University of Glasgow

Mental Toughness in Scottish Rugby Union

By

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Thesis Abstract

The purpose of this doctoral thesis was to develop a comprehensive understanding of mental toughness within Scottish Rugby Union (SRU). This aim was achieved through a considered and evidence-based analysis of the construct, with the first experimental chapter assessing the levels of mental toughness present within semi-elite and elite rugby union players in Scotland. It was concluded that mental toughness is an important psychological construct associated with rugby union performance, as it discriminated between semi-elite and elite rugby union players. The range in levels of self-reported mental toughness present within this cohort, warrants the development of an effective intervention. The next experimental chapter promoted the use of an interpretative phenomenological approach (IPA) to explore what it means to *be* mentally tough with professional rugby union in Scotland. Participants included players and support staff, conclusions from within this chapter provided a theoretical basis for the subsequent experimental chapters. Rugby specific, mentally tough behaviours were identified from this qualitative analysis and the next experimental chapter sought to identify and measure these mentally tough behaviours. These behaviours were positively correlated with self-reported scores of mental toughness, highlighting the value of measuring psychological constructs using notational analysis. The final experimental chapter investigated the feasibility of the Mindfulness Acceptance and Commitment (MAC) approach to enhance mental toughness in a group of semi-elite rugby union players. Consistent with the view that mental toughness is a complex psychological construct, a feasibility study completed as it was a fundamental step to ensure the success of any future intervention efforts. The development of such an intervention would have a positive impact upon the mental toughness, performance and potentially the mental health of professional rugby players.

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Author's Declaration

I declare that I have carried out all the work submitted herein. Collaborative work is acknowledged where present.

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Conference Presentations Arising from this Thesis

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List of Abbreviations

ACT Acceptance Commitment Therapy

BIG Back in game

BL Balanced loss

BTE Beating teammates to events

BW Balanced win

95% CI 95 percent confidence interval

GPS Global Positioning Systems

IPA Interpretative Phenomenological Analysis

MAC Mindfulness Acceptance Commitment

MMA Mixed Martial Arts

MTQ48 Mental Toughness Questionnaire-48

MTI Mental Toughness Index

PCP Personal Construct Psychology

PCT Personal Construct Theory

PPI Psychological Performance Inventory

PST Psychological Skills Training

SD Standard Deviation

SDT Self-Determination Theory

SMTQ Sports Mental Toughness Questionnaire

SRU Scottish Rugby Union

UL Unbalanced loss

UW Unbalanced win

1. General Introduction

1.1 The Psychological Demands of Rugby Union

Professional rugby union is an intermittent, high-intensity, collision sport that calls for periods of maximal strength and power, interspersed with episodes of lower intensity aerobic activity and rest (Cunniffe, Proctor, Baker, & Davies, 2009). The move from amateur to professional status in 1995 marked a paradigm shift in the performance demands placed on rugby union players. The scrutiny of player performance and physical demands of the game have increased. Time-motion analysis has suggested that players cover between 4.5km-7km on average, of which 300m-800m is covered as high-intensity running (>14.4km.hr-1) and sprinting (>25km.hr-1). Match demands also include multiple elements of contact (e.g. rucking, tackling) which add to the physical stress experienced (Dubois et al., 2017). Global Position Systems (GPS) and video-coding practices are now commonplace in rugby, from professional through to age-grade and club level standard. As a result, the physiological demands of the game are well understood, conversely there have been few peer-reviewed attempts to understand the psychological demands associated with rugby union. As a result our understanding of these demands are limited (Quarrie et al., 2017).

Of the limited empirical efforts that exist, there have been a number of important conclusions reported. Within a cohort of elite players from Ireland, injury, mental error, physical error and performance worries emerged as seminal stressors. It was also concluded that more stressors where reported during periods when higher profile games were taking place. This conclusion provides a rationale for increased psychological support to elite rugby players, who are frequently involved in games of this nature (Nicholls, Holt, Polman, & Bloomfield, 2006). This knowledge was extended upon within a group of English semi-elite players, as they reported the additional stressors of receiving parental and coach criticism (Polman, Nicholls, Cohen, & Borkoles, 2007). This finding highlights the importance of context when considering stressors that are seminal within a particular cohort. Nicholls and colleagues (2009) then completed a follow up to their earlier work, with an investigation into possible non-sport

stressors. They examined mood and stressors of semi-elite rugby players, with their findings suggesting that diet, sleep, and travel all contributed to experiences of stress. Other researchers have shown that semi-elite ruby union players, despite reporting better psychological stress profiles, still lack the capacities to deal with stress (Hartwig, Naughton, & Searl, 2009). An inability to cope with this stress may have potentially deleterious effect of stress on a player's performance and participation in sport (Lazarus, 2000).

There has been evidence of burnout within professional rugby union, as players are unable to cope with the associated sport and non-sport stressors. Semi-elite players suggested that efforts to enhance stress management should target both sport and non-sport stressors (Eklund & Cresswell, 2007). In a follow up study, it was concluded that the key symptom to experiences of burnout was the individual's perception of their resources, and the ability of these resources to cope with the demand (Eklund & Cresswell, 2007). Thus, there is an empirical and practical need to understand psychological qualities that may assist in developing the player's resources to cope with the demands of professional rugby union. To date, there is dearth of research with respect to psychological qualities that promote success within rugby union. This is a somewhat surprising gap that exists in the contemporary literature, as performance success in rugby union has been shown to differentiate depending on a player's psychological qualities and effective use of mental techniques (Andrew, Grobbelaar, & Potgieter, 2007; Tanaka & Gould, 2015)

Increasing the coping capacity of rugby union players is of paramount importance to those working within the sport, as there is a need for elite players to develop the resources that allow them to cope with the sport and non-sport stressors they will inevitably face. With the knowledge that these stressors, and management of the associated stress, plays a vital role in allowing players to be successful, support to players should be structured accordingly in an effort to enhance a nation's performance outcomes. One such psychological construct that has been identified as an important with respect to rugby union

performance, is the concept of mental toughness (Holland, Woodcock, Cumming, & Duda, 2010).

1.2 Mental Toughness: The Research Narrative

Mental toughness is the most used, but least understood term used in sports psychology (Crust, 2008). The concept has populated contemporary sporting discourse and it has been reported that mental toughness captures "the very essence of sport psychologists work with elite athletes" (Jones, Hanton, & Connaughton, 2002, p. 213). A number of important debates currently exist within the mental toughness literature, and before discussing the concept in more detail, it is important to outline the central aspects of each position. The dimensionality of mental toughness has been contested, with empirical discussions centring on whether mental toughness is multidimensional or unidimensional. Clough and colleagues (2002) 4Cs conceptualisation of mental toughness, views the concept as a multidimensional one, consisting of the distinct, yet related dimensions of Confidence, Commitment, Control and Challenge. Conversely, the work of Gucciardi and colleagues (2015) promotes mental toughness as a unidimensional concept, suggesting it is a resource caravan that can vary across situations and time. The distinctiveness of mental toughness has also been debated. The construct has been described as an umbrella term and linked to a number of positive psychological concepts (Gucciardi, 2017). This has led to the blurring of conceptual lines, fuelling a debate on the discreteness of the term. Two central concepts that have been employed as synonyms for mental toughness, are that of resilience and grit. While acknowledging mental toughness shares similarity with both of these concepts, in that they promote positive adaptations, researchers within the field have made clear distinctions between them.

With respect to resilience, this concept relates to an individual's reactions to risk and stress (Luthar et al., 2006). Mental toughness not only accounts for behaviours associated with these demands, it also includes the proactive tendencies of individuals to seek out challenges for personal growth. Thus mental toughness, unlike resilience, captures both proactive and reactive experiences (Lin et al., 2017; Gucciardi, 2017). The concept of grit has also been likened to mental toughness, with researchers again highlighting seminal differences between the constructs. Grit has been conceptualised as

dispositional in nature, consistent with Clough's (2002) model of mental toughness, although more recently evidence has revealed that mental toughness varies within individuals, across situations and over time (Weinberg et al., 2017). Another difference that has been evidenced, centres on the basis that grit is concerned primarily with a singular goal and its associated behaviours (Duckworth, 2016), whereas mental toughness encompasses multiple, and potentially conflicting goals (Gucciardi, 2017). It is essential for research within the field of mental toughness to maintain this delineation, and there is strong evidence of this within the extant literature. Thus, the aims of the thesis do not seek to offer an opinion on this debate. Another seminal issue, that this thesis will examine, is the lack of a valid and reliable measure of mental toughness. The lack of such an instrument is proving obstructive to the advancement of the construct. A comprehensive description of the issues associated with measuring mental toughness have been detailed within Chapter 4.

Another important discussion within the mental toughness literature is grounded in the degree with which the construct is inherited or changeable through a targeted intervention. On one side of the debate, mental toughness is viewed as a personality trait, which determines how individuals deal with stressors, pressure and challenges, irrespective of the prevailing situations (Strycharczyk & Clough, 2012). This stance has softened over time, to acknowledge that variation in mental toughness can be accounted for by environmental factors and that the construct is subject to some level of change (Lin et al., 2017; Horsburgh, Schermer, Veselka, & Vernon, 2009). Opposed to this, is the argument that mental toughness is taught through psychological skills training and social experiences (Gordon, 2012; Gucciardi et al., 2009). This view that mental toughness is state like, was fuelled by conclusions that suggested it could be developed through targeted interventions (see Bell et al., 2013) and through positive youth experiences (Gould et al., 2011; Gucciardi & Jones, 2012). More recently research has revealed that mental toughness is subject to within-person variability (Gucciardi, 2017; Weinberg et al., 2017), and this conclusion has led to Cooper and colleagues (2019) dividing mental toughness into capacity and functional mental toughness. Capacity mental toughness can be seen as the level of mental toughness that you are born with and functional mental toughness

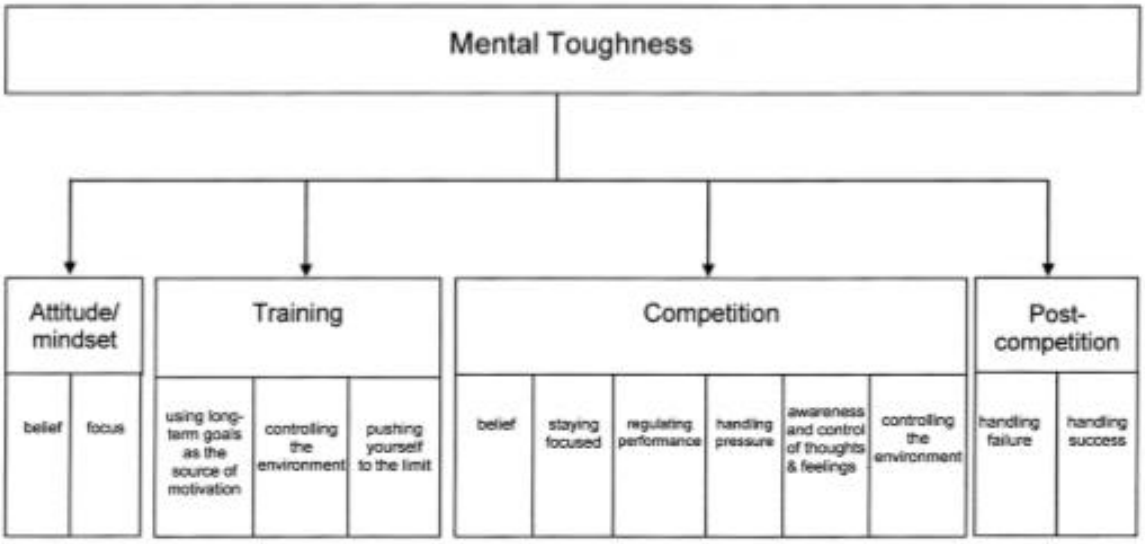
should be viewed as the amount of that capacity that you can use at any given time. Dividing mental toughness in this way provides a succinct and clear vision of the construct, which acknowledges there are generic inherited factors, along with aspects which are changeable through a targeted intervention. This conceptualisation, in turn, opens exciting opportunities with respect to developing the construct that will be explored within this thesis.

Two early conceptualisations of mental toughness dominated the mental toughness landscape. From interviews with key stakeholders, Jones et al., (2002) sought to capture a more robust understanding of mental toughness, with much of the literature up until this point being descriptive in nature. An inductive thematic analysis with elite performers from a variety of sports, including rugby union, led to the identification of several key attributes of mentally tough athletes. These attributes included an unshakable self-belief, an ability to bounce back from setbacks and an ability to remain fully focused on the task at hand. These conclusions support the view of mental toughness as an umbrella term, which appears to encapsulate many positive psychological attributes.

Clough and colleagues (2002) presented an alternative conceptualisation of mental toughness. Analysis of qualitative data with key stakeholders revealed a concept similar to that of Hardiness (Kobasa, 1979), as mental toughness is comprised of: (1) Challenge, which denotes the extent to which we view change as an opportunity for self-development, and not as threat. (2) Commitment, which reflects how we set and respond to goals. (3) Emotional-control, that indicates how in control of our emotions we are and how much of them we show. (4) Life-control, which represents the tendency with which we feel we can influence the world around us. (5) Confidence in abilities, that indicates our sense of self-belief and lack of need for external validation. (6) Interpersonal-confidence, which is one's ability to interact others (Clough, Earle, & Sewell, 2002).

Extending upon their earlier research that reported a number of key attributes of mentally tough performers, Jones and colleagues (2007) included support staff and sports psychologists in their cohort, as they sought to advance our understanding of mental toughness. They developed a framework that consisted of 30 attributes that underpin the mental toughness, across four separate dimensions of attitude, training, competition and post-competition. The production of such a framework was a seminal step within the mental toughness research narrative. From the framework, it is clear that mental toughness exists out with the individual and this supported the emerging literature promoting the influence of context in our understanding of what it means to *be* mentally tough. Bull and et al., (2005) and Thelwell et al., (2005) employed a qualitative methodology to understand mental toughness from the coaches and athlete's perspective, with the aim of understanding how they made sense of mental toughness within a particular sporting environment. They noted that mental toughness encompasses an interaction of the environment with the character, attitudes, and thinking of players. Despite these conclusions, future investigations continued to seek to understand the concept from a multi-sport standpoint.

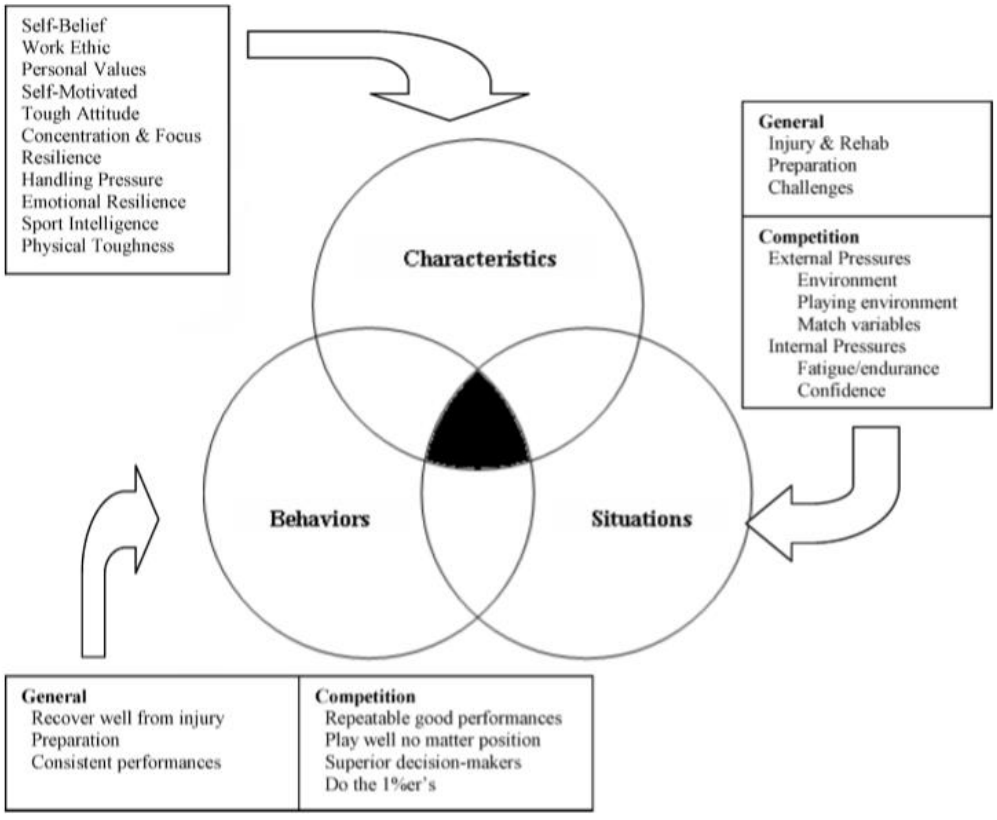
Figure 1. The mental toughness framework developed by Jones, Hanton and Connaughton (2007)



One such approach that did acknowledge the need to take a sport-specific approach was that of Gucciardi, Gordon and Dimock (2008), who made a number of breakthroughs as they sought to develop an understanding of mental

toughness within Australian football. With the increasing volume of research devoted to mental toughness, this work offered a refreshingly scientific approach to developing an understanding of the concept. Gucciardi and colleagues made a conscious effort to be guided by theory, as their qualitative analysis was grounded in personal construct psychology (PCP; Kelly, 1991). In PCP, the authors also adopt a framework that is cognisant of previous research. They sought to investigate the participant's experiences as the influence of context had been promoted, when seeking to understand mental toughness. The evidenced-based nature of this approach led to the generation of impactful conclusions, namely the development of a sport-specific model of mental toughness, an inventory that measures mental toughness and the development of an intervention that sought to enhance mental toughness.

Figure 2. A model of mental toughness in Australian Football developed by Gucciardi, Gordon and Dimock (2009).



When considering the model presented above, there is a sense that many factors influence mental toughness, indeed this is a common finding from within the literature (see Gucciardi & Gordon, 2011). The multifaceted nature of the construct shares commonalties with the determination of a complex psychological construct, detailed by Connaughton, Hanton, Jones and Wadey

(2008). The research attempts of Gucciardi and colleagues noted above, represent attempts that are consistent with this view. Gucciardi, Gordon and Dimock (2009) also suggested a contemporary definition of the concept, as they described mental toughness as:

> A collection of values, attitudes, behaviours, and emotions that enable a rugby player to persevere and overcome any obstacle, adversity, or pressure experienced, but also to maintain concentration and motivation when things are going well to consistently achieve their goals. (Gucciardi, Gordon & Dimock 2009, p. 191)

There have been similarly rigorous efforts to conceptualise mental toughness form a behavioural perspective. This seminal research was conducted in response to a lack of understanding that still existed with respect to what mental toughness *is*. Hardy, Bell and Beattie (2013), recognised that to understand different cognitions, attitudes, and emotions associated with mental toughness, researchers must firstly know when mentally tough behaviour has taken place. In taking this novel view, while guided by reinforcement sensitivity theory, they concluded that mentally tough players tended to be sensitive to punishment cues. They found this unsurprising, but suggest that individuals who are sensitive to punishment are predisposed to pick up threat early, and this provides them with the time to plan and cope with pressure situations. The manifestation of this, being mentally tough behaviour. These conclusions advance literature around mental toughness and once again promote the value of research that adopts scientific principles.

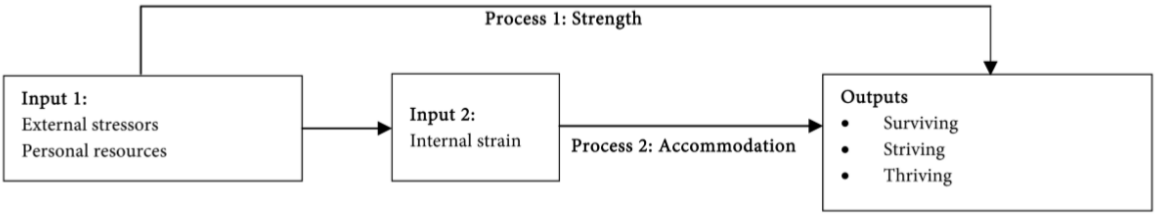
At this stage in the research narrative, a more evolved view of mental toughness began to emerge. It had been hinted at previously, within the four dimensions of Jones (2007) framework and the situations piece within Gucciardi and colleagues (2009) model of mental toughness. It is clear that elements of the sporting experience play a leading role in understanding what mental toughness *is*. Caddick and Ryall (2012), in their review of the literature, suggest that mental toughness is simply a reflection of the sporting culture. They view mental toughness as pseudoscientific construct, it is just an ideology derived from success in elite sport. The evidence presented up until this point in the research narrative suggests that there is more to the concept that being just a reflection

of elite sporting culture, thought this commentary did encourage researchers to investigate the space around the athlete, when seeking to understand mental toughness.

Research that followed pursued this research direction and viewed mental toughness through an experiential lens, as Mahoney et al., (2014) employed Bronfenbrenner's (2001) bio-ecological model to explore mental toughness. They suggest that mental toughness, and its associated characteristics, are developed through lived experiences. The authors made novel contributions to the research narrative as they identified that social intelligence and support seeking where importance aspects of what it means to *be* mentally tough. This study can be considered seminal as it employed established theory and subscribed to the idea that mental toughness existed out with the individual. Extensions of these conclusions soon followed with two assessments from within Australian football. Tibbert et al., (2015) suggested that researches may be have been misguided in assessing the attributes of mentally tough performers, as they suggested that mental toughness is defined by what the subculture determines it as. They made these inferences based on their analysis of a player within Australian football who, to be viewed as mentally tough, needed to embrace the norms, traditions and ideals of the football culture present. Again, within Australian football, Coulter and colleagues (2015) found mental toughness to be a socially derived term marked by unrelenting standards and sacrificial displays. In this sense, players are judged to be mentally tough if they are perceived as a performer who conforms to the values present. These assumptions mean that researches will struggle to understand mental toughness if they do not pay attention to contextual norms related to the term.

These conclusions led Sorensen, Schofield and Jarden (2016) to adopt a systems approach to conceptualise mental toughness. The authors developed a model of mental toughness that included processes and outputs of the concept shown in Figure 3.

Figure 3. A systems-approach model of mental toughness developed by Sorensen, Schofield & Jarden (2016).



Sorensen and colleagues acknowledge that any efforts to develop a performer's personal resources will develop their mental toughness. This conceptualisation moves away from the restricted focus of mentally tough characteristics, but also acknowledges the emerging view that mental toughness is bound by meaning. Based on their conclusions, they suggest that intervention strategies such as Acceptance Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) may promote processes of strength that underlie mental toughness, thus developing it. Experiences of mental toughness are important in the development and understanding of what the construct is, and others have shared this view. Antony and colleagues (2018) suggest that researches have not paid enough attention to the sporting environment and so cannot fully capture and understand mental toughness. They suggest that future research needs to adopt a wider perspective and make use of methodologies, such as phenomenology, to comprehend what it means to *be* mentally tough. These the culturally rich accounts of the performer's lived experiences may offer a number of impactful conclusions that will move our understanding of mental toughness forward, and closer to the development of an intervention that enhances mental toughness.

The focus of this thesis will be to investigate this construct within a sporting setting, although it is worth acknowledging the literature that exists out with sport, as the stress buffering of capabilities of mental toughness have also been noted within an occupational and educational setting. The presence of stress, in some ways, characterises these environments. Within an educational context, students may experience stress from a variety of sources associated with their learning (see Suldo et al., 2008). Similarly, within an occupational setting, researchers have noted that long work hours and high work intensity, which are common within today's workplace society, are likely to be significant contributors to sources of work stress (Basu, Qayyum & Mason, 2017). The ability to cope with these intense and varied demands, is at the heart of many

conceptualisations of mental toughness, thus it would appear to be a valuable construct within these environments (see Clough et al., 2002; Jones et al., 2007: Gucciardi et al., 2015). In a review of the literature, Lin et al., (2017) concluded that mental toughness has a clear, positive impact on performance within these domains and can facilitate achievement in a variety of settings.

A number of studies have revealed that the positive outcomes associated with mental toughness, do generalise across to an educational setting. Crust and colleagues (2014) highlighted that undergraduate students who showed higher levels of mental toughness, had significantly higher academic performance than those with low levels of mental toughness. Students with lower levels of mental toughness were also more likely to drop out of their undergraduate course, suggesting a lack of ability to cope with the demands of tertiary education. In support of these findings, academic attainment and attendance have also been found to have significant, positive association with mental toughness (St Clair-Thompson et al., 2015). Within a cohort of undergraduate students, mental toughness was also positively associated with other important correlates of academic performance, as it was responsible for explaining 35-64% of variance in psychological wellbeing, (Stamp et al., 2015). It is clear then that mental toughness is a valuable resource within an educational domain, and these conclusions have also been mirrored within an occupational setting.

In a group of service men and women, mental toughness was found to be significantly, negatively related to perceived stress and thus would facilitate enhanced workplace performance (Ward, St Clair-Thompson & Postlethwaite, 2018). This positive association with performance has been further evidenced within the workplace, as Marchant and colleagues (2009) revealed how mental toughness varied significantly between different managerial positions. In a cohort of managers, senior managers displayed the highest levels of mental toughness, followed by middle managers, junior managers and then clerical staff. Along with performance, the concept has been positively related to life satisfaction and negatively related to depressive symptoms, within employees. As result, efforts to enhance mental toughness could reduce days lost to stress,

along with enhance staff performance and wellbeing (Gerber et al., 2013). Other aspects of mental toughness also advocate that the concept would be of interest to those working in educational and occupational settings. Commitment and confidence are considered key aspects of many conceptualisations of mental toughness (see Clough et al., 2002; Jones et al., 2007), both have been positively associated with academic achievement (Sheard, 2009; Al-Hebaish, 2012). Considering the evidence presented above, in conjunction with the empirical activity that has taken place within a sporting domain, it is clear that mental toughness is an important concept for those that are working within a stressful environments. It would also appear that mental toughness, as a construct, does generalise across performance contexts. It is evident that the concept incorporates a number of personal characteristics that, in combination, allow individuals, regardless of performance context, to regularly perform to their abilities.

Detailed above are a number of seminal studies within the mental toughness literature that generated impactful conclusions, which informed future research. These inferences are fostered from applying scientific principles to the study of mental toughness. As highlighted within this research narrative, the multifaceted nature of mental toughness is consistent with an understanding of a complex psychological construct and researchers should treat mental toughness as one. In light of this, researchers must be rigorous in their assessment of the concept if they are to continue advancing this research narrative. Taken together, the successful studies above outline a clear investigatory strategy that begins with a qualitative assessment of the concept, before analysing mentally tough behaviour to support this understanding, before then seeking to develop an intervention that is effective at enhancing mental toughness. Such a strategy represents a robust and complete analysis of mental toughness.

1.3 Statement of the Problem

Scottish Rugby Union has a participation 'debt' when compared to other leading rugby playing nations (World Rugby, 2016). These participation statistics present the Scottish Rugby Union (SRU) with a competitive challenge, as nations with higher playing populations tend to be more successful in international competition (Foster, James & Haake, 2010). In an effort to remain competitive on the world stage, the SRU must provide an expert, talent development pathway (Hancock & Côté, 2014). Stressors and the associated stress is ubiquitous within elite sports, and the domain of professional rugby union is no different. To maximise their relatively small talent pool, those interested in supporting the SRU's vision of being competitive on the world stage must prepare performers appropriately for the stressful situations and circumstances that are prevalent within a professional rugby environment.

Mental toughness has emerged as psychological construct that has positive associations with performance in rugby union (Woodcock et al., 2011). Despite these positive associations, and the substantial empirical activity that surrounds the concept, mental toughness is not a well understood term in sport psychology (Gucciardi, 2017). To address this, mental toughness must be viewed as complex psychological construct and its development has many influencing factors that must be considered in the development of a complete intervention (Connaughton, Hanton, Jones & Wadey, 2008). Consistent with this, efforts to measure, understand and develop mental toughness must be guided by evidence-based practice. With respect to measuring the concept, this includes the adoption of the empirically supported inventories that are psychometrically sound. In understanding mental toughness, there is a need to be guided by theory and address calls for novel approaches to develop a greater understanding of mental toughness (Anthony, Gucciradi & Gordon, 2018). Researchers have often employed a thematic analysis that has not been guided by existing theory, and this fairly myopic approach has not produced empirical conclusions that have advanced our understanding of mental toughness (Fawcett, 2012).

The culturally specific nature of mental toughness (Tibbert et al., 2015) dictates that this contextual understanding, both qualitative and quantitative, must be in place for before any intervention efforts are contemplated. The need to understand mental toughness in situ, twinned with the view that it is a complex, psychological construct suggests the completion of a pilot study is an essential step in the development of an effective intervention. The purpose of conducting a pilot study is to evaluate the feasibility of recruitment, retention, procedures, and implementation of a novel intervention, all in an effort enhance the probability of success in the subsequent efforts (Leon et al., 2011).

The lack of rigour and subsequent lack of knowledge that has plagued the mental toughness literature, offers further emphasis for researchers to take a more considered approach. In practice, an approach of this nature includes a rigorous qualitative and quantitative assessment of mental toughness, before employing this information to begin developing an effective intervention that enhances mental toughness. Conclusions from this extended, yet more objective research narrative have the ability to generate some highly impactful conclusions for practitioners. Ultimately, such a research narrative would serve the development of effective psychological support within Scottish Rugby and back the SRU's vision of being competitive on the world stage. This thesis represents the next logical step within the research narrative of mental toughness, in a previously unreported sport that would benefit from understanding how mentally tough players are, what it means to *be* mentally tough and ultimately develop an intervention that enhances mental toughness within this population.

2. Mental Toughness within Scottish Rugby Union: Profiles of Elite and Semi-Elite Male Players

2.1 Introduction

The domain of high-performance sport has been acknowledged as a highly demanding workplace, where there are non-traditional working practices and often frequent organizational change (Fletcher & Hanton, 2003). The environment of professional rugby union has been acknowledged as one that is consistent with this demanding workplace, indeed professional rugby players have reported a multitude of stressors, that include injury, mental error, physical error, diet, home-life and sleep (Nicholls, Jones, Polman, & Borkoles, 2009; Polman et al., 2007). Despite the psychological challenges that players face, peer-reviewed studies assessing the psychological demands present within rugby union are scant. As a result, there is limited understanding of the psychological skills that enable success in the sport (Quarrie et al., 2017). This is a somewhat surprising gap that exists in the literature, as psychological skill usage has been shown to predict superior performance outcomes (Birrer & Morgan, 2010). Indeed, performance success in rugby union has been shown to differentiate depending on a player's psychological qualities and effective use of mental techniques (Andrew et al., 2007; Tanaka & Gould, 2015). Taken together, we can assume that the ability to manage stress and stressful situations, is of critical importance for today's professional rugby players.

Cognitive-transactional stress theory proposes that stress is determined through a cognitive appraisal. Individuals will evaluate the internal or external demands of a situation, against their personal resources and ability to cope with those demands. If they deem the demands of the situation to be high, they will see the situation as a stressor. If they perceive the stressor to be greater that their coping resources, the resulting in-balance can lead to feelings of stress (Lazarus & Folkman, 1984). Stressors, and the associated stress, are ubiquitous within elite sport environments. Players must develop an ability to cope with the demands they face, if they are to maintain a high standard of performance

(Lazarus, 2000). Within professional rugby union, players that perceive the situational demand to be greater than their personal coping resources, have been shown to experience burnout and a decrease in performance (Eklund & Cresswell, 2007). Collectively then, it can be suggested that coping with stress is key to allow professional rugby union players to pursue performance excellence. Identifying psychological qualities that can positively influence this ability to cope with stress, would be of great significance to those working in professional rugby union. One such psychological resource that has been associated with stress management, is that of mental toughness.

2.1.1 What is Mental Toughness?

Mental toughness has been frequently cited as an important psychological construct associated with optimal sporting performance (Connaughton, Hanton, & Jones, 2010). Early investigations into the concept were qualitative in nature and involved interviews with athletes and coaches, with the aim of better understanding mental toughness and how it develops. In their assessments, which included professional rugby players, researchers identified several key attributes of mentally tough athletes. These included unshakable self-belief, an ability to bounce back from setbacks and an ability to remain fully focused on the task at hand (Jones et al., 2002; Potgieter & Fourie, 2001). These conclusions support the view of mental toughness as an umbrella term, which appears to encapsulate many positive psychological attributes.

This accumulation of information regarding mental toughness has made agreeing upon a single definition of the construct challenging (Andersen, 2011). Despite this lack of agreement, there is an understanding that mental toughness is a state-like psychological resource that is purposeful, flexible, and efficient Gucciardi, (2017), and it enables athletes to manage obstacles, distractions, pressure and adversity from a wide range of stressors (Clough & Strycharczyk, 2012). The plethora of published material on mental toughness has also made conceptualising the construct problematic, but one such conceptualisation that reflects the multi-dimensional nature of mental toughness is that of Clough and colleagues (2002). Through interviews with athletes, coaches, and sport

psychologists, they promoted a model of mental toughness that had conceptual links with Hardiness (Kobasa, 1979). This model includes six factors; *control*, made up of *emotional control* and *life control*, *challenge*, *commitment* and *confidence*, which is made up of *confidence in abilities* and *interpersonal confidence*. Control denotes the feeling of being influential, with life control being the feeling of taking charge in one's life, and emotional control, managing one's emotions. Challenge refers to the inclination to perceive barriers and change as opportunities to grow, rather than a threat. Commitment involves striving for success and persisting with goal attainment. Confidence in one's abilities is made up of confidence in abilities, which encompasses believing in one's abilities to perform, and interpersonal confidence, being competent in social contexts. Based on this conceptualisation, mentally tough players may be able to cope with stress more effectively because they feel more in control of their lives and their emotions, they perceive difficult situations as an opportunities to improve, they have an ability to stay committed when confronted with adverse circumstances, and they believe in their abilities. The 48-item Mental Toughness Questionnaire (MTQ48; Clough et al., 2002) is the accompanying self-report measure used to assess these components of mental toughness.

The surge in empirical attention that mental toughness has received, is in part down to the capacity for this concept to be amenable to change. A number of intervention studies have evidenced this, with one of the more rigorous efforts being that of (Bell, Hardy, & Beattie, 2013). The primary objective of their longitudinal intervention was to provide the players with opportunities to practice dealing with pressure, by exposing players to punishment conditioned stimuli. The intervention group demonstrated significant improvements in mental toughness when compared with the control group, which supports the view that we can enhance mental toughness. Based on the success of interventions that aimed to enhance mental toughness, it would be prudent to report the levels of mental toughness that are present, to determine if an intervention is required and effectively design that intervention.

In developing a greater understanding of mental toughness, researchers suggested the concept is contextually bound and sport specific. Seminal work by Bull, Shambrook, James, & Brooks, (2005) concluded that assessments of mental toughness in sports, such as rugby union, warrant investigation in their own right. In support of this conclusion, differing levels of mental toughness have been reported in basketball, cross country, riflery, swimming, tennis, and golf (Solomon, 2015). In addition to this, our understanding of what it means to be mentally tough appears to differ depending on culture (Coulter, Mallett, & Singer, 2016) and this is sensitive to differences in nationality (Gucciardi & Jones, 2012). Mental toughness has also been shown to differ across positions within team sports, indeed, (Asamoah & Grobbelaar, 2016) found positional differences in mental toughness, within a group of male football players, with forwards reporting lower levels of mental toughness, compared with defenders and midfields. To date, there is a paucity of research investigating differences in mental toughness, based upon position in rugby union. The sport of rugby union possesses varying positional demands, and these demands have been reflected in positional differences when considering psychological skills usage (Andrew et al., 2007). In light of this information, mental toughness assessments across several levels of competition, should be completed within one population, one sport and across all positions. By employing this strategy, the influence of these confounding factors would be minimised, and more robust conclusions could be drawn from the relationship between mental toughness and performance.

The concept of mental toughness has been associated with several psychological strategies such as such as self-talk, emotional control and relaxation strategies (Crust & Azadi, 2010). Constructs such as resilience, emotional intelligence and motivation have also been linked to mental toughness, they have been promoted as facilitating mentally tough individuals to excel within stressful performance situations (Nicholls et al., 2015). Based on these positive associations, one would postulate that those who report greater levels of mental toughness would reach higher levels of performance. This has been assumption has been evidenced in a cohort of swimmers, whereby mental toughness was associated with faster swim times (Beattie, Alqallaf & Hardy, 2016). There is currently no published

literature that investigates performance level and mental toughness in rugby union, as a result our understanding of this relationship is lacking.

2.1.2 Mental Toughness and Performance

When the physical, technical and tactical aspects of performance are matched, mental toughness has been promoted as the psychological differentiator between players competing at various competitive standards. In a recent review, it was suggested that 70% of the extant quantitative literature indicates that mental toughness is able to discriminate between players at different performance level (Cowden, 2017). Findings from the qualitative literature also provides substantial support for this perspective, indeed an early definition highlighted the ability of mental toughness to allow players to cope and perform better than their opponents (see Jones et al., 2002). Statistical support for this performance relationship has been provided in non-sport performance domains, such as education and employment (Lin, Mutz, Clough, & Papageorgiou, 2017). Confirmation of this relationship within sporting settings remains elusive. This empirical ambiguity may be a consequence of the current literature adopting inconsistent definitions of athlete groups. This is an issue that exists out with just the mental toughness literature, and recent research has sought to address this inconsistency. Scholars are encouraged to classify the participants included in their cohort, in line with the standardised classification descriptions promoted by Swann, Moran, & Piggott, (2015). In doing so, accurate levels of mental toughness can be determined between athletes within the same performance level.

One of the fist numerical assessments examining this performance relationship was conducted by (Crust & Clough, 2005). They found that weight holding performance was positively correlated with levels of mental toughness, in a cohort of sports students. These efforts have been replicated within sporting populations, whereby the level at which the athlete competes, is used as a proxy for performance. Golby and Sheard (2004), demonstrated that international players reported significantly higher levels of mental toughness compared to players competing below them. These conclusions must be treated with caution,

as these authors employed a self-report measure that lacked psychometric integrity. There have been similar peer-reviewed studies that have employed more robust self-report measures.

Scholars have provided evidence supporting this positive relationship with performance, as international athletes reported significantly higher levels of mental toughness compared with their counterparts competing at a lower level (Meggs, Ditzfeld, & Golby, 2014; Sheard, Golby, & van Wersch, 2009). In a cohort that included rugby players, Crust & Azadi (2010) found that players of a county standard and above, reported significantly higher levels of mental toughness than club athletes. Conversely, some authors have reported no differences in mental toughness between different levels of competition (Crust, 2009; Nicholls, Polman, Levy, & Backhouse, 2009). Despite the use of robust self-report measures, it is still uncertain if greater levels of mental toughness results in greater performance outcomes. This may be a consequence of these studies including participants from a variety of sports. The efficacy of recruiting a multi-sport cohort in the analysis of mental toughness has been questioned. Not only is mental toughness viewed as sport specific (Bull et al., 2005), making comparisons between sports troublesome, but it has been suggested that mental toughness develops over time, through an athlete's experiences and opportunities in sport (Buhrow et al., 2017). From the early seminal work of Thelwell and colleagues (2005), it has been postulated that a player's mental toughness develops through the different experiences and environmental influences they encounter. If mental toughness is grounded in the player's own experiences, and assuming athletes from a variety of sports are likely to have been exposed to vastly different experiences, it is logical to investigate sports on an individual basis (Crust, 2008).

