bounce back after illness or hardship
11	Can achieve goals despite obstacles
14	Can stay focussed under pressure
16	Not easily discouraged by failure
17	Thinks of self as a strong person
19	Can handle unpleasant feelings

3.10.3 Data collection.

This study did not recruit additional participants, or require further data collection to that of the previous study. Please refer back to section 3.2.3 for the initial recruitment process. Participants were required to complete the questionnaire package, which included a demographic questionnaire and the 25-item CD-RISC (Connor & Davidson, 2003), this scale incorporated the questions forming the refined CD-RISC 10 (Cambell-Sills & Stein, 2007) to avoid repetition.

There are a small number of notable limitations when using the same sample from the previous studies to test additional variations of the factor structure of the CD-RISC. In

particular, MacCallum (1986) argued that any findings obtained by a single sample must be viewed tentatively until cross-validated on an additional independent sample. Nevertheless, due to the practicalities of obtaining an additional sample of junior athletes to cross-validate the findings from the current studies, similar procedures to those of Gucciardi et al. (2011), Gonzalez et al. (2016), and Burns and Anstey (2010) were conducted. These numerous studies have conducted multiple CFA's to test variations of the CD-RISC structure on data from the same sample.

All participants and their guardians (where participants were under 16 years of age) were required to provide verbal and written informed consent. An information pack explaining the nature of the study and what participation would involve, was available for all participants and guardians.

3.10.4 Statistical analysis.

Statistical data analyses were carried out using Analysis of Moment Structures (AMOS) and IBM Statistical Package for the Social Sciences Version 20 (SPSS V-20) software for Windows. Descriptive statistics, where appropriate, were presented as means, medians, and standard deviations.

A CFA with Maximum Likelihood Estimation (MLE) was applied to examine the construct validity of the a priori unidimensional models proposed by Connor and Davidson (2003) and Cambell-Sills and Stein (2007) when measuring resilience with a junior athlete sample (N=347).

The hypothesized loading of the 25 items onto a single-factor were assigned using AMOS, this was repeated for the 10-item model (Figures 3.4 and 3.5 respectively). The goodness of fit for the model was assessed based on the following indices: chi-square statistic (X^2/df ratio <3.00); root square mean of estimation (RMSEA <.08), the comparative fit index (CFI ≥.95), the Tucker-Lewis Index (TLI ≥.95), and incremental fit index (IFI ≥.95), based on the guidance of Schreiber et al. (2006).

Figure 3.4. A single-factor 25-item model of resilience entered for CFA. *Note*: e = error, regression coefficients fixed to 1.

Figure 3.5. A single-factor 10-item model of resilience entered for CFA. *Note*: e = error, regression coefficients fixed to 1.
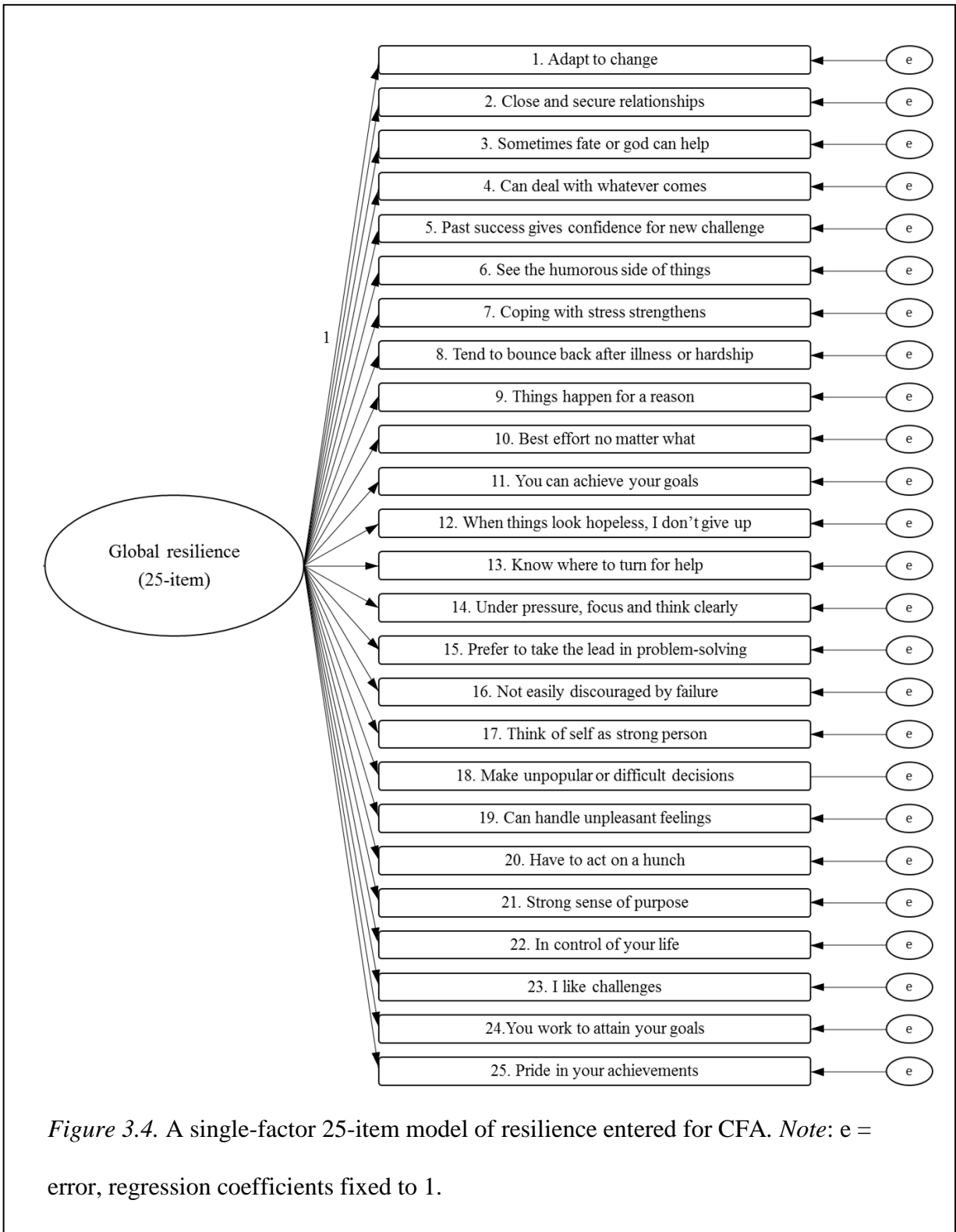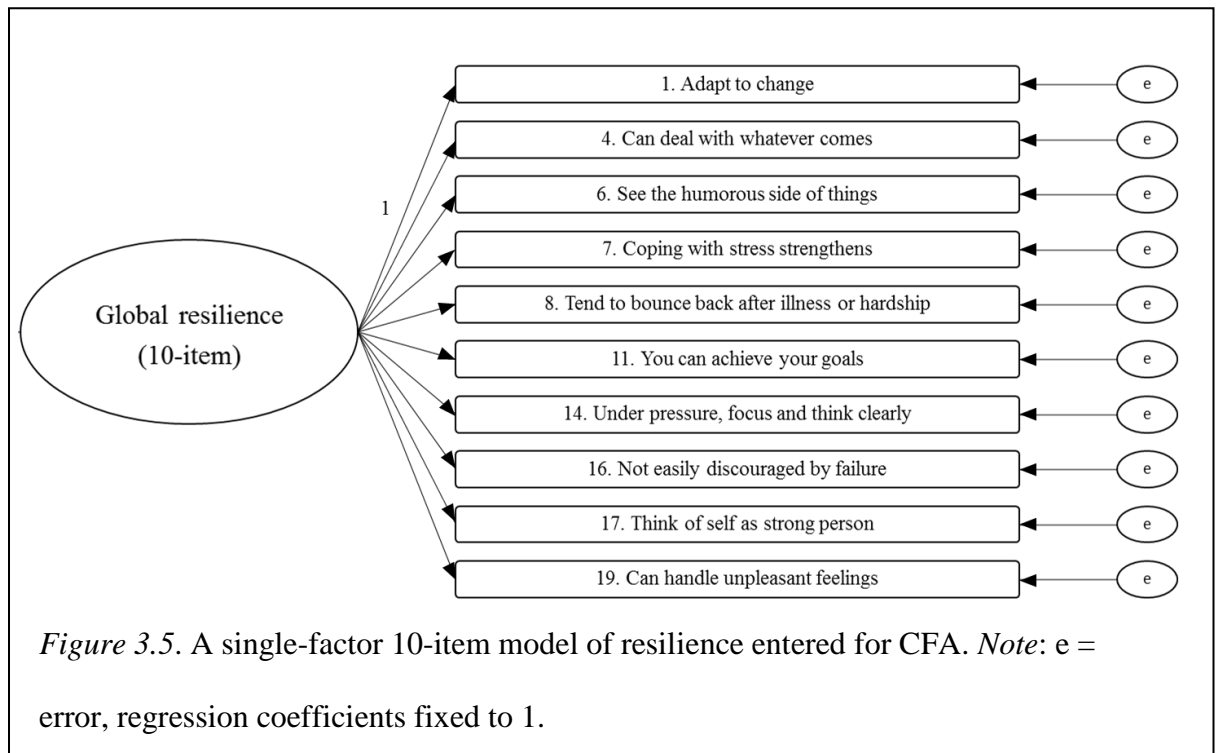
3.11 Study 1 (c) results

3.11.1 Descriptive statistics and reliability estimates.

Descriptive statistics including means, standard deviations, medians and reliability estimates, for the total sample are displayed in Table 3.11. Initial internal reliability estimates of the global resilience unidimensional structures revealed that both models obtained satisfactory alpha levels, (Cronbach's α >.70; Nunnally & Berstein, 1994).

Table 3.11

Means, standard deviations, medians and alpha coefficients

Variables	3	4
Mean	71.16	28.04
%	71.16	70.10
SD	8.93	4.26
Median (1st, 4th Q)	71 (65, 77)	28 (25, 31)
α	.81	.69

Note: N=347
       3 CD-RISC 25-item_Global resilience
       4 CD-RISC 10-item_Global resilience

3.11.2 Unidimensional model fit, 25-item.

Findings indicated that the unitary factor, 25-item model proposed by Connor and Davidson (2003) did not demonstrate acceptable fit following CFA with the data from the current sample (N=347). GFIs were not improved from those of the previously proposed 5-factor or 2-factor models, and the CFA demonstrated poor model fit (X^2 (275)= 532.675, p<.001; Table 3.12).

Table 3.12

Goodness-of-fit indices from CFA of three proposed models of resilience

Model	X^2	df	X^2/df	p	CFI	IFI	TLI	RMSA	90% Confidence interval of RMSA
Model 3	532.675	275	1.937	.000	.794	.798	.772	.052	.045-.059
Model 4	64.486	35	1.842	.002	.921	.923	.899	.049	.030-.068
Model 5	44.992	27	1.66	.016	.950	.951	.934	.044	.019-.066

Note: Model 3: Unidimensional model including all 25 items from the original CD-RISC (Connor & Davidson, 2003); N=347
Model 4: Unidimensional model including 10 items (Cambell-Sills & Stein, 2007); N=347
Model 5: Unidimensional model including nine items from the CD-RISC 10 (Cambell-Sills & Stein, 2007); N=347

3.11.3 Unidimensional model fit, 10-item.

Convergent validity values indicate that the single-factor model utilising the 10 items from Cambell-Sills and Stein's (2007) abridged CD-RISC displayed good levels of fit (X^2 (35) = 64.486, p=.002), thereby supporting Cambell-Sills and Stein's (2007) unidimensional 10-item measure to assess resilience within junior athletes over the previously discussed models.

Table 3.13

Item statistics for the CD-RISC 10-item unidimensional scale

CD-RISC item	Descriptive statistics					
	M	SD	Skewness	Kurtosis	Corrected item-total correlation	α if item deleted
1	2.98	.68	-.31	.43	.30	.68
4	2.77	.75	-.18	.16	.37	.66
6	3.16	.82	-.75	.35	.09	.71
7	2.17	.97	-.09	-.11	.36	.67
8	2.90	.86	-.46	.02	.37	.66
11	3.42	.67	-.78	-.25	.29	.68
14	2.64	.91	-.43	.05	.43	.65
16	2.63	.91	-.37	-.12	.35	.67
17	2.83	.82	-.66	.77	.51	.64
19	2.54	.86	-.22	-.07	.44	.65

Corrected item-total correlations were generally low for all items, however due to a large sample size (N=347) this is to be expected (Table 3.13; Field, 2013,). Item 6 ('I see the humorous side of things') showed an extremely low correlation to the overall total (global resilience, r =.09), and did not correlate with any of the other items included in the scale (r = -.08-.11). Further reliability estimates identified item 6 as unreliable, lowering the overall alpha coefficient of the scale. Following iterative deletion of this item the alpha value raised to an adequate .71 from .69. An additional CFA confirming a newly proposed 9-item unidimensional measurement model was performed (Figure 3.6). Although GFI fell marginally short of the stringent threshold value for TLI (>.95), this 9-item model can be accepted as a superior model for measuring resilience as a unidimensional construct in junior athletes as it offers better model fit indices than those of the originally proposed 25-item and 10-item models, as well as increased reliability.

Figure 3.6. A single-factor 9-item model of resilience entered for CFA. *Note*: e = error, regression coefficients fixed to 1.
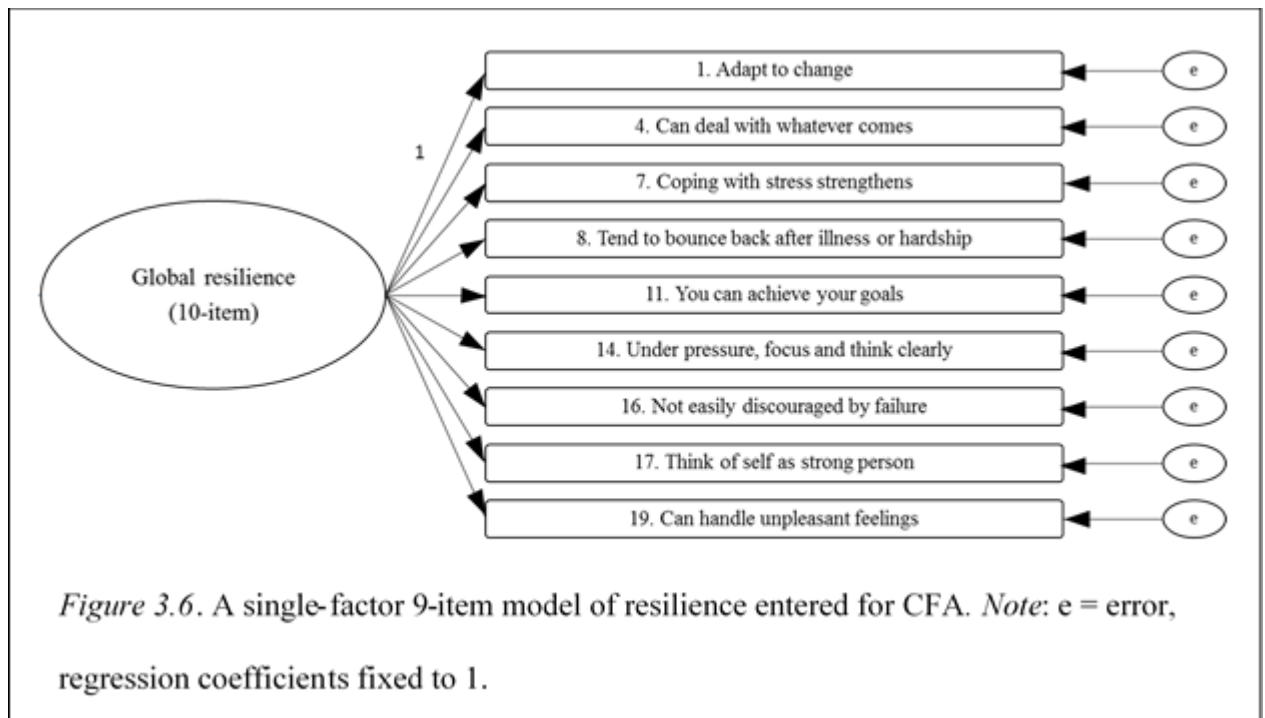
3.12 Study 2 (c) Summary

The present study aimed to assess the unidimensional structure of the CD-RISC using both the originally proposed 25-item scale (Connor & Davidson, 2003) and the abridged 10-item scale (Cambell-Sills & Stein, 2007). The results showed that the 25-item unidimensional structure did not show good model fit when measuring the psychological resilience of junior athletes, when compared to the shortened 10-item version. This supports the findings of Gucciardi et al. (2011) whom recognised the 10-item unidimensional scale as the superior model, over both the a priori 5-factor multidimensional and the 25-item global resilience model.

In the current study, the 10-item unidimensional model showed good model fit, however, reliability analyses and corrected item-total correlations highlighted item 6 'I see the humorous side of things' to be unreliable and showed very low correlations with the other items comprising the scale and the total score. Gucciardi et al. (2011) also found item 6 to be problematic with both adult and adolescent samples. Following iterative deletion of item 6 from the scale, a newly modified 9-item model was subject to CFA, and showed improved model fit in comparison to previous models.

There is clear theoretical as well as empirical rationale for the deletion of item 6 from the scale, which is paramount when considering scale modifications (Williams, Brown, & Onsman, 2012). Kaiseler, Polman, and Nicholls (2009) showed that humour (an emotion focussed coping strategy) is negatively associated with mental toughness and

hardiness qualities amongst a sample of athletes. When considering qualities associated to resilience more specifically, humour negatively predicts commitment and perceived control of life; meaning athletes showing high-level commitment are less likely to use humour as a coping strategy. Kaiseler et al. (2009, p.732) go so far as to state 'mentally tough athletes do not give up and are not likely to laugh things off'. Therefore, because of the conceptual overlap, and the shared qualities of mental toughness, hardiness, and the characteristics associated with fostering resilient adaptation within sport (Collins & MacNamara, 2012; Fletcher & Sarkar, 2012), the decision to delete this item appears justified.

Of the unidimensional models of resilience, the 9-item modified version appears to demonstrate the highest GFI indices, however it is also important to consider the 'quality' of the scale when deciding between competing models. The following section aims to give a comprehensive empirical comparison of the previously proposed multi- and unidimensional models of resilience, and the emergent 2-factor and unitary 9-item structures; taking into account subtle differences in objective goodness of fit indices and a model comparison using Chi squared tests of difference.

3.13 Overall model comparison

The aim of this final study within this chapter was to examine the comparative fit of the models explored thus far using Chi squared (X^2) tests of difference, and to suggest the 'best fitting' model to assess resilience characteristics in junior athletes using the CD-RISC (Connor & Davidson, 2003). The Akaike Information Criteria (AIC) was also used to assess the quality of each model in relation to the information lost from reducing the number of parameters in each of the models (relative likelihood). Comparisons were made using the following equation, whereby AIC_{min} represents the preferred model with the lower AIC value and AIC_i represents the comparison model: Exp $((AIC_{min}-AIC_i)/2)$. An overall improvement of model fit between the models was shown, Table 3.14 presents a summary of GFIs and model comparison statistics.

Of the multidimensional structures, the 2-factor measurement model that emerged from EFA on a random sample of the junior athletes data was shown to have superior model fit (p<.01) than the originally proposed 5-factor model. This is corroborated by the goodness of fit indices, which were closer to the threshold values suggested by Schreiber et al. (2006). The relative probability that the 5-factor model minimizes the (estimated) information loss calculated using AIC values was extremely low (1.49x 10(^-72)), which suggests that the 5-factor model should be omitted from further consideration.

The 25-item global resilience model emerged as the worst fitting unidimensional structure tested using a X^2 test of difference, when compared to the 10-item shortened version of the CD-RISC (Cambell-Sills & Stein, 2007), and the further modified 9-item model (p<.01). A X^2 test of difference also revealed that the modified 9-item scale was the better fitting of the two shortened version models. The relative probability that the 10-item unidimensional model minimizes the (estimated) information loss calculated using AIC values was again very low (7.9 x 10(^-6), suggesting that Cambell-Sills and Stein's (2007) 10-item model does not limit information loss over a 9-item model. Overall, the GFI's support the use of the 9-item scale as a better fitting model when measuring resilience as a unidimensional construct within junior athletes, and the general 'quality' of the scale in relation to information loss is improved. In response, the 10-item scale was omitted from further analysis.

The best fitting multi- and unidimensional models were also compared. Higher GFI's support the 9-item model as having enhanced fit, however, the X^2 test of difference specified neither the 17-item 2-factor structure, nor the 9-item single-factor scale to be superior; revealing that these models fit the resilience data collected with junior athletes comparatively (p>.01). As with the previous model comparisons, the relative probability that the 2-factor model minimizes the (estimated) information loss was low (1.54 x 10(^-34)), supporting the use of the 9-item unidimensional model. Although the statistical 'estimated information loss' support the use of the 9-item beyond that of a 2-factor model, it is paramount that the 'theoretical loss of information' is considered when choosing appropriate measurement tools. When exploring a complex construct such as psychological resilience, a single 'global' measurement tool may miss the intricacies concerning the processes and characteristics that underpin an athlete's successful reintegration back into sport following adversity. A single structured tool such as this may have benefits such as convenience of distribution and speed of completion, and should not be discounted when a simple global measure of resilience is necessary to answer the research question. Nevertheless, in the context of the current thesis, which aims to explore the construct of psychological resilience in junior athletes, a more complex sample specific tool yielding the most comprehensive account possible is favoured. Theoretical implications of employing a multi- or unidimensional measurement model are discussed in the following sections.

Table 3.14

Goodness-of-fit indices from CFA of three proposed models of resilience

	Model	X^2	df	X^2/df	p	CFI	IFI	TLI	RMSA	90% Confidence interval of RMSA	AIC	Model comparisons [a]
Multidimensional models	Model 1	447.484	265	1.69	.000	.854	.858	.835	.045	.037-.052	567.484	M1 < M2
	Model 2	166.707	118	1.413	.002	.897	.901	.881	.047	.029-.063	236.707	M2 > M4
Unidimensional models	Model 3	532.675	275	1.937	.000	.794	.798	.772	.052	.045-.059	632.675	M3 < M4 / M3 < M5
	Model 4	64.486	35	1.842	.002	.921	.923	.899	.049	.030-.068	104.486	M4 < M5
	Model 5	44.992	27	1.66	.016	.950	.951	.934	.044	.019-.066	80.992	M5 = M2

Note: Model 1: Original a priori five-factor model (Connor & Davidson, 2003); N=347
Model 2: Proposed two-factor model emerging from EFA; n=184
Model 3: Unidimensional model including all 25 items from the original CD-RISC (Connor & Davidson, 2003); N=347
Model 4: Unidimensional model including 10 items (Cambell-Sills & Stein, 2007); N=347
Model 5: Unidimensional model including 9 items from the CD-RISC 10 (Cambell-Sills & Stein, 2007); N=347
[a] Model fit comparisons were carried out using chi squared test of difference (p=.01): (=) indicates comparative model fit, (<) indicates worse fitting model.

3.14 Discussion

A number of scales targeting the measurement of resilience have been developed and widely employed across a variety of areas. Nevertheless, the desire for a sport specific tool to assess resilience amongst athletes is ever increasing (Sarkar & Fletcher, 2013). Versions of the Connor-Davidson Resilience Scale (CD-RISC) have been broadly deployed across a number of different contexts, with numerous authors seeking to confirm the scale's proposed factor structure or establish any emergent factor structures underlying resilience within different populations (Burns & Astay, 2010; Karaırmak, 2010; Yu & Zhang, 2007; Sexton et al., 2010). The initial aims of the current study was to test the structural validity of the hypothesised unidimensional 25- and 10-item global resilience measures and the multidimensional 5-factor structure from the original 25-item CD-RISC, in a junior sporting context. An additional aim was to explore enhancements to the originally proposed structures and increase the structural validity of the scale for use amongst a heterogeneous sample of junior athletes. This approach aimed to build upon the work of Gucciardi et al. (2011) by exploring emergent multidimensional structures amongst this participant group. The findings showed that although a shortened 9-item unidimensional measure of psychological resilience had good model fit (shown through the highest GFI values), a multidimensional model that yielded two coherent factors which clearly reflect the previously identified distinct processes of resilience in sport (cf. Sarkar & Fletcher, 2014b; MacNamara et al., 2010) had comparable fit when compared using a chi squared test of difference.

A number of recent researchers have supported the use of a global measure of resilience, choosing a simple unitary structure over a more complex multidimensional measure, emphasising the instability of the 5-factor structure as rationale (Carli et al., 2014; Kukihara et al., 2014; Min et al., 2013). Indeed, Connor and Davidson (2003) themselves chose only to report the global scores when comparing psychological resilience across their samples, even though their factor analysis in the same study had yielded 5-latent variables. The 25-item global measure has also been used by a number of authors such as Smith et al. (2008) to assess the criterion validity of newly developed single dimension scales such as the brief resilience scale. In their study, Cambell-Sills and Stein (2007) supported a 10-item unitary measure of psychological resilience with a sample of American undergraduate students. Due to the weaknesses in the original scale development as previously discussed, Cambell-Sills and Stein (2007) suggested that a unidimensional measure that yields a global resilience score is superior to the original multidimensional

model based on its improved validity and stability across independent samples. Global resilience scores assessed by this scale (out of maximum of 40) are proposed to reflect an individual's ability to bounce back. Although this global resilience score may give a reasonable 'snapshot' as to an individual's ability to cope with adversity, Cambell-Sills and Stein (2007) themselves alluded that the content validity of the abridged version may suffer as a consequence of the deletion of so many of the original items. A study by Gucciardi et al. (2011), which aimed to explore the dimensionality and measurement invariance of the CD-RISC in a sport specific sample using adult and adolescent cricketers, supported the use of the abridged 10-item unidimensional structure proposed by Cambell-Sills and Stein (2007), and did not support the multidimensional 5-factor measurement model. In the current study, both the unidimensional 25-item, and the abridged 10-item measures were submitted to confirmatory factor analysis to assess model fit within the sample of junior athletes.

The data from the current study showed poor model fit of the 25-item single dimension structure, and adequate fit when applying the 10-item unitary structure to CFA. Follow-up reliability analysis highlighted problems with item 6 ('I see the humorous side of things'), which lowered the overall alpha coefficient. Following deletion of this item an additional CFA showed that a 9-item unidimensional model had improved fit to that of the 10-item, and displayed acceptable goodness of fit indices in accordance with Schreiber et al's. (2006) thresholds. Nevertheless, there remains weaknesses with retaining an over simplified measurement model, specifically when measuring a complex construct such as resilience, which is multifaceted and dynamic in nature (Tusaie & Dyer, 2004; Rutter, 2013). A broad ranging, unitary structure may not allow subtle changes in resilient qualities to be assessed suitably, and may overlook factors of importance within specific populations. This is of particular importance when measuring resilience within a sporting population, as it is important to capture the key definitional elements of resilience in sport (i.e., protective factors, adversity, and positive adaptation; Fletcher & Sarkar, 2012). It may be argued that a broad unitary measure such as the 10-item CD-RISC (or indeed the 9-item version supported in the current study) which includes items developed for a general population sample, do not operationalise in athletes facing very different challenges and pressures.

Although previous research into the measurement of resilience in junior athletes by Gucciardi et al. (2011), has already shown support for global measure over a multidimensional one, the current study has built upon this analysis by taking an exploratory as well as confirmatory procedural approach which intended to allow the

structure of resilience to be operationalised within a junior athletes sample. Initial confirmatory factor analysis revealed that the original multidimensional 5-factor structure (Connor & Davidson, 2003) was not supported with the current sample of junior athletes. Fundamentally, this means that construct equivalence of psychological resilience across populations has not been found. This suggests that assuming the a priori factor structure of the CD-RISC is inappropriate when measuring resilience in junior athletes, and may lead to misleading or invalid inferences from data. Exploration into the multidimensional nature of resilience in the current sample using an EFA on a random selection of the data (n=163), resulted in the emergence of a 2-factor model. The goodness of fit indices from a follow up CFA (conducted with the remaining data) on this emergent model, demonstrated acceptable model fit which was far superior to that of the originally proposed 5-factor model with the current sample.

Importantly, the 2-factor model showed excellent theoretical fit based on the item loading patterns, which retained 17 of the original 25-items and accounted for 28.01% of total variance, which is notably lower than both the Chinese version (45%; Yu & Zhang, 2007) and the Turkish version (52%; Karaırmak, 2010). The first factor explained 20.49% of total variance, and extracted 10 items including: 'under pressure, I focus and think clearly' and 'I can handle unpleasant feelings'. This factor consisted of a variety of items which originally loaded onto three different factors of the hypothesised structure; with two items from the factor named *personal competence, high standards and tenacity*, six items from the factor named *trust in one's instincts, tolerance of negative affect, and strengthening effects of stress*, and a final two items from *positive acceptance of change, and secure relationships.* Although the clustering of items loading onto the first factor of the emergent model may appear unrelated given the combination of loadings from the original, upon further scrutiny, it is clear that the items within this factor had commonalities relating to *control through adversity*. All items within this factor reflected an individual's perceived level of control over the adversity or challenge (e.g., 'I can deal with whatever comes'), as well as the protective systems that allow an individual to remain in control through difficult situations (e.g., 'I think of myself as a strong person'). The remaining seven items that loaded onto the second factor explained 7.16% of the total variance, and included six items from the originally proposed factor named *personal competence, high standards and tenacity*, and one further item from the original factor labelled *control.* Upon inspection, the clustering of items appeared well-defined, and had shared characteristics concerning the hard work and effort involved in overcoming adversities (e.g., 'best effort no matter what'), as well as the perseverance involved in

striving for personal growth (e.g., 'I work hard to achieve my goals' and 'when things look hopeless I don't give up'). The label of *growth mind-set* was assigned to this factor, as the associated items were considered to be aligned with the notion that effort and practice are key contributors in promoting positive change when experiencing challenge (Dweck, 2009).

The measurement structure that emerged from the current study using the CD-RISC suggests that resilience in athletes is more integrative in nature (as opposed to the more defined differentiated a priori structure), whereby more holistic factor themes are representative of an individual's ability to respond positively to adversity (Karaırmak, 2010). The first factor reflects how a resilient athlete is able to make clear and often difficult decisions to overcome significant challenges; they are also able to respond well to the pressure and stress which are inherent with adversity in sport. An individual's control through adversity is shown to include both behavioural and cognitive elements, including protective mechanisms such as thinking as oneself as a strong person, and personal characteristics including leadership and problem-solving skills. This emergent factor reflects the findings of previous research outside of sport, which has suggested resilient reintegration or positive adjustment is dependent on the perceived controllability of the risk factors experienced, with both efficacy and autonomy of individuals playing a vital role (Sun & Stewart, 2007). When considering the conceptualisation of resilience in sport, Galli and Vealey (2008) also recognised that a combination of cognitive and behavioural strategies play a key role in what they labelled the 'agitation' phase of the resilience process, whereby athletes are experiencing mental struggles and unpleasant emotions. Although, personal resources that facilitate the perception of control when dealing with adversity have also emerged as factors using different populations (Connor & Davidson, 2003), understanding the specific clustering of items has the potential to positively influence resilience development. This is particularly pertinent in a sporting population when one considers the anticipatory nature of adversities across a sporting career, and the opportunities for both physical and mental training to facilitate perceived control and ultimately improve resilience.

The second factor, which emerged in the current study, may be suggestive of how resilience in sport is operationalised when facing challenges by positively influencing motivation, hard work, and perseverance. This factor is reflective of the core component of the grounded theory of psychological resilience in Olympic champions (Fletcher & Sarkar, 2012), which suggests that perceiving stressors as opportunities for growth, development and mastery is associated with resilience and high-level performance in athletes. Factor 2

was labelled *growth mindset* to reflect the effective behavioural responses associated with making the most of adversities by viewing them as development and learning opportunities. An individual with a growth mindset values effort and improvement and is orientated towards learning and striving to reach their goals (Dweck, 2012). Yeager and Dweck (2012) have made a link between mindsets and resilience and suggest that those with implicit theories that maintain that characteristics such as personality, intelligence and ability are fixed and unchangeable, are often left feeling inadequate and socially excluded when facing challenges, even when this is not the case (Blackwell, Trzesniewski, & Dweck, 2007; Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011). In comparison, those individuals with implicit personal theories that they have the potential to change and develop are more likely to respond to adversity with in a way that promotes adaptation and personal growth (Yeager & Dweck, 2012). Although the majority of research into growth mindset has been conducted in an education setting, with little focus on translating findings into sport, the research has shown quite conclusively that through teaching and subsequent adoption of a growth mindset performance can be improved (Dweck, 2008). This has clear implications for applied practice influencing resilience in sport, as athletes facing inevitable and substantial challenges through their sporting careers may be taught a growth mindset to strive for a level of performance beyond that which was previously attained (Dweck, 2009).

The emergence of this factor appears to be specific to a sporting population, and has not been shown as an independent factor in any other population to date. The factor structure of the Resilience Scale for Early Adolescents (RSEA), which used a similar age range to that of the current study also did not support an independent factor relating to growth mind-set (Baltacia & Karataş, 2014). This suggests that the conceptualisation of resilience in a junior sporting context differs to that of psychological resilience outside of sport, even within individuals of an equivalent age. One argument which may help explain this, is that the motivations of athletes experiencing adversities differs to that of the general population, in that athletes are more often seeking to improve performances and achieve success in their career, rather than maintain stable functioning. Although successful adaptation is a key definitional feature of resilience, it is more likely that athletes are active in seeking positive personal development and increased competence.

Although the 9-item unidimensional model produced better GFI values than the 2-factor model, which were closer to the stringent thresholds suggested by Schreiber et al. (2006); when comparing the quality of the two emergent measurement structures using a chi-squared test of difference, the models were shown to have comparable fit.

Nevertheless, considering the theoretical support for the 2-factor measurement model, and the weaknesses already discussed with retaining an over-simplified structure, the use of the 2-factor structure would be the superior choice when assessing the psychological resilience in junior athletes. By employing this newly emergent structure, the testing of theoretically driven research questions concerning the nature of resilience in junior sport can be accurately conducted. In addition, it would be valuable to analyse correlates with associated concepts such as stress, coping, and burnout; and in particular, given the suggestion of Fletcher and Sarkar (2012) that individuals should be seeking challenges to develop resilience, correlates with personality characteristics such as sensation seeking tendencies and risk taking behaviours would be warranted.

Both items 3 ('sometimes fate or God can help') and 9 ('things happen for a reason') which formed the original factor *spiritual influences*, did not load onto the new structure, which ultimately removed all spiritual or religious dimensions of resilience. Similarly to the findings of Karaırmak (2010) and Yu and Zhang (2007), this suggests the spirituality construct does not differentiate resilience in athletes, or at the very least does not function as an independent factor. The participant sample in the current study were ethnically non-diverse, however information regarding tendencies towards spirituality and religion were not gathered. Considering the integration of religions and the diversity of religious views within the United Kingdom, it is perhaps not surprising that an independent spirituality component was not extracted. Numerous authors have reported the importance of religious beliefs in athletic careers, facilitating personal growth and overall well-being (Watson & Nesti, 2005; Maranise, 2013), but its role is yet to be fully understood in the context of resilience and adversity negotiation. Nevertheless, given its importance for some individuals, additional study is required to assess its role in resilient reintegration for athletes following adversity.

Previous authors outside of the sporting environment have also failed to verify the original psychometric qualities of the CD-RISC, with distinctive pattern structures emerging within Turkish trauma survivors and Chinese general population samples (both 3-factor; Karaırmak, 2010; Yu & Zhang, 2007), American undergraduate students (single-factor; Cambell-Sills & Stein, 2007), and in a large sample of community-dwelling older women with a mean age of 72.7 years (4-factor; Lamond et al., 2008). Within an older population sample, Lamond et al. (2008) found emergent factors associated with the expectance and toleration of negative affect, as opposed to the tenacity and high standards themes which have occurred in younger samples (Connor & Davidson, 2003; Yu & Zhang, 2007). Emergent factors associated with a tendency toward spirituality in Turkish

earthquake survivors (Karaırmak, 2010), also fosters the argument that the psychometric qualities of psychological resilience are specific to the population's demographic characteristics and environment (e.g., age, culture) and the original factor structure is therefore unstable when employed across different samples. It could be argued that there are three likely causes of these differences. First, the dimensional nature of resilience may manifest differently based on the nature of the challenges or adversities encountered (Lamond et al., 2008). For example, some populations may predominantly experience short-term obstacles whereas others may encounter more chronic challenges such as bereavement or long bouts of ill health. Whether an individual is facing an anticipated or unexpected challenge may also define the way in which it is negotiated. Challenges in sport such as important competitions, transitions, and even bouts of poor performance are often foreseen, which may allow individual to prepare and increase the perception of control through adversity.

Second, the structure of resilience may be reflective of goals or expectations succeeding any challenges faced, whereby structural differences in the constitution and interaction of protective factors independently reflect those labouring to survive, and those attempting to improve and thrive. Numerous authors have suggested that experiencing adversity can facilitate an individual's psychological resilience (Flach, 1997; Galli & Vealey, 2008; Richardson et al., 1990). It may therefore be argued that such challenges in sport can provide a 'teachable moment' (TM) or "opportunity for meaningful change" (Fletcher & Sarkar, 2012, p.673) to individuals which offers learning experiences, but also acts as a cue to increased effort and motivation which can facilitate positive behavioural and cognitive outcomes (Bateman & Crant, 2003; McBride, Emmons, & Lipkus, 2003). Specifically within sport, the challenges faced are often viewed as influential in shaping future performance, and has been recognised as a key consideration when providing performance pathways to develop young athletes (Durand-Bush & Salmela, 2001; Howells & Fletcher, 2015). This notion has been supported by Collins and MacNamara (2012, p. 2) whom suggested that a "purposeful provision of such challenge at appropriate levels is an essential feature of any TD [talent development] system" to promote the resilience process.

Third, the inherent and pre-emptive nature of challenge with an elite sport setting can provide a platform for the development and training of psychological skills associated with the resilience process, offering a provision not available to those who are guarded from or do not have opportunity to prepare for small challenges or significant one-off trauma (Howells & Fletcher, 2015). In addition, this notion can be linked with theories of posttraumatic growth (Calhoun & Tedeschi, 2006) or stress-related growth (Park, Cohen,

& Murch, 1996) which suggest that those experiencing significant hardship in sport can benefit from increases in perceived benefits such as self-perception, mental toughness and motivation (Bianco, Malo, & Orlick, 1999; Howells & Fletcher, 2015; Hurley, Moran, & Guerin, 2007). These theories help to understand the specific operationalisation of resilience in sporting populations whereby individuals are intentionally striving to improve, and explain the reason behind the emergence of factors relating to effort and perseverance (*growth mind-set*) within junior athletes.

3.14.1 Strengths and limitations.

A number of limitations were identified in the current study. First, the self-report nature of the CD-RISC questionnaire suffers from a number of inherent problems such as: limited generalisability of the results, cognitive issues regarding question comprehension, and situational issues concerning the setting in which the questionnaires were completed (Brener, Billy, & Grady, 2003). The language of the original CD-RISC was not modified for this study, however clarification of terms was given verbally by the research team if requested. Aligning appropriate language with the target population may have improved the validity of the data collected (Brener et al., 2003). In addition, although participants are asked to answer truthfully, desirability bias is a key consideration when using self-report assessments in a sporting population. The assumption that information may be used to select teams or drop individuals is hard to supress and may ultimately affect the emerging psychometric properties.

The assessment of convergent validity and test-retest reliability were not considered in the current study. The inclusion of additional scales, such as measures of hardiness and burnout used by Gucciardi et al. (2011), may have strengthened understanding of conceptual overlap. This may have emphasised fundamental characteristics that positively correlate or correspond with resilience in junior athletes, or highlighted qualities, which stimulate negative symptoms or maladaptive reintegration following adversity (Gucciardi et al., 2011).

Although the CD-RISC has been exercised with a number of samples of similar age ranges to that of the current study (Gucciardi et al., 2011; Yu et al., 2011), the scale was originally used for measuring resilience in general and clinical adult samples. This restricts the observed variables and the 'meaning' of resilience from being specific to the population used in the current analysis. This may mean that aspects of resilience that are important in a sporting or junior athlete context have been omitted, this may also go some way to explain the low percentage variance obtained by the modified structure. Future

studies should consider the development of a sport specific measurement tool or the inclusion of additional sport specific items to strengthen the existing structure.

The current study contained comparable numbers of male and female participants from a covering an age range from 12 to 18 years. This allowed a wide-ranging measure of resilience with scope for use with a range of junior athletes from a number of different sports to emerge. Gucciardi et al. (2011) found measurement invariance across ages; however, gender variance has been highlighted when measuring resilience in adolescents (Stratta et al., 2013). Future researchers should consider how both gender and age effects may have influenced individual's responses to items, and if assessed independently in a sporting context would these samples yield differing factor structures.

However, despite these limitations, the current study utilises robust statistical analyses, employing a theory driven approach to test the previously hypothesised models of psychological resilience using CFA, and an exploratory approach which allowed factors to be extracted based on sample specific loading characteristics (Schreiber et al., 2006; Henson & Roberts, 2006). CFA is a respected analytical procedure that takes into account existing theoretical relationships between observed and unobserved variables (Hagger & Chatzisarantis, 2009), and provided a robust measure of structural and construct validity within this this study. Although EFA is criticised based the overall subjectiveness of results, and particularly on researchers' tendencies for pragmatic rather than theoretical interpretation of factors (Williams et al., 2012). Subjectiveness of the EFA was limited in the current study by following the guidance of Henson and Roberts (2006), who state that the researcher must apply thoughtful judgement when considering analytical decisions based on factor extraction, as well as the explicit reporting of the decisions the procedures followed.

The current study has added to previous research involving the confirmation and exploration of underlying resilience structures using the CD-RISC 25-item (Connor & Davidson, 2003) and the CD-RISC 10-item measures with a sample of junior athletes. The findings extend the work of Gucciardi et al. (2011) which used a homogenous sample of adolescent cricketers; and sought to explore resilience in individuals with a range of sporting backgrounds not previously targeted. The 2-factor measurement structure offers future researchers in sport the potential to measure resilience within junior athletes using an improved theoretically sound context specific tool. By employing this newly formed coherent 2-factor measure, researchers can be confident that the 'meaning' of resilience within a junior sporting population has not been lost. The findings of the current study are of value to both practitioners and researchers seeking to improve conceptual understanding

of resilience in this population, and has the potential to inform intervention and applied practice.

3.14.2 Summary.

The present study provided additional evidence of the inadequacies of the a priori multidimensional model of resilience, and did not support the originally proposed five-factor structure (Connor & Davidson, 2003) with a reasonably large sample of junior athletes. Two modified versions of the CD-RISC emerged from the analysis of the current study with psychometric qualities that were shown to be both reliable and valid measures of resilience when used with a sample of junior athletes. The initial structure emerged through exploratory factor analysis, measuring resilience as a multidimensional structure, whereas a second structure was obtained through CFA and further modification of the abridged 10-item unidimensional scale (Cambell-Sills & Stein, 2007). Goodness of fit indices supported the latter unidimensional structure, yielding GFI's which were closer to the stringent thresholds suggested by Schreiber et al. (2006); although, when comparing the quality of the two emergent measurement structures using a chi-squared test of difference, the models were shown to have comparable fit. The emergent 2-factor model has emphasized the differences between the conceptualisation of resilience and adversity in junior sport in comparison to other non-sporting populations. Although the 9-item unitary measure and the 2-factor multidimensional measure have both been supported empirically, the theoretical support for the latter model suggests that this measure has scope for exploring the nature of resilience in junior athletes, and has the potential to shape understanding of the construct of psychological specific to a junior sporting population.

Issues have been raised by previous authors concerning the need for cross-cultural comparisons of imported paradigms and measurement tools that target the resilience construct, as different structures to those previously proposed have elicited more meaningful interpretation (Yu & Zhang, 2007). The current author argues that similar problems can occur when exploiting a measure created for general or clinical use, and applying (or importing) it to a sporting sample. The application of this original measurement model to an athlete population may be particularly problematic, as individuals' relationships with challenge and adversity is likely to be distinguished from that of the general population, whereby athletes are willingly exposed to competitive environments that are riddled with adversity potential. This would suggest that the implications of the construct differ across contexts, for example in a sporting context, an individual may relish an opportunity for positive adaptation and resilience may reflect a

level of preparedness in approaching adversity, whereas others may be forcibly exposed to unanticipated life threatening or life limiting challenges.

Future studies should aim to use the new 2-factor measurement tool to explore the nature of resilience amongst junior athletes, focussing on age, gender, and sport type differences. In addition, due to the emergence of a factor relating to growth mindset, and the suggestion that exposure to challenge can facilitate personal growth and resilience; an investigation into how resilience links with personality characteristics associated with risk exposure (such as sensation seeking) would be encouraged.

Chapter 4

Study 2- Exploring the nature of resilience in junior athletes

4.1 Introduction

By understanding the nature of resilience in sport, in particular amongst junior athletes, we can begin to understand several important factors. For example, how resilience manifests within different environments (e.g., team and individual); individual differences (e.g., gender, personality); the mechanisms by which resilience can be developed; and the potential links with performance outcomes. Inquiries into the nature of psychological resilience with junior athletes at a pre-professional level warrants further exploration, to supplement research using senior athletes and inform us of the foundation from which psychological resilience emerges or develops (Fletcher & Sarkar, 2012).

4.2 Aims

The aims of this chapter aligns with Aim 1 of this thesis and were achieved through targeting Objective 3. Specifically, given the emergence of a sport specific measurement model in the previous chapter, this study aims to explore the nature of resilience in junior athletes using the modified CD-RISC scale, with specific consideration of individual and team sport differences, sensation seeking characteristics, age, and gender. It is hypothesised that there will be a positive relationship between the two factors of the modified CD-RISC scale and sensation seeking. With consideration of previous research findings, it is also expected that there will be a difference in resilience and sensation seeking between gender groups and sport types, with male team athletes displaying the highest level of psychological resilience and sensation seeking. Due to the challenging nature of the competitive environment for adolescent sport, it is also expected that resilience will increase with age.

4.3 Methods

4.3.1 Participants.

Junior athletes (N=373) representing both individual and team sports participated in this study. Data from 26 respondents were excluded (listwise) from data analysis due to omissions in the reporting of key demographic information (n=26), or missing data (n=6). The final sample (N=347) consisted of 152 male (43.8%) and 195 female (56.2%) athletes aged 12 to 18 years inclusive (M age=15.42, SD=1.72). Participants represented 19

different sports, these comprised of: 12 individual sports, including swimming, table tennis, gymnastics, and equestrian (n=151, 43.5%); and six team sports including football, rugby, netball, and handball (n=196, 56.5%). All athletes were current junior sports performers, competing at regional level or above and/or were part of an elite academy or regional training program. Ethical approval was sought from the Faculty of Life Sciences Research Ethics Committee of the main researcher prior to the commencement of the study. Verbal and written informed consent was obtained from all participants and guardians (where participants were under 16 years of age) after receiving information about the study and their involvement.

Study 2 and Study 1 used the same sample population. Although it could be argued that independence of data was violated in this instance, resulting in findings, which can only tentatively be applied to the population (MacCallum, 1986), the rationale for using the same sample was two-fold. First, as a modified structure of the CD-RISC emerged in Study 1, by using the same sample, one can be confident that the best fitting model to explore the nature of resilience is being used for this specific sample. This approach to exploring the structure and nature of psychological constructs in sport with the same sample across number of studies (e.g., Hammond, Young, & Loretta, 2014; Konjarski Marsh, Nagengast, & Morin, 2012). Second, as the large volume of data collected for Study 1 took a considerable length of time to obtain, using the same data lent itself to both practicalities and efficiency in relation to the research programme.

4.3.2 Measures.

4.3.2.1 The Emergent CD-RISC scale.

This measure is a modified sport specific version of the CD-RISC that emerged in the previous chapter. This is a 17-item 2-factor multidimensional self-report questionnaire which shows good internal consistency and can be used as a reliable and valid measure of resilience in an athletic context (α=.80), with greater scores reflecting higher resilience. The scale is answered on a 5-point Likert scale, with anchors of: '0' *not true at all* to '4' *true nearly all of the time* (Connor & Davidson, 2003). The two factors are labelled: control through adversity (10 items), and growth mindset (7 items). See Chapter 3 for factor structure and associated items.

4.3.2.2 The Brief Sensation Seeking Scale (BSSS; Hoyle et al., 2002).

The BSSS is an adapted version of the Sensation Seeking Scale form V (SSS-V; Zuckerman, Eysenck, & Eysenck., 1978) developed for use with adolescents. The scale

measures dispositional risk taking behaviour on the four primary dimensions of sensation: thrill and adventure seeking (TAS) [2 items; e.g., 'I like to do frightening things'], experience seeking (ES) [2 items; i.e., 'I would like to explore strange places'], disinhibition (D) [2 items; i.e., 'I like wild parties'] and, boredom susceptibility (BS)[2 items; i.e., 'I get restless when I spend too much time at home']. The BSSS is answered on a 5-point scale labelled '*strongly disagree*' to '*strongly agree*'. Hoyle et al. (2002) found BSSS score to be a valid and reliable predictor of risk taking behaviours. The BSSS in the current study had an overall Cronbach Alpha value of .72.

4.3.3 Procedures.

To recruit junior athletes for the current study a number of team coaches, governing body administration assistants, and club directors were contacted across a range of different sports. All participants and, where appropriate, parents/guardians provided informed consent prior to completion of a questionnaire package. Participants were informed that their participation was voluntary and that they could withdraw at any stage of the study without consequence.

The questionnaire package consisted of three sections. First, junior athletes completed a demographic questionnaire designed to gather information regarding their age, sport, and level of participation for the purpose of individual categorisation. This also served as a method for coding data to preserve anonymity. The final two sections included the modified CD-RISC and the BSSS. Questionnaire packs were distributed by the lead researcher in paper form and were completed by participants at their training or event facility where possible. The time required for the participants to complete the questionnaire package was approximately 15-20 minutes. Athletes returned the completed questionnaires to the researcher in a sealed envelope.

4.3.4 Statistical analysis.

Statistical data analyses were carried out using IBM Statistical Package for the Social Sciences Version 20 (SPSS 20) software for Windows. Descriptive statistics, where appropriate, were presented as means and standard deviations.

A two-way (2x2) analysis of variance (ANOVA) was conducted to compare the main effects of gender and sport type on each of the Modified CD-RISC Factors 1 and 2, and the interaction effect between these two independent variables on resilience. A second two-way ANOVA was also conducted to compare the main effects and interaction effects of gender and sport type on global sensation seeking scores. Relationships between

resilience and sensation seeking scores were assessed using Pearson's correlations. Statistical significance was accepted at p<.05.

4.4 Results

Descriptive statistics for participants' resilience as measured by the Modified CD-RISC and sensation seeking tendencies as measured by the BSSS are reported in Table 4.1.

As the Modified CD-RISC is an emergent measurement model from EFA with the current sample of junior athletes, comparable athlete data is not yet available. Additionally, due to the context specific nature of the 2-factor scale, comparison to a general population sample from previous research is not possible. In the current study, the factor labelled *control through adversity* achieved a Cronbach alpha of .73, and *growth mindset* achieved an alpha level of .71 with the overall alpha coefficient for the scale reported at .80. The overall, BSSS Cronbach alpha was recorded as .72.

Table 4.1

Means and standard deviations for resilience and sensation seeking

Measure	Factor	Mean +/- SD					
		Males			Females		
		Team (n= 96)	Individual (n=56)	Male total (n=152)	Team (n= 100)	Individual (n=95)	Total female (n=195)
Modified CD-RISC	Factor 1[a]	27.06+/-4.48	24.84+/-4.15	26.24+/-4.48	24.93+/-4.34	23.76+/-5.43	24.36+/-4.92
	Factor 2[b]	24.11+/-2.59	22.82+/-2.80	23.64+/-2.73	23.34+/-2.90	22.80+/-3.15	23.08+/-3.03
	Total[c]	51.18+/-6.36	47.66+/-5.77	49.88+/-6.36	48.27+/-6.12	46.56+/-7.59	47.44+/-6.91
BSSS	TAS[d]	5.48+/-2.18	5.38+/-2.01	5.44+/-2.11	5.19+/-2.33	4.64+/-2.19	4.92+/-2.27
	ES[e]	5.45+/-1.58	5.36+/-1.63	5.41+/-1.59	5.44+/-1.66	4.99+/-1.88	5.22+/-1.78
	D[f]	4.31+/-2.16	4.63+/-2.08	4.43+/-2.23	4.39+/-2.06	4.19+/-1.95	4.29+/-2.01
	BS[g]	5.77+/-1.40	5.20+/-1.70	5.56+/-1.54	5.55+/-1.52	5.21+/-1.79	5.38+/-1.66
	Total[h]	21.01+/-5.18	20.55+/-5.13	20.84+/-5.16	20.57+/-5.46	19.03+/-5.71	19.82+/-5.62

Note: N=347, [a] Modified CD-RISC Factor 1: Control through adversity, [b] Modified CD-RISC Factor 2: Growth mindset, [c] Modified CD-RISC total score

4.4.1 Gender and sport type differences.

4.4.1.1 Control through adversity

A two-way ANOVA was used to test the effects of gender and sport type on scores for the modified CD-RISC Factor 1 (control through adversity; Figure 4.1). Gender was submitted with two levels (males and females) and sport type consisted of two levels (individual and team sports). The assumption of normality for residuals for 'control through adversity' were satisfied for all group combinations of gender and sport type, as assessed by Skewness and Kurtosis Z scores, normality was accepted at p>.01 level (Z±2.58), and visual inspection of normal QQ-plots. There were no residual outliers assessed as being greater than three box-lengths away from the edge of the box in a boxplot. Homogeneity of error variances was assessed by Levene's test which was statistically significant (p =.048), which violated the assumption of homogeneity of variances. As the group sample sizes are approximately equal (male 43%; female 57%) and large (>150), normality had not been violated and the ratio of the largest group variance to the smallest group variance is less than three, the two-way ANOVA was used anyway as it deemed to be robust to heterogeneity of variance in this case (Jaccard, 1998).

Results showed no statistically significant interaction effect between gender and sport types for 'control through adversity' scores, $F(1,343)=1.038$, $p=.309$, partial $\eta^2 = .003$. Tests of simple main effects for sport type showed no significant differences within individual sports between males (24.84±4.15) and females (23.76±5.43), a mean difference of 1.08 95% CL [-.47, 2.63], $F(1,343)=1.89$, $p=.170$, partial $\eta^2= .01$, a small effect. Within team sports, simple main effects showed statistically significant differences between gender, with a mean difference of 2.13 95% CI [.82, 3.45], male team athletes showed significantly higher scores for 'control through adversity' (27.06±4.48) than female team athletes (24.93±4.34), $F(1, 343)=10.210$, $p=.002$, partial $\eta^2= .01$, a small effect. For gender, male team sport athletes showed significantly higher 'control through adversity' scores than male individual sport athletes, a mean difference of 2.22 95% CI [.68, 3.77], $F(1,343)=8.013$, $p=.005$, partial $\eta^2= .02$, a small effect. Scores for female team sport athletes showed no significant differences to those of female individual sport athletes for 'control through adversity', $F(1, 343)=3.068$, $p=.081$, partial $\eta^2= .01$, a small effect. Main effects revealed that there was a statistically significant difference in 'control through adversity' scores between males (26.24±4.48) and females (24.36±4.92) regardless of sport type, $F(1, 343) = 9.702$, $p = .002$, partial η2 = .03, a small effect. There was also a statistically significant main effect of sport type regardless of gender, $F(1, 343) = 10.828$, p

= .001, partial η^2 = .03, a small effect, with team athletes (25.97±48) scoring higher than individual sport athletes (24.16±5.00) for 'control through adversity'.

Figure 4.1. Mean scores for 'control through adversity' by gender and sport type
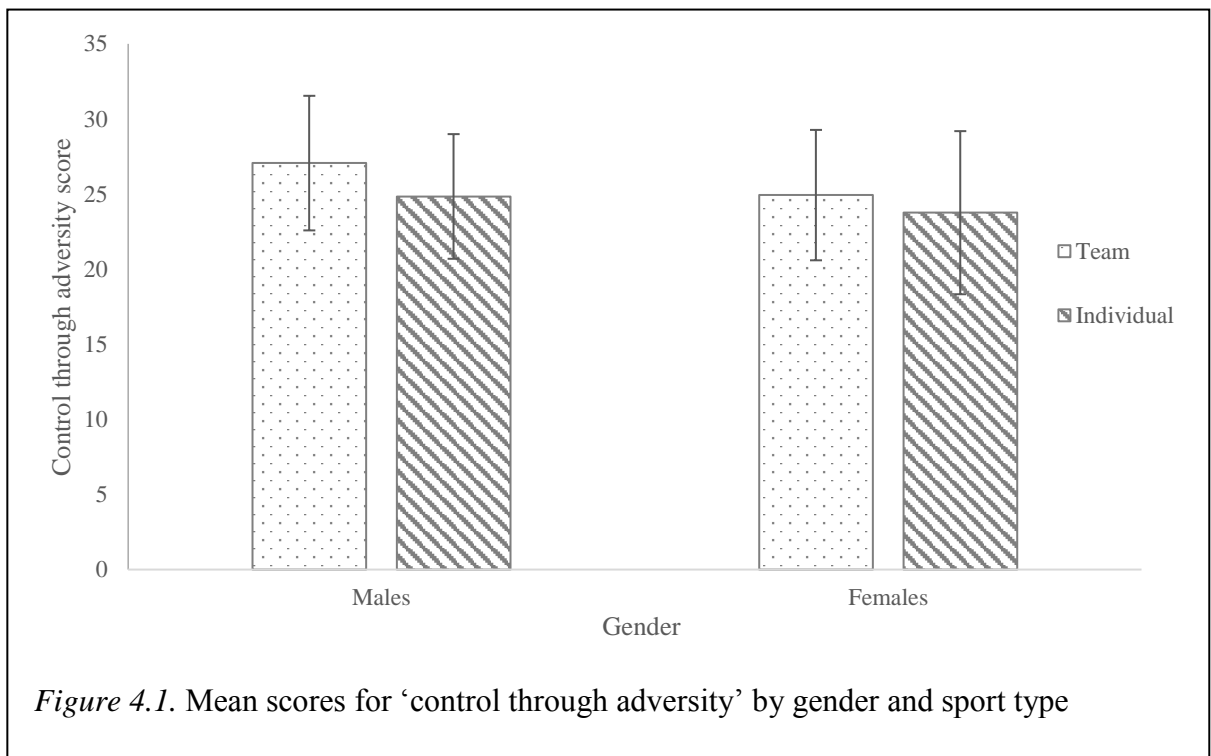
4.4.1.2 Growth mindset

The assumption of normality for residuals for 'growth mindset' was satisfied for most group combinations of gender and sport type, as assessed by Skewness and Kurtosis Z scores. Residuals for female team sport athletes violated this assumption yielding a Z score out-with of the threshold for significance (Z±2.56), however, visual inspection of normal QQ-plots supported normal distribution. As there were no outliers as assessed by inspection of a boxplot, and due to ANOVAs being largely "robust" to deviations from normality (cf. Maxwell & Delaney, 2004), a two-way ANOVA was also used to test the main effects of, and interaction between gender and sport type on scores for the modified CD-RISC Factor 2 (growth mindset). As with the previous analysis, gender was submitted with two levels (males and females) and sport type was submitted with two levels (individual and team sports). Results from the Levene's test showed that the residuals did not violate the assumption of homogeneity of error variances (p =.19).

Means scores for 'growth mindset' by gender and sport type are presented in Figure 4.2. Results from the ANOVA showed no statistically significant interaction effect between gender and sport type for 'growth mindset', $F_{(1,343)}$=1.408, p=.236, partial η^2= .004, a small effect. A test of simple main effects for 'growth mindset' revealed no

statistically significant differences for team sports between males (24.11±2.59) and females (23.34±2.90), $F_{(1,343)}=3.56$, p=.060, partial η^2=.01, a small effect, with a difference of .775, 95% CI [-.03, 1.58]. Likewise for individual sports, simple main effects showed no significant difference between males (22.82±2.80) and females (22.80±3.15) with a difference of only .02, 95% CI [-.93, .97], $F_{(1,343)}$=.002, p=.965, partial η^2=.00, a small effect. For sport type, there was a statistically significant difference in mean 'growth mindset' scores between male individual sport athletes and male team sport athletes, $F_{(1, 343)}$ = 7.164, p= .008, partial η^2 = .02, a small effect. Simple main effects showed no significant differences between female team and individual athletes, $F_{(1, 343)}$=1.721, p=.190, partial $\eta2$=.01. Main effects revealed that there was a statistically significant effect of gender (irrespective of sport type), $F_{(1,343)}$=9.70, p=.002, partial η^2=.03, a small effect, with males scoring higher than females. A significant main effect of sport type (not considering gender) was also shown, with team sport athletes scoring higher than individual sport athletes, $F_{(1, 343)}$= 10.83, p=.001, partial η^2=.03, a small effect.

Figure 4.2. Mean scores for 'growth mindset' by gender and sport type
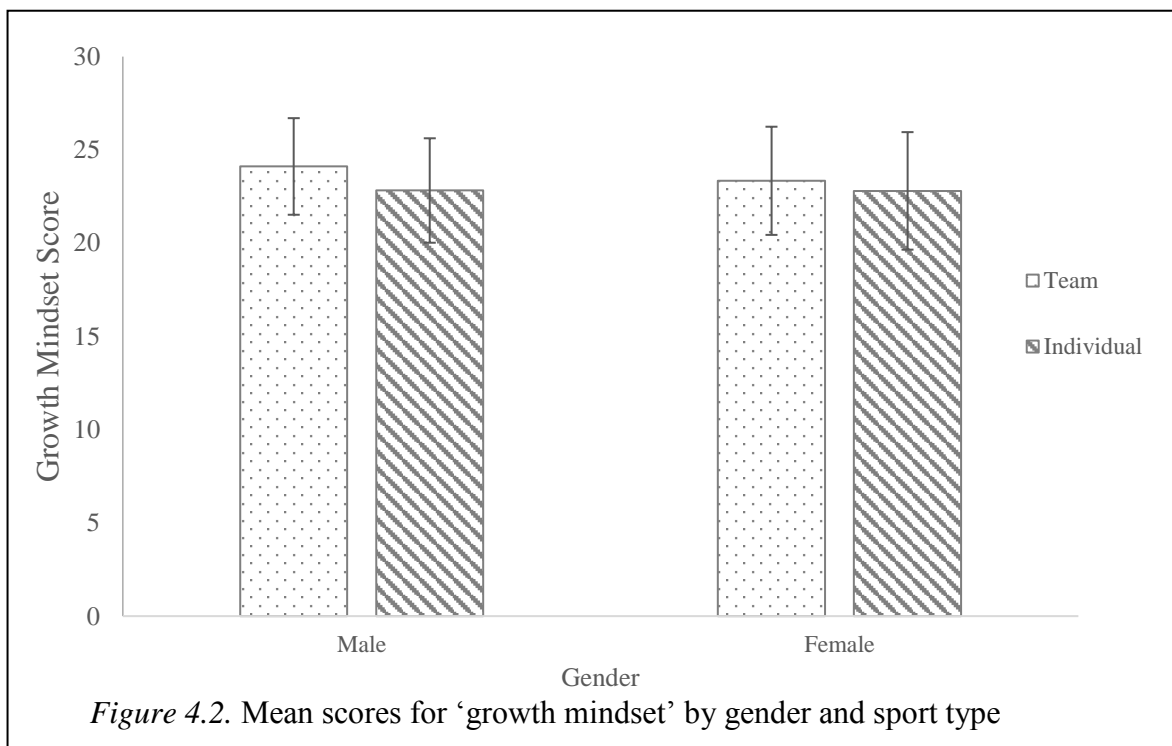
4.4.1.3 Sensation seeking

Global sensation seeking scores were also submitted to a two-way ANOVA to test the effects of gender and sport type sensation seeking tendencies. The assumption of normality for residuals were satisfied for all group combinations of gender and sport type, and no outliers were identified. Homogeneity of error variances was also assumed. Results

showed no significant interaction effect between gender and sport type, $F(1, 343)=.821$, $p=.366$, partial $\eta2=.00$. A test of simple main effects for global sensation seeking scores revealed no statistically significant differences for team or individual sports between males and females, or sport type differences in males $(p>.05)$. Simple main effects revealed significant differences for female team athletes ($M=20.57+/-5.46$) and female individual athletes ($M=19.03+/-5.71$), with a mean difference of 1.54 95% CI [.02, 3.06], $F(1,343)=3.948$, $p=.048$, partial $\eta2=.01$, a small effect.

4.4.2 Age differences.

A one-way multivariate analysis of variance (MANOVA) was run to determine the effect of age on resilience characteristics. Mean and standard deviations for CD-RISC-Factors 1 and 2 are presented in Figure's 4.3 and 4.4. All data was assessed for univariate normality and univariate outliers. Skewness Z-scores showed data for 'growth mindset' for 15- and 16-year age groups to be moderately negatively skewed. No univariate outliers were identified. 'Reflect and square root' transformations were applied, with no effect on the outcome of the MANOVA, because of this subsequent results reported are using untransformed data. Further tests showed that here was no multicollinearity, as assessed by Pearson's correlation ($r = .508$, $p = .000$), and there was a linear relationship between modified CD-RISC Factors 1 and 2 for each age group, as assessed by visual inspection of scatterplot. There were no multivariate outliers in the data, as assessed by Mahalanobis distance $(p>.001)$ and there was homogeneity of variance-covariance's matrices, as assessed by Box's test of equality of covariance matrices ($p = .40$).

The results from the MANOVA showed there was no statistically significant difference between age groups on the combined dependent variables, $F(12, 679) = 1.004$, $p=.443$, Pillai's Trace$=.035$, partial $\eta2 = .02$.

Figure 4.3. Mean and standard deviations for Factor 1 'control through adversity'

Figure 4.4. Mean and standard deviations for Factor 2 'growth mindset'
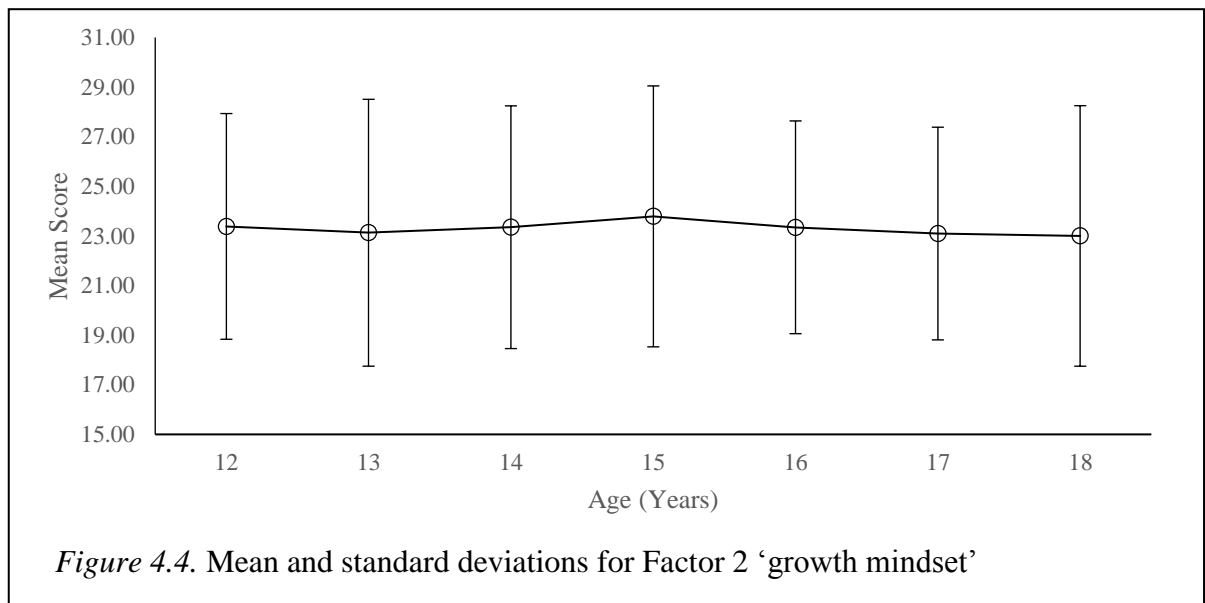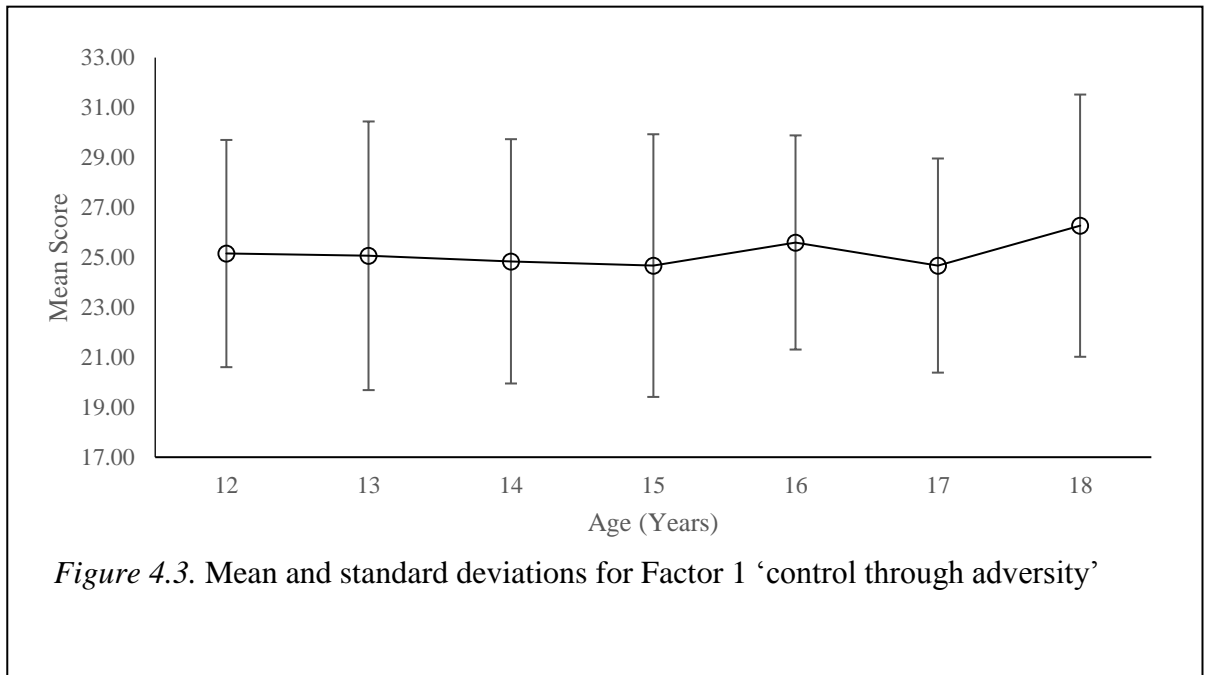
4.4.3 Relationship between resilience and sensation seeking.

Table 4.2 displays the correlations between resilience and sensation seeking factor scores. Results from the Pearson's correlations showed a significant positive relationship between 'control through adversity' and all four of the sensation seeking subscales (ES, BS, TAS and D) measured by the BSSS at either a $p<.05$ or $p<.01$ level. 'Growth mindset' showed a significant positive correlation with the thrill and adventure seeking subscale ($p<.01$), but none of the other subscales as measured by the BSSS.

Table 4.2

Correlation coefficients between the subscales of the modified CD-RISC (control through

adversity, growth mindset) and the BSSS (ES, BS, TAS, D).

		BSSS			
	Subscale	3	4	5	6
Modified	1	.24**	.16**	.20*	.23**
CD-RISC	2	.21**	.08	-.02	.05

Note. *p < 0.05; **p < 0.01.
N=347
1 Modified CD-RISC Factor 1: Control through adversity
2 Modified CD-RISC Factor 2: Growth mindset
3 Thrill and adventure seeking
4 Experience seeking
5 Disinhibition
6 Boredom susceptibility

Figure 4.5. Scattergraphs to show correlations between global sensation seeking and

control through adversity (r=.29, p<.01) and growth mindset (r=.12, p<.05).
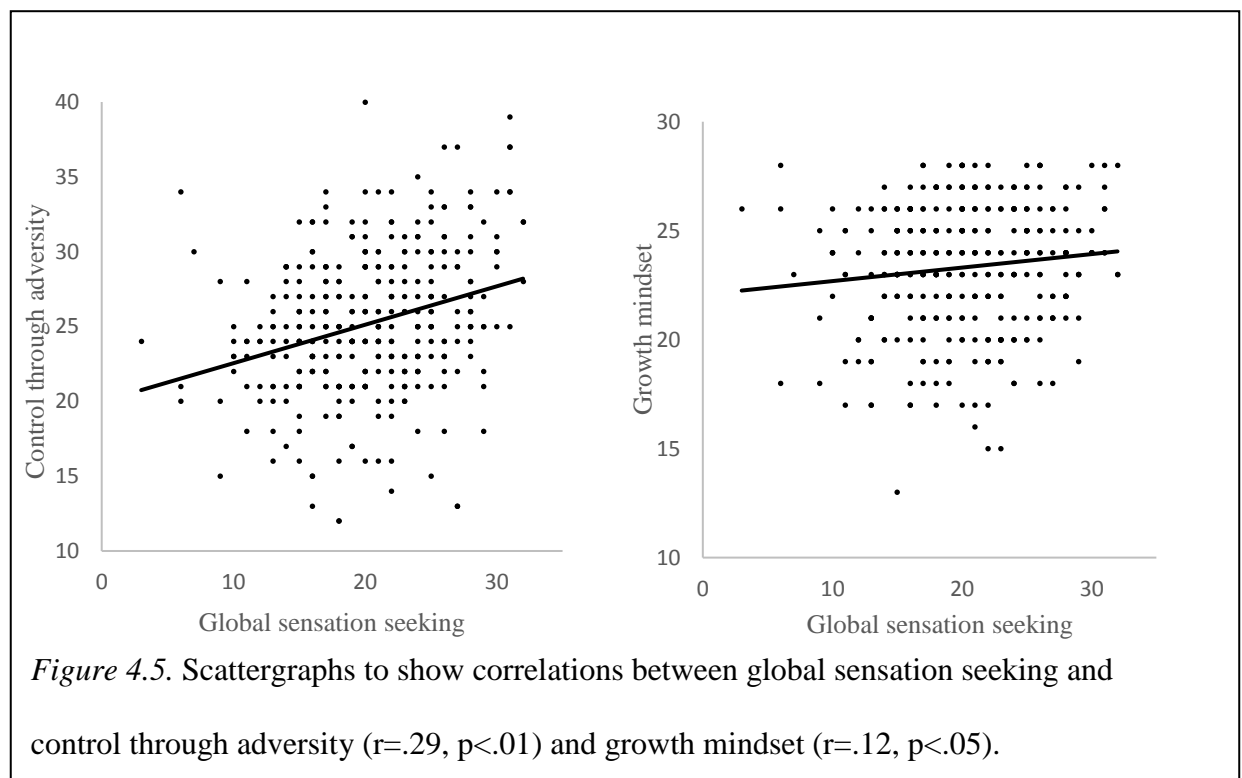
Fisher r to z transformations were conducted to test the differences in correlations

for male and female participants, these tests showed that the relationship of resilience and

sensation seeking characteristics was comparable across gender. Fisher r to z

transformation also showed that the relationship of resilience and sensation seeking

characteristics was comparable across sport type. Figure 4.5 shows the relationships

between the factors measured by the modified CD-RISC and global sensation seeking

scores. Pearson's correlations showed a significant positive relationship between global

sensation seeking and control through adversity (r=.29, p=.00). A significant positive relationship between growth mindset and global sensation seeking was also shown (r=.12, p=.03).

In general, the results show that the greater a junior athlete's perception of control though adversity, the more likely they are to engage in a broad range of behaviours associated with risk and sensation seeking, regardless of gender or sport type. In addition, higher scores for a mindset relating to growth and personal mastery, relate to the likelihood of individuals also engaging in activities associated with thrill and adventure seeking, but not with experience seeking, boredom or disinhibition. The correlation coefficients for the identified relationships were low, suggesting that the relationships were generally small, but nevertheless interesting.

4.5 Discussion

Literature concerning the nature of psychological resilience in the general adolescent population experiencing both minor stressors and extreme circumstances is well established (Stratta et al., 2013; Olsson et al., 2003). In addition, recent years have seen a notable increase in the study of resilience within elite athletes, predominantly favouring a qualitative approach to assess the psychosocial processes and behaviours that promote a positive adaptation to stress or challenge in sport (cf. Fletcher & Sarkar, 2012; Galli & Vealey, 2008; White & Bennie, 2015). Nevertheless, without a sport specific measure of resilience to-date most of these inquiries have adopted retrospective interviews or autobiographical analyses within a senior athlete context, with the adolescent athlete population being largely ignored (Howells & Fletcher, 2015; Morgan et al., 2014). This study was designed to determine the nature of psychological resilience within junior athletes using the 2-factor emergent model of the CD-RISC developed in the previous study. Of interest in the current study, were gender, age, and sport type differences in the protective factors measured by the emergent resilient scale. Additionally, due to the claims presented by many authors suggesting that: first, stress and trauma create vital opportunities for developing resilience, and second, that athletes should therefore be encouraged to seek out such circumstances (cf. Sarkar & Fletcher, 2014a), this study also aimed to assess the relationship between resilience and sensation seeking tendencies within the sample.

4.5.1 Gender differences.

The results of this study report a pattern of resilience within junior athletes that supports the hypothesis, and suggests that males possess a significantly higher level of resilience than females. Although effect sizes for these differences were notably low, this was evident for both 'control through adversity' and 'growth mindset' subscales as measured by the emergent CD-RISC model.

With respect to gender, Dell'Osso et al. (2011) and Stratta et al. (2013) documented that female adolescents in the face of severe adversity demonstrate higher-level PTSD symptoms and lower resilience when compared to exposed adolescent males. This is also reflected by the findings of the current study that suggests that male adolescents in sport fare better than their female counterparts when negotiating a complex and turbulent competitive sporting environment. Interestingly, Stratta et al. (2013, p. 330) suggested that resilience in adolescents is 'itself 'activated' in face of the traumatic event', a notion that is also reiterated within the research concerning the development of psychological resilience in sport (Fletcher & Sarkar, 2012; Galli & Vealey, 2008). Previous research has shown that boys are more likely to engage in a greater variety of health-risk behaviours more often than girls (Veselska et al., 2009). In addition, Lipowski, Lipowska, Jochimek, and Krokosz, (2015) proposed that gender differences associated to resilience and risk exposure could be explained by the maturity of the individual. It was suggested that during adolescence, females are more mature than males, focussing on predefined objectives and engaging in less frequent risky behaviour (Lipowski et al., 2015). Additionally, Savage and Holcomb (1999) found that participation in high performance competitive sport, can act as a protective factor against some high-risk behaviours for adolescent females. Although the data from studies such as those by Veselska et al. (2009) and Lipowski et al. (2015) focus predominantly on risk taking in the form of delinquent behaviours outside of a sporting context, this pattern of gender moderated risk taking behaviour, whereby boys are more likely to make independent choices and challenge accepted norms, may also be transferable into choices made within competitive sport. This may mean that male adolescents develop their increased level of resilience through greater exposure to stress and adversity in the competitive environment. Arguably, this may help to equip them with the increased personal resources associated with positive adaptation such as a growth mindset and feelings of control, and thus increase the likelihood of obtaining problem solving skills in the face of challenge. It appears that gender differences in resilience may be explained by characteristics that naturally differ between males and females (maturation

etc.) as well as the differing nature of the environment that the athletes are immersed in, and the opportunities this provides for negotiating challenge and risk events.

There is a body of literature which shows how social support can buffer against the negative effects of severe stressors and moderate psychosocial responses that are detrimental to health and wellbeing (Cohen, Gottlieb, & Underwood, 2000; Mitchell, Evans, Rees, & Hardy, 2014). Support mobilisation from significant others is also considered key to the resilience process within adolescents (Vetter et al., 2010). Within the sporting literature, athlete responses to injuries and the stressors associated with the recovery process have been of particular focus (Mitchell et al., 2014), likely due to their traumatic nature and objectivity of occurrence. Within junior sport, support is necessary not only for the most traumatic injury incidents, but also for the numerous competitive and personal stressors associated with this stage, which are arguably much smaller in nature. Research has shown that positive parental engagement and coach interaction in junior sport can help to alleviate performance stressors (Jowett & Timson-Katchis, 2005; VanYperen, 1995), and can promote foundations such as hard work, effort, and perseverance through the modelling of their own beliefs and behaviours (Csikszentmihalyi, Rathunde, & Whalen, 1993). Alternatively, the dyadic and triadic relationships between coaches, parents, and athletes can also be a major source of stress for adolescent athletes, and have been shown to relate to dropout, burnout, and enjoyment (Hellstedt, 1987; Jowett & Timson-Katchis, 2005; Martin, Dale and Jackson, 2001). Involvement of these parties in the competitive environment and the experiences of athletes is dynamic, and has variable effects on male and female athletes (Eccles & Harold, 1991). Parents, coaches, and other significant adults play important roles in structuring the environment and providing athletes opportunities for development of both physical and psychological characteristics such as those associated with resilience (Côté, 1999; Dumont & Provost, 1999; Eccles & Harold, 1991). Previous research has demonstrated gender differences in the value placed on sport, with parents often perceiving that sport is more important for boys than it is for girls (Eccles, Jacobs, & Harold, 1990), and male and female athletes are often afforded different environments in which to develop. In addition, the way in which support is used by both male and female athletes differs, specifically, females require greater parental support and encouragement (Lewko & Ewing, 1980), and use more coping strategies associated with seeking social support than males (Frydenberg & Lewis, 1993). As these developmental environments are often structured as gender-typical, with males socialised for independence and effectiveness, and females for dependency and helplessness (Unger & Crawford, 1992), it is possible that whilst female athletes are receiving support to

safeguard them from the negative effects of stressors, they may also being shielded from opportunities to develop personal resources associated with psychological resilience e.g., personal feelings of control and problem solving skills (Dumont & Provost, 1999). Neill and Dias (2001) showed that perceived social support was positively related to increasing resilience over the course of a 22-day outward-bound program, and specifically the perceived support from the *least supportive* member of the group was a significant predictor of resilience. This suggests that within a competitive sporting environment, the support males receive is more beneficial for fostering resilience, and may also mean that group processes and team interactions are not only gender specific (Berndt, 1982; Eccles & Harold, 1991), but more facilitative in male sport. A further investigation into the gender differences in parental, coach, and peer support will play an important role in facilitating an understanding of the differences in psychological resilience identified in the current study.

4.5.2 Sport-type differences.

In addition to gender differences, the results from this study provided evidence to support that junior athletes competing in team sports have greater personal resources associated with psychological resilience than athletes competing in individual sports. Although psychological resilience has not yet been compared across different sports, there are explanations for these findings that can be drawn from research concerning adolescents in a community setting and the concept of 'team resilience' in sport.

LaFromboise, Hoyt, Oliver, and Whitbeck (2006) explained that the strongest predictors of resilience and prosocial outcomes amongst a sample of Native Americans adolescents were high levels of enculturation and perceived community support. Community involvement, such as that provided in a team setting has been identified as being critical for psychological resilience development (Dumont & Provost, 1999; Garmezy, 1985), this is likely to be emphasised when the individuals within a group that are striving for collective goals and driven by shared values and ideology (Brodsky et al., 2011). Although not measured in the current study, higher levels of resilience within team sport athletes may be explained by a greater perception of community support, whereby team athletes have more sources of emotional assistance from peers within a cooperative group and inspirational leaders (Dudas & Snider, 1993). In terms of a sporting population, Morgan et al. (2013) have also highlighted how team structures, with particular reference to social conventions, norms and roles, can elevate psychological resilience resources and are key contributors to 'team resilience'.

Over recent years, there has been an increasing interest in the concept of team resilience, which has been defined as "a dynamic, psychosocial process which protects a group of individuals from the potential negative effect of stressors they collectively encounter" (Morgan et al., 2013, p.557). Team resilience is characterised by psychosocial factors such as collective efficacy, trust, and caring relationships, and takes the concept of psychological resilience beyond an individual level and considers resilience processes at an organisational level (Fletcher & Wagstaff, 2009; Wagstaff, Fletcher, & Hanton, 2012). Although the current data does not go beyond that of resilience measured at an individual level, the literature concerning team resilience suggests that individuals can benefit from the 'culture of resilience' in a team setting (Brodsky et al., 2011; Morgan et al., 2013). A resilient team are likely to not only provide additional healthy peer support but also pool their collective resources when the team faces a challenge (Morgan et al., 2013). This is suggestive that the experience of these collective encounters in a team environment are likely to be of benefit, by fostering resilience on both an individual and a group level.

Although individual sports are not generally practiced in isolation, and often have a team or community element, an obvious difference is that individual performers outside of a conventional team setting may be in competition with their teammates. They have their own agenda and goals, and are not as clearly defined by group norms and values. Therefore, it is unlikely that resilience is fostered in the same way, and may go some way to explain higher scores for resilience factors for team athletes in the current study albeit with relatively low effect. It is also important to recognise that due to the stages of adolescence spanned by the participants in the current study and the elite and sub-elite nature of their involvement, it is likely that the athletes were taking part in more than one sport (Côté & Fraser-Thomas, 2007). Although the categorisation of team or individual sport athletes was based upon participation in their main sport in the current study, the protective factors of community support and 'team resilience' may be transferrable and account for low effect sizes for both control through adversity and growth mindset factors. Additionally, low effect sizes for the differences in resilience resources between gender groups and sport type, may be explained as occurrences of sport specific adversity (such as; performance slumps and transitions), as well as adversities facing adolescents external to the sporting arena can be associated with all competitive sport participants, regardless of gender or sport type. In this respect, the opportunities for stress or challenge exposure in both team and individual sports may be as much the same as they are different, with any differentiation being accounted for experiences outside of sports (i.e., parents may have a greater influence than sporting peers). Using a questionnaire that does not target the

process of resilience, and looks only at protective factors, is unlikely to be successful when attempting to differentiate junior athletes based on the way in which they experience adversity.

4.5.3 Resilience and age.

The results from the current study showed no significant differences in the scores for either 'control through adversity' or 'growth mindset' between the age groups, which shows that these protective factors associated with resilience do not change significantly with age between 12 and 18 years.

Previous research into numerous protective factors associated with psychological resilience have revealed equivocal effects of age, and present with differing rates and directions of developmental change amongst children and young adults within a similar age range of the current study, both within and outside of sport. Numerous authors have shown how protective factors such as social competence (Bolognini, Plancherel, Bettschart, & Halfon, 1996), coping resources (Seiffge-Krenke, 1995) and emotional regulation (Amirkhan & Auyeung, 2007) increase throughout adolescence. Whilst other researchers have demonstrated that constructs such as global self-esteem and perceived athletic competence remain stable (Mendelson et al., 1996; Noordstar et al., 2016), and that any changes in these protective factors are often gender specific (Block & Robins, 1993; Noordstar et al., 2016). Therefore, it seems that age-related changes in behavioural and cognitive strategies associated with overcoming adversity or challenge are complex in nature, and take into account interactions between gender, normative adolescent behaviours, pubertal hormone changes, neural alterations, and the subsequent psychosocial consequences (Spear, 2000). Nicholls, Levy, and Perry (2015) argues that biological maturity, which is defined by age and the passing of time, has a function in the development of physiological systems associated with coping. Nevertheless, evidence has suggested that it is cognitive or emotional maturity, which is defined by an ability to understand, manage, and regulate emotions with "sufficient meta-cognitive abilities", which has the capacity to constrain coping ability (Nicholls et al., 2015, p. 32). Considering emotional maturity is important as individuals mature at different rates (McCormick & Matthews, 2007), and can develop as a consequence of experiencing adversity in sport such as injury (Wadey et al., 2011), the findings in the current study may not be surprising. The results associated with both age and sensation seeking tendencies together may suggest that the protective factors measured in the current study ('control through adversity' and 'growth mindset') are not developed naturally through the passing

of time alone; but instead, require experience of challenge or adversity in the context of sport (which may or may not come as a product of advancing years) to develop emotional maturity and activate resilience processes.

4.5.4 Resilience and sensation seeking.

The results from the current study showed that 'growth mindset' and 'control through adversity' were significantly positively related to global sensation seeking scores. Specifically, the factor labelled 'control through adversity', correlated positively with global sensation seeking, and each of the four factors measured by the BSSS, with 'thrill and adventure seeking' having the largest correlation, followed by 'boredom susceptibility', 'disinhibition' and 'experience seeking'. The second factor, termed 'growth mindset' was significantly positively correlated with global sensation seeking and 'thrill and adventure seeking' only, and did not show a significant correlation with the remaining three factors. Although the correlation coefficients for the relationships between the specified factors were low (between .12 and .29), the results show that in general protective factors associated with resilience are positively related to sensation seeking characteristics, and that 'control through adversity' is more broadly related to tendencies leading to greater risk exposure than 'growth mindset'.

Athletes with a growth mindset view talents and abilities as aspects that they can develop through dedicated practice, effort and instruction (Dweck, 2009). Growth mindset is characterised by a greater ability to deal with setbacks and a stronger belief that challenges offer opportunities for learning, and are more in control of their own learning process (Dweck, 2009). The evidence presented in the current study suggests that athletes with a 'growth mindset' are also more likely to show thrill and adventure seeking tendencies, which are "the desire to engage in sports or other activities that provide unusual sensations" (Jack & Ronan, 1998, p. 1069). Thrill and adventure seeking is generally associated with more socially acceptable pursuits that provide frightening sensations, such as gravity defiant or high speed activities (Jack & Ronan, 1998). Therefore, as one can still strive for personal mastery, using resources and instruction with both a passion and dedication towards such pursuits (Yeager & Dweck, 2012), whilst also being offered challenge and novel experiences from which to learn, approaching thrill and adventure seeking may arguably be in-line with the implicit beliefs of an individual with a growth mindset. Conversely, the results from the current study found that the remaining three scales within the BSSS were not significantly correlated with growth mindset. These scales are: Experience seeking, which a describes tendencies towards less socially

acceptable or more unusual stimulations; Disinhibition, which represents sensations sought through often rebellious social activities; and Boredom Susceptibility, which characterises intolerance to repetitive experience. It is the nature of these three scales that arguably contradict the beliefs of an individual with a growth mindset.

With particular reference to boredom susceptibility, it is likely that those with a growth mindset are more likely to understand the necessity of hard work and repetitive practice over those with a fixed mindset, and that it is the effort to endure these repetitive activities that it will ultimately lead to better performance. With more of a focus on learning and improvement, individuals with a growth mindset may deem repetitive practice in a sporting context as beneficial for development, and therefore are no more likely to be susceptible to boredom related distractions. This means that growth mindset is unlikely to correlate strongly with or be a predictor of boredom escaping activities. Additionally, for an athlete with a growth mindset, experience seeking and disinhibition qualities may not be perceived to be appropriate for long-term development or achievement as they are associated to a lesser extent with providing opportunity for learning over sensations. Instead, it could be argued that engaging with activities associated with disinhibition and experience seeking, can provide opportunities for 'looking good' over learning, and are more reflective of an individual with a fixed mindset, whereby a particular image can be attained without too much effort.

Jack and Ronan (1998) suggested that an individual's perception of ability and coping capabilities relating to risk and challenge can mediate sensation seeking behaviours. As individuals with a growth mindset have implicit incremental theories about goals, attributions, effort and development following adversity, amongst other things they are more likely to learn from experience by working harder and modifying strategies to deal with challenge (Yeager & Dweck, 2012), through this approach it is more likely that athletes with a growth mindset also have greater perceptions of coping ability.

The results from the current study have broadly shown that a growth mindset may not be a simple protective factor for psychological resilience, but may instead may act as a mechanism which mediates an individual's challenge seeking behaviours, differentiating tendencies which are likely to give opportunity for challenge, development and personal mastery (TAS) and those that offer sensations without the capacity for learning (i.e., delinquent behaviours, D, ES, BS).

As previously mentioned, scores for control through adversity were more broadly related to sensation seeking, showing significant positive correlations with each of the four subscales and global sensation seeking. Previous literature has identified perceived

vulnerability as a significant predictor of injury risk amongst adolescent sport participants (Kontos, 2004). In addition, research has suggested that when an individual is confident in their ability to cope with or manage such risky situations they are more likely to take calculated risk (Llewellyn & Sanchez, 2008; Slanger & Rudstam, 1997). Furthermore, experienced, high-risk sport participants have described the need to be in control to make these calculated risks (Delle Fave, Bassi, & Massimini, 2003). In support of these findings, Bandura (1997) suggests that individuals are more likely to expose themselves to risky situations, and persevere for longer when negotiating challenges, when they have feelings of self-efficacy and control. Exercising control, or heightened perceptions of control over challenging and impactful events, have been shown to be important in providing the opportunity to moderate emotional expression and give personal agency, allowing an individual to be both responsive and proactive to changing environments (Bandura, 1997; Lester, 2004). These previous findings, together with those of the current study suggest that perceptions of personal control through adversity increases the likelihood of seeking challenge and arousal inducing sensations, whilst also acting as a protective factor against the negative impact of future risk exposure. Specifically, those with a greater perception of control will take more calculated risks and set more challenging goals, which offers the opportunity to increase personal mastery through developed interpersonal relations, emotional expression, problem solving skills and coping resources.

Understanding the link between and individual's perception of control through adversity, and their likelihood of engaging in risk taking behaviours is important, as practitioners need to be aware of both the positive and negative psychosocial consequences of engaging in risky behaviours. Providing a careful balance of feelings of control through adversity in adolescents who report as higher sensation seekers, may increase the likelihood of exposure to beneficial risky situations, but also increase delinquent risk taking or dangerous thrill seeking behaviours (Zuckerman, Buchsbaum, & Murphy, 1980).

Due to the nature of the study, it is not possible to examine cause and effect for resilience and sensation seeking scores, and there remains ambiguity relating to the directional properties (i.e., if higher resilience leads to higher sensation seeking or vice versa?). If a higher level of resilience causes higher sensation seeking, this may be explained by individuals' greater perceived control and an increased desire to overcome and learn from exposure to challenging situations. This directional relationship may partly be explained by Bandura's (1986) self-efficacy theory, which describes how risk takers appraise the level of risk according to their perceived level of control, and because of this, risks appear lower in situations where individuals perceive they have control and

competency. This might suggest that athletes who have a higher resilience would engage in increasingly riskier behaviours, particularly when previous experiences have been successful.

Conversely, it may be argued that individuals who have low sensation seeking tendencies, and engage in risky behaviours to a lesser degree, possess less of the protective factors associated with resilience because of the potentially limited challenge exposure. In support of this argument, early researchers have reported the link between low sensation seekers and measures of psychological distress in response to traumatic life events, but less so within high sensation seekers (Johnson, Sarason, & Siegel, 1979). This can also be linked with a concept of increasing interest amongst practitioners that 'talent needs trauma' (Collins & MacNamara, 2012), and that risk exposure can act as a catalyst to develop psychological resilience through the activation of internal and external resources as well as characteristics such as flexibility and adaptability, balance and perspective (Galli & Vealey, 2008; Sarkar & Fletcher, 2014b). This might suggest that individuals who are low sensation seekers should be encouraged to pursue lower level risk to facilitate perceptions of control, consequently increasing their personal mastery for dealing with future challenge. This idea of the gradual development of protective factors and de-sensitisation to the adverse effects of challenge and adversity through exposure, has implications for individualised practice in talent development.

Examining the link between sensation seeking and psychological resilience via a correlational approach has highlighted the nature in which the factors of the modified CD-RISC are related to characteristics associated with sensation seeking. Nevertheless, to enable specific resilience processes and outcomes associated with risk and challenge exposure to be established, future research should focus on a detailed contextual (qualitative) assessment of individuals' personality traits and perceptions. It may also be of interest to systematically investigate whether a higher level of resilience causes higher sensation seeking, or, if higher sensation seeking tendencies lead to greater resilience.

4.5.5 Strengths and limitations.

Thus far, research into resilience in sports performers has been either retrospective, with qualitative information recalled from experiences of adversity (Galli & Vealey, 2008), or resilience theory developed from the qualitative study of athletes already established within their athletic careers (Fletcher & Sarkar, 2012). To date there is a dearth of literature concerning resilience in an adolescent population at a pre-professional level. Although qualitative data concerning adult athletes' experiences of adversity is vital for an in depth

study of resilience, from the information that is currently available amongst the sporting literature, it is difficult to generalise the findings to understand psychological resilience in an adolescent population. Therefore, a quantitative study was preferred on this occasion to provide valuable statistical information concerning protective factors associated with resilience and their relationship with sensation seeking tendencies in the context of junior athletes. The high participant numbers and the age range of athletes in the current study adds to the literature surrounding the nature of psychological resilience in adolescents at this pre-professional, pre-adult level, and supplements previous research using senior athletes (e.g., Galli & Vealey, 2008). The turbulent nature of this point within an athlete's career has the potential to shape their experiences later, through building necessary protective factors and processes involved in experiencing adversities. Engagement in junior competitive sport acts as a vital canvas on which to develop resilience in the context of sport. Nevertheless, because of the vulnerability of athletes to complex transitions and stressors within this stage, those who do not have the resources to transition successfully are not likely to progress, and therefore understanding psychological resilience within this population is critical.

Although age differences were not identified in the current study, given the complexities of psychological resilience in sport, and the intricate and individual nature of psycho-social development throughout adolescence, a longitudinal rather than cross-sectional investigation into how the complex process of developing resilience qualities begins and changes over the career of an athlete should be encouraged (Fletcher & Sarkar, 2012). As the qualitative research with adult athletes has revealed the multidimensional nature of resilience within elite sport, and with an understanding that the often turbulent adolescent phase of development towards sporting excellence likely adds to this complex process, it is unlikely that a questionnaire can adequately examine this and/or explore developmental changes. Whilst, the emergent measure of resilience from the previous study may not offer the scope or sensitivity to detect gender, age, or sport type differences with large effect, there is a place for questionnaires in the study of resilience which are developed specifically for use in sport, and which can objectively assess developmental changes based on applied interventions. Nevertheless, without a current sport specific measure of psychological resilience researchers and practitioners who are intrigued by the prospect of measuring psychological resilience in a sporting context are left with a number of options.

First, due to the criticisms of the CD-RISC, including item development and context specificity, the development of an entirely new sport specific measurement scale

that assesses the three pivotal components (adversity, positive adaptation, and protective factors) in a tripartite fashion would offer exciting potential (Gonzalez et al., 2016; Gucciardi et al., 2011). Nevertheless, researchers may instead wish to conduct additional scale development on the emergent 2-factor structure and consider supplementary components of sport specific resilience missing from the model. Although, both of these options offer credible opportunities for measuring psychological resilience in sport, it remains difficult to imagine the extent to which such a measure could reveal the nature of resilience beyond an individual level, given the complexities. It may be advantageous to explore other novel ways of understanding resilience in a sporting and adolescent context. It would be important that such an approach considers the interactions between protective factors, and move beyond quantification of (non-sport specific) protective factors at an individual level (Gonzalez et al., 2016; Gucciardi et al., 2011).

Future research might also consider an alternative measure of characteristics associated with challenge seeking behaviours in sport, as a measure of 'sensation' seeking may not fully encapsulate the way in which individuals in elite sport expose themselves to risk. Specifically, sensation seeking as a personality characteristic defined by seeking high intensity kinaesthetic physical sensations (Zuckerman, 1994), may not relate directly to the process of challenge exposure as a necessity for mastery experiences in sport. This also goes some way to explain the low correlation coefficients between the emergent subscale of growth mindset (associated with characteristics such as effort and perseverance involved in facilitating positive change; Yeager & Dweck, 2012) and sensation seeking subscales. In addition, the use of the BSSS has been critiqued for hampering knowledge in one's understanding of the motives that underlie participation in high-risk activities (Barlow et al., 2013).

To summarise, there are a number of limitations raised by the current study in relation to the measurement of psychological resilience in general. In terms of quantitative measures there is yet to be a sport specific tool to effectively measure psychological resilience amongst athletes. Even though a new structure that presents good theoretical and statistical fit was revealed in the previous chapter, it is likely that psychometric questionnaires in general would not capture the complexities of the construct within adolescent sport. Qualitative measures so far have had led to the development of more holistic understanding of psychological resilience, and have provided theoretical structures of resilience in the sporting population. Nevertheless, there are characteristics of resilience (i.e., its transient nature, changes based on risk exposure) that cannot be objectively/statistically tracked in the same way as quantitative approaches. Therefore, to

obtain greater understanding concerning the measurement of psychological resilience different approaches should be considered.

4.5.6 Conclusions.

The aim of the current study was to utilise the emergent measurement model from the previous chapter to explore the nature of resilience in junior athletes. Results demonstrated that both team sport and athletes, and male athletes reported significantly higher resilience than both females and those participating in individual sports. This suggests that the environment in which both male and team athletes are exposed to, is facilitative to the development of the protective factors of control and growth mindset associated with psychological resilience. Further investigation into the mechanisms by which these characteristics can be developed, for example support structures and the concept of team resilience would be beneficial to further understand the nature of resilience at this stage. Additional qualitative enquires into the link between risk and challenge exposure and psychological resilience are also advocated.

The key limitation with this study resides in its quantitative, cross-sectional design. Because of the complexities of psychological resilience in sport, and the limited scope of a questionnaire that only addresses a single component of the construct (protective factors) on an individual level, this ultimately limits the scope of the findings. It is encouraged that a 'middle ground' is sought between a quantitative and often time committed subjective qualitative approach to the study of psychological resilience in junior athletes.

There is a strong need to develop an innovative solution to the measurement of psychological resilience that enables an appreciation of the complexities of the construct as well as its context specific nature. Potential measurement tools should have the capacity to objectively track changes in athlete's complex resilience processes over time.

Chapter 5

Study 3- A review of current methodological approaches to measuring psychological resilience in sport

5.1 Introduction

Health researchers from numerous different domains, including psychiatric health (Sexton et al., 2010), developmental psychology (Diehl & Hay, 2010) and trauma rehabilitation (Bonanno et al., 2011; Simpson & Jones, 2013), have demonstrated a significant investment in measuring and exploring the nature of psychological resilience within their specific contexts. Similarly, within a sporting context, the ability to coherently define the resilience process amongst athletes, and to differentiate individuals with the potential to thrive and develop from those who may be weakened by exposure within a stressful competitive environment, are exciting concepts. In light of this, the focus on measuring this complex concept has intensified (Gonzalez et al., 2016; Gucciardi et al., 2011; Sarkar & Fletcher, 2013).

Two research studies with an aim of validating a priori resilience measures developed within alternative contexts have been conducted (Gonzalez et al., 2016; Gucciardi et al., 2011). Both of these have concluded that a shortened 10-item version of the CD-RISC (Cambell-Sills & Stein, 2007) was a psychometrically sound tool for measuring resilience amongst adolescent and adult athletes. This tool has yet to be employed by researchers seeking to understand the more specific nature (antecedents and consequences) of adversity and resilience amongst athletes.

Although the abridged 10-item CD-RISC was supported with the data presented within Chapter 3 of this thesis, by using an exploratory method of factor analysis, a new adaptation of the original CD-RISC emerged. When evaluated using previous qualitative literature within the area, the emergent model was deemed to provide less information loss and superior theoretical support for the concept of psychological resilience in sport. In addition, within the previous chapter, the first study using a quantitative measure to explore the nature of resilience within adolescent athletes was presented, and the associations between resilience and risk seeking tendencies were examined. Nevertheless, the problems with employing quantitative measures to assess psychological resilience in athletes have been acknowledged, and the need for a new innovative approach has been raised (Galli & Gonzalez, 2014).

5.1.1 Resilience research in sport.

Galli and Gonzalez (2014) recently conducted a literature review on the concept of resilience in sport, and aimed to give an overview of the scholarship available up to the point it was written. The authors identified common conceptualisations of resilience, as well as conflict associated with its definitional qualities; but had a major focus on suggesting future research and applications for applied practitioners. Although Galli and Gonzalez (2014) do not pertain to conducting a systematic review, they offer no search strategy displaying how research articles were obtained, and critically it has been identified by the current author that a number of articles available at the time (i.e., Belem et al., 2014; Cardoso & Sacomori, 2014) have been omitted, which questions the exhaustive nature of the review. Since this review, there have been an added number of articles made available, and it was felt that a literature review conducted in a more systematic style would allow confidence in the fact a comprehensive search had been conducted. In their review, Galli and Gonzalez (2014) focussed on articles where resilience was conceptualised as a process or as an outcome. As the focus of this chapter concerned the measurement of psychological resilience, research articles that do not attempt to measure the concept directly and instead operationalise resilience as a performance outcome (i.e., experiencing a stressor followed by improved performance), were not of interest in the current review.