Mixed martial arts (MMA) athletes competing at a professional level scored significantly higher in mental toughness, compared with amateur and semi-professional athletes (Chen & Cheesman, 2013). The positive influence of mental toughness on competitive standard has also been evidenced in football players. Male footballers who play, or had played internationally, reported significantly

higher mental toughness scores than players who had not (Wieser & Thiel, 2014). Within female football, those playing in the elite league reported significantly higher total mental toughness scores than players in the lower leagues (Danielsen, Giske, Høigaard, & Rodahl, 2017). This positive relationship with performance level also exists within endurance events, as ironman competitors reported higher levels of mental toughness than standard distance triathletes (Meggs, Chen, & Koehn, 2019). However, research does not support this assumption across all sports. There were no reported differences in mental toughness between super-elite and elite fencers (Ghasemi, Yaghoubian, & Momeni, 2012), yet within a study of kick boxers, mental toughness *was* found to discriminate between winners and losers (Slimani, Miarka, Briki, & Cheour, 2016). It is clear then that intra-sport comparisons still fail to confirm the relationship between mental toughness and competitive standard. To date, no research has investigated this relationship within rugby union and a study of this nature may further our understanding of the role of mental toughness in performance.

Interpreted collectively, research that investigates the relationship between mental toughness and an athlete's level of competition, should employ robust measures, within one sport and within one nationality. It is worth noting that there are a number of physical and psychological skills that may impact upon the level of competition an individual may reach. There is evidence to suggest the strong influence of mental toughness in determining sporting success, but to date the levels of mental toughness across Scottish Rugby Union have yet to be reported. By bridging this gap in the literature, it may be possible to provide novel insights into the relationship between mental toughness and performance. The identification of psychological skills cognisant to the demands of each playing position and performance level, would be considered valuable information regarding future interventions that target enhancing a player's performance.

2.1.3 Mental Toughness, Age and Experience

The construct of mental toughness has been promoted as a collection of trait-like features that can be considered malleable over time (Lin et al., 2017). The early qualitative investigations into the concept noted that mental toughness develops over time, through a variety of experiences. They concluded that those older, more experienced, player's possessed greater levels of mental toughness (Thelwell, Such, Weston & Greenlees, 2010; Thelwell, Weston, & Greenlees, 2005). This assumed relationship with age and experience, is it yet to be confirmed in contemporary quantitative research.

Some authors have provided evidence of the positive influence of age and experience on levels of mental toughness. Gucciardi et al., (2010) grouped participants according to their reported levels of mental toughness, they concluded that players in the high mental toughness group had significantly greater playing experience than the moderate group. Gucciardi found no significant relationship between these mental toughness groups and age, although this relationship has been reported elsewhere. In a cohort of wrestlers, self-reported mental toughness was positively correlated to age but not sporting experience (Drees & Mack, 2012). These conflicting results may be a result of the self-report measures employed by these studies, as they both lacked psychometric support, or a novelty present within two varying sporting disciplines.

Scientific investigations employing more robust measures have offered some support for the positive correlation between age, experience and reported levels of mental toughness. In athletes from a variety of sports, both age and years of experience have been shown to significantly influence total mental toughness and the challenge, life control and commitment sub-dimensions of the MTQ48 (Nicholls, Polman, et al., 2009). In juxtaposition to this, Solomon (2015) conducted an exploratory investigation of mental toughness in a variety of college athletes, employing the same self-report measure. Athletes were divided into two groups based on years of playing experience, those with one to nine

years were compared to those athletes with ten or more years of experience. No differences in mental toughness were reported.

When assessing single sport studies, conclusions relevant to this relationship are still not clear. Within a cohort of endurance athletes, it has been reported that levels of mental toughness are positively associated with demographics such as age, and sports characteristics, such as years competing (Zeiger & Zeiger, 2018). Within a football academy, differences were found between the U16s and U19s, with the older players possessing significantly greater levels of mental toughness (Guillen & Santana, 2018). Although previously, Crust and colleagues (2010) concluded that older and more experienced academy football players do not possess higher levels of mental toughness than younger, less experienced players. Drawing on the conclusions above, it is not yet possible to confirm the positive influence of age and experience on reported levels of mental toughness. There is an absence of research investigating this relationship within rugby union. A study addressing this gap in the literature may offer novel conclusions and extend our understanding of this relationship between age, experience and mental toughness.

2.1.4 Aim

Mental toughness has been identified as an important personal resource for managing stress (Gerber et al., 2013). The ability to manage stress is particularly significant within professional rugby union, where players experience a number of non-sport and sport stressors. Despite this relevance within professional rugby union, scholars have yet to allocate a significant amount of time to understand mental toughness in the sport. To date, the levels of mental toughness that are present within Scottish Rugby Union have not been reported and we do not know if mental toughness will distinguish between rugby players operating at different levels of competition. The potential insights from this research are highly impactful, they will provide the basis for an effective intervention and also provide additional evidence that mental toughness can positively influence performance.

Therefore, the purpose of this study was to explore the levels of mental toughness within the players within Scottish Rugby Union and this research has three aims. Firstly, to report the current profiles of mental toughness that exist within semi-elite and elite Scottish Rugby Union players. Secondly, to investigate any differences in mental toughness between semi-elite and elite players. Thirdly, to assess if age and experience influence mental toughness within rugby union players. Based on the understanding of mental toughness presented above, we would expect that elite players will report greater levels of mental toughness compared with semi-elite players, and that age and experience will positively influence mental toughness.

2.2 Methods

2.2.1 Participants

A total of 126 rugby union players were included in the cohort. Participants were recruited from two of the SRU regional rugby academies (East and West) and the two professional rugby clubs within Scotland. As defined by Swann et al., (2015), 59 semi-elite players from the two academies and 67 successful-elite players from the two professional clubs were recruited. Successful-elite status was attributed to these players as they not only compete at the highest level but have experienced success at this standard. At the point of analysis, the participants were aged between 16 and 37 years (Mean age (SD) = 23 (5)) and had an average of 14 (SD = 5) years' experience playing rugby. Within the cohort of successful-elite players, they had been playing professionally for between 1 and 14 (Mean professional experience (SD) = 3 (4)) years. One hundred percent of the sample was male. There are female players within the regional academies, although there are no female professional rugby teams in Scotland and so this comparison could not have been made. Selection of the participants was subject to availability on the day of data collection. Factors influencing availability included injury, team selection and schedule changes.

2.2.2 Procedure

After receiving ethical approval from the University of Glasgow's College of Medical, Veterinary and Life Sciences Research Ethics Committee and the Scottish Rugby Union High Performance Department, support staff within the clubs and academies were approached via email about the possibility of participating. The nature of the study was explained to the support staff, who then agreed to schedule a meeting with players whereby the researcher could explain to them the purpose of the study. These meetings were scheduled into the player's normal training day, at time convenient to them and the support staff. It was clearly expressed to the players that participation in the study was voluntary and they could withdraw at any time, without having to give a reason and without consequence.

The players were made aware that the support staff would gain access to the results. This sharing of information was a condition of gaining access to recruit the participants. The support staff agreed that the results would not be used in their squad selection process, they would simply be employed to allow them to more effectively understand and manage each individual player. This was conveyed to the participants. It was also highlighted to participants that it was in their interest to complete the self-report measure in an open and honest manner, so that the information could be utilised effectively. Players were offered the opportunity to ask any questions.

Once consent had been obtained, participants were emailed a link to the questionnaire, which they completed electronically during the meeting. In the first season, questionnaires were completed through the AQR website (https://aqrinternational.co.uk/mtq48-mental-toughness-questionnaire). After establishing a relationship with the authors of the MTQ48, the questionnaires were completed through our self-developed uniform resource locator (https://drive.google.com/open?id=1dlXu6uZhvhOTaoAUju_90fN6UDRGAcakV-dpy_ipQiU). On one measurement occasion, at the request of the support staff, paper copies were made available to the players. Data were collected at several time points over the course of three seasons. Due to the size of the Scottish Rugby academies, questionnaire data for the semi-elite cohort were collected at two separate time points within the SRU East and West academy. Data were collected within the elite cohort over four separate time points, due to the challenges associated with gaining access to professional players.

2.2.3 Measurement

The MTQ48 (Mental Toughness Questionnaire 48; Clough et al., 2002) was employed as the self-report measure of mental toughness. The MTQ48 measures *total mental toughness*, along with six sub-components of the concept, namely *Control*, comprised of *Emotional Control* and *Life Control*, *Challenge*, *Commitment* and *Confidence*, being made up of *Confidence in Abilities* and *Interpersonal Confidence*. The MTQ48 is a general measure of mental toughness

and the responses to the items are made on 5-point Likert Scale, where by 1 is anchored by ‘strongly disagree’ and 5 by ‘strongly agree’. Higher overall scores on the MTQ48 are indicative of greater levels of mental toughness. The average completion time for this self-report measure is 8 minutes. Clough et al., (2002) provided initial evidence for the criterion validity of the MTQ48. They reported significant, moderate relationships with optimism, self-image, life satisfaction, self-efficacy and trait anxiety. There is also support for the internal validity of this measure (Perry et al., 2013).

2.2.4 Statistical Analysis

One of the paper questionnaires was omitted from the analysis, as the participant had selected two options on the Likert Scale. Some (N=7) players appeared more than once, as they had moved between performance levels at later time points when additional data were being collected. As such, they appear in the results as both an academy player and a professional player. The questionnaires were scored in line with the instructions given by Clough et al., (2002). The authors also provided norm data that allowed for the scores to be normed into a score out of ten. As some of the questionnaires had been completed through the AQR website, which normed the MTQ48 data, the provision of these norm values allowed for these questionnaires to be combined with questionnaires from our own link.

Statistical assumptions were tested prior to the analysis and data were checked for normality and homogeneity of variance. Descriptive statistics were obtained using Minitab 18 statistical software, means and standard deviations were also calculated for all MTQ48 variables, age, years of playing experience and years of professional playing experience in the elite cohort. These descriptive outcomes will service one of the study aims; to report the levels of mental toughness present in semi-elite and elite Scottish Rugby Union players. Boxplots were created for each MTQ48 variable for semi-elite and elite players, to offer visual indications of differences between performance levels. Two-sample T-tests were carried out on those identified MTQ48 variables, to test for significance through reported 95% confidence intervals (95%CIs). This facilitated the second aim, to

assess any differences between semi-elite and elite rugby union players. Correlations, as a method of statistical analysis, offer an effect size that allows researchers to verbally describe the strength of a relationship. The strength of these effect sizes were determined in accordance with classifications outlined by Evans (1996).

Scatterplots were created to assess the relationship between age and playing experience on levels of mental toughness. Each MTQ48 variable was plotted against age and then playing experience. Within the elite cohort, each MTQ48 components was plotted against professional playing experience. These scatter plots included a fitted regression line, and for those relationships that were deemed linear, simple linear regression was completed. Each of the MTQ48 subscales acted as response variables, with age and playing experience used as the explanatory variables. This linear regression analysis was used to determine the relationship between age, experience and the athletes' mental toughness. In addition, a linear regression analysis was employed to assess the influence of professional playing experience within the elite cohort of male rugby union players. Ninety-five percent confidence intervals (95% CIs) and a fitted regression line were included in the fitted plot. For all, a significance level of $P \leq 0.05$ was used. A simple linear regression was calculated to determine the influence of age on the level of total mental toughness in semi-elite and elite rugby union players.

2.3 Results

Visual inspection of probability plots and scatterplots revealed acceptable normality for total mental toughness and its associated subcomponents. Demographic and sporting characteristics (rugby playing experience, professional playing experience) of the participants have been presented in Table 1.

Table 1. Descriptive statistics for demographic variables and sporting characteristics of the participants.

Demographic and Sporting Characteristics	Performance Level	
	Semi-elite (n=59)	Elite (n=67)
Age	19 (2)	26 (4)
Rugby Playing Experience	10 (3)	17 (5)
Professional Playing Experience	0 (0)	6 (3)

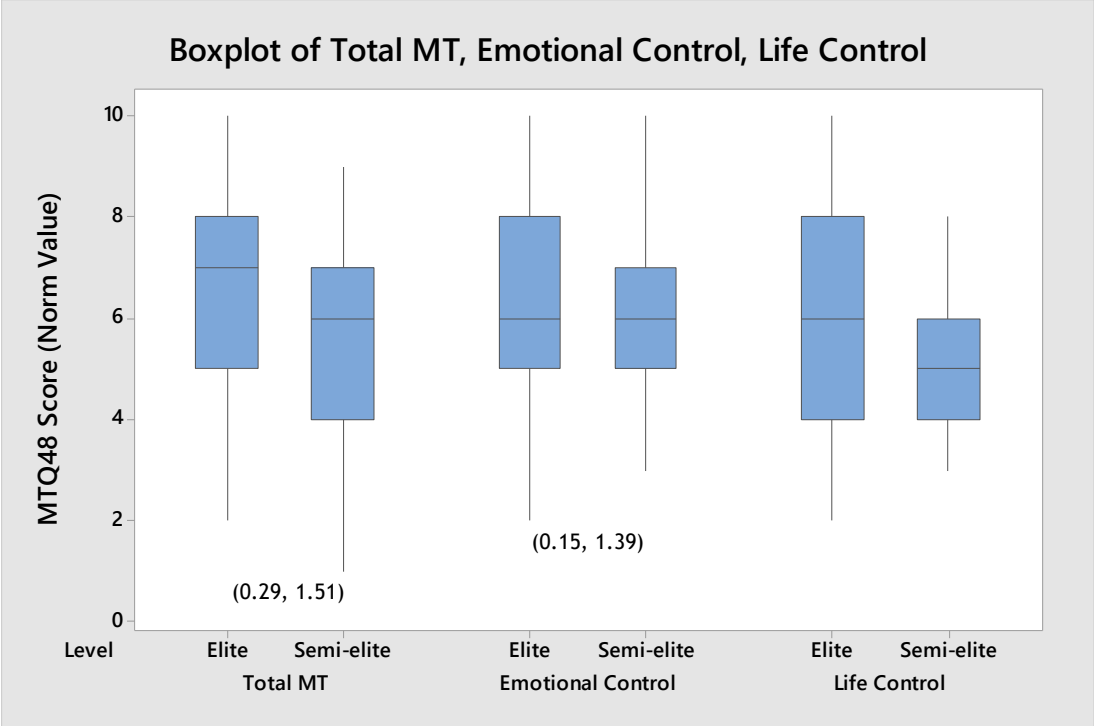
Demographic and sporting characteristics are mean years (SD)

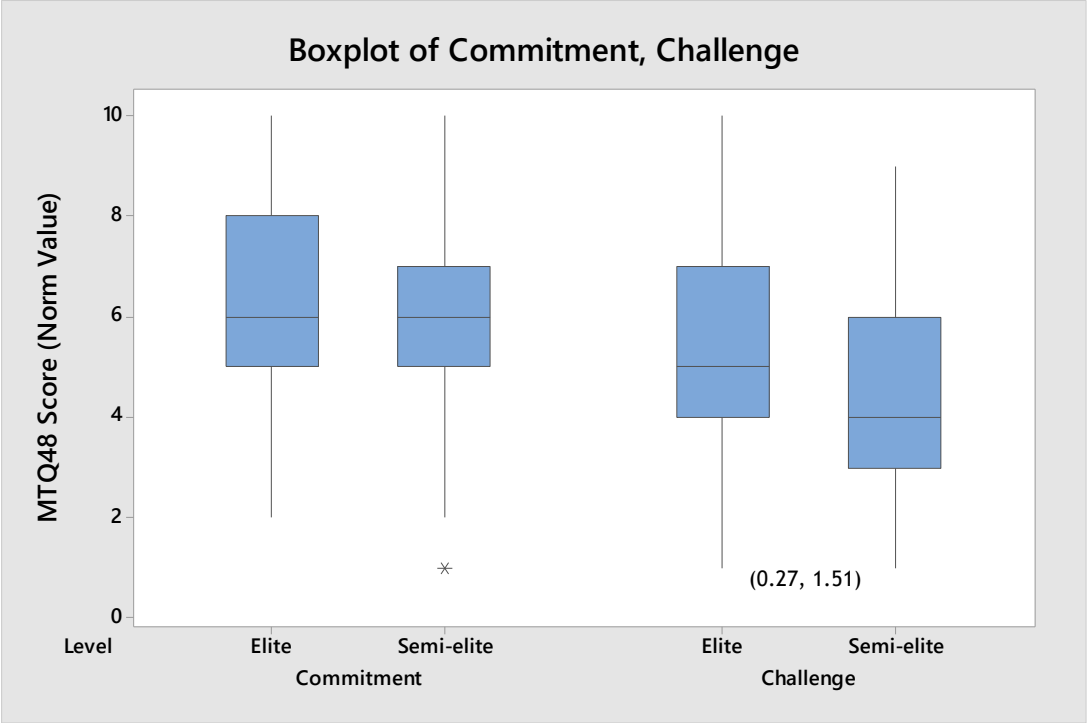
Boxplot representations of total mental toughness (Figure 4) and each subscale (Figure 5-6), between semi-elite and elite rugby players, suggested significant differences may be present. Figure 4 shows the median norm scores for Total MT and Life Control subscale from MTQ48 are higher for elite group of players compared with semi-elite and no difference between the 2 groups for Emotional Control. Figure 5 shows higher median, although similar range, in Challenge scores in the elite compared with semi-elite players and no difference in Commitment scores between the two player groups. Similar medians, a high degree of overlap between the boxes and similar range of scores show that a statistically significant difference in Interpersonal Confidence between the elite and semi-elite group is unlikely (Figure 6). The difference in the medians in the second pair of boxplots in Figure 6 also suggested that a statistical difference was likely between the 2 groups with respect to Confidence in Abilities.

Means and standard deviations of the MTQ48 outcomes are shown in Table 2. Independent t-tests revealed that significant differences were present in the means of total mental toughness for elite players compared with semi-elite players (95% CI (0.29, 1.59)). Elite players' total mental toughness scores are typically 0.29 to 1.59 units higher than semi-elite players. Elite rugby union players also reported significantly higher scores for life control (0.15, 1.39), challenge (0.27, 1.51) and confidence in abilities (0.31, 1.61) compared with semi elite, male rugby union players. Semi elite and elite rugby union players did not differ significantly on levels of emotional control (95% CI (-0.14, 1.04),

commitment (-0.02, 1.39) or interpersonal confidence (-0.31, 1.61). See chapter appendix for all statistical outputs.

Fig. 4-6. Boxplots of MTQ48 Norm Value Scores for Total MT, and each subcomponent of MT, between Semi-Elite and Elite Rugby Union Players. ***The 95% Confidence Interval of difference between Semi-Elite and Elite players are listed where statistically significant.***





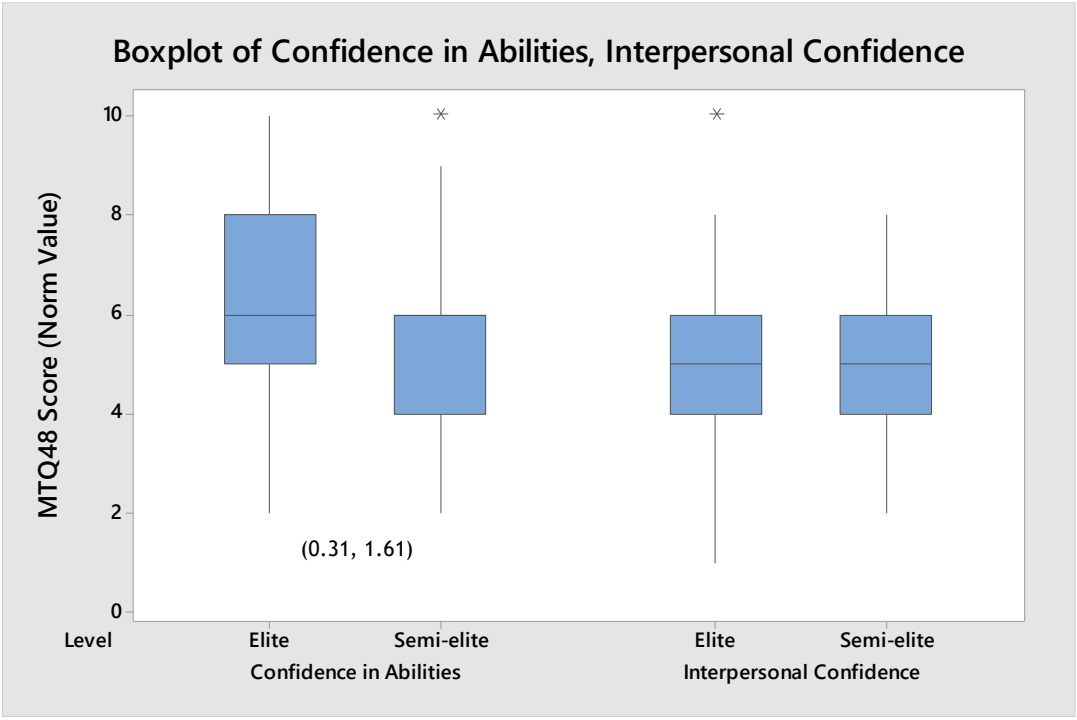

Boxplot of Confidence in Abilities, Interpersonal Confidence
MTQ48 Score (Norm Value)
10
8
6
4
2
0
(0.31, 1.61)
Level
Elite
Semi-elite
Elite
Semi-elite
Confidence in Abilities
Interpersonal Confidence

Table 2. Descriptive statistics for MTQ48 subscales between semi-elite and elite rugby union players

MTQ48 Subscale	Performance Level		Mean Difference
	Semi-elite (n=59)	Elite (n=67)	(95% CI)
Total Mental Toughness	5.5 (1.7)	6.4 (1.8)*	(0.29, 1.51)
Emotional Control	5.9 (1.5)	6.3 (1.9)	(-0.14, 1.04)
Life Control	5.2 (1.5)	6.0 (2.1)*	(0.15, 1.39)
Commitment	5.8 (1.9)	6.5 (2.1)	(-0.02, 1.39)
Challenge	4.5 (1.7)	5.4 (1.8)*	(0.27, 1.51)
Confidence in Abilities	5.4 (1.8)	6.4 (1.9)*	(0.31, 1.61)
Interpersonal Confidence	4.8 (1.5)	5.1 (1.9)	(-0.31, 0.87)

MTQ48 Subscales are mean norm score (SD), *p< 0.05.

When splitting the analysis for positional groupings of forwards and backs, there were no significant differences in total mental toughness, or its subcomponents, based on playing position (forward and back), as displayed in Table 3.

Table 3. Descriptive statistics for MTQ48 subscales based on playing position in semi-elite and elite rugby union players.

MTQ48 Subscale	Position		Mean Difference
	Forward (N=66)	Back (N=42)	(95% CI)
Total Mental Toughness	5.7 (2.0)	6.1 (1.4)	(-0.32, 0.99)
Emotional Control	6.1 (1.8)	6.0 (1.6)	(-0.69, 0.60)
Life Control	5.2 (1.8)	5.8 (1.6)	(-0.10, 1.22)
Commitment	5.9 (2.3)	6.1 (1.6)	(-0.55, 0.93)
Challenge	4.7(2.0)	5.3 (1.5)	(-0.04, 1.28)
Confidence in Abilities	5.9 (2.2)	5.8 (1.5)	(-0.80, 0.58)
Interpersonal Confidence	4.9 (1.8)	4.9 (1.6)	(-0.66, 0.63)

Data are mean norm score (SD), $p< 0.05$.

Scatterplots and Pearson's correlation coefficient of age against mental toughness revealed weak, positive correlations with total mental toughness (r = 0.21) and life control (r = 0.23). Very weak, positive effect sizes were recorded between age and emotional control (r = 0.11), commitment (r = 0.13), challenge

(r = 0.19), confidence in abilities (r = 0.15), interpersonal confidence (r = 0.09). Simple linear regressions revealed a significant regression between age and levels of total mental toughness ($F(1,124) = 5.64$, $p < 0.05$) with an R^2 of 0.04. A significant regression was also found between age and the life control component of mental toughness ($F(1,124) = 6.72$, $p < 0.05$) with an R^2 of 0.05. These results suggest that age explains 4% and 5% of the variance in reported levels of total mental toughness and life control, respectively.

Scatterplots and Pearson's correlation coefficient of years playing rugby against total mental toughness and its subcomponents, revealed weak positive correlations with total mental toughness (r = 0.21) and challenge (r = 0.21). Very weak effect sizes were recorded for the relationship between years playing rugby and emotional control (r = 0.06), life control (r = 0.18), commitment (r = 0.16), confidence in abilities (r = 0.16), interpersonal confidence (r = 0.05). A simple linear regression was calculated to determine the influence of years playing rugby on total mental toughness. A significant regression was found between rugby playing experience and total mental toughness ($F(1,124) = 5.72$, $p < 0.05$) with an R^2 of 0.04. A significant relationship was also found between rugby playing experience and the challenge dimension of mental toughness ($F(1,124) = 5.54$, $p < 0.05$) with an R^2 of 0.04. These results suggest that years playing rugby explains only 4% of the variance in reported levels of total mental toughness and challenge. All the aforementioned regression lines fall completely within the confidence bands, and as such, these results are considered plausible.

A multiple linear regression predicted total mental toughness, based on both age and playing experience. A significant regression was found ($F(2,123) = 3.14$, $p < 0.05$) with an R^2 of 0.05. Semi-elite and elite rugby player's total mental toughness increased 0.04 for each year of age, and 0.04 for each year they have been playing rugby. Given that the mean number of years of playing experience in this elite cohort (17 years), this equates to an increase in only 1 whole unit of total mental toughness through playing experience alone. Within the elite cohort of players, scatterplots and Pearson's correlation coefficient of years playing professional rugby against total mental toughness and its subcomponents,

revealed very weak, positive correlations with total mental toughness (r = 0.09) emotional control (r = 0.01), life control (r = 0.16), commitment (r = 0.09), challenge (r = 0.09) and interpersonal confidence (r = 0.07). Very weak, negative effect sizes were observed for the relationship between years playing professional rugby against confidence in abilities (r = -0.11). Linear regression analysis found no significant relationship between professional playing experience and total mental toughness, or indeed any of the mental toughness subscales.

2.4 Discussion

Mental toughness has been identified as an important psychological resource with respect to performance excellence (Gould et al., 1987). To date, levels of mental toughness have yet to be described in semi-elite and elite rugby union players. The purpose of this study was to detail the levels of mental toughness that exist among semi-elite and elite male rugby union players, along with an examination any differences in mental toughness between these groups. In addition to this, the present study sought to assess the influence of age and years playing rugby, on reported levels of mental toughness in semi-elite and elite rugby union players.

2.4.1 The Levels of Mental Toughness Present within Scottish Rugby Union

This study demonstrates that there are moderate to high levels of mental toughness within semi-elite and elite male rugby union players in Scotland. When making comparisons with the extant research, semi-elite and elite ruby union players report greater levels of mental toughness than male high school students (Gerber et al., 2013) and within sporting populations, this cohort share similar levels of mental toughness with international male athletes (Nicholls et al., 2009). Comparisons with other studies employing the MTQ48 have proved troublesome. Often the normative values of mental toughness are not reported (see Mattie & Munroe-Chandler, 2012) and levels of mental toughness are commonly not explicitly reported, in favour of the authors discussing more attractive correlations with related psychological concepts (Cowden, 2017). In other cases, MTQ48 results have been incorrectly reported (Meggs & Chen, 2018). Comparisons with existing research have also been challenging due to the variety of self-report measures that have been employed, and appraisals against these studies must be made cautiously. As we have proposed, the stress buffering capabilities of mental toughness has particular relevance within professional rugby union, as players with low levels of mental toughness may not be able to cope with the demands of the sport, leading to a performance decrement. By reporting the normative levels of mental toughness and employing semi-elite and elite definitions that are consistent with those outlined by Swann, Moran and Piggott (2015), this study offers data that can be compared

within other nations and other sports. Researchers investigating levels of mental toughness are encouraged to adopt this format when reporting results, to advance our understanding of this construct and its relationship with performance.

The range of results described in both semi-elite and elite rugby union players suggests that there is a need for psychological support within this cohort. Profiles within the elite group of players suggests that mental toughness is not a requirement of reaching this level of competition. The current authors note that there is a plethora of other physical and psychological considerations that must be included when investigating performance, and as others have postulated, mental toughness is just one of these variables (Crust, Nesti, & Littlewood, 2010).

Based on playing position (forward and back), no significant differences in mental toughness were noted in semi-elite and elite, male rugby union players. (Asamoah & Grobbelaar, 2016) reported differences in mental toughness based on playing position in soccer, although these results stem from a cohort of amateur soccer players and so caution should be exercised when comparing with semi-elite and elite, rugby union players. The suggestion that mental toughness will differ based on playing position is grounded in the belief that different positions carry different physical and psychological demands, thus the mental skills required to be successful in that position will differ. In support of this belief, positional demands within professional rugby union do differ. Forwards are involved in more total impacts than backs, but backs have more ball carries and high-speed running (Lindsay et al., 2015). These positional demands have been shown to manifest into differences in psychological skills, as half-backs and hookers have reported greater levels of psychological skill than other positional groups (Andrew et al., 2007).

Although this study failed to substantiate positional differences in mental toughness, its conclusion adds to the body of research assessing the relationship between psychological skills and playing position. This result may be a consequence of the evolving, modern game. Within professional rugby union, the dated, one dimensional view of a player and their capabilities is being eroded. Morden day players are expected to perform across all facets of the game, whether that be physical, or skill based. Exposure to these experiences may have enabled players across all positions to adapt and develop the skills to cope with the varying demands of modern rugby union. We conclude that levels of mental toughness in Scottish, semi-elite and elite rugby union players are moderate to high, and we suggest that mental toughness is no *more* significant to either backs or forwards.

2.4.2 The Differences in Reported Levels of Mental Toughness between Semi-elite and Elite Rugby Union Players

The construct of mental toughness has been promoted as a psychological differentiator between players at different performance levels (Cowden, 2017). Despite this association, there is an absence of studies that assess this relationship within rugby union. Consequently, the purpose of this study was to gain a greater understanding of the mental toughness–performance relationship, by investigating differences in mental toughness between a group of semi-elite and elite, male rugby union players. This study found that total mental toughness and the subcomponents of life control, challenge and confidence in abilities, did indeed discriminate between semi-elite and elite rugby union players. Conclusions from this study show that total mental toughness, as measured by the MTQ48, separates rugby union players at different performance levels. This is congruent with previous studies that have employed the MTQ48 (see Crust & Azadi, 2010; Beckford et al., 2016). Research that has employed alternative, valid measures of mental toughness have also found evidence of this positive relationship with performance level (see Chen & Cheesman, 2013; Meggs et al., 2014). Although has we have outlined, caution should be exercised when comparing these results to the current study. The findings in the present study suggest that players with greater levels of mental toughness have an ability to manage the obstacles, distractions, pressures and adversity associated with playing professional rugby union (Clough & Strycharczyk, 2012). This will enable

them to thrive in these high-performance settings, in comparison to peers with lower levels of mental toughness (Gucciardi & Jones, 2012). When we consider the identified stressors in rugby union and the potentially deleterious effect of stress on a player's performance, it can be concluded that mental toughness is crucial to allow professional rugby union players to pursue performance excellence.

Elite rugby union players reported higher levels of life control than semi-elite players, suggesting that elite rugby union players have a stronger belief that they are in control of their own destiny. This result is congruent with other findings from similar studies, as Danielsen et al., (2017) found that elite female football players reported higher levels of the control, as measured by the SMTQ, when compared with sub-elite players. Higher levels of control could significantly enhance a player's ability to cope within a high-performance environment. Day to day, semi-elite and elite rugby union players have their routine timetabled for them, they have selection concerns and they must negotiate contracts. It can be reasonably assumed then that these challenges may reduce an athlete's perceived influence over their life and its direction. Players with greater life control scores would have an enhanced ability to handle such demands. The mechanism by which this may occur has been evidenced by Kaiseler, Polman and Nicholls, (2009), as they found the life control dimension of the MTQ48 to be significantly, positively associated with problem focused coping strategies such as planning and increasing effort. The life control dimension has also been negatively associated with behavioural disengagement, so it would be expected then that rugby union players with greater levels of life control, would persevere through challenging experiences and would plan their future efforts more effectively, thus facilitating performance success.

Elite rugby union players also scored significantly higher in the challenge dimension of MTQ48, compared to their semi-elite counterparts. The ability of the challenge dimension to discriminate between performance levels has also been evidenced by Beckford and colleagues (2016), in elite and sub-elite male sprinters. According to Clough's (2002) conceptualisation, players who report

greater levels of challenge will view stressful situations as an opportunity to develop. Those reporting lowers scores in this dimension will see these situations as a threat. This understanding agrees with contemporary research that suggests mentally tough athletes are less likely to believe that the demands of the situation will exceed their coping resources (Gucciardi, 2015). This positive appraisal has been shown to manifest in athletes, as they look to take more risks (Crust & Keegan, 2010). Collectively then, players who report greater levels of the challenge dimension are better able to cope with the demands of professional rugby union and thus reach a higher level of performance.

The present study found that elite rugby union players have significantly greater confidence in their abilities, compared with their semi-elite counterparts. This result conflicts with the previous findings of Nicholls and colleagues (2009), who also employed the MTQ48. Despite this disagreement, other measures of mental toughness have promoted the role of confidence, in discriminating between performance levels. International and national athletes have reported greater levels of confidence, as measured by the SMTQ, when compared with lower level athletes (Sheard et al. 2009; Meggs, Ditzfield & Golby, 2014). These authors suggest that athletes who report greater levels of confidence will be more likely to successfully overcome challenges and rebound from failures, as their self-esteem is not highly contingent on performance outcomes. This will allow them to achieve greater levels of performance success, compared with their less mentally tough peers (Meggs, Ditzfield & Golby, 2014). Despite these conflicting results with respect to confidence, there are reasonable grounds on which to suggest that the confidence in abilities dimension would distinguish between elite and semi-elite rugby union players, as the important role of confidence in elite performance has been well evidenced (see Hays et al., 2009). The confidence dimension of the MTQ48 has also been linked with optimism, suggesting that more mentally tough players will expect the best possible outcome and this could result in an increased willingness to preserve through challenging situations, in the pursuit of achieving performance excellence (Nicholls et al., 2008).

In summary, elite rugby union players in Scotland possess higher levels of total mental toughness than their semi-elite counterparts, this is largely brought about by having significantly greater feelings of control, viewing stress as an opportunity to grow and a greater belief in their ability to perform. We suggest that the dimensions of life control, challenge and confidence in abilities are more salient with respect to performance excellent in elite rugby union, than emotional control, commitment and interpersonal confidence are. Within rugby union, there has been a paucity of research analysing the psychological qualities of performance success. The findings presented in the current study highlight that mental toughness is one of those qualities. The conclusions made in this study also advance the mental toughness literature, as they promote the positive relationship this construct has with performance with rugby union.

2.4.3 The Influence of Age and Playing Experience on Reported Levels of Mental Toughness in Semi-elite and Elite Rugby Union Players

The final aim of the study was to investigate the relationship between age, playing experience and mental toughness. In semi-elite and elite rugby union players, older players reported higher scores in total mental toughness and the life control dimension of the MTQ48. This finding is consistent with that of Nicholls and colleagues (2009), who also found that age positively influenced an individual's total mental toughness in a variety of athletes, as measured by the MTQ48. A possible explanation for these findings is linked to the assumption that mental toughness is grounded in the player's own experiences. Older players will have been exposed to more significant life events and a greater number of sporting experiences, through this they will have developed greater levels of mental toughness. This explanation is supported by a contemporary view of the construct, which suggests that mental toughness develops over time, through an athlete's experiences (Buhrow et al., 2017). With respect to the life control dimension of the MTQ48, the results from the present study suggest that with increasing age, rugby union players would tend to feel more influential in their own destiny. This result is consistent with the findings of Nicholls et al., (2009), who concluded that the life control dimension of the MTQ48 was significantly, positively influenced by age. There is also sufficient evidence from studies who

employed alternative measure of mental toughness, as they also indicate that older subjects report higher levels of mental toughness (Dress & Mack, 2012; Gucciardi et al., 2016; Zeiger & Zeiger, 2018). The findings of the present study strengthen the body of research that promotes the positive relationship between mental toughness and age, in the previously unreported sport of rugby union.

Players that have been playing the game for longer also reported greater levels of mental toughness, as years of playing experience was found to explain a significant amount of the difference in total mental toughness and the challenge dimension of the MTQ48. Connaughton et al., (2008), in their qualitative exploration of the concept, suggested that mental toughness develops through critical life events and exposure to a variety of sporting experiences. The quantitative support for this qualitative belief has been mixed. Previous research employing the MTQ48 has found a positive relationship between playing experience and mental toughness (see Nicholls el al., 2009). A possible explanation for this inconsistency may lie in the use of years playing the sport, as a proxy for a player's experience. It must be recognised that players with similar years playing a sport, may have had very different experiences during that time. These sporting experiences would have been influenced by team selection, different coaching influences and the exposure to different sporting environments. This study also found that elite and semi-elite players with fewer years playing rugby union reported lower levels of the challenge dimension. The conclusion that younger players viewed stressful situations as a threat, in agreement with the findings of (Nicholls et al., 2009b). These conclusions support the view that sporting experience positively influences self-reported levels of mental toughness.

Although significant, age and years playing rugby union only accounted for 4-5% of variance in self-reported mental toughness. This relatively low level of explanation is unsurprising, given the conclusions of previous research. Horsburgh and colleagues (2009), in their assessment of adult monozygotic and dizygotic twins, highlighted that differences in mental toughness could be attributed to genetic factors. In addition to this, the low level of variance also

supports the view that a considerable percentage of mental toughness can be explained by social and environmental influences (Gucciardi et al., 2015b). It was worth noting from the results that mean number of years of playing experience in this elite cohort (17 years), equated to an increase in only 1 whole unit of total mental toughness. This relationship suggested that efforts to intervene and enhance mental toughness, are warranted.

The relationship between age and years playing a sport most be noted, as they are closely related variables (r = 0.80 in this study). With respect to the age of the participants, their physical, emotional and cognitive development must also be considered. Adolescence is a time characterised by dramatic hormonal and physical changes, which can then influence cognitions which may then map onto behaviours (Blakemore & Choudhury, 2006). Differences in these developmental stages have been shown to influence psychological skill usage, as attentional focus has been shown to increase with experience with (Di Corrado, Murgia & Freda, 2014). An increase in psychological skills associated with mental toughness, may also in part explain the positive influence of sporting experience, through age, on the construct. For those components of mental toughness that did not appear to discriminate between semi-elite and elite rugby union players, it may be that factors other influence athletic success to a greater extent.

2.4.4 Limitations and Future Research

The present study is not without limitations. By employing a self-report measure to determine mental toughness, there may have been a tendency for the participants to present a favourable image of themselves when completing the questionnaire. This social desirability bias must be considered when interpreting the results (Van de Mortel, 2008). The procedure associated with the data collection may have also magnified this bias, as participants were informed that support staff would gain access to the results. We suggest that this bias may have led to an over-reporting of mental toughness, given the social sensitivity of acting tough within rugby union (Mellieau, 2016). Encouragingly, the wide range

of mental toughness levels reported, especially within the elite cohort, suggests that the players were truthful with their responses.

The validity of the MTQ48 as a measure, has also been questioned. There have been calls for caution when employing the MTQ48 within an elite athlete population (Vaughan, Breslin & Hanna, 2017). It is important to acknowledge that until another valid measure of mental toughness is developed, the limitations associated with using a self-report measure will persist. Future research should seek to develop alternative measures of mental toughness that address these limitations and allow for scholars to make stronger conclusions regarding mental toughness and its relationship with performance. More recently, a 'third wave' of mental toughness research has emerged, which seeks to develop an objective, behavioural analysis of mental toughness (Gucciardi & Hanton, 2016). Previous attempts have been made to accomplish this in sports such as tennis (Cowden, 2016) and swimming (Beattie et al., 2017), but to date no attempts have been made in rugby union. The sport of rugby union would offer a suitable platform from which to carry out such an investigation, as notational analysis is commonplace within the sport. Research of this nature may uncover a valid, performance relevant, behavioural measure of mental toughness. Although the present study has the ability to suggest that mental toughness is a significant indicator of a rugby player's performance level, it would be able to corroborate such a finding with performance relevant data. The scholarly activity listed above would bridge the gap between theory and practice, and the practical applications from this research would be immediate and far reaching.