Sarkar and Fletcher (2013) aimed to review the psychometric issues relating to resilience research in sport, and have highlighted problems with measuring psychological resilience amongst athletes, particularly relating to definitional and contextual differences. The authors suggested that to measure resilience, three elements should be assessed in a tripartite fashion: adversity, positive adaptation, and protective factors. A number of options for measuring adversity were explored, which included "multiple-item checklists of negative life events, single life occurrences, and the simultaneous consideration of multiple risks to form an overall adversity estimate" (Sarkar & Fletcher, 2013, p.266). Although a number of existing tools such as the Life Events Checklist (Work, Cowen, Parker, & Wyman, 1990), and the Daily Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981), were discussed as options to measure negative life events, Sarkar and Fletcher (2013) raised the concern that these are not validated measures of adversity. They also highlighted that the specific nature of adversities and stressors in sport, for example, the 'controllability' of incidents (if an individual can control the occurrence of a stressor or not), and the potential of "ostensibly positive life events" (positive incidents which have an adversarial effect, e.g., winning a competition leads to increased pressure and

expectations), can make identifying and measuring potential challenges encountered very difficult (Sarkar & Fletcher, 2013, p. 267). Sarkar and Fletcher (2013) proposed a lengthy systematic approach to overcome these problems when measuring adversity in a sporting population, including the use of a panel of experts to identify potential stressors and their controllability, excluding any stressors from a measure which were deemed 'controllable' by the athlete. Nevertheless, measurement complexities remain concerning the differing properties of adversity (frequency, intensity, duration), and respondents interpretations of these characteristics.

In terms of measuring positive adaptation amongst athletes, Sarkar and Fletcher (2013) proposed a number of different options to consider, including measuring; external and internal ratings of success, and absence versus presence of psychiatry symptoms following adversity. Problems with differentiating factors which emerge as positive outcomes and those which are pre-cursers to such outcomes (protective factors) such as self-efficacy and personal competence, makes a simple credible measurement of positive adaptation unlikely. Finally, Sarkar and Fletcher (2013) discuss research measuring protective factors, and highlight the importance of measuring characteristics that facilitate positive adaptation, both at an individual level (i.e., control, problem solving, perseverance) and a social interaction level, where social ties are mobilised through family and community influences. Developing a psychometric measure (or a number of discrete measures) which thoroughly assesses adversities, positive adaptation and protective factors specific to a sporting context in a tripartite fashion, is proposed to be the most comprehensive approach moving forward (Sarkar & Fletcher, 2013). Nevertheless, it is apparent that there are a number of substantial issues that have yet to be overcome on the route to developing such a measure/s.

There have also been a number of key advancements suggested for the study of psychological resilience in sport that emerged from the review conducted by Galli and Gonzalez (2014). First, and similarly to the call from other researchers (e.g., Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2013), the authors suggest that a measurement tool developed specifically for use with competitive athletes is required to enhance current understanding. Second, Galli and Gonzalez (2014) suggest that modelling multiple variables associated with psychological resilience in sports performers would enable greater understanding of the dynamic nature of resilience, and the interaction between qualities such as personal resources and environmental conditions and their influence on positive outcomes. The authors propose that Structural Equation Modelling (SEM) would be an option to predict how combinations of resources influence resilience, and that Latent

Growth Mixture Modelling (LGMM) could be used to examine resilience trajectories over time. Finally, Galli and Gonzalez (2014) welcomed the use of mixed-method approaches to offer a more comprehensive view of resilience in sport by combining quantitative and qualitative designs. These suggestions may play an important role when considering a new and innovate approach to the study of psychological resilience amongst athletes.

However, prior to proposing a suitable alternative method of measuring psychological resilience in junior sport and consequently understanding its nature in this context, it is important to understand the scope of previous methodological approaches within the sporting literature, as well as their strengths and weaknesses. To achieve Aim 1 of this thesis, a short literature review was undertaken in a systematic manner to identify the current research associated with psychological resilience in sport, with a particular focus on the methods employed (Objective 4). The main research question considered by this review is: what methodological approaches have been taken to understand the nature of resilience in sport? The inclusion and exclusion criteria are presented in Table 5.1 using review structure adapted from Ahern et al. (2006). Literature had to meet all inclusion criteria to be included in the review. Although this thesis focusses on psychological resilience in the pre-adult population, due to the limited research using this population, research including all competitive athletic samples were considered for review.

Table 5.1

Inclusion and exclusion criteria for the literature search

Inclusion criteria	Exclusion criteria

1. Study population
  • All ages
  • Individuals of any race, culture or ethnicity
2. Sample must contain current or retired athletes, whom are performing/ have performed at a competitive level
3. Time period
  • Published from 1980 to present
4. Publication criteria
  • English only
  • Articles in print
5. Study design
  • Original research concerning psychological resilience
  • All types of study design
	1. The study contains no original data concerning psychological resilience
	2. The study only focuses on the concept of team resilience
	3. The study is a psychometric evaluation and/or development of an instrument
	4. The article could not be retrieved
	5. The article is only published in abstract/supplement form.

5.2 Search strategy

Search terms used were 'resilience' AND 'sport'. The search was limited where possible by date (post 1980), language (English), and peer review. Both sporting and psychology based publications were sourced. Supplements or abstract only publications were omitted. Initially, EBSCOhost databases were searched which included PsycINFO, SPORTDiscus, MEDLINE, and Psychology and Behavioural Sciences Collection. A second database search was conducted using ScienceDirect, and a further search was completed using the Edinburgh Napier University online library search engine.

Table 5.2

Literature search output

Literature source	Total articles identified	Articles excluded	Articles included in review
PsycINFO	164	157	7
SPORTDiscus	182	176	6
Psychology and Behavioural Sciences Collection (EBSCOhost)	36	36	0
MEDLINE	0	0	0
ScienceDirect	2125	2125	0
Online Institutional Library search	228	227	1
Totals	2735	2721	14

NB. The number of articles accepted/excluded reflects deletion of duplications

Most of the articles included emerged from the first EBSCOhost database search, with an almost equal yield from PsycINFO and SPORTDiscus. Follow-up searches yielded mainly duplications. The highest volume of articles generated by the search strategy was through ScienceDirect, however aside from duplications already included from the previous searches, no other articles met the inclusion criteria. The majority were excluded from this broader science search as they concerned resilience of a different nature (e.g., resilience of fish stock, ecological/ conservational resilience, and cultural resilience) or included the study of psychological resilience with a different population to that targeted. An additional reason for exclusion of articles included a lack of original data associated with psychological resilience in competitive sport, specifically when an article referred to 'resilience' but instead used measures for similar constructs such as 'hardiness' or 'mental toughness'. Articles sourced whereby resilience was conceptualised as an outcome, i.e., resilience is assumed based on superior performance following a stressor were also excluded (e.g., Mummery et al., 2004). Articles that met each of the elements of the inclusion criteria were reviewed, with a particular focus placed on the methodological approach to assessing resilience. For ease of interpretation, tables including quantitative (n=8) and qualitative literature (n=7) have been presented separately (Tables 5.3 and 5.4).

Because of the broad nature of methodological approaches to measuring resilience, there was a large range of participant numbers used in the studies sourced. Within the quantitative research articles, this ranged from 41 to 351, and for the qualitative literature

was 7 - 22. A range of study locations, including European, American, South American, African, Asian and Australian participants were included. The date range of the articles included in the review was between 2008 and 2016.

5.3 Quantitative approaches to measuring psychological resilience in athletes

This literature review identified eight quantitative research papers measuring psychological resilience via self-report surveys amongst athletes from a range of different backgrounds. Six of these articles were of a cross-sectional design whereby athletes completed the self-report measure (or questionnaire package) on only one occasion. The remaining two included data collected at two time points: before the competitive cycle and after an important competition (Secades et al., 2016) and one week prior to a national event and on the day of the event (Meggs, Golby, Mallett, Gucciardi, & Polman, 2015). Of the quantitative papers included, only two included athletes of a similar age to those included in the previous chapter of this thesis, however the age range of these studies was narrower and/or not reported (Meggs et al., 2015; Vitali et al., 2015).

The quantitative approaches to measuring psychological resilience in this review have provided readers with key information regarding the nature of resilience, specifically associations between the construct and others, as well as its predictive and moderating qualities. The relationship between resilience and coping was the focus of numerous authors. The results from these inquiries demonstrated that athletes with greater resilience scores used more task-orientated and less disengagement and distraction-orientated coping strategies (Secades et al., 2016), and used more coping strategies relating to peaking under pressure and coachability (Belem et al., 2014). Coping was also shown to be a mediating factor in the relationship between dispositional resilience and perceived stress related growth (Salim et al., 2015). Given the multidimensional and complex nature of the resilience process, and its conceptual parallels with additional constructs (Hosseini & Besharat, 2010), it is somewhat unsurprising that Cowden et al. (2016) revealed positive associations between resilience and mental toughness.

Meggs et al. (2015), who have been amongst the first authors to investigate resilience alongside both sport performance and physiological characteristics, in this case cortisol awakening response (CAR), conducted an interesting approach to the study of the nature of psychological resilience. This study supplements knowledge in both fields, and aligns with conceptualisations of resilience in sport derived from qualitative inquiry whereby both the perception/appraisal of stress and protective factors together buffers against potential negative consequences (Fletcher & Sarkar, 2012, 2013). Specifically, this

study revealed that the impact of perceived threat or the interpretation of a stressor as facilitative (measured via cortisol release) on athletic performance, is moderated by psychological resilience.

The link between self-determination and environmental characteristics in the form of perceived competence and motivational climate have also been examined in terms of their associations with resilience in athletes, as well as their combined impact on athlete burnout (Vitali et al., 2015). The main findings from this study suggest that a mastery climate in youth sport protects against athlete burnout whilst the opposite is shown when a climate is perceived to be of ego-orientation. Again, resilience appears to have a moderating role, in this case combined with perceived competence to buffer against the negative effects of stress. These findings are of particular interest to applied practitioners and those engaged in athlete development, providing evidence to demonstrate the impact of motivational climates on resilience.

Although the academic quality of the articles included in the literature review was not the focus, it is clear that there are a number of methodological issues relating to a selection of the articles included, which affects the value or potential scope of the findings. Although the nature of resilience within sports performers is more often acknowledged to be complex and multidimensional, from the majority of the quantitative articles included in the review there appears to be an assumption that the measurement of resilience is simple.

A major critique of the quantitative research included in this review is their use of non-validated questionnaires to measure psychological resilience. Meggs et al. (2015) employed a version of the Academic Resilience Scale, which was modified by the authors to suit a sporting context, changing phrases such as 'a bad mark' to 'a bad performance'. An article by Vitali et al. (2015) created a 10-item measure of resilience that was based on a number of previous scales such as the CD-RISC and the Resilience Scale, but aside from testing internal reliability, the authors did not follow any procedures to test the structure or validity of the measure. Additionally, Lu et al. (2016) employed a measure consisting of only 2-items that were drawn from the CD-RISC, and focussed purely on positive adaptation (items were; 'able to adapt to change' and 'tend to bounce back after illness or hardship'). Along with the problems which have been discussed in the earlier chapters of this thesis concerning the need for measurement models validated in a sporting context, and the minimum size of measurement scale or factors, the quality of information gained through employing such a scale is questionable, particularly when there has been so much scholarly interest in conceptualising the complex construct of psychological resilience specific to sport (Sarkar & Fletcher, 2013).

Context specificity of measurement scales is important, particularly in the study of psychological resilience in sport, which is understandably likely to require alternative responses and re-integrative processes to those unwillingly exposed to adversity in other contexts (Nash et al., 2011; Sarkar & Fletcher, 2014a). Given the multitude of protective and vulnerability factors associated with responses to stress, and the environmental and social differences denoted by sport, age, sex and level of competition, it may be questioned that intra-variability in a sporting context alone may mean that even a resilience questionnaire developed specifically for use with athletes may not offer the scope to measure the complexities of resilience across sporting contexts without being made up far too many items/factors. This creates an arduous and possibly fruitless job for any researchers attempting to develop an all-encompassing sport resilience questionnaire. Therefore acknowledging the limitations of questionnaire design and development is important, especially within the complex processes associated with a concept like resilience.

Table 5.3

Quantitative research concerning the nature of psychological resilience in athletes

Author/s (year) Location	Aim	Participants	Design	Instruments	Analysis	Findings
Secades et al. (2016) Spain	To analyse the relationship between resilient qualities and coping in Spanish athletes	235 Spanish athletes from a variety of different sports (Mage= 20.7+/-4.3)	Quantitative repeated-measures design, self-report survey, time point 1= before the competitive cycle, time point 2= after an important competition	Spanish validated version of the Resilience Scale (Ruiz, De La Vega, Poveda, Rosado, & Serpa, 2012) and the Coping Inventory for Competitive Sport (ISCCS; Molinero, Salguero, & Marquez, 2010)	A 3 (low, medium, high resilience) x 2 (time points) MANOVA for coping variables.	• Resilience scores did not change over time • Emotion-oriented and distraction-oriented coping increases during competition • Resilience scores correlated positively with task-oriented coping, and negatively with disengagement and distraction-oriented coping
Meggs et al. (2015) England/ Australia	To investigate the relationship between the Cortisol Awakening Response (CAR) and resilience in elite swimmers	41 competitive swimmers (Mage=15.2)	Quantitative repeated-measures design, self-report survey, time point 1= one week prior to a national event, time point 2= on the day of the event	An adapted version of the Academic Resilience Scale (Martin & Marsh, 2006), buccal saliva swabs to obtain cortisol measures, and Likert scale measures of perceived importance and satisfaction following the event.	Bivariate correlations to assess associations between CAR, resilience, and performance. Multiple regression analysis to predict performance using CAR and resilience scores. One-way repeated measures ANOVA to assess the change in CAR from time 1-2.	• CAR levels significantly increased on the day of the event • Negative correlations between resilience and CAR • Perceived importance and satisfaction were not significant predictors of performance • Resilience significantly predicted performance • The influence of cortisol release upon performance was moderated by resilience
Lu et al. (2016) Taiwan	To examine the conjunctive effects of athletes' resilience and coaches' social support on the relationship between life stress and burnout	228 competitive Division I student-athletes representing both individual and team sports (Mage=20.04+/-1.32)	Quantitative cross-sectional design, self-report survey	An abbreviated 2-item version of the Connor-Davidson Resilience Scale (CD-RISC2; Vaishnavi, Schwarzwald & Salomon, 2007), Athletes' Received Support Questionnaire (ARSQ; Freeman, Coffee, Moll, Rees, & Sammy, 2014), Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001), and the College Student Athlete Life Stress Scale (CSALSS; Lu, Hsu, Chan, Cheen, & Kao, 2012)	Hierarchical multiple regression analyses to assess disjunctive and conjunctive moderation effects.	• Resilience and coaches' social support conjunctively moderated the stress-burnout relationship • Particularly the interaction between resilience and informational and tangible social support from coaches moderated the stress-burnout relationship for both high and low life stress
Cowden et al. (2016) South Africa	To investigate the relationships between mental toughness (MT), resilience, and stress amongst competitive South African tennis players	351 competitive tennis players (Mage=28.71+/-13.87)	Quantitative cross-sectional design, self-report survey	The Resilience Scale for Adults (RSA; Friborg et al., 2003), a modified version of the Recovery-Stress Questionnaire for Athletes (RESTQ; Kellmann & Kallus, 2001), and the Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009)	Pearson correlations and multiple linear regressions to examine the relationships between variables	• Total MT was positively correlated with total resilience and subscales of resilience. • MT was negatively associated with general stress • All subscales measured by the RSA were significant predictors of MT aside from family cohesion • Total MT and total resilience were significant predictors of stress

Study	Aim	Participants	Design	Measures	Analysis	Key Findings
Salim et al. (2015) UK	To examine the relationship between hardiness, coping and perceived stress-related growth (SRG) in a sport injury context	206 individuals (Mage= 22.23+/-6.50) participating in either team or individual sports from recreational to elite standard of competition who had been injured within two years of the study commencing	Quantitative cross-sectional design, self-report survey	Dispositional Resilience Scale (Bartone, Ursano, Wright, & Ingraham, 1989), the Stress-Related Growth Scale (Park et al., 1996), and the Brief COPE (Carver, 1997)	Independent-samples t-tests and a one-way ANOVA to examine the differences between sex, sport type, injury types and competition level Pearson correlations were used to identify the effect of hardiness on perceived growth. Bootstrapping procedures were used to examine if coping mediated the relationship between hardiness and perceived SRG	• Significant associations between hardiness (dispositional resilience) and perceived SRG. Emotional support and positive reframing mediated this relationship.
Vitali et al. (2015) Italy	To examine the role of perceived competence, resilience and motivational climate on burnout in adolescents practicing team sports	87 basketball and volleyball players (Mage= 15.92+/-1.12)	Quantitative cross-sectional design, self-report survey	A 10-item scale measuring resilience was created adapting previous scale items into a sport context, the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Newton, Duda, & Yin, 2000), perceived competence was assessed by a single item answered on a Likert scale (1-9), and the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001).	Pearson's correlations between dependant variables, MANOVA to test differences on dependent variables (age, gender, sport), hierarchical regression to predict burnout from competence and resilience.	• Resilience correlated negatively with burnout and positively with perceived competence • No age/ gender/ sport differences were found for resilience • Resilience and perceived competence predicted reduced sense of accomplishment, perceived mastery climate improved this. • Resilience and perceived mastery climate predicted sport devaluation
Cardoso & Sacomori (2014) Brazil	To examine resilience in Brazilian competitive athletes with physical disabilities	136 athletes with physical disabilities representing a variety of different sports (Mage= 30.20+/-8.91)	Quantitative cross-sectional design, self-report survey	A Portuguese translation of the Resilience Scale (Wagnild & Young, 1993)	Multiple t-tests and a one-way ANOVA with post hoc tests to compare total resilience between distinct groups.	• Resilience in general was lower in athletes with physical disabilities than in able bodied populations from other studies.
Belem et al. (2014) Brazil	To analyse the impact of coping strategies on the resilience of beach volleyball athletes	48 volleyball (doubles) athletes (Mage= 18+/-1.3)	Quantitative cross-sectional design, self-report survey	Portuguese validated Connor-Davidson Resilience Scale (CD-RISC; Solano & Lotufo Neto, 2012) and Athletic Coping Skills Inventory-28 (ACSI-28; Serpa & Palmeira, 1997)	Repeated measures ANOVA with post hoc to compare frequency of coping strategy, Mann-Whitney U tests to compare coping strategies according to level of resilience (intermediate/high), Spearman's correlations assessing associations between coping variables and global resilience, and simple linear regression to examine the impact of coping strategies on resilience	• 'Coping with adversity' and 'confidence and achievement motivation' were the highest predictors of resilience • Athletes with higher resilience also used more coping strategies relating to; 'coachability' and 'peaking under pressure'

Even by developing a multidimensional sport specific questionnaire, it may be argued that the nature of a questionnaire that follows psychometric R methodology constrains what we understand about psychological resilience in athletes. R methodology is regarded as a 'statistical method of data reduction that identifies and combines sets of dependent variables that are measuring similar things' whereby a person completing the questionnaire receives an individual score for each factor (McGarty & Haslam, 2003, p. 387). This approach has been the focus of quantitative psychological resilience studies in sport thus far, but critically, does not allow for an objective measurement of holistic personal profiles. The author believes that significant advances in the understanding of the complex processes underlying why two very different individuals may both flourish in the face of stress or adversity, or indeed how one may flourish whereas another may withdraw from sport, is required. The assessment of individual characteristics is important, however given the sports specific theories/models explain how protective factors and personal characteristics feed in to the cognitive processes and evaluation of challenge (e.g., Fletcher & Sarkar, 2012), the interaction between these elements should be a consideration for future quantitative measurement tools.

Assessing objective changes in protective factors associated with psychological resilience over time is a major benefit of using quantitative psychometric questionnaires, and is a quality not afforded by qualitative approaches. This capability is vital when appraising interventions that are developed to enhance resilience in sport, or track longitudinal changes. Although two of the research articles included in the review measured resilience at two different time points, the repeated measures nature of two of the articles whereby measurements were taken under two different environmental conditions did not allow a comprehensive longitudinal approach over a significant period of time. Meggs et al. (2015) distributed questionnaire packages one week apart with competitive swimmers, one week before a national event, and then on the day of the event. Secades et al. (2016) used the Spanish validated version of the Resilience scale (Ruiz et al., 2012) to measure resilience prior to the competitive cycle of athletes representing a range of sports, and second after an important competition. Nevertheless, the authors do not give an indication of the time lapse between data collection points. As is clear from these approaches the scope for correlational research assessing how psychosocial characteristics associated with positive adaptation develop and change over time is a quality of quantitative designs that should be exploited by future research. Specifically, this desirable quality should be considered when developing novel and innovative measurement tools.

5.4 Qualitative approaches to measuring psychological resilience in athletes

Six qualitative research papers were identified by the search strategy in the current review, published between 2008 and 2015 (Table 5.4). All of these studies collected data via an interview format, predominantly employing inductive thematic analysis to make sense of the participant's subjective experiences relating to resilience in sport.

The first qualitative research exploring psychological resilience with an athletic population was conducted by Galli and Vealey (2008) who use semi structured interviews to examine how individuals who had been identified as having experienced major setbacks or adversities in their careers, perceive their experience of resilience. This paper also aimed to explore how the experience of adversity itself can help facilitate the resilience process. The authors used an interview guide with a number of predetermined questions developed from the resilience model (Richardson et al., 1990), to ensure that the key components of the resilience process were targeted. These included biopsychospiritual factors, and envirosocial protective, enhancing, supportive, and reintegrative processes. Following inductive analysis and rigorous trustworthiness procedures, the conceptual model of sport resilience emerged. As previously discussed (section 2.4.1) the model proposes that following adversity, athletes experience an agitation phase whereby unpleasant emotions and mental struggles are negotiated alongside behavioural and cognitive coping strategies. Positive outcomes from this agitation phase included increased motivation to help others, learning, and a broadened life perspective. The positive outcomes were also shown to be influenced by the impact of sociocultural influences (e.g., social support) and personal resources (e.g., achievement motivation) on the agitation phase. The development of this model enhanced the knowledge of resilience as a process within athletes, and demonstrated the importance of considering both personal and environmental factors (Galli & Gonzalez, 2014).

Table 5.4

Qualitative research concerning the nature of psychological resilience in athletes

Author/s (year) Location	Aim	Participants	Design [sampling method]	Analysis	Findings/emergent themes associated to the process of resilience
White & Bennie (2015) Australia	To investigate gymnast and coach perceptions about the development of resilience through gymnastics participation	22 female gymnasts and seven gymnastics coaches (Athletes Mage=12.5, range=10-16) (Coaches Mage=22.14, range=18-30)	Qualitative, Semi-structured interviews [Purposive sampling]	*Inductive data analysis-* *Open coding-* identifying key concepts *Axial coding-* refining codes to explain broader categories and higher concepts	Concepts that underpin the development of resilience in gymnastics • The environment • Interpersonal relationships • Coach behaviours
Brown et al. (2015) UK	To explore winter sports athletes' experiences of adversity within their sporting careers	7 British elite winter sports athletes representing a variety of disciplines (Mage= 23.1+/-2.4)	Qualitative, Semi-structured interviews [Purposive sampling]	*Inductive thematic analysis* using a 2-stage approach (data organization and data interpretation).	Factors contributing to the resilient reintegration into winter sports, including; Adversity characteristics, passion, social support Influence of adversity on an athlete and their ability to adapt; modifying training, career ambiguity Acquisition of resilient qualities; significant others, seeking knowledge, previous experience
Sarkar & Fletcher (2014a) UK	To identify and explore resilient qualities that enable high achievers to thrive and perform at high levels	13 high achievers from numerous performance domains (e.g., sport, business, politics) (Mage= 50.6+/-12.3)	Qualitative, Phenomenological semi-structured interviews [Purposive sampling]	*Interpretative phenomenological approach* (IPA)- exploring meanings and participants making sense of their world, providing an indication of theme convergence and divergence	• Positive and proactive personality • Experience and learning • Sense of control • Flexibility and adaptability • Balance and perspective • Perceived social support
Machida et al. (2013) USA	To examine the resilience process of individuals who have experienced spinal cord injuries, and the role of sport participation in the resilience process.	12 male quadriplegic wheelchair rugby players (Age range= 21-41)	Qualitative, Semi-structured phenomenological interviews [Purposive sampling]	*Analytic induction-* seeking emergent patterns and understanding, and their relation to the Resilience Model (Richardson et al., 1990)	• Pre-existing factors and experiences, • Disturbance/disturbing emotions, • Multiple sources and types of support, • Special opportunities and experiences • Various behavioural and cognitive coping strategies, • Motivation to adapt, • Gains from the resilience process
Fletcher & Sarkar (2012) UK	To explore and explain the relationship between psychological resilience and optimal sport performance	12 Olympic champions representing a variety of sports (Mage= 47.5+/-10.44)	Qualitative, Grounded theory approach following the guidelines of Strauss and Corbin (1998) and Corbin and Strauss (2008) [Theoretical sampling]	*Open coding-* identifying key concepts *Axial coding-* refining codes to explain the resilience-performance relationship Employing a *constant comparison method* to compare similarities and differences of incidents and accounts. *Selective coding-* to form a theoretical framework	• Psychological factors including: motivation, focus, perceived social support, confidence and positive personality influence challenge appraisal and meta-cognitions which promotes facilitative responses to stressors in sport
Galli & Vealey (2008) USA	To explore athletes' perceptions and experiences of resilience	10 high-level athletes (Mage= 21.4)	Qualitative, Semi-structured interviews [Purposive sampling]	*Inductive data analysis-* focussing on similarities and differences in individuals' resilience process including temporal sequence	• Breadth and duration • Agitation • Sociocultural influences • Personal resources • Positive outcomes

Based on the conceptual model of sport resilience, and using similar methodology to that of Galli and Vealey (2008), Brown et al. (2015) aimed to explore the process of resilience and factors that contribute to a resilient reintegration specifically within a winter sports context. The results from this study largely supported the conceptual model of sport resilience particularly relating to influences of both behavioural and cognitive strategies on positive outcomes that subsequently feeds forward into future adversity experiences. Additional dimensions such as knowledge seeking, recognition of one's own abilities, and the impact of environmental change suggest that what we understand about resilience in sport from the conceptual model is far from exhaustive, and that different attitudes, personalities and environments in which athletes function symbolise a very individualised approach to recovering and thriving following adversity.

From these two research articles, a number of limitations associated specifically to the methodology have been identified. First, the relatively small participant numbers (n=10, Galli & Vealey, 2008; n= 7. Brown et al., 2015) are problematic when studying a complex multidimensional construct such as psychological resilience, and means that practitioners can be less confident when generalising the findings within applied practice. Indeed, the problem with generalising findings yielded though qualitative research is not an issue that purely relates the topic of psychological resilience (Merriam & Tisdell, 2015). The depth of information gained through interviewing a single participant can be imperative to understanding the phenomenon of resilience for *that individual*, and only reader or user generalisability can be applied. This means that an individual who reads information from qualitative research in an attempt to understand their own/athletes resilience process, would decide whether the findings apply to them (Merriam & Tisdell, 2015). This process requires clear and detailed context specific information to be relayed to the reader (e.g., age/ sport played, adversity type experienced), and would require a certain level of knowledge to help facilitate accurate judgement.

The retrospective nature of data collection whereby individuals are requested to reflect back on past experiences during interview, also raises concerns as when attempting to reproduce thoughts and behaviours there is likely to be information loss to some extent. In addition, specifically when being asked to discuss incidents that have been pivotal within one's life/career it is can be easy for interviewees to respond in a narrative manner to portray their experiences to others. This may mean that when telling these stories about their resilience process, individuals may be inclined to catastrophize negative experiences and/or overemphasise their positive qualities and social interactions (Merriam & Tisdell, 2015). In addition, if a narrative approach to analysing the data has not been applied, there

is a danger that information that is metaphorical or symbolic, or even glorified, is taken in a literal manner by researchers. Although Ungar (2003) suggested that a narrative qualitative design to explore individual's resilience experiences would help to extend knowledge in the area. In response, Morgan et al. (2014) and Howells and Fletcher (2015) have used this approach (via the examination of athletes autobiographies) to explore the construct of team resilience in a World Cup winning rugby team, and to explore adversity and growth-related experiences in elite swimmers. Even though this is an innovative way of assessing experiences and processes involved in a resilient reintegration which considers the individual's own interpretation, and which has the potential to demonstrate changes in the resilience process over time, there remains an over-reliance on data collected with individuals who are resilient, rather than a more balanced approach to help understand both those who might respond positively and those who do not.

Machida et al. (2013) also adopted a qualitative approach to examining resilience, and used phenomenological semi-structured interviews with athletes who had suffered spinal cord injuries. The findings suggested that sport participation offered unique opportunities to develop protective factors associated with resilience. In addition, athletes highlighted how experiences occurring prior to the devastating injury influenced the way in which they coped with the adversity, as well as an already established positive environment including influential role models and family support. Many of the factors emerging from data analysis which when combined create a 'model of resilience after traumatic injury' (Machida et al., 2013, p.1057), and reflect those included in the conceptual model of sport resilience. The phase where disturbing emotions and cognitive and behavioural strategies are influenced by multiple sources and types of support is comparable to the agitation phase of Galli and Vealey's (2008) model. Nevertheless, there are some key differences between the 'traumatic injury' model with wheelchair athletes and the more generic conceptual model. Specifically, Machida et al. (2013) identified that the athletes suffering traumatic spinal cord injuries revealed that being involved in competitive sport offered special opportunities to relieve frustration, and allowed athletes to be competitive and exert effort, which distracted from disturbing emotions. In addition, other significant experiences away from sport, such as becoming a parent, and seeing others with similar or more severe injuries become independent and successful, helped with the realisation of one's own capabilities to adapt. Broad similarities between the models can also be seen with regards to the influence of individuals' motivations to overcome adversity, however the source of these motivations was different. Wheelchair athletes' motivations stemming mainly from social contexts which included being able to

live independently and needing to change for others, whereas those athletes outside of disability sport were helped in the resilience processes by motivation largely relating to athletic achievement. These differences highlight the need to understand resilience in both an adversity specific and a sport specific context, as opportunities offered which help athletes to thrive following adversity are likely to be different.

Similarly to both Galli and Vealey (2008) and Brown et al. (2015), Machida et al. (2013) employed the resilience model (Richardson et al., 1990) as a guiding framework to aid an understanding of psychological resilience in their respective studies. Both Fletcher and Sarkar (2012) and Galli and Gonzalez (2014), have highlighted that these studies therefore have an "overreliance on a sequential framework and coping-oriented focus" presented by the resilience model (Galli & Gonzalez, 2014, p. 248). Instead, a research design that is less constrained to linear models of resilience developed in alternative contexts is required when attempting to measure resilience in sport. For research that is purely qualitative, a more ethnographic-based exploratory approach to the study of psychological resilience amongst athletes may yield more holistic insights at both an individual and a group/organisational level.

Fletcher and Sarkar (2012) were the first authors to use a grounded theory approach to investigate psychological resilience in their study with Olympic Champions. Their methods were based on previous studies such as Holt and Dunn (2004) and Weissensteiner, Abernethy, and Farrow (2009) who used a similar approach, and found that resilience played an important role in the development of athletic expertise and success. Using the guidelines presented by Strauss and Corbin (1998) and Corbin and Strauss (2008) this study aimed to develop an explanatory theory inductively generated from the data itself. They stated "this approach allows for elucidation of the construct of resilience free from the constraints of a preconceived model" (Fletcher & Sarkar, 2012, p.670). The grounded theory of psychological resilience and optimal sport performance was developed, which moved beyond the coping-oriented focus of previous literature. This theory offered an understanding of the concept that included challenge appraisal and meta-cognitions (see section 2.4.2 for more in depth overview of this theory). Although there are some clear strengths in this methodological approach, most notably the authors focus on explaining rather than describing the concept of resilience as well as the high level of athletes sampled, there remain some limitations which the qualitative research to date have not addressed.

First, as previously highlighted, there has been an over-reliance on the retrospective recall of the participants, over what are commonly long periods. Indeed this is a critique of

all the qualitative studies included in this review. In the case of the study by Fletcher and Sarkar (2012), the oldest participant was 70 years old with their Olympic experience possibly dating back to the 1960's. As the participants were being asked to reflect on "an event that was important on your journey to becoming an Olympic champion" (Fletcher & Sarkar, 2012, p.671), the findings are dependent on an ability to recall in detail an event which occurred up and over around 50 years ago, which presents a clear problem.

Second, the purposive sampling strategy displayed by most qualitative research to date, whereby a sample has been sought based either on outcome criteria such as high level performance (e.g., Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014a), or that which is potentially biased based on recommendations from coaches, other athletes or trainers, means that there has been an over-emphasis on data collected with those who have successfully negotiated stress or adversity. This likely means that there is a wealth of data from potential ex-athletes, or those who have remained at the same or lower level than that before adversity, which would help in understanding the individual differences and resilience processes involved between those who are successful and those who are less so.

Finally, within the qualitative literature that has emerged from the current review it is clear that, as with the quantitative literature, there has been a heavy dependence on data collected by interviews conducted at a single time point. Although qualitative approaches to assessing psychological resilience in sport performers has allowed a greater understanding of resilience at a conceptual level, there is adequate scope to use phenomenological interviewing techniques to assess the developmental nature of protective factors and the resilience process. A longitudinal approach would facilitate this, however this would only ever provide an athletes own subjective interpretation of change and/or effect, and relies heavily on their own articulation and recall, which is a problem that is inherent within qualitative research. To combat these issues and to further enhance understanding of psychological resilience in athletes, a prospective cohort study, normally favoured in medical research would be a viable option. Importantly, this approach would need to employ data collection methods that have the capacity to objectively track the development of, or changes in, resilience over time.

5.5 Quantitative and qualitative approaches to understanding the nature of resilience

Purely quantitative research relies upon standardised and validated measures, which can be employed to objectively assess resilience within specific populations in both a cross-sectional and/or longitudinal manner. This means that statistical procedures can be successfully applied to measure demonstrable changes over time, and presents clear

evidence regarding intra- and inter-group differences and effects where required. In addition, distribution of psychometric questionnaires is a relatively simple undertaking, which means that within research, large samples can be used. This means that the knowledge gained from such an inquiry is more easily generalisable across the athletic population. From an applied perspective this approach not only provides scholarly information which is relatable and impactful to those working with athletes, but would also be a quick, simple and desirable way to understand the nature of resilience within the athletes they are working with to develop.

However, due to the complexities of the construct and its context specific nature it is likely that even with the imminent development of a sport specific measure, there will be a significant amount of information loss as the multidimensional nature and interactions between protective factors is not fully appreciated. This would ultimately make any data yielded less representative of an individual's entire resilience process. In addition, as with many psychological constructs there remains inherent problems relating to social desirability bias. This might result in individuals responding in a way that is not entirely illustrative of their potential responses to stress or adversity, and instead attempts to make them appear 'more resilient' to significant others (King & Bruner, 2000). Additionally, when attempting to use a psychometric questionnaire specifically amongst a junior sample, the tedious task of completing sometimes lengthy measurement scales can cause significant problems with the reliability of the data. Finally, because of the Likert scale nature of many questionnaires those involved in completing them do not gain a great deal from this experience i.e., the responses to not often require careful articulation or in depth thought. This means that aside from the reliability of the data coming into question, the potential to influence personal reflection at an individual level is also lessened when using quantitative questionnaires. In addition, as previously acknowledges (Section 5.3) there are also limitations that are important to consider concerning questionnaire design and development.

Alternatively, a qualitative approach using individual interviews provides a much more engaging environment in which athletes can describe and discuss their experiences of resilience and adversity. This method enables individuals to reflect on the resources they employed to negotiate the stressful event throughout different its stages, and tell their own story, without being constrained to a questionnaire's stringent factor structure. Within an applied context, this generates rich phenomenological or epistemological data that is not available when employing a quantitative approach. Although subjective, qualitative data also provides an in-depth context specific view of individuals' experiences of adversity and

offers potential for the development of 'personal profiles' relating to their experience of reintegration. Within an applied field this approach to understanding resilience would help to highlight each individual's protective and vulnerability qualities, and provide a platform on which intervene or develop environments designed to help equip athletes with opportunities which facilitate the resilience process. Within scholarly research to date, it could be argued that it is the amalgamation of these personal profiles that have formed the theories of psychological resilience amongst athletes (e.g., Fletcher & Sarkar, 2012; Galli & Vealey, 2008). Nevertheless, the generalisability of data, and subsequent theoretical models of this scholarly data, to the entire athletic population is questionable, particularly as this approach has provided data collected within small samples from a variety of backgrounds and experiencing numerous types of adversities. Because of the multitude of transitions and complex interpersonal relationships that are often specific to junior athletes, is essential to achieve a greater understanding of resilience, to target its development.

Unlike quantitative approaches to collective data, qualitative research requires a greater investment, particularly for those working in applied practice, in terms of time and training. As the time taken for an athlete to take part in an interview often means time taken away from physical training, both the athlete and those working in a supporting role (i.e., coaches) maybe less likely to commit to this approach to gathering information. In addition, to obtain quality information pertaining to the resilience of individuals within a team or squad, the necessary skills associated with interviewing design and strategy, as well as an understanding of bias, trustworthiness and analysis of raw data are often necessary to make the most out of the information collected.

As practitioners in applied practice are often concerned with the development of an athlete, it must also be recognised that interviewing techniques do not allow for objective measurements or comparisons to be made, either between individuals or over time. Although interviews can be used in longitudinal designs, any assessment of change relies on clear articulation from the interviewee and an opinion relating to the intensity and direction.

5.6 Summary

The current review has identified both quantitative and qualitative approaches to the study of resilience in athletes. Quantitative approaches have largely used a correlational design to examine the relationship between resilience and similar constructs such as mental toughness and/or coping strategies. This approach has increased conceptual understanding of resilience in sport specifically relating to its positive associations with task-oriented

coping (Secades et al., 2016), mental toughness (Cowden et al., 2016), and perceived stress-related growth (Salim et al., 2015). The moderating qualities of psychological resilience relating to the stress-burnout relationship (Lu et al., 2016), were also highlighted as well as its predictive ability on performance (Meggs et al., 2015), stress (Cowden et al., 2016), and sense of accomplishment (Vitali et al., 2015). This literature review has highlighted that quantitative research could be useful in measuring and understanding the nature of resilience in a junior athlete context, specifically for longitudinal studies tracking its transient nature, but also allowing associations between other relevant constructs and behaviours to be better understood. There remains two key issues with a quantitative approach which employs the use of psychometric questionnaires: first, there is no sport specific measure which had been developed and validated with an athletic population to-date; second, it cannot be assumed that a sport specific measure would offer sufficient depth of understanding given the complexities surrounding both the construct of psychological resilience and the nature of an elite sporting environment.

Qualitative studies have largely focussed on developing theoretical understanding of psychological resilience amongst athletes through adopting phenomenological methodologies. From these enquires, the conceptual model of sport resilience (Galli & Vealey, 2008) and the grounded theory of psychological resilience and optimal sport performance (Fletcher & Sarkar, 2012) have been developed. These, as well as the additional qualitative studies identified in the current review, have increased knowledge concerning the complex nature of interactions between adversity and psychological factors, interpersonal relationships, and personal resources specific to facilitative responses in a sport setting. Important links with superior sports performance have also been identified (Fletcher & Sarkar, 2012). The qualitative research identified by this review highlights that data collection via semi-structured interview offers an in depth view of the nature of resilience, which takes into account the complexities of individuals' 'personal journeys' following stress or adversity. In addition, as the data is not constrained by questionnaire factors this approach has the potential to give the most comprehensive understanding of an athlete's resilience process. Nevertheless, the usefulness of data obtained is questioned as they cannot be generalised to those outside of the study itself, and application of knowledge relies on user generalisability alone. Finally, adopting a qualitative approach does not allow for an objective measure of change when attempting to understand how resilience adapts and/or develops over time, and instead requires the individuals own subjective perception of change.

It is clear that there are positives and negatives relating to the use of qualitative and quantitative data collection methods, when attempting to understand the conceptual nature of psychological resilience in sport. In general, qualitative approaches have provided depth and contextually grounded information, whereas quantitative designs allow objective statistical assessments to be achieved. In addition, there are un-desirable qualities of each with regards to employing these in applied practice. Although not targeting resilience specifically, mixed methods approaches with athletes such as that conducted by Galli and Reel (2012) may offer an option of providing understanding that is more comprehensive. Galli and Reel (2012) used a mixed method approach to explore stress-related growth in athletes, employing a self-report measure to highlight collegiate athletes with a moderate to large degree of growth, followed up by semi-structured interviews. Their findings demonstrated the importance of social support, and explained a process of developing new life philosophies following stress. Galli and Reel (2012) suggested that this approach allowed them to explore the interaction between combinations of numerous life-events experienced by the athlete, and their effects on personal growth, rather than focussing on the effect of a single stressor.

However, it could also be argued that by combining both qualitative and quantitative designs, the problems relating to the reliability and validity of data are also consolidated (Tashakkori & Teddlie, 2003), and may cause confusion when there were discrepancies between the data collected from the two different approaches. Therefore, it is paramount that any novel methodological approaches to exploring resilience that move away from being purely qualitative and quantitative, consider the positive elements and pitfalls of both data collection methods.

Within the next chapter of this thesis, the author aimed to address some of the methodological problems related to understanding the nature of resilience that have been raised in this review, including but not limited to: context specificity and generalisability, and the potential for measuring objective change, by using Q- method with junior athletes. Its methodological qualities, including both qualitative and quantitative elements, have been exploited to obtain greater understanding of the nature of psychological resilience as a process amongst junior rugby league players.

Chapter 6

Study 4- Q-method: Developing the Q-set

6.1 Introduction

Within the next two chapters, the efficacy of employing Q-method as a novel way of understanding the nature of resilience in junior sport performers has been introduced and explored. To successfully gather data using Q-method, a five stage approach is suggested in the literature: 1) Defining the concourse, 2) Generating the Q-set, 3) Selecting the P sample, 4) Administering the Q-sorts, 5) Analysing and interpreting the data (Brown, 1996; Watts & Stenner, 2005; Watts & Stenner, 2012). Specifically, the focus of this chapter was on the initial two stages, and aimed to define the concourse and develop a Q-set of items, which is then used to explore the nature of resilience and responses to adversity in junior rugby league players.

6.1.1 Q-method theory.

Q-method is a phenomenological research method that was developed by Stephenson (1935) as one of the first 'alternative' approaches to understanding psychological constructs (Watts & Stenner, 2005). Stephenson (1953) proposed that Q-method acts as a dynamic medium through which subjectivity, attitudes, beliefs, and experiences can be actively articulated and understood from the viewpoint of the participant. Whilst this approach has quantitative features that indicate patterns of similar and opposing viewpoints, the tool also allows for effectual thematic analysis (Shinebourne & Adams, 2007). As this method can be defined as neither solely qualitative nor quantitative, and instead incorporates the desirable qualities of each, the term 'qualiquantilogical' has been adopted as a preferred description (Stenner & Stainton Rogers, 2004).

In its most simplistic form, Q-methodology might be interpreted as an inversion of factor analysis techniques, or *R* methodology (Watts & Stenner, 2012). Described as a data reduction technique, factor analysis uses data collected with a number of participants (commonly in the form of self-report scores) to identify patterns of association between discrete variables. Standardised correlations (such as Pearson's correlation, *r*) or *Z* scores allows variables to be directly compared and reduced to a number of latent variables or '*factors*' based on how they vary or more importantly co-vary in the sample and which broadly defines a measure's structure. Stephenson (1953) argued that through the process

of standardisation, the scores no longer represent the individuals' personal qualities or characteristics, and instead only consider the scores relative to others amongst the pool of scores collected by the sample. Because of its nature, this type of factor analysis is commonly referred to as by-variable factor analysis, and allows direct comparisons to be made between individuals or groups scores for specific latent variables (Watts & Stenner, 2012). Nevertheless, in the context of understanding the nature of resilience in junior athletes, the results from such analysis would provide generalizable characteristics across the population as a whole, but would not be useful when attempting to understand a single individual within the group in a holistic fashion (Watts & Stenner, 2012).

Stephenson (1953) proposed an alternative to R-methodology (by-variable factor analysis) by inverting the same process so that there is a more holistic focus on the individuals being tested. This *by-person* analysis formed the basis of Q-methodology, and allows a more *gestalt* approach, whereby the emphasis is on the person as a 'whole' as opposed their constituent 'parts' or themes (Good, 2000; Watts & Stenner, 2005). Importantly, this analysis identifies the ways in which these themes are related or configured, and shows where an individual 'fits' within the participant group. Alternatively, as Stephenson (1936b, p. 278) explains, "to map out the field into groups of persons who resemble one another with respect to the whole aspects of their personality." However, a different approach to collecting data which permits by-person analyses was required, as data collected using R-methodology cannot be simply transposed because of a number of problems it creates (e.g., the measurement scales for variables may be different; see Brown, 1980), which was the original proposition (Burt & Stephenson, 1939). This led to the development of the Q-set, which is a set of 'stimulus items' using statements or images relating to the construct being measured. By ranking items within the Q-set from high significance to low significance, a person creates a profile of statements, which are ranked relative to each other from the viewpoint of that single individual. In essence this in itself acts as an alternative way of standardising the data, as items (statements) are scaled (sorted) relative to an individual, which also makes them more meaningful when understanding individual profiles (data matrices), and can also be directly compared to another individual. The standardization of items to allow for by-person analysis in Q-method also comes from the forced-choice ranking distribution (Q-sort), which is pre-determined by the researcher, and which forms a quasi-normal distribution. The shape of this distribution was developed based on the belief that the agreement/disagreement or importance of items would naturally form a normal distribution, with few identified at the

extreme ends of the scale and most clustering around the centre (i.e., neither agree nor disagree; Burt & Stephenson, 1939).

The approach to studying individuals as a 'whole' was considered an attractive and powerful alternative to understanding the complex process of psychological resilience in sport (Wagstaff et al., 2017), that has been previously untapped by other methods. Indeed, the ability of Q-method analysis, which reduces the data by-person, could provide fundamental knowledge concerning covariations of resilience qualities across a sporting population in a scientific, quantitative manner, whilst providing qualitative information about the depth and diversity of psychological resilience within individuals in the sample.

6.1.2 Research using Q-method.

Since the development of Q-method by Stephenson (1935), the innovative gestalt approach to understanding individuals' perspectives has established a substantial following. This has resulted in the foundation of "Operant Subjectivity" which is a scientific journal dedicated to research using Q-method and the study of subjectivity, which is the official journal of the International Society for the Scientific Study of Subjectivity (ISSSS). The society has also hosted an annual conference surrounding the multidisciplinary use of Q-method since 1985.

The method developed to specifically investigate human subjectivity and behaviour (Brown, 1980; Stephenson, 1953), lends itself to multiple disciplines including: chronic pain (McParland, Hezseltine, Serpell, Eccleston & Stenner, 2011), leisure studies (Grix, 2010), and parent-child relationships (De Mol & Busse, 2008) amongst many others. Although Q-method research is not as prevalent as purely qualitative or quantitative approaches, the use of this method within psychology research is reasonably well established, with numerous authors calling for its promotion amongst those studying attitudes and behaviours (Cross, 2005; Müller & Kals, 2004; Watts & Stenner, 2005). This method has been adopted as a useful way of understanding how individuals (either singularly or with a group) perceive themselves, and offers a superior way of analysing data "where the uniqueness of a person is paramount" (Goldstein & Goldstein, 2005, p.40).

Numerous authors have discussed the practicalities of Q-method and a number of key characteristics that promote this approach within psychology research have emerged (Watts & Stenner, 2005). First, the process of data collection, whereby the participant plays an active role in getting their viewpoint across, both through the development of the items and the Q-sort configuration itself, arguably gives them power to reveal their true perceptions (Adams, Dominelli, & Payne, 2002; Ellinsen, Størksen, & Stephens, 2010),

and also engages them in a process of self-reflection not usually a component of other research designs. Second, as the items within the Q-set should aim to reflect the specific dialogue of the participants, and by detailing emergent rather than imposed viewpoints, those with lower level verbal skills or cognitive abilities (e.g., younger populations) can also be given a voice (Ellingsen, Størksen, & Stephens, 2010).

6.1.3 Using Q-method to understand resilience in athletes.

As discussed in the previous chapter, the qualitative-quantitative divide in the research on psychological resilience within sport remains intact. In addition, researchers in the area have not embraced mixed method approaches to bridge this gap. As psychological resilience has been identified as a broad multidimensional construct that is influenced by the context as well as athletes personal protective and/or vulnerability factors (Galli & Vealey, 2008), it makes sense that research exploring psychological resilience in athletes can assess holistic profiles at both an individual and a group level.

In their qualitative study of psychological resilience, Morgan et al., (2014) showed an appreciation of the need to analyse narrative as a whole by employing holistic-form analysis on their autobiographical data. Their analysis took into account not only the content of the data in relation to resilience, but underlying meaning relative to the environment. Fletcher and Sarkar (2012) have also stated that investigating resilience and the relationship with stress and performance from a holistic and longitudinal perspective is warranted. A Q-method approach may help to facilitate this by conceptualising the experiences of athletes and their resilience processes, whilst also offering potential for single-case and developmental or longitudinal studies.

6.1.4 Overview of Q-method: Stages 1 and 2 (Defining the concourse and developing the Q-set).

The Q-set is made up of a number of items that relate to the phenomenon being tested, and are often presented as multiple different answers to a research question (Donner, 2001). More often the Q-set is made up of statements or descriptions of behaviours or traits (Stephenson, 1953), but may include objects, pictures or words dependant on the research question (Watts & Stenner, 2012). There are a number of different ways in which to develop a Q-set to suit the research question or phenomenon being assessed. Statements, for example, may be gathered through quotes and themes from interviews or focus groups with participants (Kitzinger, 1986), and/or emerge from theoretical knowledge within academic literature (Stainton Rogers, 1991; Watts & Stenner,

2012). Block (2008) and Curt (1994) emphasise that Q-set should be developed in a rigorous and methodical manner, and both challenge the original description of the process by Stephenson (1953) which appeared to outline a relatively quick and unscientific process, and proposed an alternative more systematic approach. By committing to a systematic approach, the Q-set can be developed in a structured or unstructured way, which is usually dictated by the research question (Watts & Stenner, 2005). Nevertheless, it is not unusual for research employing Q-method to focus little attention on the reporting of Q-set development procedures, and often detail is lacking in relation to the both the processes they have taken, and justifications relation to the specific items retained for the Q-set.

A structured Q-set is developed in much the same way as a psychometric questionnaire is created, by targeting the inclusion of clusters of items relating to certain themes, which, taken together form a preconceived theory (Watt & Stenner, 2012). In other words, items are selected for the Q-set based on an a priori factor structure (Dziopa & Ahern, 2011). Structured and unstructured approaches to developing the Q-set are similar in that both should be influenced by the academic literature in the area of concern, allowing key themes and issues to be identified which are relative to the topic. An unstructured Q-set offers more flexibility, and although might start in a similar way to a structured Q-set (to make sure the concept targeted is being measured), focuses on gathering items or responses which are specific to the population being assessed. The key difference between these two approaches is that an unstructured approach seeks to develop a Q-set, which is not only representative of the construct, but more importantly is representative of the target population (Dziopa & Ahern, 2011). This is a desirable quality when attempting to better understand the nature of a particular construct within a specific sample, and may be why this is the most popular method preferred by Q-researchers (Kerlinger, 1986). As psychological resilience has consistently been shown to be context specific in nature, an unstructured approach appears to be the obvious choice, allowing subjective viewpoints to emerge relative to the sample being explored.

As previously mentioned, the Q-set can be developed in a number of different ways. For single-participant case studies, the Q-set needs to reflect parameters that are relative to *them,* and so it would be natural for items to be developed from an interview or discussion with a specific individual (Watts & Stenner, 2012). Given that most research is interested in perspectives that go beyond the viewpoint of a single individual, typically Q-sets are gathered using a wider participant pool using semi-structured interviews or focus group techniques (Brown, 2004). The information or dialogue (concourse) created with the

participants during this phase is then reduced via an inductive or deductive approach to form a balanced, unbiased Q-set (Ellingsen et al., 2010).