Another limitation may lie in the use of performance level as a proxy for sporting performance, a view that has been shared by others (see Crust, 2008; Cowden, 2017). Performance level may not be a sensitive enough measure of performance, as this classification is unable to fully capture a player's performance. This may call into question the efficacy of the results and the conclusions made regarding the mental toughness-performance relationship. The development of an objective, behavioural measure of mental toughness would

address this, and future researchers are encouraged to link mental toughness with more acute measures of performance. These concerns regarding efficacy would also be present with respect to the use of age and years playing rugby union, as these are arbitrary numbers and do not fully capture the player's experiences and how they have influenced their mental toughness. It could be that a younger, less experienced player has vastly more diverse sporting experiences, based on their background and coaching. With our knowledge that variations in mental toughness can be attributed to cultural and social influences, future research should seek to investigate the lived experiences of mental toughness, to advance our understanding past an association with age and years playing the sport. This would allow for scholars to make more robust conclusions about how different experiences, impact on mental toughness its development.

This study's cross-sectional design may have influenced the results, as it would have been biased by how the players were feeling at the time. The limitations of such a snapshot audit may have been visible in one of the professional teams, who had not been performing as well as the other. This was reflected in the mental toughness levels that were reported. Recent literature shows that mental toughness fluctuates across situations (Weinberg et al., 2017), and athletes with a higher winning percentage report significantly higher levels of mental toughness (Slimani et al., 2016). This cross-sectional approach also fails to explain causality between the components of mental toughness and performance. We are unable to confirm the direction of the relationship between mental toughness and performance. As such, we cannot establish whether players with high levels of mental toughness are more likely to play at a higher performance level, or if players playing at higher performance levels develop higher levels of mental toughness. Studies employing a longitudinal design are required to examine how mental toughness and its components change between, and within, performance levels. Such an approach would be time-consuming, but it would lead to a more valid and reliable assessment of mental toughness in rugby union players.

Although the sample represents a group of semi-elite and elite rugby players, our lack of understanding of what it means to *be* mentally tough in Scottish Rugby Union, would prevent the findings from the present study being generalised across sporting contexts and cultures. It is also important to be cognisant of the descriptive nature of this research. As mentioned previously, age and years playing experience carry little information about the player's experiences of mental toughness and how they impact upon performance. It is necessary that researchers explore the meaning of mental toughness, investigating what it means to be mentally tough in rugby and how the construct directly impacts rugby union performance. Qualitative methods of data collection have provided clarity on what mental toughness is, as well as those key features evident in mentally tough athletes (Anthony, Gucciardi & Gordon, 2016). Although the findings of the present suggest that mental toughness is a reliable indicator of superior performance and reaching elite status, additional qualitative information and context would be of great value to practitioners who aim to prepare players for professional rugby union. Research of this nature would further inform our understanding of the relationship between mental toughness and performance, allowing for the development of an effective intervention aimed at enhancing mental toughness. To date, there have been no qualitative investigations into mental toughness within Scottish Rugby Union.

2.5 Conclusion

Mental toughness is an important psychological quality that can support performance excellence (Gucciardi & Jones, 2012). The present study finds that the levels of mental toughness within Scottish, semi-elite and elite rugby union players, a previously unreported group, are moderate to high. Within the current literature, researchers have compared levels of mental toughness within sports and across nations, using a variety of psychometric measures and reporting styles. This approach has been prevalent within mental toughness literature, as in haste researchers have sought to comprehend a construct that has dominated contemporary sporting culture. This race to publish may have been in an effort to validate the construct, although it has led to confusion, as they chased measurement over meaning (Nesti, 2011). By employing semi-elite and elite definitions that are consistent with those outlined by Swann, Moran and Piggott (2015), this study offers a position from which mental toughness can be

compared within other nations and sports. Thus, the data presented within the study has the potential to advance our understanding of the mental toughness and researchers investigating levels of mental toughness are encouraged to adopt this format when reporting results.

The range of results across both semi-elite and elite rugby union players suggests that there is a need to support the development of mental toughness in this cohort. The constructs stress buffering capabilities (Clough & Strycharczyk, 2015), twinned with the documented stressors that rugby union players face Quarrie et al., (2017) suggest that the development of an effective intervention would be facilitate performance excellent in semi-elite and elite rugby union players. Despite this relevance within the game, our understanding of mental toughness in rugby union is limited. Results presented in the current study show that elite rugby union players reported higher levels of total mental toughness, life control, challenge and confidence in abilities, compared with their semi-elite peers. These conclusions strengthen the existing body of researchers that highlights the discriminative power of mental toughness, in separating players at different performance levels (Cowden, 2017). This understanding promotes the need for an effective mental toughness intervention within this population, to enhance performance. Despite this positive relationship, a clear understanding of how mental toughness influences performance remains elusive. Qualitative approaches have been employed by researchers in an attempt to uncover what mental toughness is and how it influences performance, although a study of this nature is yet to take place within rugby union (Weinberg et al., 2016). Conclusions from such are required before researchers and practitioners alike, consider designing an effective mental toughness intervention.

The conclusion that age and sporting experience positively influence self-reported levels of mental toughness is not a novel one. The findings of the present study support this relationship within Scottish rugby union, though future researchers must number consider the efficacy of age and years playing rugby as a proxy for sporting experience. The development of mental toughness is heavily influenced by the quality and content of the player's experience, with

contemporary research conclusions promoting this view (Crust, Swann & Allen-Collinson, 2016). A qualitative approach that seeks to uncover a player's experiences of mental toughness within rugby union would accelerate our understanding of the construct and how to develop it. While the seminal aim of the present study was to offer an insight into the levels of mental toughness that exist within Scottish Rugby Union, the findings do begin to offer some preliminary knowledge on the role of mental toughness and performance. The potential insights from this research are highly impactful and provide the basis for the development of an effective intervention, which will support performance excellence with Scottish rugby union.

3. What does it mean to *be* mentally tough? Understanding Mental Toughness in Scottish Rugby Union: An Interpretative Phenomenological Approach

3.1 Introduction

In the pursuit of a competitive advantage, professional sports teams have been investing vast amounts of resource into the analysis of player performances, in both training and competition. This drive is aligned with a contemporary movement that currently exists within performance sports, one which is heavily influenced by data driven analytics (Hutchins, 2016). When considering this objective pressure, and the current emphasis within sporting culture that promotes athletes extending beyond their perceived physical limitations (Tibbert, Andersen, & Morris, 2015), it could be argued that the expectations and demands placed on professional rugby union players have never been higher. Empirically, Nicholls et al., (2009) note the multitude of potential sport and non-sport stressors that face a professional rugby player. Sport stressors that were reported included injury, physical and mental errors during training and competition. This constant evaluation, that is commonplace within performance sports, would only serve to increase the intensity and frequency of these stressors. Nicholls acknowledged that enhancing a player's ability to cope with these potential stressors would facilitate optimal training and competition performance.

Focus group discussions with elite, adolescent, rugby players identified eleven psychological qualities that were associated with rugby union performance. One of the qualities identified, was mental toughness (Holland et al., 2010). Woodcook and colleagues (2011) then extended upon these conclusions as they conducted interviews with coaches and parents, with mental toughness once again emerging as a higher order theme. Indeed, practitioner's accounts would also support the important role of mental toughness within the environment of

professional rugby, as the physical nature of the sport often manifests itself into an act 'tough' culture (Mellalieu, 2016). This evidence suggests that mental toughness should be considered a valuable psychological resource within professional rugby union today. Despite the significant role that mental toughness could play in enhancing performance, scholars still do not fully understand what mental toughness is.

It has been suggested that the accumulation of scholarly material, that lacked scientific rigour, has led to this conceptual confusion (Gucciardi, 2016). A possible explanation for this hasty accumulation of unscientific information, may be in some part linked to a drive within mental toughness research to validate the concept. These motivations can be linked to the broader need to validate the discipline of sports psychology (Nesti, 2011). When considering the time and space that researchers and practitioners were operating in, this race to understand mental toughness was understandable. The concept was populating contemporary sporting discourse; indeed it had been reported that "mental toughness is the very essence of sport psychologists' work with elite athletes" (Jones, Hanton & Connuaghton, 2002, p. 213). This race to provide a clear understanding of mental toughness led to an accumulation of information that caused this conceptual confusion. Indeed, mental toughness has been described as the most used, yet least understood term in sport psychology (Crust, 2009). There have been a number of qualitative attempts made that have shaped our understanding of mental toughness.

3.1.1 A Qualitative Understanding of Mental Toughness

The early inquiries into the mental toughness were anecdotal and descriptive in nature. This can be seen in the work of Loehr (1986), who conceptualised mental toughness from his own experiences working with elite athletes and coaches. These unsystematic approaches did little to advance the concept beyond a colloquial term and it wasn't until 2002, that more robust analyses of the concept were made. Jones and colleagues, in their efforts to explain what mental toughness is, interviewed 10 international athletes from a variety of sports. Analysis of these data led to the generation of attributes that were

consistent with a mentally tough performer, including having an unshakable self-belief in your ability and thriving on the pressure of competition. Clough and colleagues (2002) also interviewed elite athletes, coaches and sports psychologists with the aim of conceptualising mental toughness. The thematic analysis that followed revealed a construct conceptually similar to that of Hardiness (Kobasa, 1979) and facilitated the development of the Clough's 4C's model of mental toughness. Researchers continued to employ qualitative methodologies to further our understanding of the construct with Bull et al., (2005) and Thelwell, Weston & Greenless, (2005), providing evidence through interviews within cricket and soccer respectively, that mental toughness is contextually bound.

The aforementioned studies are considered seminal with respect to our current understanding of mental toughness, although qualitative investigations that followed did little to advance our knowledge of what mental toughness *is*. This can be seen in the work of Driska, Kamphoff and Armentrout (2012) as they employed the Jones' (2007) framework of mental toughness to guide their analysis. Unsurprisingly, their understanding of mental toughness was similar to that of Jones and colleagues (2007) and this replication of previous findings was common. In the first systematic review of qualitative research undertaken in mental toughness, Anthony, Gucciardi and Gordon, (2016) note this ongoing preference of scholars to employ the same research design. Researchers have often employed a thematic analysis that has not been guided by existing theory, and this fairly myopic approach has not developed our understanding of mental toughness (Fawcett, 2012).

One of the few qualitative investigations guided by theory was completed by Gucciardi, Gordon and Dimmock (2008), as they employed personal construct psychology (PCP; Kelly, 1995) to understand mental toughness within Australian football. They employed PCP as a framework as they felt it had the ability to organise the knowledge base that existed at the time. The theoretical orientation of PCT places emphasis on the ways in which individuals try to make sense of the world around them, by constructing personal theories that are

revised over time as they better understand the world in which they live (Kelly, 1995). With regards to understanding mental toughness, an individual's evaluation of their experience will shape how they understand the concept. Gucciardi and colleagues (2009) then extended this research, as they went on to suggest scholars should consider mental toughness as a phenomenon involving interpersonal and intrapersonal influences, rather than just an objective personality attribute. As result, other agents such as support staff should be included in any analysis of mental toughness (Weinberg et al., 2016). These key contributions to the literature are the result of employing a more scientific approach, when investigating mental toughness.

The understanding that the space in which athletes operate, and the interactions they have, influence what mental toughness *is,* was extended by Mahoney and colleagues in 2014. As a result, the athlete's experiences are an important aspect related to an understanding of mental toughness and they make a call for researchers to diversify their researcher methods, highlighting a phenomenological approach as one methodology that could advance or understanding of mental toughness (Mahoney et. al, 2014). Cognisant of the important role that context plays in our understanding of mental toughness, Coulter and colleagues (2016) conducted interviews with coaches and players from an Australian Football League club. After deductive and inductive analyses of interview data, they found that being mentally tough related to certain behaviours, artefacts, values, and assumptions within the club's culture. As a result, they consider mental toughness as a product of sport culture and encourage researchers to explore experiences within that culture when seeking to understand what it means to *be* mentally tough.

In addition to this, Eubank, Nesti and Littlewood (2017) have suggested the need for a socially considerate approach to investigating mental toughness. They highlight that researchers have often taken a top-down approach to understand mental toughness, neglecting the space that athletes operate in. These sporting cultures and environments carry their own values and beliefs that directly influence what it means to *be* mentally tough. Based on this assumption, if

researchers are to fully understand what it means to be mentally tough, they must adopt a wider perspective that acknowledges the importance of the culture in sport, in our understanding of mental toughness. To do this, they direct researchers to the use of qualitative methodologies, specifically phenomenology, to capture culturally consistent accounts of mental toughness. The potential of phenomenological approaches to capture culturally rich information from participant's experiences has been shown to create new knowledge within sports psychology (O'Halloran et al., 2018). This may be a particularly effective approach to understand mental toughness as there are several different elements of the sporting experience that will influence what it means to *be* mentally tough.

Considering the evidence presented above, one can understand that mental toughness is different when considering different athletes, in different teams, in different sports. By acknowledging the idiosyncrasies of mental toughness, and their value in shaping our understanding, we can now begin to understand the construct in more depth, and this began to shape the research direction moving forward. There have been calls for a more scientific approach to be employed to enhance our understanding of mental toughness (see Gucciardi & Hanton, 2016). In the first systematic review of the qualitative research on mental toughness, Anthony, Gucciardi and Gordon (2018) detail how the current empirical approaches, and their outcomes, are limited. They discuss how the ongoing preference of mental toughness researchers to employ the same theoretical framework and as previous studies and how assess the athlete as a single agent. It has been argued more recently that a lack of clarity around this concept remains, as mental toughness is "a far more opaque theoretical construct than described in the literature" (Sorensen, Schofield & Jarden, 2016, p.139). The more contemporary view of mental toughness acknowledges that the athlete's experiences, which are shaped by the space and people that surround them, are pivotal to our understanding of what it means to be mentally tough. Thus, we must adopt a framework that allows for these experiences to be explored.

3.1.2 Phenomenological Approaches in Sport Psychology

Giorgi (1997) developed phenomenological psychology in response to a criticism that conclusions from psychology lacked relevance in society. This qualitative research methodology sought to demonstrate how psychological concepts manifested in the real world, through analysing the participants lived experience. Phenomenological psychology investigates how an individual makes sense of their experiences, as it views them as a source of information that can lead to a deeper understanding of the psychological construct under investigation. Such approaches would seem highly valuable to sports psychology researchers, who often seek to develop a greater understanding of psychological concepts within a sporting context. Dale (1996) was the first to highlight the potential of these approaches within sports settings. He emphasised that this methodology had the potential to provide insights that otherwise may be unattainable, with the resulting information being useful to those who desire to meet the needs of athletes. Despite the potential novel and impactful findings this methodology could foster, its use within sport psychology research has been limited.

In 2004, Nesti described how research within sports psychology often focused on the measurement of psychological concepts. He suggests that this drive to quantify came from a perception that the discipline of sports psychology needed to validate itself, as it competed with the data rich disciplines of sports science and strength and conditioning. These disciplines could offer immediate, statistically significant research that gave them measurable value. To fight for a place at the performance table, sports psychology researchers became obsessed with chasing measurement over meaning and this race to validate led to conceptual confusion (Gucciardi & Hanton, 2016).

IPA values human experiences as it places the individual as the expert, in an effort to gain access to meaning and knowledge about a psychological concept (Smith, 2011). Researchers in the field of sport psychology have highlighted the potential of analysing the subjective experience, to advance the sports psychology literature (O'Halloran et al., 2018). With respect to mental toughness, an IPA approach would seek to understand what it means to *be* mentally tough. It would achieve this by investigating the participant's

experiences of the mental toughness in a given context. By analysing these experiences, researchers could then deduce how individuals assign meaning to them, and how this then impacts upon their view of what it means to *be* mentally tough. Indeed, the question of 'What is mental toughness?' has largely remained unanswered from when it was proposed by Jones and colleagues back in 2002. Developing a clearer understanding of what it means to *be* mentally tough, may advance the mental toughness literature and offer conceptual clarity.

In accessing the participants lived experiences, IPA often identifies the essential components of a psychological construct, which in turn reveals what make its distinguishable from similar constructs (Pietkiewicz & Smith, 2014). A common criticism of the current conceptualisations of mental toughness, are that they are not seen to be distinct enough from other closely related concepts such as grit and resilience. Evidence has been provided that highlights the differences between these concepts (see Gucciardi, 2017), although an IPA analysis may strengthen the view that mental toughness is a psychological concept in its own right. Mental toughness researchers have also been encouraged to employ greater methodological diversity, in an effort to increase our knowledge and understanding of mental toughness (Crust, 2008; Gucciardi 2017). An IPA approach offers that diversity. Taking influence from these studies, an IPA approach offers a suitable lens through which to investigate mental toughness, as it has the ability to advance our understanding of the construct.

3.1.3 Interpretative Phenomenological Analysis (IPA) and Mental Toughness

It has been strongly evidenced that our understanding of mental toughness and what it means to *be* mentally tough, is contextually bound (Bull et al 2005; Coulter et al., 2016). Cognisant of the influence that context plays in our understanding of mental toughness, an approach that investigates the participant's lived experiences, ensures that this contextual information is captured within the data. To date, there have been a limited number of studies that employ an IPA approach to investigate mental toughness. The first study of

this nature was completed in 2006, as Fawcett sought to understand how explorers, elite coaches and elite athletes perceived mental toughness. Conclusions from this research agreed with previous findings, in that mental toughness encompassed dealing with pressure, great physical coping ability, commitment and determination. As well as supporting previous research, Fawcett suggested that individual differences exist in each participant's understanding of mental toughness. The participants, who were from a variety of sports, all made sense of the concept in different ways and therefore had different perceptions of what it means to *be* mentally tough (Fawcett, 2006). These findings offered evidence that mental toughness was not only bound by context, but also by meaning, as one's experiences of mental toughness directly influence one's perceptions of what it means to *be* mentally tough. These conclusions highlight the value of employing an IPA approach, as it permits researchers to develop a greater understanding of mental toughness, by allowing any meaning attached to what means to *be* mentally tough, to be explored.

More recently, scholars have employed IPA in a single sport cohort, to develop a greater understanding of what it means to *be* mentally tough. A group of high-altitude mountaineers described their experiences of mental toughness and what it means to them. The findings presented suggested that high-altitude mountaineers accepted their physical limits and sacrificed personal goals to aid others (Crust, Swann & Allen-Collinson, 2016). This is juxtaposed to a contemporary understanding of mental toughness, which views mentally tough individuals as those who pursue goal directed behaviours (see Gucciardi, 2017). This divergence from what we think we know about mental toughness highlights the ability of an IPA approach to provide context specific information that can advance our understanding of the construct. Conclusions from a recent IPA study, within a group of Paralympians, suggested that this cohort perceived stressful situations as manageable and normal for development, linked to both the control and challenge dimensions of Clough's model for mental toughness (Powell & Myers, 2017). The conclusions listed above highlight the ability of IPA to be sensitive to differences in an individual's views of what it means to *be* mentally tough. This sensitivity that an IPA approach provides, allows

researchers to develop a new and evolved understanding of mental toughness, in a variety of contexts.

As well as being sensitive to the idiosyncrasies of what it means to *be* mentally tough, IPA approaches have also led to the construction of a sport-specific definitions and behaviours of mental toughness. Jaeschke and colleagues (2016) employed IPA to guide qualitative enquiries into ultramarathon runner's perceptions of mental toughness. This cohort represented a discrete culture within endurance sport athletes, and the adoption of IPA facilitated the collection of information that was cognisant of their understanding of mental toughness. Findings from this study led to the construction of an ultramarathon-specific definition of mental toughness and the generation of mentally tough behaviours within ultra-runners. These findings evolve our understanding of mental toughness in a unique culture and also provide information that can be used to develop effective interventions.

The studies above clearly show the value of an IPA approach to uncover a new understanding of mental toughness in a variety of sports and athletes. This methodology has previously been employed within professional rugby, as Cotterill and Cheetham (2017) sought to develop a greater understanding of captaincy experiences. The participant's experiences of captaincy highlighted the lack of formal education and training that players received when taking on the role. These findings have immediate value for practitioners, as they can enhance the effectiveness of their work. Within the sport of rugby union itself, it has been suggested that to be successful, practitioners must fully understand the context and culture that they are working in (Melleiau, 2016). By analysing the players lived experience, one can gain access to this contextual and cultural information, which can be employed to service effective research and practice. The empirical efforts detailed above highlight how IPA can access rich information that accelerate our understanding of what it means to *be* mentally tough in a variety of contexts. To date, there are no empirical studies that have sought to develop a greater understanding of mental toughness, through analysing the experiences of professional rugby players and support staff. Such a

study advances our understanding of what it means to *be* mentally tough in professional rugby, along with influencing practitioners as they support the development of mental toughness.

3.1.4 Aim

Researchers have yet to allocate a significant amount of time and resources to understand the concept of mental toughness within professional rugby union. This study will employ an IPA approach to develop an understanding of what it means to *be* mentally tough in professional rugby union. The question of 'What is this thing called Mental Toughness?' remains largely unanswered and if researchers do not consider the contextual nuances within each sport, they will fail to develop a comprehensive understanding of mental toughness (Crust, 2008). It has been argued that current qualitative efforts have lacked the scientific rigour to move our understanding of the construct forward (Gucciardi & Hanton, 2014). It is hoped that by employing existing psychological theory and diversifying our investigative approach, the present study can develop an understanding of what it means to *be* mentally tough within professional rugby.

While assessing the contemporary mental toughness literature, there is a consensus that "different people explain mental toughness differently depending on their personal experience and interactions within their own social world" (Fawcett, 2012, p. 9). Those individuals will assign meaning to mental toughness based on their own experiences, thus a methodology that accesses the lived experiences of participants would be a particularly efficacious approach. As a result, an IPA approach would provide a suitable framework with which to gather the information required to understand and conceptualise mental toughness in the context of Scottish Rugby Union. To date, this research has not taken place. In IPA, the present study has a methodology that is able to organise the knowledge base that currently exists, much like the efforts of Gucciardi and colleagues, as they employed a PCT approach in 2008.

This study will provide researchers and practitioners with valuable information with which they can begin to develop an effective, context rich mental toughness intervention. Research that conceptualises mental toughness in professional rugby union would extend current literature regarding this concept, as it would also illuminate the cognitive, emotional, situational, and behavioural components of mental toughness in rugby union. A study of this nature will also offer a preliminary insight into the processes and behavioural outcomes of mental toughness within professional rugby union. Thus, the aim of this research is threefold; firstly, to describe what it means to be mentally tough from the perceptions of professional players and support staff. Secondly, this study seeks to provide researchers and practitioners with the cognitive, emotional, situational, and behavioural components of mental toughness in professional rugby union before thirdly, operationalising mental toughness into a number of sport-specific behaviours within professional rugby union.

3.2 Methods

3.2.1 Methodological and Philosophical Underpinnings of IPA

IPA draws on three main philosophical concepts; phenomenology, hermeneutics and idiography (Eatough & Smith, 2008). It has been suggested that these philosophical pillars have often been neglected by those completing IPA research within the field of sports psychology (O'Halloran et al., 2018). If researchers seek to complete excellent IPA research, it has been noted that they must detail these philosophical principles, along with their impact upon the methodological process (Smith, 2011). The phenomenological arm of IPA places value on the subjective knowledge that the participant possesses. There have been two types of phenomenological analysis employed within the sports psychology literature, descriptive and interpretative. This study will employ one that is closely aligned to Heidegger's interpretative phenomenology, which commits to ontological enquiry and the study of being (O'Halloran et al., 2018). In the case of this study, that will lead us to assess the participant's lived experiences of mental toughness, and detail how these experiences shape their understanding of what it means to *be* mentally tough.

The hermeneutic element that exists within IPA is a dual interpretive process. The participant interprets and discusses their own experiences, before the researcher then listens to, and interprets those experiences. This interpretative component allows the researcher to bring their own understanding into the analysis, to more fully make sense of the participant's responses. The idiographic component of IPA ensures the preservation of how each individual makes sense of their lived experiences, before then comparing these experiences with others. To achieve this, IPA studies commonly use a small cohort of participants, so that responses of each participant can be attended to individually, before then making comparisons with the experiences of other participants. By taking these multiple snapshots of experience, researchers can offer a more comprehensive explanation of what it means to *be* mentally tough (Eatough & Smith, 2008).

3.2.2 Participants

Purposeful sampling of the participants is considered best practice in qualitative research, as it allows for experience-rich individuals to be recruited and further our understanding of what it means to *be* mentally tough (Patton, 2002). This process also allowed researchers to gather a homogenous group of participants, who possessed detailed experiences of mental toughness in Scottish Rugby Union, to ensure agreement with the philosophical roots of IPA (Pietkiewicz & Smith, 2012). Once ethical approval from The University of Glasgow College of Medical, Veterinary and Life Sciences Research Ethic Committee and the Scottish Rugby Union High Performance Department had been granted, support staff from the national team and both professional rugby clubs in Scotland were contacted via email. Five current, professional rugby players and three support staff took part in the study. At the time of the interview, the players (M = 27.4, SD = 2.1 years) had been playing professionally for between seven and nine years. Four of the players interviewed were Scottish and all of these players had represented their country. The other professional player was from Northern Ireland and had been playing professional rugby in Scotland for two seasons. The three support staff participants (M = 42.0, SD = 9.2 years) had been a working in professional rugby for between 13 and 25 years.

Of the support staff members interviewed, two were working within each of the two professional teams in Scotland, and the third was part of the national team staff. The support staff participants held positions that included lead video analyst, lead strength and conditioning coach and head coach. Two of the support staff were Scottish, with the third being from New Zealand. Those participants that had played or worked at clubs outside of Scotland, at times, referenced these experiences. They often used these insights as a point of comparison with their experiences in Scotland, to better articulate their experiences of mental toughness. There were no female participants selected for this study. There are currently no professional female rugby teams in Scotland and there is a limited number of female support staff working within

the two-professional teams or national team. This reflects a wider social issue that exists within male high-performance sport in the UK (Robertson, 2016).

3.2.3 Procedure

After the participants were recruited, support staff members within the professional teams and national team, were sent the following definition of mental toughness offered by Gucciardi and colleagues (2009). This definition was selected because it would allow participants to fully describe their experiences of mental toughness, as it details how mentally tough athletes think, feel, and behave, rather than simply presenting a group of positive psychological variables associated with mental toughness. These staff members were blinded to the term ‘mental toughness’, and it did not appear in any correspondence. The term ‘psychology of performance in professional Rugby Union’ was deployed instead, as the author felt it necessary to guide the participants understanding of mental toughness. When asked, lay people generated list of 75 attributes of mental toughness, highlighting the lack of understanding that surrounds the concept (Sorensen et al., 2016). By providing a definition of mental toughness, the author of the present study felt that this would ensure the participants were describing their lived experience of mental toughness. This process has been employed previously within mental toughness literature (see Thelwell, Weston, & Greenlees, 2010). Support staff members were asked to submit the names of players that were most closely aligned to qualities listed within the definition.

Seven mentally tough player’s email addresses were made available to the first author and these players were contacted for interview. Three members of support staff were identified and contacted, with the parameters for their selection were that they had extended experience working in professional rugby union in Scotland. Players and staff that expressed an interest in participating were sent an information sheet outlining the nature of the research, at this point they were made aware that they had the right to withdraw from the study at any time. A total of eight interviews were conducted, in line with recommendations made for IPA research (Smith, Flowers & Larkin, 2009). Professional players and support staff were recruited in this study, as previous

studies have indicated the value of gathering the experiences of support staff, as these insights can generate important considerations for understanding what mental toughness is (Weinberg, Butt & Culp, 2011).

Prior to the first interview, a brief pilot study was completed with a semi-professional rugby player and support staff member. This was deemed an important step as the research team were able to review the interview schedule, as they sought to conduct competent, qualitative research (Kim, 2011). Following the pilot study, the interview schedules were adapted to include a different prefix for players and support staff, to ensure clarity for the support staff members when they discussed their experiences of working with mentally to players. After the support staff member had pre-prepared information for the pilot interview, it was agreed that the definition of mental toughness would be offered to participants at the beginning of the interview, as opposed to 24 hours before. These pilot interviews also provided an opportunity for the first author to refine their ability to conduct interviews in a manner consistent with the principles of IPA. The phenomenological interview technique requires skills such as active listening, asking open-ended questions and having a level of comfort with silence during the interview (Pietkiewicz & Smith, 2012). Supervisor Ross White, who had experience of phenomenological interview techniques, provided feedback on the use of these skills within the pilot interviews.

On giving consent, the participants took part in an interview at a time and place convenient for them. Four of the interviews took place in a meeting room at the venue were the players or staff were working, while three took place in the homes of the participants. After greeting the participants, they were issued with the working definition of mental toughness detailed previously, and then asked to consider it. Once they had contemplated the definition, a semi-structured interview framework was deployed. This semi-structured interview schedule was developed following the helpful guidelines produced by Smith and Osborn (2008), and it allowed participants the space to explore their own experiences of mental toughness. A key consideration during the creation of the interview

questions was ensuring that these questions gave the opportunity for participants to describe their experiences of mental toughness in full. The interview schedule served as a guide only, it was used flexibly so that the interviewer could pursue novel lines of enquiry and uncover these unique experiences of mental toughness (Eatough & Smith 2008). Broadly, the interview schedule focused on the participant's experiences of what it means to *be* mentally tough.

As the participants were blinded to the concept mental toughness, the first author referenced the definition in terms of the qualities listed, which included attributes, values, emotions and behaviour. This grounded the participant's responses in the concept of mental toughness. The first question to which the participants responded was 'Please tell me about a team mate or opposing player who you regard as having these set of qualities?'. This allowed participants to describe the behaviours and emotional responses of mentally tough players. An elaboration question that was employed at this point encouraged participants to make comparisons between more and less tough players, as a way of describing and defining features of mental toughness more fully. The players, who were mentally tough, were then asked to position themselves in relation to the set of qualities listed in the definition, with elaboration questions being employed to facilitate a deeper understanding of the participant's experiences. These questions included "Could you please tell me a more about that?" and "Could you please expand on that for me?". Other examples of questions on the schedule included asking players to consider 'What do you think are the stages of developing this set of qualities?', 'What role does this set of qualities play in professional rugby union?' and 'Can you tell me about strategies that you think might enhance this set of qualities?'. The aim of these questions was to investigate the importance of *being* mentally tough and the participant's experiences of *becoming* mentally tough. At the end of each interview, the researcher encouraged further contributions by asking, 'Is there anything more you can add to further describe exercise mental toughness?'. The interviews lasted between 45 to 87 minutes and were recorded by two Dictaphones. Practical steps were taken to ensure the safety and security of the researcher and participants.

3.2.4 Data Analysis

The interviews were transcribed verbatim onto Microsoft Word by the first author. Manually transcribing the data allowed the first author to become immersed in the data, increasing the accuracy and richness of the analysis (Evers, 2011). After each transcription, the first author made general, preliminary comments regarding the interviews and noted any quotes that could have been considered especially relevant to the description of what it means to *be* mentally tough in professional rugby union in Scotland. A preliminary analysis of the transcribed interviews was completed on Microsoft Word, with initial comments made in the right hand column. A second round of analysis saw these exploratory comments imported onto NVivo software package. At this stage a more rigorous analysis of the data took place as these experiential codes were the grouped together into a thematic structure, with superordinate themes being identified.

The analytical strategy that was employed was consistent with that outlined by Eatough and Smith (2008). Identified themes and codes were reviewed by all the researchers who had varying levels of immersion in the texts. Finally, a master list was generated from the previous compilation of themes. This process involved carefully identifying higher order and super-ordinate themes, before then eliminating non-relevant themes that were not as prevalent throughout the text. As a result of this process, 4 main themes of the lived experience of mental toughness emerged, with associated higher order themes. Interviews were coded one at a time, with the first author attending to each individual transcript, before then coding the remaining individual transcripts. When analysing subsequent transcripts, a ‘master theme list’ approach was employed which enabled the primary researcher to find connections between the transcripts as well as novel and contradictory experiences. This approach can be fully understand as Smith describes “by remaining aware of what had come before, it was possible to identify what was new and different in the subsequent transcripts and at the same time to find responses which further articulated the extant themes” (Smith et al., 1999, p. 225).

3.25 Trustworthiness of the Data

IPA promotes the belief that it is impossible to fully interpret the participants' lived experiences, due to the inevitable biases that arise from interpreting their experiences. As a result, researchers must employ a number of techniques to ensure the validity and trustworthiness of their interpretations (Willig, 2017). Investigator triangulation is one such method by which scholars can enhance the trustworthiness of their data (Smith, 1996). Within this study, the identified themes and codes were reviewed by all the researchers who had varying levels of immersion in the texts. The contributions of the second and third authors support the credibility of the analysis, as they drew on their informed positions with respect to the research topic. In an effort to further enhance the validity of the data, the participants were provided with a summary of the analysis and offered the opportunity to review the manuscripts. This process of member-checking has been considered good practice when seeking to generate credible interpretations of the participant's responses (Tracy, 2019). Participants did not report any issues and did not request any changes to the analysis or manuscript. To add to this, quotations have been included in the results section to illustrate themes and to allow readers to form their own interpretations.

The process of bracketing is often considered a prerequisite for phenomenological approaches. This process involves the primary investigator detailing their understanding of the chosen construct, so that they can put aside past knowledge, in an effort to achieve the full phenomenological epoché. Within IPA, the researcher participates in making sense of the data, thus bracketing was not considered a fundamental process within this analysis. IPA is based on the principles that achieving this epoché is impossible and thus, rejects the idea of suspending these personal understandings (Tuffour, 2017). Callary and colleagues describe how making space for the researcher's prior assumptions about the topic will allow for a more accurate meaning to be obtained, which can then be used to inform more effective practice. Indeed, this interpretative license is critical to better elucidate and assign meaning to the participant's responses (Callary, Rathwell & Young, 2015). As a result, this study did not

include a bracketing process and permitted the primary researcher to bring his own understanding of mental toughness to the data analysis process.

While reflecting upon the generation of the data, researchers noted the influence of existing relationships between the interviewer and the players interviewed. It was interesting to note that the two shortest interviews were with two of the three players not known to the principal researcher at the time of interviewing. One player, who was not known prior to interviewing, had a family background in some sport psychology techniques, and as such represented a unique participant within the study. In contrast, the longest interview (14,332 words) was with a player with whom the principal researcher knew personally. In such a small cohort, this finding may be coincidental, although it goes some way to highlighting the important influence that a pre-existing relationship plays in the gathering of qualitative data. These relationships may have allowed for the collection for richer data.

3.3 Results

Analysis of the participant's responses revealed four superordinate themes. Firstly, characteristics of mentally tough rugby players were identified, and they included individuals who displayed a growth mentality, were self-determined and goal-orientated. Secondly, a number of behavioural outcomes of mental toughness emerged from the analysis. These behaviours were subdivided into high performance behaviours, behaviours consistent with a high work ethic and a number of unselfish acts. The third theme to emerge from the data was the influence of socio-cultural factors on mental toughness, specifically existing team values and culture, along with the presence of cultural architects or exemplars. Lastly, the fourth theme to emerge was the challenging situations that demand mental toughness, which included return from injury and team (de)selection.

Table 4. Super-ordinate, sub themes and example quote from elite rugby union players and support staff experiences of mental toughness

Super-ordinate themes	Sub-themes	Example quotes
Key characteristics of mentally tough rugby players	Growth mind-set (n=6)	they could… have feedback on a certain area that they need to do something better… they will attack that, at training doing extras, they will often seek out that feedback. (Support staff member 3)
	Self-determined (n=5)	Monday morning and you're like "Eugh, I'm fucked"… you can make excuses but that's the kind of time were I will be like right "Screw the nut… come on… this is… go out and have fun and do what you have always done". (Professional Player 2)
	Goal orientated (n=4)	like I will try… and set little targets or make goals on each of my weights, things that I am doing, almost like a bit of bodybuilding, I was like right "I am going to put on a bit of mass", so it means that now every morning I'm like "Fuck, I want to get in and smash the, my weights". (Professional player 4)
Behavioural outcomes of mental toughness	High performance behaviours (n=5)	more highly evolved, if you want to put him on that level… person is… doing all the little things. Doing your recovery, looking after your nutrition, looking after your supplementation, doing your stretching, doing all those things that… no one ever sees but… have an impact on how you perform. (Support staff member 2)
	Behaviours consistent with high work ethic (n=4)	when we are playing any game were they split you into two teams in training we're all trying to win and… just for me I will run to… like say if you the other team make a break… if there's a chance I can get back and cover it I'll run… to exhaustion when some people might just stop (Professional player 2)
	Unselfish acts (n=4)	Yeah they will… you know when you need boys to put their hand up and fucking do the nitty gritty stuff they are not going to shy away from it… and that's exactly what you want. (Professional player 3)
Socio-cultural influences and mental toughness	Team values and culture (n=5)	the culture that we have got in the last sort of… five, six years especially, everyone that comes in straight away is expected to meet the standards of everyone else or else they just get chewed up and spat out. (Professional player 1)
	Cultural architects and exemplars (n=4)	The first type of people that we have been discussing [consistent with a definition of mental toughness], they can basically keep those guys in check… and pull them into line… if not… they will basically work hard to get rid of them… and usually people like that don't last in solid teams. (Support staff member 1)
Situations that demand mental toughness	Injury (n=7)	you need a bit of mental toughness and… keeping optimistic and like… yeah obviously you need a hell of a lot of resilience to get, like injuries to come back from… you know it's easy to feel sorry for yourself and just lye around and… "Aw the whole worlds against me, how can this happen to me" but that's like pathetic, it's never going to get you back. (Professional player 5)
	Team (de)selection (n=5)	you pick your dogs and I think all three of them are… you know… go to… its sounds cliché but they will go to the dark places. (Professional player 2)

3.3.1 Key Characteristics of Mentally Tough Rugby Players

Participants detailed a number of key characteristics that are consistent with their understanding of what it means to be mentally tough within professional rugby union. They described how players they viewed as mentally tough are "willing to do whatever it takes", they have "the hunger, the drive to get better and ultimately to go out there and play" (Player 1). One support staff member highlighted the value of these characteristics with respect to performance, "I firmly believe if you have got more players… with this attitude [definition of mental toughness], especially in team sport we play, the team will play better… it will play more… than the sum of its parts" (Support staff member 3). After analysis of the data, the characteristics that made up a mentally tough rugby player were identified as; *growth mind-set* (n=6), *self-determined* (n=5) and g*oal orientated* (n=4).

3.3.1.1 Growth mind-set

Analysis of the data revealed that a having a growth mind-set was viewed as an important aspect of being mentally tough in professional rugby union. From their experiences, participants shared the understanding that a player with mental toughness will "just seem to do whatever he seems to think it takes to… better himself." (Player 4). One support staff member discussed his experiences of working with mentally tough players.

> they could… have feedback on a certain area that they need to do something better… they will attack that, at training doing extras, they will often seek out that feedback. (Support staff member 3)

From this quote, there is a sense that to be considered a mentally tough rugby union player you have to "do the extras" and "seek out feedback". In making sense of what it means to be mentally tough, this support staff member used the word "attack" to describe how these players approach this aspect of their game. There is a sense that mentally tough players look to better themselves with an enthusiasm and vigour, so much so that it provides a noticeable point of difference compared to players that lack mental toughness. A fellow support staff member also highlighted how a growth mind-set is an important aspect of being mentally tough in professional rugby union.

> players that share these abilities [definition of mental toughness] let's call it… look themselves first and go "Right how can I be better", "How can I help my team be better", which is great… in a team sport but more "Right, how can I improve". (Support staff member 2)

This support staff member recalls how players he views as mentally tough, are constantly seeking for ways to develop their abilities and they take ownership of this, as they "look at themselves first". This view is extended upon by a mentally tough player, who recalls his experiences of playing with other mentally tough players.