The Q-set is required to include a collection of items that are "broadly representative of the opinion domain, population or concourse at issue" (Watts & Stenner, 2012, p. 58). It is important that each of the items within the Q-set makes an original contribution to the collection, whilst together the items should represent a wide range of viewpoints from a number of perspectives within a population, providing maximal coverage relevant to the concept being measured (Shinebourne, 2009; Watts & Stenner, 2012). The Q-set does not necessarily require a perfect balance of positive or negative items, however a *balanced* Q-set should capture items that cover a full spectrum of subjective opinions or views, presented in a non-biased way. This means that some items may prove to be contentious between individual participants, whilst some demonstrate relative agreement.

In general, a Q-set that contains between 40 and 80 is considered satisfactory (Stainton Rogers, 1995); however, Q-sets with as few at 20 items can also be deemed acceptable (Donner, 2001). The number of items in a Q-set can vary, dependant on the concept being assessed, the characteristics of the sample (age, capacity etc.), and the number of participants taking part in the Q-sort (Ellingsen et al., 2010). A minimum ratio of 1:1 (number of participants in the Q-sort study: number of items in the Q-set) was proposed by Watts and Stenner (2005), who suggest that the number of participants should be at least equal to, if not more than the number of items retained within the Q-set. In their systematic literature review of the applications of Q-method, Dziopa and Ahern (2011) revealed that of the 11 articles that emerged from the review only four adhered to this guideline. A key characteristic of the Q-set is that it should not restrict an individual from expressing their viewpoint when the Q-sort is constructed; this therefore denotes the size of the Q-set, but in turn relies heavily on a systematic approach in the development phase.

6.1.5 Q-set development in sporting literature.

Q-methodology is an approach that is seldom used within sport science research, and is a technique that has never been applied to understand the nature of athletes' psychological processes (not least psychological resilience). The small number of research articles within the sporting literature that have employed Q-method, have been conducted by the same lead author, focusing on coach behaviours, the coach athlete relationship/interactions and their perceived effects (Moen, 2012, 2014; Moen, Giske, & Høigaard, 2015; Moen & Kvalsund, 2013; Moen & Sandstad, 2013). These studies have

predominantly used elite Norwegian coaches as their participant sample, with only a single study including a sample of athletes (Moen, 2014). This has meant that there is a lack of diversity in terms of the methods employed within each of the articles (due to authors repeating the same processes). Additionally, the conceptual focus of the Q-studies within sport does not extend from a coaching paradigm, and the usefulness of the approach to help understand *athlete* processes is yet to be fully exploited.

Norwegian based researcher Moen and his collaborators have all taken a structured approached to developing the Q-set in their Q-method studies (Moen, 2014; Moen et al., 2015; Moen & Kvalsund, 2013). Each of the articles used a combination of identified literature, theories, and research to develop a concourse relating to their specific research questions. These included: exploring what both coaches and athletes believe is expected coach behaviour, and how this relates to athlete motivation, focus, emotion and performance (Moen, 2014); exploring the subjective viewpoints of coaches about their beliefs concerning the effects of relational factors on athletes achievement process (Moen, 2012); and, exploring coaches subjective beliefs about effective communication with athletes (Moen & Kvalsund, 2013).

From the concourse obtained via this structured approach, the statements were "reduced into a meaningful Q sample to create a balanced sample" resulting in a Q-set of 36 statements representing opinions or perspectives being adopted for each of the above studies (Moen et al., 2015, p.183). To achieve this, some of the articles established combinations of 'levels' of items to add rigor to the study design (Stephenson, 1950). For example, Moen et al. (2015) aimed to explore coaches' perceptions of how coach behaviour affects athlete motivation, focus, performance and emotions, and, to ensure the Q-set covered each behaviour and possible effect in a balanced manner two main themes were drawn from the literature, and are used to ensure that the items are balanced and represent the whole concourse; coaching behaviour and effect. Coaching behaviour included three relevant levels; decision making style, motivational tendencies, and instructional behaviour. In addition, the theme effect included four levels relating to athletes' motivation, performance, focus, and emotions. Each level of coaching behaviour was combined with each level of effect (coach behaviour x effects), resulting in 12 possible combinations, e.g., instructional behaviour effects athlete motivation/ decision making style effects athlete performance. Moen et al's. (2015) final Q-set included three items (1 x positive, 1 x negative, 1 x neutral) for each of the 12 combinations, resulting in a 36 statements.

Although there is not a specific number of items that are recommended within a Q-set (Stainton Rogers, 1995), and smaller Q-sets are often beneficial for both participants and researchers alike, the number of items retained from the concourse in the research articles above appears somewhat arbitrary. Although systematic in their approach, the structured manner by which the Q-set was developed in each of the Q-studies within sport means that the participants within the sample are being characterised based on preconceived understanding of a concept, in essence, exploring how the participants 'fit' into theory. Therefore, this structured approach does not lend itself to the study of psychological constructs such as resilience, which is a dynamic, multifaceted and context specific process (Wagstaff et al., 2017), as one cannot be certain that the complexities of the concept which are specific to the sample have been fully considered (Ellingsen et al., 2010). Instead, an unstructured approach would facilitate the emergence of these complexities when defining the concourse, and would allow a more gestalt exploration of the *nature* of a particular concept such as psychological resilience, relative to others within the sample and unrestricted by a priori theory or data.

6.1.6 Aims.

The aim of the current study aligns with Aim 1 of this thesis, and was to define the concourse and collate subjective viewpoints of junior rugby league players reflecting their experience of adversity (Objective 5). Using this information, a Q-set of items that represented their perceptions of how they might respond when faced with stress or adversity was developed. An unstructured approach was taken to ensure context specific viewpoints relating to psychological resilience emerged from the concourse.

6.2 Methods

Q-method was chosen to investigate resilience in junior athletes, through exploring their subjective views and experiences related to stress and adversity in the sporting environment. Data collection for this study will include two stages: 1) Defining the concourse, 2) Generating the Q-set.

6.2.1 Defining the concourse.

6.2.1.1 Participants.

Participants were recruited from two Rugby Football League (RFL) clubs based in Yorkshire. Twenty-nine junior male rugby league players consented to participate. Players were aged 13 or 14 (M=13.14+/-.35) and were currently representing their club in the

Under 14's age group. Players and their parents were given information sheets regarding their involvement prior to providing consent. Ethical approval was granted from the institutional review board for all phases of the Q-study data collection.

6.2.1.2 Procedures.

In order for the Q-set to reflect a broad range of beliefs (Brown, 2004), the concourse aimed to include any possible views relating to junior rugby league players' resilience processes, and their beliefs on how they might respond to stress or adversity experienced in sport. An unstructured approach meant that the concourse was not constrained to elicit specific responses identified by theory or previous literature.

There were two opportunities for data collection at two different locations with RFL junior squads. Two focus groups (one with each RFL club) were conducted with the aim of defining the concourse. The focus groups took place in a classroom setting following a scheduled late-season training session at the players training grounds, which were deemed to be comfortable environments within which the participants could easily exchange responses (Kitzinger, 1994). All players attending the training session were invited to take part. The first group consisted of 19 players, and the second of 10 players. To manage the large focus group sizes, the participants were divided into smaller groups of 4-6, which aligns more closely with the guidance of Morgan (1997).

Focus group procedures were selected over semi-structured interviews to allow for group discussions where the participants can communicate their opinions, viewpoints, or perceptions on their resilience process (Brown, 2004; Ellingsen et al., 2010; McKeown & Thomas, 1988). As the participants may or may not have experienced stress or adversity within their competitive sport, the group environment facilitated the diversity of responses, as it allowed participants to communicate and share their views on how *they* might respond to adversity from their own knowledge and experiences, or the experiences of *others*. In line with the guidance of Donner (2001), the focus groups identified the concourse by using semi-structured, broad questions to elicit multiple responses.

Four questions (outlined on page 172) were developed as probes to promote discussions within each of the groups of 4-6 participants. As the data collection methods were developed prior to the publication of a sport specific definition of psychological resilience expressed by Fletcher and Sarkar (2012), the focus group questions and procedures were developed using the definition of resilience outlined by Richardson et al. (1990); "the process of coping with stressors, adversity, change or opportunity in a manner that results in the identification, fortification, and enrichment of resilient qualities or

protective factors" (p. 308). This approach was taken to increase the likelihood of rich context specific (junior sport) viewpoints and experiences to emerge, whilst also maintaining confidence that psychological resilience remained the topic of interest.

First, because of the different interpretations and appraisals of stressful environments, and to clarify potentially unfamiliar terminology to the participants, the word *adversity* was explained to the athletes using Richardson et al's. (1990) definition as guidance. It was explained that that *adversity* (when referred to in the questions posed) might refer to an unpleasant or difficult situation or an incident/situation that causes stress. Examples of such situations were also described to the participants, including those that might result in a period of change for the athlete, or offer opportunity, such as injury, bouts of poor performance, conflict, and transferring between teams.

The questions posed to the participants within the focus groups to promote discussion were:

1. How *do you feel* when you experience adversity?
2. What *do you do* when you experience adversity?
3. What *should I do* when I experience adversity?
4. What would a *top player* do when they experience adversity?

The first two questions concerned how the players perceive they would respond to adversity behaviourally (what do you do?) and emotionally (how do you feel?). These questions were formulated to target the coping element of the resilience process within Richardson et al's. (1990) definition. The final two questions were discussed with the participants as qualities or characteristics that they felt *they should* demonstrate, or that a *top player* would demonstrate to successfully overcome adversity. These questions aimed to broaden the scope of responses, and illicit ideas which they may or may not associate with on a personal level, but which aimed to encapsulate "the identification fortification, and enrichment of resilient qualities or protective factors" as much as possible (Richardson et al., 1990, p.308).

To engage the participants with the content of the discussion, and for ease of collating data, players were encouraged to use poster sized A2 paper and large pens to record their responses or ideas. These 'posters' (each with one of the four questions on) were rotated between small groups of 4-6 within each of the focus group sessions. The players were encouraged to discuss and add their own alternative responses or note their agreement with any responses already proposed. Two facilitators (the lead researcher and a second researcher) who were sufficiently trained and had at least two years' experience in

qualitative data collection methods were present in each of the focus groups. The facilitator's roles were to encourage interactions between participants and keep them on task in a relaxed and open fashion (Kitzinger, 1994). Additionally, the facilitators assisted the participants to articulate their responses by using probe questions where necessary, however their aim was to use minimal intervention to ensure the trustworthiness of the data collected.

It must be noted that that there are a number limitations associated to these methods that are worth recognising. First, similar to other qualitative approaches, there may be issues with recall of participants experiences, even within a relatively short time, which has the potential to negatively impact the quality and detail of responses. It is also especially important to note the potential impact of impression management issues, particularly within a competitive environment. The facilitators role was to minimise these issues by encouraging personal reflection and truthful responses.

6.2.2 Data analysis; Generating the Q-set.

The data from the focus groups was analysed using an inductive thematic approach to identify, analyse, and report themes within the focus group data (Braun & Clarke, 2006; Frith & Gleeson, 2004). As the data collected in the current study were not the same as that which might be collected during individual interviews (i.e., full transcriptions of the spoken-word), and instead took the form of a collection of short statements, the data analysis process followed the guidance of Braun and Clarke (2006) which had been modified to fit the data. The analysis took place in three stages: (1) familiarisation, (2) searching for themes, (3) naming the themes.

(1) Familiarisation. A phase of familiarisation of the data took place both during and after data collection, and required the researcher to become fully immersed within the data, first by facilitating discussion, answering questions/queries and by using probe questions to elicit rich data responses and gain a better understanding of participants' responses (Krueger, 1994). Second, following each of the data collection sessions, the lead researcher reviewed the posters in their entirety several times to ensure familiarity with the depth and breadth of the data (Braun & Clarke, 2006). Finally, the raw data in its original form was transcribed into an excel file to facilitate thematic analysis.

As the raw data was already presented as "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998, p.63), the stage Braun and Clarke (2006) refer to as 'generating initial codes' was not necessary.

(2) Searching for, and reviewing themes. The raw data, taken directly from the 'posters' developed by the participants, were then inductively themed. A theme was considered to capture "something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006, p.10). Themes consisting of any number of raw data items were considered, and as Q-method research strives to study individuals in a holistic manner, the analysis was intended to accurately reflect the raw data set in its entirety. The process of theming the raw data involved the grouping of similar statements in relation to their meaning. Once all of the patterns within the raw data had been explored, the grouping of items was reviewed to ensure that they formed coherent themes (Rabiee, 2004; Braun & Clarke, 2006). Where an item had no shared similarities with another, it was accepted as a theme on its own, so that the Q-set can provide as broad, wide-ranging coverage of responses concerning psychological resilience and responses to adversity as possible.

(3) Naming the themes. As the purpose of searching for themes within the data was to develop a set of statements (Q-set) that reflected how a person may or may not respond to adversity which could be used by individuals for Q-sorting procedures, the themes were labelled in a first person manner (i.e., I get angry). The language used for labelling was reviewed, and attempted to follow the terminology that has been used by the participants within the focus groups.

6.2.3 Trustworthiness.

To ensure the quality of the data collected, procedures to strengthen the study's trustworthiness were considered throughout both data collection and data analysis phases. The main questions posed within the focus groups that aimed to facilitate discussion between the participants were of paramount importance when considering the validity of the data collected. Additionally, participants understanding of what was meant by the term 'adversity' was integral when assessing their responses to such a situation. Richardson et al's. (1990) definition of resilience facilitated the development of these questions and helped to increase the validity of the study by grounding participant responses within the resilience process, as opposed to a sole focus other concepts such as coping, hardiness, and mental toughness that have some shared characteristics.

Triangulation of analysts within the second stage (searching for, and reviewing themes) was also key to reliability of the raw data themes identified (Galli & Vealey, 2008). Within this stage, an independent research active individual (who held at least two years' experience in qualitative data collection and analysis procedures within the field of

sport psychology) was presented with the raw data statements and each of the named themes, and was asked to assign each of the statements within one of the themes. The lead researcher and the independent researcher were in agreement for 72/77 original statements. The five statements that caused disagreement were: 'disruptive', 'don't do anything stupid', 'let your rugby do the talking', 'paranoid', and 'take it like a man'. These discrepancies were rectified by the introduction of a third independent researcher, with experience superior to those already involved. Where agreement was not achieved the items were discussed be all researchers until agreement was reached. The participants were informed that their data and contributions within the focus groups would remain confidential, and that they would not be identifiable from any reports produced. The value of their contributions was emphasised and truthful responses were encouraged.

6.3 Results

6.3.1 Defining the concourse.

From the data collected during the focus groups, a list of 77 statements emerged relating to responses to adversity (Table 6.1). Using the procedures outlined in section 6.2.2 the responses were reduced (where necessary) in a manner which did not lose the context of the statement.

Table 6.1

Concourse statements

Focus group question	Responses	*n*
How *do you feel* when you experience adversity?	Angry	8
	Annoyed	8
	Determined	7
	Upset	6
	Sad	5
	Stressed	4
	Worried	4
	Eager	4
	Strong state of mind	4
	Want to make up for it	4
	Embarrassed	4
	Destructive	3

	Furious	3
	Motivated	3
	Try not to let team down	2
	Paranoid	1
What *should I do* when I experience adversity?	Stay calm	12
	Take anger out in tackles	11
	Put more effort in	10
	Stay focused	5
	Try to ignore it	4
	Try not to get angry and shout	4
	Concentrate	4
	Don't dwell on mistakes	4
	Try to get back on	3
	Man up	3
	Retaliate	3
	Don't retaliate	3
	Go mental	3
	Avoid it	3
	Tackle	3
	Attack as a team	3
	Work to fix the problem	3
	Keep going if you are pushed	2
	Carry on with heads held high	2
	Forget about it	1
	Count to 10	1
What *do you do* when you experience adversity?	Get angry	8
	I speak to someone	6
	Take anger out on the other team	5
	Channel anger into game	5
	Try and make up for it	5
	I go inside myself and rethink what I'm doing and how I'm going to do it	4
	Worry about missing games	4
	I go and punch a punch bag	4

	Try to find positives and build on them	4
	Support each other	4
	Motivate myself	3
	I go and cry	3
	I talk to my friends	3
	Apologize	3
	Try hard	2
	Man up	2
	Expect the worst to happen	2
	Motivate teammates	2
What would a *top player* do when they experience adversity?	Remain focused	6
	Don't show emotions	6
	Control their temper	5
	Make up for it	5
	Get over it and move on	4
	Don't show negative emotions	4
	Don't do anything stupid	4
	Stay positive	4
	Don't be put off	4
	Try their best to overcome it	3
	Have mental toughness	3
	Bounce back	3
	Take it like a man	3
	Work hard to overcome it	3
	Put their hand up for making a mistake	3
	Don't get wound up	3
	Don't dwell on it and keep going	3
	Let your rugby do the talking	2
	Try and take a positive	2
	Laugh	2
	Joke about it	2
	Tackle them hard	2
	No foul language	2

NB. The total number of players who either responded or noted their agreement with a response is presented in the column labelled *n*.

6.3.2 Generating the Q-set.

Following inductive thematic analysis, using the guidance of Braun and Clarke (2006), 30 themes emerged from the raw data statements. These will form the Q-set for the sorting procedures in the following study (Table 6.2). To achieve a balanced and meaningful Q-set (McKeown & Thomas, 1988), which covered as much of the concourse as possible, all raw data items were included in the analysis, and themes consisting of only one item were permitted. The size of the final Q-set was dictated by the number of themes which emerged from the data (n=30), but was also considered appropriate based on; time restrictions on data collection sessions for Stage 3 (Q-sorting), and engagement in the Q-sorting task (i.e., minimising the effects of boredom balanced with information loss from the concourse).

Table 6.2

Development of the Q-set

Raw data statement	Theme/final named item	Item No
Angry Destructive Furious Go mental Get angry	I get angry	1
I talk to my friends	I talk to my friends	2
Eager Make up for it Keep going if you are pushed	I am eager to overcome the problem	3
Upset Sad I go and cry	I get upset	4
I try to speak to someone	I find someone to speak to	5
Support each other Try not to let team down	I support my teammates	6

Annoyed	I feel annoyed	7
Try and make up for it Don't be put off Bounce back	I try my best to overcome it	8
Control their temper Don't do anything stupid Put their hand up for making a mistake No foul language	I control my temper and put my hand up when I make a mistake	9
Stressed Paranoid	I feel stressed	10
Put more effort in Try hard Work hard to overcome it Try their best to overcome it Attack as a team Let your rugby do the talking	I put more effort into the game/training	11
Take anger out in tackles Retaliate Tackle Take anger out on the other team Tackle them hard I go and punch a punch bag	I take my anger out in tackles	12
Embarrassed Apologize	I feel embarrassed by what has happened	13
Work to fix the problem Want to make up for it Try to get back on	I try to fix the problem	14
Channel anger into game	I channel my anger into the game	15

Worried Worry about missing games Expect the worst to happen	I worry for what will happen in the future	16
Try to find positives and build on them Try and take a positive Stay positive	I try to find positives and build on them	17
Try not to get angry and shout Don't retaliate	I try not to get angry and shout at my teammates	18
I go inside myself and rethink what I'm doing and how I'm going to do it	I go inside myself and rethink what I'm doing and how I'm going to do it	19
Carry on with heads held high Get over it and move on	I carry on with my head held high	20
Don't show emotions Don't show negative emotions	I don't show negative emotions	21
Motivated Motivate myself Motivate teammates	I try to motivate myself	22
Avoid it	I avoid the situation	23
Determined	I am determined	24
Laugh Joke about it	I laugh and joke about it	25
Try to ignore it Forget about it	I try to forget about it	26
Strong state of mind Have mental toughness Man up Take it like a man	I have a strong state of mind	27

Stay focused		
Concentrate	I try to remain focussed	28
Remain focused		
Stay calm		
Don't get wound up	I stay calm	29
Count to 10		
Don't dwell on mistakes	I try not to dwell on what has	30
Don't dwell on it and keep going	happened	

6.4 Discussion

The aim of the current study was to define the concourse of junior rugby league players' subjective viewpoints that represents their beliefs about how they might respond when faced with stress or adversity. Second, by using an inductive thematic approach to analyse the concourse, this study aimed to develop a Q-set of items that can be used to examine the nature of psychological resilience via Q-method. An unstructured approach was taken to ensure context specific viewpoints relating to psychological resilience emerged from the concourse.

From the focus group data, 77 statements were recorded reflecting the resilience process within junior rugby league players and how they may or may not respond when facing stress or adversity. These statements were combined to form 30 themes that summarised the participants' responses, and were named in a manner that they could be used as items with a Q-set.

The athletes' subjective beliefs concerning their resilience process, and how they would respond to stress or adversity were broad ranging, and reflected numerous types of responses, protective factors, and processes. Broad themes of responses relating to cognitive strategies, emotional responses, social support, and behavioural strategies emerged from the data. Cognitive strategies and items relating to emotion (responses, control, and outlets) accounted for the majority of themes, making up 40% of items retained for the Q-set. Behavioural strategies (n=3) and items expressing tendencies towards seeking or giving support (n=3) made up the remaining 20% of the Q-set. The statements each reflected either positive, negative or neutral responses, which was in line with previous Q-sort studies in sport (e.g., Moen et al., 2015).

The current study found that junior rugby league players perceived that several forms of cognitive strategies could be employed when responding to and trying to overcome stress or adversity. These included strategies relating to concentration or focus, being motivated, seeking positives, and determination.

The conceptual model of sport resilience (Galli & Vealey, 2008) featured 'cognitive coping strategies' a component within the agitation phase of the resilience process. These cognitive strategies have been shown within the literature to mediate the relationship between stressor and the outcome following adversity (Galli & Vealey, 2008; Kim & Duda, 2003). Within their study, Galli and Vealey (2008, p. 323) also stated that all of their participants expressed that they used cognitive strategies "as a way to manage the unpleasantness of their adversity", to overcome the disruption caused by experiencing stress and adversity.

Within the grounded theory of psychological resilience and optimal sport performance (Fletcher & Sarkar, 2012), psychological factors were shown to influence individuals' challenge appraisals and meta-cognitions following an experience of a stressor. These psychological factors included; motivation, confidence, focus, and positive personality, and were communicated by the participants within Fletcher and Sarkar's (2012) study as playing a fundamental role in the stress-resilience-performance process. Item #17 'I try to find positives and build on them' in the current study reflects the positive personality component identified by Fletcher and Sarkar (2012), and represents how an individual might be proactive and optimistic to bring about a positive outcome. Components relating to motivation and focus that Sarkar and Fletcher (2014a) highlighted as important characteristics, and which facilitate how an athlete views a stressor as a threat, or as an opportunity for growth and development were represented in the current study by items: #3 'I am eager to overcome the problem', #22 'I try to motivate myself', #19 'I go inside myself and rethink what I'm doing and how I'm going to do it', and #28 'I try to remain focussed'. Galli and Gonzalez (2016, p.250) also suggest that measures such as achievement motivation are good indicators of positive adaptation, and help to "provide a more complete understanding of athletes' response to adversity".

Three items within the Q-set related to how an athlete might respond to adversity by mobilising effort to overcome the problem. These behavioural strategies included; 'I put more effort into the game/training' and 'I try to fix the problem', and again indicates how individuals behave in ways that demonstrate they are motivated to overcome adversity.

Numerous conceptualisations of psychological resilience both within and outside of sport have identified motivation as a key psychological factor which impacts, the way in

which stress is appraised, which subsequently affects the facilitative responses and protective qualities that emerge from the process (cf. Fletcher & Sarkar, 2012). However, unlike the role of motivation within the resilience process proposed by Fletcher and Sarkar (2012), which refers to a more stable form of self-determined extrinsic motivation which is possessed by resilient athletes, the current study postulates that motivation specifically reflects how for some athletes, experiencing a stress or adversity can act as a catalyst which results in increasing efforts to negotiate the problem faced (Collins & MacNamara, 2012). Previous studies outside of sport have suggested that this increase in effort and motivation to recover defines the resilience process. These characteristics therefore distinguish those who withdraw from the sport from those who thrive from the process of recovery (Fraser-Thomas et al., 2005).

Item #30 'I try not to dwell on what has happened' reveals that an athlete might respond to stress or adversity by looking to the future as a way of managing their response. In previous studies, this characteristic has been linked with lower level anxieties relating to overcoming adversity, as well as an increased focus on aspects of the environment that are controllable (Cardoso & Sacomori, 2014; Wagnild & Young, 1993).

Item #25 'I laugh and joke about it' shows how an individual might use humour as a protective factor against the negative effects of stress. Although this does not appear within the sport specific resilience models presented above, humour can often reflect a superior level of social competence, which is a trait that often characterises resilient children (Martinek & Hellison, 1997). Tugade, Fredrickson, and Barrett (2004) explain that displays of laughter and humour can be in response to positive emotions, but also that humour (cognitive construct) and laughter (behaviour) also contribute to increases in positive emotions experienced, which consequently facilitate both psychological and physical wellbeing. The broaden-and-build theory, developed by Fredrickson (1998, 2001) explains how positive emotions (often presented as humour) can produce patterns of cognitive functioning relating to increased openness to new experiences and information, flexibility, creativity and varied behavioural responses associated with psychological resilience.

A number of authors including Sarkar and Fletcher (2014a), Galli and Vealey (2008) and Gucciardi et al. (2011) have identified the importance of confidence in the resilience process. Confidence is regularly associated with increased performance and the general wellbeing of competitive athletes (Woodman & Hardy, 2003). More specifically Vealey and Chase (2008) suggested that it is a robust confidence that is maintained through challenging circumstances such as stress or adversity that is a strong contributor to success.

Although item #20 'I carry on with my head held high' does not specifically refer to confidence, this item could be interpreted as being the behavioural response associated with a heightened degree of conviction in relation to their ability.

Finally, item #26 'I try to forget about it' might be considered both a protective and a vulnerability factor associated with experiencing challenge or adversity. Generally, denial or avoidance of a negative situation is associated with limited personal resources (such as low self-esteem, personal control, or confidence; Fasting, Brackenridge, & Walseth, 2007), and has been reported as a quality demonstrated by 'non-resilient' athletes (Yi, Smith, & Vitaliano, 2005). Alternatively, evidence has also shown that directing attention away from a negative event or stressor, which is often referred to as repressive coping can help to foster psychological resilience, and reduce symptoms of psychopathology (Bonanno, 2004; Bonanno, Keltner, Holen, & Horowitz, 1995). In their study, Coifman, Bonanno, Ray, and Gross (2007) examined a sample of bereaved and non-bereaved adults, measuring negative affect, autonomic responsivity during interviews, and long-term adjustment. Their results showed that both bereaved and non-bereaved participants who engaged with repressive coping behaviours, demonstrated less symptoms of psychopathology, fewer self-reported somatic complaints, and were rated higher by friends for their level of long-term adjustment. Although the trauma experienced in this study was not within a sporting context, stress and adversities in sport such as transitions, loss, and retirement are often viewed in a similar way to bereavement (Lavellee, Grove, & Gordon, 1997). As Q-method allows individuals to express the degree to which they elicit particular responses following adversity, item #26 'I try to forget about it' was kept within the Q-set. This will provide an interesting and first hand insight into the extent to which repressive coping is used as a part of the resilience process of competitive junior athletes, and may offer a platform on which to develop future study.

Within the current study, a number of responses to adversity emerged relating to the role of emotions within the resilience process. These included items that expressed how athletes may; *demonstrate negative emotions* (e.g., anger and embarrassment), attempt to *control their emotions* (e.g., item #18 'I try not to get angry and shout at my teammates'), and use certain behaviours as *outlets for negative emotions* (e.g., item #15 'I channel my anger into the game').

Experiencing unpleasant emotions is a common response associated with facing adversities within sport (Brown et al., 2015; Males, Kerr, Thatcher, & Bellew, 2006; Sarkar & Fletcher, 2014b). Unpleasant emotions emerged with the qualitative data of athletes who had experienced adversity in the study by Galli and Vealey (2008), and was

identified as a part of the agitation phase within the conceptual model of sports resilience. The items retained for the Q-set within the current study are also reflected by similar responses from the participants within their qualitative research i.e., anger (#1 'I get angry'), embarrassment (#13 'I feel embarrassed by what has happened'), and sadness (#4 'I get upset') following adversity.

These unpleasant emotions experienced by the athletes show how an adversity can have a negative impact on the athlete. Nevertheless, Wadey, Evans, Evans, and Mitchell (2011) suggest that self-disclosure of emotions by athletes (e.g., showing anger, guilt, or jealousy) can promote relationships and positive interactions with others, and ultimately facilitate individuals understanding of their own emotional responses and their expression, as well as help individuals learn how to regulate their emotions (Wadey, Clark, Podlog, & McCullough, 2013). This suggests that experiencing unpleasant emotions is not only a common outcome of facing stress or adversity, but can also play a role in fostering resilience by offering opportunities to understand their emotions as well as learning how to regulate them to promote recovery.

By including negative emotional responses within the Q-set, which are characteristic of an athlete's response to adversity (Sarkar & Fletcher, 2014a; Machida et al., 2013), it will be possible to gain an insight into an individual's ability to successfully manage their emotions. In addition, the relative rankings of these emotional responses may facilitate an understanding of how they relate to other items (e.g., seeking support #5 'I find someone to speak to', focus #28 'I try to remain focussed') which are known to protect athletes from the negative effects of stress.

Four items emerged which reflected how an athlete might attempt to control their emotions following stress or adversity, which included 'I control my temper and put my hand up when I make a mistake' and 'I try not to get angry and shout at my teammates'. Numerous authors have identified that displaying positive emotions is a crucial aspect of the resilience process both within and outside of sport (e.g., Truffino, 2010). Specifically, the management of negative emotions (and thus their subsequent affects), is often seen to be an indicator of a greater capacity for resilience and growth (Truffino, 2010). In addition, by proactively managing negative emotions, athletes are more likely to gain confidence in their ability to successfully deal with adversity, and use previous experiences to develop and guide future responses (Gonzalez et al., 2016).

Two of the items selected for the Q-set (#12 'I take my anger out in tackles', #15 'I channel my anger into the game') relate to the way in which an individual might behave to release anger resulting from an adverse experience. Machida et al. (2013) suggested that

this is an important part of the resilience process, and that in general sport provides a unique opportunity to express emotions. The athletes within their study, who had experienced spinal cord injuries, expressed that using sport to exert themselves and "take out frustrations" (p.1059) served to facilitate the resilience process through the release of disturbing thoughts and emotions.

Numerous authors have identified having an increased sense of control as a critical component of the resilience process within sport (Galli & Vealey, 2008; Hall, 2011; Machida et al., 2013). Within their study of psychological resilience and thriving in high achievers Sarkar and Fletcher (2014a) identified *sense of control* as one of six themes that summarised the resilient qualities of high achievers (including athletes), along with; positive and proactive personality, experience and learning, flexibility and adaptability, balance and perspective, and perceived social support. Specifically, Sarkar and Fletcher (2014a) reported that active choice in relation to the challenging environment that individuals are exposed to, prioritising and decision-making were key to the sense of control perceived by the individual. These are slightly different to the items emerging within the current study (which relate to emotional control, as well as strength of mind and determination), and may be reflective of the differing capacities, environments, and experiences of the samples involved. Nevertheless, both allude to the shared components of both mental toughness and psychological resilience (determination and strength of mind) and can be reflective of how an athlete is mentally resistant to the negative effects of stress by successfully controlling negative emotions (Gucciardi & Jones, 2012).

Perceived social support has been identified as a key component of the resilience process when athletes experience stress or adversity (Galli & Vealey, 2008; Smith, Smoll, & Ptacek, 1990). The conceptual model of sport resilience demonstrates that social support facilitates athlete resilience in two ways; first, that the support athletes receive provides them with an emotional crutch by being there throughout the process, as well as knowledge and advice to guide expectations (Galli & Vealey, 2008). Second, the conceptual model suggests that by experiencing adversity, athletes are able to realise the extent and importance of support received from others. This realisation of support is a positive outcome of experiencing stress, where athletes can identify the strength and potential impact of their support network, and mobilise such resources/networks when experiencing the process of agitation in response to future stressors.

Similarly, the grounded theory of psychological resilience in Olympic champions shows that the perception of social support received from family, coaches teammates and other support roles, underpins the stress-appraisal process and the meta-cognition of

stressors (Fletcher & Sarkar, 2012). Specifically, if athletes perceive they are supported through the challenges they face as an athlete, they are more likely to appraise these situations as opportunities for growth and development, and are more likely to evaluate their own thoughts as controllable. Items #5 'I find someone to speak to' and, #2 'I talk to my friends' in the current study, which each relate to seeking support from others, suggests that some athletes actively engage in building their resources by mobilising their support networks as a part of the resilience process.

The perception of support available from sources such as parents, coaches, and teammates underpins the resilience process for athletes facing difficulties, and can have a positive impact on performance (Kim & Duda, 2003; Fletcher & Sarkar, 2013). Perceived support from others can provide a stress-buffering effect by providing an environment with mutual trust and respect (Fletcher & Sarkar, 2013), whilst also helping athletes deal with negative emotions (Galli & Vealey, 2008). Two of the items relating to social support expressed a degree of effort on the part of the athlete to seek help, which in itself has been linked with greater resilience and minimising mental health problems (Sun & Stewart, 2007). The final item relating to social support expresses how an athlete might give support to others when facing stress or adversity (#6 'I support my teammates'), which may appear to align more with the concepts of team resilience (Morgan et al., 2014). Nevertheless, the item was included in the Q-set as evidence of prosocial behaviour and a positive outcome that is indicative of growth following adversity (Galli & Vealey, 2008; Howells & Fletcher, 2015).

Overall, an unstructured approach has resulted in the development of a Q-set that covers a broad range of subjective viewpoints concerning rugby league players responses to stress or adversity within the competitive environment, and the characteristics that they perceive to be beneficial in overcoming adversity. In turn, the Q-set appears to have much in common with the theoretical models and previous research concerning psychological resilience in sport. The focus group procedures that were developed to align with Richardson et al's. (1990) definition, have allowed for the researcher to successfully access the concept of psychological resilience amongst junior rugby league players, which can now be utilised in the final stages of the Q-method procedures.

6.4.1 Strengths and limitations.

Taking an unstructured approach to developing a Q-set has allowed the emergence of items that are specific to psychological resilience and experience of stress or adversity within the context of junior rugby league. Specifically, by conducting focus groups with

junior rugby league players, this study was first able to define the concourse of their subjective viewpoints representing their beliefs about their resilience process and how they might respond when faced with adversity. Second, by using rigorous and trustworthy analysis techniques to inductively reduce the concourse data, the study was able to develop a final Q-set without the constraints of previous theory or literature outside of a junior rugby league context. This builds upon previous Q-method research residing within sport science literature, which has solely used a structured approach, resulting in non-context specific Q-sets being developed. As psychological resilience is considered to be an extremely complex and contextually dynamic construct, which is specific to the population (Luthar & Cicchetti, 2000), it is a strength of the study that the Q-set items reflect protective factors, behaviours, emotions and other responses that those completing the Q-sort procedures (Study 5) can relate to.

It can be argued that a second strength of the study is the representation of the resilience process reflected by the responses of the participants within the focus groups. When reviewing the emergent themes, it is clear that although the behaviours and emotions expressed responses are specific to junior rugby league players, each item can be easily placed within the resilience process outlined by either the conceptual model of sport resilience or the grounded theory of psychological resilience in Olympic champions (Fletcher & Sarkar, 2012; Galli & Vealey, 2008). Importantly, facilitative responses which characterise a resilient recovery process are clear within the data, e.g., additional effort (item #11 'I put more effort into the game/training') and attempting to build on positives (item #17 'I try to find positives and build on them) following adversity, which supports the grounded theory of psychological resilience (Fletcher & Sarkar, 2012). In addition, this helps to authenticate the Q-set as an appropriate means to explore psychological resilience amongst junior rugby league players. Nevertheless, due to the nature of the questions asked within the focus groups (i.e., targeting responses to stress or adversity), there appears to be a small number of gaps within the Q-set developed in the current study, specifically relating to subjective viewpoints concerning learning and gained perspective as positive outcomes following adversity (Galli & Vealey, 2008). As the participants in the current study may or may not have experienced stress or adversity within their sporting careers, and may not have had the opportunity to reflect on what had been learnt or gained following such a challenge, it is unlikely that they would be able to provide an informed viewpoint concerning these important components of resilience. As defining the concourse and developing the Q-set are only the first stages of understanding the nature of resilience in junior RL players, the following stages whereby the Q-sort is administered can help to

shed light on these areas. For example, a longitudinal approach could be employed to track changes, learning, or development of resilience characteristics over time with the current Q-set. As an alternative approach, future research may wish to define a concourse with a more homogenous sample (i.e., injured athletes who have successfully reintegrated back into competition). By doing this, using questions which target the individuals' characteristics or protective factors associated with successfully overcoming adversity, and also asking for the athletes' subjective viewpoints on what has been learned through the experience or if any changes that have occurred.

Unfortunately, during the focus groups a note taker was not present to observe any non-verbal interactions or make comments on the discussion of participants during the course of the session (Rabiee, 2004). This limited the richness of the data collected, and meant that any responses that were not recorded by the participants on the posters were omitted from further analysis. In addition to focus group interviews (Donner, 2001), previous studies have employed a number of different methods to define the concourse relating to their research question following an unstructured approach. Akhtar-Danesh, Dehghan, Morrison, and Fonseka (2010) employed qualitative, open-ended questionnaires to gather the concourse on parents' subjective viewpoints of good health and eating behaviours with a sample of 20 parents. Whereas, Goto, Tiffany, Pelto, and Pelletier (2008) used in-depth interviews with action researchers and project managers about their attitudes and experiences of using action research as a strategy for HIV/AIDS prevention to develop their Q-set. Each of these unstructured approaches aims to allow the communication of subjective viewpoints or beliefs on a topic (McKeowen & Thomas, 1988). Nevertheless, it was important to balance the practicalities of collecting rich qualitative data (i.e., time commitment for collection and analysis procedures) with a small number of participants, and providing for appropriate breadth of a particular context to emerge. Within the current study, it was felt using small focus groups would help to achieve this, both with a defined timeframe and in consideration of the participant demographics. Future studies using an unstructured approach where time is not a problem, may wish adopt a more in-depth procedure to ensure the whole concourse is defined and recorded.

6.4.2 Conclusion.

This research extends our knowledge of psychological resilience in junior rugby league players, and offers an insight into how athletes perceive they might respond when challenged within their competitive environment. As a Q-set, the data collected in the

current study provides a framework to explore this complex construct in more depth within the population. The present study will prove to be particularly valuable when attempting to investigate holistic patterns of responses to adversity, including similarities and differences in resilience processes within junior athletes.

Q-method research in general, focusses little attention on the development of the Q-set (Dziopa & Ahern, 2011), and although the processes have been well described by authors such as Donner (2001), and Watts and Stenner (2012), research articles rarely disclose in detail this part of their research design. These problems relate not only to the processes involved in collecting the data, but also the way in which this is analysed and refined into the final Q-set for the study. This is a particular problem within the sporting Q-method literature, not only as research papers are somewhat lacking in detail in relation to Q-set development, but specifically because authors in sport are yet to move beyond a structured approach.

The present study not only evidences a greater degree of transparency and rigor at this important stage of Q-method research, but an unstructured approach has enhanced understanding of psychological resilience within the context of junior rugby league. The themes that emerged from the data collected which make up the Q-set, were successful in eliciting a Q-set that has theoretical relevance to psychological resilience in sport.

However, notwithstanding the strengths of this study, an important limitation to consider is the lack of emergent themes/items that relate to positive adaptation; one of the three components of psychological resilience (alongside adversity and protective factors) outlined by Sarkar and Fletcher (2013) in their more contemporary conceptualisation of the concept in sport. Due to the nature of the questions posed and the junior athlete sample, positive adaptation, which refers to an adaptation that "is substantially better than what would be expected given exposure to the risk circumstance being studied" (Luthar & Zelazo, 2003, p. 515), was not specifically targeted. Although the procedures that follow Q-set development can be designed to offer insight into this component, future studies with an aim to develop context specific Q-sets to examine psychological resilience should seek to maintain a greater focus on each of the three components of psychological resilience.

Within the next chapter, the author sought to utilise the Q-set that was developed with junior RL players, to examine the nature of psychological resilience specific to this context.

Chapter 7

Study 5- Q-method: Administering the Q-sort

7.1 Introduction

This study will utilise the Q-set developed in the previous chapter, to explore the nature of resilience in junior sport performers using Q-sort data collection methods. The latter of the five stages proposed within Q-research have been presented, 3) Selecting the P sample, 4) Administering the Q-sorts, 5) Analysing and interpreting (Brown, 1996; Watts & Stenner, 2005; Watts & Stenner, 2012). The efficacy of employing Q-method as a novel way of understanding the nature of resilience in junior sport performers will also be reviewed. As there is a dearth of literature employing Q-method within a sporting context, an assumption has been made that the reader has little to no prior knowledge concerning this approach. This introduction will offer a detailed overview of the procedures and analysis, as well as discuss the small amount of research using Q-method in sport.

7.1.1 The Q-sort.

Once the initial phase of developing the Q-set has been completed, and the researcher is confident that: a) this collection of items is representative of a population's perspective on a particular topic, b) the items are characteristic of any theoretical/ conceptual frameworks being targeted, Q-sorting procedures can begin. Put simply, the Q-sort procedure requires respondents to rank order each of the items in the Q-set. Ranking is completed with the aid of a distribution grid ranging from highest to lowest, although other 'scalable' anchors such as 'most agree/ most disagree' or 'most like/ most dislike' are also acceptable (Brown, 1980). The outcome of these procedures is that each respondent creates a personal profile, which is modelling their viewpoint.

The distribution grid (see Figure 7.1) typically represents a quasi-normal distribution, with few spaces allocated at the extreme ends of the rating scale (most intense responses), and with the majority located towards the centre (neutral responses; Karim, 2001; Prasad, 2001). Watts and Stenner (2005) suggested that the distribution grid would typically include between 11 and 13 columns, which represent the full scale of responses (i.e., +6 most agree to -6 most disagree). A symmetrical forced distribution grid is usually preferred, however the researcher has freedom to decide the exact shape of the grid, and specifically, how many items can be assigned to each ranking value.

162

Most disagree										Most agree
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

Figure 7.1. Quasi-normal, forced distribution grid
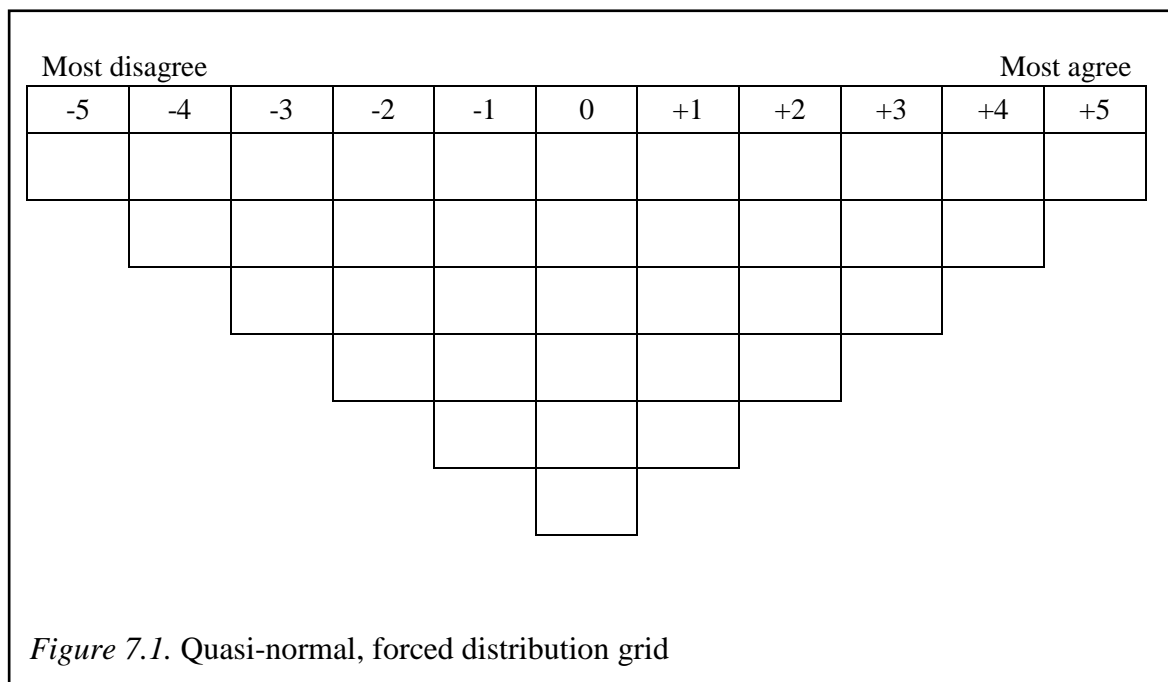
Forced distributions, such as the one presented in Figure 7.1, can appear restrictive to some qualitative researchers, and respondents alike, who may feel that the forced nature prevents the 'true' model of responses from emerging (Watts & Stenner, 2012, 2005). An alternative may be to offer respondents a 'free distribution', where respondents are able to rank any number of items to the ranking positions on the grid. Nevertheless, because of the additional freedom, free distributions require much more effort from the respondent to articulate their personal model of responses (Watts & Stenner, 2012). Furthermore, Brown (1980, p. 289) showed in their statistical comparisons between these types of distributions that the effects of distribution type are "virtually nil", and so therefore the additional effort involved in the respondent developing unstructured distributions may not be warranted.

Each item in a Q-set is numbered and presented on a separate card. To facilitate the sorting activity, respondents are first asked to read each of the statements carefully in relation to the research question they are answering, and divide them into one of three piles: (1) a pile representing items which the respondent agrees with, (2) a pile representing items which the respondent disagrees with, and finally (3) any statements which are considered neutral (Ellingsen et al., 2010; Watts & Stenner, 2012). The number of q-sort items in each of the three piles does not have to be equal, and each respondent should be encouraged to consider items on an individual level, and not be influenced by how previous responses have been categorised.

Once the respondents have achieved a 'basic sort', they can then start to apply their Q-set to the forced distribution grid. Commencing with the pile 'most agreed with', the respondent must identify the item which they agree with the most, and place this in the

space beneath the most positive anchor (usually on the right hand side of the grid). Following this, the next two most agreeable items remaining in the pile are placed in the column to the left, followed by the next three etc. This process continues until the respondent has placed all of the items from the first pile into the grid. The same procedures are followed for the second pile, where the respondent places the item that they disagree with the most to the left of the grid, followed by the next two etc. working in towards the centre. The items in the neutral pile are then sorted into the remaining space on the grid, placing the most agreeable 'neutral' items to the right of those less agreeable 'neutral' items.

It is important that the respondents are encouraged to consider each of the items carefully, and compare the intensity of their agreement/disagreement against other items in the Q-set. By the nature of this process, active engagement in the data collection is promoted on a task whereby respondents have to critically and logically explore their own subjectivity. This is arguably a task that is not usually requested of them when responding to psychometric questionnaires (Kagan, 2007). Therefore, the process itself may be considered a beneficial activity for respondents, regardless of the outcome of subsequent analyses, as it has the potential to promote the respondents self-awareness and provides an opportunity for critical reflection (Argyris, Putnam, & McLain Smith, 1985).

7.1.2 Q-method analysis (factor analysis and rotation).

Once the Q-sorts have been completed, the Q-sort grid template and the data from each sort can be entered for analysis. Typically, researchers employing this method use a software program named PQMethod (Dziopa & Ahern, 2011; Ellingsen et al., 2010). The data is subject to a by-person analysis (Watts & Stenner, 2005). The analytic process of Q-method requires both statistical data analysis procedures (factor extraction and rotation), and researcher interpretation of the emerging factors. Brown (1980) explains the complex technical process of analysing Q-sort data. It is worth noting, that within Q-method research (and within the current study specifically), the 'factors' represent discrete subgroups of individuals from the sample with similar or shared characteristics, and are referred to in this manner.

First, a correlation matrix is generated, which shows the intercorrelations between each Q-sort, and illustrates how strongly each sort is related to every other sort included in the analysis. High intercorrelations between Q-sorts represent similarities in the way combinations of items have been ranked and the overall configuration of the Q-sorts (Watts & Stenner, 2005). Following this, there are a number of different procedures, which

can be followed for factor extraction and rotation, although the aim of factor analysis remains the same: to reduce the data and recognise patterns of similarity in overall configurations of Q-sorts (Watts & Stenner, 2012). This is achieved by identifying *common variance* in Q-sorts (both within and between groups), *specific variance* that represents the individuality of Q-sorts, and *error variance*, in an attempt to reduce the data and explain its meaning through groups' shared qualities. The greater the percentage variance explained by the factor analysis, the more we can explain about the shared meaning and relationships between individuals' sorts (Watts & Stenner, 2012). There are a number of different types of factor analysis a researcher could apply to their Q-sort data, including principle component analysis (PCA) and centroid factor analysis (Watts & Stenner, 2005). Kline (1994) offers a complete and in-depth comparison of these approaches, however both have been shown to produce comparable results (Harman, 1976). PCA seeks the single, best mathematical solution to the data. Although, to some this may seem a desirable quality, this is also considered by many early Q-researchers to be problematic, as this procedure did not originally permit factor rotation using Q-specific analysis systems, meaning that it did not permit theoretically driven exploration or investigation of the data. The functions on updated Q-analysis systems also allow numerous factor structures to be explored, and therefore it could be argued that the meaning and significance of the data is not restricted from emerging (Brown, 1980). The centroid method of factor analysis is generally preferred by Q-methodologists, and is often the only option when using dedicated Q-method analysis systems (Watts & Stenner, 2005). This method offers more flexibility in analysis and interpretation, and data can be explored data for any number of factor solutions (Watts & Stenner, 2005). This means that the number of factors to extract can be driven not only by the best fitting mathematical model, but also by the "most appropriate and theoretically informative" structure (Watts & Stenner, 2005, p.81). As the centroid methods can be employed with factor rotation procedures, the *best solution* for the data can be explored both theoretically and mathematically.

Un-rotated factor structures tend to be complex, and often contain numerous cross-loading Q-sorts (i.e., individuals' Q-sorts which load into more than one factor) making factor interpretation difficult. Factor rotation procedures can be used to facilitate the interpretation of factors (Brown, 1980). These procedures 'map' each individual's Q-sort into a *conceptual space,* whereby each person's position within the space represents their viewpoint on the *concept* being tested (Watts & Stenner, 2012). Within this conceptual space, individuals with similar viewpoints are mapped closely to one another, but will be

further away from those with distinctively different viewpoints. The space in which the individual Q-sorts are mapped is multidimensional, and axes dividing the space represent the factors. The factor rotation procedures rotate the axes in a way which best fits the data collected in the study, its intention is to rotate axes so that individual's viewpoints are located as closely as possible to the axes (factors) themselves (Watts & Stenner, 2012). By doing this, the factors more closely represent the viewpoints of different groups of participants (Watts & Stenner, 2012). There are two types of rotation methods that can be used: orthogonal, and oblique. Orthogonal rotations assume that the factors are not correlated with one another, and rotated axes within the conceptual space remain always at 90 degrees from one another. Oblique rotations do not make this assumption, which means that axis movement is less restrictive (Kline, 1994; McKeown & Thomas, 2013). Although the latter option may appear to be more desirable, this is not currently an option on Q-method programs such as PQMethod or PCQ for Windows. Nevertheless, Watts and Stenner (2012) explain that oblique rotations would not necessarily be the best solution, as this can reveal problems with the interpretation of correlated factors and the complementarity of emergent factors (Stephenson, 1986). In essence, factor rotations are employed to give a less general picture of the results, and instead focus on the specific groupings of viewpoints and patterns of similarity in Q-sort configurations.

Once factor analysis procedures have been performed, the by-person analysis reveals how individuals are grouped within the sample based on their similarities and differences (McKeown & Thomas, 1988). The factors are generally orthogonal (statistically independent) and are usually ordered by the amount of variance in the data that each factor explains (Abdi, 2003). The factor loadings yielded by the analysis show how strongly each Q-sort correlates with each factor, just as by-variable analysis shows how well individual items correlate with each factor (Ellingsen et al., 2010). This ultimately means that individuals who have ranked the Q-set in a similar way are grouped together to form a factor (or subgroup). Consequently, other individuals who ranked the Q-set in a different manner are grouped based on their shared characteristics. It is possible that some subgroups share some similarities, but load independently based on their holistic profile. Z-scores (factor loadings), which represent the weighted average of item rankings within a factor (or centroid), are used to determine or define the factors (Watts & Stenner, 2012).

7.1.3 Factor extraction.

The number of factors can be driven in an inductive (whereby the data indicates the best possible solution) or deductive approach (whereby the researcher is lead to a solution though a priori theoretical or practical knowledge), dependent on the choice of the researcher as to which best suits the data being collected (Watts & Stenner, 2012). An inductive approach would be preferred when *exploration* of a particular concept is the main aim, this is less hypothesis driven than the deductive alternative (Watts & Stenner, 2012). Nevertheless, Stephenson (1953) states that factor solutions, whether expected or not, should be driven by the data itself and represent a structure that makes sense theoretically, statistically and practically.

In their systematic review, Dziopa and Ahern (2011) acknowledged that the descriptions of procedures relating to factor extraction are generally inadequate or inconsistent. There are a number of criteria outlined to aid researchers in identifying the most appropriate number of factors to extract for interpretation, these are closely related to those used for R method exploratory factor analysis. The most commonly used criterion for factor extraction is the Kaiser-Guttman criterion, whereby factors are extracted which yield an eigenvalue greater than 1.00 (Watts & Stenner, 2012). Eigenvalues signify the statistical strength of the factors, and are related to the percentage variance explained by the factor (Watts & Stenner, 2005). This criterion is generally well-accepted by Q-researchers as a way of maintaining the reliability of factors, however, this can lead to an excessive number of factors being extracted or meaningful factors (with eigenvalues < 1) being ignored (Brown, 1980; Watts & Stenner, 2005, 2012). Brown (1980) specifies the requirement of an extracted factor to meet two additional criteria: first, a factor must have two (or ideally more) significant loading Q-sorts (prior to rotation), and second, the cross-product of the two highest loading Q-sorts on a factor must be larger than twice the standard error of the study (Humphrey's rule). Both of these requirements can be stringent and should not be arbitrarily applied (Watts & Stenner, 2012), instead careful consideration from the researcher is required, in relation to the selection of meaningful factors for interpretation and their theoretical implications (Stainton Rogers, 1995).

7.1.4 Factor estimates, confounding sorts and factor arrays.

As a factor would typically be loaded by two or more Q-sorts, Q-method analysis applications generate a 'factor estimate' by weighted averaging of all the loading Q-sorts into one single configuration which best characterises the factor. A factor will likely consist of Q-sorts of varying degrees of factor-exemplifying or defining qualities (Watts &

Stenner, 2012). Q-sorts with higher Z-scores (>.60) are considered to be defining sorts, and contribute more to overall factor estimates. In contrast, Watts and Stenner (2012) suggest that all significantly loading Q-sorts should be included, incorporating those with lower Z-scores, which represent only close associations. Because of the nature of developing factor estimates through weighting averages, this reduces the error and makes the factor estimate more reliable. In addition, the process of factor estimation excludes any confounding sorts that significantly load onto more than one factor (Stainton Rogers, 1995). Once configured, each factor estimate results in the rank ordered weighted average of each item in the Q-set calculated using each of the significantly loading sorts. These show which items (on average) have been ranked more positively and which items have been ranked more negatively. The weighted averages are standardised by converting them into Z-scores, which allows for cross-factor comparisons (Watts & Stenner, 2012).

Factor estimates are then used to create factor arrays, which are simply the rank ordered Z-scores for each of the items presented in the original shape of the forced distribution grid. This is often referred to as exemplifying Q-sorts or best-estimate Q-sorts, and can aid interpretation of factors by giving a visual representation of a group's viewpoint on a concept (Watts & Stenner, 2005). This process is welcomed by many Q-researchers, as Q-method is, by its own design, a gestalt approach, focussing on how items are configured within each group as a whole (McKeown & Thomas, 1988). Nevertheless, whilst factor arrays present a general overview on the ranking characteristics of the Q-set, as the data has been converted from continuous data (in the form of Z-Scores) into ordinal data (in the distribution grid), there is a degree of information loss as the absolute 'distances' between items have been condensed to an arbitrary scale (Watts & Stenner, 2012).

7.1.5 Interpretation of Q-method results.

The factor arrays developed for each factor that show the general configuration of items as well as the extreme views (both positive and negative) can be compared and contrasted to aid interpretation of the factors (Dziopa & Ahern, 2011; Stainton Rogers, 1995).

Statistical outputs provided by Q-method programs such as PQMethod, can facilitate an understanding of the characteristics that define particular factors or groups of people. P-values highlight items that have been ranked in a significantly different way across factors. Although these outputs are important for factor interpretation, it is paramount that Stephenson's (1936) rationale for the development of Q-method procedures

is not lost, and that the entire item configuration of factor arrays, including the relationships between items are considered to deliver effective and holistic interpretation. Therefore, the process of identifying characteristics of the factor arrays that are 'information rich' and not only significant is vital. This includes; identifying unitary viewpoints that span most factors (consensus items, Donner, 2001), in other words, items with similar rankings across factors, and items, which distinguish a factor from others (distinguishing items; McKeown & Thomas, 1988). Items that are ranked within the neutral area of the distribution grid should not be ignored, and can add greater dimensionality to understanding the viewpoint as a whole, and capture subtle differences in groups' subjectivity (Watts & Stenner, 2005; Stephenson, 1936). It is for this reason that the location of as many items as possible in the factor array should be considered when interpreting the factor structure.

7.1.6 Q-method research in sport.

Within a sporting context, Q-method has seldom been employed as a research method. The limited research within the area has only been occupied with studying the role of the coach with an elite performance environment. Moen (2012) explored coaches' subjective beliefs relating to the coach-athlete relationship; specifically focussing on its impact on athletes' intrinsic motivation, and the responsibility the athlete takes in the achievement process (deliberate practice). The Q-method procedures requested that the sample (18 Norwegian coaches) rank order 36 statements that "describe the most optimal relationship between a coach and an athlete" considering "how they affect motivation, responsibility, and achievement seen from the athletes' point of view". The results from a centroid factor analysis and varimax rotation were interpreted as a single-factor solution that included 17 of the 18 participants (Moen, 2012, p. 227). This single-factor was characterised by coaches' beliefs that a coach-athlete relationship based on mutuality, with items such as 'I wouldn't perform as well if I didn't have the help and quality assurance from my coach in the learning process' being ranked high. This was reinforced by low rankings of items relating to athlete independence from the coach, e.g., I 'need no help from others than myself in my learning process'.

Similar studies by Moen et al. (2015) and Moen and Kvalsund (2013) also used Q-method to study coach-athlete relationships and coach behaviours, exploring Norwegian coaches' subjective beliefs about athletes' coach expectations, and effective communication, respectively. In the same way as the previous study, coaches completed a Q-sort with 36 statements relating to the respective research questions. The findings were

169

discussed in relation to the factors emerging from each of these studies, and importantly both consensus and distinguishing factors were used to aid interpretation. Similarly to the previous study, the participant numbers fall short of the guidance presented by Watts and Stenner (2005). Watts and Stenner (2005) advocate that the item to participant ratio should be at least 1:1), and suggest that a ratio below this would limit the richness of the data collected. In addition, the Q-sets from these studies were written from the points of view of the athlete using first person pronouns, but were sorted by coaches, which means interpretation of the data is unnecessarily complex (i.e., interpreting the coaches' perceptions of athlete perceptions).

In the only Q-method study that has used a sample of athletes, Moen (2014) explored specialist high school coaches (n=23) *and* athletes (n=59) expectations of the role of the coach, specifically in relation to how they can affect athletes' motivation, performance, focus and emotions. Both coaches and athletes Q-sorts were entered into the same centroid analysis with varimax rotation, and were distributed evenly throughout the three factors interpreted by the researchers (i.e., the factor analysis did not differentiate athletes from coaches). The three factors which emerged were, A). Democratic coach behaviour (loading participants emphasised the importance of feedback and democratic decision making), B). Autocratic coach behaviour (emphasising the importance of instruction for motivation and focus), and C). A personal coach (highlighting the importance of close coach-athlete relationships and an appreciation of athlete welfare). Distinguishing and consensus items were discussed. The development of the Q-set (concourse) for each of the above studies were developed from literature, theories and research within the field, and not original data gathered from Norwegian coaches (or athletes) themselves. This may mean that has been an amount of information loss in relation to the possible viewpoints expressed by the Q-set that are specific to the context in which subjectivity is being assessed.

An additional example of a study sourced within the sporting literature is an unpublished, single study, doctoral thesis exploring Olympic sport coaches' and athletes' beliefs about the defining qualities of expert coaches which are deemed integral (DeWeese, 2012). From this study, five unique factors emerged which represented coach and athlete perspectives on expert coaches: (1) the knowledgeable coach, (2) the evolving coach, (3) the communicating coach, (4) the trustworthy coach, and (5) the teaching coach. This approach to exploring these perspectives using Q-method helped to show the multifaceted nature of expert coaching, and how many of the attributes or abilities of the coach are perceived differently, and that coaches' interpersonal skills and knowledge were valued

highly by all. Although the thesis by DeWeese (2012) offers an interesting and viable alternative to understanding coach attributes, there appears to be a number of limitations which, as well as being non-peer reviewed, reduces the study's status to more of a pilot of the method in this context. The limitations (which are not highlighted in the respective study) include; its small sample size (10 coaches and five athletes), the lack of theoretical justification of retaining three factors with only one loading Q-sort, and most importantly the unclear processes regarding the development of the concourse (Q-set) and factor interpretation.

Finally, a study by Farquhar and Meeds (2007) used Q-method to examine the motivations and attitudes of online fantasy sports users. Using a pre-made Q-set, 42 fantasy sports users completed the Q-sort, and were shown to load into one of five factors reflecting their holistic Q-sort distributions: Casual players, skilled players, isolationist thrill-seekers, trash-talkers, and formatives. Although the focus of this study was not directly associated with competitive sport, Farquhar and Meeds (2007) successfully showed Q-method can be used effectively to understand psychological concepts that could be easily applied within a sporting setting from the viewpoint of the participants.

By reviewing the studies above, it is clear that within the sporting literature, Q-method has yet to be employed in competitive sport outside of a coaching context. By the limited in the area of sport psychology, it appears that those researching within the area do not yet possess a thorough appreciation of its potential for innovative research. It is more likely however, considering the method's clear potential to study concepts relating to human behaviour and subjectivity from a more gestalt or holistic perspective, that it has been a lack of awareness of Q-method and the alternative approach it offers, that has been the most limiting factor. This holistic approach to understanding individuals subjectivity appears to be particularly applicable to the study of psychological resilience amongst athletes, as this is a complex context specific process, integrating personal protective factors, coping resources, and emotional as well as environmental factors (Galli & Gonzalez, 2014; Galli & Vealey, 2008).

7.1.7 Aims.

The current study aligned to both Aims 1 and 2 of this thesis and specifically aimed to use an alternative, novel approach to stimulate the understanding of resilience within a junior setting by employing Q-method, and to examine how responses to adversity interact and group individuals. This study systematically explores junior athletes' perceptions of their own protective and/or vulnerability qualities and provide insight into the nature of

psychological resilience in junior rugby league players. In addition, this study seeks to evaluate the use of Q-method in both research and applied practice and make comparison to the quantitative measure currently preferred by sport psychology researchers (e.g. Gonzalez et al., 2016; Gucciardi et al., 2011).

The following research questions were addressed to meet Objectives 6, 7 and 8:

(1) What are the subjective viewpoints among junior athletes about their resilience process and how they respond to stress or adversity?

(2) How do junior athletes' perceive the effectiveness of their responses to adversity in relation to the resilience process?

And (3) Can Q-method be a useful tool for the study of psychological resilience amongst athletes?

7.2 Methods

7.2.1 Selecting the P sample.

Sixty male junior rugby league players volunteered to take part in the study. All of the participants were aged 13 or 14 (M=13.56+/-.50), and were competing at a club level (i.e., the same level as those who were involved in Study 4), however, had been identified as talented by their governing body (RFL; Rugby Football League) and invited to one of two regional (North/North East) talent development events where the data collection took place. The mean length of experience within the sport was 4.01 years. Players and their parents were given information sheets regarding their involvement prior to providing consent. The rationale for recruiting this sample was based its homogenous nature, in terms of age, sport, and experience, meaning the Q-set included appropriate, relatable statements for the whole sample. The practicalities which included access, location, and provision of resources for data collection with a large group players also justified the recruitment of this sample.

7.2.2 Measures.

7.2.2.1 Q-sort.

Each participant was given a Q-pack containing: a set of 30 statements (Q-set), 50 red/orange/green dot stickers, and 1 x Q-sorting template (Figure 7.2). The items included within the Q-set (see Chapter 6) were numbered in a random order so that participants completing the Q-sort would find it difficult to recognise assigned themes (Moen, 2014).

Each statement was written on a separate card in preparation for the Q-sorting procedures (Watts & Stenner, 2005).

What I wouldn't do →					Don't apply specifically to me in any way				← What I would do	
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5

Figure 7.2. Q-sort template
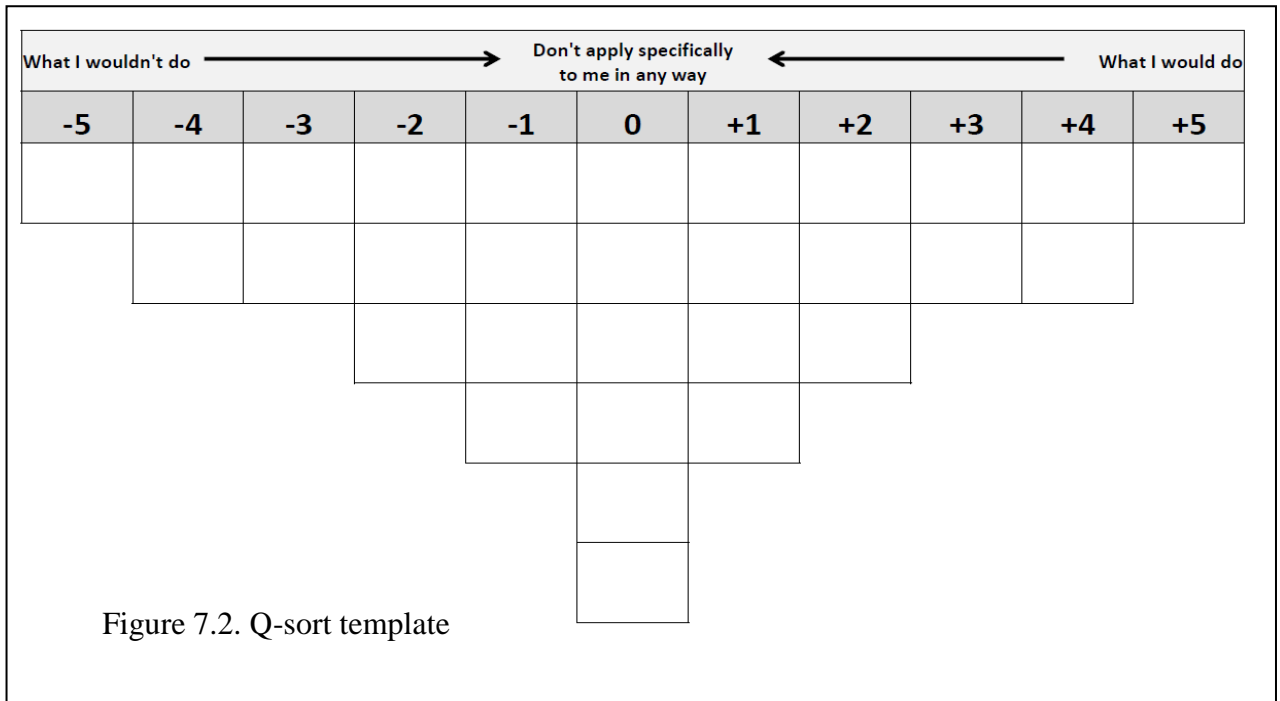
Using standard Q-sort protocol each participant was asked to rank order the 30 statements in the Q-set that related to their association with the resilience phenomenon generated from the focus groups. The lead researcher and an additional researcher facilitated the participants throughout the Q-sorting procedures. The additional researcher was given an in-depth brief on the protocol of the study, and had undertaken sufficient training and experience in qualitative data collection methods. 'Adversity' was defined for the athletes as outlined in Chapter six , and any terms that the participants were unsure of were clarified and explained. The Q-sorts were completed within the talent development environment's classroom facilities. Although completed in a group setting, the participants completed the Q-sort individually to allow the unique configurations of their engagement with resilience and adversity to be explored (Shinebourne & Adams, 2007).

7.2.2.2 The Connor-Davidson Resilience Scale 10-item (CD-RISC 10; Cambell-Sills & Stein, 2007).

The CD-RISC is a 10 item unidimensional abridged version of the original 25-item CD-RISC. Questions are answered on a 5-point Likert scale, with anchors of: '0' not true at all to '4' true nearly all of the time. This unidimensional measure calculates global resilience by summing the answers to the 10 items (maximum score = 40). The rationale for using the 10-item CD-RISC was twofold: (1) in order to compare the results of the Q-sorting task with a quantitative measure of resilience, and (2) to provide a validated and

practical measure of resilience in a junior sporting context. Most recently, Gonzalez et al. (2016), who offer psychometric evidence for its use with sports performers, have supported the 10-item unidimensional model.

7.2.3 Procedures; Administering the Q-sorts.

Participants followed a four-step procedure to complete their Q-sort:

- *STEP 1*

Participants were encouraged take their time to read though each of the statements in the Q-set carefully, and divide the items into three piles:

1. All the statements that best describe what they *WOULD* do when facing adversity.

2. All the statements that best describe what they *WOULDN'T* do when facing adversity.

3. All of the statements that don't apply specifically to you in any way.

The size of each of the piles was irrelevant and statements did not need to be evenly distributed. The division of items in this way facilitates the next step where participants are invited to rank order the statements (Watts & Stenner, 2012).

- *STEP 2*

Participants were encouraged to familiarise themselves with the Q-sorting template (Figure 7.2). This quasi-normal distribution grid, offers participants a forced pattern in which to rank the statements. The scale starts from -5 "what I wouldn't do" and goes up to +5 "what I would do".

For practical reasons, each item in the Q-set was written on a separate card with a Velcro attachment on the reverse. The Q-sorting template had corresponding Velcro attachments within each of the available spaces on the grid. This facilitated engagement in the task, and allowed participants to change their mind about their rank order of statements without consequence.

Starting with their first pile, participants were asked to choose the statement that BEST describe what they would do when facing adversity, and enter it into the scale at the +5 point. They were then asked to choose two items from the remaining statements in the first pile that were the next best descriptions of what they would do when experiencing adversity, these were then places at the +4 point within the grid. These procedures were

continued, working inwards towards 0 "don't apply specifically to me in any way", until each of the statements within the first pile had been placed within the grid.

It is important to note at this stage that statements are only ranked horizontally in the Q-sorting template and not vertically, i.e., items ranked at +4 are more positively associated with the individual's responses to adversity than those ranked at +3, however each item ranked in the +4 column is receiving the same rank score.

The same procedures were then followed using the items that had been placed in the second pile, this time by first choosing the statement that BEST describes what you wouldn't do when facing adversity, and placing them within the Q-sort template at -5 "what I wouldn't do". This is then followed by identifying the items which next best describe their response to adversity, continuing to work inwards to 0 "don't apply specifically to me in any way" making sure that all the boxes are filled. The final pile was then entered into the Q-sort template and starting with the statements that BEST describe the participant, filling the gap from right to left.

Once all the items were placed in the Q-sort template, and the template was full participants were then asked to review their patterns of responses as a whole to make sure that they were happy with their choices, and that their individual Q-sort was a good representation of how they would or would not respond to adversity.

- *STEP 3*

  In addition to the standard Q-method procedures outlined by Watts and Stenner (2005) and Donner (2001), this study also aimed to explore the athletes' perceptions of the role the items in the Q-set, in relation to their effectiveness in facilitating a resilience response. To achieve this, a novel traffic light rating system was devised for participants to reveal how effective or useful they thought the statement would be in order for them to overcome an adversity in rugby league. Once the Q-sorting procedures were complete, participants were asked, once again to read each statement independently, and add a red, orange or green sticker to reflect its effectiveness (red= not effective, orange= somewhat effective, and green= very effective).

- *STEP 4*

  Finally, to allow for a comparison (with an existing quantitative measure of resilience) and therefore, facilitate subsequent reflection on the usefulness of Q-method to explore psychological resilience in junior athletes, participants also completed the shortened 10-item version of the CD-RISC (Cambell-Sills & Stein, 2007).

7.2.4 Analysis and interpretation.

7.2.4.1 Q-sort.

Following data collection, each Q-sort was entered into PQMethod, a specialized statistical program specifically designed for Q-method research (Schmolck, 2002). Initially seven factors were extracted using following the guidance by Brown (1980) and Watts and Stenner (2012). As the number of factors to be extracted was permitted to emerge from the data itself and was not pre-defined by literature or theory, the best fitting factor structure was explored by examining different numbers of factors to extract. The data was submitted to a Varimax rotation, significant factor loadings were considered at p<.01. Factor arrays were developed using Q-sorts that significantly loaded into each factor. Z-scores, consensus items and distinguishing items were used to aid interpretation of the factors (Donner, 2001; McKeown & Thomas, 1988).

Significant factor loadings for this study were calculated using the following equation (Brown, 1980; Watts & Stenner, 2012, p.107);

$$Sig\ factor\ loading\ = 2.58 \times \left(1 \div \sqrt{no.\ items\ in\ the\ Qset}\right)$$

$$= 2.58 \times \left(1 \div \sqrt{30}\right)$$

$$= 2.58 \times (1 \div 5.4772)$$

$$= 2.58 \times .18257$$

$$= .4710\ (rounded\ up\ to\ .48)$$

Standard error (SE) for this study was calculated using the guidance from Brown (1980) and Watts and Stenner (2012, p. 107);

$$Standard\ Error\ = 1 \div \left(\sqrt{no.\ items\ in\ the\ Qset}\right)$$

$$= 1 \div \left(\sqrt{30}\right)$$

$$= 1 \div 5.4772$$

$$= .18257\ (rounded\ up\ to\ .19)$$

7.2.4.2 CD-RISC 10.

Statistical data analyses of the 10-item CD-RISC were carried out using IBM Statistical Package for the Social Sciences Version 20 (SPSS 20) software for Windows.

Descriptive statistics, where appropriate, were presented as means and standard deviations. A one-way ANOVA was conducted to compare the global resilience scores between factors. One-way ANOVAs were also conducted to assess factor/group differences for player age and experience. Statistical significance was accepted at $p < .05$.

7.2.4.3 Effectiveness analysis.

Participants' ratings of the perceived effectiveness of items within the Q-set (in relation to how they might respond to adversity) have not been gathered in previous Q-method studies to date, and there is not a standardised approach to analysing these results. The main aims of collating participants' effectiveness ratings in the current study were to add depth to the interpretation of the factors emerging from the Q-sort analysis, and to assess how the groups might differ in terms of the individual items they perceive to be effective or not. The effectiveness data was combined with the factor arrays within each group to aid interpretation and give an idea of 'how resilient' they perceive themselves as being.

Two approaches to analysing the data have been adopted. First, given the non-parametric nature of the effectiveness data (i.e., ordinal dependant variables), Kruskal-Wallis H tests were used to determine if there were any statistically significant differences between the emergent factors effectiveness ratings. Statistical significance was accepted at $p < .05$.

Second, an effectiveness profile was developed for each groups emerging from the Q-method data. This has been displayed as a visual representation of effectiveness ratings within the factor array from each group, showing effectiveness ratings relative to the ranking of each item.

7.3 Results

This results section has been broken up into four sections. First, the general results associated with factor extraction following the PCA Q-sort analysis procedures have been presented. Following this, the nature of psychological resilience are reported based on the emergent factor characteristics. These are interpreted based on the commonalities of individuals loading onto each of the factors, as well as by identifying their distinguishing and consensus items. Third, participants' effectiveness ratings are presented by factor, showing the differences and similarities between them. Finally, the differences between the factors have been displayed, based on their demographic information, and their resilience scores as measured by the CD-RISC-10.

7.3.1 Factor extraction.

Following the guidance of Watts and Stenner (2012), seven initial factors were extracted for rotation following PCA, which resulted in numerous confounding (cross-loading) sorts (n=5) and nine Q-sorts which did not load onto a single-factor (see Table 7.1). Overall, the seven-factor solution accounted for 68.59% of the study's variance, and all eigenvalues were greater than one.

Table 7.1

Seven rotated factors following CPA

Factor (eigenvalue)	Significant loading Q-sort number	n	Cross-product
1 (20.89)	1, 8, 9, 14, 16, 29, 30, 40, 43, 47. 48, 49, 54, 59	14	.67
2 (5.81)	4, 13, 18, 20, 21, 24, 27, 35, 36, 41	10	.42
3 (3.42)	10, 22	2	.36
4 (3.38)	3, 5, 6, 26, 33, 34, 53, 57, 58, 60	10	.21
5 (2.89)	12, 15, 39, 51	4	.18
6 (2.47)	19, 46	2	.24
7 (2.28)	11, 32	2	.13
Confounded	25, 31, 50, 55, 56	5	-
Non-loading	17, 23, 28, 37, 38, 42, 44, 45, 52	9	-

NB. All loading sorts are significant at p<.01

Although, the seven-factor solution met a number of the decision-making criteria concerning how many factors to extract e.g., eigenvalue >1, Brown's (1980, p. 223) "magic number seven", there remained numerous confounding and non-loading Q-sorts. Three factors emerged with only two significant loading sorts (Factors 3, 6 and 7), which is not ideal (Brown, 1980). Factor loadings from the un-rotated factor matrix showed that both Factors 1 and 2 satisfied Humphrey's stringent rule that the cross-product of the factor must exceed twice the SE, with Factors 3 and 4 satisfying the less stringent rule that it must exceed one times the standard error; suggesting that a four-factor solution may be the best.

A six-factor extraction resulted in a complex structure with one factor consisting of an individual Q-sort, two confounding and 11 non-loading Q-sorts. A five-factor rotated solution showed adequate fit, and consisted of five confounding and five non-loading sorts. When a four-factor solution was explored, the correlations between factors were lowered which reduces the likelihood of accepting "alternative manifestations of the same viewpoint" (Watts & Stenner, 2012, p.141). Additionally, one of the factors in the five-

factor solution contained only three significant loadings, which is on the borderline of being acceptable. A four-factor solution eradicated this problem as the significant loading Q-sorts on one of the smallest factors from the five-factor solution re-loaded onto alternative factors based on their holistic similarities. Therefore, although a five-factor solution would be considered a good reduction of the data in the study, a four-factor solution was deemed to provide the best fit, reducing the complex configurations of individual viewpoints into four clear viewpoints.

A four-factor solution was retained as the best fit for the data (Table 7.2). This solution minimised confounding sorts to only four, and non-loading sorts to six. All eigenvalues for factors were greater than one, with each factor containing more than two significant loading sorts. Factor arrays were developed using Q-sorts with significant factor loadings of .47 or above to best define the factors without reducing the amount of error the factor estimates or arrays contain.

Table 7.2

Four rotated factors following CPA

Factor (eigenvalue)	Significant loading Q-sort number	n
1 (20.89)	**3**, **5**, **6**, **25**, **26**, **33**, 34, 42, 45, 53, 57, 58, **60**	13
2 (5.81)	**4**, 7, 12, **13**, 15, 17, **18**, **20**, **21**, 23, **24**, **27**, **35**, **36**, **39**, **41**, 55, 56	18
3 (3.42)	1, **8**, **9**, **14**, **16**, 29, 30, **37**, **38**, **43**, **47**, 49, **59**	13
4 (3.38)	10, 11, **19**, 22, 44, **46**	6
Confounded	31, 40, 54, 48	4
Non-loading	2, 28, 32, 50, 51, 52	6

NB. **Bold type** represents a defining Q-sort with a factor loading of .60 or above

The value of .47 was chosen over a more defining value of .60 as this means that all significant loading Q-sorts can contribute to the factor estimates that is proportionate to its loading value (weighted averages; Watts & Stenner, 2012). By using all significant loading factors the error in the factor estimates are reduced and are more reliable (see Table 7.3 for full factor matrix). Confounding and non-loading Q-sorts were eliminated when developing factor arrays (Stenner & Stainton Rogers, 2004).

Table 7.3

Factor matrix with an X indicating a significant loading Q-sort

Q-sort	1	2	3	4
1	.2452	.3449	.5140 X	.1087
2	.4545	.0493	.0953	.0871
3	.6537 X	.3533	.1246	-.0611
4	.1810	.6018 X	.3428	-.0503
5	.6457 X	.0684	.3708	.2207
6	.6305 X	.0668	.1251	-.0906
7	.4436	.5575 X	.1550	-.1870
8	.1942	.2604	.6129 X	.2577
9	.2166	.3077	.7148 X	.1602
10	.2322	-.1414	.1693	.4904 X
11	.1248	-.1543	-.0724	.5430 X
12	-.1141	.4805 X	-.3784	.3322
13	.3016	.7056 X	.1338	.1582
14	.2884	.2268	.7297 X	-.1291
15	-.2010	.5161 X	.1251	.1178
16	.2215	.3923	.6586 X	.0727
17	.3858	.5309 X	.3253	.0618
18	.1581	.7895 X	.3828	-.0645
19	-.1167	.0512	.1542	.6963 X
20	.0322	.8618 X	.0646	-.0069
21	.2745	.7780 X	.1156	-.0575
22	.2085	.3844	.0328	.5432 X
23	.3789	.4949 X	.3247	-.0177
24	.0853	.8454 X	.1696	.1501
25	.7022 X	.2104	.4764	.0571
26	.6480 X	.2354	.0064	.0789
27	.3593	.6798 X	.3359	.2432
28	-.0321	.3589	.3700	-.0764
29	-.0752	.0930	.7275 X	.3653
30	.2273	.0867	.7057 X	.0771
31	.5531	.3774	.4976	.0718
32	.3794	.3230	.2819	.1964
33	.7164 X	.2014	.2168	.2843
34	.5238 X	.1197	.2496	.2715
35	.0324	.6430 X	.3871	.0026
36	.3193	.6890 X	-.1020	.2465
37	.1237	.2396	.7927 X	-.0199
38	.2597	.1159	.8112 X	.1166
39	.3231	.6430 X	.1970	-.1579
40	.5453	-.0304	.6998	.0685

41	.1116	.6858 X	-.0318	-.0714
42	.5256 X	.4278	.4045	.1931
43	.3353	.1657	.6401 X	-.1105
44	.0815	.2945	.4540	.5536 X
45	.5317 X	.2445	.2531	.2944
46	-.0969	-.0345	.0319	.7095 X
47	.0754	.0057	.6831 X	.0731
48	.4972	.0923	.5652	.1402
49	.3595	.0504	.5605 X	-.1503
50	.2417	.3519	.4306	.0811
51	-.3820	.4526	.2648	.1500
52	.4528	.3352	.4005	.3841
53	.5587X	-.0739	.2001	-.1172
54	.5557	.1245	.5455	-.0028
55	.2590	.5949 X	-.1655	.4578
56	.0005	.5856 X	.2259	-.2910
57	.4813 X	-.1473	.3874	-.2057
58	.5119 X	.1297	.4332	-.1022
59	.3833	.1203	.7261 X	.0890
60	.6475 X	.3121	.2496	.0393

Table 7.4 shows the characteristics of each of the factors in relation to the total number of defining variables, reliability, and SE of factor scores. Factor 2 has the largest number of loading sorts (n=18), followed by both Factors 1 and 3 (n=13). Factor 4 has the lowest number of loading sorts with only six loading onto this factor. The composite reliability scores show a high level of test-retest reliability for each of the factors (Brown, 1980).

Table 7.4

Factor characteristics

	Factor			
	1	2	3	4
Number of Defining Variables	13	18	13	6
Composite Reliability	.98	.99	.98	.96
Standard Error of Factor Scores	.14	.12	.14	.20

NB. Composite reliability relates to the likelihood that participants loading into the factors will rank the items in a similar way if completing the Q-sort on another occasion.

7.3.2 The nature of resilience; factor interpretation.

The principle component analysis and varimax rotation have demonstrated that four factors can be interpreted which represent junior rugby league players' responses to adversity as a part of the resilience process. The following sub-sections will define, explore, and interpret the four factors relative to the way in which each subgroup of the sample respond to adversity, followed by a consideration their distinguishing and shared characteristics.

7.3.2.1 Specific factor characteristics.

The four emerging factors relating to responses to adversity have been interpreted as: (1) Determined and calm, (2) Agitated but channelling anger, (3) Confident and hardworking and (4) Hardworking and reflective. In depth explanations of these factors are presented below, with the aim of delivering a full interpretation of the unique perspectives emerging from the data. Factor estimates, presented as normalised factor scores (Z-scores) to allow for cross-factor comparisons, and factor arrays for each factor are presented in Tables 7.5-7.8.

Factor 1; Determined and calm. Factor 1 has an eigenvalue of 20.89 and accounts for 34.82% of the study variance. Thirteen individual Q-sorts significantly loaded onto this factor, which represents 22% of the junior rugby league players in the sample who share these characteristics. The factor array is presented in Table 7.5.

This narrative or viewpoint appears to show that when facing stress or adversity within their sport, individuals within this group are most likely to respond with increased effort directed towards overcoming the problem they have encountered in a direct manner. The placement of items relating to active problem solving combined with determination and focus imply that these individuals prioritise effort, and demonstrate a personal and robust approach to prevailing over adversity. It is also worth noting that each of these items is ranked higher within this factor than any of the other three factors:

> *I try my best to overcome it (+5)*
> *I am determined (+4)*
> *I try to remain focussed (+4)*
> *I am eager to overcome the problem (+3)*

182

Table 7.5

Factor estimates and arrays for Factor 1; Determined and calm

Item no.	Item	Rank	Z-score
8	I try my best to overcome it	5	1.772
24	I am determined	4	1.549
28	I try to remain focussed	4	1.213
6	I support my teammates	3	1.059
3	I am eager to overcome the problem	3	0.971
15	I channel my anger into the game	2	0.900
29	I stay calm	2	0.826
12	I take my anger out in tackles	2	0.757
14	I try to fix the problem	1	0.744
20	I carry on with my head held high	1	0.716
22	I try to motivate myself	1	0.676
17	I try to find positives and build on them	1	0.562
25	I laugh and joke about it	0	0.529
26	I try to forget about it	0	0.283
27	I have a strong state of mind	0	0.260
11	I put more effort into the game/training	0	0.133
9	I control my temper and put my hand up when I make a mistake	0	-0.108
30	I try not to dwell on what has happened	0	-0.289
2	I talk to my friends	-1	-0.314
5	I find someone to speak to	-1	-0.500
7	I feel annoyed	-1	-0.554
21	I don't show negative emotions	-1	-0.610
18	I try not to get angry and shout at my teammates	-2	-1.012
10	I feel stressed	-2	-1.117
19	I go inside myself and rethink what I'm doing and how I'm going to do it	-2	-1.185
16	I worry for what will happen in the future	-3	-1.292
1	I get angry	-3	-1.306
13	I feel embarrassed by what has happened	-4	-1.328
23	I avoid the situation	-4	-1.461
4	I get upset	-5	-1.874

In comparison to the other factors, the individuals within this group are the most likely to stay calm (+2) and the least likely to try to forget about the problem (0). Avoiding the situation is ranked low (-4) which again can represent how individuals' in this group work directly to overcome the problem, and along with a mid-ranking of putting effort into

the game/training (0), might suggest that effort might be directed differently if not experiencing performance related stressors.

Whilst this narrative highlights the importance of determination and effort, the offer of support to teammates is also ranked positively ('I support my teammates':+3). Whilst support is willingly given to others, items relating to seeking support are generally ranked low (#2 'I talk to my friends':-1, #5 'I find someone to speak to':-1).

The negative rankings of items relating to displaying negative emotions following adversity demonstrate that individuals within this group are unlikely to feel angry, stressed upset or embarrassed. Indeed, all items including a description of a negative emotion have been ranked from -1 to -5:

I feel annoyed (-1)
I feel stressed (-2)
I worry for what will happen in the future (-3)
I get angry (-3; lowest ranking across factors)
I feel embarrassed by what has happened (-4)
I get upset (-5; lowest ranking across factors)

Although the viewpoint suggests that individuals within this group do not get angry when experiencing stress or adversity, the responses do show how they use behavioural strategies to manage their anger:

I channel my anger into the game (+2)
I take my anger out in tackles (+2)
I try not to get angry and shout at my teammates (-2)

This suggests that the low ranking of anger may be reflective of the minimal perceived impact anger has on their resilience process, rather than their perception of anger itself; meaning that the behavioural strategies are successful in helping individuals within this group channel negative emotions in a positive way. The effect of stress during the resilience process may be mediated by their methods of emotional control (i.e., channelling anger into their performance, and inclination to demonstrate their anger to their teammates).

Factor 2; Agitated but channelling anger. This factor has an eigenvalue of 5.81 and explains 9.69% of the variance within the data. This was the largest collective viewpoint expressed by the junior rugby league players, with 18 of the 60 participants significantly loading onto this factor (30%). The factor array is presented in Table 7.6.

Anger and behaviours associated with anger appear to be the dominant responses to stress and adversity for individuals loading onto this factor. The three highest-ranking items in the factor (all relating to anger) significantly distinguish this group from the others, and along with feeling of annoyance (#7 'I feel annoyed') are ranked higher than those loading into other factors:

> *I take my anger out in tackles (+5)*
> *I channel my anger into the game (+4)*
> *I get angry (+4)*
> *I feel annoyed (+2)*

Conversely, the lowest ranking item within this factor reflects the players inability to remain calm (#29 'I stay clam':-5) following stress or adversity, as well as the lowest ranking of all factors for item #9 'I control my temper and put my hand up when I make a mistake' (-2). This narrative reflects a response to adversity that is heavily weighted towards anger, agitation, and high arousal experiences. Equally, aside from determination (#24 'I am determined':+3), other items themed relating to control rank reasonably low within the group:

> *I try not to get angry and shout at my teammates (-1)*
> *I don't show negative emotions (-1)*

Cognitive strategies play a mixed role in this group's response to stress or adversity, with motivation (#22 'I try to motivate myself': +1) and focus (#28 'I try to remain focussed': +2) ranking slightly higher, and self-reflection (#19 'I go inside myself, rethink what I'm going to do and how I'm going to do it': -1), positivity (#17 'I try to find positives and build on them': 0) and humour (#25 'I laugh and joke about it': -3) ranking lower.

This viewpoint suggests that although anger is a principle response to stress and adversity in this group, other negative emotional responses including worry (#16 'I worry for what will happen in the future': -3), upset (#4 'I get upset': -3) and embarrassment (#13 'I feel embarrassed by what has happened': -4) are much more minor and have been ranked negatively. This may be understood as players differentiating between unpleasant emotions, such as those they perceive to weaken a response to adversity, and others they feel have the potential to fuel a high-energy practical approach to overcoming stress. Therefore, this group may be the most likely to mask emotions that could make them appear weaker or are viewed as damaging to the process, and rather prefer demonstrate

their anger and eagerness (#3 'I am eager to overcome the problem': +1) to fix the problem (#14 'I try to fix the problem':+1).

Table 7.6

Factor estimates and arrays for Factor 2; Agitated but channelling anger

Item no.	Item	Rank	Z-score
12	I take my anger out in tackles	5	1.972
15	I channel my anger into the game	4	1.864
1	I get angry	4	1.681
24	I am determined	3	1.159
6	I support my teammates	3	0.937
28	I try to remain focussed	2	0.877
11	I put more effort into the game/training	2	0.825
7	I feel annoyed	2	0.758
22	I try to motivate myself	1	0.694
3	I am eager to overcome the problem	1	0.605
14	I try to fix the problem	1	0.446
8	I try my best to overcome it	1	0.375
27	I have a strong state of mind	0	0.362
20	I carry on with my head held high	0	0.177
30	I try not to dwell on what has happened	0	-0.146
17	I try to find positives and build on them	0	-0.181
2	I talk to my friends	0	-0.192
10	I feel stressed	0	-0.205
18	I try not to get angry and shout at my teammates	-1	-0.498
21	I don't show negative emotions	-1	-0.684
19	I go inside myself and rethink what I'm doing and how I'm going to do it	-1	-0.705
5	I find someone to speak to	-1	-0.852
26	I try to forget about it	-2	-0.876
9	I control my temper and put my hand up when I make a mistake	-2	-0.882
25	I laugh and joke about it	-2	-1.030
16	I worry for what will happen in the future	-3	-1.045
4	I get upset	-3	-1.194
13	I feel embarrassed by what has happened	-4	-1.307
23	I avoid the situation	-4	-1.389
29	I stay calm	-5	-1.544

Factor 3; Confident and hardworking. Factor 3 has an eigenvalue of 3.42 and accounts for 5.70% of the study variance. Thirteen Q-sorts significantly loaded onto this factor, which represents 22% of the junior rugby league players in the sample who share this viewpoint. The factor array is presented in Table 7.7.

Table 7.7

Factor estimates and arrays for Factor 3; Confident and hard working

Item no.	Item	Rank	Z-score
11	I put more effort into the game/training	5	1.878
20	I carry on with my head held high	4	1.509
6	I support my teammates	4	1.325
24	I am determined	3	0.938
12	I take my anger out in tackles	3	0.934
18	I try not to get angry and shout at my teammates	2	0.913
28	I try to remain focussed	2	0.840
22	I try to motivate myself	2	0.702
15	I channel my anger into the game	1	0.681
9	I control my temper and put my hand up when I make a mistake	1	0.661
17	I try to find positives and build on them	1	0.564
29	I stay calm	1	0.429
19	I go inside myself and rethink what I'm doing and how I'm going to do it	0	0.399
27	I have a strong state of mind	0	0.337
3	I am eager to overcome the problem	0	0.236
2	I talk to my friends	0	0.212
14	I try to fix the problem	0	0.021
8	I try my best to overcome it	0	0.003
30	I try not to dwell on what has happened	-1	-0.302
21	I don't show negative emotions	-1	-0.354
5	I find someone to speak to	-1	-0.356
26	I try to forget about it	-1	-0.996
1	I get angry	-2	-1.027
23	I avoid the situation	-2	-1.040
25	I laugh and joke about it	-2	-1.166
7	I feel annoyed	-3	-1.180
16	I worry for what will happen in the future	-3	-1.199
4	I get upset	-4	-1.594
10	I feel stressed	-4	-1.613
13	I feel embarrassed by what has happened	-5	-1.755

This viewpoint is characterised by high rankings relating to a number of behavioural strategies, which suggest the individuals within this group work hard to overcome stress or adversity. Specifically, this group are likely to increase effort into their performance (#11 'I put more effort into the game/training': +5) and use the high impact tackles to release anger associated with challenge (#12 'I take my anger out in tackles': +3). Additionally, item #20 'I carry on with my head held high' was a distinguishing item for this factor, with its high ranking demonstrating a response that reflects a high level of self-belief or hardiness. The ranking of this item may suggest that the individuals loading onto this group appreciate potential benefits gained from experiencing adversity, and behave in a way that reflects not only their perseverance, but also their confidence.

In general, cognitive strategies including focus (#28 'I try to remain focussed': +2) and positivity (#17 'I try to find positives and build on them':+1) were ranked relatively highly by this group, and the following were ranked higher than any other factor:

I try to motivate myself (+2)
I go inside myself and rethink what I'm doing and how I'm going to do it (0)

However, similarly to Factor 2, using humour as a response to stress or adversity was ranked low (-2). This may be a product of lesser developed team dynamics and cohesion at this junior stage.

Although it did not distinguish this factor, the item relating to supporting one's teammates (#6 'I support my teammates') was ranked higher in this factor than the others (all were ranked positively), however, seeking support by talking to friends was ranked significantly higher within this group.

Similarly to Factor 1, this viewpoint expresses that players within this group would be less likely to respond to adversity by demonstrating any unpleasant emotions, with worry (#16 'I worry for what will happen in the future': -3), stress (#10 'I feel stressed': -4), upset (#4 'I get upset' : -4), annoyance (#7 'I feel annoyed': -3) and embarrassment (#13 'I feel embarrassed by what has happened': -5) being ranked at the negative polar end of the ranking scale.

Factor 4; Hardworking and reflective. Factor 4 has an eigenvalue of 3.38 and accounts for 5.64% of the study variance. This was the smallest of the four factors, with only six (10%) individual Q-sorts sharing this viewpoint. It is apparent from the factor array (Table 7.8), and differences between this factor and others (Table 7.9), that whilst Factors 1-3 share some similarities, Factor 4 is characterised in a different way with 19 of the 30 items ranking the highest or lowest of all factors.

Table 7.8

Factor estimates and arrays for Factor 4; Hardworking and reflective

Item no.	Item	Rank	Z-score
11	I put more effort into the game/training	5	2.201
28	I try to remain focussed	4	1.571
17	I try to find positives and build on them	4	1.024
16	I worry for what will happen in the future	3	0.939
18	I try not to get angry and shout at my teammates	3	0.936
6	I support my teammates	2	0.916
25	I laugh and joke about it	2	0.812
9	I control my temper and put my hand up when I make a mistake	2	0.755
8	I try my best to overcome it	1	0.667
22	I try to motivate myself	1	0.660
14	I try to fix the problem	1	0.491
24	I am determined	1	0.348
4	I get upset	0	0.268
13	I feel embarrassed by what has happened	0	0.256
29	I stay calm	0	0.140
10	I feel stressed	0	-0.026
15	I channel my anger into the game	0	-0.031
1	I get angry	0	-0.112
7	I feel annoyed	-1	-0.309
27	I have a strong state of mind	-1	-0.456
12	I take my anger out in tackles	-1	-0.476
3	I am eager to overcome the problem	-1	-0.514
2	I talk to my friends	-2	-0.643
19	I go inside myself and rethink what I'm doing and how I'm going to do it	-2	-0.832
23	I avoid the situation	-2	-0.978
26	I try to forget about it	-3	-1.087
20	I carry on with my head held high	-3	-1.130
21	I don't show negative emotions	-4	-1.329
5	I find someone to speak to	-4	-1.837
30	I try not to dwell on what has happened	-5	-2.223

The highest ranking items from this group are presented below:

I put more effort into the game/training (+5)

I try to remain focussed (+4)

I try to find positives and build on them (+4)

Although these items reflect how this group can maintain focus and positivity to persevere following stress or adversity, a key differentiating item emerging within this group is the increased likelihood of worry for the future (#16: +3). This item is ranked significantly higher within this factor than the others (F1:3, F2:3, F3:3). Additionally, item #21 'I don't show negative emotions' has been ranked significantly lower (-4) than other factors (-1). This is suggestive that this group are more likely to demonstrate their negative emotions externally, and use techniques to consciously control anger (#18: +3, #9: +2).

Item# 20 'I carry on with my head held high' is also ranked very low (-4), which indicates that the individuals within this group experience a period of emotional slump following adversity. This is also emphasised by polarised negative rankings that suggest individuals struggle to re-direct focus when experiencing adversity and ultimately struggle to concentrate attention away from negative events (#30: -5, #26: -3).

Once again, this interpretation is supported by higher rankings for negative emotional responses such as upset (#4: 0), embarrassment (#13: 0), annoyance (#7: -1) and stress (#10: 0) than any of the other factors. When taken together, these rankings may be reflective of individuals facing difficulties when attempting to negotiate stress by controlling or managing negative emotions This may also be indicative that the cognitive strategies ranked higher than others (i.e., 'I laugh and joke about it' +2) and behavioural strategies ranked lower than others (i.e., 'I find someone to speak to' -4) are not effective when experiencing adversity.

7.3.2.2 Descriptive differences and similarities between factors.

Table 7.9 shows the factor arrays for all four factors. Factor arrays represent the position on the Q-sort template where the items would be placed, giving an average characterisation of all participants loading into each factor (e.g., +5, what I would do; -5, what I wouldn't do; 0, doesn't specifically apply to me in any way).

Table 7.9

Factor arrays

No.	Statement	Z-score (factor array)			
		1	2	3	4
1	I get angry	-3	4	-2	0
2	I talk to my friends	-1	0	0	-2
3	I am eager to overcome the problem	3	1	0	-1
4	I get upset	-5	-3	-5	0
5	I find someone to speak to	-1	-1	-1	-4
6	I support my teammates	3	3	4	2
7	I feel annoyed	-1	2	-3	-1
8	I try my best to overcome it	5	1	0	1
9	I control my temper and put my hand up when I make a mistake	0	-2	1	2
10	I feel stressed	-2	0	-4	0
11	I put more effort into the game/training	0	2	5	5
12	I take my anger out in tackles	1	5	3	-1
13	I feel embarrassed by what has happened	-4	-3	-3	0
14	I try to fix the problem	2	1	0	1
15	I channel my anger into the game	2	4	1	0
16	I worry for what will happen in the future	-4	-3	-3	3
17	I try to find positives and build on them	1	0	1	4
18	I try not to get angry and shout at my teammates	-2	-1	2	3
19	I go inside myself and rethink what I'm doing and how I'm going to do it	-2	-1	0	-2
20	I carry on with my head held high	1	0	4	-3
21	I don't show negative emotions	-1	-1	-1	-4
22	I try to motivate myself	1	1	2	1
23	I avoid the situation	-4	-4	-2	-2
24	I am determined	4	3	3	1
25	I laugh and joke about it	0	-2	-2	2
26	I try to forget about it	0	-2	-1	-3
27	I have a strong state of mind	0	0	0	-1
28	I try to remain focussed	4	2	2	4
29	I stay calm	2	-5	0	0
30	I try not to dwell on what has happened	0	0	-1	-5

Correlations between factor scores show that all factors are positively correlated, specifically, they show that Factors 1 and 3 are the most strongly correlated (r =.63), followed by Factors 1 and 2 (r =.50) and 2 and 3 (r =.48), and are likely to share more

similarities. Factor 4 shows the lowest correlations with the other factors (Table 7.10), and is likely to be differentiated from the other factor characteristics to a greater extent.

Table 7.10

Correlations between factor scores (r)

Factors	1	2	3	4
1	1.00	.50	.63	.24
2	.50	1.00	.48	.18
3	.63	.48	1.00	.28
4	.24	.18	.28	1.00

   7.3.2.2.1 Consensus statements.

Three items were identified by the analysis that did not distinguish significantly between any of the four factors, meaning participants across the entire sample ranked these in a similar way. These consensus items are presented in Table 7.11.

From these statements, it is clear that when experiencing stress or adversity, all of the junior rugby league players are likely to support their teammates, whilst all are unlikely to avoid the situation as a way of coping.

Table 7.11

Consensus items that do not distinguish between any pair of factors

Item No.	Statement	Factors							
		1		2		3		4	
		Rank	Z-Score	Rank	Z-Score	Rank	Z-Score	Rank	Z-Score
6	I support my teammates	3	1.06	3	.94	4	1.36	2	.92
22*	I try to motivate myself	1	.68	1	.69	2	.70	1	.66
23	I avoid the situation	-4	-1.46	-4	-1.39	-2	-1.04	-2	-.98

NB. All listed statements are non-significant at $p > .01$, and those flagged with an * are also non-significant at $p > .05$.

7.3.2.2.2 Distinguishing items.

Tables 7.12 and 7.13 highlight the items that significantly distinguish each factor from the others. Individuals loading within Factor 1(Determined and calm) are distinguished from the other four factors by 10 of the 30 statements. They are differentiated from the other three groups, by their high ranking of items #8 ('I try my best to overcome it'), #24 ('I am determined'), and #29 ('I stay calm'). Notably, they are also distinguished by their lower rankings of item #18 ('I try not to get angry and shout at my teammates') and #11 ('I put more effort into the game/training').

Those participants loading into Factor 2 (Agitated but channelling anger) are significantly more likely to respond with anger, with their dominant high-ranking items depicting how they would use the sport as an outlet for this emotional response. In line with this, these individuals are also significantly less likely to stay calm or control their temper. In total, 12 items distinguish this group from the others.

For Factor 3 (Confident and hardworking), there are a total of eight items which significantly distinguish them from others within the sample, these include a much higher ranking of item #20 ('I carry on with my head held high'), and a lower ranking of item #13 ('I feed embarrassed by what has happened') adds to the narrative that this group presents, in that they respond with confidence and openness with others.

Finally, Factor 4 (Hardworking and reflective) has the largest number of distinguishing statements (13/30), which along with the lower correlation coefficients when relating to the other factors (Table 7.10), suggests that this group are the most differentiated from the others. For example, those individuals loading into this factor are significantly more likely to respond worry for the future, getting upset, and feeling embarrassed. Interestingly, there are more negatively ranked items that differentiate this group from the others, including significantly lower rankings of items #21 ('I don't show negative emotions'), #5 ('I find someone to speak to'), and #30 ('I try not to dwell on what has happened'). This suggests that unlike the other groups, players loading into this factor would find it difficult not to be preoccupied with the stressor or the effects of a stressor, but are the least likely group to seek help from others.