> having to ask coaches "Well why haven't I been selected, what can I do ?" and… some players will sit back and wait for the coach to come to them… other players will be more proactive and go to the coaches and say "Well… I'm doing everything you want, tell me what I need to do to get into this team, because I want to be in this team". (Professional player 4)

There is an acknowledgement then that being "proactive" and having a constant desire to their abilities, plays a role in this participants understanding of what it means to be mentally tough in professional rugby union.

3.3.1.2 Self-determined

In making sense of mental toughness, the participant's considered mentally tough players as those who "are self-starters" and they "are the guys that you don't have to nudge", they are often "the ones that have an internal drive to succeed". Support staff member 3 expands upon this understanding of what it means to be mentally tough, by sharing his experiences of working with mentally tough players.

> They… look at themselves first… what can they do… to improve. With people that don't have those qualities will look… more at… excuses or reasons for why something didn't work and be more external in terms of… well that was because my team mate didn't do this, or the coach… didn't do that right or… whatever weather, referee, whatever it is. (Support staff member 3)

From this quote there is a sense that being mentally tough is about motivating one's self. In recalling his experiences, a mentally tough player highlighted this.

> Monday morning and you're like "*Eugh*, I'm fucked"… you can make excuses but that's the kind of time were I will be like right "Screw the

> nut… come on… this is… go out and have fun and do what you have always done" and I will try and make sure that I will still train really well and train like I am still desperate to get in that squad, because at the end of the day you are you know. (Professional player 2)

From this quote there is a sense that being mentally tough is about striving to improve in something they want to do or achieve, the players highlighted their "love for the game" and how they are "desperate to do well". In recalling his own experiences, one mentally tough player spoke about his own drive and determination to perform at the highest level.

> I'm… still as hungry, no matter…. I'm sure you'll understand like it's… no matter what you do, as soon as you get a taste of something slightly higher, like you're never happy but I feel like that's the only way I'm going to get any better. (Professional player 5)

3.3.1.3 Goal orientated

Analysis of the participants responses highlighted that being goal orientated was an important factor in their understanding of what it meant to *be* mentally tough in professional rugby union. One mentally tough player spoke about how "there are times were you are like "This is the last thing I want to do" but ultimately… you have to have that goal in your head of ultimately where you are trying to get to." (Player 2). Another mentally tough player recalled how they employ goals within their training.

> like I will try… and set little targets or make goals on each of my weights, things that I am doing, almost like a bit of bodybuilding, I was like right 'I am going to put on a bit of mass, so it means that now every morning I'm like 'Fuck, I want to get in and smash the, my weights'… you know as supposed to being like 'Aw I have to go and do weights'… It's like I am looking forward to going in and doing my weights. (Professional player 4)

This player's experiences suggest that mentally tough players are goal orientated, as this allows them to behave in a way that is consistent with mental toughness in professional rugby union. There is a sense that mentally tough players enjoy pushing themselves and achieving their goals. Another mentally tough player highlighted how goals have played a role within his career.

> So… when I was younger I remember being desperate to make the Cale U16s, it was like district stuff "if I can just makes this squad it would be amazing" and then you get named in the squad and you are like "right, I want to start" and as soon as you start your like "Right I want to start for Scotland 17s" you know and it just kind of… spirals. I remember just being like "one cap" what I would do for one cap… for [name of professional club] and then like I got one cap and it was amazing, then I was like right "I want to start a game" and I started a game. (Professional player 2)

It is clear from the quotes above that having established performance goals and being goal-orientated is an important aspect of what it means to *be* mentally tough in professional rugby union.

3.3.2 Behavioural Outcomes of Mental Toughness

As participants described their experiences of playing and coaching mentally tough rugby players, a number of behavioural outcomes emerged. At their core, these behaviours emphasised how mentally tough players "never give up", "do not shy away" and "give everything". The participants understanding of what it means to *be* mentally tough was grounded in the display of these behaviours, with player 3 suggesting that mentally tough players "will display all the behaviours". From the analysis these behavioural outcomes can be separated into; *high performance behaviours* (n=5), *high work ethic* (n=4) and *unselfish acts* (n=4).

3.3.2.1 High performance behaviours

The most frequently cited behavioural outcome of *being* a mentally tough player was contained within the theme of high-performance behaviours. Player 2 described how these behaviours can encompass "being physically and mentally as prepared as possible". In making sense of what it means to *be* mentally tough, support staff member 2 referenced his experiences of working with players that lacked mental toughness and the behaviours consistent with this.

> …it doesn't mean anything else, and it's just pulling a pay cheque every month, whereas professional to that… more high evolved, if you want to put him on that level… person is… doing all the little things. Doing your recovery, looking after your nutrition, looking after your supplementation, doing your stretching, doing all those things that… no one ever sees but… have an impact on how you perform. (Support staff member 2)

This quote suggests *being* mentally tough is doing "all the little things" that "no one ever sees". This support staff member then makes the suggestion that players lacking mental toughness, are not willing to complete these behaviours as to them, it is "just pulling a pay cheque". Player 3 extends upon this understanding, as he recalls his experiences of playing professional rugby with mentally tough players.

> All three of them prepare really, really well, like I said they will put in lots of preparation from the start of the week so that… when, by the time the game comes they all know their role… you know we have got a playbook that will have 20 plays on it and the majority of those plays will have three or four phases to kind of… before the strike comes… so like everybody needs to know their role exactly for what rucks you are in. (Professional player 3)

This player acknowledges the mental preparation that these players go through, in preparing to perform. He believes that this is an important aspect associated with *being* mentally tough. Display behaviours associated with "knowing their role" and this is what this player assign mental toughness too.

3.3.2.2 Behaviours consistent with high work ethic

In their understanding of mental toughness within professional rugby union, players recognised that "people with these sort of qualities are, they are just going to work really hard" (Player 4) and "will step up and they will just fucking grind it out" (Player 3). Similarly, Player 1 described teammates that lacked mental toughness as those that are "lazy and kind of cut corners" (Player 1). To extend these behavioural descriptions beyond a general summary, Player 2 shares why he believes he is viewed as mentally tough.

> when we are playing any game were they split you into two teams in training we're all trying to win and… just for me I will run to… like say if you the other team make a break… if there's a chance I can get back and get back and cover it I'll run… to exhaustion when some people might just stop (Professional player 2)

Displaying these behaviours when he could just "stop", is a fundamental reason as to why this player feels he is viewed as mentally tough. This ability to work hard when others won't is fundamental to *being* mentally tough, and this is a

view that is shared by others who described mentally tough players as those that "will stand up, they are not going to shy away from it… I'd say that's the biggest one probably" (Player 5). Players feel that it is important to display these behaviours, as showing up to difficult experiences and not avoiding them is what it means to *be* mentally tough. One player recalls a particular episode which is central to his understanding of what it means to *be* mentally tough.

> …back to like the semi-final of the league a few years ago, we were just playing pretty shit, we were against Ulster at home, and we were playing terrible… they had the ball and it was just relentless, time and time and time again they were just battering us, but like… you know guys like you are saying that have all of this, they will be the ones that will just step up and make their tackle, make their tackle, make their tackle, they are not going to then… lie in the ruck. (Professional player 4)

This theme of high work ethic penetrated many aspects of mental toughness, and support staff member 1 was drawn to his experiences of working within the environment of professional rugby union.

> players that don't have that quality, some of them will just… avoid the extra work all together, they will do the bare minimum to get by… some of them will do it when they know the coach is going to be around. (Support staff member 1)

This quote highlights the antithesis of the behaviours displayed by mentally tough players, and in making sense of this we develop a better understanding of what it means to *be* mentally tough in rugby union.

> *I mean players… the weaker minded players will, the less mentally resilient, the less mentally tough will always find, try and find a soft shoulder… in a management group and will try and almost back door the system and basically not toe the line effectively. (Support staff member 1)*

This quote provides an insight into a broader view of what it means to *be* mentally tough, through a participant's experiences of less mentally tough players. There is an understanding that mentally tough players will not take the easy option, in a physical sense of a "soft shoulder" or within the organisation as they try to "back door the system".

3.3.2.1 Unselfish acts

On a number of occasions, participants referenced how mentally tough players are always "personally sacrificing for the team" (Player 5). While sharing his experiences of mental toughness, support staff member 2 compared mental toughness between players, and illustrated the selfish nature of player's that lack mental toughness.

> another team, I probably should not say who that was, but you would never get anyone offering to help you and you basically just think… this team is not going to be very successful because…there's more people who want to put their hand out to get something… rather than put their hand up to volunteer to do something, and I thinks that a massive factor. (Support staff member 2)

Support staff member 3 feels that an unselfish nature plays a role in his understanding of what it means to *be* mentally tough, along with its links to creating a successful team environment. This view is extended upon by player 3 as he shares an example of this theme.

> Yeah they will… you know when you need boys to put their hand up and fucking do the nitty gritty stuff they are not going to shy away from it and that's exactly what you want. (Professional player 3)

For this player, mental toughness is about doing the "nitty gritty" and unseen work, around the pitch that tends not to receive attention, acknowledgement or recognition, especially in the media. This fundamental to what it means to *be* mental tough in professional rugby union.

3.3.3 Socio-Cultural Influences and Mental Toughness

In making sense of what it means to *be* a mentally tough player, participants reported that "in terms of a wider squad… you need those players underpinning… what it means to *be* a [name of professional club], what it means to *be* a professional rugby player… they can model behaviours to improve themselves and others." (Support staff member 3). The analysis revealed that mentally tough players "underpin" the team's culture and values. Analysis of this theme also suggested the influence of mentally tough players on others, as one support staff member described how "the more people within the group that have these qualities [definition of mental toughness] they will drag people with them."

(Support staff member 2). These quotes offer a summary of themes that emerged within the superordinate theme of social-cultural influences and mental toughness, namely; *team values and culture* (n=5) and *cultural architects and exemplars* (n=4).

3.3.3.1 Team values and culture

The participants understanding of what it means to *be* mentally tough was often described through their own constancy with the team's values and culture. Participants recalled how mentally tough players "are consistent with it, they will…. reinforce your… sort of attitudes with the rest of their team mates." (Support staff member 1). This alignment with the team values and culture also emerged when one mentally tough player recalled his experiences of players who lacked mental toughness, coming into the environment of professional rugby union.

> the culture that we have got in the last sort of… five six years especially, everyone that comes in straight away is expected to meet the standards of everyone else or else they just get chewed up and spat out. (Professional player 1)

With respect to the team values and culture, this player made sense of mental toughness as "meeting" the standards of the team, as those that lacked mental toughness often failed to meet these standards. Another mentally tough player extended upon the notion that players who lack mental toughness are "chewed up and spat out".

> if there are two or three people that don't possess that [definition of mental toughness]… either they have to change… because they realise that's the norm and to fit in the group… you have got to fit in with the norms and that's how they will behave, or they will be repelled and don't want to be there… which happens… there is environments where people have a different way of training or viewing their week… and… if they are not in that group of everybody…. training these behaviours… these attitudes then they will drift away (Player 4).

From this player's experience, he saw mental toughness as realising, and then adopting the "group norms", those players that lack mental toughness are not able to do this and are "repelled". The ability of mentally tough players to adopt the culture present within the club was a view shared by support staff

too, as a support staff member also referenced an occasion when his club brought new players in.

> I think because they had that [definition of mental toughness]… for example, a player was brought in from another club who was known to be a bit of a… dick and… it was look, well two players, one player left… because he didn't suit… the culture or… he was wrong for the club… he didn't fit that family so he left. Were as the other person, adapted, started displaying more of these behaviours and went on to be internationally capped. So the culture of the team… is forcing those behaviours on the player when they are in there. (Support staff 2)

This quote captures, in part, what it means to *be* mentally tough. It is the ability of player to behave in a manner consistent with the values of the team. Players that are unable to do this are considered to be less mentally tough and ultimately, they will not remain in a mentally tough environment.

3.3.3.2 Cultural architects and exemplars

When making sense of mental toughness, the participants reflected on their experiences involving other mentally tough rugby union players. One support staff member discussed how "those people we are discussing [players with mental toughness], are the ones that drive that process and… by their strength of character, will drag people on board with them." (Support staff member 1). There is a sense that mentally tough players develop and drive the culture within the team. Participants were also cognisant of the exemplar role that mentally tough players often adopt, as these players are the embodiment of the team's culture. One player recalled how "we've got loads of guys like that, you know if you are a young kid coming in there is plenty of players that you can be like "Fucking hell that's good", you know." (Player 1). This understanding that these players set and drive standards was also captured as a support staff member shared his experiences of working within professional rugby union.

> they help set the standards at training as well so if you… maybe have… a situation where the team are coming back from a defeat or… maybe there is not as many people like them in the session, you lean on them or they will… set the standards and… when I'm putting together a squad in terms of recruitment… these players… aren't always the best players in terms of ability in your group, but you need them to drive the day to day… that underpins the very good players. (Support staff member 3)

This quote captures the proactive role that these mentally tough players have with respect to setting and driving the standards within the club. From the analysis there was also an understanding that emerged, one which highlighted how mentally tough players were also players projected as the embodiment of the culture present. On player captures this when he shares his experiences of being in a team with another mentally tough player.

> you know he still trains every day, still puts it out there, he still runs his meters and you we have GPS's on all the time and I think that for a young kid seeing him do that and smashing it, that will make them you now be like that's what I need to do, I need to be like him, I need to work, I need to do make sure I do my analysis, I have got to work fucking hard at training and I need to smash my gym stuff. Like you can all see it coming together. (Professional player 2)

From a player's perspective, there is an understanding that mentally tough players set these expectations for performance and embody what it means to *be* a professional rugby player. This view was shared by a member of the support staff who extends upon this meaning associated with mental toughness, these mentally tough players set and police the standards within the team.

> I think every teams got them, but… depending on the strength of the group of the… first type of people that we have been discussing [consistent with a definition of mental toughness], they can basically keep those guys in check… and pull them into line… if not… they will basically work hard to get rid of them… and usually people like that don't last in solid teams. (Support staff member 1)

A support staff member also noted how "you have people who possess those qualities [definition of mental toughness] that model them to the younger players that are coming in… it's going to influence how they behave and then they start to influence people younger. So modelling is really important." (Support staff member 3).

3.3.4 Situations that Demand Mental Toughness

Analysis of the data revealed that there are a number of identifiable situations that demand mental toughness. This theme stemmed from the understanding that "setbacks in life are inevitable, it's rare that you see people just fly through life… without any sort of bumps in the road" (Player 1). The participants understanding of what it means to *be* mentally tough was grounded in their own,

and others, experiences of coping with these difficult situations. There was an acknowledgment that within professional rugby union "there are challenges with injury where you are not able to play, and with selection when you are not picked to play… and it can be… quite tough" (Player 3). Thus, these situations were separated into; *injury* (n=7) and *team (de)selection* (n=5).

3.3.4.1 Injury

On a number of occasions, participants referenced how players with mental toughness approached being injured. One support staff member recalls how injured players who are mentally tough are "still there every single day working hard to… get back as quickly as they can to… not only progress their own careers but also to help the team" (Support staff member 1). While sharing his experiences of being injured, a mentally tough player also highlighted what a challenging situation this can be.

> you need a bit of mental toughness and… keeping optimistic and like… yeah obviously you need a hell of a lot of resilience to get, like injuries to come back from… you know it's easy to feel sorry for yourself and just lye around and… "Aw the whole worlds against me, how can this happen to me" but that's like pathetic, it's never going to get you back. (Professional player 5)

From this extract there is a sense that those who lack mental toughness take a pessimistic view and are lazy in response to the challenges associated with being injured. Another mentally tough player described his attitude that sits in complete opposition to players who lack mental toughness.

> like I am finding it at the moment that there are some other guys in… long term injured group that I'm like… what the fuck are you doing with your time… you know you are hoping to be back playing in six weeks and… you know, all your looking for is a day off through mid-week… it pisses me off, people like that so… I think you need to work hard when you are injured, you should be working hard to get back fit. (Professional player 2)

This player assigned meaning to having a particular attitude when injured, one in which you do everything you can to come back quickly and stronger than before. For this player, this is what it means to *be* mentally tough in this situation. This quote also highlights the frustrations that mentally tough players feel when working with players that lack mental toughness, as they look for "a

day off". This attitude stands in juxtaposition to a mentally tough player's view, one that is enthusiastic and eager to return.

> I remember the first few days running out to do fitness when normally you are like 'Ah fucking fitness' like all of a sudden you are like 'Yes! I can run' you know? 'I can't wait to run' and like the first contact session you are like 'Who wants to tackle? Yeah I do some tackles' because you are desperate to… to do it. (Professional player 2)

Player 2 is able to provide a particularly rich account of what it means to be mentally tough in this situation, as he was coming back from a recent injury.

3.3.4.2 Team (de)selection

A player's ability to manage team selection decisions was identified as important in the participants understanding of what it means to *be* mentally tough within professional rugby union. One support staff member emphasised the prevalence of this situation within professional rugby union as "we have 46 players in our squad and only 23… or 15 start every week… and 23 are in the squad… so that's almost half that group know they are not going to play every week." (Support staff member 3). With respect to not being selected, participants understood mental toughness in response to this is about "trying hard and coming up short… but then having the perseverance to actually… come back and try again." (Support staff member 1). This "perseverance" to continue to push for a place in the team was also referenced by a support staff member, as he made sense of his experiences of working with mentally tough players.

> the biggest test of a player is… and accepting himself that, if he is the number three half back for example and… he is just not getting any game time at all, he is just going to have to accept that maybe he is just not as good as… the other two blokes ahead of him and because we often say that you are one injury away from being the number one or the number two, so you basically have to stick with it and I think… (Support staff member 2)

This support staff member highlighted how he perceived mental toughness as the ability of a player to continue to "stick with it" when they are not being selected. Mentally tough players also acknowledged that for certain games players may be selected based on their perceived levels of mental toughness. One player recalled an instance playing against a less established team in the league, as he described how "they're shite" and "it's a shite trip".

> you pick your dogs and I think all three of them are… you know… go to… its sounds cliché but they will go to the dark places. (Professional player 2)

Through his experience of playing with mentally tough players and their ability to perform and go to "dark places", this player felt that this was a reason for their selection ahead of other talented players, who may be less mentally tough. A support staff member also recalled an instance when his team recruited based on the concept of mental toughness.

> if you recruit with character… from character in the first place, these sort of qualities that we are discussing, about these sort of resiliency and the mental toughness, and the ethics and the values… they are more or less ingrained and the process… of going through, working hard and… playing games and sometimes losing and sometimes winning but…brings out those strength of characters even more. (Support staff member 1)

It is clear from these quotes that mental toughness is an important factor within professional rugby union, as it allows players to cope with the demands of the game and is considered an important component linked with positive performance outcomes.

3.4 Discussion

The aim of this study was to develop an understanding of what it means to *be* mentally tough in Scottish Rugby Union. This aim was explored through analysing the lived experiences of elite, mentally tough rugby union players and support staff that had experiences of mental toughness in professional rugby union. Central findings of the current study indicated a number of key characteristics associated with mentally tough rugby union players, behavioural outcomes of mental toughness, socio-cultural links with what it means to *be* mentally tough and a number of situations that demand mental toughness. Previously researchers who have examined mental toughness, have done so through a PCP framework and in doing so have given attention to the athlete's experiences, in how they understand mental toughness (Gucciardi, 2008). More recently this emphasis on an investigating an athlete's experiences has been extended upon, with researchers employing an IPA approach to assess mental toughness (Crust et al., 2016). This study extends previous mental toughness research by exploring mental toughness within a previously unreported cohort of elite of rugby union players and support staff.

3.4.1 Key Characteristics of Mentally Tough Rugby Players

The findings of the present study highlight a number of key characteristics associated with mentally tough rugby union players, characteristics that have a positive association with rugby union performance. This conclusion agrees with previous research detailed within this thesis, and within the mental toughness literature (Cowden, 2017). Players and support staff acknowledged that having a drive to develop their rugby abilities was an important aspect of what it means to *be* mentally tough in professional rugby union. Previous research would support this understanding, as it has detailed how striving (Mahoney et al. 2014) and personal growth (Gucciardi & Gordon, 2009) are important aspects of mental toughness. In making sense of their experiences, participants suggested that this drive to get better occurs not just in response to challenging moments, as mentally tough rugby players are constantly seeking to develop their abilities. This is consistent with a contemporary understanding of the construct (Gucciardi & Hanton, 2016). This pursuit of mastery is equivalent to a growth mind-set (Dweck, 2017), which is an important aspect of what it means to *be* mentally

tough in professional rugby union. This consistency of effort to pursue mastery, is a view that is in opposition to an understanding that mental toughness can fluctuate (Weinberg et al., 2017). The conclusions of the present study promote that mentally tough rugby union players are consistent with their actions.

Participants also recalled how mentally tough rugby players took control of their own performance, and experiences of this played an important role in their understanding of what it means to *be* mentally tough in professional rugby union. Themes of determination and self-belief have consistently emerged as important characteristics of mental toughness, as viewed by support staff (Weinberg et al., 2011) and players (Jones et al., 2007). The participants detailed how this determination allows them to retain psychological control on difficult training days. This mirrors an understanding of mental toughness in swimming, as support staff viewed retaining psychological control on poor training days, a key aspect of being mentally tough (Driska, 2012). The concept of mental toughness has also been bridged with motivation theory, as Mahoney and colleagues (2014) employed self-determination theory (SDT) to reconceptualise mental toughness. They suggested that mental toughness is indicative of how athletes strive, survive, and thrive in their ongoing pursuits of performance standards. This understanding is consistent with findings in the present study, as participant's experiences of what it means to *be* mentally tough in professional rugby union included players who had a drive to succeed.

Participants also shared an understanding of mentally tough players that promoted their goal orientated nature. From early efforts to understand mental toughness, such as Jones and colleagues (2002), having an ability to achieve your goals was an important attribute with respect to mental toughness. This theme was emerged in a recent qualitative investigation into the concept (see Weinberg et al., 2017), indeed the concept has been defined within the framework of completing goal directed behaviours (Gucciardi, 2017). Participants felt that this goal focus allowed mentally tough players to pay attention to what they must do. This is consistent with the views of Jones and colleagues (2007), as they provided a framework of a mentally tough performer

that suggested being goal orientated, allowed mentally tough players to stay focused on the task in hand (Jones et al., 2007).

The present study details a number of characteristics, all of which have been commonly identified throughout the mental toughness literature. In this respect, the findings highlight that attributes of mentally tough rugby players are consistent with what it means to *be* mentally tough across a number of sports. This study provides fewer characteristics than previous research, which has often presented an exhaustive list of characteristics associated with mental toughness. This has led to conceptual confusion as the concept has been linked to every positive psychological attribute (Jones et al., 2002; Gucciardi et al., 2009a). As a result, an accurate and clear understanding of what it means to *be* mentally tough, has remained elusive (Weinberg, 2011). The present study offers fewer, more frequently reported, characteristics in an effort to capture a clear understanding of what it means to *be* mentally tough in professional rugby union.

3.4.2 Behavioural Outcomes of Mental Toughness

The process of identifying and describing what mentally tough players do, in making sense of what it means to *be* mentally tough, led to the generation of behavioural outcomes of mental toughness. Participants found that mentally tough players prepare very well with respect to their nutrition, video analysis and learn rugby specific information. The completion of these non-pitch behaviours is aligned to an understanding of mental toughness in academy football players, as Cook and colleagues suggest *being* mentally tough is having a commitment to excellence (Cook et al., 2014). The consistency of mentally tough players behaviour has been reported within the literature, as Gucciardi and colleagues (2014) found a positive relationship between behavioural perseverance and mental toughness. Researchers have focused on the behaviours that mentally tough rugby players perform within in training and competition, as seen in Jones and colleagues (2007). Findings from the present study highlight link positively with the conclusions of these aforementioned studies that suggest to *be* mentally tough, there is an emphasis placed on actions beyond the pitch.

Like many, participants perceived mental toughness as working hard and grinding it out, when others would stop. This finding is in agreement with qualitative investigations into mental toughness, that conceptualised mental toughness as going the extra mile (Bull et al., 2005) and having a high worth ethic (Coulter et al., 2010). There have been behavioural investigations into mental toughness, which show that the concept manifests as chasing every ball down in football (Diment, 2014) and fighting for every point in tennis (Gucciardi et al., 2015). The participants understanding of mental toughness is consistent with these studies, although in addition to this participants also concluded that players who lack mental toughness, will seek to cut corners and find and easy path with the environment itself. This finding offers support to themes that have emerged, with other studies that link mental toughness to a positive relationship with coaches (Driska, 2012) and a conformity to the sporting culture present (Tibbert et al., 2014).

Recent conceptualisations of the concept have suggested that mentally tough performers can be selfish and single minded (Vaughan et al., 2018). The findings of the present study stand in opposition to these views, as both players and support staff understood mental toughness in rugby union as personally sacrificing for the team and completing unselfish behaviours. This finding correlates strongly with an understanding with what it means to *be* mentally tough within climbing, promoted by Crust and colleagues (2015). Participants came to this novel understanding of what it means to *be* mentally tough in professional rugby union, through recalling their experiences with players that lacked mental toughness, as they described them as lazy and looking for an easy option. This conclusion reinforces the value of making space for participants to explore mental weakness, in understanding mental toughness (Harmison, 2011).

3.4.3 Socio-Cultural Influences and Mental Toughness

Perhaps the most important finding within the present study is that being aligned to the team's values and being active in shaping the team culture, is an important aspect of what it means to *be* mentally tough. The suggestion that

external influences impact upon how mental toughness is understood, is one that is consistent with previous research completed by Sorensen, Schofield & Jarden (2016). Indeed, the understanding that being aligned to the team's values is linked to an understanding of mental toughness has been promoted by Tibbert and colleagues (2015). They presented evidence that highlighted how embracing the norms and ideals of the culture present, was an important part of the toughening process. The findings of the present study extend this view, as embracing these norms is not just part of the toughing process, but plays a role in understanding what it means to *be* mentally tough. In their cohort of Australian football, Tibbert highlighted that the culture present was one of hyper masculine behaviour, typified by a no-pain no-gain attitude. The culture within the present study was grounded in doing extras and working hard. At a different club, this culture and thus an understanding of what it means to *be* mentally tough, will be different. These conclusions support previous research that emphasises sports should be investigated individually (Crust, 2008) and that mental toughness can mean different things, to different people (Crust, Swann & Allen-Collinson, 2016).

Coulter and colleagues (2015) found that mental toughness related to certain behaviours, artefacts, values, and assumptions within the club's culture. Indeed, these subcultural ideals define what it means to *be* mentally tough. This supports the findings of the current study. Within the subculture of Australian football club, they also identified that mentally tough players were linked to being cultural architects, which again was reported within the present study. Eubank, Nesti and Littlewood (2017) promote the importance of taking a top-down approach to understanding mental toughness, whereby the space in which the performers are situated, is considered. The results of the present study re-emphasise the need to investigate the performer's interactions with the systems and agents around them, to achieve a more complete understanding of mental toughness. One novel finding, the sense that mentally tough players shape the culture and are the epitome of the culture present. The example give of a new player coming into the environment, if mentally tough they can adapt and be consistent with it. In this, there was a suggestion that mentally tough players in the environment modelled behaviours for incoming players. This conclusion is

consistent with researchers who have shown that vicarious learning experiences can enhance mental toughness (Thelwell et al., 2010).

The results promoting the links between socio-cultural influences and mental toughness, in part, support the claims that mental toughness is not an empirically measurable attribute, it is pseudoscientific concept that is constructed in line with dominant sporting ideals (see Caddick & Ryall, 2012). The findings of the current study suggest that those ideals do play a role in what mental toughness *is*, but the consistent emergence of attributes and behaviours associated with mental toughness proposes that is more than just this. The present study promotes researchers to investigate the origins and nuanced meanings attached to mental toughness, along with the various behaviours consistent with the term in particular context, in a an effort to fully understand what it means to *be* mentally tough,

3.4.4 Situations that Demand Mental Toughness

Both players and support staff identified seminal instances when mental toughness was required as a professional rugby player. Indeed, the ability to cope with critical incidents has always played a role in both the development and understanding of what it means to *be* mentally tough (Connaughton, Hanton & Jones, 2010). From Jones and colleagues (2007) framework of mental toughness, there was an understanding that mental toughness is required across variety of situations and in developing an understanding of these situations, scholars have developed a greater awareness of what it means to *be* mentally tough. Being mentally tough in rugby union was understood in terms of coping with injury, which is in agreement with previous research that sees overcoming trauma and adversity as consistent with mental toughness, both in Paralympians (Powell & Myers, 2017) and elite youth tennis (Weinberg et al., 2017). Embedded within the participants' experiences of mental toughness and injury, there was a sense that players can set aside the disappointment associated with the situation and focus on the present. This conclusion offers support to the direct forgetting paradigm, as a cognitive process for being mentally tough (Dewhurst et al., 2012). It is clear from the results that mentally tough players appraise these

situations as an as an opportunity to develop, this finding corroborates with conclusions that highlight the positive relationship between mental toughness and effective coping strategies (Nicholls et al., 2011).

Successfully coping with not being selected was also an important situation that participants felt defined what it means to *be* mentally tough in professional rugby union. A novel finding from the present study was that participants felt, at times, players would be picked based on their perceived levels of mental toughness. Quantitatively, evidence exists that suggests mentally tough players reach a higher level of performance than their less mentally tough counterparts (Crust & Azadi, 2011). Thus the selection of mentally tough players ahead of the less mentally tough players, is unsurprising. Although what is novel, is that the participants felt that there were specific matches were talent was superseded by a player's mental toughness, with respect to selection. This highlights the importance of accurately capturing what it means to *be* mentally tough, along with an accurate measure of mental toughness, so that effective selection decisions can be made that will enhance a team's performance outcomes.

3.4.5 Limitations and Future Research

Qualitative research now plays a central part in advancing sport and exercise psychology knowledge, as the methodology explores and understands the meaning people assign to their experiences (Kay, 2016). The present research offers insights into players and support staff experiences of mental toughness in professional rugby, although there are limitations to these findings. The limitations inherent within IPA research have been documented, with questions regarding the ability of IPA to accurately capture the meanings of experiences, rather than just opinions of it (Tuffour, 2017). The experiences detailed within the present study are also domain specific and should not be generalised or compared with other professional sports. The author of the current study would suggest that this is no longer a limitation of sport specific studies, it is grounded in an understanding that there are socio-cultural influences that play a role in what it means to *be* mentally tough, thus the understanding won't transfer over. As a branch of phenomenological research, IPA seeks to understand the lived

experiences of participants although it does not explain why they occur (Tuffour, 2017). Within the content of the participant's responses, there was naturally information that could provide information on the development of mental toughness. The focus of the study was grounded in what it means to *be* mentally tough and so the development was not explored fully. Professional rugby is diverse in terms of the experiences that players have and these interviews provide a snapshot of the perception of players and support staff within Scottish professional rugby union. Based on the understanding of mental toughness, the findings of the present study cannot be extended to wider populations with the same degree of certainty that quantitative analyses can.

There are a number of important practical implications that have emerged from this study. The identification of key characteristics that are consistent with what it means to *be* mentally tough within rugby union, will allow for the development of an effective intervention that seeks to foster the development of these abilities in professional players. With the knowledge that the one's understanding of what it means to *be* mentally tough is different, to different people (Allen-Collinson, 2016), practitioners and researchers must first develop an understanding of what it means to *be* mentally tough within the cohort in question, before then seeking to enhance mental toughness. Proceeding on without this information would lead to the development of an intervention that is incomplete. This supports the views of researchers, who emphasise that one size-fits all model is not sufficient to support mental toughness development, from an empirical or applied standpoint (Jaesckehe et al., 2017).

Results within the present study also detail how mental toughness plays out within a professional rugby union context. These behavioural outcomes could be utilised to develop a sport-specific measure of mental toughness. Within the sport of rugby union, there is a plethora of behavioural information contained within the notational analysis that professional rugby union clubs complete. Research of this nature would identify rugby-specific behaviours that are consistent with mental toughness, and would provide the basis for a mental toughness training program. With the lack of conceptual clarity and issues of

self-presentation bias, a behavioural measure of this concept may also lead to the development of a valid and reliable measure of mental toughness, one that is grounded in a true understanding of what mental toughness *is*.

The understanding *being* mentally tough is assigned based on how consistent players were with the team's values and culture, is an impactful result that can be applied to develop an effective intervention. Values based therapies, such as the mindfulness and acceptance approach (see Gardner & Moore, 2008) may provide an innovative approach to the development of mental toughness. There has been a call for who research mental toughness to diversify their efforts (Anthony et al., 2018) and the adoption of a values-based therapy to enhance mental toughness would action this. Each of the situations identified represent environmental challenges that are likely to occur throughout a player's career. An awareness of these difficult situations will allow researchers and practitioners to provide additional support in and tailor intervention efforts to coping with these situations.

3.5 Conclusion

Within the sport of rugby union itself, it has been suggested that to be successful, practitioners must fully understand the context and culture that they are working in (Melleiau, 2016). By investigating the player's lived experience, this study has given those that wish to support player performance, the necessary contextual and cultural information that will inform effective practice. The use of a phenomenological approach, such as IPA, has also addressed calls within the contemporary mental toughness literature to use novel methodologies, in an effort to develop a more complete understanding of the concept (see Anthony et al., 2018). The aim of this research was to describe what it means to *be* mentally tough within professional rugby union, and the results presented above show that mentally tough rugby players possess a growth mind-set, are self-determined and goal orientated. These conclusions have been commonly identified throughout the mental toughness literature, but there were also novel aspects to being mentally tough within professional rugby union.

A number of outcomes associated with mental toughness were identified within the results, which are in keeping with the "third wave" of behavioural studies that are emanating from this research domain (see Gucciardi & Hanton, 2016). The identification and availability of mentally tough behaviours that are specific to professional rugby union, warrants a behavioural investigation within the sport. In line with the work of Cook and colleagues (2014), this study took an interest in how mental toughness 'plays out' in a specific sporting context. In doing so, links were identified between socio-cultural influences and rugby specific situations that demand mental toughness. The hope is that the current study has moved the mental toughness research narrative forward, and closer to a more complete understanding of what it means to *be* mentally tough. This study is the first to provide an understanding of what it means to *be* mentally tough in professional rugby union and offers a potentially informative standpoint from which researchers can consider the processes that are involved in *being* mentally tough. This information can then be utilised to design interventions that build mental toughness and enhance performance in in rugby union.

4. “I get knocked down, but I get up again”: The Measurement of Mental Toughness through Notational Analysis in Professional Rugby Union

4.1 Introduction

Within professional rugby union, a player’s psychological qualities have been described as “the glue that holds together the technical, tactical and physical aspects of the game” (Nicholls & Callard, 2012, p. 7). Despite this perceived importance, our understanding of the psychological abilities that underpin superior rugby union performance remains limited (Quarrie et al., 2017). This absence of knowledge is a surprising gap that exists in the contemporary literature, as identifying psychological factors that contribute to sporting success and team selection, would facilitate the development of training programmes that could enhance performance. As a sport, professional rugby union places a huge physical demand on the players. The high number of contact events in a game and the length of the playing season, have led to it being labelled a brutal occupation (Aylwin, 2016). Running alongside these physical demands are the sport-specific psychological demands, such as making errors, coach criticism and the constant evaluations of one’s performance and non-sport stressors such as diet and home life (Nicholls et al., 2006; Nicholls et al., 2009; Quarrie et al., 2017). Taken together, for professional rugby union players to be successful, they must develop their ability to cope with large physical and psychological loads.

Like many modern-day professional sports, rugby union utilises technology to produce ‘big’ data. The belief is that this data-driven, statistical approach will allow players and support staff to access knowledge that will enhance performance (Boyd & Crawford, 2012). More recently it has been suggested that this endless evaluation of performance can create a maladaptive association with these metrics, as the added demand can negatively impact a player’s performance (Williams, Manley, & Millington, 2017). With this in mind, it is imperative that support staff collect and utilise data in a manner that positively

supports athletes and athletic performance, measuring salient concepts and behaviours within the sport. With the technological advancements and plethora of performance data that is now available to staff and players, it is important that only impactful information is reported, so as to not overwhelm players.

The concept of mental toughness is a construct that has been linked to more effective coping and has also been shown to facilitate superior performance in rugby union (Holland et al., 2010; Kaiseler, Polman, & Nicholls, 2009). The construct itself has become a prevalent expression within modern day sporting discourse, although empirically there is a shortage of studies investigating mental toughness within rugby union. A chronological assessment of the research to date reveals the waves of mental toughness research that have taken place. The first wave of research was unsystematic, as the scholarly activity was simply several practitioner's own views based on their experiences working with athletes. The second wave, which began at the turn of the century, was considered as a period when researchers generated a list of unobservable personal attributes associated with the concept, as they tried to develop a greater understating of what mental toughness is (Gucciardi & Hanton, 2016). Within this second wave, both qualitative and quantitative methodologies were employed to understand the construct, but the impact of these efforts has been criticised.

It has been suggested that qualitative investigations into mental toughness have been guilty of employing a similar process to understand the construct as Anthony, Gucciardi, & Gordon, (2016) note how researchers have often conducted semi-structured interviews with experienced informants, using a similar framework to guide these interviews. This can be seen in the repeated use of Jones, Hanton, & Connaughton, (2007) framework of mental toughness, leading to researchers offering very similar conclusions. Unsurprisingly then, this replication led to a stagnation in our understanding of what mental toughness is (Gucciardi, 2017b). Criticisms have also been levelled at the use of cross-sectional, quantitative assessments to understand mental toughness. These studies often sought to relate mental toughness to a number of associated

concepts, in essence defining what mental toughness *is*, through other concepts. This can be seen in the links with coping (Nicholls, Levy, Polman, & Crust, 2011), hardiness (Clough et al., 2002), self-awareness (Cowden, 2017), mindfulness (Jones & Parker, 2018) and dispositional flow (Crust & Swann, 2013). It has been suggested that this approach has compromised the distinctiveness of mental toughness, and further contributed to this conceptual confusion. The imprecision and ambiguity of these qualitative and quantitative approaches has even led scholars to question legitimacy of mental toughness as a scientific construct (Andersen, 2011). To dispel this conceptual ambiguity and advance our understanding of the construct, it is crucial for researchers to develop a valid and reliable measure of mental toughness, which captures what mental toughness is (Gucciardi, 2012b).

4.1.1 Issues Associated with Measuring Mental Toughness in Sport

Within sports psychology, self-report measures have dominated the measurement of psychological constructs. This method of data collection is also the most common within the mental toughness literature, as the ease with which a self-report measure could be employed no doubt appealed to researchers as they sought to publish material associated with this popular concept (Paulhus & Vazire, 2007). Although, the complex nature of mental toughness has made the development of a reliable and valid measurement tool challenging (Crust, 2008). Within mental toughness research, 7 separate self-report measures have been developed in the last 15 years. This not only highlights the enthusiasm within the field to find a measure, but also emphasises what a difficult task it has been (Gucciardi, 2012a). As detailed previously within this thesis, there has been a lack of rigour applied within mental toughness research and so it is important to evaluate the robustness of each of these measures. The construct validation framework provides scholars with an ability to critically evaluate the development of a self-report measure, based on its theoretical and psychometric integrity (Marsh, 1997). Below we provide a commentary on the most popular self-report inventories that purport to measuring mental toughness and in doing so, extend upon the work of (Gucciardi & Hanton, 2016).

At the turn of the century, the Psychological Performance Inventory (PPI; (Loehr, 1986, 1995) was the most commonly employed self-report measure of mental toughness. This multidimensional measure of mental toughness was developed from (Loehr, 1995) experiences as an applied sports psychologist. Several studies have employed the PPI as a measure of mental toughness (see (Golby, Sheard, & Lavallee, 2003); (Golby & Sheard, 2004). When viewing this inventory through a construct validation lens, the PPI fails to meet many of the requirements of a robust self-report measure. Loehr failed to explain how items for this measure were generated, and this lack of underlying theory sees it fail to meet the construct validation criteria. The psychometric integrity of the PPI has also been questioned within the extant literature, resulting in the shared view that restraint should be employed when considering results from the PPI (Middleton et al., 2004). In an effort to strengthen the psychometric properties of the PPI, Golby and colleagues removed a number of items after a confirmatory factor analysis, to develop the PPI-A (Golby, Sheard, & Van Wersch, 2007). This shorter, psychometrically stronger alternative to the PPI does also appear within the contemporary literature (Sheard, 2009). Despite these enhanced psychometric properties and appearance in the literature, there remains a lack of established theory underpinning the measure and as a result a key aspect of a construct validation approach is still absent. In light of this, researchers should treat the results of the PPI-A with caution, which is a view promoted by others (see Gucciardi, 2012a).