Table 7.12

Distinguishing statements for Factors 1 and 2

Item No.	Distinguishing statements for Factor 1	Factors							
		1		2		3		4	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score
8	I try my best to overcome it	5	1.77*	1	.37	0	.00	1	.67
24	I am determined	4	1.55	3	1.16	3	.94	1	.35
3	I am eager to overcome the problem	3	.97	1	.60	0	.24	-1	-.51
29	I stay calm	2	.83	-5	-1.54	1	.43	-3	-1.13
20	I carry on with my head held high	2	.72*	0	.18	4	1.51	-3	-1.09
26	I try to forget about it	0	.28*	-2	-.88	-1	1.00	-3	-1.09
11	I put more effort into the game/training	0	.13*	2	.82	5	1.88	5	2.20
9	I control my temper and put my hand up when I make a mistake	0	-0.11*	-2	-.88	1	.66	2	.75
18	I try not to get angry and shout at my teammates	-2	-1.01*	1-	-.50	2	.91	3	.94
10	I feel stressed	-2	-1.12*	0	-.20	-4	-1.61	0	-.03
Item No.	**Distinguishing statements for Factor 2**								
12	I take my anger out in tackles	2	.76	5	1.97*	3	.93	-1	-.48
15	I channel my anger into the game	2	.90	4	1.86*	1	.68	0	-.03
1	I get angry	-3	-1.31	4	1.68*	-2	-1.03	0	-.11
11	I put more effort into the game/training	0	.13	2	.82*	5	1.88	5	2.20
7	I feel annoyed	-1	-.55	2	.76*	-3	-1.18	-1	-.31
3	I am eager to overcome the problem	3	.97	1	.60	0	.24	-1	-.51
20	I carry on with my head held high	1	.72	0	.18*	4	1.51	-3	-1.13
17	I try to find positives and build on them	1	.56	0	-.18*	1	.56	4	1.02
18	I try not to get angry and shout at my teammates	-2	-1.01	-1	-.50*	2	.91	3	.94
9	I control my temper and put my hand up when I make a mistake	0	-.11	-2	-.88*	1	.66	2	.75
4	I get upset	-5	-1.87	-3	-1.19	-4	-1.59	0	.27
29	I stay calm	1	.83	-5	-1.54*	1	.43	0	.14

NB. All listed statements are significant at p>.05, and those flagged with an * are also non-significant at p>.01.

Table 7.13

Distinguishing statements for Factors 3 and 4

Item No.	Distinguishing statements for Factor 3	Factors							
		1		2		3		4	
		Rank	Score	Rank	Score	Rank	Score	Rank	Score
20	I carry on with my head held high	1	.72	0	.18	4	1.51*	-3	-1.13
19	I go inside myself and rethink what I'm doing and how I'm going to do it	-2	-1.18	-1	-.71	1	.40*	-2	-.83
3	I am eager to overcome the problem	3	.97	1	.60	0	.24	-1	-.51
2	I talk to my friends	-1	-.31	0	-.19	0	.21	-2	-.64
8	I try my best to overcome it	5	1.77	1	.37	0	.00	1	.67
7	I feel annoyed	-1	-.55	2	.76	-3	-1.18*	-1	-.31
10	I feel stressed	-2	-1.12	0	-.20	-4	-1.61	0	-.03
13	I feed embarrassed by what has happened	-4	-1.33	-4	-1.31	-5	-1.75	0	.26
Item No.	Distinguishing statements for Factor 4								
16	I worry for what will happen in the future	-3	-1.29	-3	-1.05	-3	-1.20	3	.94*
24	I am determined	4	1.55	3	1.16	3	.94	1	.35*
4	I get upset	-5	-1.87	-3	-1.19	-4	-1.59	0	.27*
13	I feel embarrassed by what has happened	-4	-1.33	-4	-1.31	-5	-1.75	0	.26*
15	I channel my anger into the game	2	.90	4	1.86	1	.68	0	-.03*
1	I get angry	-3	-1.31	4	1.68	-2	-1.01	0	-.11*
27	I have a strong state of mind	0	.26	0	.36	0	.34	-1	.46*
12	I take my anger out in tackles	2	.76	5	1.97	3	.93	-1	-.48*
3	I am eager to overcome the problem	3	.97	1	.60	0	.24	-1	-.51*
20	I carry on with my head held high	1	.72	0	.18	4	1.51	-3	-1.13*
21	I don't show negative emotions	-1	-.61	-1	-.68	-1	-.35	-4	-1.33*
5	I find someone to speak to	-1	-.50	-1	-.85	-1	-.36	-4	-1.84*
30	I try not to dwell on what has happened	0	-.29	0	-.15	-1	-.30	-5	-2.22*

NB. All listed statements are significant at p>.05, and those flagged with an * are also non-significant at p>.01.

7.3.3 Ratings of perceived effectiveness.

7.3.3.1 Effectiveness ratings by factor.

Table 7.14 shows the two highest and two lowest ranked items according to their perceived effectiveness for each the four factors. The ratio of effective: ineffective ranked items for each group were also recorded. These show that individuals within Factor 1 had the lowest ratio of perceived effective to perceived ineffective items, identifying a higher number of items that they deem would not be beneficial in their resilience process in comparison to the other groups. Factors 2 and 3 were similar in that on average they perceived the large majority (approximately 70-77%) of items within the Q-set to be effective. Factor 4 however, appeared less critical of the responses described by the Q-set, rating only 4/30 as ineffective.

Table 7.14

Effectiveness rating by factor

Factor		Items ranked most effective		Items ranked least effective		Ratio[1]
1	Determined and calm	=1	#24; I am determined	1.	#4; I get upset	18:12
		=1	#29; I stay calm	2.	#13; I get embarrassed by what has happened	
2	Agitated but channelling anger	1.	#12; I take my anger out in tackles	1.	#4; I get upset	23:7
		2.	#27; I have a strong state of mind	2.	#13; I feel embarrassed by what has happened	
3	Confident and hardworking	1.	#11; I put more effort into the game/training	1.	#4; I get upset	21:9
		2.	#24; I am determined	2.	#10; I feel stressed	
4	Hardworking and reflective	1.	#27; I have a strong state of mind	1.	#30; I try not to dwell on what has happened	26:4
		2.	#28; I try to remain focussed	2.	#26; I try to forget about it	

[1] Ratio of effective ($\geq$2): ineffective (<2)

Figure 7.3 represents the effectiveness ratings of each of the items relative to where within the Q-sort grid the items were placed for each factor.

Factor 1; Determined and calm

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
1.3	1.8	1.5	1.6	2.1	2.5	2.5	2.5	2.5	2.7	2.5
	1.4	1.8	1.6	2.3	1.6	2.1	2.7	2.4	2.5	
		1.5	1.8	2.2	2.1	2.5				
				1.8	2.5	2.4				
					2.2					
					1.9					

Rating scale: Minimum 1.0 (not effective)- Maximum 3.0 (very effective)

Factor 2; Agitated but channelling anger

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
2.1	1.8	1.4	1.8	2.4	2.7	2.4	2.4	2.6	2.5	2.8
	1.4	1.8	2.1	2.2	2.4	2.3	2.6	2.5	2.3	
			1.9	2.2	2.5	2.3	2.3			
				2.0	2.2	2.3				
					2.2					
					1.6					

Rating scale: Minimum 1.0 (not effective)- Maximum 3.0 (very effective)
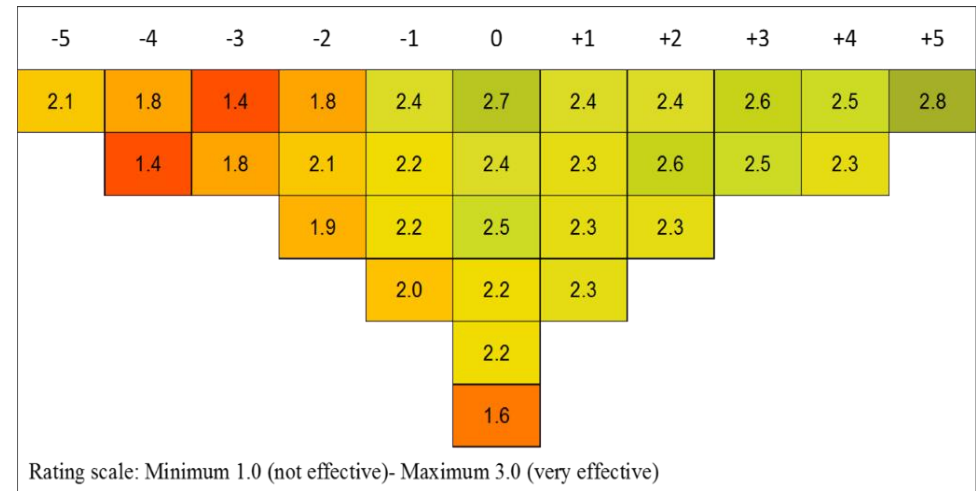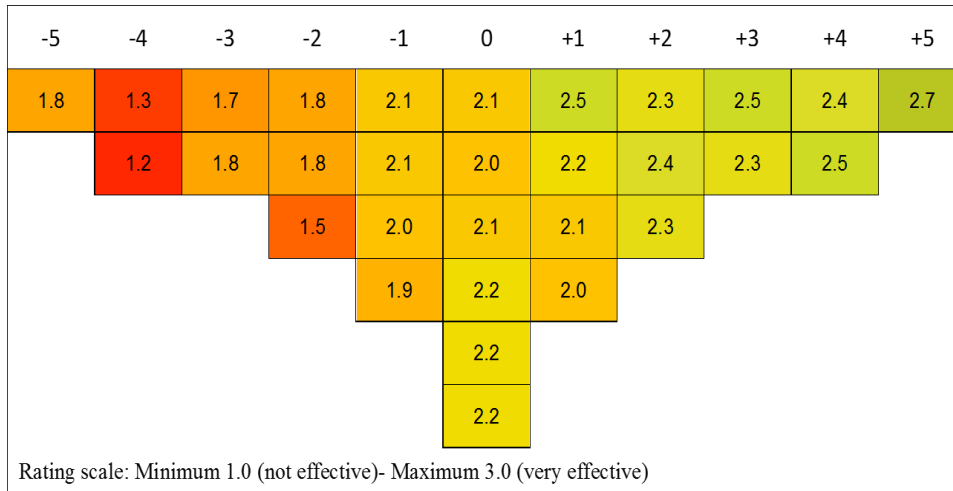
Factor 3; Confident and hardworking

-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
1.8	1.3	1.7	1.8	2.1	2.1	2.5	2.3	2.5	2.4	2.7
	1.2	1.8	1.8	2.1	2.0	2.2	2.4	2.3	2.5	
			1.5	2.0	2.1	2.1	2.3			
				1.9	2.2	2.0				
					2.2					
					2.2					

Rating scale: Minimum 1.0 (not effective)- Maximum 3.0 (very effective)

Factor 4; Hardworking and reflective

5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
1.5	2.5	2.7	2.3	1.8	1.8	2.5	2.2	2.2	2.7	2.3
	2.2	1.7	2.0	2.8	2.3	2.5	2.2	2.3	2.2	
			2.2	2.0	2.5	2.2	2.3			
				2.2	2.2	2.3				
					2.2					
					2.5					

Rating scale: Minimum 1.0 (not effective)- Maximum 3.0 (very effective)

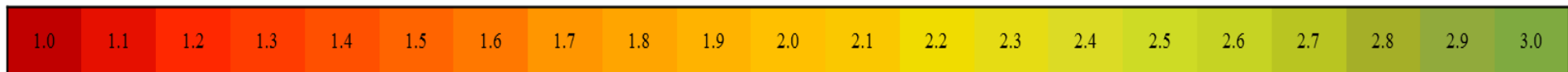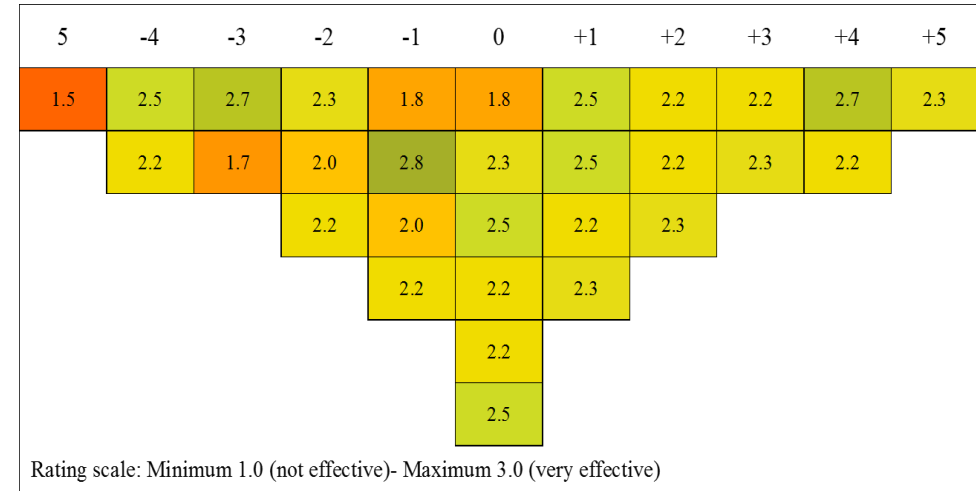| 1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0

Figure 7.3. Visual schematic of the factor arrays for Factors 1-4 coded to depict effectiveness ratings

In general for each of the factors, the coded factor arrays (Figure 7.3), show that for the most part individuals within all of the groups perceive the way in which they would respond to adversity constitutes an effective response to adversity (effective resilience process). In addition, the factor arrays show that in general the items that they have ranked the most negatively (what players would not do when facing stress or adversity) are perceived to be the least effective in terms of the resilience process. Nevertheless, for each of the factors there are a small number of items that do not follow this trend.

Those within Factor 1 (determined and calm), gave the most balanced rankings of effective verses ineffective items (18:12) in comparison to the other groups, however there are a few items that appear 'out of place' within the factor array relative to their effectiveness rankings. First, it might have been expected that items #5 (I find someone to speak to), and #29 (I stay clam) be ranked more positively in terms of how these players might respond based on their perceived effectiveness. Likewise, item #26 (I try to forget about it) was positioned in the centre of the factor array, but rated as one of the least effective items.

For Factor 2 (agitated but channelling anger) there are a number of items that stand out with the visual representation of the factor array. First, item #27 (I have a strong state of mind) is perceived to be the second most effective protective factor within the resilience process, but player within this group do not feel they do this as much as other responses. Alternatively, item #10 'I feel stressed' was perceived to be one of the most ineffective responses when experiencing stress, but its ranking within the factor array suggests that responding in the way is as common as others deemed to be much more effective (Z= -0.205).

The coded factor array for Factor 3 (confident and hardworking) shows effectiveness rankings to be the most aligned with responses to adversity, with only a single item (#1; I get angry) ranking slightly higher than expected based on its effectiveness rating.

Finally, when visually inspecting the coded factor array for Factor 4 (Figure 7.3), there is much less of a defined pattern of effectiveness ratings in relation to the placement within the factor array. Specifically, this suggests that individuals within this group perceive that some of the responses that they believe they would be likely display following adversity are ineffective, and which they are less likely to display are perceived to be very effective (e.g., #27; I have a strong state of mind, #20; I carry on with my head held high, #5; I find someone to speak to). Based on the effectiveness ratings for each of the groups there appears to be scope for improvement in terms of adversity responses,

particularly for those loading within Factor 4. Additionally, if one were to consider this a reflective exercise for the participants, it highlights that many believe that their responses to adversity could be modified to align better with the process of resilience.

7.3.3.2 Effectiveness ratings; group differences.

Kruskal-Wallis H tests were run to determine if there were significant differences in effectiveness rankings of all items within the Q-set between four groups of participants emerging from the Q-sort analysis: (1) Determined and calm (n=13), (2) Agitated but channelling anger (n=18), (3) Confident and hardworking (n=13), and (4) Hardworking and reflective (n=6). Distributions of effectiveness rankings were not similar for all groups, as assessed by visual inspection of independent boxplots. Stepwise step-down follow up procedures were followed to assess how the groups clustered based on their similarities (homogeneous subsets). Kruskal-Wallis tests showed that the distributions of effectiveness rankings of a large majority of the statements (26/30) were not statistically significantly different between groups (p>.05), with only four items showing a significant difference. Overall effectiveness rankings have been summarised in Table 7.15 (from most effective to least effective based on mean ranking).

Table 7.15

Mean effectiveness rankings per item

Item		N	Mean rank	SD	Min	Max
24	I am determined	60	2.53	.60	1	3
11	I put more effort into the game/training	60	2.52	.68	1	3
12*	I take my anger out in tackles	60	2.50	.65	1	3
15	I channel my anger into the game	60	2.50	.68	1	3
6	I support my teammates	58	2.45	.65	1	3
27*	I have a strong state of mind	60	2.43	.72	1	3
28	I try to remain focussed	58	2.43	.62	1	3
8	I try my best to overcome it	60	2.38	.72	1	3
22	I try to motivate myself	60	2.37	.76	1	3
14	I try to fix the problem	60	2.35	.71	1	3
3	I am eager to overcome the problem	59	2.34	.76	1	3
20	I carry on with my head held high	60	2.32	.70	1	3

17	I try to find positives and build on them	59	2.24	.73	1	3
29	I stay calm	60	2.23	.81	1	3
9	I control my temper and put my hand up when I make a mistake	60	2.17	.67	1	3
2	I talk to my friends	60	2.15	.76	1	3
18	I try not to get angry and shout at my teammates	60	2.13	.85	1	3
5	I find someone to speak to	58	2.09	.76	1	3
21	I don't show negative emotions	60	2.08	.72	1	3
30*	I try not to dwell on what has happened	59	2.02	.80	1	3
19	I go inside myself and rethink what I'm doing and how I'm going to do it	60	2.00	.80	1	3
25	I laugh and joke about it	59	1.97	.81	1	3
1*	I get angry	60	1.93	.84	1	3
7	I feel annoyed	59	1.92	.84	1	3
26	I try to forget about it	59	1.83	.65	1	3
23	I avoid the situation	60	1.82	.70	1	3
16	I worry for what will happen in the future	59	1.76	.80	1	3
13	I feel embarrassed by what has happened	59	1.64	.78	1	3
10	I feel stressed	58	1.64	.77	1	3
4	I get upset	60	1.40	.67	1	3

NB. Items are presented from highest to lowest mean rank; *denotes significant group differences (p<.05), n<60 indicates missing data.

The distributions of effectiveness ratings for item #1 'I get angry' were statistically significantly different between the four factors/subgroups, H(3) = 13.361, p = .004. Specifically, individuals in Factors 3 and 1 perceived the effectiveness of getting angry following adversity to be significantly lower (average ranks= 19.50 and 18.12 respectively) than those grouped into Factors 2 and 4 (average ranks= 31.75 and 35.75 respectively).

The distributions of effectiveness ratings for item #12 'I take my anger out in tackles' were also statistically significantly different between the four subgroups, H(3) = 9.747, p = .021. Step-down follow-up analysis showed that the effectiveness ranking of this item was significantly different between Factors 4 and 2 (average ranks= 15.08 and 31.58 respectively), with individuals loading within Factor 4 ranking this item much lower. Similarities in the effectiveness rankings were identified between Factors 4, 3 and 1 (p=.203) and between Factors 3, 1 and 2 (p=.059).

Effectiveness ratings for item #27 'I have a strong state of mind' were distributed in a statistically significantly different way, $H(3) = 10.658$, $p = .014$. Individuals in Factors 3 and 1 perceived the effectiveness of having a 'strong state of mind' following adversity to be significantly lower (average ranks= 18.58 and 21.04 respectively) than those grouped into Factors 2 and 4 (average ranks= 31.22 and 33.00 respectively).

Finally, the distributions of effectiveness ratings for item #30 'I try not to dwell on what has happened' were statistically significantly different between the four factors/subgroups, $H(3) = 8.87$, $p = .031$. A follow-up analysis showed that whilst Factors 4, 1 and 3 showed similarities in ranking distributions (p= .451), and Factors 1, 3 and 2 also showed similarities (p=.069), individuals in Factors 4 and 1 ranked the effectiveness of this item in a significantly different way (average ranks= 15.25 and 32.15 respectively).

7.3.4 Demographics and global resilience scores as measured by the CD-RISC-10.

There were no significant differences in age or number of years' experience in competitive rugby league of the participants loading onto each of the four factors (p>.05). Additionally, global resilience (assessed by the CD-RISC-10; Cambell-Sills & Stein, 2003) showed no significant difference across the four factors (p>.05) (Table 7.16).

Table 7.16

Factor demographics and global resilience scores

Factor	n	Age (years) (M+/-SD)	Global resilience (M+/-SD)	Experience (years) (M+/-SD)	Clubs represented
1	13	13.62+/-.51	29.54+/-2.93	4.10+/-3.00	5
2	18	13.50+/-.62	28.0+/-5.19	3.00+/-2.46	8
3	13	13.67+/-.49	27.75+/-4.03	4.25+/-2.26	6
4	6	13.17+/-.41	26.00+/-4.38	2.67+/-1.17	4
Cross-loading	4	13.50+/-.58	27.50+/-4.04	6.00+/-2.71	5
Non-loading	6	13.50+/-.55	31.33+/-2.25	3.92+/-1.86	3
Total	60	13.53+/-.54	28.39+/-4.20	3.75+/-2.48	10

Although it is unlikely that any significant differences in age or experience would emerge given the small age range and relatively short level of experience of the sample, it is noteworthy that Factor 4 included individuals who were, on average, the youngest, and least experienced of the sample. Interestingly, this factor also had the lowest average global resilience scores.

7.4 Discussion

In response to the issues highlighted relating to existing methodologies and ultimate measurement of psychological resilience, the present study aimed to use an alternative, novel approach to explore the resilience process among junior athletes. Specifically, this was achieved by exploring junior rugby league player's subjective viewpoints concerning their resilience process, and, by adding to normal Q-method procedures, to assess how they perceive the effectiveness of their responses to adversity in relation to this process.

The results from the current study uncovered some interesting within group differences concerning junior rugby league players' psychological resilience via the emergence of four distinguished groups. In addition, the study has shown that the 10-item CD-RISC was insensitive to these differences, and was unable to show significance differences in global resilience between the groups. Q-method has proven to be, in the present case, an effective and more sensitive way of exploring the nature of psychological resilience in junior athletes, offering detail beyond that gained by using a psychometric measure. The holistic approach which employs a detailed analysis designed to group individuals within a cohort based on their similarities and differences, has provided some more specific details about the complexities of individuals' resilient processes within the same context, not currently addressed in the literature.

The current study therefore presents an original and significant contribution to knowledge based on both the qualiquantilogical method which has not been employed previously within this context, and the emergence of differing patterns or 'profiles' of resilience within a single context. The emergence of four groups within this context that each displays differing patterns of resilience, extends previous qualitative research which has focused on the identification and development of single models or structures to represent the resilience process of all individuals within a specific population, such as; elite swimmers (Howells & Fletcher, 2015), Olympic champions (Fletcher & Sarkar, 2012) and current or former American college or professional athletes (Galli & Vealey, 2008).

As previously stated, four distinct groups of players emerged within the current study, which represent four differing resilience processes in response to adversity: (1) Determined and calm, (2) Agitated but channelling anger, (3) Confident and hardworking, and (4) Hardworking and reflective.

First, those individuals who identified as 'determined and calm' can be defined by their determination and eagerness to overcome adversity. These individuals achieve this by maintaining focus and effort, and remaining calm following stress or challenge. Notably, individuals within this group aim to stay in the moment by not worrying for the future or avoiding the stressful situation.

The second factor that emerged was labelled 'agitated but channelling anger' due to their most likely responses to adversity reflecting how those within this group get angry, but also use behavioural strategies to control or make positive use of this emotion. A player within this group is not likely to remain calm that distinguishes them from other players, and is less likely to acknowledge when mistakes have been made.

A player in the third factor is likely to respond to adversity with determination and effort (similarly to group one); however, they are distinguished from others by their demonstration of confidence within the resilience process. This includes holding their head high, which is a reflection of being proud that they are doing their best to overcome challenges. An individual within this group is not likely to respond by being annoyed, stressed, or embarrassed by the situation.

For the final factor (hardworking and reflective), attempting to remain positive, and maintaining effort and focus play a key role in their resilience process. Interesting, this group is the most differentiated from the other three by the way in which they are most likely to worry about the future following stress or challenge, and in addition are more likely than others to show their negative emotions such as upset and embarrassment. This demonstrates that those within this group experience more agitation when facing adversity, attempting to balance attempts to be positive with the inevitable negative emotional responses associated with stress. This group are also the least likely to voice concerns to others, feel less mentally strong and struggle not to dwell on negative experiences.

There are a number of adversity responses that were found to be similar between groups, with Factors 1, 2 and 3 showing the most commonalties, with examples including; not getting upset or embarrassed, being determined, and not worrying for the future. Players across all four of the factors also demonstrated some similarities in the way in which they would respond to adversity. Specifically, all of the players disclosed how supporting others is a key part of the resilience process when facing adversity, and are

equally unlikely to use avoidance strategies to overcome the problem. Regardless of these overall similarities, group four can be clearly identified as being the most differentiated from the others, with the greatest number of distinguishing factors, and lowest overall correlates.

With respect to the second aim of this study, relating to the ratings of perceived effectiveness of adversity responses in the resilience process, it was found that there were only few differences between the four groups. The results showed that there was agreement on the effectiveness ratings of 26 of the 30 statements, with only four items showing significant differences between the groups. In general, responses perceived to be the most effective reflected determination and effort, whilst negative emotions such as being upset, stressed or embarrassed, were deemed the least effective responses.

When reviewing the way in with the groups ranked the different responses to adversity relative to their perceived effectiveness ratings, it was clear that for the most part, players in each of the groups feel that the way in which they respond to adversity is mostly effective, and in turn, the responses they are unlikely to elicit are less effective in the resilience process. Nevertheless, there are a number of items which do not follow this pattern were identified within each factor, suggesting that there is scope for improvement in the way in which players respond to adversity based on what they perceive to be effective or not. Interestingly, Factor 4 was again identified as having the most incongruence between what they do when facing an adversity and what they think is the most effective. This may mean that they are simply the most critical or analytical of their responses. As fewer items were identified as not effective by this group, with ineffective items accounting for only around 10% of items (ranked <1.99) showing less criticality, arguably their response to adversity is simply more confused or disorganised than others.

Interestingly, no significant differences were found between the groups in relation to global resilience scores as measured by the CD-RISC 10-item scale. Considering the observations made in relation to the four differing resilience processes that have been identified in the current study, it is clear that the data yielded from using a Q-method approach, goes far beyond the scope of the CD-RISC when attempting to understand the nature of resilience in junior athletes. This first reiterates the previously outlined problems with psychometric measures of resilience (e.g., lack of context specificity, and complexity of the construct; Gucciardi et al., 2011), and highlights the limited sensitivity of the CD-RISC-10 to identify individual differences. This in turn highlights the improved quality of information and insight possible through using a Q-method approach and the greater scope

this offers in comparison to current quantitative measures. This finding also emphasises the usefulness of Q-method in understanding the nature of resilience amongst athletes.

An analysis of group differences concerning participant demographics (age and years' experience) in addition to global resilience scores, revealed that although they were no statistical differences between the four groups, factor four contained on average the youngest and least experienced players within the sample, as well as the lowest resilience scores. This is somewhat unsurprisingly, given the characteristics of factor four that differentiate them from others within the sample (e.g., higher level of worry, and lower determination), and may go some way to explain the greater level of agitation experienced when facing adversity, and the confusion or disorganisation in balancing the use of effective and ineffective responses. Although conclusions cannot be made as to whether the differences between the groups are as a function of age or experience, the findings may go some way to explain the developmental nature of resilience, for example whereby older, more experienced athletes encounter less emotional agitation and dwell less on the negative situation than their younger or less experienced counterparts. Although not addressed in the current study, a longitudinal exploration using Q-method to assess objective and subjective changes in resilience processes is an interesting avenue for future research.

7.4.1 Common themes associated with the nature of resilience in junior athletes.

The results from the Q-sorting task highlighted some interesting information regarding the nature of psychological resilience in junior rugby league players; in particular, there were a number of common themes that were repeatedly revealed amongst the emergent groups. The following section will discuss the results from the current study and their association with common themes emerging from the sporting literature concerning psychological resilience.

7.4.1.1 The importance of effort.

Each of the four factors within the current study revealed how effort and hard work play an important role within the resilience process. This suggests that junior rugby league players in general show a level of commitment to overcoming the challenges one may face within competitive sport. This can be highlighted as a dominant feature of the psychological resilience process in junior athletes. These results corroborate the critical attribute associated with psychological resilience outlined by Dyer and McGuinness (1996, p.277), who identify determination as a defining protective factor and state that a resilient

person "perseveres until the task is completed or the goal is achieved" and that "he or she views obstacles as just another of life's hurdles to be jumped." Similarly, the results support those of Chambers (2003) in his unpublished doctoral thesis who describes the characteristics of resilience identified by elite swimmers. Within their study, persistence and self-belief (exhibited through determination) were revealed as key personal resources when facing adversity, and were linked with behaviours that were described as resilient (e.g., being competitive).

Within their qualitative study on high-level adult athletes, Galli and Vealey (2008) highlighted that determination, persistence and commitment, were personal resources that affected the way in which athletes negotiate adversity. Fletcher and Sarkar (2012) also offer evidence to suggest that it is the adversity itself (or the appraisal of the adversity) that can have a positive impact on effort and commitment which along with other factors (e.g., positive personality, motivation) underpin the resilience process.

Persistence and determination have been widely cited as personal resources and achievement behaviours that are linked to a task-orientation (which places importance on the process of learning, and attaining personal mastery though increased effort), rather than ego-orientation (which focuses on performance outcomes or social comparison; Ames, 1992). White and Duda (1994) outlined how the properties of task- or ego-involving climates within which a person is functioning promotes their individual orientation. More specifically, a study by Bars and Gernigon (1998) showed that young judokas who dropped out of their sport, perceived their environment to be less task-orientated than those who persisted in judo. This means that to facilitate persistence and determination, which has been highlighted as a key personal resource of junior athletes resilience process in the current study, those working with athletes must consider how success is defined within a training environment (e.g., mastery through effort, or outcome based). In their study with youth Gymnasts, White and Bennie (2015) stated that coach behaviour is a key concept that underpins the augmentation of resilience in athletes, and that the specific positive contribution to this development when coaches' expectations were focussed on effort and have a positive attitude towards challenge. In another example, research by Mueller and Dweck (1998) suggests that if an individual student is praised for being 'smart' when successful they are unlikely to respond with resilience following future setbacks. Instead, if one was to praise an individual for the process they engaged in (to achieve success) were more likely to approach future challenges by demonstrating focus, effort and persistence, which are akin to a successful resilience process.

The results from the current study advocate further exploration of the connections between individual's attributions, goal-orientation, mindset, and psychological resilience. This inquiry will add to current understanding concerning the nature of resilience and adversity in junior sport, and may serve as a step forward in relation to the effective development of resilience in competitive athletes.

7.4.1.2 Emotional responses.

With the inherent unpleasantness that accompanies stress or adversity in sport, it is unsurprising that emotional responses are a common part of the resilience process (Galli & Vealey, 2008). Although a number of potentially negative emotional responses emerged in the previous study where participants were asked how they might respond following adversity, in the current study, three of the factors illustrated how becoming upset, embarrassed or worried would be the least likely part of their resilience process. For the remaining factor (Factor 4), a significantly higher ranking for items relating to each of these were defining components of their general response.

Fletcher and Sarkar (2012) suggest that meta-cognitions and appraisal of challenge, which relate to an individual's knowledge and perceived control over their thoughts (Flavell, 1979), and the appraisal of adversity as an opportunity for development or personal growth, are central to the resilience process, and can shape the meta-cognitive skills or coping strategies one engages in to manage unpleasant emotions following adversity. The findings in the current study may therefore suggest that the majority of players (those in Factors 1-3) are selecting coping strategies that successfully reduce negative emotions attributed to increased feelings of control and positive appraisals of challenge. Coping strategies ranked highly within these three factors include increased effort to overcome the problem and channelling anger into the game. Nevertheless, those whom are reporting higher levels of distress and a tendency to dwell on their experiences of stress ('hardworking and reflective') are also displaying high levels of effort. In turn, the same people are reporting much lower rankings for seeking support/talking to their peers and behaviours relating to confidence, as well as displaying less strategies aimed at controlling emotions such as channelling anger.

Alternatively, the low ranking of such responses like emotional distress and worry, may be a product of efforts by the majority of participants to manage others perceptions of themselves and their approach to reintegration following adversity, thus reflecting their own views about how these negative emotional responses might signal a 'weakness' in this process.

7.4.1.3 Value of social support.

As previously mentioned players loading into all four factors perceived that they would offer support to others as a part of their resilience process following stress or adversity. All of the factors also expressed how they perceived this to be an effective behaviour that would facilitate the resilience process. Within the conceptual model of sport resilience, Galli and Vealey (2008) also identified that providing support through a gained motivation to help others was a positive outcome of the resilience process, which often comes as a reciprocation of how others have supported them. This is an interesting finding given the team sport context within which the data was collected, and alludes to the concept of 'team resilience' whereby supporting one another within a team is linked with group identity to form social capital (Morgan et al., 2013). Social capital is the "existence of high quality interactions and caring relationships within groups" and is identified as one of four resilient characteristics of elite teams (Morgan et al., 2013, p. 555).

Previous research into psychological resilience both inside and outside of sport have identified that social support and prosocial interactions protect individuals from the negative effects of adversity, stress or risk (Nettles & Pleck, 1994; Richardson et al., 1990). Intriguingly however, although all factors in the current study identified giving support to others as an effective behaviour, as well as deeming it to be something that they would do, being active in receiving support was a behaviour that in comparison was not ranked as highly or deemed to be as effective. This is unlike the findings of previous research with senior athletes, who have discussed seeking support as an adaptive coping strategy in response to adversity (Galli & Vealey, 2008). A possible explanation for this finding may be that at this early stage within a player's career, they do not have the same gained realisation of support that other more experienced athletes may have. Instead seeking support may be considered a less desirable quality due to its links with perceptions of weakness or lack of control (Rees & Hardy, 2000). This has important implications in applied practice, as helping junior athletes realise the important role of social support and prosocial interactions in athlete development and specifically the resilience process, may encourage support-seeking behaviours. If athletes are steered towards these behaviours earlier within their athletic careers through efforts by coaches, parents, or intervention programs, the realisation of support should be better established at a senior level (Brown & Huang, 1995).

7.4.2 Implications for using Q-method in a research context.

Through highlighting the subtle differences in the psychological resilience processes experienced by junior rugby league players, this study has shown Q-method to be a previously untapped, but nevertheless appropriate means of exploring the construct. There are a number of qualities of Q-method that make it a desirable approach to employ alongside or instead of more traditional (quantitative and qualitative) methodologies to understand resilience in a research context.

One of the many benefits of employing Q-method to explore the nature of psychological resilience, is the fact that the participants completing the tool are not constrained to questions or items that are not relevant within their particular context. This comes as a product of developing the Q-set using participants within the same context as those completing the Q-sort. This is not a quality associated with psychometric questionnaires being used to measure psychological resilience in athletes, which have been initially developed with clinical or general populations. In addition because of the gestalt nature of Q-method, which views constructs in a holistic manner, subsequent analysis of data is able to reveal detailed profiles of individuals' subjective viewpoints and where they fit within the wider sample, which again is not possible when taking a purely quantitative approach. These complex interactions, and subtle differences in the way in which individuals respond to adversity are essential to capture within such as complex construct as resilience. The capability of Q-method to identify these subtleties is specifically evidenced in the current study, where a number of distinguished resilience 'profiles' emerged, but between which the CD-RISC did not identify any differences.

There are also benefits of employing Q-method over a purely qualitative approach to understand psychological resilience in athletes. Whilst offering rich and detailed insight into individuals' subjective interpretations of encounters with adversity, the participant samples used for semi-structured interviews to inform the theoretical understanding of psychological resilience in athletes thus far have been small (e.g., 10-12; Galli & Vealey, 2008; Fletcher & Sarkar, 2012). As qualitative research is notoriously time-consuming and labour intensive in nature (Pope, Ziebland, & Mays, 2000), collecting data from large numbers of participants is often not an option. This means that our understanding of a complex and broad ranging construct can be based on only a handful of individuals and their experiences, limiting the overall scope of an exploration. There are therefore practical advantages to using Q-method as a way of collecting comprehensive, holistic information from a large number of participants in limited time, without significant information loss

(Davis & Michelle, 2011; Watts & Stenner, 2012). By exploring the nature of psychological resilience through Q-method, one can inform the development, testing, and expansion of theoretical accounts with a "clearer structure, better replicability and a more rigorous analytical framework than purely qualitative approaches" (Davies & Michelle, 2011, p.516). This in-turn means that Q-method offers a valid and reliable means of monitoring subjectivities in a more comprehensive way than conventional questionnaires, whilst also capturing the complexity of responses and profiles within a single sample.

The 'qualiquantilogical' nature of Q-method described by Dzopia and Ahern (2011) represents a systematic unification of quantitative and qualitative research, and combines the techniques used in both (Ellingsen et al., 2010). Specifically, this means that the desirable elements of quantitative approaches (for example; generalisability based on statistical analyses, reduction and structure of a complex construct into meaningful variables, and the ability to objectivity monitor differences or changes over time), are used alongside desirable characteristics of qualitative research (e.g., detailed subjective interpretation based on theoretical and empirical understanding, and a focus on naturally occurring phenomenon from a holistic perspective). By doing this the Q-method can be described as a 'methodological hybrid' which combines the strengths of each approach, whilst minimising their weaknesses.

By using Q-method within a research setting there are the obvious benefits to the researcher relating to its qualiquantilogical data (outlined above), however, there are also benefits to the participants (in this case junior athletes) who are recruited to complete the Q-sort task. The practical nature of the Q-sort task undertaken by the participants in a Q-sort study required them to engage in a level of self-reflection, which may not normally be asked of them. The process of sorting items within the Q-sort and ranking them relative to one another, means that participants are asked to go beyond reading the items carefully and making a quick response on a Likert scale, like a psychometric questionnaire would require. Instead, they must go through a two stage process, first broadly dividing items into three categories (what I would do, what I wouldn't do, don't apply specifically to me in any way), and second by engaging in a more in-depth analysis of the items, asking themselves questions such as; "from the items that I have identified which state how I would respond when experiencing stress or adversity, which ones would I do more or less?" By engaging in this process, individuals need to reflect on how they may have responded in the past (if possible), but also think about their character, temperament, motivations, and other personal protective factors, which may underlie their resilience process. As a product of this increased engagement and reflection, the validity of the

responses elicited is likely to be further enhanced, once again adding to the quality of data collected.

The active engagement in the process of data collection, and the effort afforded by the participants to present their pattern of responses which represents them holistically as an athlete, is a quality that is unique to this style of research. Q-method should considered a desirable alternative for use within both research and applied practice to understand the qualities of athletes within a specific cohort. For example, questionnaires in both instances can be completed quickly, but do not always require a large degree of concentration, nor do they demand that individuals think carefully to compare each of their responses to one another, meaning that items are not given comparative ratings. This might result in younger participants, such as those in the current study, not becoming engaged with the content and preferring to answer in sequences, or using a minimal variety of responses. Indeed, qualitative research using one-to-one semi-structured interviews would allow for an in-depth personal narrative to emerge, however this approach can be time consuming and can limit responses to the memory of the participant or willingness to share their experiences, a problem which is minimised in Q-research by a systematic definition of the concourse and development of a Q-set.

7.4.4 Implications for using Q-method in an applied context.

There are a number of advantages to a practitioner or coach of using Q-method. First, participating itself may lead to an increased self-awareness of athletes' own behavioural responses and cognitive processes following adversity, which in itself might act as a vehicle to develop the resilience process within these athletes. It is commonly stated that an experience of adversity helps to develop psychological resilience through developing emotional insight, efficacy, esteem, prosocial interactions, and reflecting on past experiences (Brown et al., 2015; White & Bennie, 2015), and therefore by taking part in the Q-sort based on a scenario of facing challenge in sport, it is possible one would witness the same (if not slightly lessened) positive effect. Second, by taking part in a Q-method task such as the one in the current study, athletes may also benefit by sharing perceptions and discussing resilience processes with others. By using the task to open a dialogue between peers or significant others, a number of positive outcomes could be foreseen, such as shared strategies/perspective and collaborative learning.

Q-method also acts as a way of facilitating a dialogue and interaction between the athlete and the coach, helping the coach to understand how an athlete perceives themselves, their protective qualities and resilience processes when challenged. A coach

may also benefit from identifying what elements of the resilience process are perceived to be the most effective, which may help to inform interventions aiming to develop athlete processes and understanding. By using Q-method alongside other outcome measures (i.e., performance, or psychological characteristics associated with being a good 'developer') this approach could also be used to inform interventions designed to facilitate a resilience process that is aligned to these positive outcomes.

Finally, similarly to its capacity for research, the Q-sort could be used as a monitoring tool to observe adaptations in athlete resilience processes as a function of stress, challenge, athlete development, or intervention. In addition, the Q-sort could be used by coaches or practitioners alongside outcome measures (such as performance) to highlight resilience 'profiles' which align with these desirable outcomes. Indeed, in the future inquiry such as this may serve a function in designing and assessing the effectiveness of talent development environments.

7.4.5 Limitations.

Although the results of the present study provide both interesting insight and a novel method of examining and into the nature of psychological resilience in junior athletes, it is also important to beware of a number of limitations of the current study.

First, a limitation relating to the characteristics of the sample must be noted. As the data collected for both the development of the concourse, and the Q-sort procedures were using 13-14 year old male rugby league players, although not the same players, the findings of this study are not generalisable outside of this population. The present research findings may not represent the responses to stress or adversity experienced by junior athletes outside of this sport/age bracket, which may limit their scope. Nevertheless, the information yielded from the current study by adopting a Q-method approach, is no more nor less generalisable than that which might have been collected using a purely quantitative or qualitative research design. Qualitative approaches, such as using semi-structured interviews, are reliant on reader or user generalisability, whereby the transfer of knowledge obtained from one situation to another is dependent on the reader or user applying their own understanding to decide on whether the findings have meaning to them or not (Merriam & Tisdell, 2015). Alternatively, by their nature, knowledge gained through quantitative approaches are more easily generalisable across different populations, due to the objectivity of statistical analyses. Nevertheless, in the case of measuring psychological resilience using the most currently accepted measure for use in sport (the CD-RISC 10; Gonzalez et al., 2016), generalisability is a problem because of the systematic differences

in the types of adversity and conceptualisation of resilience between the context from with the scale was developed (i.e., clinical), and the one in which it have been employed (i.e., sport). Without being widely used or applied with this specific population, generalisability remains an issue (Carlson, 2001).

Therefore, in brief, the generalisability of data is worth noting, however because of the context specificity of the construct this should not be a barrier to considering Q-method as an alternative approach to understanding psychological resilience in future studies. Indeed, because of its context specific nature, the study and measurement of psychological resilience lends itself to a method, which can be modified to comprehensively cover these qualities (i.e., via the development of the Q-set), even if the results of which cannot be generalised out-with of the context.

Second, the recruitment process within this study did not limit participation to those who had been identified as having experienced stress or adversity in their athletic career as other research has (e.g., Galli & Vealey, 2008). Therefore, there is an uncertainty that those included in the study were capable of eliciting a reliable pattern of responses, which fully represented the way in which they would respond to adversity. A lack of experience in encountering significant adversity, may have limited their understanding of the way in which they perceive they would respond and their perception of the effectiveness of each response.

An additional limitation of the current study is that the items included in the Q-set were developed from focus groups with junior rugby league players. The terminology within the Q-set aimed to reflect the responses given, so that understanding and interpretation of the items did not limit the Q-sorting procedures. When doing this the researcher included both positive and negative statements, i.e., those reflecting what a person might ('I get angry') or might not ('I try not to get angry and shout at my teammates') do. This may have led to minor difficulties relating to interpretation of the participants responses concerning their negative rankings of negative items (double negative). For example where an individual ranked 'I try not to get angry and shout at my teammates' negatively i.e., something they wouldn't do, it was understood that his person would make no effort to control their anger, and might shout at their teammates. This interpretation remained consistent for the researcher; however, as this also makes interpretation by the participants a little more complex it is uncertain whether this was interpreted by all in the same way (Moen & Garland, 2012). To reduce this impact of this in future studies, all items should be written as a positive.

Finally, as previously mentioned, some Q-sort studies involve a follow-up interview to clarify the reasons *why* items have been ranked in a particular way. This adds depth to the narrative and can aid the interpretation of factors, which emerge from the study. By doing this in the current study, we may have been able to explore individuals' resilience processes more rigorously, going beyond the definition of resilience outlined by Richardson et al. (1990) which was adopted during the development of the Q-sort. As the data was collected at a single regional talent development event with approval of the RFL, allocation of time for research during the event was limited and additional qualitative data could not be gathered. In other areas of research, it is often the case that research attempting to gather data in applied settings is limited, restricted by both time and preparation (Bandura, 2004).

7.4.6 Future research.

Despite the limitations presented above, the present study supports the use of Q-method in the study and exploration of psychological resilience in junior athletes, which appears to offer a viable alternative approach to the previously favoured quantitative or qualitative research designs. This provides a platform for future research to improve and develop.

As an improvement of the current study, it would be interesting for future research, to consider sourcing a p-sample who have been through specific adversities in their careers, which would allow an exploration of potential differentiated viewpoints based on the type or timing of the adversity experienced. Performance or other outcome measures (e.g., self-determination, self-regulation, or challenge seeking behaviours) may also be beneficial to help develop a more detailed profile of each group, whilst also permitting an assessment of the resilience-performance relationship proposed in previous theories (Fletcher & Sarkar, 2012).

The scope of Q-method research also goes beyond that addressed in the current study, and this approach to understanding psychological resilience and other interesting constructs within a sporting setting can be advanced further. A specific example of this includes taking a longitudinal case study approach to explore how an athlete's resilience and their perceptions of effective responses might change over time or through experience, education, and/or challenge. For example, within the talent development literature, Collins et al. (2016) suggest that interventions in the form of considered constructed challenges with junior athletes provide opportunities to develop psychological skills that can help with the 'rocky road' aspiring athletes must take. Therefore, Q-method would be an attractive

tool to assess the development of psychological resilience and bridge the gap between this, Psychological Characteristics of Developing Excellence (PCDEs; MacNamara et al., 2010) and performance.

Q-method analysis would enable the tracking of an individual's resilience 'profile' and could therefore be linked with specific stressors or challenges faced within ones career. Also, by taking this approach with a larger sample (such as that in the current study) patterns of athlete development could be monitored, based on both statistical evidence and qualitative interpretation. Additionally, as the second study in this thesis highlighted gender and sport type differences using a psychometric questionnaire alone, it would be interesting to use Q-method to study the more subtle differences in psychological resilience across these groups, highlighting how processes differ between team and individual sport participants, and across age ranges, gender, and cultures etc. This would also make it possible to search for additional evidence concerning how context specific the construct really is, and would help to highlight distinguishing features of the construct across these settings.

Although Q-method is designed to assess the subjective viewpoint of individuals, future research may choose to take more of a behaviourist approach to understanding psychological resilience, developing items from a concourse that explain what an individual would do behaviourally, i.e., how they would behave following adversity, rather than have to interpret often complex cognitions and emotions experienced. This would mean that the pattern of responses would be more objective and may be easier for young athletes to interpret and coaches to facilitate, and might also mean that coaches, parents or significant others could also be included in the analysis, again adding additional narrative explaining athletes responses to stress or adversity. Follow-up interviews may tap into the cognitive and/or emotional roots of such behaviours.

Finally, as a Q-method approach has been deemed a promising way of uncovering the nature of psychological resilience in junior athletes in the current study, future research may wish to employ a similar method to gain insight into other complex constructs, such as team resilience, mental toughness and attitudes towards re-injury in sport etc. These constructs might specifically lend themselves to such an approach because the current understanding is lacking a holistic and robust narrative that draws from the desirable objective qualities of quantitative data, but also considers the importance of individual perception and subjectivity.

Chapter 8

General discussion, conclusions, and recommendations

8.1 Conclusions

8.1.1 Overview.

This thesis has been concerned with extending current knowledge regarding the nature of psychological resilience in athletes, and has responded to the dearth of literature focusing on understanding the construct with junior athletes. Throughout the programme of work, it became evident that to achieve a greater understanding of psychological resilience across an adolescent phase of athletes' careers, the issues surrounding the assessment or measurement of such a complex and context specific construct must be confronted. In response, two broad aims were addressed:

1. To investigate the nature of psychological resilience within a junior sport context.
2. To explore appropriate measures or methodological approaches by which to examine resilience in junior athletes.

To successfully explore the nature of resilience, the quality and robustness of measures and methodology employed were a key consideration. In response, a concurrent approach to addressing both Aims 1 and 2 simultaneously was largely adopted. These were achieved through addressing several research objectives throughout the thesis (alignment with research aims is shown in parentheses):

1. To review and highlight gaps within the literature concerning the nature of psychological resilience in junior athletes [1]

2. To explore the validity and dimensionality of the original Connor Davidson Resilience Scale CD-RISC (Connor & Davidson, 2003) amongst a sample of junior athletes [2]

3. To explore the nature of resilience and challenge seeking in junior athletes using an appropriate quantitative scale [1]

4. To review current approaches to the assessment of psychological resilience in athletes [2]

5. To gather subjective viewpoints of junior athletes, representing their perceptions of how they might respond when faced with stress or adversity [1]

6. To explore an alternative, novel approach to stimulate the understanding of psychological resilience within a junior setting [2]

7. To explore junior athletes' perceptions of their own protective and/or vulnerability qualities and their effectiveness in the resilience process [7]

8. To examine how responses to adversity interact and group junior athletes [8]

The following sections outline the rationale of these objectives, and how they were achieved throughout this programme of work in a concurrent manner.

8.1.2 Study 1.

To investigate the nature of psychological resilience in junior athletes and align with Aim 2, an initial quantitative approach was adopted. Nevertheless, the rationale for Objective 2, conducting an initial assessment of measurement validity and dimensionality of the existing CD-RISC (which amongst other available scales was rated the highest for its psychometric properties; Windle et al., 2011), was fourfold:

1. Resilience has been consistently cited as a context specific construct, whereby the process athletes engage in to overcome adversity is likely to be different from that of someone facing life-limiting illnesses or natural disasters. The personal protective and vulnerability factors measured by the existing scale may or may not be relevant across all contexts. Without a sport specific measure of psychological resilience that has been developed with athletes, employing a scale that was designed to measure the construct amongst general and clinical populations raised concerns with its validity.

2. Although the CD-RISC was identified as the most appropriate existing measure, numerous authors had highlighted the instability of the factor structure when exploring its dimensionality in different populations (e.g., Sexton et al., 2010; Yu et al., 2011).

3. Resilience has been consistently cited as a complex multidimensional construct, however research validating the CD-RISC as a psychometric measure for use with athletes has consistently supported a simplistic unidimensional measure (Gonzalez et al., 2016; Gucciardi et al., 2011).

4. Although a 10-item abridged unidimensional structure had be supported following confirmatory factor analyses on athlete data (Gonzalez et al., 2016; Gucciardi et al., 2011), nobody has yet to explore an alternative dimensional structure in a sporting population.

The results from this study offered a response to both objectives proposed within the current study. First, the exploration of the CD-RISC factor structure revealed a multidimensional model consisting of 17-item measure consisting of two coherent factors which had superior model fit when compared to the original 5-factor multidimensional structure or the shortened 10-item previously supported with a sample of athletes. This 2-factor model also offered comparable fit to a shorter 9-item unitary model, which had been confirmed by the analysis. The emergent structure can be deemed to be the preferred measure of psychological resilience in athletes as it showed good theoretical fit based on conceptualisations of resilience outlined in the literature (e.g., Galli & Vealey, 2008), and minimised information loss in comparison to the shorter measures.

Second, through an interpretation of the emergent factors structure, this study also offered insight into the nature of psychological resilience amongst junior athletes. The factors labelled 'control through adversity' and 'growth mindset' show the resilience process for this population is based on remaining in control, personal effort, and determination to achieve goals. This is in contrast to some of the original protective characteristics measured by the CD-RISC such as 'spirituality' or 'positive acceptance of change'.

Future research should seek to assess the convergent validity and test-retest reliability of the emergent 17-item scale, and would be encouraged to explore further development of the measure, or of a new measure to include additional observed variables specifically reflecting the process of resilience and positive adaptation experienced by athletes.