Another self-report measure of mental toughness that has been developed from Loehr's applied understanding of mental toughness is the Mental, Emotional and Bodily Toughness Inventory (MeBTough; Mack & Ragan, 2008). Mack and Ragan provided evidence that supported the psychometric integrity of this self-report measure, although this was established through a Rasch analyses, and not the more encouraged methods of exploratory and confirmatory factor analysis. The MeBTough has briefly appeared within the published literature, as it was employed to assess mental toughness over the course of a season (Drees & Mack, 2012). As this measure has been developed from Loehr's applied understanding

of mental toughness, there still lacks any theoretical basis for its development. On inspection then, this inventory also fails to meet much of the criterial outlined in the construct validation approach and it cannot be employed with any confidence.

The Mental Toughness Scale (MTS; Madrigal, Hamill, & Gill, 2013) is a self-report measure of mental toughness, which takes its theoretical basis from the framework of mental toughness promoted by Jones and colleagues (2007). The inclusion of qualitative data in the development of the inventory, in part, fulfils the construct validation approach (Marsh, 1997). Madrigal and colleagues highlight that the MTS was developed to be a valid and reliable measure of mental toughness in a specific population, namely college athletes. They presented initial psychometric support for this instrument and it has been used in the assessment of injury of female college athletes (Madrigal & Gill, 2014). Despite its use, we raise concerns with the development of this measure, specifically with the framework upon which it is built. The Jones (2007) framework was used as a theoretical basis for this measure, but this framework was built based on the responses of elite athletes, which is incongruent with the population the measure is assessing. There is strong evidence to suggest that differing performance levels impact upon an athlete's perceptions of mental toughness (Cowden, 2017). Indeed, Madrigal and colleagues (2013) note that "college athletes are more diverse, not all are elite, and criteria for mental toughness may be different" (p.64). This juxtaposition between theory and application leads to scepticism around the scientific legitimacy of this measure. As a result, the validity and reliability of the MTS is called into question.

A measure that appears frequently in the literature is The Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009). This measure of mental toughness has also been developed based on Jones (2007) framework of mental toughness. Sheard and colleagues (2009) then linked this conceptualisation to (Seligman & Csikszentmihalyi, 2014) positive psychology, which provided the theoretical roots for the instrument. Initial exploratory and confirmatory factor analysis, completed by the creators, provided support for the use of the SMTQ.

The authors also highlighted the ability of the SMTQ to discriminate an athlete's mental toughness based on their experience level and age, further supporting the validity of this measure. A number of scholars have employed the SMTQ as a self-report measure of mental toughness (see Meggs et al., 2014); Cowden, Meyer-Weitz, & Oppong Asante, 2016). At a glance then, the SMTQ seems to fulfil much of the construct validation criteria, as it is grounded in established theory, has undergone a psychometric analysis, and is currently being employed by researchers. Although on closer inspection, Sheard and colleagues (2009) simply highlight the association between positive psychology and their conceptualisation of mental toughness, with little or no methodological discussion on the factor structure or the generation of the items (Gucciardi, Hanton, & Mallett, 2012). Taken collectively then, the SMTQ is a stronger measure than those mentioned previously, as it in part fulfils the construct validation criteria, but there remains doubt over its ability to quantify mental toughness in sport, due to the absence of established theory linked to the development of the measure.

The most commonly selected mental toughness instrument is the Mental Toughness Questionnaire-48 (MTQ48; Clough et al., 2002). The MTQ48 was developed from interviews with professional athletes, coaches, and sport psychologists who discussed their experiences of mental toughness. The resultant conceptualisation of mental toughness shared many links with psychological hardiness (Kobasa, 1979). Although related, Clough and colleagues promoted mental toughness as an entirely distinct concept. Indeed, the factor structure that emerged from this conceptualisation of mental toughness appears consistent with conclusions that have been drawn from a number of qualitative studies (Crust & Swann, 2011). Conclusions from studies that have employed the MTQ48 as a self-report measure of mental toughness also support its construct validity. For example, increasing age and performance level have been shown to have a significant, positive influence on mental toughness as measured by the MTQ48 (Crust & Azadi, 2010; Nicholls et al., 2009). There is also empirical support for the psychometric integrity of the MTQ48 (Crust & Azadi, 2010; Perry et al., 2013). Some scholars have contested this, as they suggest that there are doubts surrounding its reliability in an elite sporting population question the 4-

factor framework proposed by Clough and colleagues (Gucciardi et al., 2012); Vaughan, Hanna, & Breslin, 2018). Clough and colleagues go on to concede that there are some methodological weaknesses associated with the instrument, but insist that the validation of the measure is an ongoing process (Clough, Earle, Perry, & Crust, 2012).

All of the self-report measures noted above can be considered general measures of mental toughness in sport. Although following the seminal papers of Bull et al., (2005) and Thelwell et al., (2005), the view that mental toughness might be somewhat contextually bound emerged. In response to this, Gucciardi and colleagues focused their attention on developing a valid, sport-specific measure of mental toughness. They developed the Mental Toughness Inventory (MTI) in Australian football (AfMTI; Gucciardi & Gordon, 2009; Gucciardi, Gordon, & Dimmock, 2009) and in cricket (CMTI; Gucciardi & Gordon, 2009). The authors developed these measures from qualitative investigations of mental toughness within each sport, with the resultant conceptualisations informing item generation. In development of the MTI for Australian Football, Gucciardi and colleagues identified 11 key components of mental toughness, before then proposing a 60-item model of mental toughness. After exploratory factor analysis, a 4-factor, 24 item was chosen, as it reported acceptable psychometric properties. The large scale removal of items from the original conceptualisation, in an effort to generate acceptable levels of fit, was also recorded in the development of the CMTI, which went from 50 item to 15 items. Although these measures meet much of the criteria outlined in the construct validation framework, this large-scale removal of items from the original model of mental toughness compromises the validity of these measures.

Above, we have focused our attention on the issues of validity and reliability when employing self-report measures of mental toughness. It is also important to acknowledge the confounding self-presentation bias that is inherent when using self-report measures (Paulhus, 2017). We argue that this bias would be especially salient in the professional rugby union, as within it there exists an ‘act tough’ (Mellalieu, 2017). The narrative that exists within contemporary

performance sport must also be considered, athletes may find it difficult to report low levels of mental toughness, as they will be viewed as weak (Bauman, 2016). One can appreciate the scholarly activity that has gone into developing a valid and reliable self-report measure of mental toughness, but based on the information above one could argue that presently, one does it exist. Those immersed within the field of mental toughness have suggested that a fundamental shift in thinking is required to advance our understanding of this construct. A recent criticism of all of the self-report measures above, are that they do not address what mentally tough individuals do. The measurement of mentally tough behaviour has been highlighted as a direction that may prove an important step in the development of mental toughness theory, and bridge the gap between research and practice (Andersen, 2011; Gucciardi, 2017).

To this end, Hardy and colleagues developed the Mental Toughness Inventory (MTI; Hardy, Bell, & Beattie, 2014), as they conceptualised mental toughness from a behavioural perspective. The items in this informant rated scale consisted of a list of mentally tough behaviours in cricket, which were developed from discussions with experienced sports psychologists and high-performance cricket coaches. This scale was scored based on the player's ability to maintain a high level of performance under a number of different circumstances, for example when conditions are difficult, when the match is tight or when teammates are struggling. The MTI was able to discriminate between professional cricketers and university level athletes in terms of mental toughness, supporting the construct validity of the measure. In developing this scale, Hardy and colleagues (2014) promote the need to evaluate whether mentally tough behaviour has actually occurred, before then making claims about the associated cognitions, attitudes, and emotions. Thus, a behavioural measure of mental toughness, such as this is scale, is essential to if researchers are to fully understand the construct. The development of informant-rated scales also negates the self-presentation bias that influences the results of self-report measures, and they highlight the ability of observations of behaviour to measure mental toughness. Informant rated scales measuring mental toughness have developed for use within other sports such as swimming (Beattie, Alqallaf,

& Hardy, 2017), but to date there currently exists no informant rated scale of mental toughness in professional rugby union.

4.1.2 Observational Measurement of Behaviour in Sport

A fundamental aim of psychology research is to understand an individual's behaviour, yet there is a lack of investigations that actually employ behavioural measures to gain this understanding (Patterson, 2008). Instead, self-report measures are commonly deployed as a method of data collection for how individuals behave. This overreliance on questionnaires has led scholars to question the impact of conclusions from these studies, as they fail to link psychological concepts to behaviour (Baumeister, Vohs, & Funder, 2007). The absence of behavioural data is a criticism that has also been directed towards mental toughness research, (Gucciardi, 2017) suggested that collecting behavioural data relevant to the mental toughness would advance our understanding of the construct. Conclusions from such behavioural investigations into mental toughness would inform interventions that could positively influence an individual's health, performance and wellbeing (Meredith, Dicks, Noel, & Wagstaff, 2018).

The observation of behaviour has been considered a valuable methodology for obtaining objective data on real life actions (McCall, 1984). Such observations require a trained individual who "follows stated guidelines and procedures to observe, record and analyse interactions" (Darst, 1989). Observations of mentally tough behaviour may act as a valid and reliable measure of mental toughness and develop our understanding of the concept. Within professional sport, performance analysis is widely employed to evaluate and analyse aspects of performance, in an effort to better understand the technical tactical, physical and cognitive make up of successful performance (Bishop, 2008). Under the umbrella of performance analysis is notational analysis, which involves "objective recording performance so that key elements of that performance can be quantified in a valid and consistent manner" (Hughes & Hughes, 2005, p.1). This objective recording of performance and use of notational analysis could

provide a more robust analysis of mental toughness, compared with the subjective ratings of experienced informants.

There have been attempts by researchers to employ notational analysis to measure performance relevant behaviours within rugby union. Conclusions from these studies concluded that the number of passes completed (Vaz, Van Rooyen, & Sampaio, 2010), lineouts won on the opposition throw and tries scored were able to statistically distinguish winning and losing performances (Jones, Mellalieu, & James, 2004). One could be forgiven for being underwhelmed by the knowledge that keeping the ball and scoring more tries leads to performance success, in a sport were winning is determined by scoring more points that your opponent. More recently, similar attempts have been made to analyse behaviours that yield conclusions that are more impactful. Salivary testosterone and cortisol were found to have a strong, positive relationship with aggressive rugby behaviours (Crewther et al., 2013). This conclusion highlights the capability of researchers to measure behaviours in rugby union and link them to performance variables, in turn providing novel applied conclusions. In view of the information above, a quantitative assessment of behaviour could act as a measure for a psychological construct, such as a professional rugby union player's mental toughness. Such work would not only allow researchers to make highly impactful conclusions that may lead to more successful performance outcomes, it may also act as a valid and reliable measure of mental toughness.

4.1.3 Mentally Tough Behaviours in Sport

Contained within the mental toughness literature, there are a plethora of qualitative investigations that have sought to understand what mental toughness *is*. In servicing this aim, they often list general expressions of mental toughness, which to a certain degree, detail what mentally tough individuals do. Conclusions from these studies have shown that mentally tough individuals are able to stay focused and handle pressure (Jones et al., 2007), react to situations positively (Thelwell et al., 2005) and commonly displayed behaviours that could be described as the 1%ers (Gucciardi, Gordon, & Dimmock, 2008). Coulter, Mallett and Gucciardi, (2010) extended upon these general conclusions, and

offered more situation specific inferences within Australian football. They presented evidence that mentally tough players block opposition passes and shots, they run into space to open up the opposition and they get back to tackle an opposition player after having lost the ball. By reaching this degree of specificity with respect to mentally tough behaviours, it opens up the possibility for these actions to be coded and quantified through notational analysis of performance.

Anthony and colleagues (2018), in their efforts to distinguish between mental toughness and its behavioural outcomes, defined mentally tough behaviour as "a purposeful yet adaptable verbal or physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals" (Anthony et al., 2018). They suggested that mentally tough behaviours are best conceptualised in a way that highlights how mental toughness can influence performance. Mentally toughness, as a construct, has previously been linked to successful performance behaviours such as winning and faster race times (Kuan & Roy, 2007; Beattie, Alqallaf, Hardy, & Ntoumanis, 2018). Although it should be noted that previous research has also promoted the need to separate mental toughness and successful performance (Andersen, 2011). Indeed, Hardy, Bell and Beattie (2014) warn against the use of indicators of achievement to determine mental toughness, given evident confounds with talent, practice, skill level and a myriad of other psychological and physiological variables. It would be appropriate then to account for this in the analysis of mentally tough behaviour, as mentally tough behaviours may not always result in performance success.

Despite the potential outcomes of behavioural investigations into mental toughness, such studies have seldom been completed. The first recorded attempt at using observations of behaviour to quantify an individual's level of mental toughness was completed by (Davis & Zaichkowsky, 1998). Managers, coaches and scouts were asked to subjectively rate each ice hockey player's mental toughness, based on criteria that was developed in conjunction with the authors and the staff. These behavioural rating scales included effort,

achievement, enthusiasm and skill. As the interest in mentally tough behaviours grew, (Diment, 2014) developed an observation checklist of 15 mentally tough behaviours that could be observed in soccer. The behaviours included players scanning the game, pressuring their opponent and tactical communication in play. An investigation of mentally tough behaviour has also been completed in tennis, as an informant rated scale was produced through interviews with key stakeholders. The items on this scale included performing well when challenged, refusing to give up when things get tough and good at fighting for every point (Gucciardi, Jackson, Hanton, & Reid, 2015). The approaches above demonstrate the value of directly assessing mentally tough behaviours, rather than assuming them through achievement levels or self-report scores. One issue that researchers are mindful of with respect to these aforementioned informant-rated scales, is the question of if they are actually measuring a behavioural expression of mental toughness. The validity of these scales could be supported through correlations with already established, self-report measures of mental toughness.

After earlier raising concerns with the validity of mental toughness inventories, the suggestion that researchers should establish the validity of mentally tough behaviours through correlations with self-reported mental toughness, may seem a contradiction. There are inventories that have recorded acceptable levels of validity and reliability, and their use would support the construct validity of the identified mentally tough behaviours. In 2016, Gucciardi and colleagues sought to investigate behavioural expressions of mental toughness in Australian footballers. They employed performance in a multi-stage fitness as a proxy for mentally tough behaviour, and concluded that self-reported scores of mental toughness could explain 14-34% of variance in performance. In their analysis, the authors did not control for the physical fitness of the participants, which challenges the robustness of the results. This omission was addressed in a later study by Giles et al., 2018, who included the participant's physical fitness in their analysis and also employed a match specific fitness test as a proxy for mentally tough behaviour. They concluded that self-reported mental toughness was a salient determinant of the variation in the match specific fitness, but despite this, these studies above do not employ sports specific behaviours when

making judgements on the levels of mental toughness present. It has been noted that the discipline needs to make an effort to understand mental toughness within naturalistic settings (Gucciardi, 2017a).

Beattie et al., (2018) assessed the correlation between self-reported mental toughness and mentally tough behaviours in swimming. They developed an informant rated scale of mentally tough behaviours that included attending all training, always completing prescribed swimming volume and challenging themselves during kick sets. They employed the MTI (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015) as a self-report measure of mental toughness and found that there was a significant, positive relationship between self-report scores of mental toughness and coach rated mentally tough behaviour. The questions surrounding the psychometric integrity of the MTI and the subjective nature of coaches completing informant rated scales, reduce the confidence in the conclusions that they made. Within professional rugby union there are trained performance analysts who objectively record performance so that key elements of that performance can be quantified in a valid and consistent manner. The use of these staff members to generate behavioural data, that can be correlated with a valid and reliable self–report measure of mental toughness, would allow more confident conclusions to be made. To date, an objective assessment of mentally tough behaviour has yet to be complete within professional in rugby union.

4.1.4 Aim

To date, the majority of research has relied on self-report inventories to quantify an individual's mental toughness. A methodological limitation of this approach is that mentally tough behaviour is being inferred, rather than directly assessed. The inventories available to researchers either lack psychometric support or are subject to a possible self-report bias, which challenges the robustness of any conclusions that are made. As a result, contemporary research has failed to advance our understanding of mental toughness. The use of observations to measure mental toughness would allow researchers to determine if mentally tough behaviour has occurred, before then attempting to then

generate a more complete understanding of the construct. This ‘third wave’, behavioural approach has great potential for refining and evolving the conceptualisation of mental toughness (Gucciardi, 2017a). Despite the importance of this work, and the availability of this observational data within professional rugby union, there have are currently no studies that examine mentally tough behaviour in professional rugby union.

The primary aim of this study is to establish whether it is feasible to use video analysis to quantify mentally tough behaviours, in an effort to measure the mental toughness of a professional rugby union player. A secondary aim will be to investigate the ability of these mentally tough behaviours to discriminate between self-reported scores of mental toughness. If successful, these behavioural expressions of mental toughness could be employed as more valid, reliable and objective measure of mental toughness. The creation of such a measure would allow us to advance our understanding of this construct, along with make confident conclusions that would inform effective practice. Based on the understanding of mental toughness presented above, we would expect that professional rugby union players with greater self-reported mental toughness would score more positively with respect to mentally tough behaviours.

4.2 Methods

4.2.1 Participants

A total of 22 professional rugby players participated in the study. All of the participants were male and contracted to a professional rugby club based in Scotland. At the time of analysis, the participants were aged between 21 and 37 years (Mean age (±SD) = 27 (5)) and had an average of 5 (±SD = 3) years' professional rugby playing experience. A senior performance analyst within the professional club assisted with identifying mentally tough behaviours that were consistent with an understanding of what it means to *be* mentally tough in professional rugby.

4.2.2 Procedure

After ethical approval from The University of Glasgow's College of Medical, Veterinary and Life Sciences Research Ethic Committee and the Scottish Rugby Union High Performance Department, support staff within a professional rugby club in Scotland were approached via email. The nature of the study was explained to the relevant support staff members and access to notational analysis data was granted, as the club sought to improve performance by developing a greater understanding of mentally tough behaviour. However, permission to the data was conditional on basis that the club's performance analysis strategies were not published, in an effort to allow them to maintain their professional advantage over their opponents. To determine a set of mentally tough behaviours prevalent within professional rugby union, themes from the previous chapter's qualitative investigation into mental toughness were discussed with the senior performance analyst at the club. That discussion fostered a number of match specific behaviours that were deemed to be consistent with the identified themes of mental toughness, and were also behaviours that were included in the clubs coding strategy. Details of these themes and behaviours are detailed in Table 5.

Accounts of these identified on-field behaviours were taken from the club's notational analysis database. Video analysts employed by the club, who had a combined professional experience of 17 years, collated these data using video analysis software (*SportscodeElite*, 2017). The notational analysis from each match was then imported into a Microsoft Excel flat list, so that it could be accessed and analysed easily. The club coded for a vast array of performance variables for every player who featured in any match over the course of the season. The match behaviours were coded from footage that was made available by the television broadcaster. The data for the self-reported scores of mental toughness were obtained from a previous quantitative investigation into mental toughness, detailed within this thesis. The questionnaires were completed electronically through our self-developed a uniform resource locator (https://drive.google.com/open?id=1dlXu6uZhvhOTaoAUju_90fN6UDRGAcakV-dpy_ipQiU). On one occasion, at the request of the support staff, paper copies were made available to the players. Due to the challenges associated with gaining access to professional players, this data was collected over four separate time points.

4.2.3 Measurement

Mentally tough behaviour. Conclusions from the previous chapter's qualitative investigation into mental toughness, described within this thesis, were used to gain an understanding of mentally tough behaviours within rugby union. This study employed an Interpretive Phenomenological Approach (IPA; Smith, Flowers, & Larkin, 2009), in an effort to understand what it means to *be* mentally tough. Professional rugby union players and support staff, including a performance analyst, participated in a semi-structured interview which sought to discover the lived experience of mental toughness. Purposeful sampling was employed to gather these participants. This was to ensure that mentally tough players were being interviewed about mental toughness, along with confirming that the support staff interviewed had experiences of mental toughness in rugby union. After analysing the data, a number of common themes were reported, which provided a framework for the analysis of mentally behaviours that can be coded for using video analysis technology. These are detailed in Table 5. Taking conclusions from qualitative data to identify mentally tough actions that can be

observed and quantified, is a method that has been employed previously within mental toughness research (see Beattie et al., 2017; Diment, 2014).

Table 5. A table of an understanding of what it means to be mentally tough in professional rugby union and associated behaviours that are coded for in video analysis practices.

Behavioural Theme	Associated Behaviour	Units of Measurement
Working hard	Speed to reset in defence	Seconds (s)
Unselfish acts	Beating team mates to events	Count of behaviour (n)

The first behaviour that emerged from the discussion with the club's video analyst was Beating Teammates to Events (BTE). For this behaviour, a count was produced for each player based on how many times they beat a teammate to an event. For each player, these counts were totalled across all matches and adjusted for minutes played, to give a value of counts per minute played. The Back in Game (BIG) behaviour was measured in seconds and was based on the ability of the player to re-join the defensive line, after a defensive contact. This value was also averaged to give a value in seconds for each player, across all matches. The units of measurement for these behaviours varied, but the success to with which the player completed the determined behaviour, acted as a measure of the player's mental toughness. This then provided a value that could be compared to the player's self-reported scores of mental toughness.

Mental toughness. The MTQ48 (Mental Toughness Questionnaire 48; Clough et al., 2002) was employed as the self-report measure of mental toughness. The MTQ48 measures total mental toughness, along with six sub-components of the concept, namely Control, comprised of Emotional Control, Life Control, Challenge Commitment and Confidence, being made up of Confidence in Abilities and Interpersonal Confidence. The MTQ48 is a general measure of mental toughness and the responses to the items are made on 5-point Likert Scale, where by 1 is anchored by 'strongly disagree' and 5 by 'strongly agree'. Higher overall scores on the MTQ48 are indicative of greater levels of mental toughness. The average completion time for this self-report measure is 8

minutes. Clough et al. (2002) provided initial evidence for the criterion validity of the MTQ48. They reported significant, moderate relationships with optimism, self-image, life satisfaction, self-efficacy and trait anxiety. There is also support for the internal validity of this measure (Perry et al., 2013).

4.2.4 Variability

A prominent issue associated with the measurement of behaviour, is the reliability and validity of the data that has been collected (Smith, Quested, Appleton, & Duda, 2016). At this point, it is important to acknowledge the use of experienced video analysts, and how their inclusion supported the reliability and validity of the behavioural data being collected. In previous studies, experienced coaches and sports psychologists have been deployed as analysts (see Gucciardi et al., 2015). By utilising the skills and experience of performance analysts, this study extends upon these previous efforts and offers a more robust assessment of mentally tough behaviour in sport. The reliability of the data is assured through the training and employment experience of the video analysts, inherent in which would have been regular assessments of intra and inter-analyst reliability. In addition to these experiences, the analysts were guided by predetermined protocols for examining each behaviour. As suggested previously, when measuring observations of behaviour researchers must “follow stated guidelines and procedures to observe, record and analyse interactions” (Darst 1989, p.6). Cognisant of this, employing video analysts to complete these observations offers a comprehensive embodiment of this definition, and further ensures the integrity of the data.

In discussions with the senior performance analyst that sought to identity the mentally tough behaviours, the degree to which the behaviour could be expressed was considered. The mentally tough behaviours were not classified as positive or negative, instead they were viewed on a continuum. As a result, a player’s mental toughness was determined based on the degree to which the player expressed the identified behaviours. This avoided reducing mental toughness into a discreet data set and is aligned to a more contemporary view of

the concept, as a purposeful, flexible, and efficient construct that facilitates the enactment of goal-directed behaviours (Gucciardi, 2017a). In selecting appropriate mentally tough behaviours, consideration was also given to the influence of other confounding factors on the expression of the behaviour. This understanding that the behaviour of other players, or a player's skill level, may influence a player's ability to express these mentally tough behaviours was embedded within the analysis. Within the coding process, there was space for the analysts to make judgements with respect to the mentally tough behaviours. For example, if a number of players were on top of the nominated player and he was unable to reset in defence, this would not be counted in the behavioural analysis, as there was no opportunity for the player to express that mentally tough behaviour. In their search for reliable performance indicators, (Lames & McGarry, 2007) highlight how performance behaviours are a dynamic interaction between different opponents, different situations and different match outcomes. In an effort to account for this natural performance variability, we obtained behavioural data from a number of matches that were classified into an unbalanced win (UW; >7 points), a balanced win (BW; <7), a balanced loss (BL; <7 points) and an unbalanced loss (UL; >7 points). Matches were categorised into these situations in an effort to minimise the variability associated with measuring performance behaviours, thus preserving the validly and reliability of the data.

4.2.5 Statistical Analysis

All 29 matches were observed and coded by experienced video analysts employed by the professional club, with data being collected from a total of 22 players. Match data were collected from all competition matches in the 2017-2018 season, with matches in both the Guinness Pro 14 and Champions Cup competitions. Some players were eliminated from the analysis as they did not have any match data in a particular match category. Five players were removed from the analysis of BW and BL matches, with 6 players being removed from the analysis of BW matches. Minitab 18 statistical software was used to assess the relationship between the identified mentally tough behaviours and a self-reported mental toughness score of the MTQ-48. After visual assessment of the scatterplots, a Pearson correlation (r) was employed to assess the relationship between the BIG behaviour and each MTQ48 variable, from each match

category. This method of analysis was repeated for the BTE behaviour. The guidelines promoted by Cohen (1988) were followed to determine the strength of the correlation, with a weak correlation returning an r value of between 0.1 and 0.3, an r value between 0.3 and 0.5 suggested a moderate correlation and an r value higher than 0.5 indicated a strong correlation. Linear regression analyses were then used to assess the influence between those variables that reported moderate to strong correlations with subscales of the MTQ48. 95% confidence intervals (95% CIs) and a fitted regression line were included in these fitted plots. For all, a significance level of $P \leq 0.05$ was used.

4.3 Results

Visual inspection of the scatterplots revealed acceptable normality for self-reported mental toughness, its associated subcomponents and both mental toughness behaviours (BIG and BTE). Demographic variables and MTQ-48 scores of mental toughness of the participants have been presented in Table 6.

Table 6. Descriptive statistics of demographic variables and MTQ-48 subscales for mental toughness.

Demographic and Sporting Characteristics	Participants (N=22)
Age	25.7 (3.4)
Professional Playing Experience	4.7 (3.0)
Overall Mental Toughness	6.4 (1.8)
Emotional Control	5.8 (2.0)
Life Control	6.3 (2.0)
Commitment	5.6 (1.6)
Challenge	6.1 (1.6)
Confidence in Abilities	7.0 (1.9)
Interpersonal Confidence	5.0 (1.7)

Demographic variables are mean years (SD). Subscales of the MTQ-48 are mean normed values (SD).

Scatterplot representations of BTE against average game time (Minutes) highlight the dependency of this behaviour on minutes played. There appears to be a linear increase in the number of BTE behaviours as the average minutes of game time increases (see Figure 7) A simple linear regression analysis revealed a significant, positive regression between BTE and average game time (Minutes) ($F(1,21) = 25.36$, $p < 0.001$) with an R2 of 0.56 (see Figure 8). Means and standard deviations of the mentally tough behaviours across all 5 match categories are shown in Table 7.

Figure 7. Scatterplot of BTE (N) and average game time (Minutes), for each subject, in all of the games analysed. A line of best fit shown in red illustrates the dependency of BTE on game time.

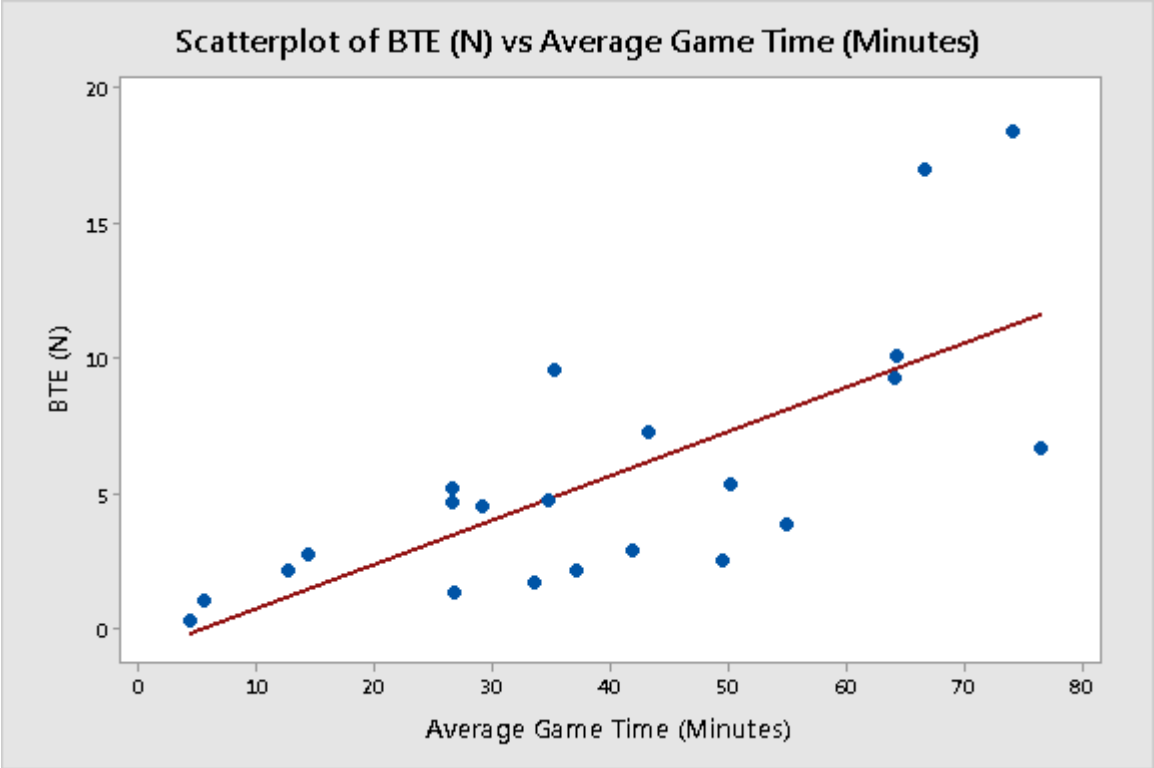


Figure 8. Simple linear regression of BTE (N) and average game time (Minutes), for each subject, in all of the games analysed.

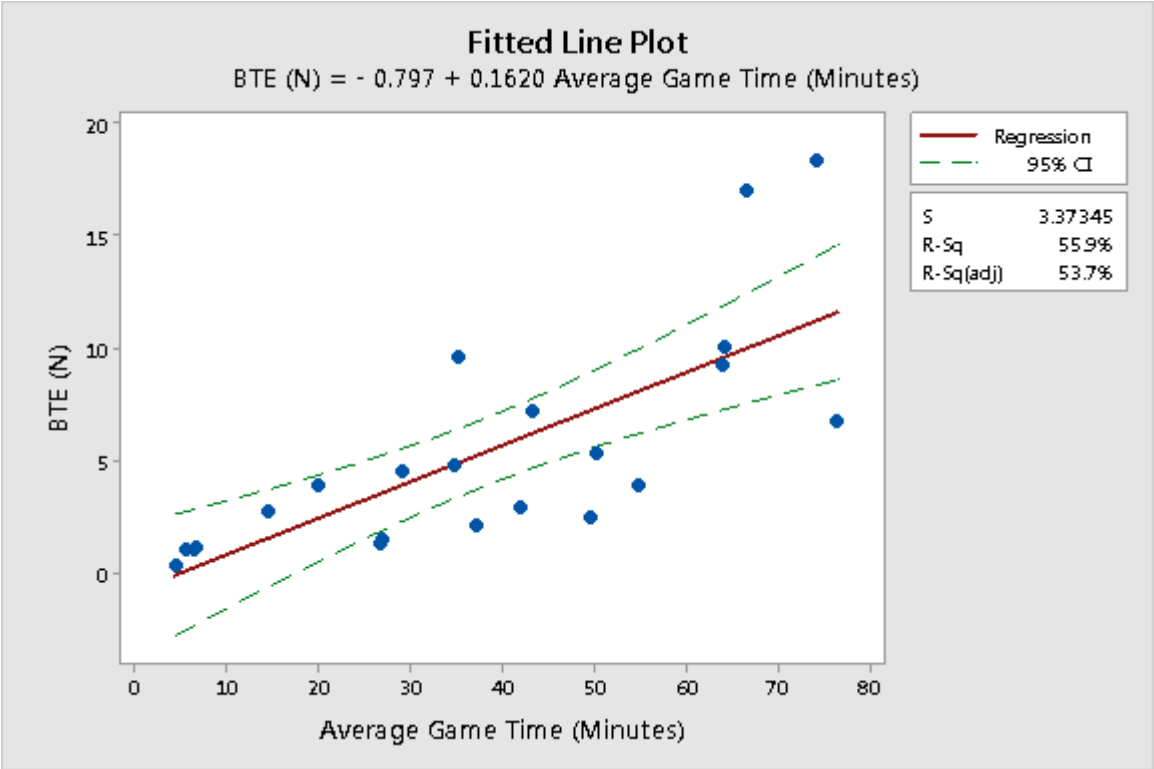


Table 7. Mean values of mental tough behaviours across all match categories

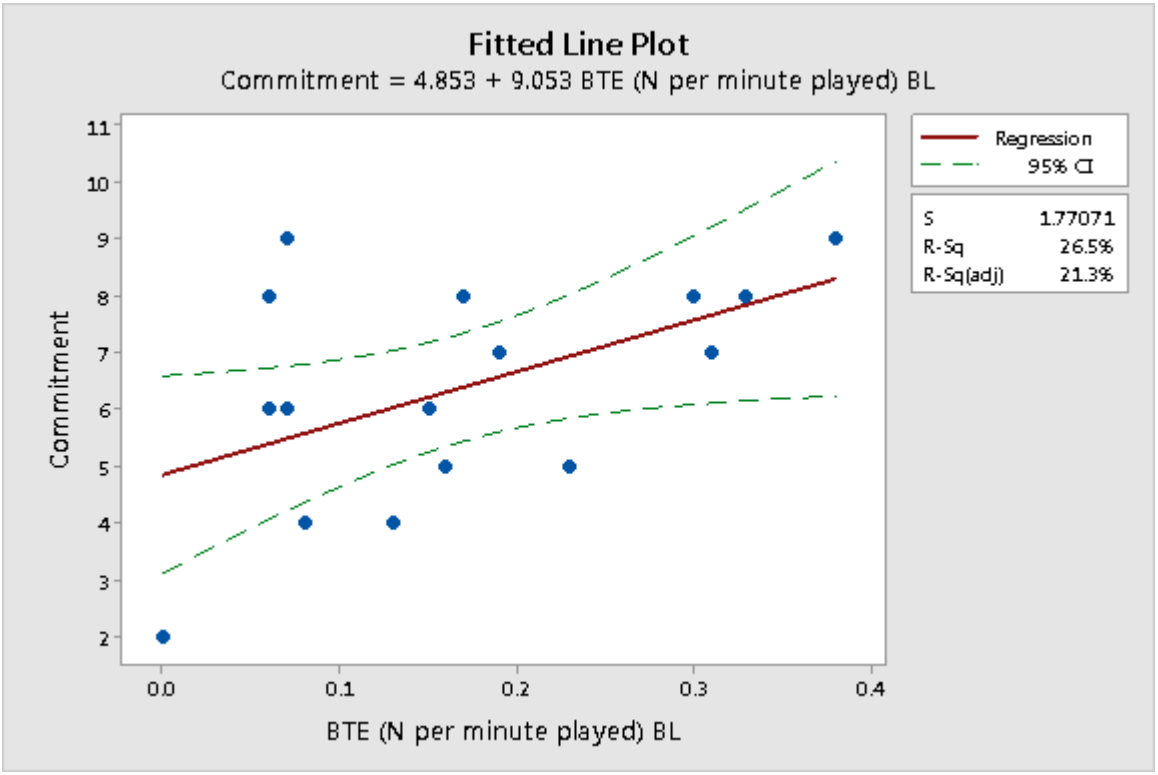
Match Category	Mentally Tough Behaviour	
	BTE (N)	BIG (s)
UW (N = 17)	5.8 (4.1)	3.4 (0.8)
BW (N = 3)	5.2 (5.5)	2.8 (2.0)
BL (N = 3)	5.9 (6.7)	3.0 (1.9)
UL (N = 6)	4.9 (4.1)	2.6 (1.7)
All (N = 29)	5.3 (4.8)	3.0 (1.2)

BTE is mean count (N) (SD). BIG is mean seconds (SD).

Independent t-tests revealed that there were significant differences present between the means of each behaviour compared between each match category with BIG (95% CI (4.69, 6.21)) and BTE (95% CI (2.41, 3.50)). Initial scatterplots of each MTQ-48 subscale against the behavioural outcomes, across all 5 match categories, suggested significant correlations may be present. Pearson's correlation coefficient of self-reported mental toughness and match-categorised behaviours revealed weak, negative correlations between overall mental toughness and BIG (UL) ($r = -0.21$), confidence in abilities and BIG (BL) ($r = -0.27$) and confidence in abilities and BTE (All) ($r = 0.25$).

Moderate, positive correlations between the emotional control subscale and BTE (UW) ($r = 0.32$) were recorded, although this was not significant (-0.21, 0.70). The BTE behaviour also was moderately, positively correlated with confidence in abilities in BL matches ($r = 0.49$) and UL matches ($r = 0.30$). The results in BL matches approached significance (-.0.01, 0.74), while the results of the BTE behaviour were not significant (-0.23, 0.69). The BIG behaviour was moderately, negatively correlated with commitment in BL matches ($r = 0.46$). This result also approached significance (-0.78, -0.05). A strong, positive correlation was observed between the commitment subscale and BTE (BL) ($r = 0.51$), and this was a significant result (0.03, 0.81). A significant regression was found between the commitment subscale and BTE (BL) ($F(1,15) = 5.06$, $p < 0.05$) with an R2 of 0.27 (Figure 9). These results suggest that the commitment component can explain up to 27% of variance seen with the behavioural completion of BTE. All the aforementioned regression lines fall completely within the confidence bands, and as such, these results are considered plausible.

Figure 9. Simple linear regression of BTE (N) and Commitment scores, for each subject, in all of the games resulting in a balanced loss.



4.4 Discussion

The aim of the present study was to explore the ability of notational analysis to measure behaviours that are consistent with an understanding of what it means to *be* mentally tough in professional rugby union. There is a lack of evidence-based information with respect to mentally tough behaviours and conclusions from this study make empirical contributions to address this gap in our understanding. Hardy and colleagues (2014) argue that before investigating the processes and the outcomes of being mentally tough, you must be sure that mentally tough behaviour has been displayed. As a result, a behavioural measure of mental toughness is essential before researchers and practitioners can understand what it means to *be* mentally tough. The findings presented above suggest there are mentally tough behaviours which can be coded for, that display a moderate to strong relationship with self-reported mental toughness within professional rugby union.

4.4.1 Behavioural Outcomes of Mental Toughness and Self-Reported Mental Toughness

An early understanding of mental toughness promoted that winning and out-performing your opponents was an important aspect of *being* mentally tough (Jones et al., 2002), yet the conclusions of the present study sit in opposition to this. Most of the correlations below were recorded in matches that this professional club lost, suggesting the completion of these mentally tough behaviours was more pronounced in these match categories. These findings align with a view of mental toughness promoted within this thesis, that in these difficult situations mentally tough players come to the fore. These conclusions also advance our understanding of the relationship between mental toughness and performance, by supporting previous research that calls for the need to separate mental toughness and successful performance (Andersen, 2011).

Analysis of the BIG behaviour offered a number of insightful conclusions. The positive, yet weak, correlation with BIG and overall mental toughness in UL matches offers an initial validation of this behaviour and its ability to objectively

measure mental toughness. These expressions of BIG behaviours within the UL match category fall in line with previous research that suggests mental toughness is about refusing to give up when things get tough and fighting for every point (Gucciardi, Jackson, Hanton, & Reid, 2015). The BIG behaviour also produced a moderate, positive correlation with the commitment subscale of the MTQ48 in BL matches. This positive relationship with commitment, within this match situation, is in agreement with previous research that suggests mental toughness is the ability to maintain a high level of performance when the match is tight (Hardy, Bell & Beattie, 2014). This behavioural expression of mental toughness is also line with an understanding presented in the previous chapter, suggesting that key characteristics of *being* a mentally tough rugby player is drive (motivation) to succeed and commitment to performance excellence.

With respect to the BTE behaviour, analysis of the data revealed a positive, moderate relationship with the emotional control subscale of the MTQ48, in UW matches. With respect to this behaviour and match category, it is interesting to note this link emotional control, as it suggests that mentally tough players are able to regulate positive emotions associated with winning, and remain self-determined and task focused. This again support conclusions listed in the previous chapter. As suggested by Weinberg and colleagues (2016), high self-belief and confidence are important aspects of being mentally tough. The findings of the present study are in agreement with this, as the confidence in abilities subscale reported moderate correlations with BTE in BL matches. This behavioural expression of mental toughness, in this match category, may be driven by a self-belief that has been consistently cited as a key aspect of what it means to *be* mentally tough (Jones et al., 2002). The most notable finding within the present study, was that there was a significant, positive correlation between the commitment subscale of the MTQ48 and BTE in BL matches. The positive ability of self-reported mental tough players to beat other players to events, even when losing, has been suggested within the literature. Self-reported mental toughness has been shown to positively influence a player's ability to sustain effort in variety of match specific situations (Giles et al., 2018) and are in line with qualitative understanding of what mental toughness *is* (Gucciardi et al., 2015).

BTE was the only behaviour to correlate with mental toughness across all match categories. The, albeit, weak correlation with BTE and confidence in abilities across all matches is a promising, initial validation of this behaviour and its ability to objectively measure mental toughness across a variety of situations. The conclusion that only one behaviour showed a worthwhile correlation across all the match categories is disappointing, but this highlights the difficulty of the task. Researchers have suggested that a one-size fits all approach within mental toughness would be unsuccessful (Jaeschke, Sachs, & Dieffenbach, 2016). Others would suggest that the lack of correlation supports the view that mental toughness fluctuates across different situations (Weinberg et al., 2016). The authors of the current study would side with the difficulty of a one-size fits all approach, as this thesis as rigorously generated conclusions that mentally tough rugby union players are consistent across a variety of situations. In spite of these conclusions, the task of developing an objective, behavioural of mental toughness should not be abandoned, as it will underpin our understanding of what it means to *be* mentally tough in professional rugby union.

4.4.2 Limitations and Future Research

Exploratory investigations of this nature are not without their limitations. The authors of the present study acknowledge that the correlations evidenced, only determine that these mentally tough behaviours and self-reported mental toughness have a relationship, they do not allow researchers to determine if one variable causes a change in another variable (Asamoah, 2014). As a result, it cannot be concluded that they these behaviours are directly influenced by a psychological construct, such as mental toughness. When considering performance behaviours, researchers must be mindful of the multitude of physical and psychological factors that are at play. In an effort to control for these confounding variables, researchers are encouraged to investigate the ability of Global Positioning Systems (GPS) monitoring data and fitness testing metrics, to correct for physical fitness within the cohort. This would offer a more complete understanding of these mentally tough behaviours and a study of this nature would support the conclusions that these behavioural observations

are a determination of mental toughness, as opposed to superior physical fitness.

This study did not include player position as variable, yet it has been evidenced that the psychological skills and attributes of rugby players differ, based on position (Andrew et al., 2007). In other studies, utilising video and time motion analysis in rugby union, players were split by position (see Duthie, Pyne & Hooper, 2005), and doing this may reveal the behaviours that are more relevant to one particular positional group. The author of this thesis decided against this within the present study, as the study wanted to remain exploratory. By adding position specific conclusions to our findings, the authors felt that the behavioural observations would be heavily caveated, and limit the practical applications and potential engagement from professional support staff and players within professional rugby. Another limitation was the limited behavioural data recorded for both the BW and BL matches. There were significant conclusions made within these match categories, and a greater volume of data may strengthen these conclusions, as well as illuminate other significant results within other match situations. The present study was unable to include additional data due to the timescale of this thesis and the professional playing season coming to an end.

The application of the MTQ48 to measure the player's mental toughness may be a possible limitation as doubts have been raised, regarding the reliability of this measure within elite sporting populations (see Gucciardi et al., 2012; Vaughan, Hanna, & Breslin, 2018). In defence of this, the authors of the MTQ48 have conceded that there are some methodological weaknesses associated with the instrument, but insist that the validation of the measure is an ongoing process (Clough, Earle, Perry, & Crust, 2012). The authors of the current study point to the lack of more valid and reliable alternative to the MTQ48. Until such a measure exists, the MTQ48 is the most empirically supported self-report measure of mental toughness.

The results of this study could be employed by support staff and sports psychologist within professional rugby union to measure and enhance mental toughness professional rugby players. The identification of mentally tough behaviours will also allow coaches to better understand what mental toughness *is* and what it *is* not. This understanding will allow them to develop more effective mental toughness practices that include these behaviours, with the focus on enhancing the successful completion of these behaviours. This research strategy has been completed within cricket, as Hardy and colleagues (2014) identified mentally tough behaviours and employed them to develop a training program to enhance mental toughness. An intervention of this nature would also develop performance, as the associations between mental toughness and performance have been well documented (Cowden, 2017). Support staff may also assess these behaviours to aid team selection or identify mentally tough players for squad recruitment.

4.5 Conclusion

To develop an understanding of mental toughness, researchers have moved move away from listing unobservable attributes and characteristics of mental toughness athletes. The empirical focus has shifted the identification and subsequent measurement of mentally tough behaviours, to offer objective indicators of mental toughness and performance (Gucciardi & Hanton, 2016). This study successfully demonstrates that it is possible to use notational analysis, to analyse mentally tough behaviours in professional rugby union. Despite limited data within some match categories, both identified behaviours correlate with components of mental toughness, in a variety of match situations. There has been an absence of behavioural data linked to the concept of mental toughness (Patterson, 2008), and the understanding that match-specific behaviours correlate modestly with self-reported scores of mental toughness, has advanced our understanding of the what it means to *be* mentally tough. This understanding is conditional, as it is based on the assumption that the behaviours measured are a true representation of mental toughness. Despite this, the present study goes beyond basic descriptions of match-specific behaviours with little rigour applied to their observation (see Diment, 2014), or the use of informant rated scales rather than empirically supported measures of mental toughness (see Gucciardi, Jackson, Hanton, & Reid, 2015).

The authors of the present study have made a deliberate effort to capture a more scientific and accurate understanding of mentally tough behaviour, something that has been lacking within the mental toughness literature (Crust, 2008). This novel and innovative approach has led to the development of a number of promising conclusions. Despite the potential value of this work, and the availability of this observational data within professional sport, few studies have examined mentally tough behaviour in this way. Future research should look to replicate a study of this nature in sports such as football and cricket, as the qualitative understanding of what mental toughness *is,* is in place for these sports (see Bell al., 2014; Cook et al., 2014). This understanding must be in place before researchers then attempt to identify and measure mentally tough behaviours, as mental toughness means different things to different people

(Crust, Swann & Allen-Collinson, 2016). Such approaches will offer information that will further distinguish between mental toughness and its behavioural outcomes, and thus develop our understanding what it means to *be* mentally tough (Anthony, Gordon, Gucciardi, & Dawson, 2018). These conclusions can also inform the development of effective interventions that could positively influence a performer's mental toughness and performance (Meredith, Dicks, Noel, & Wagstaff, 2018).

This research has moved the current literature closer to a more complete understanding of mentally tough behaviour, and has made conscious efforts to link the psychological concept of mental toughness, to behaviour. This study extended upon previous behavioural studies, as it employs a sports-specific match behaviour, over a proxy behaviour for mental toughness. It also employs an empirically supported self-reported measure rather than informant-rated scales of mental toughness. In doing so, this study addresses criticisms identified in the current literature. Hardy and colleagues (2014) promote the need to evaluate whether mentally tough behaviour has actually occurred, before then making claims about the associated cognitions, attitudes, and emotions. Thus, a behavioural measure of mental toughness, such as this is scale, is essential if researchers are to fully understand the construct of mental toughness. More empirical activity is required before these behavioural expressions of mental toughness could be employed as valid, reliable and objective measure of mental toughness, but the basis for this research is now in place.

5. Developing Mental Toughness: The Feasibility of the Mindfulness-Acceptance-Commitment (MAC) Approach in a Group of Semi-Elite, Rugby Union Players.

5.1 Introduction

Rugby Union is sport that is played in 121 countries by over 8 million players (World Rugby, 2016). In 2016 it was reported that Scotland had 49,265 registered rugby players, a number that is comparatively lower than other leading rugby nations such as England (382,154), France (542,242), Ireland (101,922), South Africa (405,438) and Australia (203,753) (World Rugby, 2016). Although the Scottish men's national rugby team have sat as high as 4th in the world, these participation statistics present the Scottish Rugby Union (SRU) with a competitive challenge, as nations with higher playing populations tend to be more successful in international competition (Foster, James & Haake, 2010). It has been shown that smaller playing nations can compete on the world stage and overcome the challenges associated with a participation 'debt', by providing an expert, talent development pathway (Côté & Hancock, 2016).

The development of talent is a complex process that requires contributions from a number of key areas including physiology, biomechanics and psychology (Gulbin, Croser, Morley, & Weissensteiner, 2013). Anecdotally, there have been suggestions that this expert talent development pathway is not currently being provided within Scottish Rugby. Jason O'Halloran, a New Zealand native and assistant coach with Glasgow Warriors, has gone on record to say that Scottish rugby are 20 years behind world number 1 side New Zealand, when it comes to sports psychology (The Scotsman, 2018). This perceived deficiency would compromise player development, as the psychological side of rugby union is considered "the glue that holds together the technical, physical and tactical sides of the game" (Nicholls & Callard, 2012, p.175). The development of effective, psychological support within Scottish Rugby would serve to produce an

elite development pathway that would support the SRU's vision of being competitive on the world stage.

In a recent review of player load, Quarrie et al., (2017) highlighted that our understanding of the psychological demands associated within professional rugby union is limited. They reported that professional rugby players experience a number of stressors including training, travel, performance analysis, interpersonal relationships, planning after rugby, study and the media. In order to maintain performance within professional rugby union, players must develop an ability to cope with the stressors they will be exposed to (Lazarus, 2000). With the understanding that these stressors, and management of the associated stress, plays a vital role in allowing players to be successful at an elite level, support to players should be structured accordingly. One such psychological construct that has received empirical attention, based on its stress buffering capacity, is that of mental toughness (Clough & Strycharczyk, 2012).

Within rugby union, the concept of mental toughness has emerged as one that is not only critical to performance (Holland et al., 2010), but it also carries cultural significance within professional rugby (see Mellieau, 2016). A clear definition of the concept has proved elusive, although there is a contemporary understanding that mental toughness is a psychological resource that is purposeful, flexible, and efficient in nature for the enactment and maintenance of goal-directed pursuits (Gucciardi, 2017). The goal for many rugby players within a development program is to turn professional, and the inclusion of support that aims to develop a player's mental toughness will service this goal. To effectively support players, they must be appropriately prepared to experience the stressful situations and circumstances that are prevalent within a professional rugby environment, as an inability to cope with this can lead to poor performance and burnout (Gerber at al., 2018).

It has been reported that a key symptom of burnout, is when an individual's perception of the demands exceeds their ability to cope with those demands (Eklund & Cresswell, 2007). Mental toughness has been associated with greater coping skills and adopting a challenge state, as individuals with higher levels of mental toughness are less likely to believe the demands of the situation exceed their coping resources (Beckford, Poudevigne, Iriving & Golden, 2016). The impact of including mental toughness development within a talent development program would be twofold. It would not only minimise the impact of burnout and ensure the pool of playing talent is not reduced, it would also enhance the quality of that talent pool and prepare them for the next stage of development, professional rugby. Ultimately, support of this nature will serve to provide an expert, talent development pathway that will enhance a nation's performance outcomes. In light of the information above, there is a need for an effective mental toughness intervention that enhances a player's ability to succeed within these performance environments. A key question when researchers seek to address this need, is determining which interventions are effective at enhancing a player's mental toughness. Relatively few scientific investigations have attempted to answer this question, but before an effective intervention can be designed, we must understand how mental toughness develops.

5.1.1 Our Understanding of How to Enhance Mental Toughness

Early empirical activity highlighted the difficultly of enhancing this concept, as only 9% of wrestling coaches interviewed believed that they could develop the mental toughness of their athletes (Gould et al., 1987). Before seeking to enhance this concept, it is important to first clarify the construct in question. There have been a number of points of contention within the mental toughness literature, mainly grounded in its conceptualisation. This disagreement still exists, as some scholars view the construct as several distinct but related dimensions (Lin et al., 2017), where others have promoted the view that mental toughness is unidimensional concept, and acts as a 'resource caravan' (Gucciardi, 2017). Despite this disagreement with respect to dimensionality, there is a combined understanding that mental toughness allows individuals to successfully cope with stressors, and thus strive when faced with challenging situations (Anthony et al., 2018). Despite some clarity on what mental toughness *is*, conceptual arguments exist over the extent to which mental toughness is

changeable. Some researchers have suggested that mental toughness is an inherited and relatively stable construct (Clough & Strycharczyk, 2012), others have suggested that it is taught via socialisation and formal psychological skills training (Gordon, 2012), with some even suggesting that it is simply a reflection of prevailing social attitudes towards success in elite sport (Caddick & Ryall, 2012). In light of this debate, there have been empirical studies that support the view that mental toughness is susceptible to change through targeted interventions.

Work by Bull and colleagues (2005), noted that mental toughness was amenable to change, highlighting that it is brought about by an interaction of the environment with the character, attitudes, and thinking of the players. Based on these conclusions, Bull advocated an approach at a social level, not just an individual to develop of mental toughness. In the wake of these conclusions, Connaughton, Wadey, Hanton, and Jones (2008) re-interviewed seven participants from the seminal Jones (2002) study. In understanding how mental toughness is developed, they concluded that mental toughness was a long process that involved the interaction of a number of factors such as motivational climate, a strong social support network a mix of sport-specific and life experiences. It is clear then that researchers must be cognisant of the influence of the environment in developing mental toughness. It has been suggested that purely a skills-based approach is insufficient for mental toughness development (Crust & Clough, 2011), as mental toughness development involves multiple mechanisms (Connaughton, Thelwell, & Hanton, 2011).

Anthony, Gucciardi and Gordon (2016) completed a meta-study of mental toughness development and identified four key themes, namely, personal characteristics, interactions with environment, progressive development, and breadth of experience as important aspects of mental toughness development. These conclusions provided an updated standpoint on mental toughness, one that encouraged researchers to consider the space that the performer operates in, when seeking to develop mental toughness. Strong evidence has been presented that promotes the influence of culture (see Tibbert et al., 2015) and

context (see Fawcett, 2012) in what it means to *be* mentally tough, and thus must be considered when seeking to develop the construct. Consistent with the understanding that social influences play a role in the development of mental toughness, Mahoney and colleagues (2016) completed an autonomy supportive intervention to develop mental toughness in adolescent rowers. This approach was grounded in self-determination theory (SDT) and they hypothesised mental toughness would increase through autonomy-supportive coaching behaviours. Conclusions from this researcher provided a theoretical precedent for researchers to consider employing support at an organisational level they argued that any attempt to develop mental toughness must be culturally informed, if it is to be successful.

Within the current literature, attempts to enhance mental toughness have neglected these cultural influences. Gucciardi and colleagues (2009a; 2009b) investigated the effectiveness of a psychological skills training program (PST) to develop mental toughness. The authors presented evidence that a general PST and a mental toughness focused PST program were equally effective at enhancing mental toughness. The content from the mental toughness PST program included identifying team and personal values core values, discussing the importance of work ethic and gave opportunities for players to reflect. These conclusions illustrate the ability of PST approaches to enhance mental toughness, although PST approaches within rugby union have not evidenced the same success. Parkes & Mallett (2011) sought to develop mental toughness through attributional style retraining in rugby. They used a mixed methods approach and delivered a number of cognitive-behavioural techniques (CBT), based upon previous empirical studies that highlighted the role of optimism in mental toughness development (see Coulter, Mallett, & Gucciardi, 2010). Quantitative analysis provided little support for the intervention and it could be argued that this may be a result of applying standalone education presentations, taking into account socio-cultural influences. Similar PST efforts have concluded that support staff play an important role in enhancing mental toughness, thus they should be included in any intervention efforts (Gucciardi & Gordon, 2011). It would seem that an intervention method that is more holistic, would offer a more efficacious approach to develop mental toughness.

From a practitioner's perspective, it has been suggested that to develop mental toughness, any intervention efforts must be thoughtful and purposeful. They must include aspects that that seek to intervene with the performers, the support staff and the environment (Weinberg, Freysinger & Mellano 2018). Bell, Hardy, & Beattie (2013) completed a seminal intervention within the mental toughness literature. Based upon their understanding of mental toughness that was grounded in reinforcement sensitivity theory (McNaughton & Gray, 2000), they sought to enhance the ability to the players to achieve personal goals in the face of a wide range of stressors. By definition, they were enhancing mental toughness. They included a mix of cognitive, behavioural and social influences and they offer the one of the most rigorous and successful attempts to develop mental toughness, with the extant literature. Eubank and colleagues (2017) suggest that despite conclusions promoting the importance of developing interventions that are culturally informed, this knowledge is not been integrated into practice. They suggest that to develop a more complete intervention, researchers must not focus on the individual; they must pay attention to the values and beliefs present within the culture. This knowledge, twined with the lack of support for PST interventions and the inability of these approaches to employ cultural information, suggests researchers should seek to adopt novel intervention methodologies to enhance mental toughness.

5.1.2 Mindfulness-Acceptance Approaches within Sport

A traditional cognitive-behavioural view is one that suggests negative internal states are directly related to less successful performance outcomes. This belief has been strongly influenced by the work of Meichenbaum (1977) and his skills-based approach to CBT. Meichenbaum surmises that athletes need to think and feel optimally to perform optimally, and this view has dominated sports and exercise psychology research, PST interventions have been commonly employed to support optimum functioning. These interventions attempt to reduce, control or eliminate negative internal experiences, by employing a variety of self-regulation strategies that allow the performer to reach an optimal internal state (Hardy, Jones & Gould, 1996). Strategies such as motivational self-talk (Hatzigeorgiadis et al., 2011) and imagery (Martin et al., 1999) have been

employed to allow athletes to control the content of internal experiences, with alternative strategies seeking to shift our attention to critical components of skill execution, such as instructional self-talk (Hardy, 2006) and goal setting (Locke & Latham, 2002). This assumption that our internal states need to be controlled to enhance psychological functioning has been challenged, and the basis for this lies in the lack of empirical support for CBT approaches (Gardener & Moore, 2012).

In a review of CBT approaches in sport, Birrer, Rothlin & Morgan (2012) suggest two theories that explain the poor efficacy of these approaches. Firstly, they detail how our desire to supress thoughts, actually leads to an increase in their presence and the amount of attention we pay to them (Wegner, 1984). This irony of internal processing, then leads to a decrease in performance through a lack of task relevant focus. Birrer and colleagues also cited the theory of reinvestment (Baumesidter, 1984) as a mechanism for the poor efficacy of CBT approaches in sport. This theory suggests that athletes will experience a performance decrement when they consciously direct attention to the skill, rather than allow the skills to be executed (Masters & Maxwell, 2008). The maladaptive processes of reinvestment theory and the irony of internal processing, twinned with the inability of these strategies to prove their efficacy, have led researchers to explore alternatives to enhance performance.

Contemporary literature has promoted a new class of intervention that allows athletes to sustain a task-focused attention, by encouraging a present moment awareness and acceptance of any perceived negative internal states. Mindfulness and acceptance approaches seek to promote a modified relationship with internal experiences, rather than seeking to change their frequency or intensity like PST approaches (Gardener & Moore, 2012). Unlike CBT, these approaches promote the acceptance of perceived negative internal states, as they are a component part of the athletic experience. So rather than thought suppression or thought control techniques, these approaches suggest that success in sport is related to the degree to which an athlete can accept the presence of negative thoughts and emotions, while being engaged in the task and behaving in

accordance with their values (Henrisken et al., 2016). Empirical support for the positive impact of these approaches has been provided by Josefsson and colleagues (2017) as they provided evidence to show the positive influence of mindfulness on sport specific coping, via decreased rumination and more effective emotional regulation. Such mechanisms of enhanced coping could also support the development of mental toughness.

The conclusions presented above are consistent with previous empirical research (see Coffey et al., 2010; Rothlin et al., 2016), and they also share conceptual space with identified our understanding of what it means to *be* mentally tough. Earlier in the chapter, the strong links between mental toughness and coping have been detailed, although the concept also has close links to aspects of mindfulness and acceptance approaches. It has been evidenced that mental toughness and mindfulness are positively associated (Jones & Parker, 2018), and it has been suggested that mindfulness plays an important role in the development of mental toughness (Weinberg et al., 2016). Mindfulness has also been considered as a cognitive process that underpins mental toughness, as high levels of mindfulness reported higher control, constancy and general mental toughness than those with lower levels of mindfulness as measured by the SMTQ (Walker, 2016). Closely linked to the concept of mindfulness is the concept flow. Evidence exists that suggests mentally tough performers have a greater ability to enter, maintain and restore flow states compared with their less mentally tough counterparts (Jackman, Swann & Crust, 2016; Meggs, Chen & Koehn, 2019). This evidence from the aforementioned studies provides a basis for mindfulness and acceptance approaches, to develop mental toughness. The acceptance arm of these approaches also shares conceptual space with mental toughness, as experiential acceptance, and accepting difficult thoughts and feelings is also considered essential to what it means to *be* mentally tough (see Gucciardi et al., 2015). Mental toughness has also been positively associated with self-compassion, which is related to self-kindness and acceptance (Wilson et al., 2019). In light of this information, employing a mindfulness and acceptance approach to develop mental toughness is a choice that is grounded in theory, based upon the considerable amount of overlap between the two. To date,

researchers are yet to employ mindfulness-acceptance approaches to enhance mental toughness within rugby union.

5.1.3 The Mindfulness-Acceptance-Commitment (MAC) Approach and Mental Toughness

The Mindfulness-Acceptance-Commitment approach (MAC: Gardener & Moore, 2008) was developed from Acceptance Commitment Therapy (ACT; Hayes, Strosayl & Wilson, 2009), for use within sporting populations. This approach encourages athletes to become aware of, and accept, any challenging thoughts and emotions, as they are viewed a product of their sporting experience. The MAC approach then cultivates the performer's personal values, before finally encouraging them to engage in committed actions that serve these values (Hayes et al., 2012; Henrisken et al., 2016). The MAC approach is delivered in step by step protocol to enhance poise, which is "the capacity to act in one's own best interest and function in the service of performance values regardless of thoughts and emotions" (Gardener & Moore, 2007, p.159). In an evaluation of the MAC approach, Hasker (2010) compared the 7-session approach with traditional PST interventions in collegiate athletes, from variety of sports. Hasker's findings suggested that the MAC experimental group demonstrated increased mindfulness skills and experiential acceptance. Participants in this cohort also described their enhanced ability to take action towards their goals. This ability to complete goal directed behaviours shares considerable conceptual overlap with a contemporary of understanding of mental toughness, defined by some as a psychological resource that is purposeful, flexible, and efficient in nature for the enactment and maintenance of goal-directed pursuits (Gucciardi, 2017).

A number of studies have also supported the efficacy of the MAC approach to enhance performance in field hockey, netball and diving (Wolanin & Schwanhausser, 2010; Schwanhausser, 2009). Schwanhausser (2009), in attempting to support the performance of a male diver, modified the MAC approach to include information that would enhance the ecological validity of the intervention. Evidence presented in the mental toughness literature (see Coulter et al., 2016, Eubank et al., 2015) along with conclusions detailed within

previous chapters of this thesis, highlight the important role of context in our understanding of what it means to *be* mentally tough. This sensitivity in our understanding of mental toughness, linked with the ability of the MAC approach to be adapted to account for these idiosyncrasies in understanding, suggest it is a suitable intervention framework with which to enhance mental toughness and performance.

Zhang and colleagues (2016) made a more rigorous attempt to investigate the effectiveness of the MAC approach within sport. They employed a randomised control design, assessing the effectiveness of a PST vs MAC approach within a cohort of dart players. The concluded that the MAC approach, led to a more significant improvement in dart throwing performance, compared with the PST control group. The MAC group also showed significant improvements in mindfulness, experiential acceptance and flow post-intervention. As described previously in the chapter, mindfulness and flow have been positively associated with mental toughness and as a result, the MAC approach could be employed to indirectly enhance mental toughness, through these mechanisms. The cohort in this study was made up of first year college students and this should be considered a point of caution with respect to the employing conclusions made by Zhang and colleagues (2016) within elite sport. There remains a need for a comprehensive assessment of the MAC approach in elite and semi-elite sporting populations.

The findings above demonstrate features of the MAC approach that are consistent with an understanding of what it means to *be* mentally tough. Analysis of the mental toughness literature also highlighted that there are further links that support the use of the approaches like MAC, to enhance mental toughness. Gardner and Moore (2008) suggest that the MAC approach can allow performers to fulfil their potential, showing similarities with an understanding that mental toughness is an important resource that supports self-actualization (Gucciardi, Hanton & Fleming, 2017). Having a strong sense of self has also been promoted within the literature as an important aspect of what it means to *be* mentally tough, as self-awareness has been positively associated with mental toughness

(Meggs, Ditzfield & Golby, 2014). This shares conceptual overlap with the self-as-context piece within ACT (see Hayes, Strosayl & Wilson, 2009) and suggests that the MAC approach could support the development of mental toughness, through developing the performers self—awareness.

Another seminal concept within mental toughness and the MAC approach is the role of personal values in enhancing performance. Connaughton, Thelwell, and Hanton (2011) proposed that mental toughness was comprised of personal values and others have suggested that adopting cultural values within the sporting environment, is in essence, what it means to *be* mentally tough (Coulter, Mallet & Singer, 2016). From a MAC perspective, performers are encouraged to cultivate performance values, before then engaging in committed actions that serve these values (Hayes et al., 2004; Henrisken et al., 2016). Based on this understanding, it could be assumed that the MAC approach could facilitate the performer's efforts in being value driven and thus enhance their mental toughness. It is clear then that there is a strong relationship between components of mental toughness and the MAC approach, with the evidence presented above offering a meaningful starting point from which to understand how the MAC approach may serve to develop mental toughness.

5.1.4 Aim

Stress is ubiquitous in elite sports, and the potentially deleterious effect of stress on a player's performance and well-being have been acknowledged (see Crocker et al., 2015). If smaller nations, such as Scotland are to compete on the world stage they will need to support the psychological development of their performers, to prepare them appropriately for the adverse situations that they will face. Mental toughness has been promoted as a psychological construct that is important for superior rugby union performance and preparing academy players for the stresses of the professional game. Researchers have paid increasing attention to the construct of mental toughness, and a contemporary understanding of mental toughness acknowledges that it is caught through experience and taught through psychological skills. Due to the considerable influence of context, skills intervention alone is incomplete and not sufficient

for mental toughness development (Crust & Clough, 2011). Classic PST approaches are not compatible with employing any cultural information, there efficacy in enhancing mental toughness remains unproven.

Researchers have been encouraged to adopt novel approaches to enhance mental toughness (Anthony et al., 2018), and MAC approach has been identified as a novel and potentially effective intervention framework. The ability of the MAC approach to enhance mental toughness has been assumed based on the knowledge that several functions of the MAC approach are consistent with conclusions regarding successful mental toughness development. These are primarily linked through mindfulness, experiential acceptance and behaviours that have a valued end. A constant theme throughout this thesis has been the rigour and adoption of scientific principles that mental toughness researchers must now adopt, if they are to develop a true understanding of what it means to *be* mentally tough. Consistent with this is the view that mental toughness is a complex psychological construct, a pilot study assessing the feasibility of the MAC approach represents a fundamental phase of the research process. The purpose of conducting a pilot study is to evaluate the feasibility of recruitment, retention, procedures, and implementation of a novel intervention, all in an effort enhance the probability of success in the subsequent efforts (Leon et al., 2011). Thus, the aim of this study is to evaluate the feasibility of the 7-session MAC approach for enhancing mental toughness in semi-elite rugby union players.

5.2 Method

5.2.1 Design

This study employs an uncontrolled trial study design, as the authors suggest that mental toughness is a complex psychological construct and should be investigated in a manner consistent with this. A pilot study is the necessary first step in designing an effective intervention, as the feasibility of an intervention must be established before researchers then seek to deliver it (Hassan, 2006). A mixed methods approach was employed, as quantitative data was taken to establish any changes in mental toughness or concepts associated with the MAC approach. Qualitative data also was collected in relation to the participants' perceptions of the MAC approach and its effectiveness. A mixed methods approach to investigating mental toughness is one that has been used within rugby union previously (Parkes & Mallet, 2012).

5.2.2 Participants

After purposeful sampling, 33 participants from the SRU regional academies (East and West) were included in the cohort. As defined by Swann et al., (2015), these academy players are considered semi-elite. At the point of analysis, the participants were aged between 17 and 22 (Mean age = 20, ±SD = 1.28) years with an average of 10 (±SD = 3.9) years playing rugby. All of the sample was male. There were female players within the regional academies, although the differences in the player's schedules did not allow for their inclusion in the study. Selection of the participants was subject to availability on the day of data collection and factors that influenced this included injury, team selection and schedule changes. This cohort was deemed particularly suitable, as the importance of positive youth experiences are considered a key aspect of developing mental toughness (Jones & Parker, 2013).

5.2.3 Outcome Variables

Pre and post-intervention measures included self-report inventories of mental toughness, mindfulness, psychological flexibility and performance, along with focus groups that generated post-intervention social validation data.

MTQ48 - The MTQ48 (Mental Toughness Questionnaire 48; Clough et al., 2002) was employed as the self-report measure of mental toughness. The MTQ48 measures total mental toughness, along with six sub-components of the concept, namely Control, comprised of Emotional Control and Life Control, Challenge, Commitment and Confidence, being made up of Confidence in Abilities and Interpersonal Confidence. The MTQ48 is a general measure of mental toughness and the responses to the items are made on 5-point Likert Scale, anchored by 'strongly disagree' and 'strongly agree'. Higher overall scores on the MTQ48 are indicative of greater levels of mental toughness. The average completion time for this self-report measure is 8 minutes. Clough et al. (2002) provided initial evidence for the criterion validity of the MTQ48. They reported significant, moderate relationships with optimism, self-image, life satisfaction, and self-efficacy. There is also support for the internal validity of this measure (Perry, Clough, Crust, Earle, & Nicholls, 2013).

SMTQ – The SMTQ (Sports Mental Toughness Questionnaire; Sheard, Golby, & van Wersch, 2009) is a 14-item self-report measure of mental toughness. This inventory yields a total mental toughness score, as well as scores in three subscales, namely confidence, constancy and control. Participants rated the items on a four-point Likert-type scale, anchored by the statements 'not at all true' and 'very true'. Sheard and colleagues (2009) provide evidence of the psychometric integrity of this measure and a number of scholars have employed the SMTQ as a self-report measure of mental toughness (see Meggs, Ditzfeld, & Golby, 2014; Cowden, Meyer-Weitz, & Oppong Asante, 2016).

AAQ-II - The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a 7-item measure of psychological inflexibility and experiential avoidance. Items are rated on a 7-point Likert-type scale, anchored by the terms 'never true' and 'always true, with lower scores on the AAQ-II indicating greater levels psychological flexibility. Psychometric support for this measure has been provided out with the authors, by Gloster and colleagues (2011).

Support staff ratings of mental toughness - Two support staff members, from each academy, will complete a rating of each player's mental toughness. This measure will complement the self-report measures of mental toughness, a practice that has been employed previously within mental toughness interventions (see Mahoney et al., 2016). Staff will be presented with a definition developed by Gucciardi and colleagues (2009), then asked to score participants on how consistent they are with this definition. Player ratings will be given out of 10.

Social validation - On completion of the study, all three experimental groups will take part in post-intervention focus groups. The function of these focus groups will be to gather the participant's views on the delivery of the MAC approach, guided by the PICO framework. Social validation methods have been utilised previously to assess the participant's satisfaction with respect to the delivery of interventions and have been employed to assess the effectiveness of mental toughness interventions (Gucciardi, Gordon & Dimmock., 2009).

5.2.4 The Intervention

The authors developed an adapted version of the MAC approach, one that takes into consideration the contextual information detailed in a previous chapter. During the intervention, the first author was visible at training and immersed himself in the environment. This was considered to be an important aspect in establishing trust with the participants and presenting a clear picture of what sport psychology support is (Mellaeiau, 2016). It also allowed the first author to gain access to context-specific information that could be used to complement

learning within the sessions and enhance their impact. The separate arms of the intervention have been detailed below.

MAC sessions: The session content was structured around the 7-session MAC approach detailed by Gardener & Moore (2007), which included a mix of cognitive techniques, group discussions and reflections. Sessions last for approximately 45 minutes and they included activities that allowed participants to draw upon their own rugby experiences, in an effort to highlight the applicability of the MAC approach within rugby union. Sessions also included the use of videos, media and quotes to bring elements of the MAC approach to life. At the end of the session, participants were emailed supplementary information to complement their learning, along with a session reflections document. Here, participants completed anonymous session reflections that included two questions. 1) What did you learn about yourself? 2) What did you learn about performance? These questions were mandatory and players were encouraged to answer fully. If the participant had not learnt anything, they were instructed to simply write 'nothing' in the space. The function of these reflections was to ensure the participants understood the concepts presented in the session. The language used in these reflections was analysed to deduce this. Each session reflection was revisited at the beginning of the following session, in an effort to consolidate the learning from the previous session and stimulate discussion among the participants early in the group session.

Personal Development Sessions: There were 3 of these sessions timetabled into the program and they took the form of book groups. Participants selected a text that was based on topics consistent with the MAC approach and an understanding of what it means to *be* mentally tough in rugby union. The function of these sessions was to explore how elements of the MAC approach could support their rugby lives, along with develop the participants understanding of content discussed in the sessions. Examples texts include information on growth mentality, which is considered a key aspect of being mentally tough (see Cowden et al., 2014). Details of the texts that were made available to players can be found in the appendices.

Motivational Sessions: Based on the influence of modelling in the development of mental toughness that has been detailed within a previous chapter, the first author recruited iconic figures to deliver motivational sessions. Two professional players from each of the professional rugby clubs in Scotland agreed to take part. Within their session, players discussed their experiences of mental toughness and aligned this to the MAC approach. A non-rugby figure was also recruited, who told a highly impactful story of nearly losing his life during the war in Afghanistan. These iconic figures were briefed before these sessions, and upskilled on the elements of the MAC approach. This was done to ensure that the participants could clearly identify how content discussed in the MAC sessions, could allow them to become more mentally tough and enhance performance.

Support Staff Development Sessions: 4 support staff sessions were completed, as the important role of staff in the development of mental toughness has been emphasised (Weinberg et al., 2016). These sessions lasted approximately 45 minutes and upskilled staff on the session content that was delivered to the players. Staff were emailed supplementary information to complement their learning, and then were prompted on the ways in which they could co-deliver aspects of the MAC approach. Space was made for the support staff to ask questions and discuss the applicability of the approach in their daily interactions with players.

5.2.5 Procedure

After ethical approval from The University of Glasgow College of Medical, Veterinary and Life Sciences Research Ethics Committee and the Scottish Rugby Union High Performance Department, support staff within the clubs and academies were approached via email about the possibility of participating. The nature of the study was explained to the support staff, who then agreed to schedule a meeting with players whereby the purpose of the study could be explained to them. These meetings were scheduled into the player's training day, at time convenient to them and the support staff. It was clearly expressed

to the players that participation in the study was voluntary and they could withdraw at any time, without having to give a reason and without consequence. Once consent had been obtained, participants were emailed a link to the questionnaire, which they completed electronically during the meeting. In the first season, questionnaires were completed through the AQR website (https://aqrinternational.co.uk/mtq48-mental-toughness-questionnaire). After establishing a relationship with the authors of the MTQ48, the questionnaires were completed through our self-developed a uniform resource locator (https://drive.google.com/open?id=1dlXu6uZhvhOTaoAUju_90fN6UDRGAcakV-dpy_ipQiU). Once recruited, participants were then split into experimental groups. Participants completed the FFMQ, AAQ-II and SMTQ at similarly developed uniform resource locators. This intervention ran from September 2018 to December 2018. In that time, all participants were sent weekly e-mail reflections that included supplementary material, based on the intervention content from that week. One week after the intervention had been completed, participants were invited complete post-intervention measures, in an identical manner to the pre-intervention data. The focus groups interviews were transcribed verbatim onto Microsoft Word by the first author. After each transcription, the first author made general, comments on themes that emerged from the focus group discussions. The participants were asked the questions on the effectiveness of the approach, their opinions of the sessions, their view of the support staff's involvement and the most important lesson they learned from the intervention.

5.2.6 Data analysis

Of the 33 participants that began the intervention, 3 decided to withdraw from the project and 1 dropped out of the academy system all together. In collecting post-intervention data, some of the players did not respond to communications asking them to complete the post intervention measures. After 1 month, those participants that had not completed these outcome measures, their data was omitted from any post-intervention comparisons. Statistical assumptions were tested prior to the analysis and the data were checked for normality and homogeneity of variance. Descriptive statistics were obtained using Minitab 18 software, means and standard deviations were calculated age, years of playing experience and for all the self-report outcome variables. The difference (Post-

Pre) for each outcome variable was calculated, before boxplots were created to offer visual indications of significant differences pre to post-intervention. A one-sample T-test was carried out on the difference for those variables that indicated significance. Data from the social validation focus groups was analysed for emergent themes, guided by the PICO framework. This ensured that the acceptability and utility of the program, in relational to the participants, was explored.

5.3 Results

5.3.1 Quantitative Data

Visual inspection of the box plots revealed acceptable normality for all of the outcome variables. Demographic variables of the participants have been presented in Table 8. The mean difference and standard deviations of all outcome variables from pre to post intervention are shown in Table 9.

Table 8. Descriptive statistics of demographic variables for all participants within the intervention

Demographic Variables	Participants (N=33)
Age	19.5 (1.8)
Years Playing Experience	10.1 (3.9)

Demographic variables are mean years (SD).

Table 9. Descriptive statistics of all outcome variables MTQ-48 subscales for mental toughness.

Intervention Outcome Variables		Difference (Post-Pre Intervention)
MTQ48 Outputs (n=24)	Overall Mental Toughness	0.3 (1.2)
	Emotional Control	-0.3 (1.5)
	Life Control	0.2 (1.2)
	Commitment	-0.2 (2.0)*
	Challenge	1.0 (1.0)
	Confidence in Abilities	0.5 (1.0)*
	Interpersonal Confidence	0.5 (1.4)
SMTQ Outputs (n=)	Total Mental Toughness	0.1 (2.4)
	Confidence	0.0 (1.5)
	Control	0.7 (1.1)*
	Constancy	-0.5 (1.3)
FFMQ Outputs (n=28)	Observe	1.3 (3.6)
	Describe	0.9 (3.6)
	Act	-0.4 (4.2)
	Nonjudge	0.5 (3.9)
	Nonreact	1.1 (2.8)
AAQ-II Output (n=27)	Psychological Flexibility	-0.3 (2.6)
Mental Toughness Rating (n=28)	Support Staff Member 1	0.0 (1.1)
	Support Staff Member 2	0.5 (1.0)

All outcome variables are mean difference (SD), *p< 0.05.