8.1.3 Study 2.

Study 2 was specifically designed to align with Aim 1 by meeting Objective 3, to investigate the nature of psychological resilience within a junior sport context, using the emergent measurement model from the previous study. The rationale for this study was based around a number of key inferences from previous literature and empirical research. First, although research concerning the nature of resilience amongst young people and adolescents drawn from clinical and general populations is reasonably common, there is limited research focussing on the nature of psychological resilience within an adolescent sport context. Our understanding of how resilience is conceptualised amongst junior athletes can be facilitated by the resilience literature outside of sport (e.g., Blum, 1998; Short & Russell-Mayhew, 2009), or with that concerning adult athletes (e.g., Galli & Vealey, 2008). Nevertheless, it is important to consider the potential differences and

distinctions of those negotiating complex personal changes, transitions, and social interactions both within and outside of sport at this key developmental stage.

Second, there has been a growth of literature concerning talent development, PCDEs, and psychological resilience, which shares the view that personal protective factors associated with positive adaptation can be developed by encouraging and supporting athletes to experience challenges (Collins & MacNamara, 2012; MacNamara et al., 2010). It is suggested that by experiencing challenges, an athlete is exposed to situations that act to mobilise personal resources, provide opportunities to test and refine skills, and positively influence key elements of the resilience process such as an individual's realisation of support. Therefore, this study sought to assess the potential link between psychological resilience and the likelihood of experiencing challenge on a personal level.

The results from this study revealed that males scored higher for both factors measured by the modified CD-RISC than females. Team sport athletes also scored higher on both factors than their individual sport counterparts. There were no differences for either control through adversity or growth mindset across age. These findings suggest that the environments that male athletes and team athletes are exposed to are more likely to be effective in relation to the development of 'resilient' characteristics. These characteristics might include increased independence, problem solving opportunities, supporting and competitive relationships, and collaborative efforts. In terms of age, these results suggest that differences in psychological resilience are not a general function of the passing of time alone, and development of resilience is more likely to be a product of experiences within the competitive or development environment. Finally, positive relationships between resilience and risk taking behaviours were identified. Control through adversity was more broadly related to the factors measured by the BSSS, which suggests that exercising higher level of perceived control through stressful situations increases the likelihood of active risk exposure, and can be linked to perseverance when negotiating troublesome challenges. Growth mindset was less broadly related to sensation seeking, with the results indicating that instead of being a factor that directly protects an individual from the negative effects of stress, it is one that guides an individual towards seeking challenges for development and mastery, over more sensational risks with less opportunity for learning. As the cause-and-effect of these relationships cannot be confirmed, future research should aim to break down the interaction between personality characteristics associated with seeking challenge, individuals risk appraisal and resilience processes in more depth.

8.1.4 Study 3.

Within this study, a systematic style review following the structure adapted from Ahern et al. (2006), was conducted to align with Aim 2. Specifically, this desktop review was designed to explore methodological approaches that have been taken to understand the nature of resilience in sport within the literature thus far (Objective 4).

Sarkar and Fletcher's (2013) paper on the measurement of psychological resilience in sport performers offered recommendations into the way in which the measurement of resilience should be approached. This paper proposed that one should take a three pronged approach targeting adversity, positive adaptation, and protective factors somewhat independently, when assessing resilience. Nevertheless, the emphasis of this article was to guide the development of an accurate and reliable quantitative measure of psychological resilience in athletes, without the consideration of alternative previously untapped methods that may better suit the assessment of such a construct. Therefore, this study aimed to tap into previous research in sport, to review the offering of both quantitative and qualitative approaches to date, and to consider the way in which each can contribute to the in-depth knowledge concerning the nature of resilience. To summarise simply, this review identified a number of qualities from both approaches that would be beneficial to incorporate when considering an alternative method (Table 8.1):

Table 8.1

Positive and negative characteristics of qualitative and quantitative designs for use in the study of psychological resilience

	Quantitative designs	Qualitative designs
Positive characteristics	• An ability objectively track resilience over time • Statistical analyses of an inferential nature widens the scope of findings • An ability to statistically assess associations between resilience and other characteristics • Useful for both research and applied settings	• An ability to explore individuals resilience processes that go beyond the scope of a questionnaire • Detailed and holistic understanding of a construct

Negative characteristics	• Reliant on a context specific measure of resilience developed with athletes is not currently available • Understanding is confined to the structure of the questionnaire, which can be oversimplified	• Subjectivity of response • Inability to objectively track changes over time • Limited generalisability even within a single context • Time commitment required

Psychometric questionnaires and qualitative interview techniques have facilitated our understanding of psychological resilience amongst athletes to date, and will always have their place in sport psychology research. Study 3 of this thesis necessitates the need to explore an alternative approach based on current methodological pitfalls previously encountered in resilience research.

8.1.5 Study 4.

This study provided the initial two stages of a five stage Q-method approach to understand the nature of psychological resilience in junior athletes (Aim 1), and is followed by final 3 stages of this process in Chapter 5. Aim 1 was achieved through meeting research Objective 5 (t*o gather subjective viewpoints of junior athletes, representing their perceptions of how they might respond when faced with stress or adversity*).

The rationale for utilising a Q-method approach over other more novel existing research designs (e.g., SEM or LGMM; Galli & Gonzalez, 2014) was that it exploits the positive methodological qualities from both qualitative and quantitative designs in an integrative rather than an independent manner. This study aimed to complete the first two stages of a Q-method design, (1) defining the concourse, and (2) generating the Q-set.

By using focus groups with a sample of junior athletes, followed by an inductive thematic analysis, the data were reduced to a Q-set of 30 themes/items relating to a junior rugby league players resilience process. The themes that emerged depicted a broad range of responses as a part of the resilience process experience by athletes, for example: cognitive strategies (e.g., control, concentration, reflection), emotional responses (e.g., anger, upset), social support (both giving and receiving), and behavioural strategies (e.g., increasing effort).

Whilst developing the Q-set would clearly be considered a precursor to achieving Objective 2, by undergoing a unstructured process using original data collected with junior

rugby league players, this study also gives insight into the nature of an athlete's resilience process, inadvertently targeting Objective 1. The emergent themes demonstrate clear similarities between the resilience process of a junior athlete and that of an adult performer illustrated in previous research. Indeed, each theme can be aligned with elements of either the conceptual model of sport resilience or the grounded theory of psychological resilience in Olympic champions (Fletcher & Sarkar, 2012; Galli & Vealey, 2008). By eliciting a Q-set that has theoretical relevance to psychological resilience in adult sport, we can begin to use this knowledge to consider the more subtle developmental changes in the process over time.

This study is one of few studies capturing qualitative data concerning psychological resilience in junior athletes, and specifically depicted the agitation and emotional disruption experienced by athletes when facing stress or adversity, as well as the behaviours and protective factors that characterise a resilient recovery (e.g., additional effort and attempting to build on positive experiences).

8.1.6 Study 5.

This study was designed to align with both Aims 1 and 2 of this thesis. This was achieved through targeting research Objectives 6, 7, and 8 in a concurrent manner by: (1) exploring the nature of psychological resilience in junior athletes using a Q-method approach, (2) investigating the perceptions of effectiveness in relation to how one might respond to adversity, and (3) exploring the efficacy of Q-method as a tool for understanding resilience amongst athletes.

From the by-factor analysis, this study identified four distinct groups of junior rugby league players based on their differing 'profiles' reflective of their resilience process. These four groups were labelled: determined and calm, agitated but channelling anger, confident and hardworking, and hardworking and reflective. In general, the results from the study indicate that individuals within the first three groups shared the most similarities in terms of their responses to adversity and ratings of perceived effectiveness, with the fourth being the most differentiated. Overall, the evidence from this study suggests that players loading into all four of the groups perceive that what they are doing is the most effective in terms of a resilient response to adversity. Nevertheless, for each of the groups there is scope for improvements given a small number of items can be identified that do not follow this trend.

The emergence of these four groups within a homogenous sample of junior athletes (e.g., age, sport, location), shows that even though there are some commonalities, the

resilience process is not the same for each person. This has important implications for applied practice. By considering resilience interventions on an individual, as well as a group level, psychosocial and behavioural elements are likely to be best targeted. For example, fostering an environment that encourages social support, prosocial interactions, and support-seeking, as well as teaching individual strategies to cope effectively with negative emotions.

Significantly, no differences were found in the 10-item CD-RISC global resilience scores between the four factors/groups that emerged from the Q-method analysis. The implication of this is that Q-method, is sensitive to, and can identify, the complexities of psychological resilience and intricate between-group differences, that the 10-item CD-RISC cannot, even when employed within a single context.

Notwithstanding the limitations addressed, this study offers a framework on which to develop even greater understanding of psychological resilience in a wider context. For example, by employing longitudinal or case study approaches to track the development of resilience over time. This study provides a robust qualiquantilogical approach that can be used in the study of related constructs within sport psychology.

8.2 General discussion

The following subsections aim to summarise the key findings from this research, and will highlight the significant and original contribution to knowledge in relation to each of the objectives proposed.

8.2.1 Aim 1- To investigate the nature of psychological resilience within a junior sport context.

Aim 1 was achieved through the following research objectives:
1. To review and highlight gaps within the literature concerning the nature of psychological resilience in junior athletes
2. To explore the nature of resilience and challenge seeking in junior athletes using an appropriate quantitative scale
3. To gather subjective viewpoints of junior athletes, representing their perceptions of how they might respond when faced with stress or adversity
4. To explore junior athletes' perceptions of their own protective and/or vulnerability qualities and their effectiveness in the resilience process
5. To examine how responses to adversity interact and group junior athletes

From targeting these objectives there are three key messages that have emerged from the current research programme that offer significant and original contribution to knowledge concerning our understanding of the nature of psychological resilience in junior athletes (these are presented in sequence through Studies 1 to 5): (1) positive links between resilience and traits associated with challenge/risk seeking tendencies, (2) the multidimensional and multifaceted nature of the construct with a single context, and (3) the role of effort, control, persistence and determination in overcoming adversity in sport.

Numerous researchers have outlined the potential benefits of experiencing adversity or challenge (Brown et al., 2015; Galli & Vealey, 2008; Fletcher & Sarkar, 2012; Sarkar & Fletcher, 2014a). Nevertheless, most of the understanding concerning this connection has been derived from qualitative data with successful elite level athletes, and it is difficult to infer whether everyone would benefit from similar adverse experiences. The current researcher is not aware of any longitudinal designs that have tracked resilience over the course of adversity to provide systematic evidence of this positive effect. Nor has previous research sought to explore the connection between dispositional traits that predict risk taking behaviours and resilience in athletes, to identify whether those who are more likely to seek challenges are considered more resilient. The findings from this research programme contribute to existing knowledge from research conducted outside of sport, that has shown positive trends between psychological resilience and risk taking; so long as this is neither antisocial nor health-risking (Van Tiggelen et al., 2008). Importantly, the significant link between the perception of 'control though adversity' and sensation seeking may be particularly impactful in relation to encouraging and managing healthy risk taking in sport.

The main contribution in relation to the first objective has been achieved specifically using Q-method. Although being one of few studies focussing on junior athletes, the results have provided support concerning the complex nature of resilience in athletes that has been outlined by previous research (c.f. Fletcher & Sarkar, 2012; Galli & Vealey, 2008; White & Binnie, 2016). In particular, some key individual elements have been recognised concerning the process of psychological resilience in juniors that overlap those identified within adult athletes, for example, the importance of social support. Additionally, this research has confirmed the multi-dimensional nature of resilience outlined in sport specific models, but more importantly has extended this understanding beyond viewing resilience as a singular pattern of characteristics and processes. Instead the findings have highlighted both the multi-dimensional and multi-faceted nature of

psychological resilience, offering insight into the subtleties of the within group differences not considered by previous research.

Finally, by reflecting back on the key characteristics of psychological resilience in junior athletes that have emerged from the current research program, it is clear that effort, social support, and emotional responses are some of the most common attributes associated with the process for junior athletes. Interestingly each of these components are also highlighted within the sport specific conceptualisations of resilience to date. Nevertheless, due to the nature of Q-method, which allows for the perceived level to which components contribute to the resilience process to be identified, it was made clear that for junior athletes effort/determination and support are perceived to be the *most* effective, and that much of these efforts are concerned with controlling and channelling emotional responses. This has implications for the design of an intervention aiming to develop resilience in athletes.

In particular, the qualities that were emphasised throughout the course of this research programme as key for positive adaptation were effort, persistence, and determination. The emergence of growth mindset within Study 1 supports this theme, and suggests that individuals' implicit theories about striving for personal development and learning play a key role in influencing positive change. These mindsets and ultimate behavioural responses to overcome challenges appear to set junior athletes aside from adolescents experiencing adversities outside of a sporting context (Haase, 2004). These differences are likely a product of the nature of adversities faced, but also the aspirations or goals of those involved. For example, a young person within sport who experiences adversity is less likely to 'move the goal posts' of what they were initially trying to achieve within their chosen sport. It may be for this reason that striving behaviours and attitudes are more apparent within the resilience process for this group. As determination was also emphasised by the athletes themselves as being the most effective way of overcoming adversity, it is clear that this finding could make a significant contribution to the development of, and the characteristics targeted by, resilience interventions moving forward.

8.2.2 Aim 2- To explore appropriate measures or methodological approaches by which to examine resilience in junior athletes.

Aim 2 was achieved through the following research objectives:
1. To review and highlight gaps within the literature concerning the nature of psychological resilience in junior athletes

2. To explore the validity and dimensionality of the original Connor Davidson Resilience Scale CD-RISC (Connor & Davidson, 2003) amongst a sample of junior athletes

3. To review current approaches to the assessment of psychological resilience in athletes

4. To explore an alternative, novel approach to stimulate the understanding of psychological resilience within a junior setting

Through achieving these research objectives, this programme of research has provided significant and original contribution to knowledge concerning the measurement of psychological resilience amongst athletes. In the order in which they emerged throughout the thesis, these are: (1) the emergence of a modified 2-factor measurement scale for use with athletes, and most importantly (2) the support for a novel method of assessing psychological resilience in sport.

By reviewing previous research that had sought to validate a measurement model from the original CD-RISC that is relevant to a number of different populations, it was clear that the factor structure was unstable, and that dimensions underlying resilience differed between populations (Karaırmak, 2010; Yu & Zhang, 2007; Yu et al., 2011). This instability initiated the interest in investigating a factor structure that best reflected the process of resilience in a sporting domain. Although previous researchers had sought to confirm existing a priori measurement models, resulting in general support for the shortened 10-item CD-RISC developed by Cambell-Sills and Stein (2007), none had *explored* the scale (Gonzalez et al., 2016; Gucciardi et al., 2011). The emergence of a 2-factor scale offers a significant contribution to both researchers and applied practitioners seeking to use a validated measurement model with both statistical and theoretical fit. There are limitations of employing the emergent scale, such as: the use the original language for items developed with adults, lack of convergent validity testing, the potential for missing latent variables not assessed by the original scale, and desirability bias. Nevertheless, the current researcher advocates this as a preferred quantitative measurement tool, if only until a systematically developed sport specific scale becomes available.

The most significant contribution of this programme of research has been the introduction of Q-method as a novel approach to exploring resilience within a junior sport setting. Although psychological resilience outside of sport has yet to be explored via this approach, as a construct, resilience fits the philosophy of this method. Specifically, this was achieved by studying resilience from the viewpoint of the athletes themselves, which is key to exploring the complexities of the construct. By grouping similar individual profiles as opposed to grouping variables, this method allowed a comprehensive view of

how characteristics that constitute a resilience process interact, and offers in-depth, holistic profiles of resilience to emerge.

The significance of a Q-method approach in this context is evidenced by comments made by Galli and Gonzalez (2014), who highlighted the need for measurement options that predict how combinations of resources influence resilience. Importantly, this approach is much more sensitive to the intricacies and subtle within-group differences that existing psychometric scales are not sensitive to. The method provides opportunities to enhance the research design further (see section 8.4), to gather information at a greater depth, similarly to qualitative research, but in a way that interview/focus groups struggle to access.

Finally, the assessment of athletes' perceptions of effectiveness was a pioneering stage of the current research program that has not been previously considered by Q-researchers. This information offered an additional layer of understanding, and whilst it offered insight into what athletes would consider to be the 'most resilient profile', it also encouraged them to think critically about their own processes. This addition should be considered a useful pilot for use with normal Q-method procedures, and a platform upon which to develop additional analyses or enhancement.

Ultimately, this approach offers more than the mere mixed-methods designs called for by Galli and Gonzalez (2014), and presents a tool, which is a true methodological hybrid that actively integrates both quantitative and qualitative design features.

8.3 General limitations

There are a number of limitations that have already been highlighted throughout this thesis which relate to the design of specific studies contained within. Nevertheless, there are a small number of more global limitations in relation to the research program as a whole.

First, there is a limitation concerning understanding psychological resilience in sport, relating to the conceptual overlap between this and the resilience required to deal with life stress away from sport. As resilience is argued to be a context specific construct, this means that the processes experienced in response to stress should be mutually exclusive, based on the context within which they are experienced. Nevertheless, this viewpoint is problematic, as we cannot deny that athletes are also functioning within a real world setting, facing normal challenges affiliated with everyday life. It is therefore difficult to isolate where the development of protective factors required within sport originate from, or indeed where elements such as the prosocial interactions that facilitate a resilience process in sport are occurring (i.e., with sporting peers and coaches or friends and family

away from sport). Future studies may be interested in exploring this interaction, identifying for example the mechanisms by which life-stress influences resilience in sport, and vice versa.

The final general limitation identified within this program of research, concerns the issues facing measurement of psychological resilience. Within sport, numerous researchers have supported two key features of psychological resilience that differentiate it from similar constructs (i.e., coping or mental toughness; Fletcher & Sarkar, 2013; Gucciardi et al., 2011; Sarkar & Fletcher, 2013). It is these two features (adversity and positive adaptation) along with protective factors, which broadly describe the resilience process, and so should be targeted when measuring resilience (Sarkar & Fletcher, 2013). In general, researchers have tended to prefer the direct measurement of protective factors or personal qualities possessed by sports performers, with less of an emphasis on the remaining definitional features. This means that in these cases there is less of a differentiation between what is being measured as resilience, and what would considered to be coping etc. Within the current programme of research, the challenge of measuring resilience over other concepts has to be acknowledged, particularly when considering Q-method as a novel approach. Steps were taken to ensure psychological resilience was the target of the data being collected, i.e., using Richardson et al's. (1990) definition to inform focus group questions and discussions, and the theoretical triangulation with sport specific models of resilience following the development of the Q-set (Galli & Vealey, 2008; Fletcher & Sarkar, 2012). Due to the pitfalls relating to the hypothetical nature of adversity about which individuals considered their response, participants may have omitted key information about the reality of responding to adversity. In addition, this made positive adaptation difficult to assess. Although a number of emergent items in the Q-set outlined an *effort* to achieve these positive changes, and individuals' perceptions of effectiveness were considered, the current design did not include a measurement of adaptation directly. Nevertheless, Q-method has the capacity to attend to the measurement of both adversity and positive adaptation in a more direct manner when adopted for a longitudinal study. This capacity informs a number of recommendations for future research.

8.4 Recommendations for future research

Over the course of this programme of research, two key areas of psychological resilience in athletes (nature and measurement) have been systematically explored. From these, several broad avenues for further study are advocated.

8.4.1 Recommendation one- Using Q-method to further explore the nature of psychological resilience amongst junior athletes.

As the Q-sort data within the current study were collected using junior male rugby league players more information is required to understand the nature of psychological resilience across the wider junior sport context. As the sensitivity of Q-method means that subtle differences in athletes' resilience profiles can be effectively identified, future research should consider taking this approach to investigate gender and sport type differences. As resilience literature outside of sport has shown interesting cultural differences (Ungar et al., 2008) and has recognised sociocultural influences as contributors to the agitation phase of resilience in sport (Galli & Vealey, 2008); seeking to explore cultural differences in relation to the resilience process may also be a potential route for additional assessment using Q-method.

8.4.2 Recommendation two- Using Q-method to assess resilience alongside other key skills associated with positive adaptation and junior athlete development.

Currently, there are a small number of studies that have aimed to develop interventions to foster resilience amongst athletes (i.e., Schinke & Jerome, 2002). Given the intricacies of the nature of resilience demonstrated by the Q-method approach within this thesis, it is clear that there are a number of combinations of processes, characteristics, and skills that could be targeted by such an intervention. In addition, it remains unclear as to which resilience profile is the most beneficial (or resilient), and what it is we are actually looking to 'benefit' in the first instance, i.e., are we trying to develop resilience to improve performance, enjoyment, wellbeing or ongoing participation? Therefore, to understand which factors or themes we are looking develop through intervention or the refinement of coaching education, future research should aim to align emergent groups within a sample (gathered through Q-method) with other key outcome characteristics, e.g., performance, coachability, attitude or PCDE's.

8.4.3 Recommendation three- Using Q-method to objectively measure the development of resilience over time.

Future research utilising Q-method has the capacity to enhance and extend our current understanding of psychological resilience in junior sport, by using the method to assess how an athlete's resilience and their perceptions of effective responses might change over time. To achieve this, one may wish to take one of two approaches:

1. Importantly, one could use Q-method to assess how the perceptions of resilience processes change when facing particular challenges within a junior athlete's career, i.e., international competition, injury, and the transition into adult sport. The potential adaptations to individuals' resilience profiles as a product of facing particular challenges or adversities in sport, would help to identify the role of the adversity or challenge negotiation itself in the development of these processes and characteristics. This approach would also provide objective evidence to show the specific (potentially facilitating; Galli & Vealey, 2008) effects of adversity on a holistic level.

2. A longitudinal approach using Q-method would also provide an interesting evaluation of interventions targeting resilience development in sport, which would offer detail beyond that of current psychometric measures of resilience.

8.4.4 Recommendation four- Developing a sport-specific measure of psychological resilience.

The findings from this thesis extend the appeals made by other researchers who have emphasised the theoretical and conceptual differences of resilience both within and out of sport, by highlighting the instability of a general resilience scale across contexts (Galli & Gonzalez, 2014; Gonzalez et al., 2016; Sarkar & Fletcher, 2013). Whilst the emergence of a 2-factor measurement structure offers insight into specific factors associated with resilience in athletes, additional research needs to be carried out to further validate the scale developed from the CD-RISC. Attention could be paid to enhancing the emergent measurement model, however it is anticipated that a preferred approach to solving the measurement predicament would be the development of a sport-specific measure of resilience, developed wholly with athletes for athletes.

With many researchers having turned to theoretically derived qualitative research modelling psychological resilience in athletes since the commencement of this program of work (e.g., Fletcher & Sarkar, 2012; White & Binnie, 2016), it is expected that interested parties or stakeholders will not have long to wait for a sport resilience scale.

8.5 Summary

Using a novel research approach, which has not been employed within this context before, this research program offers an original contribution to the knowledge within this area. In particular, the significance of the current research aims are evidenced by previous comments made by Wagstaff et al. (2016) and Galli and Gonzalez (2014) who have called

for additional research within the area which has subsequently been targeted by this thesis. Specifically, Fletcher and Sarkar (2013) stated that a more in depth understanding concerning the nature of psychological resilience in junior sport is paramount. Understanding the construct at an early stage would help to uncover the specific transient nature of resilience from the beginning through to the end of an athlete's career, and would be key to providing a development pathway for athletes that can facilitate characteristics and processes that foster resilience and promote positive adaptation. In addition, the use of the Q-method has responded to calls made by both Fletcher and Sarkar (2013) and Galli and Gonzalez (2014) who stated that that the quantitative measurement of psychological resilience within athletes prior to this research programme is inadequate, and that an approach which explores resilience in a holistic manner is warranted.

References

Abdi, H. (2003). *Factor rotations in factor analyses*. Encyclopedia for Research Methods for the Social Sciences. Sage: Thousand Oaks, CA, 792-795.

Adams, R., Dominelli, L., & Payne, M. (2002). *Social work: Themes, issues and critical debates*. Basingstoke: Palgrave.

Ahern, N. R., Kiehl, E. M., Sole, M. Lou, & Byers, J. (2006). A review of instruments measuring resilience. *Issues in Comprehensive Pediatric Nursing, 29*, 103–25. doi:10.1080/01460860600677643

Akhtar-Danesh, N., Dehghan, M., Morrison, K. M., & Fonseka, S. (2011). Parents' perceptions and attitudes on childhood obesity: A Q-methodology study. *Journal of the American Academy of Nurse Practitioners, 23,* 67-75. doi:10.1111/j.1745-7599.2010.00584.x

Alvord, M. K., & Grados, J. J. (2005). Enhancing resilience in children: A proactive approach. *Professional Psychology: Research and Practice, 36*, 238-245. doi:1037/0735-7028.36.3.238

Amirkhan, J., & Auyeung, B. (2007). Coping with stress across the lifespan: absolute vs. relative changes in strategy. *Journal of Applied Developmental Psychology, 28*, 298-317. doi:10.1016/j.appdev.2007.04.002.

Andersen, M. B. (2011). Who's mental? Who's tough and who's both? Mutton constructs dressed up as lamb. In D. F. Gucciardi, & S. Gordan, (Eds.), *Mental toughness in sport: Developments in research and theory* (pp. 69-88). Routledge; New York.

Anthony, E. J. (1974). The syndrome of the psychologically invulnerable child. In E. J. Anthony & C. Koupernik (Eds.), *The child in his family: Children at psychiatric risk,* (pp. 201-230). New York: Wiley.

Argyris, C., Putnam, R., & McLain Smith, D. C. (1985). *Action science: concepts, methods and skills for research and intervention*. San Francisco, CA.: Jossey-Bass.

Arnold, R., & Fletcher, D. (2012). A research synthesis and taxonomic classification of the organizational stressors encountered by sport performers. *Journal of Sport & Exercise Psychology, 34*, 397–429. doi:10.1123/jsep.34.3.397

Asante, K. O., & Meyer-Weitz, A. (2014). Measuring resilience among homeless youth: Psychometric assessment of the Connor-Davidson Resilience Scale in Ghana. *Journal of Psychology in Africa, 24*, 321-326. doi:10.1080/14330237.2014.980620

Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organizational research. *Administrative Science Quarterly*, *36,*421-458.

Baltaci, H. Ş., & Karataş, Z. (2014). Validity and reliability of the Resilience Scale for Early Adolescents. *Procedia-Social and Behavioral Sciences, 131,* 458-464.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Engle- wood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31,* 143-164.

Bartone, P. T., Ursano, R. J., Wright, K. M., & Ingraham, L. H. (1989). The impact of a military air disaster on the health of assistance workers. *The Journal of Nervous and Mental Disease, 177,* 317-328.

Bateman, T. S., & Crant, M. J. (1993). The proactive component of organizational behavior: a measure and correlates. *Journal of Organizational Behavior*, 14, 103-118. doi:10.1002/job.4030140202.

Beasley, M., Thompson, T., & Davidson, J. (2003). Resilience in response to life stress: The effects of coping style and cognitive hardiness. *Personality and Individual Differences, 34*(1), 77–95. doi:10.1016/S0191-8869(02)00027-2

Belem, I. C., Caruzzo, N. M., Nascimento Junior, J. R. A. D., Vieira, J. L. L., & Vieira, L. F. (2014). Impact of coping strategies on resilience of elite beach volleyball athletes. *Revista Brasileira de Cineantropometria & Desempenho Humano, 16,* 447-455. doi:10.5007/1980-0037.2014v16n4p447

Bell, C. C., & Suggs, H. (1998). Using sports to strengthen resiliency in children. Training heart. *Child and adolescent psychiatric clinics of North America, 7,* 859-865.

Bernard, B. (1995). *Fostering resiliency in kids: Protective factors in the family, school and community.* San Francisco: Far West Laboratory for Educational Research and Development.

Berndt, T. J. (1982). The features and effects of friendship in early adolescence. *Child Development*, *53*, 1447-1460.

Bianco, T. (2001). Social support and recovery from sport injury: elite skiers share their experiences. *Research Quarterly for Exercise and Sport, 72,* 376–88. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11770787

Bianco, T., Malo, S., & Orlick, T. (1999). Sport injury and illness: Elite skiers describe their experiences. *Research Quarterly for Exercise and Sport*, *70*, 157–169

Blackwell, L. A., Trzesniewski, K. H., & Dweck, C. S. (2007). Theories of intelligence and achievement across the junior high school transition: A longitudinal study and an intervention. *Child Development, 78,* 246–263.

Blascovich, J., & Mendes, W. B. (2000). Challenge and threat appraisals: The role of affective cues. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 59–82). Paris: Cambridge University Press.

Block, J. (2008). *Q-sort in character appraisal: Encoding subjective impressions of persons quantitatively.* Washington, DC: American Psychological Association

Block, J., & Robins, R. W. (1993). A longitudinal study of consistency and change in self-esteem from early adolescence to early adulthood. *Child Development, 64*, 909-923.

Blum, R. W. M. (1998). Healthy youth development as a model for youth health promotion. *Journal of Adolescent Health, 22,* 368-375. doi:10.1016/S1054-139X(97)00261-9

Bolognini, M., Plancherel, B., Bettschart, W., & Halfon, O. (1996). Self-esteem and mental health in early adolescence: Development and gender differences. *Journal of adolescence, 19*, 233-245.

Bonanno, G. A, & Diminich, E. D. (2013). Annual Research Review: Positive adjustment to adversity--trajectories of minimal-impact resilience and emergent resilience. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 54*, 378–401. http://doi.org/10.1111/jcpp.12021

Bonanno, G. A, Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology, 75*, 671–682. doi:10.1037/0022-006X.75.5.671

Bonanno, G. A. (2004). Loss, trauma, and human resilience: have we underestimated the human capacity to thrive after extremely aversive events? *The American Psychologist*, *59*, 20–28. doi:10.1037/0003-066X.59.1.20

Bonanno, G. A., Keltner, D., Holen, A., & Horowitz, M. J. (1995). When avoiding unpleasant emotions might not be such a bad thing: Verbal– autonomic response dissociation and midlife conjugal bereavement. *Journal of Personality and Social Psychology, 69*, 975–989. Retrieved from: http://greatergood.berkeley.edu/dacherkeltner/docs/bonanno.jpsp.1995.pdf

Bonanno, G. A., Westphal, M., & Mancini, A. D. (2011). Resilience to loss and potential trauma. *Annual Review of Clinical Psychology, 7,* 511-535. doi:10.1146/annurev-clinpsy-032210-104526

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development.* Thousand Oaks, CA: Sage.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77–101. doi:10.1191/1478088706qp063oa

Brener, N. D., Billy, J. O. G., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*, 436–457. doi:10.1016/S1054-139X(03)00052-1

Brennan, M. A. (2008). Conceptualizing resiliency: An interactional perspective for community and youth development. *Child Care in Practice, 14*, 55–64. doi: 10.1080/13575270701733732

Broderick, P. C., & Korteland, C. (2002). Coping style and depression in early adolescence: Relationships to gender, gender role, and implicit beliefs. *Sex Roles, 46*, 201-213

Brodsky, A. E., Welsh, E., Carrillo, A., Talwar, G., Scheibler, J., & Butler, T. (2011). Between synergy and conflict: balancing the processes of organizational and individual resilience in an Afghan women's community. *American Journal of Community Psychology, 47*, 217-235. doi:10.1007/S10464-010- 9399-5.

Brown, B., & Huang, B. H. (1995). Examining parenting practices in different peer contexts: Implications for adolescent trajectories. In L. J. Crockett & A. C. Crouter (Eds.), *Pathways through adolescence* (pp. 2–37). Mahwah, NJ: Erlbaum.

Brown, H. E., Lafferty, M. E., & Triggs, C. (2015). In the face of adversity: Resiliency in winter sport athletes. Faire-face à l'adversité: La résilience chez les athlètes. *Science and Sports, 30*, 105–117. doi:10.1016/j.scispo.2014.09.006

Brown, M. (2004). *Illuminating patterns of perception: An overview of Q methodology* (No. CMU/SEI-2004-TN-026). Carnegie-Mellon University Pittsburgh PA Software Engineering Inst.

Brown, S. R. (1980). *Political subjectivity: Applications of Q methodology in political science.* New Haven, CT: Yale University Press.

Brown, S. R. (1996). Q methodology and qualitative research. *Qualitative Health Research, 6,* 561-567. doi:10.1177/104973239600600408

Brown, S. R. (2006). A match made in heaven: A marginalized methodology for studying the marginalized. *Quality and Quantity, 40*, 361-382

Bruneau, M., Chang, S., Eguchi, R., Lee, G., O'Rourke, T., Reinhorn, A.,…von Winterfelt, D. (2003). A framework to quantitatively assess and enhance the seismic resilience of communities. *EERI Spectra Journal, 19,* 733-752. doi:10.1193/1.1623497

Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology, 17,* 209-227. doi:10.1080/10413200591010085

Burns, R. A., & Anstey, K. J. (2010). The Connor-Davidson Resilience Scale (CD-RISC): Testing the invariance of a uni-dimensional resilience measure that is independent of positive and negative affect. *Personality and Individual Differences*, *48*, 527–531. doi:10.1016/j.paid.2009.11.026

Burt, C., & Stephenson, W. (1939). Alternative views of correlations between persons. *Psychometrika, 4*, 269-281. doi:10.1007/BF02287939

Bussmann, G., & Alfermann, D. (1994). Drop-out and the female athlete: A study with track-and-field athletes. In D. Hackfort (Ed.), *Psycho-social issues and interventions in elite sport* (pp. 89-128). Frankfurt: Lang.

Byrne, C., Love, B., Browne, G., Brown, B., Roberts, J., & Streiner, D. (1986). The social competence of children following burn injury: A study of resilience. *Journal of Burn Care & Rehabilitation, 7,* 247–252. doi:10.1097/00004630-198605000-00011

Calhoun, L. G., & Tedeschi, R. G. (2006). *The handbook of posttraumatic growth: Research and practice*. Mahwah, NJ: Lawrence Erlbaum Associates.

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, *20,* 1019-1028. doi:10.1002/jts.20271

Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy, 44,* 585-599. doi:10.1016/j.brat.2005.05.001

Cardoso, F. L., & Sacomori, C. (2014). Resilience of athletes with physical disabilities: A cross-sectional study. *Revista de Psicología del Deporte, 23* (1), 15-22. Retrieved from: http://www.redalyc.org/articulo.oa?id=235129571003

Carli, V., Mandelli, L., Zaninotto, L., Alberti, S., Roy, A., Serretti, A., & Sarchiapone, M. (2014). Trait-aggressiveness and impulsivity: Role of psychological resilience and childhood trauma in a sample of male prisoners. *Nordic Journal of Psychiatry*, *68* (1), 8–17. doi:10.3109/08039488.2012.756061

Carver, C. S. (1997). You want to measure coping but your protocol' too long: Consider the brief cope. *International Journal of Behavioral Medicine, 4,* 92–100. doi:10.1207/s15327558ijbm0401_6

Carver, C. S. (1998). Resilience and thriving: Issues, models, and linkages. *Journal of Social Issues, 54,* 245–266. doi:10.1111/j.1540-4560.1998.tb01217.x

Castanier, C., Le Scanff, C., & Woodman, T. (2010). Beyond sensation seeking: affect regulation as a framework for predicting risk-taking behaviors in high-risk sport. *Journal of Sport & Exercise Psychology, 32*, 731–738. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20980713

Cattell, R. B. (1966). The scree test for the number of factors. Multivariate analysis: Differential bias in representing model parameters? *Multivariate Behavioral Research, 1*, 245-276. doi:10.1207/s15327906mbr0102_10Raymond B. Cattell

Chambers, T. (2003). *Personal constructs on resilience in swimming* (Unpublished doctoral dissertation). The University of Western Australia, Australia

Charlesworth, H., & Young, K. (2006). Injured female athletes. In S. Loland, B. Skirstad, & I. Waddington (Eds.), *Pain and injury in sport- Social and ethical analysis* (pp. 89e107). Oxon: Routledge.

Chaumot, A., da Lage, J. L., Maestro, O., Martin, D., Iwema, T., Brunet, F., … Bonneton, F. (2012). Molecular adaptation and resilience of the insect's nuclear receptor USP. *British Medical Council of Evoutional Biology, 12(1)*, 1-16. doi:10.1186/1471-2148-12-199

Child, D. (1990). *The essentials of factor analysis, second edition*. London: Cassel Educational Limited.

Cicchetti, D. (2010). Resilience under conditions of extreme stress: A multilevel perspective. *World Psychiatry, 9*, 145-154. doi:10.1002/j.2051-5545.2010.tb00297.x

Cicchetti, D., & Rogosch, F. A. (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology, 70* , 6–20.

Clauss-Ehlers, C. S., Yang, Y-T. T., & Chen, W-C. J. (2008). Resilience from childhood stressors: The role of cultural resilience, ethnic identity, and gender identity. *Journal of Infant, Child, and Adolescent Psychotherapy, 5,* 124–138. doi:10.2513/s15289168jicap0501

Clough, P., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in Sport Psychology*, (pp.32-45). London: Thomson Publisher.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of applied social psychology*, *13*, 99-125. Retrieved from: http://repository.cmu.edu/cgi/viewcontent.cgi?article=1264&context=psychology

Cohen, S., Underwood, L. G., & Gottlieb, B. H. (Eds.). (2000). *Social support measurement and intervention: A guide for health and social scientists*. Oxford University Press.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Satisfaction by building resilience. *Emotion*, *9*, 361–368. doi:10.1037/a0015952

Coifman, K. G., Bonanno, G. A., Ray, R.D., & Gross, J.J. (2007). Does repressive coping promote resilience? Affective-autonomic response discrepancy during bereavement. *Journal of Personality and Social Psychology, 94,* 745-758. doi:10.1037/0022-3514.92.4.745

Collins, D. J., MacNamara, A., & McCarthy, N. (2016). Putting the bumps in the rocky road: Optimizing the pathway to excellence. *Frontiers in Psychology, 7*, 1–6. doi:10.3389/fpsyg.2016.01482

Collins, D., & MacNamara, Á. (2012). The Rocky road to the top: Why talent needs trauma. *Sports Medicine*, *42,* 907-914. doi:10.2165/11635140-000000000-00000

Comrey, A. L. (1988). Factor-analytic methods of scale development in personality and clinical psychology. *Journal of consulting and clinical psychology, 56*, 754.

Condly, S. J. (2006). Resilience in Children: a review of literature with implications for education. *Urban Education, 41*, 211–236. doi:10.1177/0042085906287902

Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*, 76–82. doi:10.1002/da.10113

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Grounded theory procedures and techniques* (3rd ed.). London: Sage.

Costello, A. B. & Osborne, J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation, 10*. Retrieved from http://pareonline.net/getvn.asp?v=10&n=7

Côté, J. (1999). The influence of the family in the development of talent in sport. *The Sport Psychologist*, *13*, 395-417.

Côté, J., & Fraser-Thomas, J. (2007). Youth Development in Sport. In P.R.E. Crocker (Ed.), *Sport psychology: A Canadian perspective* (pp. 266–294). Toronto: Pearson Prentice Hall.

Cowden, R. G., Meyer-Weitz, A., & Asante, K. O. (2016). Mental toughness in competitive tennis: Relationships with resilience and stress. *Frontiers in Psychology*, *7*, 1–9. doi:10.3389/fpsyg.2016.00320

Cross, R. M. (2005). Exploring attitudes: The case for Q methodology. *Health Education Research*, *20*, 206–213. doi:10.1093/her/cyg121

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success & failure*. New York: Cambridge.

Curt, B. (1994). *Textuality and tectonics: Troubling social and psychological science*. Buckingham: Open University Press.

Curtis, W. J., & Cicchetti, D. (2003). Moving research on resilience into the 21st century: Theoretical and methodological considerations in examining the biological contributors to resilience. *Development and Psychopathology*, 15, 773-810. doi:10.1017/S0954579 403000373.

Danish, S.J., Petitpas, A.J., & Hale, B.D. (1993). Life development intervention for athletes: Life skills through sports. *The Counseling Psychologist, 21*, 352–386. doi:10.1177/0011000093213002

Davis, C. H., & Michelle, C. (2011). Q methodology in audience research: Bridging the qualitative/quantitative 'divide'? *Participations: Journal of Audience and Reception Studies, 8*, 559-593.

Davydov, D. M., Stewart, R., Ritchie, K., & Chaudieu, I. (2010). Resilience and mental health. *Clinical Psychology Review, 30*, 479-495. doi:10.1016/j.cpr.2010.03.003

De Mol, J., & Busse, A. (2008). Understandings of children's influence in parent-child relationships: A Q methodological study. *Journal of Social and Personal Relationships, 25,* 359-379.

Dell'Osso, L., Carmassi, C., Massimetti, G., Daneluzzo, E., Di Tommaso, S., & Rossi, A. (2011). Full and partial PTSD among young adult survivors 10 months after the L'Aquila 2009 earthquake: Gender differences. *Journal of Affective Disorders, 131*, 79–83.

Delle Fave, A,, Bassi, M,, & Massimini, F, (2003), Quality of experience and risk perception in high-altitude rock climbing. *Journal of Applied Sport Psychology, 15*, 82-98

DeWeese, B. H. (2012). Defining the constructs of expert coaching: a q-methodological study of Olympic sport coaches (Unpublished doctoral dissertation). North Carolina State University, Raleigh, North Carolina

Diehl, M., & Hay, E. L. (2010). Risk and resilience factors in coping with daily stress in adulthood: the role of age, self-concept incoherence, and personal control. *Developmental Psychology, 46*, 1132–46. doi:10.1037/a0019937

Donner, J. C. (2001). Using Q-sorts in participatory processes: An introduction to the methodology. In *Social Analysis: Selected Tools and Techniques*, ed. R. A. Krueger,

M. A. Casey, J. Donner, S. Kirsch, and J. N. Maack, (pp.24-49). Social Development Papers 36. Washington, DC: World Bank.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92, 1087–1101. doi:10.1037/0022-3514.92.6.1087

Dugdale, J.R., Eklund, R.C., Gordon, S. (2002). Expected and unexpected stressors in major international competition: Appraisal, coping, and performance. *The Sport Psychologist, 16,* 20–33. Retrieved from http://fitnessforlife.org/AcuCustom/Sitename/Documents/DocumentItem/1825.pdf

Dumont, M., & Provost, M. A. (1999). Resilience in adolescents : Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of Youth and Adolescence, 28*, 343-363.

Dunn, D. (1994). Resilient reintegration of married women with dependent children: Employed and unemployed. Unpublished doctoral dissertation, University of Utah.

Dunn, L. B., Iglewicz, A., & Moutier, C. (2008). A conceptual model of medical student well-being: Promoting resilience and preventing burnout. *Academic Psychiatry, 32*, 44–53. doi:10.1176/appi.ap.32.1.44

Durand-Bush, N., & Salmela, J, H. (2001). The development of talent in sport. In R. N. Singer, H.A. Hausenblas, C. M. Janelle (Eds.), *Handbook of sport psychology* (pp. 269-289). New York: Wiley

Dweck, C. (2012). *Mindset: How you can fulfil your potential*. Hachette UK.

Dweck, C. S. (1999). *Self-Theories: Their role in motivation, personality and development*. Philadelphia: Taylor and Francis/Psychology Press.

Dweck, C. S. (2008). *Mindsets and Math / Science Achievement.* Carnegie Corporation of New York-Institute for Advanced Study Commission on Mathematics and Science Education.

Dweck, C. S. (2009). Mindsets: Developing talent through a growth mindset. *Olympic Coach*, *21* (1), 4-7.

Dyer, J. G., & McGuinness, T. M. (1996). Resilience: Analysis of the concept. *Archives of psychiatric nursing*, *10*, 276-282. doi:10.1016/S0883-9417(96)80036-7

Dziopa, F., & Ahern, K. (2011). A systematic literature review of the applications of Q-technique and its methodology. *Methodology, 7*, 39-55. doi:10.1027/1614-2241/a000021

Eccles, J. S., Jacobs, J. E., & Harold, R. D. (1990). Gender role stereotypes, expectancy effects, and parents' socialization of gender differences. *Journal of Social Issues, 46*, 183-201.

Eccles, J.S., & Harold, R.D. (1991). Gender differences in sport involvement: Applying the Eccles Expectancy-Value Model. *Journal of Applied Sport Psychology, 3*, 7-35.

Ellingsen, I. T., Størksen, I., & Stephens, P. (2010). Q methodology in social work research. *International Journal of Social Research Methodology, 13*, 395–409. doi:10.1080/13645570903368286

Elliot, A., & J. Harackiewicz. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70,* 461-475.

Engle, P. L., Castle, S., & Menon, P. (1996). Child development: Vulnerability and resilience. *Social science & medicine*, *43*, 621-635.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272-299. doi:10.1037//1082-989X.4.3.272

Farquhar, L. K., & Meeds, R. (2007). Types of fantasy sports users and their motivations. *Journal of Computer‐Mediated Communication, 12*, 1208-1228.

Fasting, K., Brackenridge, C. H., & Walseth, K. (2007). Women athletes' personal responses to sexual harassment in sport. *Journal of Applied Psychology, 19*, 419-433. doi:10.1080/10413200701599165

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological Bulletin, 116*, 429-456

Fergus, S., & Zimmerman, M.A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26*, 399-419. doi: 0.1146/annurev.publhealth.26.021304.144357

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed). London: Sage Publications Ltd.

Flach, F. F. (1997). *Resilience: Discovering a new strength at times of stress*. New York: Hatherleigh Press.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: a new area of cognitive developmental inquiry. *American Psychologist, 34*,906911. doi:10.1037/0003-066X.34.10.906

Fletcher, D, Hanton, S, Mellalieu, S. D. (2006). An organizational stress review: Conceptual and theoretical issues in competitive sport. In Hanton, S and Eds, SDM

(ed) *Literature Reviews in Sport Psychology*, Nova Science, pp.321-373, ISBN: 1594549044.

Fletcher, D, Hanton, S, Mellalieu, SD, Neil, R (2012) A concetpual framework of organizational stressors in sport performers. *Scandinavian Journal of Medicine and Science in Sports, 22*, 545-557. doi:10.1111/j.1600-0838.2010.01242.x.

Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of Sport and Exercise*, *13*, 669–678. doi:10.1016/j.psychsport.2012.04.007

Fletcher, D., & Sarkar, M. (2013). Psychological Resilience. *European Psychologist*, 18(1), 12–23. doi:10.1027/1016-9040/a000124

Fletcher, D., & Wagstaff, C. R. D. (2009). Organizational psychology in elite sport: Its emergence, application and future. *Psychology of Sport and Exercise, 10,* 427-434. doi:10.1016/j.psychsport.2009.03.009

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*, 286–299. doi:10.1037/1040-3590.7.3.286

Ford, J. K., MacCallum, R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology*, 39, 291- 314. doi:10.1111/j.1744-6570.1986.tb00583.x

Fraser-Thomas, J. L., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to foster positive youth development. *Physical Education & Sport Pedagogy*, *10*(1), 19-40.

Frazier, P., Tennen, H. Gavian, M., Park, C., Tomich, P., & Tashiro, T. (2009). Does self-reported posttraumatic growth reflect genuine positive change? *Psychological Science, 20*, 912-919. doi:10.1111/j.1467- 9280.2009.02381.x

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology, 56*, 218–226. doi:10.1037/1089-2680.2.3.300.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden and build theory of positive emotions. *American Psychologist, 56*, 218–226. doi:10.1037/0003-066X.56.3.218

Freeman, P., Coffee, P.,Moll, T., Rees, T., & Sammy, N. (2014). The ARSQ: the athletes' received support questionnaire. *Journal of Sport and Exercise Psychology, 36*, 189-202.

Friborg, O., Hjemdal, O., Rosenvinge. J. H., Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy

adjustment? *International Journal of Methods in Psychiatric Research*, 12, 65-76.

Retrieved from: http://dx.doi.org.ezproxy.napier.ac.uk/10.1002/mpr.143

Frith, H., & Gleeson, K. (2004). Clothing and embodiment: Men managing body image and appearance. *Psychology of Men & Masculinity, 5*(1), 40-48. doi:10.1037/1524-9220.5.1.40

Frydenberg, E., & Lewis, R. (1993). Boys play sport and girls turn to others: Age, gender and ethnicity as determinants of coping. *Journal of Adolescence 16*, 253-266.

Fu, C., Leoutsakos, J. M., & Underwood, C. (2014). An examination of resilience cross-culturally in child and adolescent survivors of the 2008 China earthquake using the Connor-Davidson Resilience Scale (CD-RISC). *Journal of Affective Disorders*, 155(1), 149–153. Retrieved from: http://doi.org/10.1016/j.jad.2013.10.041

Galli, N., & Gonzalez, S. P. (2014). Psychological resilience in sport: A review of the literature and implications for research and practice. *International Journal of Sport and Exercise Psychology, 13,* 243-257. doi:10.1080/1612197X.2014.946947

Galli, N., & Reel, J. J. (2012). 'It was Hard, But it was Good': a qualitative exploration of stress-related growth in Division I intercollegiate athletes. *Qualitative Research in Sport, Exercise and Health, 4*, 297-319. doi:10.1080/2159676X.2012.693524

Galli, N., & Vealey, R. S. (2008). "Bouncing back" from adversity: Athletes' experiences of resilience. *The Sport Psychologist, 22*, 316–335. Retrieved from: http://journals.humankinetics.com/AcuCustom/Sitename/Documents/DocumentItem/16186.pdf

Garmezy, N. (1985). Stress-resistant children: The search for protective factors. In J. E. Stevenson (Ed.), *Recent research in developmental psychopathology: Journal of Child Psychology and Psychiatry Book Supplement 4* (pp.213-233). Oxford: Pergamon Press.

Garmezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments. *Pediatric Annals, 20*, 459–466. doi:10.3928/0090-4481-19910901-05

Garmezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in childen: A building block for developmental psychopathology. *Child Development, 55,* 97-111. doi:10.2307/1129837

Gaskin, C. J., & Happell, B. (2014). On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. *International Journal of Nursing Studies*, *51*, 511–521. doi:10.1016/j.ijnurstu.2013.10.005

Gillespie, B. M., Chaboyer, W., & Wallis, M. (2009). The influence of personal characteristics on the resilience of operating room nurses: A predictor study. *International Journal of Nursing Studies, 46*, 968-976. doi:10.1016/j.ijnurstu.2007.08.006

Goldstein, D. M., & Goldstein, S. E. (2005). Q methodology study of a person in individual therapy, *Clinical Case Studies, 4,* 40-56. doi:10.1177/1534650103259669

Gonzales, G., Chronister, K. M., Linville, D., & Knoble, N. B. (2012). Experiencing parental violence: A qualitative examination of adult men's resilience. *Psychology of Violence, 2*(1), 90–103. doi:10.1037/a0026372

Gonzalez, S. P., Moore, E. W. G., Newton, M., & Galli, N. A. (2016). Validity and reliability of the Connor-Davidson Resilience Scale (CD-RISC) in competitive sport. *Psychology of Sport and Exercise, 23*, 31–39. doi:10.1016/j.psychsport.2015.10.005

Good, J. M. M. (2000). William Stephenson, Cyril Burt and the demise of the London school. Paper presented at the History and Philosophy of Psychology section of the British Psychological Society, Annual conference, University of Ripon and York St John, UK April.