Of the 29 participants that took part in the intervention, 21% attended all of the MAC sessions, with 73% attending at least 50% of the MAC sessions. Boxplot representations of all outcome variables (post-pre intervention) are presented in Figures 10-14. The boxplots show significant, positive differences may be present within the challenge and confidence in abilities dimensions, as measured by the MTQ48. There also appears to be a significant, positive within the control dimension of the SMTQ and support staff member 2's rating of mental toughness,

pre to post intervention. One sample t-tests on the difference (post-pre intervention) between these outcome variables revealed that significant differences existed in the means of the challenge dimension (95% CI (0.57, 1.43)) and confidence in abilities (0.11, 0.97), as measured by the MTQ48. Significant differences were also present in the means of the control (0.21, 1.10) dimension of the SMTQ. See chapter appendix for all statistical outputs.

Figure 10. Boxplots showing the difference (Post-Pre Intervention) for the MTQ48 and all of its subscales. A line of no change has been shown in red and 95% confidence intervals have been shown in brackets, for those differences that were significant, pre to post intervention.

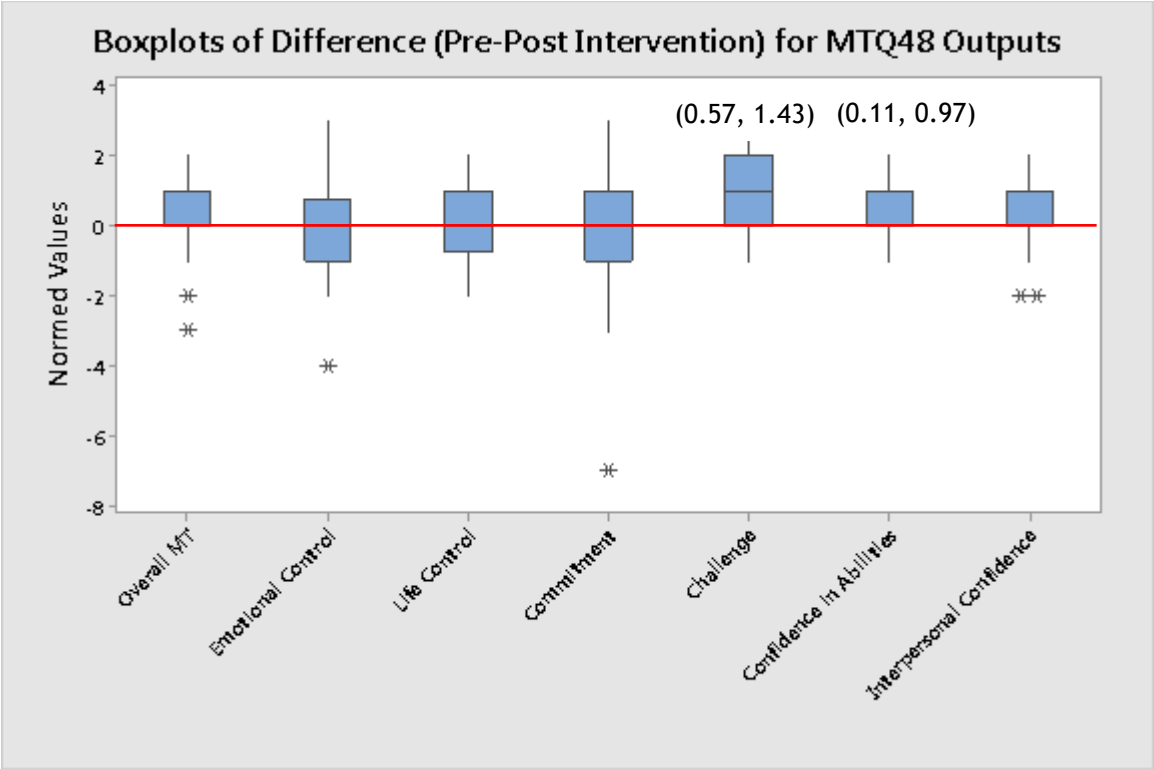


Figure 11. Boxplots showing the difference (Post-Pre Intervention) for the SMTQ and all of its subscales. A line of no change has been shown in red and 95% confidence intervals have been shown in brackets, for those differences that were significant, pre to post intervention.

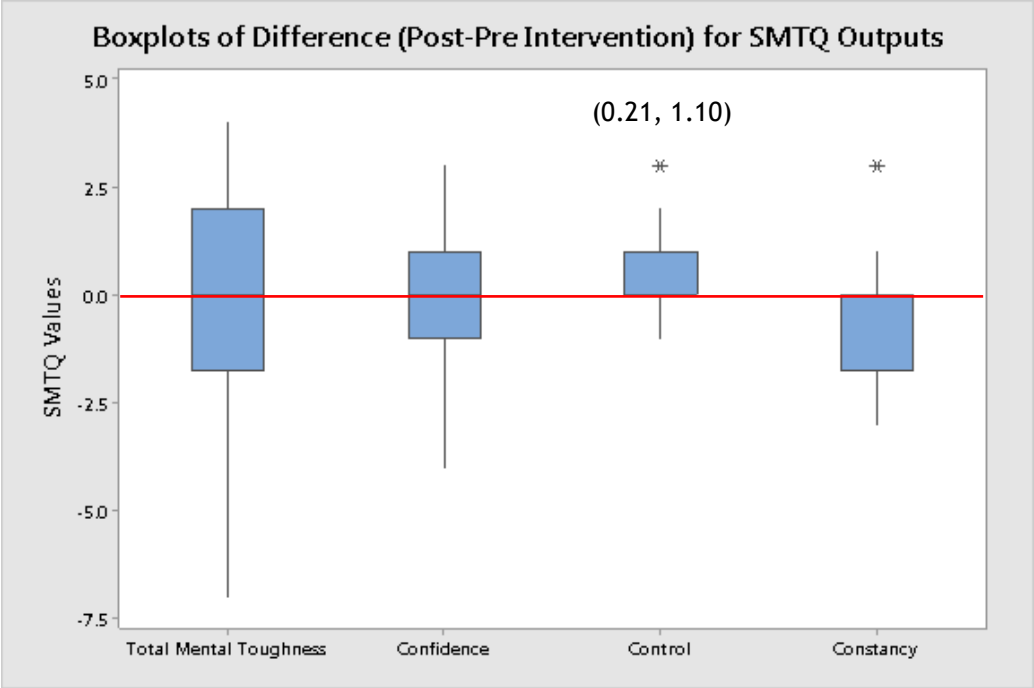


Figure 12. Boxplots showing the difference (Post-Pre Intervention) for the FFMQ and all of its subscales. A line of no change has been shown in red.

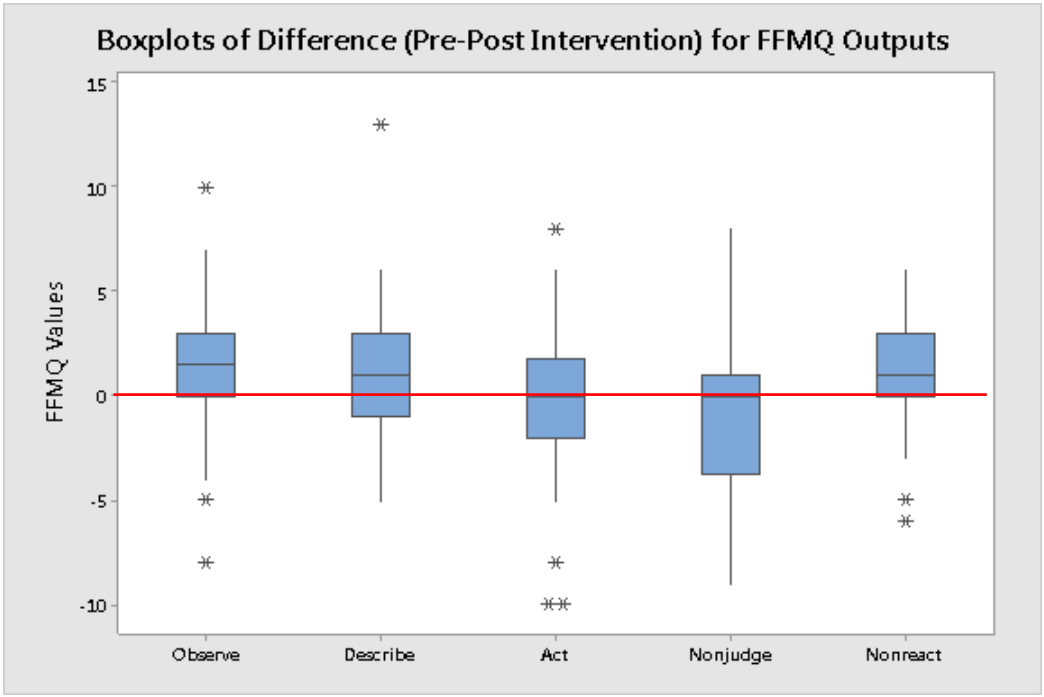


Figure 13. A boxplot showing the difference (Post-Pre Intervention) for the AAQ-II. A line of no change has been shown in red.

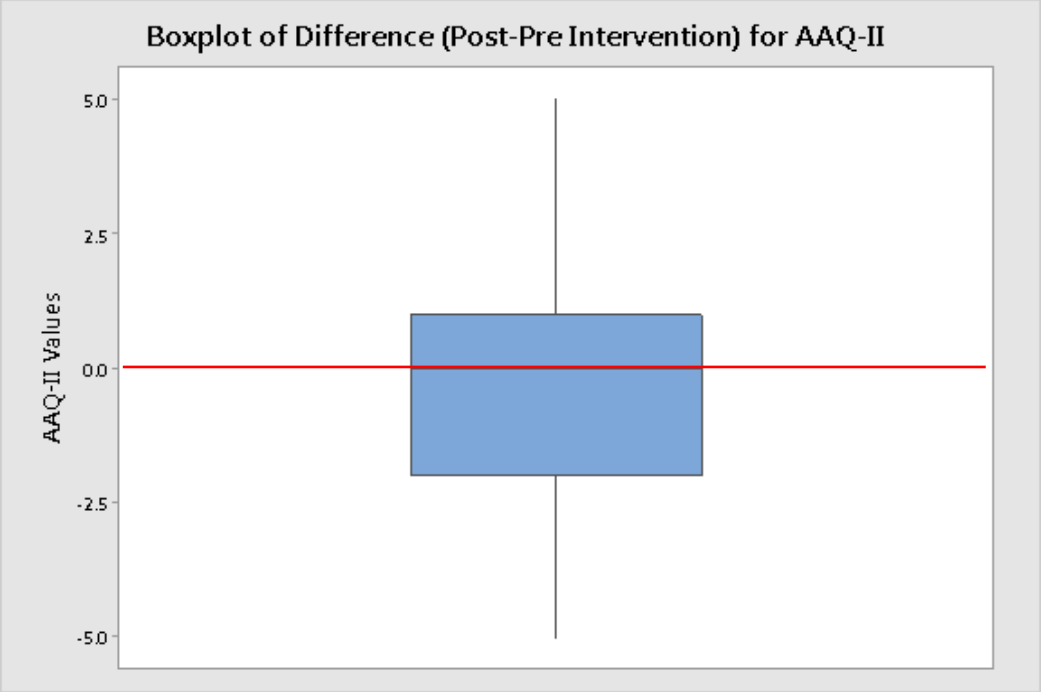
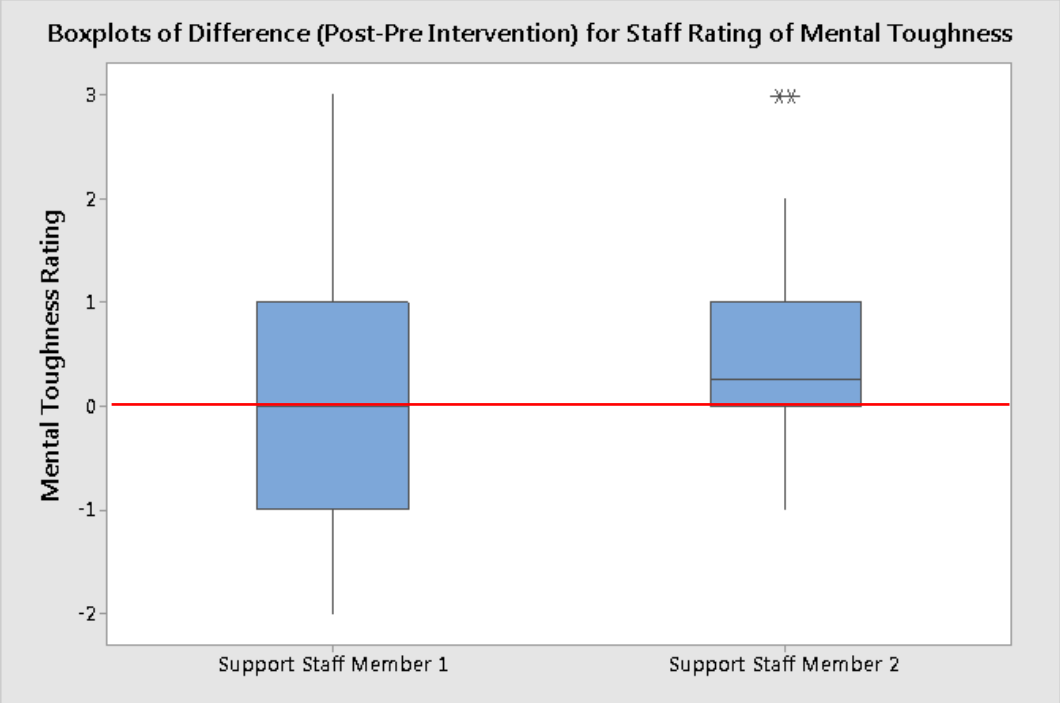


Figure 14. Boxplots showing the difference (Post-Pre Intervention) the support staff member's rating of mental toughness. A line of no change has been shown in red.



5.3.2 Qualitative Data

The positive effects that were recorded within the quantitative analysis have also been reflected in qualitative analysis. The comments gathered from focus group discussions with the participants revealed a number of comments that

support the feasibility of MAC the approach, when seeking to enhance mental toughness in this cohort.

> Yeah I think it has… you are sort of having the same thoughts… you said at the start we would have the same thoughts but… it is just about managing those and staying on the task at hand, and I have got better at that. (Player 2)

> For me it's just like… controlling the negative thoughts in your head. So if you are doing a conditioning session and… it's pretty… and you just, you still have the same thoughts like "this is shite, I just want this to end now" or "what if I don't work for this one and go for the next one" but you just kind of block those out now. You still accept they are there… but you just don't acknowledge them at all. You just keep going and that is something I found really beneficial (Player 4)

These responses highlight the developments in experiential acceptance and mindfulness within these participants, there is a sense this gave the players an ability to complete mentally tough behaviours. With respect to the words of Player 4, some of the language in the quote above suggests that his understanding is not comprehensively aligned with the MAC approach. He describes "controlling" rather than "accepting" challenging thoughts. Some participants also commented on the power of group sessions.

> I thought it was quite… well when we started like… it was a lot… of quite quiet people, like they were scared to say things and then… as it sort of went on… we just sort of… started to speak our mind more and I thought that was quite good. I think that… it wasn't that we just got more confident around the subject, I think it was like acting… sort of… not really caring what other people think and that is a mentally tough… so I think that was quite good. (Player 8)

> Yeah I thought it was quite good having it with all the boys as well because everyone is in the same boat… and everyone… like experiences challenging thoughts and stuff... so it is quite good to be... together and discussing it… as you can like… egg each other on. (Player 11)

> I think a classroom is good for like… not many distractions… but I think... if a sort of a session is quite long, it can… sort of... I get a bit bored sometimes... but I think it was good that we sort of… changed it up and we were in the gym sometimes and stuff, and I thought that was quite good… quite helpful. (Player 2)

The benefit of the group sessions is clear from the quotes above, they provided an opportunity for players to complete mentally tough behaviours away from the

pitch, along with facilitate a sharing of experiences that support the participants learning. It is worth noting the impact of having sessions out with the classroom, and the positive impact that has on the players learning. The participants also discussed the effectiveness of supplementary sessions, commenting on the motivational sessions in particular.

> It was quite helpful to listen to [name of iconic professional player] and [name of iconic non-professional player]… but I found that quite helpful… just seeing... things from a different point of view, of like,… a bit further down the line and see how you get there. (Player 9)

> Yeah I think it was quite good talking to [name of iconic professional player], like hearing… that even he has days were like "ahh I can't be fucked to do that" and is just… kind of… just shows us… that is not… just because we are having those thoughts that, like it's not necessarily a bad thing... it's just normal. (Player 4)

It was evident that the motivational sessions played an important role in validating the MAC approach within this population and allowed the players to connect the approach to having a successful career in the future. They described it as the "most helpful" aspect of the intervention, especially with respect to challenging thoughts as it was realised "everyone gets them". One player did note the timing of these sessions and how they could be more impactful.

> I do think I could be good if you started off with it... to show you... the sort of importance of it… straight from the beginning because... (Player 8)

With respect to the development sessions, one participant found this the most difficult aspect to engage with.

> After a long day… you know to literally sit down and read, like I almost fell asleep… which wasn't ideal, but it is one of those things... you just have to find the time, when you are not that tired and… you know… try and get some pages in, so yeah… it was quite a… difficult task (Player 1)

> Yeah I think it could of like... not forced us but… I have not read a book in years and… like genuinely I have not even touched a book... so… it was… kind of... a different experience for me… going back to reading a book for once… so yeah... I thought I that it was beneficial in that way… like… do the stuff I need to do… rather than the stuff I want to so (Player 3)

Player 3's comments show a more in depth understanding of these sessions, as he acknowledges the need to read while tired in an effort to develop mental toughness. Player 2 is trying to find time when he is not tried to complete the reading and there is a sense he did not complete a much reading and thus be as mentally tough, as player 3. Participants discussed a number of aspects of the intervention that may have impacted upon the feasibility of the approach.

> Having this while having everything else… like reading the emails, doing the reflection sheets, while trying to read the book… also trying to keep in contact with you… that was probably the most challenging thing with me. (Player 10)

There was a sense that this support was viewed as extra, on top of everything else. There is a need to further set the expectations and highlight the value of the work, establishing this support as a fundamental part of the environment so that players do not take this view. The provision of sport psychology support was also new for some players which impacted upon the feasibility of the approach.

> I think because it is new to us as well, like sports psychology stuff... I have never had anything like this so I found it challenging… like thinking of stuff that I don't normally think about. (Player 7)

Another player then described how being injured made it difficult to engage with the concepts.

> Like a lot of the boys… when they have been saying they have had the chance to put these things into practice… has been during game time… where they then like… they do a centering thing and it like clicks… I found it a bit difficult to do that without playing… and that made it harder in that sense. (Player 6)

A potential oversight was the lack of examples and context provided for those players who were injured and not training. There is a sense this reduced player engagement and this would impact upon the feasibility of the results. The participants also perceived that the support staff lacked the necessary understanding of the approach, and this may have undermined the support and reduced its efficacy.

> I didn't really think they really know what was going, I mean... I don't think they really had any knowledge of the subject… they just knew we were doing mental toughness. (Player 7)

> I think it would help… like in the beginning when… at times on the field… you mentioned… remember this, remember that... and I think it would just… kind of fade away. I think if they constantly reminded us to… notice when you are switching off… which would help… really getting into the habit of doing that. (Player 2)

An option that was suggested having the coaches sit in on a session, although one player raised an issue with this as “I don’t think we would be as honest with some of the things we said, “especially if talking about weaknesses and stuff like that”.

5.4 Discussion

The purpose of this study was to assess the feasibility of the MAC approach to enhance mental toughness in semi-elite rugby union players. The results of the current study support the ability of the MAC approach to enhance mental toughness, and also support the efforts of previous attempts that purport to enhancing mental toughness (Gucciardi et al., 2009; Bell, Hardy & Beattie 2013).

5.4.1 Quantitative Findings

Positive, significant differences were reported within the challenge and confidence in abilities dimensions of the MTQ48, along with the control dimension of the SMTQ. Within this thesis the challenge dimension of the MTQ48 has been linked to performance in rugby union and in line with Clough's (2002) conceptualisation of the concept, it would appear that the MAC approach is able to develop the player's ability to appraise stressful situations as a challenge. The MAC approach ensures players are less likely to believe that the demands of the situation will exceed their coping resources, thus facilitating the ability to cope with adversities and pressures, which is a key component of mental toughness (Bull et al., 2005; Gucciardi et al., 2008). The enhancement of this dimension is an important finding for those who wish to support the performance of rugby union players in Scotland, given the stressors associated with the professional game and need to maximise the potential of their talent pool.

The confidence in abilities dimension has also been identified as a key component when considering the development of mental toughness. Previously within this thesis, this dimension has discriminated between rugby players at different performance levels, and is a seminal dimension with respect to displaying behaviours associated with mental toughness. Findings from the quantitative analysis suggest that the MAC approach can enhance mental toughness, through giving players greater confidence in their ability. These conclusions suggest that the MAC approach will allow players to successfully overcome challenges and rebound from failures, as their self-esteem is not highly contingent on performance outcomes. The confidence dimension of the

MTQ48 has also been linked with optimism, suggesting that more mentally tough players will expect the best possible outcome and this could result in an increased willingness to preserve through challenging situations, in the pursuit of achieving performance excellence (Nicholls et al., 2008; Coulter, Mallett, & Gucciardi, 2010). This finding is consistent with a previous intervention effort within rugby union, which highlighted the ability of optimism to enhance mental toughness in rugby union players (Parkes & Mallet, 2012). The control dimension of the SMTQ also showed positive change as a result of the MAC approach. This is an important finding within the sport of rugby union, especially at semi-elite, academy level. Day to day, semi-elite rugby union players have their routine timetabled for them, they have selection concerns and they must negotiate contracts. It can be reasonably assumed then that these challenges may reduce an athlete's perceived influence over their life and its direction. By enhancing a player's sense of control, the MAC approach will support their ability to handle such demands and be successful within this sporting environment.

There were no significant changes for outcome variables associated with mindfulness or psychological flexibility, which was disappointing. Overcoming this lack of change is a key challenge for those seeking to effectively deliver this approach and enhance mental toughness in rugby union. High levels of mindfulness have been positively correlated to higher levels of control, constancy and general mental toughness, as measured by the SMTQ (Walker, 2016). These positive associations have not been replicated within the current study, and the ability of the MAC approach to enhance mindfulness among rugby union players warrants further investigation.

5.4.2 Qualitative Findings

The qualitative analysis revealed interesting findings in relation to the participant's thoughts on the effectiveness of the MAC approach. This feedback was found to be affirming, as participants indicated they felt the approach enhanced their mental toughness. Some of the participants suggested that before the intervention they did not consciously address their thoughts, highlighting the development in mindful thinking that took place. Although not

replicated quantitatively, these conclusions offer support for the ability of the MAC approach to enhance mindfulness, and thus mental toughness (Jones & Parker, 2018). Players also indicated how they cognitively worked through the MAC approach, which allowed them to just keep going in a conditioning session. Such reflections suggest the positive impact of the approach on the development of mental toughness and completion of mentally tough behaviours. There are also links here that tie the MAC approach to behavioural perseverance, a key tenant of being mentally tough (Gucciardi et al., 2015). The authors of the current study suggest that being present, accepting challenging thoughts and acting a manner consistent with one's performance values, is a cognitive strategy that underpins mental toughness and the completion of mentally tough behaviours.

The conclusion that mental toughness can be developed through the performers successfully implementing the MAC approach, to overcome challenging experiences, is a finding that carries valuable applications within sport. To develop mental toughness, those working in sport are encouraged to create opportunities for performers to have these successful, MAC consistent experiences. This again highlights the key role that support staff play in the development of mental toughness (Weinberg et al., 2017). There have been calls for researchers to influence the culture by ensuring players are exposed to a number of demanding situations (see Cook et al., 2014). The findings of the present study would suggest that the more experiences players can have, were they go through the cognitive process of noticing and accepting challenging thoughts, before then completing behaviours that have a valued end, the more mental toughness development will occur.

The participants acknowledged that sports psychology was new to them and this impacted upon the efficacy of the approach. Within the intervention, time and space was made available to outline what sport psychology support is, although comments made by the player's suggest that more effort is required in this area, to ensure engagement with the approach. While describing his experiences of consulting in professional rugby union, Mellalieu (2017) acknowledged that that

sport psychology is not “part of furniture” and this presents a barrier to applied work in this environment. Mellalieu also comments on the importance of ecological validity, indeed the use of classrooms, gym space and pitch time to deliver the MAC approach was supported by the players in terms of engaging with the content.

The participant’s responses highlight that that they felt the support staff lacked a knowledge and understanding of the project. This is disappointing, as support staff sessions were included within the intervention. These conclusions do highlight the difficulty of upskilling staff in a relatively short period of time. Cook and colleagues (2014) note that support staff saw their role as ‘cultural architects’, in that they could use their skills and personal qualities to assist in the creation of a culture that promotes mental toughness development. The proactive role that staff play in developing mental toughness may have been lost, due to the inability of the support staff sessions to give staff the knowledge to co-deliver the MAC content, through their own involvements with the player. There was no social validation measure completed with the staff, which is an oversight within this study design. Other researchers have suggested the difficulty of upskilling support staff due to restrictions on time, relapses into previous coaching practices and a limited understanding of the workshop materials (see Mahoney et al., 2015).

One aspect of the intervention that was viewed as highly impactful was the motivation sessions with iconic figures. There was a sense from the participant’s responses that these sessions stressed the value of the MAC approach, and its applicability in developing mental toughness. Gucciardi et al., (2009) has suggested that mental toughness can be caught through social experience. These social experiences can be taught by significant others, and the responses from within the focus group would support this. Indeed this teaching of tough thinking has been suggested as a mechanism by which performers can derive benefits from a tough environment, thus facilitating the development of mental toughness (see Bull et al., 2005). These sessions were seen as more experientially valuable that the development sessions. Comments from the

players did highlight that they understood the function of these sessions, as challenging themselves to do things they need to do, over what they want to do. Despite this, the motivational sessions were clearly more impactful.

5.4.3 Limitations and Future Research

There are limitations within the present study that may inform future research efforts. Primarily, the absence of a control group restricts the impact of the quantitative conclusions supporting the use of the MAC approach to enhance mental toughness. With the acknowledgement that mental toughness is a complex psychological construct (see Connaughton, Hanton, Jones & Wadey, 2008), evidence-based practice dictates that a pilot study is a requisite initial step in exploring a novel intervention or an innovative application of an intervention (Leon, Davis & Kraemer, 2011). Future research into developing mental toughness is encouraged to utilise the information presented above, then adopt an experimental-control group design to assess the effectiveness of the MAC approach. Such efforts have been employed within other mental toughness interventions, which have then made seminal contributions to the literature (see Gucciardi et al., 2009; Bell, Hardy and Beattie, 2013).

Another limitation concerns the measurement of mental toughness. As has been discussed previously within this thesis, the MTQ48 represents the most robust and empirically supported measure of mental toughness, although its validity and reliability has been challenged within more elite populations (Vaughan, Hanna, & Breslin, 2018). It has been suggested that to avoid the challenges associated with self-report assessments of mental toughness, researchers should collect mentally tough, behavioural data. Previous studies detailed within this thesis have explored the use of notational analysis to measure mentally tough behaviour, which is grounded in a qualitative understanding of what it means to *be* mentally tough in the sport. This thesis offers tentative conclusions regarding its effectiveness, but the need to identify specific training and competition scenarios that can be employed as an objective measure of mental toughness have been promoted elsewhere (see Bell, Hardy & Beattie, 2014). Such measures

would offer a more robust assessment of the effectiveness of interventions that purport to enhance mental toughness.

There are a small number of studies that have adopted similar principles, to those detailed within the MAC approach, to develop mental toughness. Fletcher & Sarkar (2016) produced the mental fortitude training program, which focused on developing three main areas: personal qualities, a facilitative environment, and a challenge mind-set. The personal qualities that Fletcher & Sarkar describe, consist of personality traits and psychological skills, with the latter being more malleable. Regularities with these personal qualities can be drawn from the mindfulness skills and value based approach listed within the MAC therapy (Gardener & Moore, 2008). Fletcher & Sarkar also promoted the need for a facilitative environment, this is consistent with the belief that context plays a major role within developing mental toughness. Those in charge, leaders and staff, can manipulate the sporting environment by increasing the demand, and by giving participants more opportunities to develop mental toughness. The can also make this sporting environment more relevant, through aligning the participants values and beliefs to it. In essence, the environment should be manipulated to increase the support provided to individuals, this will increase the participant's personal qualities so that they can cope with the demands of the environment (Fletcher & Sarkar, 2016). In developing the personal resources of the participant, there is a clear theoretical link to the MAC approach, as it sought to enhance the participant's psychological flexibility. Participant's that develop their personal resources, then are challenged and come through this challenge successfully, will be subject to experiences that will develop mental toughness.

Research has also taken place within the U.S Army that sought to enhance resilience and mental toughness. The Master Resilience Training program shares a number of similarities with the MAC approach adopted above. This 10-day program taught psychological skills to non-commissioned officers, which allowed them to cope with the demands of the role (Reivich, Seligman and McBride, 2011). There were 3 component modules within the program, with the first

being educational. Participants gained an understanding of what contributes to being resilient, and they were encouraged to be more self-aware, by identifying their own thoughts and emotions. This educational piece shares striking similarities to the first two sessions within the MAC approach, in that participants developed an understanding of what mental toughness is and explored the concept of mindfulness. As part of this module participants, also developed their ability and willingness to express emotions, this strongly correlates with the acceptance and psychological flexibility components within the MAC approach (Gardener & Moore, 2008). The aim of the second module was to then develop mental toughness. To achieve this, the participant's deeply held beliefs were explored, before they were asked to recognise when their emotion drove them away from these deeply held beliefs. Participants were to recognise their beliefs and then the emotional and behavioural consequences of those beliefs. This module shares direct comparison with the values awareness and committed action piece within the MAC approach (Gardener and Moore, 2008). The conclusions of the pilot study highlight that the MAC approach has efficacy with respect to enhancing mental toughness and the studies listed above, that are similar in nature, further support for this approach.

5.5 Conclusions

A central rationale for employing the MAC approach was the overlap that was noted with aspects of being mentally tough. These aspects included positive links with mindfulness (Jones & Parker, 2018), experiential acceptance (Gucciardi et al., 2015) and self-awareness (Meggs, Ditzfield & Golby, 2014). The current study appears to support these associations, along with the ability of the MAC approach to enhance mental toughness. The lack of support for PST interventions, along with the inability of these approaches to embed cultural information, suggests that the MAC approach may be a fruitful one with respect to enhancing mental toughness. Conclusions from the social validation measures confirm this, as they suggest the MAC approach provides players with a cognitive strategy that underpins mental toughness and the completion of mentally tough behaviours. These findings agree with the view held by Eubank et al., (2017), who argues that mental toughness development should not be seen as something separate from the values present, mental toughness should be connected to the culture present. It must be acknowledged that developing mental toughness is a long-term process, and cultivating these values and creating a culture consistent with mental toughness development is a difficult process. The findings from the present study suggest that to develop mental toughness, any intervention efforts must be thoughtful and purposeful. They must include aspects that that seek to intervene with the performers, the support staff and the environment, which is a view promoted by others (see Weinberg, Freysinger & Mellano 2018).

Mental toughness has been viewed as complex psychological construct throughout this thesis, and it is acknowledged that many influencing factors must be considered when seeking to develop it (Connaughton, Hanton, Jones & Wadey, 2008). The evidence in the present study highlights the applied value of the MAC approach to enhance mental toughness. The MAC approach would be of particular interest to smaller nations, such as Scotland, who seek to compete on the world stage. To do so, they need to support the psychological development of their performers and the application of this approach would allow rugby union players to cope with the demands of the sport and the environment, minimising the potentially deleterious effects of stress on performance and well-being (see

Crocker et al., 2015). The next step in this research narrative, but out with this thesis, is a randomised control trial (RCT) study design that utilises the key conclusions within this pilot study, to develop an effective mental toughness intervention. Such empirical activity will generate impactful conclusions and it is activity that should be pursued, as it captures “the very essence of sport psychologists work with elite athletes” (Jones et al., 2002 p. 213).

6. Key Findings

Experimental Study 1

- Moderate levels of mental toughness have been reported within elite and semi-elite rugby union players in Scotland.

- Mental toughness is an important psychological construct that is associated with superior rugby union performance.

- The development of an intervention that enhances mental toughness in semi-elite and elite rugby union players is warranted.

Experimental Study 2

- IPA offers an experiential framework that supports investigations of what it means to be mentally tough.

- Being mentally tough in rugby union is seen as combination of characteristics, behaviours, socio-cultural influences, with the construct being particularly important with respect to injury and team (de)selection.

- Those seeking to enhance mental toughness within this cohort must utilise this information when seeking to develop an effective intervention.

Experimental Study 3

- Notational analysis can be employed to identify and measure rugby specific, mentally tough behaviours.

- Both identified behaviours correlated moderately with mental toughness, with games lost being a particular salient match category in the expression of these mentally tough behaviour.

- Researchers should seek to replicate research of this nature in other sports that collect similar performance data, to develop a more complete understanding of mental toughness.

Experimental Study 4

- The MAC approach is a feasible intervention strategy to enhance the mental toughness of semi-elite rugby union players in Scotland.

- Key elements of the MAC approach provide a cognitive strategy that underpins mental toughness and the completion of mentally tough behaviours.

- Researchers are encouraged to use a randomised control trial study design and employ the conclusions contained within this study, to develop an intervention that enhances mental toughness in rugby union players.

7. General Conclusions and Future Directions

The aim of this thesis was to develop an understanding of mental toughness within Scottish Rugby Union, to create an intervention that would enhance mental toughness and support the performance of rugby union players. This journey of understanding began by assessing the levels of mental toughness that were present within semi-elite and elite players, in an effort to gain an insight into the landscape that the research was going to take place in. A seminal theme throughout this thesis narrative has been to view mental toughness as a complex psychological construct, and the adoption of attitudes and scientific procedures consistent with this view. In the first instance, this led to a thorough examination of self-report measures that purport to measure mental toughness. This was done in an effort to deduce the measure that would give the most accurate picture of the levels of mental toughness present within Scottish Rugby Union. Mental toughness has been promoted as an important psychological quality that can support performance excellence (see Gucciardi & Jones, 2012) and the results of the first experimental chapter support this view. With the knowledge that mental toughness has the ability to discriminate between players at different performance levels, and that the levels present within Scottish Rugby Union are moderate, further investigation into the concept is warranted. By employing semi-elite and elite definitions that are consistent with those outlined by Swann, Moran & Piggott (2015), this experimental study also offers a position from which mental toughness in rugby union can be compared within other nations and sports, while also remaining true to the theme of evidence based practice.

Qualitative approaches have been employed by researchers to uncover what mental toughness *is* and how it influences performance, although a study of this nature had not yet taken place within Scottish Rugby Union. Often, researchers would infer meaning from studies in other sports and cultures to understand mental toughness, rather than complete their own investigation into the construct. The literature surrounding mental toughness suggests that the concept is domain specific (Tibbert et al., 2015) and means different things to different people (Crust, Swann & Allen-Collinson, 2016). As a result, a

qualitative investigation into mental toughness in professional rugby union was required, before the research narrative could move forward. Previous researchers, in their haste to publish materials on this salient concept within sporting cultures, often neglected this step. Consistent with the evidenced-based approach inherent within this thesis, any qualitative investigation into the concept had to be guided by theory. When consulting the literature, it was clear that an understanding of what it means to *be* mentally tough is heavily influenced by the quality and content of the performer's experience, with IPA surfacing as a framework that would permit an analysis of these experiences and develop an understanding of what it means to *be* mentally tough (Crust, Swann & Allen-Collinson, 2016).

Again, the author of the present study stresses that this investigation was a seminal step in the research narrative, as without it, researchers would not know what they are looking to enhance, or what they are supposed to be measuring. This conscious effort to establish meaning before chasing measurement, is one that it is hoped is adopted by other researchers (Nesti, 2011). In making recommendations for future research, those wishing to develop an understanding of mental toughness in other sports are encouraged to adopt a similarly rigorous approach as the one detailed within this thesis, and elsewhere in the sports of Australian football (Gucciardi, 2008; 2009) and cricket (Bell, Hardy & Beattie, 2014). These approaches are grounded in a qualitative understanding of what it means to *be* mentally tough within the context in question, and researchers are encouraged to develop this qualitative understanding of what it means to *be* mentally tough, within other unreported contexts and sports.

The conclusions from this qualitative investigation complemented an understanding of mental toughness that has been established in a number of other sports, in different cultures. Thus, there is an acknowledgment then that there are general aspects to the concept of mental toughness, but researchers are warned against generalising the understanding of mental toughness promoted in this thesis. This study addressed calls from the extant literature

that sought for more novel approaches, grounded in phenomenology, to be used when seeking to understanding of mental toughness (Eubank et al., 2017). Increasingly, the field of sport psychology is divided into two distinct and in some ways opposed camps. One group carries out research and discusses theories. The other engages in practical work of a psychological nature with sport performers, but without any reference to the research and literature base of the discipline. Phenomenological approaches could help overcome some of these difficulties (Nesti, 2011). The value of such approaches is highlighted in conclusions of the current research, which include novel aspects of mentally tough behaviour within professional rugby union. These conclusions opened the door to the development of a sport-specific, behavioural measure of mental toughness. With the emergence of a number of behavioural approaches within the mental toughness literature, it seemed logical to pursue this avenue when presented with this information (Gucciardi & Hanton, 2016).

The phenotype of studies that sought to identify and measure mentally tough behaviour was to firstly, identify behaviours from the thematic analysis of interviews with key stakeholders. Often these analyses were not guided by theory. At times, non-sport specific fitness behaviours were used as a proxy for mentally tough behaviours, without correcting for physical fitness (see Gucciardi et al., 2016). Once these behaviours had been identified, an informant-rated scale was employed to measure mental toughness, instead of an empirically supported self-report measure of mental toughness (see Diment, 2014). In an effort to be as evidenced based and objective as possible, this study identified behaviours from qualitative investigations into the sport that were guided by theory. These behaviours were coded for in an objective manner, before then comparing these behaviours with the most empirically supported self-report measure of mental toughness, to establish a relationship and assess the presence of mentally tough behaviour. The preceding details ensured that the authors of the present study could be confident in their analysis that mentally tough behaviour had occurred, a key criticism of previous behavioural approaches into mental toughness (Gucciardi, 2017).

The conclusions from this behavioural investigation into mental toughness support the hypothesis that mentally tough behaviours can be identified and measured within professional rugby union, yet they also stress the difficulty of this task. Big data dominates many professional sports and as a result there is a plethora of behavioural information that could be correlated with mental toughness. An attractive approach would be to do simply that, develop a list of behavioural outcomes and correlate it with self-reported scores of mental toughness to see what 'sticks'. Such an approach is not consistent with the view that mental toughness is a complex psychological construct, and prior efforts must be made to understand what mental toughness *is*, in the context in question.