Goodyer, I., Kolvin, I., & Gatzanis, S. (1985). Recent undesirable life events and psychiatric disorder in childhood and adolescence. *The British Journal of Psychiatry*, *147*, 517-523. doi:10.1192/bjp.147.5.517

Gordon Rouse, K. A., Ingersoll, G. M., & Orr, D. P. (1998). Longitudinal health endangering behavior risk among resilient and nonresilient early adolescents. *Journal of Adolescent Health*. http://doi.org/10.1016/S1054-139X(98)00019-6

Goto, K., Tiffany, J., Pelto, G., & Peletier, D. (2008). Use of Q methodology to analyze divergent perspectives on participatory action research as a strategy for HIV/AIDS prevention among Caribbean youth. *AIDS Education and Prevention, 20*, 301–311. doi:10.1521/aeap.2008.20.4.301

Gould, D., Jackson, S. A., & Finch, L. M. (1993). Sources of stress in national champion figure skaters. *Journal of Sport and Exercise Psychology, 15*, 134–159. Retrieved from http://journals.humankinetics.com/doi/pdf/10.1123/jsep.15.2.134

Grix, J. (2010). Introducing 'hard' interpretivism and Q methodology: Notes from a project on county sport partnership and governance. *Leisure Studies, 29,* 457-467. doi:10.1080/02614367.2010.518290

Guadagnoli, E., & Velicer, W. F. (1988). Relation of sample size to the stability of component patterns. *Psychological Bulletin, 103*, 265–275. doi:10.1037/0033-2909.103.2.265

Gucciardi, D. F., & Jones, M. I. (2012). Beyond optimal performance: Mental toughness profiles and developmental success in adolescent cricketers. *Journal of Sport & Exercise Psychology*, *34*(1), 16–36. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/22356880

Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: tests of dimensionality, nomological network, and traitness. *Journal of Personality, 83*(1), 26-44. doi:10.1111/jopy.12079

Gucciardi, D. F., Jackson, B., Coulter, T. J., & Mallett, C. J. (2011). The Connor-Davidson Resilience Scale (CD-RISC): Dimensionality and age-related measurement invariance with Australian cricketers. *Psychology of Sport and Exercise, 12*, 423–433. doi:10.1016/j.psychsport.2011.02.005

Gucciardi, D., & Gordon, S. (2009). Development and preliminary validation of the Cricket Mental Toughness Inventory (CMTI). *Journal of Sports Sciences, 27,* 1293–1310. doi: 10.1080/02640410903242306

Gucciardi, D., Gordon, S., & Dimmock, J. (2009). Advancing mental toughness research and theory using personal construct psychology. *International Review of Sport and Exercise Psychology, 2*, 54–72. doi: 10.1080/17509840802705938

Haase, J. E. (2004). The adolescent resilience model as a guide to interventions. *Journal of Pediatric Oncology Nursing, 21*, 289–299. doi:10.1177/1043454204267922

Hagger, M. S., & Chatzisarantis, N. L. D. (2009). Assumptions in research in sport and exercise psychology. *Psychology of Sport and Exercise*, 10,511-519. doi:10.1016/ j.psychsport.2009.01.004

Hall, N. (2011). "Give it everything you got": Resilience for young males through sport. *International Journal of Men's Health, 10*(1), 65-81. doi:10.3149/jmh.1001.65

Hammond, A. M., Young, J. A., & Konjarski, L. (2014). Attitudes of Australian swimming coaches towards inclusion of swimmers with an intellectual disability: An exploratory analysis. *International Journal of Sports Science & Coaching, 9*, 1425-1436.

Harman, H. H. (1976). *Modern factor analysis* (3rd ed.). Chicago: University of Chicago Press.

Harriman, E. L. (1958). *Handbook of psychological terms.* Paterson, NJ: Littlefield, Adams, and Co.

Harrington, D, (2009). *Confirmatory factor analysis*. New York: Oxford University Press

Hawkins, J. D., Jenson, J. M., Catalano, R. F., & Lishner, D. L. (1988). Delinquency and drug abuse: Implications for social services. *Social Service Review, 62*, 258-284. doi:10.1086/644546

Hellstedt, J.C. (1987). Sport psychology at a ski academy: Teaching mental skills to young athletes. *The Sport Psychologist, 1*, 56–68

Henley, R., Schweizer, I., de Gara, F., Vetter, S. (2007). How psychosocial sport & play programs help youth manage adversity: A review of what we know & what we should research. *International Journal of Psychosocial Rehabilitation, 12*(1), 51-58. Retrieved from https://www.researchgate.net/publication/237508064

Henson, R. K., & Roberts, J.K. (2006). Use of exploratory factor analysis in published research: common errors and some comment on improved practice. *Educational and Psychological Measurement, 66*, 393-416. doi:10.1177/0013164405282485.

Herman-Stahl, M., & Petersen, A. C. (1996). The protective role of coping and social resources for depressive symptoms among young adolescents. *Journal of Youth and Adolescence, 25*, 733-753.

Hjemdal, O., Friborg, O., Stiles, T. C., Martinussen, M., & Rosenvinge, J. H. (2006). A new scale for adolescent resilience: Grasping the central protective resources behind healthy development. *Measurement and Evaluation in Counseling and Development*, *39*, 84–97. Retrieved from: http://web.a.ebscohost.com.ezproxy.napier.ac.uk/ehost/pdfviewer/pdfviewer?vid=3&sid=56adc54b-6ece-45cb-bc08-2f4b774db0e6%40sessionmgr4002&hid=4107

Holt, N. L., & Hogg, J. M. (2002). Perceptions of stress and coping during preparations for the 1999 women's soccer world cup finals. *The Sport Psychologist, 16*, 251-271. Retrieved from. http://journals.humankinetics.com/tsp.

Horne, Holt, N. L., & Dunn, J. G. (2004). Toward a grounded theory of the psychosocial competencies and environmental conditions associated with soccer success. *Journal of Applied Sport Psychology, 16*, 199-219. doi:10.1080/10413200490437949

Hosseini, S. A. & Besharat, M. A. (2010). Relation of resilience with sport achievement and mental health in a sample of athletes. *Procedia - Social and Behavioral Sciences, 5*, 633–8. doi:10.1016/j.sbspro.2010.07.156

Hou, W. K., Law, C. C., Yin, J., & Fu, Y. T. (2010). Resource loss, resource gain, and psychological resilience and dysfunction following cancer diagnosis: A growth mixture modelling approach. *Health Psychology, 29*, 484-495. doi:10.1037/a0020809

Howells, K., & Fletcher, D. (2015). Sink or swim: Adversity-and growth-related experiences in Olympic swimming champions. *Psychology of Sport and Exercise, 16* (1), 37-48. doi:10.1016/j.psychsport.2014.08.004

Hox, J. J., & Bechger, T. M. (1998). An introduction to structural equation modelling. *Family Science Review, 11*, 354-373.

Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Lorch, E. P., & Donohew, R. L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences, 32*, 401–414. doi:10.1016/S0191-8869(01)00032-0

Hurley, O. A., Moran, A., & Guerin, S. (2007). Exploring athletes' experiences of their injuries: A qualitative investigation. *Sport and Exercise Psychological Review*, 3, 14–22.

Hutchinson, G., & Sofroniou, N. (1999). *The multivariate social scientist*. London; Sage Publications Ltd

Jack, S. J., Ronan, K. R. (1998). Sensation seeking among high- and low-risk sports participants. *Personality and Individual Differences, 25*, 1063–1083.

James, B., & Collins, D. (1997). Self-presentational sources of competitive stress during performance. *Journal of Sport & Exercise Psychology, 19*, 17–35. Retrieved from http://www.naspspa.org/AcuCustom/Sitename/Documents/DocumentItem/1204.pdf

Johnson, J. H., Sarason, I. G., & Siegel, J. M. (1979). Arousal seeking as a moderator of life stress. *Perceptual and Motor Skills, 49*, 665-66

Jones, G., Hanton, S., & Connaughton, D. (2002).What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology, 14*, 205–218. doi:10.1080/10413200290103509

Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. The Sport Psychologist, 21, 243–264.

Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and threat states in athletes. *International Review of Sport and Exercise Psychology, 2,* 161-180. doi:10.1080/17509840902829331

Jørgensen, I. E., & Seedat, S. (2008). Factor structure of the Connor–Davidson resilience scale in South African adolescents. *International Journal of Adolescent Medicine and Health, 20*, 23–32. doi:10.1515/IJAMH.2008.20.1.23

Jowett, S., & Timson-Katchis, M. (2005). Social networks in sport: Parental influence on the coach-athlete relationship. *The Sport Psychologist, 19*, 267.

Kagan, J. (2007). A trio of concerns. *Perspectives on Psychological Science, 2,* 361-376.

Kaiseler, M., Polman, R., & Nicholls, A. (2009). Mental toughness, stress, stress appraisal, coping and coping effectiveness in sport. *Personality and Individual Differences*, 47, 728-733. doi:10.1016/j.paid.2009.06.012

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine, 4*, 1–39.

Karairmak, Ö. (2010). Establishing the psychometric qualities of the Connor-Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Research, 179*, 350–356. doi:10.1016/j.psychres.2009.09.012

Karamipour, M., Hejazi, M., & Yekta, Z. (2015). The role of resilience and hardiness in mental health of athletes and non-athletes. *Bulletin of Environmental, Pharmacology and Life Sciences, 4,* 37–43. Retrieved from http://bepls.com/jan2015/8f.pdf

Kellmann, M., & Kallus, K. (2001). *Recovery-Stress Questionnaire for Athletes. User Manual*. Champaign, IL: Human Kinetics.

Kerlinger, F. N. (1986). *Foundations of behavioral research*. New York, NY: Holt, Rinehart & Winston.

Kerr, J. H., & Houge Mackenzie, S. (2012). Multiple motives for participating in adventure sports. *Psychology of Sport and Exercise, 13*(5), 649–657. doi:10.1016/j.psychsport.2012.04.002

Kesebir, S., Gündoğar, D., Küçüksubaşı, Y., & Yaylacı, E. T. (2013). The relation between affective temperament and resilience in depression: A controlled study. J*ournal of affective disorders, 148*, 352-356.

Kim, M. S., & Duda, J. L. (2003). The coping process: Cognitive appraisals of stress, coping strategies, and coping effectiveness. *The Sport Psychologist, 17*, 406–425. doi:10.1123/tsp.17.4.406

King, M. F., & Bruner, G. C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology and Marketing, 17,* 79-103. Retrieved from https://www.researchgate.net/profile/Gordon_Bruner/publication/230034577_Social_Desirability_Bias_A_Neglected_Aspect_of_Validity_Testing/links/547de0a80cf27ed978625559.pdf

Kitzinger, C. (1986). Introducing and developing Q as a feminist methodology: A study of accounts of lesbianism. In S. Wilkinson (Ed.), *Feminist social psychology: Developing theory and practice* (pp. 152-172). Milton Keynes: Open University Press.

Kitzinger, J. (1994). The methodology of focus groups: The importance of interaction between research participants. *Sociology of Health and Illness, 16*(1), 103-121. Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/1467-9566.ep11347023/pdf

Kline, P. (1994). *An easy guide to factor analysis.* London: Routledge.

Kline, R. B. (2005). *Principles and practice of structural equation modelling* (2nd ed.). New York: Guilford Press.

Kline, R. B. (2010). *Principles and practices of structural equation modelling* (3rd ed.). New York: The Guilford Press.

Kobasa , S.C. (1979) . Stressful life events, personality and health: and inquiry in to hardiness. *Journal of Personality and Social Psychology, 37*(1), 1-11. doi:10.1037/0022-3514.37.1.1

Kontos, A. P. (2004). Perceived risk, risk taking, estimation of ability and injury among adolescent sport participants. *Journal of Pediatric Psychology, 29*, 447–455

Kristiansen, E., & Roberts, G. C. (2010). Young elite athletes and social support: Coping with competitive and organizational stress in "Olympic" competition. Scandinavian *Journal of Medicine and Science in Sports, 20*, 686–695. doi: 10.1111/j.1600-0838.2009.00950.x.

Krueger, R. A. (1994). *Focus groups: A practical guide for applied research* (2nd ed.). Thousand Oaks, CA: Sage.

Kukihara, H., Yamawaki, N., Uchiyama, K., Arai, S., & Horikawa, E. (2014). Trauma, depression, and resilience of earthquake/tsunami/nuclear disaster survivors of Hirono, Fukushima, Japan. *Psychiatry and Clinical Neurosciences*, *68*, 524–533. doi:10.1111/pcn.12159

LaFromboise, T. D., Hoyt, D. R., Oliver, L., & Whitbeck, L. B. (2006). Family, community, and school influences on resilience among American Indian adolescents in the upper Midwest. *Journal of Community Psychology, 34*, 193–209

Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, D. J.,… Jeste, D. V. (2008). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research*, *43*, 148-154. doi: 10.1016/j.jpsychires.2008.03.007.

Lavallee, D., Grove, J. R., & Gordon, S. (1997). The causes of career termination from sport and their relationship to post-retirement adjustment among elite-amateur athletes in Australia. *The Australian Psychologist, 32*, 131-135. Retrieved from: http://storre.stir.ac.uk/bitstream/1893/7666/1/AP_1997.pdf

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York; Springer publishing company.

Le Bars, H., & Gernigon, C. (1998). Perceived motivational climate, dispositional goals, and participation/withdrawal in judo. *Journal of Sport & Exercise Psychology, 20,* S58-S58

Leipold, B., & Greve, W. (2009). Resilience: A conceptual bridge between coping and development. *European Psychologist, 14*, 40–50. doi:10.1027/1016-9040.14.1.40

Lester, J. (1983). Wrestling with the self on Mount Everest. *Journal of Humanistic Psychology, 23*, 3141.

Lewko, J. H., & Ewing, M. E. (1980). Sex differences and parental influence in sport involvement of children. *Journal of Sport Psychology, 2*(1).

Lin, K. K., Sandler, I. N., Ayers, T. S., Wolchik, S. A., & Luecken, L. J. (2004). Resilience in parentally bereaved children and adolescents seeking preventive services. *Journal of Clinical Child and Adolescent Psychology, 33*, 673-683. doi:10.1207/s15374424jccp3304_3

Lindström, B. (2001). The meaning of resilience. *International Journal of Adolescent Medicine and Health*, *13*(1), 7-12.

Linley, P. A., & Joseph, S. (2004). Positive change following trauma and adversity: A review. *Journal of traumatic stress, 17*(1), 11-21. doi:10.1023/B:JOTS.0000014671.27856.7e

Lipowski, M., Lipowska, M., Jochimek, M., & Krokosz, D. (2015). Resiliency as a factor protecting youths from risky behaviour: Moderating effects of gender and sport. *European Journal of Sport Science, 1391*, 1–10. doi:10.1080/17461391.2015.1024755

Liu, D. W. Y., Fairweather-Schimdt, A. K., Burns, R. A., & Roberts, R. M. (2014). The Connor-Davidson Resilience Scale: Establishing Invariance Between Gender Across the Lifespan in a Large Community Based Study. *Journal of Psychopathology and Behavioral Assessment, 37,* 340-348. doi: 10.1007/s10862-014-9452-z

Llewellyn, D., & Sanchez, X. (2008). Individual differences and risk taking in rock climbing. *Psychology of Sport and Exercise, 9*, 413–426. doi:10.1016/j.psychsport.2007.07.003

Loehr, J. (1995). *The New Mental Toughness Training for Sport*. New York, NY: Penguin

Lu, F. J. H., Hsu, Y. W., Chan, Y. S., Cheen, J. R., & Kao, K. T. (2012). Assessing college student-athletes' life stress: initial measurement development and validation. *Measurement in Physical Education and Exercise Science, 16*, 254-267.

Lu, F. J. H., Lee, W. P., Chang, Y. K., Chou, C. C., Hsu, Y. W., Lin, J. H., & Gill, D. L. (2016). Interaction of athletes' resilience and coaches' social support on the stress-burnout relationship: A conjunctive moderation perspective. *Psychology of Sport and Exercise, 22*, 202–209. doi:10.1016/j.psychsport.2015.08.005

Luthar, S. S. (1991). Vulnerability and resilience: A study of high–risk adolescents. *Child Development, 62*, 600–616. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4235608/

Luthar, S. S. (2006). Resilience in development: A synthesis of research across five decades. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology: Risk, disorder and adaptation* (2nd ed., pp. 739–795). Hoboken, NJ: John Wiley & Sons, Inc.

Luthar, S. S., & Zelazo, L. B. (2003). Research on resilience: An integrative review. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 510-549). New York: Cambridge University Press.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*, 543–562. doi:10.1111/1467- 8624.00164

Luthar, S. S., Doernberger, C. H., & Zigler, E. (1993). Resilience is not a unidimensional construct: Insights from a prospective study of inner-city adolescents. *Development and Psychopathology*, *5*, 703–717. doi: 10.1017/S0954579400006246

Luthar, S.S., & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology, 12*, 857-885. doi:10.1017/S0954579400004156

Lyons, J., 1991. Strategies for assessing the potential for positive adjustment following trauma. *Journal of Traumatic Stress 4*, 93–111.

MacCallum, R. C. (1986). Specification searches in covariance structure modeling. *Psychological Bulletin, 100*, 107–120.

Machida, M., Irwin, B., & Feltz, D. (2013). Resilience in competitive athletes with spinal cord injury: The role of sport participation. *Qualitative Health Research, 23*(1), 1054- 1065. doi:10.1177/1049732313493673

MacNamara, A., Button, A., & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance. Part 1: Identifying mental skills and behaviors. *The Sport Psychologist*, *24*, 52–73.

Mahoney, J. W., Gucciardi, D. F., Ntoumanis, N., & Mallet, C. J. (2014). Mental toughness in sport: Motivational antecedents and associations with performance and

psychological health. *Journal of Sport & Exercise Psychology, 36*, 281-292. doi:10.1123/jsep.2013-0260

Males, J. R., Kerr, J. H., Thatcher, J., & Bellew, E. (2006). Team process and players' psychological responses to failure in a national volleyball team. *The Sport Psychologist, 20*, 275–294. Retrieved from: http://hdl.handle.net/2160/13078

Manuel, J. C., Shilt, J. S., Curl, W.W. & Sinal, S. (2002). Coping with sports injuries: An examination of the adolescent athlete. *Journal of Adolescent Health, 31*, 391-393. doi:10.1016/S1054-139X(02) 00400-7.

Manzano-García, G., & Ayala Calvo, J. C. (2013). Psychometric properties of Connor-Davidson Resilience Scale in a Spanish sample of entrepreneurs. *Psicothema, 25*, 245–51. doi:10.7334/psicothema2012.183

Maranise, A. M. J. (2013). Superstition & religious ritual: an examination of their effects and utilization in sport. *The Sport Psychologist*, *27*, 83–91.

Marsh, H. W., Nagengast, B., & Morin, A. J. (2013). Measurement invariance of big-five factors over the life span: ESEM tests of gender, age, plasticity, maturity, and la dolce vita effects. *Developmental Psychology, 49,* 1194.

Martin, A. J., & Marsh, H. W. (2006). Academic resilience and its psychological and educational correlates: A construct validity approach. *Psychology in Schools, 43,* 267–282

Martin, S. B., Dale, G. A., & Jackson, A. W. (2001). Youth coaching preferences of adolescent athletes and their parents. *Journal of Sport Behavior, 24*, 197.

Martinek, T. J., & Hellison, D. R. (1997). Fostering resiliency in underserved youth through physical activity. *Quest*, *49*(1), 34–49. doi:10.1080/00336297.1997.10484222

Martin-Krumm, C., Sarrazin, P., Peterson, C., & Famose, J. (2003). Explanatory style and resilience after sports failure. *Personality and Individual Differences*, *35*, 1685–1695. doi:10.1016/S0191-8869(02)00390-2

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56*, 227–238. doi:10.1037//0003-066X.56.3.227

Masten, A. S. (2013). Competence, risk, and resilience in military families: Conceptual commentary. *Clinical Child and Family Psychology Review, 16*, 278-281. doi:10.1007/s10567-013-0150-2

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. The

American Psychologist, 53(2), 205–20. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9491748

Masten, A. S., & Garmezy, N. (1985). Risk, vulnerability and protective factors in developmental psychopathology. In B. B. Lahey & A. E. Kazdin (Eds.), *Advances in Clinical Child Psychology* (pp. 1-52, Vol. 8). New York: Plenum.

Maxwell, S. E., & Delaney, H. D. (2004). *Designing experiments and analyzing data: A model comparison perspective* (Vol. 1). Psychology Press.

McBride, C. M., Emmons, K. M., & Lipkus, I. M. (2003). Understanding the potential of teachable moments: The case of smoking cessation. *Health Education Research, 18*, 156–170. http://doi.org/10.1093/her/18.2.156

McCormick, C. M., & Mathews, I. Z. (2007). HPA function in adolescence: Role of sex hormones in its regulation and the enduring consequences of exposure to stressors. *Pharmacology, Biochemistry, and Behavior, 86*, 220-233. doi:10.1016/j.pbb.2006.07.012

McGarty, C. & Haslam, S.A., (Eds.). (2003). *The message of social psychology*. Oxford: Blackwell.

McKay, J., Niven, A. G., Lavallee, D., & White, A. (2008). Sources of strain among elite UK track athletes. *Sport psychologist, 22*, 143-163. Retrieved from http://journals.humankinetics.com/tsp-back-issues/TSPVolume22Issue2June/SourcesofStrainAmongEliteUKTrackAthletes

McKeown, B., & Thomas, D. (1988). *Q methodology* (University Paper). Iowa: Sage.

Mckeown, B., & Thomas, D.B. (2013). *Q methodology* (2nd Edition). Newbury Park: Sage Publications

McParland, J., Hezseltine, L., Serpell, M., Eccleston, C. & Stenner, P. (2011). An investigation of constructions of justice and injustice in chronic pain: A Q-methodology approach. *Journal of Health Psychology*, *16*, 873-883. doi:10.1177/1359105310392417

Meggs, J., Golby, J., Mallett, C. J., Gucciardi, D. F., & Polman, R. C. J. (2015). The cortisol awakening response and resilience in elite swimmers. *International Journal of Sports Medicine, 37,* 169–174. doi:10.1055/s-0035-1559773

Mellalieu, S. D., Hanton, S., & Fletcher, D. (2006). A competi- tive anxiety review: Recent directions in sport psychology research. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 1–45). Hauppauge, NY: Nova Science.

Mellalieu, S. D., Neil, R., Hanton, S., & Fletcher, D. (2009). Competition stress in sport performers: Stressors experienced in the competition environment, *Journal of Sport Sciences, 27*, 729-744. doi:10.1080/02640410902889834

Mendelson, B. K., & White, D. R., & Mendelson, M. J. (1996). Self-esteem and body esteem: Effects of gender, age, and weight. *Journal of Applied Developmental Psychology, 17,* 321-346

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.

Min, J.-A., Jung, Y.-E., Kim, D.-J., Yim, H.-W., Kim, J.-J., Kim, T.-S., … Chae, J.-H. (2013). Characteristics associated with low resilience in patients with depression and/or anxiety disorders. *Quality of Life Research*, *22*, 231–241. doi:10.1007/s11136-012-0153-3

Mitchell, I., Evans, L., Rees, T., & Hardy, L. (2014). Stressors, social support, and tests of the buffering hypothesis: Effects on psychological responses of injured athletes. *British Journal of Health Psychology, 19*, 486-508.

Moen, F. (2012). Subjective beliefs among coaches about how relational factors affect intrinsic motivation, responsibility and development in sport. *Athletic Insight, 3*, 219-235. Retrieved from: http://search.proquest.com/openview/3c5c32cc12a2606e6132070337c784c6/1?pq-origsite=gscholar

Moen, F. (2014). The coach-athlete relationship and expectations. *International Journal of Humanities and Social Science, 4*, 29–40. Retrieved from: http://www.ijhssnet.com/journals/Vol_4_No_11_September_2014/4.pdf

Moen, F., & K, Garland (2012). Subjective beliefs among Sport Coaches about Communication during practice. *Scandinavian Sport Studies Forum (SSSF), 3*, 121-142

Moen, F., & R. Kvalsund (2013). Subjective beliefs among sport coaches about communication during coach-athlete conversations. *Athletic Insight, 5*, 229-250. Retrieved from: http://search.proquest.com/openview/d47032417cde1baf0e4de3061661049f/1?pq-origsite=gscholar

Moen, F., & Sandstad, H. (2013). Subjective expectations among athletes about coaches in sport. *Journal of Human Subjectivity*, *11,* 135-155.

Moen, F., Giske, R., & Hoigaard, R. (2015). Coaches' perceptions of how coaching behavior affects athletes: An analysis of their position on basic assumptions in the

coaching role. *International Journal of Learning, Teaching and Educational Research*, *11*(1), 180–199. Retrieved from: http://www.ijlter.org/index.php/ijlter/article/view/314/138

Molinero, O., Salguero, A., & Marquez, S. (2010). Propiedades psicometricas y estructura dimensional de la adaptacion espanola del Cuestionario de Estrategias de Afrontamiento en Competicion Deportiva. *Psicothema, 22*, 975–982.

Morgan, D. L. (1997). *Focus groups as qualitative research*. Newbury Park, Cal.: Sage.

Morgan, P. B. C., Fletcher, D., & Sarkar, M. (2013). Defining and characterizing team resilience in elite sport. *Psychology of Sport and Exercise, 14*, 549–559. doi:10.1016/j.psychsport.2013.01.004

Morgan, P. B. C., Fletcher, D., & Sarkar, M. (2014). Understanding team resilience in the world's best athletes: A case study of a rugby union World Cup winning team. *Psychology of Sport and Exercise, 16(1),* 91-100. doi:10.1016/j.psychsport.2014.08.007

Mueller, C. M., & Dweck, C. S. (1998). Intelligence praise can undermine motivation and performance. *Journal of Personality and Social Psychology, 75*, 33-52.

Müller, F. H., & Kals, E. (2004). Sort technique and Q-methodology: Innovative methods for examining attitudes and opinions. *Forum: Qualitative Social Research, 5,* Article 34.

Mummery, W. K., Schofield, G., & Perry, C. (2004). Bouncing back: The role of coping style, social support and self-concept in resilience of sport performance. *Athletic Insight, 6*, 1–18. Retrieved from. http://www.athleticinsight.com

N.C.: SAS Institute. Tugade, M., Fredrickson, B., & Barrett, L. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality, 72,* 1161-90. doi:10.1111/j.1467-6494.2004.00294.x

Neff, L. A., & Broady, E. F. (2011). Stress resilience in early marriage: Can practice make perfect? *Journal of Personality and Social Psychology, 101*, 1050–1067. doi:10.1037/ a0023809

Neiger, B. (1991). Resilient reintegration: Use of structural equations modelling. Unpublished doctoral dissertation, University of Utah.

Neill, J., & Dias, K. L. (2001). Adventure education and resilience: The double-edged sword. *Journal of Adventure Education & Outdoor Learning, 1*, 35–42. doi:10.1080/14729670185200061

Nettles, S. M.,& Pleck, J. H. (1994). Risk, resilience and development: The multiple ecologies of Black adolescents in the United States. In R. Haggerty, L. Sherrod, N. Garmezy, & M. Rutter (Eds.), *Stress, risk, and resilience in children and adolescents* (pp. 147–181). NY: Cambridge University Press.

Newton, M., Duda, J. L., Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female athletes. *Journal of Sport Sciences, 18*, 275–290

Nezhad, M. A. S., & Besharat, M. A. (2010). Relations of resilience and hardiness with sport achievement and mental health in a sample of athletes. *Procedia-Social and Behavioral Sciences, 5*, 757-763.

Nicholls, A. R., Levy, A. R., & Perry, J. L. (2015). Emotional maturity, dispositional coping, and coping effectiveness among adolescent athletes. Psychology of Sport and Exercise, 17, 32–39. http://doi.org/10.1016/j.psychsport.2014.11.004

Nicholls, A. R., Polman, R. C. J., Levy, A. R., & Backhouse, S. H. (2009). Mental toughness in sport: Achievement level, gender, age, experience, and sport type differences. *Personality and Individual Differences, 47*(1), 73–75. doi:10.1016/j.paid.2009.02.006

Noordstar, J. J., van der Net, J., Jak, S., Helders, P. J., & Jongmans, M. J. (2016). Global self-esteem, perceived athletic competence, and physical activity in children: A longitudinal cohort study. *Psychology of Sport and Exercise, 22,* 83-90.

Notario-Pacheco, B., Solera-Martínez, M., Serrano-Parra, M. D., Bartolomé-Gutiérrez, R., García-Campayo, J., & Martínez-Vizcaíno, V. (2011). Reliability and validity of the Spanish version of the 10-item Connor-Davidson resilience scale (10-item CD-RISC) in young adults. *Health and Quality of Life Outcomes, 9(*1), 63-63. doi:10.1186/1477-7525-9-63

Nunnally, J., & Bernstein, I. (1994). *Psychometric theory*. New York: McGraw-Hill.

Oberski, D. L. (2014). Evaluating sensitivity of parameters of interest to measurement invariance in latent variable models. *Political Analysis*, *22*(1), 45-60.

Olsson, C. A., Bond, L., Burns, J. M., Vella-Brodrick, D. A., & Sawyer, S. M. (2003). Adolescent resilience: A concept analysis. *Journal of Adolescence, 26* (1), 1-11. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/12550818

O'Rourke, N., Psych, R., & Hatcher, L. (2013). *A step-by-step approach to using SAS for factor analysis and structural equation modelling*. Sas Institute.

Oxford Online Dictionary (2013) accessed 16/10/15 http://www.oxforddictionaries.com/definition/english/resilience

Palmer, C. (2008). A theory of risk and resilience factors in military families. *Military Psychology, 20*, 205–217. doi:10.1080/08995600802118858

Park, C. L., & Fenster, J. R. (2004). Stress-related growth: Predictors of occurrence and correlates with psychological adjustment. *Journal of Social and Clinical Psychology, 23*, 195–215. doi: 10.1521/jscp.23.2.195.31019

Park, C. L., Cohen, L. H., & Murch, R. (1996). Assessment and prediction of stress-related growth. *Journal of Personality, 64*, 71–105

Podlog, L., Lochbaum, M., & Stevens, T. (2010). Needs satisfaction, well-being, and perceived return-to-sport outcomes among injured athletes. *Journal of Applied Sport Psychology, 22*,167-182. http://dx.doi.org/10.1080/10413201003664665

Podlog, L., Wadey, R., Stark, A., Lochbaum, M., Hannon, J., & Newton, M. (2013). An adolescent perspective on injury recovery and the return to sport. *Psychology of Sport and Exercise, 14*, 437–446. doi:10.1016/j.psychsport.2012.12.005

Polk, L. V. (1997). Toward a middle-range theory of resilience. *Advances in Nursing Science, 19*, 1–13. Retrieved from: http://eres.lndproxy.org/edoc/CNDAccel/NUR402/NUR402Polk-03.pdf

Pope, C., Ziebland, S., & Mays, N. (2000). Qualitative research in health care: Analysing qualitative data. *British Medical Journal, 320*, 114–116

Rabiee, F. (2004). Focus-group interview and data analysis. *Proceedings of the Nutrition Society, 63,* 355-660. doi:10.1079/PNS2004399

Raedeke, T. D., & Smith, A. L. (2004).). Coping resources and athlete burnout: an examination of stress mediated and moderation hypothesis. *Journal of Sport and Exercise Psychology, 26*, 525-541.

Rees, T., & Hardy, L. (2000). An examination of the social support experiences of high level sports performers. *The Sport Psychologist, 14,* 327-347.

Rees, T., Hardy, L., Abernathy, B., Gullich, A., Cote, J., Woodman, T., et al. (2013). The UK Sport White Paper: A Systematic Review of Research into the Identification and Development of the World's Best Talent. London: UK Sport.

Reeves, C., Nicholls, A. R., & McKenna, J. (2011). Longitudinal analyses of stressors, perceived control, coping, and coping effectiveness among early and middle adolescent soccer players. *International Journal of Sport Psychology*, *42*, 186-203. doi:10.1080/1612197X.2011.567104

Resnick, B., Galik, E., Dorsey, S., Scheve, A., & Gutkin, S. (2011). Reliability and validity testing of the physical resilience measure. *The Gerontologist, 51*, 643-652. doi:10.1093/geront/gnr016

Rew, L., & Horner, S. D. (2003). Youth resilience framework for reducing health-risk behaviors in adolescents. *Journal of Pediatric Nursing*, *18*, 379–388. doi:10.1016/S0882-5963(03)00162-3

Richardson, G. E. (2002). The metatheory of resilience and resiliency. *Journal of Clinical Psychology, 58*, 307–321. doi:10.1002/jclp.10020

Richardson, G. E., Neiger, B. L., Jensen, S., & Kumpfer, K. L. (1990). The resiliency model. *Health Education, 21*, 33-39.

Riolli, L., Savicki, V., & Cepani, A. (2002). Resilience in the face of catastrophe: Optimism, personality, and coping in the Kosovo crisis. *Journal of applied social psychology, 32*, 1604-1627. doi:10.1111/j.1559-1816.2002.tb02765.x

Ruiz, R., De La Vega, R., Poveda, J., Rosado, A., & Serpa, S. (2012). Analisis psicometrico de la Escala de Resiliencia en el deporte del futbol. *Revista de Psicologıa del Deporte, 21*(1), 143–151.

Rutter, M. (1971). Parent-child separation: Psychological effects on the children. *Journal of Child Psychology and Psychiatry, 12,* 233–260. doi:10.1111/j.1469-7610.1971.tb01086.x

Rutter, M. (1981). Stress, coping and development: Some issues and some questions. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 22*, 323–356. doi:10.1111/j.1469-7610.1981.tb00560.x

Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*, *147*, 598–611. doi:10.1192/bjp.147.6.598

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry*, 57, 316-331. doi:10.1111/j.1939-0025.1987.tb03541.x

Rutter, M. (1999). Resilience concepts and findings: Implications for family therapy. *Journal of Family Therapy, 21*, 119–144. doi:10.1111/1467-6427.00108

Rutter, M. (2013). Annual research review: Resilience--clinical implications. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *54*, 474–87. doi:10.1111/j.1469-7610.2012.02615

Sales, J. M., & Irwin, C. E. (2013). A biopsychosocial perspective of adolescent health and disease. In *Handbook of Adolescent Health Psychology* (pp.13-29). Springer; New York. doi:10.1007/978-1-4614-6633-8_2

Salim, J., Wadey, R., & Diss, C. (2015). Examining the relationship between hardiness and perceived stress- related growth in a sport injury context. *Psychology of Sport & Exercise*, *19*, 10–17. doi:10.1016/j.psychsport.2014.12.004

Sarkar, M., & Fletcher, D. (2013). How Should We Measure Psychological Resilience in Sport Performers? *Measurement in Physical Education and Exercise Science, 17*, 264–280. doi:10.1080/1091367X.2013.805141

Sarkar, M., & Fletcher, D. (2014a). Ordinary magic, extraordinary performance: Psychological resilience and thriving in high achievers. *Sport, Exercise, and Performance Psychology, 3*(1), 46–60. doi:10.1037/spy0000003

Sarkar, M., & Fletcher, D. (2014b). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences*, *32*, 1419–1434. doi:10.1080/02640414.2014.901551

Sarkar, M., Fletcher, D., & Brown, D. J. (2015). What doesn't kill me: Adversity-related experiences are vital in the development of superior Olympic performance. *Journal of Science and Medicine in Sport, 18*, 475–479. doi: 10.1016/j.jsams.2014.06.010

Savage, M. P., & Holcomb, D. R. (1999). Adolescent female athletes' sexual risk-taking behaviors. *Journal of Youth and Adolescence, 28*, 595-602.

Schinke, R. J., & Jerome, W. C. (2002). Understanding and refining the resilience of elite athletes: An intervention strategy, *4*(3), 1–13.

Schlossberg, N. K. (1984). *Counselling adults in transition: Linking practice with theory*. New York: Springer.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting Structural Equation Modelling and Confirmatory Factor Analysis Results: A Review. *The Journal of Educational Research, 99,* 323–338. doi:10.3200/JOER.99.6.323-338

Secades, X. G., Molinero, O., Salguero, A., Barquín, R. R., de la Vega, R., & Márquez, S. (2016). Relationship between resilience and coping strategies in competitive sport. *Perceptual and Motor Skills, 122*(1), 336-349. doi:10.1177/0031512516631056

Seiffge-Krenke, I. (1995). *Stress, coping, and relationships during adolescence*. Hillsdale, NJ: Erlbaum.

Serpa, S., & Palmeira, A. L. (1997). ACSI 28: Estudo das experiências desportivas. Lisboa: Labo- ratório de Psicologia do desporto/ Faculdade de Motricidade Humana/Universidade Técnica de Lisboa.

Sexton, M. B., Byrd, M. R., & von Kluge, S. (2010). Measuring resilience in women experiencing infertility using the CD-RISC: examining infertility-related stress, general distress, and coping styles. *Journal of Psychiatric Research, 44*, 236–41. doi:10.1016/j.jpsychires.2009.06.007

Sheard, M., Golby, J., & van Wersch, A. (2009). Progress toward construct validation of the Sports Mental Toughness Questionnaire. *European Journal of Psychological Assessment, 25*, 186–193. doi: 10.1027/1015-5759.25.3.186

Shinebourne, P. (2009). Using Q method in qualitative research. *International Journal of Qualitative Methods, 8,* 93-97. doi:10.1177/160940690900800109

Shinebourne, P., & Adams, M. (2007). Q-Methodology as a phenomenological research method. *Existential Analysis*, *18* (1), 103-116.

Short, A. L., & Russell-Mayhew, S. (2009). What counsellors need to know about resiliency in adolescents. *International Journal for the Advancement of Counselling, 31*, 213–227

Simpson, G., & Jones, K. (2013). How important is resilience among family members supporting relatives with traumatic brain injury or spinal cord injury? *Clinical Rehabilitation*, *27*, 367–77. doi:10.1177/0269215512457961

Singh, K., & Yu, X. (2010). Psychometric evaluation of the Connors-Davidson Resiliency Scale (CD-RISC) in a sample of Indian students. *Journal of Psychology, 1* (1), 20–30.

Skinner, N., & Brewer, N. (2004). Adaptive approaches to competition: Challenge appraisals and positive emotion. *Journal of Sport & Exercise Psychology, 26*, 283-305.

Slanger, E., & Rudestam, K. (1997). Motivation and disinhibition in high risk sports: Sensation seeking and self-efficacy. *Journal of Research in Personality, 31*, 355-374. doi10.1006/jrpe.1997.2193

Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The Brief Resilience Scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine, 15*, 194–200. doi:10.1080/10705500802222972

Smith, R. E., Smoll, F. L., & Ptacek, J. T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support and coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology*, *58*, 360-370.

Solano, J. P. C., & Lotufo Neto, F. (2012). Cross-cultural adaptation and validation of Brazilian Portuguese versions of the dispositional resilience scale and Connor-Davidson resilience scale (Abstract). World Psychiatric Association, Section on Epidemiology and Public Health, São Paulo.

Spear, L. (2000). The adolescent brain and age-related behavioural manifestations. *Neuroscience & Biobehavioural Reviews, 24,* 417–463

Stainton Rogers, R. (1995). Q methodology. In J. Smith, R. Harre, & L. Van Langenhove, (Eds.), *Rethinking methods in psychology*, (pp,178-192). London: Sage.

Stainton Rogers, W. (1991). *Explaining health and illness: An exploration of diversity*. London: Harvester Wheatsheaf.

Standage, M., Duda, J.L. and Ntoumanis, N. (2003). A model of contextual motivation in physical education: Using constructs from self-determination and achievement goal theories to predict physical activity intentions. *Journal of Educational Psychology, 95*, 97–110. doi:10.1037/0022-0663.95.1.97

Stenner, P., & Stainton Rogers, R. (2004). Q methodology and qualiquantology: The example of discriminating between emotions. In Z. Tod, B. Nerlich, S. Mckeown, & D. Clark (Eds.), *Mixing methods in psychology: The integration of qualitative and quantitative methods in theory and practice* (pp,101-120). London: Routledge.

Stephenson, W. (1935). Correlating persons instead of tests. *Character and Personality, 4* (1), 17-24. doi:10.1111/j.1467-6494.1935.tb02022.x

Stephenson, W. (1936). The foundations of psychometry: Four factor systems. *Psychometrika, 1*, 195-209. doi:10.1007/BF02288366

Stephenson, W. (1950). A statistical approach to typology: The study of trait universes. *Journal of Clinical Psychology, 6*, 26-38. doi:10.1002/1097-4679(195001)6

Stephenson, W. (1953). *The study of behaviour: Q technique and its methodology*. Chicago, IL: University of Chicago Press.

Stephenson, W. (1986). Protoconcurcus: The concourse theory of communication. *Operant Subjectivity, 9,* 37-58, doi:10.15133/j.os.1985.002

Stratta, P., Capanna, C., Patriarca, S., de Cataldo, S., Bonanni, R. L., Riccardi, I., & Rossi, A. (2013). Resilience in adolescence: Gender differences two years after the earthquake of L'Aquila. *Personality and Individual Differences, 54*, 327–331. doi:10.1016/j.paid.2012.09.016

Strauss, A. L., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Beverly Hills, CA: Sage.

Strümpfer, D. J. W. (1999). Psychosocial resilience in adults. *Studia Psychologica, 41*, 89–104. Retrieved from http://www.psychologia.sav.sk/sp/

Sun, J., & Stewart, D. (2007). Age and gender effects on resilience in children and adolescents. *International Journal of Mental Health Promotion, 9,* 16-25. doi:10.1080/14623730.2007.9721845

Taherdoost, H., Sahibuddin, S., & Jalaliyoon, N. (2014). Exploratory factor analysis: Concepts and theory. 2nd International Conference on Mathematical, Computational and Statistical Sciences, 375–382.

Tamminen, K. A., Holt, N. L., & Crocker, P. R. (2012). Adolescent athletes: Psychosocial challenges and clinical concerns. *Current Opinion in Psychiatry, 25,* 293-300, doi:10.1097/YCO.0b013e3283541248.

Tamminen, K. A., Holt, N. L., & Neely, K. C. (2013). Exploring adversity and the potential for growth among elite female athletes. *Psychology of Sport and Exercise, 14* (1), 28–36. doi:10.1016/j.psychsport.2012.07.002

Tashakkori, A., & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. London: Sage Publications.

Thelwell, R. C., Weston, N. J. V, & Greenlees, I. A. (2007). Batting on a sticky wicket: Identifying sources of stress and associated coping strategies for professional cricket batsmen, *Psychology of Sport and Exercise, 8*, 219–232. doi:10.1016/j.psychsport.2006.04.002

Theron, L. C. (2012). Resilience research with South African youth: Caveats and ethical complexities. *South African Journal of Psychology, 42*, 333–345. doi:10.1177/008124631204200305

Tibbert, S., Andersen, M., & Morris, T. (2015).What a difference a "Mentally Toughening" year makes: The acculturation of a rookie. *Psychology of Sport and Exercise, 17*(1), 68–78. doi:10.1016/j.psychsport.2014. 10.007

Toering, T. T., Elferink-Gemser, M.T., Jordet, G., & Visscher, C. (2009). Self-regulation and performance on elite and nonelite youth soccer players. *Journal of Sports Sciences, 27*, 1509–1517. doi:10.1080/02640410903369919

Tripp, D. A., Stanish, W. D., Reardon, G., Coady, C., & Sullivan, M. J. L. (2003). Comparing postoperative pain experiences of the adolescent and adult athlete after anterior cruciate ligament surgery. *Journal of Athletic Training, 38,* 154-157. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC164905/

Truffino, J. C. (2010). Resilience: An approach to the concept. *Revista de Psiquiatría Y Salud Mental* (English Edition), *3*, 145–151. doi:10.1016/S2173-5050(10)70024-8

Truxillo, C. (2003). Multivariate Statistical Methods: Practical Research Applications Course Notes. Cary, N. C.: SAS Institute

Tusaie, K., & Dyer, J. (2004). Resilience: A historical review of the construct. *Holistic Nursing Practice, 18,* 3–10.

Udry, E., Shelbourne, K. D., & Gray, T. (2003). Psychological readiness for anterior cruciate ligament surgery: describing and comparing the adolescent and adult experiences. *Journal of Athletic Training, 38*,167-171. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC164908/

Ungar, M. (2003). Qualitative contributions to resilience research. *Qualitative Social Work, 2*, 85-102. doi:10.1177/1473325003002001123.

Ungar, M., Liebenberg, L., Boothroyd, R., Kwong, W. M., Lee, T. Y., Leblanc, J., … Makhnach, A. (2008). The study of youth resilience across cultures: Lessons from a pilot study of measurement development. *Research in Human Development*, *5*, 166–180. doi:10.1080/15427600802274019

Unger, R., & Crawford, M. (1992). *Women and gender: A Feminist psychology.* New York: McGraw-Hill

Vaishnavi, S., Connor, K., & Davidson, J. T. (2007). An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: Psychometric properties and applications in psychopharmacological trials. *Psychiatry Research, 152,* 293-297

Van Tiggelen, D., Wickes, S., Stevens, V., Roosen, P., & Witvrouw, E. (2008). Effective prevention of sports injuries: A model integrating efficacy, efficiency, compliance and risk-taking behaviour. *British Journal of Sport Medicine, 42*, 648-652. doi:10.1136/bjsm.2008.046441

Van Vliet, K. J. (2008). Shame and resilience in adulthood: A grounded theory study. *Journal of Counseling Psychology*, *55,* 233–245. doi:10.1037/0022-0167.55.2.233

VanYperen, N.W. (1995). Interpersonal stress, performance level, and parental support: A longitudinal study among highly skilled young soccer players. *The Sport Psychologist, 9*, 225-241.

Vealey R. S., & Chase M. A. (2008). Self-confidence in sport. In T.S. Horn, (Ed.), *Advances in Sport Psychology* (pp. 66-97). Champaign, IL: Human Kinetics.

Veselska, Z., Geckova, A. M., Orosova, O., Gajdosova, B., van Dijk, J. P., & Reijneveld, S. A. (2009). Self-esteem and resilience: The connection with risky behavior among adolescents. *Addictive Behaviors, 34*, 287–291. doi:10.1016/j.addbeh.2008.11.005

Vetter, S., Dulaev, I., Mueller, M., Henley, R. R., Gallo, W. T., & Kanukova, Z. (2010). Impact of resilience enhancing programs on youth surviving the Beslan school siege. *Child and Adolescent Psychiatry and Mental Health*, *4*, 11. doi:10.1186/1753-2000-4-11

Vitali, F., Bortoli, L., Bertinato, L., Robazza, C., & Schena, F. (2015). Motivational climate, resilience, and burnout in youth sport. *Sport Science and Health, 11,* 103–108. doi:10.1007/s11332-014-0214-9

Wadey, R., Clark, S., Podlog, L., & McCullough, D. (2013). Coaches' perceptions of athletes' stress-related growth following sport injury. *Psychology of Sport and Exercise*, *14*, 125–135. doi:10.1016/j.psychsport.2012.08.004

Wadey, R., Evans, L., Evans, K., & Mitchell, I. (2011). Perceived benefits following sport injury: A qualitative examination of their antecedents and underlying mechanisms. *Journal of Applied Sport Psychology*, *23*, 142–158. doi:10.1080/10413200.2010.543119

Wagnild, G. M. & Young, H. M. (1993). Development and psychometric evaluation of resilience scale. *Journal of Nursing Measurement, 1*, 165-78.

Wagstaff, C. R. D., Sarkar, M., Davidson, C. L., & Fletcher, D. (2016). Resilience in sport: A critical review of psychological processes, sociocultural influences, and organizational dynamics. In C. R. D. Wagstaff (Ed.), *The organizational psychology of sport: Key issues and practical applications* (pp. 120-149). London, UK: Routledge.

Wagstaff, C., Fletcher, D., & Hanton, S. (2012). Positive organizational psychology in sport: An ethnography of organizational functioning in a national sport organization. *Journal of Applied Sport Psychology*, *24*(1), 26-47. doi:10.1080/10413200.2011.589423

Walsh, F. (1996). Family resilience: A Concept and its application. *Family Process, 35,* 261-281.

Watson, N.J., & Nesti, M. (2005). The role of spirituality in sport psychology consulting: an analysis and integrative review of literature. *Journal of Applied Sport Psychology, 17,* 228–239. doi:10.1080/10413200591010102

Watts, S., & Stenner, P. (2005). Doing Q methodology: Theory, method and interpretation. *Qualitative Research in Psychology*, *2*(1), 67–91. doi:10.1191/1478088705qp022oa

Watts, S., & Stenner, P. (2012). *Doing Q Methodological Research: Theory, method and interpretation*. London: Sage Publications.

Weissensteiner, J., Abernethy, B., & Farrow, D. (2009). Towards the development of a conceptual model of expertise in cricket batting: A grounded theory approach. *Journal of Applied Sport Psychology, 21,* 276-292. doi:10.1080/1041320090 3018675.

Werner, E. E. (1989). Children of the garden island. *Scientific American, 260*, 106-111.

Werner, E. E. (1995). Resilience in development. *Current Directions in Psychological Sciences, 4*, 81–85. Retrieved from http://www.jstor.org/stable/20182335

Werner, E. E., & Smith, R. S. (1982). *Vulnerable but invincible*. New York: McGraw-Hill.

Weston, N. J., Thelwell, R. C., Bond, S., & Hutchings, N. V. (2009). Stress and coping in single-handed round-the-world ocean sailing. *Journal of Applied Sport Psychology, 21*, 460–474. doi:10.1080/10413200903232607

White, B., Driver, S., & Warren, A. M. (2010). Resilience and indicators of adjustment during rehabilitation from a spinal cord injury. *Rehabilitation Psychology, 55*(1), 23–32. doi:10.1037/a0018451

White, R. L., & Bennie, A. (2015). Resilience in youth sport: A qualitative investigation of gymnastics coach and athlete perceptions. *International Journal of Sports Science & Coaching*, *10*, 379–393. doi:10.1260/1747-9541.10.2-3.379

White, S. A., & Duda, J. L. (1994). The relationship of gender, level of sport involvement, and participation motivation to task and ego orientation. *International Journal of Sport Psychology, 25,* 4-18.

Williams, B., Brown, T., & Onsman, A. (2012). Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine*, 8. Retrieved from http://ro.ecu.edu.au/jephc/vol8/iss3/1.

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*. doi:10.1017/S0959259810000420.

Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes*, *9*(1), 8. doi:10.1186/1477-7525-9-8

Windle, G., Markland, D. A, & Woods, R. T. (2008). Examination of a theoretical model of psychological resilience in older age. *Aging & Mental Health, 12*, 285–292. doi:10.1080/13607860802120763

Wolff, S. (1995). The concept of resilience. A*ustralian and New Zealand Journal of Psychiatry, 29*, 565–574. doi: 10.3109/00048679509064968

Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of sports sciences*, *21*, 443-457.

Work, W. C, Cowen, E. L., Parker, G. R., & Wyman, P. A. (1990). Stress resilient children in an urban setting. *Journal of Primary Prevention, 11*, 3-17.

Wylleman, P., & Lavallee, D. (2000). A Developmental Perspective on Transitions Faced by Athletes, In M. Weiss (Ed.), *Developmental sport psychology* (pp. 507–527). Morgantown, WV: Fitness Information Technology.

Yancey, A. K., Grant, D., Kurosky, S., Kravitz-Wirtz, N., & Mistry, R. (2011). Role modelling, risk, and resilience in California adolescents. *The Journal of Adolescent Health, 48*(1), 36–43. doi:10.1016/j.jadohealth.2010.05.001

Yanez, B. R., Stanton, A. L., Hoyt, M. A., Tennen, H., & Lechner, S. (2011). Understanding perceptions of benefit following adversity: how do distinct assessments of growth relate to coping and adjustment to stressful events? *Journal of Social and Clinical Psychology, 30*, 699- 721. doi:10.1521/jscp.2011.30.7.699

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: when students believe that personal characteristics can be developed. *Educational Psychologist, 47*, 302–314. doi:10.1080/00461520.2012.722805

Yeager, D. S., Trzesniewski, K. H., Tirri, K., Nokelainen, P., & Dweck, C. S. (2011). Adolescents' implicit theories predict desire for vengeance after peer conflicts: correlational and experimental evidence. *Development Psychology, 47*, 1090-107, doi:10.1037/a0023769.

Yi, J. P., Smith, R. E., & Vitaliano, P. P. (2005). Stress-resilience, illness, and coping: A person-focused investigation of young women athletes. *Journal of Behavioural Medicine, 28*, 257-265. doi: 10.1007/s10865-005-4662-1

Yi, J. P., Vitaliano, P. P., Smith, R. E., Yi, J. C., & Weinger, K. (2008). The role of resilience on psychological adjustment and physical health in patients with diabetes. *British Journal of Health Psychology, 13*, 311–25. doi:10.1348/135910707X186994

Yu, X. N., Lau, J. T., Mak, W. W., Zhang, J., Lui, W. W., & Zhang J. (2011). Factor structure and psychometric properties of the Connor-Davidson Resilience Scale among Chinese adolescents. *Comprehensive Psychiatry*, 52, 218-24. doi:10.1016/j.comppsych.2010.05.010.

Yu, X., & Zhang, J. (2007). Factor analysis and psychometric evaluation of the Connor-Davidson resilience scale (CD-RISC) with Chinese people. *Social Behavior and Personality: An International Journal*, *35*(1), 19-30. doi:10.2224/sbp.2007.35.1.19

Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. New York: Cambridge University Press.

Zuckerman, M., Buchsbaum, M. S., & Murphy, D. L. (1980). Sensation seeking and its biological correlates. *Psychological Bulletin, 88*, 187–214.

Zuckerman, M., Eysenck, S., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross- cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology, 46*, 139–149.