Despite this qualitative pre-requisite, researchers are encouraged to direct empirical attention to the identification and measurement of mentally tough behaviour, through notational analysis. Of particular interest, would be investigations into sports such as football and cricket, were a qualitative understanding of what mental toughness *is,* is in place (see Bell al., 2014; Cook et al., 2015). If successful, research of this nature would provide information that will further distinguish between mental toughness and its behavioural outcomes, thus developing our understanding what it means to *be* mentally tough (Anthony, Gordon, Gucciardi, & Dawson, 2016). Video analysis has as not been commonly employed as measure of psychological constructs, however there is plausibility in this approach as observing behaviour has been used previously to measure coach-athlete interactions (Turnnidge et al., 2014).The integration of these techniques will add novel performance information that can then be transferred into knowledge surrounding mental toughness and player performance variables. With this knowledge, coaches can have a more objective understanding of their player's performance and it will inform performance interventions, ultimately leading to more effective applied practice (Drawer, 2014).

On completion of the qualitative analysis, there was a now basis to develop a context-rich intervention that enhances mental toughness in professional rugby

union players. Historically, many scholars proceed on in developing a mental toughness intervention, without the correct cultural and contextual information in place. The findings present within this thesis suggest that approaches such as this will lead to the development of incomplete interventions. The present thesis, by making conclusions on what it means to *be* mentally tough in professional rugby union, represents best practice when seeking to design an effective mental toughness intervention (Slack, Maynard, Butt, & Olusoga, 2015) and addressed calls for theory to guide future intervention work (Mahoney, Gucciardi, Mallett, & Ntoumanis, 2014).

Mental toughness has been promoted as a psychological construct that is important for superior rugby union performance and preparing academy players for the stresses associated with the professional game. On review of the literature, there was a suggestion that classic PST approaches alone were insufficient as a framework to develop mental toughness, as they lacked the ability to include contextual information related to an understanding of what it means to *be* mentally tough (Connaughton, Thelwell, & Hanton, 2010). Recently there have been calls to adopt novel approaches to enhance mental toughness, and acceptance-based approaches have been highlighted as a more possible intervention strategy for developing mental toughness (Anthony et al., 2018). The authors of the present study identified the MAC approach as one that could provide an effective intervention framework, when seeking to develop mental toughness. The ability of the MAC approach to enhance mental toughness has been assumed based on the knowledge that several functions of the MAC approach are consistent with conclusions regarding successful mental toughness development. These theoretical links are primarily made through the concepts of mindfulness, experiential acceptance and behaviours that have a valued end.

In agreement with evidence-based practice and the view that mental toughness is a complex psychological construct, a pilot study assessing the feasibility of the MAC approach represents a fundamental phase of this research process. The function of a pilot study is to evaluate the feasibility of the recruitment, retention, procedures, and implementation of a novel intervention. The

conclusions made within this feasibility study can be employed to develop a complete intervention, as pilot studies are an important pre-requisite that will enhance the probability of success in any subsequent intervention efforts (Leon et al., 2011). Researchers are specifically directed towards the conclusions from within the social validation measures, as the importance of culture with respect to engaging participants, has been evidenced as an important aspect within the development of mental toughness (Cook et al., 2014). The next step in this research narrative, but out with this thesis, is a randomised control trial (RCT) study design that utilises the key conclusions within this pilot study, in developing an effective mental toughness intervention. Such empirical activity will generate impactful conclusions that will enhance the work of sports psychology researchers and practitioners and develop the skill of *being* mentally tough. It is clear from the information above that to develop an understanding of what it means to *be* mentally tough and then design an effective intervention, a number of important and time-consuming steps are required. Researchers are encouraged to complete these steps as, or they risk adding to abundance of research that has led to conceptual confusion (Gucciardi & Hanton, 2016).

The pursuit of a true understanding of what it means to *be* mentally tough and the development of intervention to enhance the concept, should not be neglected. Such empirical developments may hold promise in the area of facilitating mental health among elite performers. Keegan (2018) acknowledges that there is a benefit to addressing both mental health and mental toughness within the same intervention. Indeed, the two concepts have been discussed empirically. A short editorial article by Bauman (2016) described how mental toughness and mental health are contradictory terms within the culture that exists in sporting environments. Describing this culture as one where mental health issues are ignored, and athletes fear seeking support in case they are being viewed as mentally weak. This article does raise noteworthy points about what it means to *be* mentally tough and how this understanding may impact upon mental health support, and in response to this article Gucciardi, Hanton and Fleming (2017), acknowledge this. They go on to suggest that editorial is less to do with mental toughness, but more to do with the lack of mental health support services made available to athletes. They suggest that rather than be

contradictory, the two could be complimentary as mental toughness could be used as a ‘hook’ open dialogue that leads to mental health support.

The first author of the present study suggests an extension of this view, promoting the ability of mental toughness to ‘catch’ athletes and support staff in an intervention strategy that can be used to enhance mental toughness and in doing so, facilitate mental health. Stress and coping with stress provide a theoretical bridge between both concepts, as an inability to cope this stress can lead to poor performance and poor mental health (Gerber at al., 2018). The extent to which these stressors affect a performers mental health is dependent on the resources the athletes has available (Sarkar & Fletcher, 2014). Viewed as a resource caravan (Gucciardi, 2017), it would seem that any developments in mental toughness would enhance the resources of the performer, and facilitate mental health and optimal performance. A recent standpoint on mental health published by Schinke, Stambulova, Si and Moore (2018), highlight that mental health should be viewed on a continuum. At one end is the high functioning athlete, in which the description shares a number of similarities with an understanding of what it means to *be* mentally tough. Evidence based interventions that develop mental toughness will assist in the performer’s functioning, both in and out of the athletic milieu.

The findings within this thesis have been discussed, and the relatedness to other empirical work within the discipline has been noted. It is now worth acknowledging the models of mental toughness, and with which one, the conclusions of this thesis are most consistent. Outlined within the introduction, there are two main conceptualisations of mental toughness. Cloughs 4Cs model (Clough et al., 2002), that was drawn from hardiness theory and suggests that mental toughness is a stable personality trait, comprised of Confidence, Commitment, Control and Challenge. Conversely, the work of Gucciardi (2017) drew on theories of stress and coping to promote mental toughness as a unidimensional concept, which is changeable and influenced by context. Seen as diametrically opposed models, these two conceptualisations do share similarities in that they both promote importance of confidence and self-belief in being

mentally tough (Clough et al., 2002; Gucciardi et al., 2008). Before relating the findings within this thesis to these models, it is worth noting that any attempt to highlight inconsistencies does not suggest that the model in question lacks any relevance, or value, in explaining mental toughness. At times differences of opinion within this field have led to ill-tempered publications (see Gucciardi, Hanton and Mallett, 2013), which have not only hindered progression towards understanding the construct, but allowed others to raise concerns about the legitimacy of it (Caddick and Ryall, 2012).

The pivotal conclusions from within this thesis offer support for the Gucciardi (2017) conceptualisation of mental toughness and they further help distinguish mental toughness from other concepts. The state like nature of the construct, ensures distancing from the dispositional concepts of grit and resilience. This thesis also supports the view of mental toughness as a discrete entity, through the suggestion that to be mentally tough, there must be congruence between displayed behaviours and performance objectives. This sense of commonality can also be seen in accumulation of coping resources, specific to completing mentally tough behaviours. This supports the conceptualisation of mental toughness as a resource caravan, and a distinct entity in its own right. The conclusions within chapter 3, regarding the important influence of context on what it means to *be* mentally tough, share similarities with the model of mental toughness developed by Gucciardi, Gordon and Dimock (2009) in Australian Football (see Figure 2). The view that mental toughness is made up of characteristics, behaviours and is influenced by situations, can be directly aligned to the conclusions within chapter 3 and 4. The fundamental importance of context in understanding mental toughness is consistent with suggestions that mental toughness is defined by what the subculture promotes it as (Tibbert et al., 2015) and that mental toughness is assigned based upon the performers ability to conform to the values present within the environment (Coulter et al., 2015). These conclusions highlight that context must be accounted for within a model of mental toughness. The 4Cs model suggested by Clough and colleagues (2002) generalises mental toughness across a *variety* of domains. Work within this thesis suggests that there are a number of valuable contributions, in that challenge, confidence and commitment appear to be central to mental

toughness in rugby union. The prominent role that context plays in understanding what mental toughness is and what it means to be mentally tough, suggests that general conceptualisations cannot fully explain mental toughness within sport.

In acknowledging the sport specific nature of mental toughness, a model must be flexible to this context specificity. One model that has appeared within the extant literature is that of Bronfenbrenner's (2001) bio-ecological model. Mahoney et al., (2014) employed this model to explore mental toughness development, and in turn provided a conceptualisation that is consistent with many important conclusions present within this thesis. They selected this model as it has a robust theoretical foundation upon which to understand mental toughness development. This matches attempts within this thesis to view mental toughness as a complex psychological construct, and apply scientific theory to its investigation. This bio-ecological model also accounts for a number of key principles that have been outlined within this thesis. The model is comprised of proximal processes, personal characteristics, ecological contexts, and time. Proximal processes, within this model, can be aligned to one's experiences of mental toughness and the need for a challenging and demanding training environment. The inclusion of these aspects shares an understanding with some of the important conclusions held within thesis, such as mental toughness development being driven by context and the experiences this context creates. In accounting for an individual's personal characteristics, this model also serves to include the conclusions from chapter 3, linked to adopting a growth mind-set and being self-determined. With respect to ecological context detailed within this bio-ecological model, there is an appreciation that interactions with the environment, and the individuals within it, play a key role in mental toughness development. These interactions are not mutually exclusive and must be considered when seeking to enhance mental toughness.

Reflecting on the key conclusions within this thesis, mental toughness has considerable value within rugby union. This is grounded in its ability to discriminate between players at different performance levels in chapter 2, as

those playing at a higher level report greater levels of mental toughness. The construct also allows players to successfully complete a number of rugby-specific, performance relevant behaviours, as seen in Chapter 4. This understanding that mental toughness shares a positive relationship with performance is consistent this evidence out with this thesis (see Cowden, 2017). The next logical step for researchers is to assess if mental toughness can be developed. The outcomes of chapter 5 provide clear evidence that mental toughness can be developed. This understanding shows congruence with the view that mental toughness is a state like construct, which is amenable to change through psychological skills training and social experiences (Gordon, 2012; Gucciardi et al., 2009). Within chapter 5, this thesis has acknowledged that a number of different attempts have been employed to enhance mental toughness. The MAC approach is a strategy that can serve to action a number of key conclusions present within this thesis, with respect to what it means to *be* mentally tough and how it can be developed. Experiences of mental toughness are important in the development and understanding of what the construct *is*, and the MAC approach can foster these mental toughness experiences. In an effort to encourage others to take theory into practice, these final comments will consolidate the body of knowledge presented within this thesis, to provide a summary of key considerations for those seeking to develop mental toughness.

The strategy must be specific to the context. Empirical work must be completed before any intervention can be delivered, and this should come in the form of a qualitative investigation that seeks to understand the lived experience of mental toughness, in situ. Antony and colleagues (2018) acknowledge this, as they conclude that researches have not paid enough attention to the sporting environment and so cannot fully capture or understand mental toughness. An absence of this work will lead to an intervention that is incomplete, and therefore less effective at developing mental toughness. Any intervention efforts must also be delivered *in* context, and so the integration of other sporting processes is crucial. The technical, tactical and physical aspects of performance should be included in the support, and when appropriate, aligned to examples of mentally tough behaviour. This consistent and holistic approach can lead to the successful development of mental toughness.

The strategy must be high challenge, high support. The high support should be provided through the MAC approach, or similar, to develop the participants mental toughness and personal coping resources. The high challenge aspect will be brought about by identifying and/or providing opportunities to develop mental toughness. This should be emerge from outlining what mental toughness is, and then aligning the construct to set of mentally tough behaviours to complete, in practice and competition. These behaviours must be responses to demands from a variety of sources, and the staff within the environment can increase the frequency and intensity of these demands, when appropriate. Successful experiences within this model will develop mental toughness. The efficacy of high challenge, high support environments in developing mental toughness have been evidenced (see Bell, Hardy, & Beattie, 2013; Crust and Clough, 2011).

The strategy must involve the whole club. As has been discussed above, others within the environment play a key role in allowing the MAC approach to be delivered in a sport and performance specific manner. They also facilitate the development of a high challenge environment, which will create more opportunities to develop mental toughness. They can also assist in shaping the central values that the environment holds, and should seek to align these with an understanding of what it means to be mentally tough, for their club. Modifications to the environment should be made to support the development of each participant's personal qualities, through learning and experiential practice. Importantly, those within the club will need to carefully monitor how individuals progress along the path of developing their personal resources, gaining positive experiences of mental toughness and completing mentally tough behaviours. This will develop mental toughness.

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9. List of Appendices

9.1 Chapter 1

No associated appendices.

9.2 Chapter 2

Appendix Figure 1. Output from Two-Sample T-Tests and CI for comparing difference in Total MT between elite & semi-elite playing levels

Method

μ_1: mean of Total MT when Level = Academy

μ_2: mean of Total MT when Level = Professional

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics: Total MT

Level	N	Mean	StDev	SE Mean
Academy	59	5.49	1.66	0.22
Professional	67	6.39	1.80	0.22

Estimation for Difference

Difference	95% CI for Difference
-0.897	(-1.508, -0.285)

Test

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-2.90	123	0.004

Appendix Figure 2. Output from Two-Sample T-Tests and CI for comparing difference in Control between elite & semi-elite playing levels

Method

μ_1: mean of Control when Level = Academy

μ_2: mean of Control when Level = Professional

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics: Control

Level	N	Mean	StDev	SE Mean
Academy	59	5.69	1.47	0.19
Professional	67	6.43	2.05	0.25

Estimation for Difference

Difference	95% CI for Difference
-0.738	(-1.361, -0.115)

Test

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-2.35	119	0.021

Appendix Figure 3. Output from Two-Sample T-Tests and CI for comparing difference in Life Control between elite & semi-elite playing levels

Method

μ_1: mean of Life Control when Level = Academy

μ_2: mean of Life Control when Level = Professional

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics: Life Control

Level	N	Mean	StDev	SE Mean
Academy	59	5.19	1.46	0.19
Professional	67	5.96	2.06	0.25

Estimation for Difference

Difference	95% CI for Difference
-0.769	(-1.392, -0.146)

Test

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-2.44	118	0.016

Appendix Figure 4. Output from Two-Sample T-Tests and CI for comparing difference in Challenge between elite & semi-elite playing levels

Method

μ_1: mean of Challenge when Level = Academy

μ_2: mean of Challenge when Level = Professional

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics: Challenge

Level	N	Mean	StDev	SE Mean
Academy	59	4.54	1.74	0.23
Professional	67	5.43	1.76	0.22

Estimation for Difference

Difference	95% CI for Difference
-0.890	(-1.508, -0.273)

Test

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-2.86	122	0.005

Appendix Figure 5. Output from Two-Sample T-Tests and CI for comparing difference in Confidence in Abilities between elite & semi-elite playing levels

Method

μ_1: mean of Confidence in Abilities when Level = Academy

μ_2: mean of Confidence in Abilities when Level = Professional

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Descriptive Statistics: Confidence in Abilities

Level	N	Mean	StDev	SE Mean
Academy	59	5.44	1.79	0.23
Professional	67	6.40	1.90	0.23

Estimation for Difference

Difference	95% CI for Difference
-0.962	(-1.614, -0.311)

Test

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-2.92	123	0.004

Appendix Figure 6. Regression Analysis output, including a fitted line plot of Total MT and Age of Player.

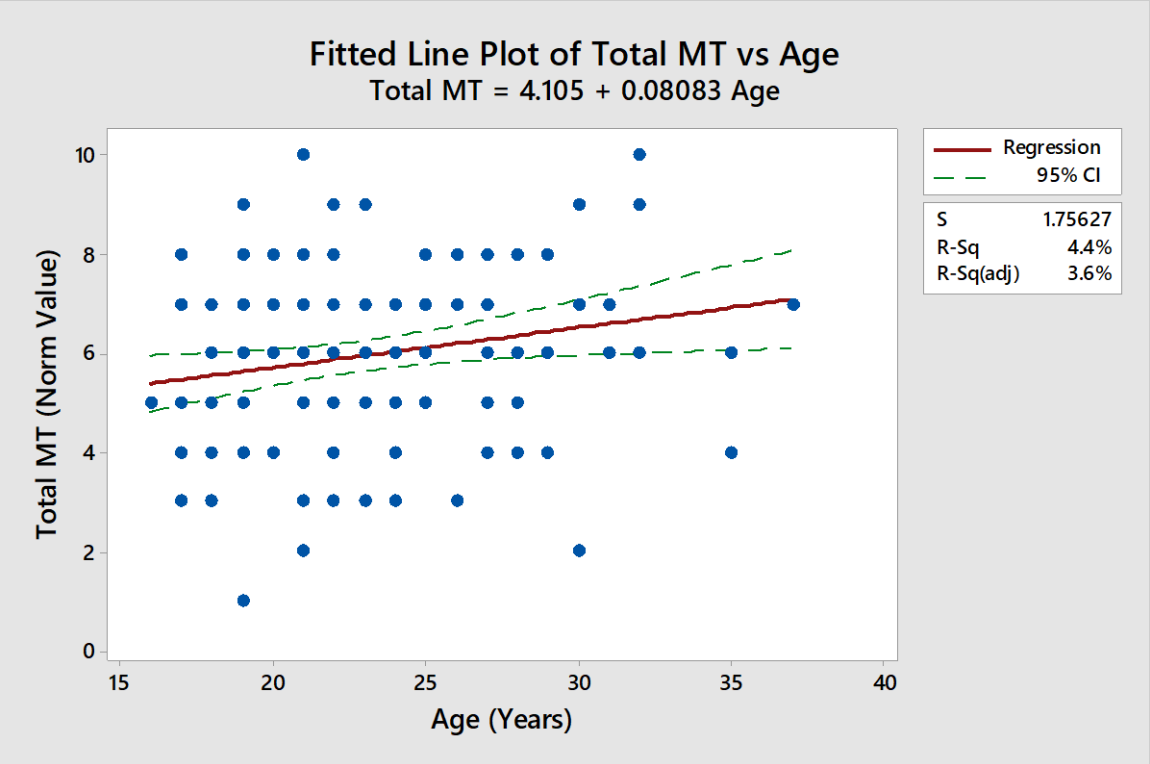
The regression equation is
Total MT = 4.105 + 0.08083 Age

Model Summary

S	R-sq	R-sq(adj)
1.75627	4.35%	3.58%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	17.397	17.3967	5.64	0.019
Error	124	382.476	3.0845		
Total	125	399.873			



Appendix Figure 7. Regression Analysis output, including a fitted line plot of Life Control and Age of Player.

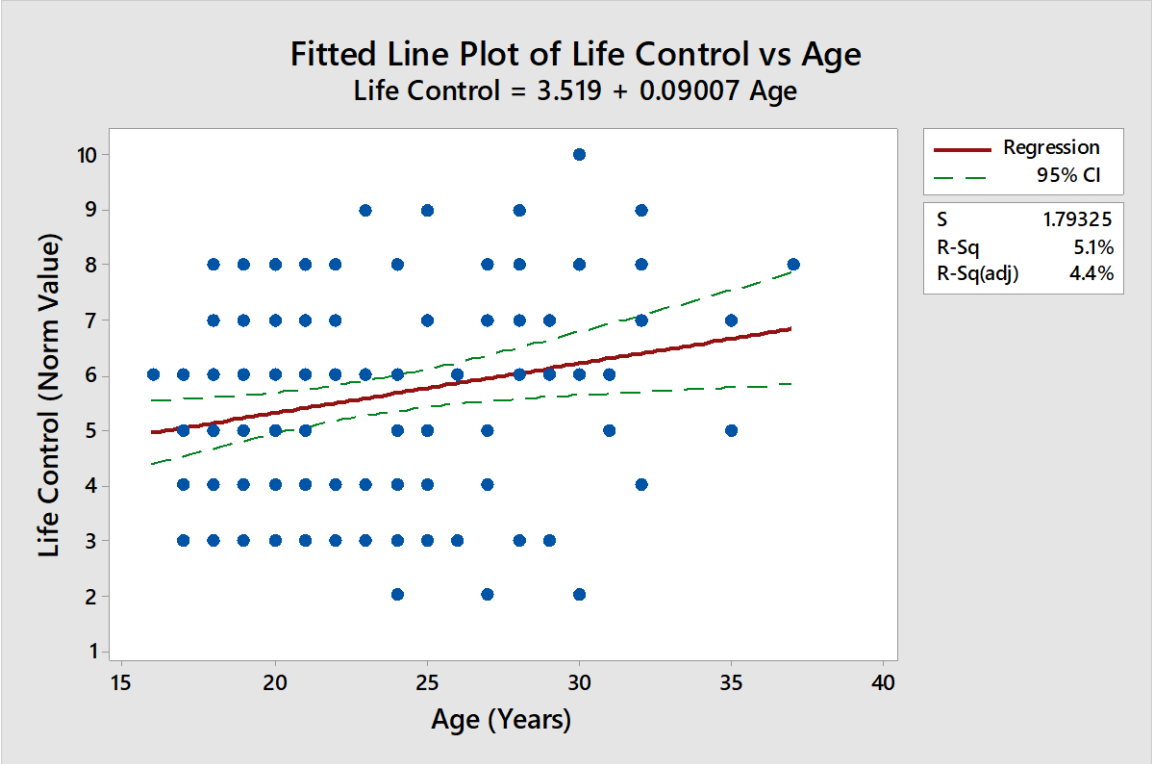
The regression equation is
Life Control = 3.519 + 0.09007 Age

Model Summary

S	R-sq	R-sq(adj)
1.79325	5.14%	4.37%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	21.603	21.6029	6.72	0.011
Error	124	398.754	3.2158		
Total	125	420.357			



Appendix Figure 8. Regression Analysis output, including a fitted line plot of Total MT and Years Playing Rugby.

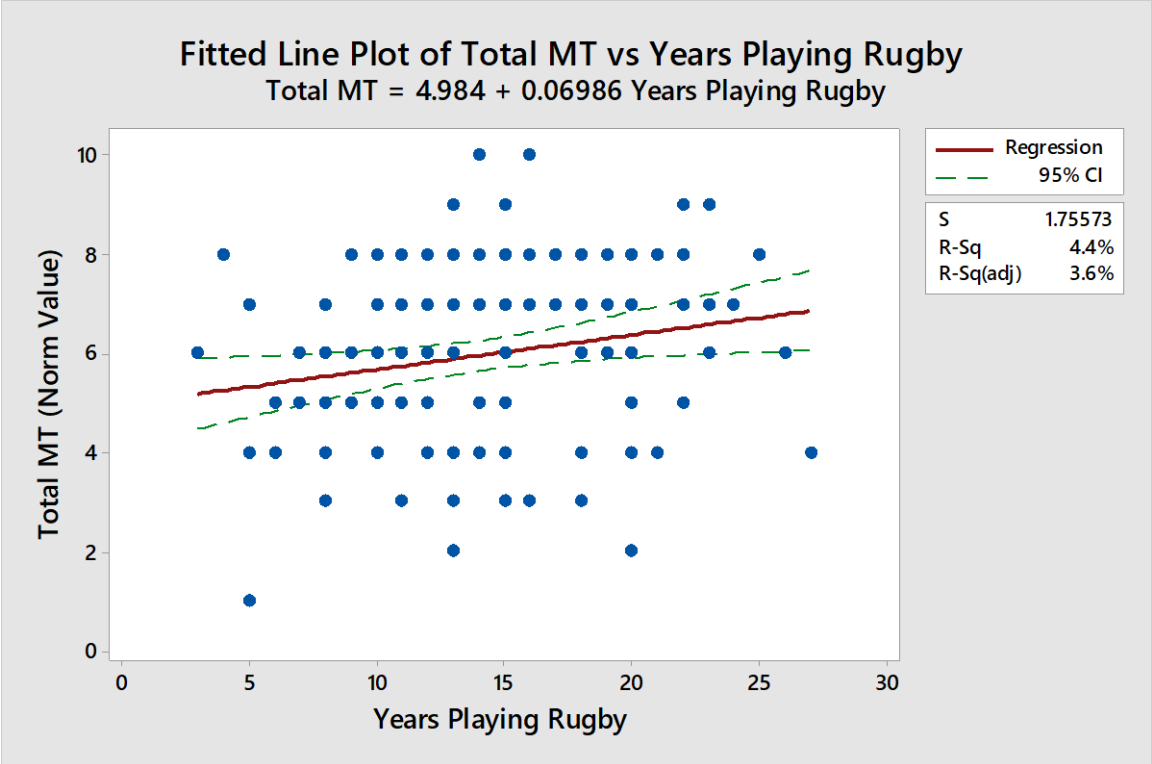
The regression equation is
Total MT = 4.984 + 0.06986 Years Playing Rugby

Model Summary

S	R-sq	R-sq(adj)
1.75573	4.41%	3.64%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	17.630	17.6300	5.72	0.018
Error	124	382.243	3.0826		
Total	125	399.873			



Appendix Figure 9. Regression Analysis output, including a fitted line plot of Challenge and Years Playing Rugby.

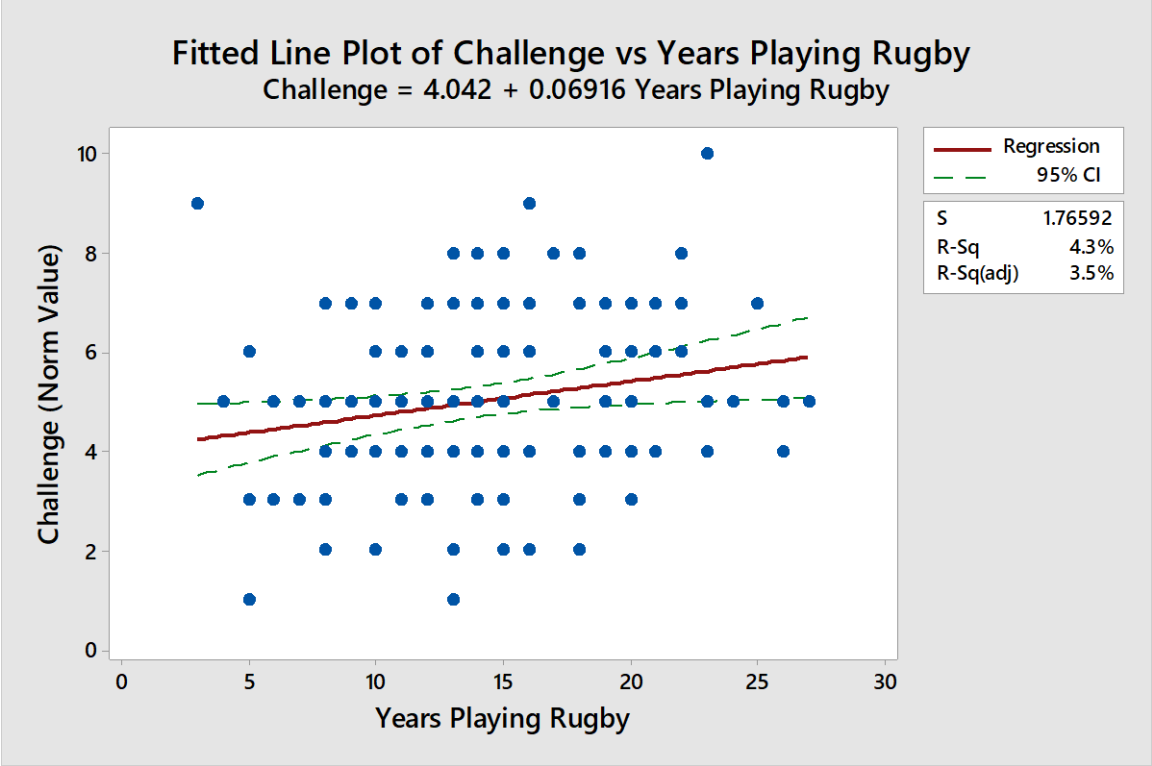
The regression equation is
Challenge = 4.042 + 0.06916 Years Playing Rugby

Model Summary

S	R-sq	R-sq(adj)
1.76592	4.28%	3.51%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	17.279	17.2791	5.54	0.020
Error	124	386.689	3.1185		
Total	125	403.968			



Appendix Figure 10. Regression Analysis output of Total MT, Age of Player and Years Playing Rugby.

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	2	19.428	9.714	3.14	0.047
Age	1	1.798	1.798	0.58	0.447
Years Playing Rugby	1	2.032	2.032	0.66	0.419
Error	123	380.445	3.093		
Lack-of-Fit	87	263.078	3.024	0.93	0.621
Pure Error	36	117.367	3.260		
Total	125	399.873			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
1.75871	4.86%	3.31%	0.00%

Coefficients

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	4.402	0.881	4.99	0.000	
Age	0.0436	0.0572	0.76	0.447	2.82
Years Playing Rugby	0.0398	0.0491	0.81	0.419	2.82

Regression Equation

Total MT = 4.402 + 0.0436 Age + 0.0398 Years Playing Rugby

Fits and Diagnostics for Unusual Observations

Obs	Total MT	Fit	Resid	Std Resid		
50	1.000	5.430	-4.430	-2.57	R	
55	2.000	5.835	-3.835	-2.19	R	
65	10.000	5.955	4.045	2.32	R	
76	2.000	6.506	-4.506	-2.60	R	
80	7.000	6.772	0.228	0.14		X
93	10.000	6.355	3.645	2.18	R	X

R Large residual
X Unusual X

9.3 Chapter 3

Appendix Figure 11. The interview schedule developed for players

1. Please tell me about rugby players who you regard as having these set of qualities.

Can you tell me how they behave in competition and training? How do they show they have these set of qualities when they train or compete? Can you tell me how they respond emotionally in training and competition?

2. Can you tell me about your own experience of working with players who have this set of qualities?

What are the main differences between players that have these set of qualities and those that don't? How do these players respond in training and competition?

3. Can you tell me about how you think these player's view themselves in relation to this set of qualities?

How do players that don't have these set of qualities view themselves?

4. What do you think are the stages of developing these set of qualities?

Can you tell me more about each stage? Who do you think is involved in this process?

5. What role do you think these set of qualities play in professional rugby union?

Can you tell me more about its role in training and competition? How does a player with these set of qualities perform?

6. A) Please tell me about the challenges that players you work with face in rugby union, and B) What qualities do you think have allowed them to deal with these challenges?

7. Can you tell me about strategies that you think might enhance these set of qualities?

Who do you think is involved in this process?

Figure 12. The interview schedule developed for support staff

1. Please tell me about rugby players who you regard as having these set of qualities.

Can you tell me how they behave in competition and training? How do they show they have these set of qualities when they train or compete? Can you tell me how they respond emotionally in training and competition?

2. Can you tell me about your own experience of working with players who have this set of qualities?

What are the main differences between players that have these set of qualities and those that don't? How do these players respond in training and competition?

3. Can you tell me about how you think these player's view themselves in relation to this set of qualities?

How do players that don't have these set of qualities view themselves?

4. What do you think are the stages of developing these set of qualities?

Can you tell me more about each stage? Who do you think is involved in this process?

5. What role do you think these set of qualities play in professional rugby union?

Can you tell me more about its role in training and competition? How does a player with these set of qualities perform?

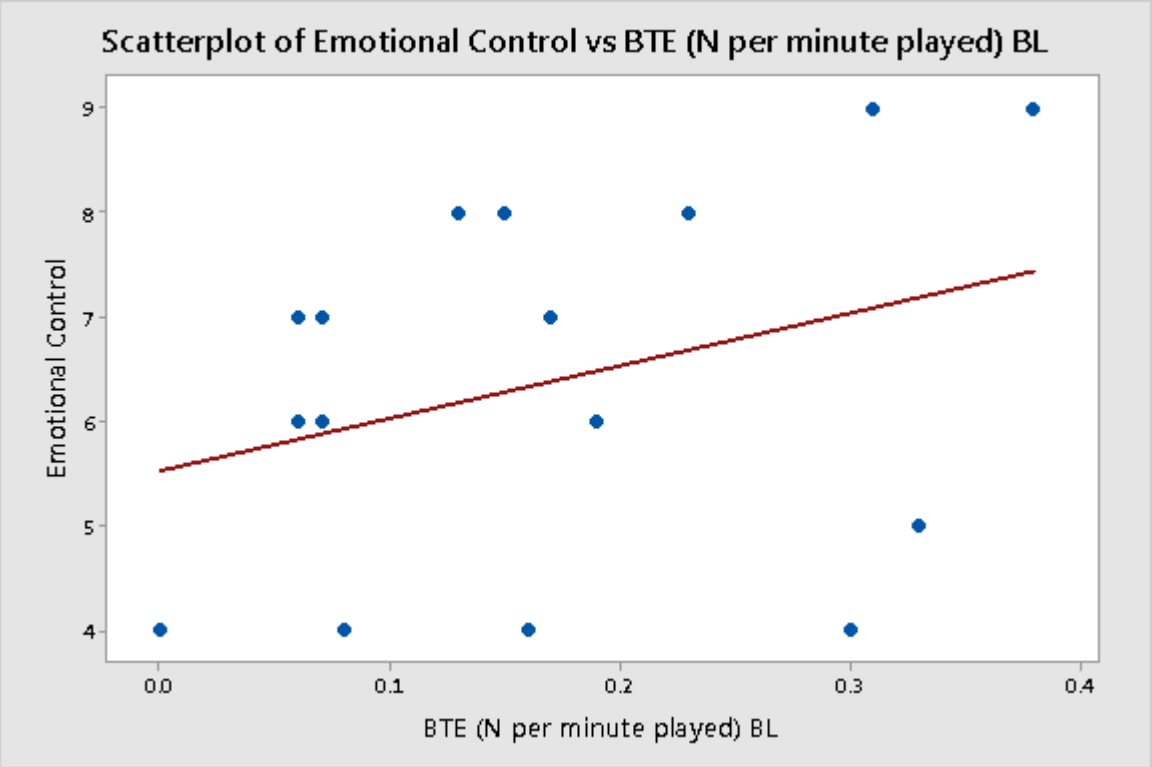
6. A) Please tell me about the challenges that players you work with face in rugby union, and B) What qualities do you think have allowed them to deal with these challenges?

7. Can you tell me about strategies that you think might enhance these set of qualities?

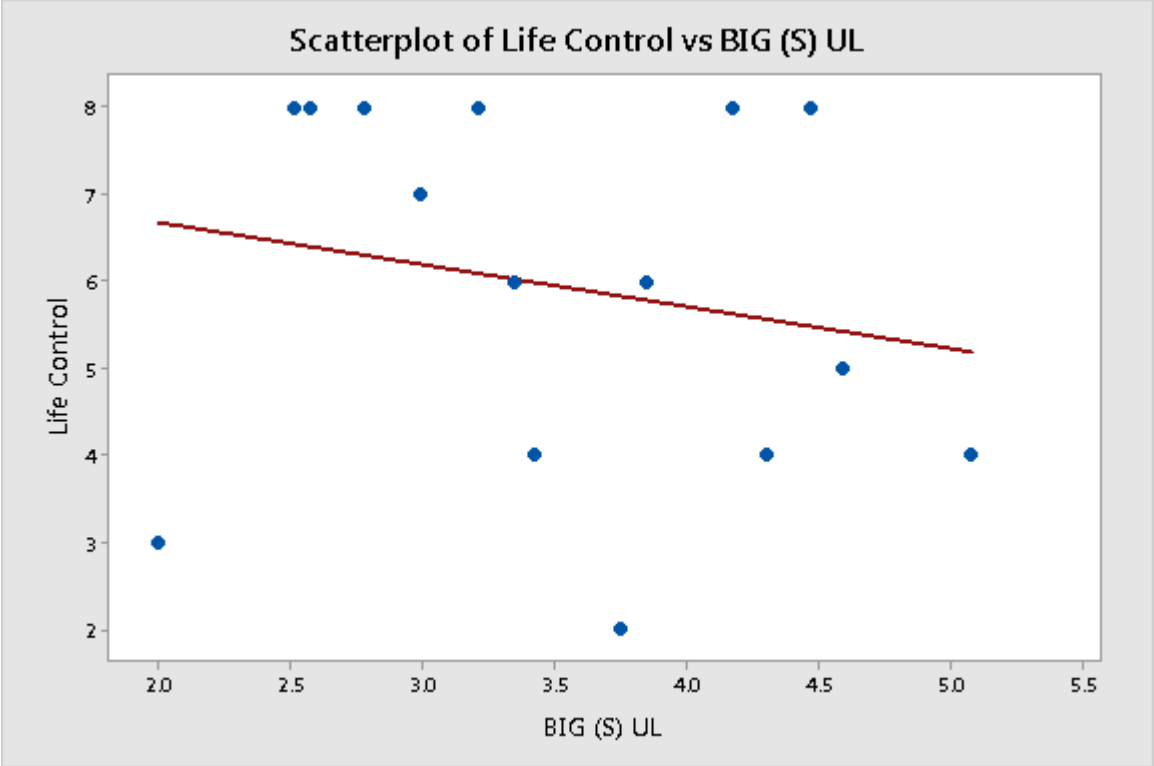
Who do you think is involved in this process?

9.4 Chapter 4

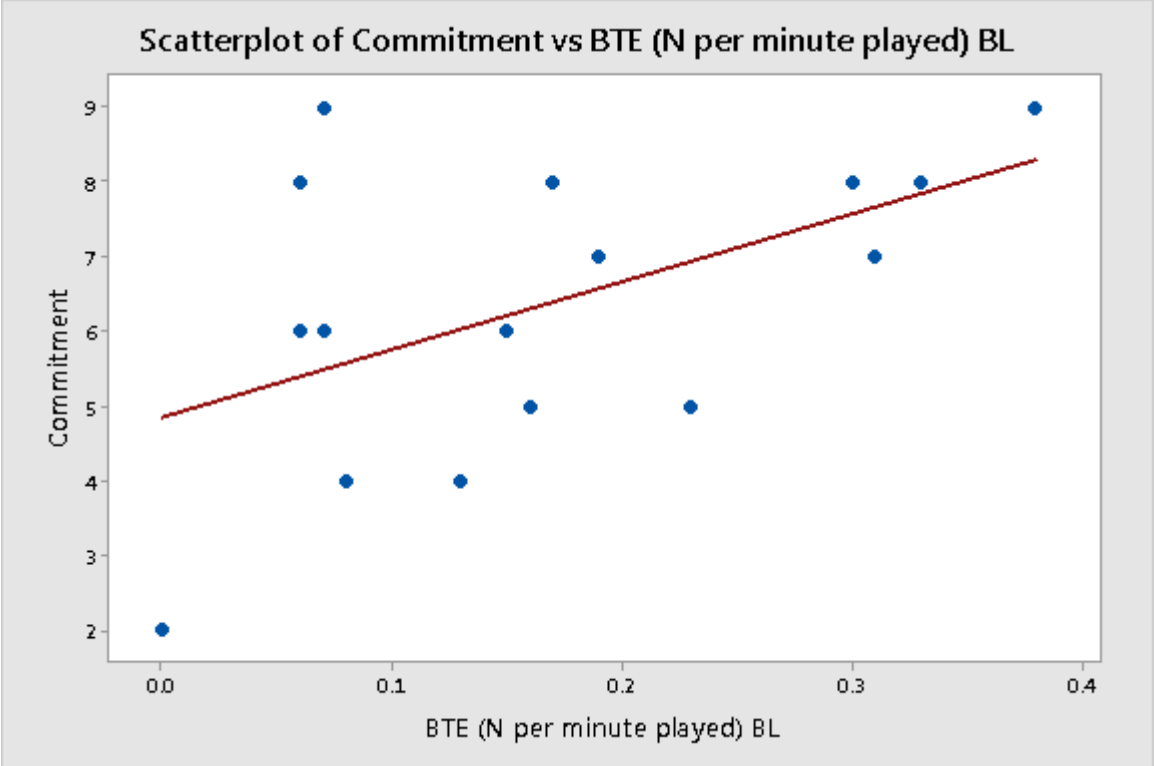
Appendix Figure 13. Scatterplot of emotional control and BTE (N per minute played) and average game time for each subject in the balanced loss games analysed. A line of best fit shown in red illustrates the higher the emotional control of players with increasing number of BTE during matches.



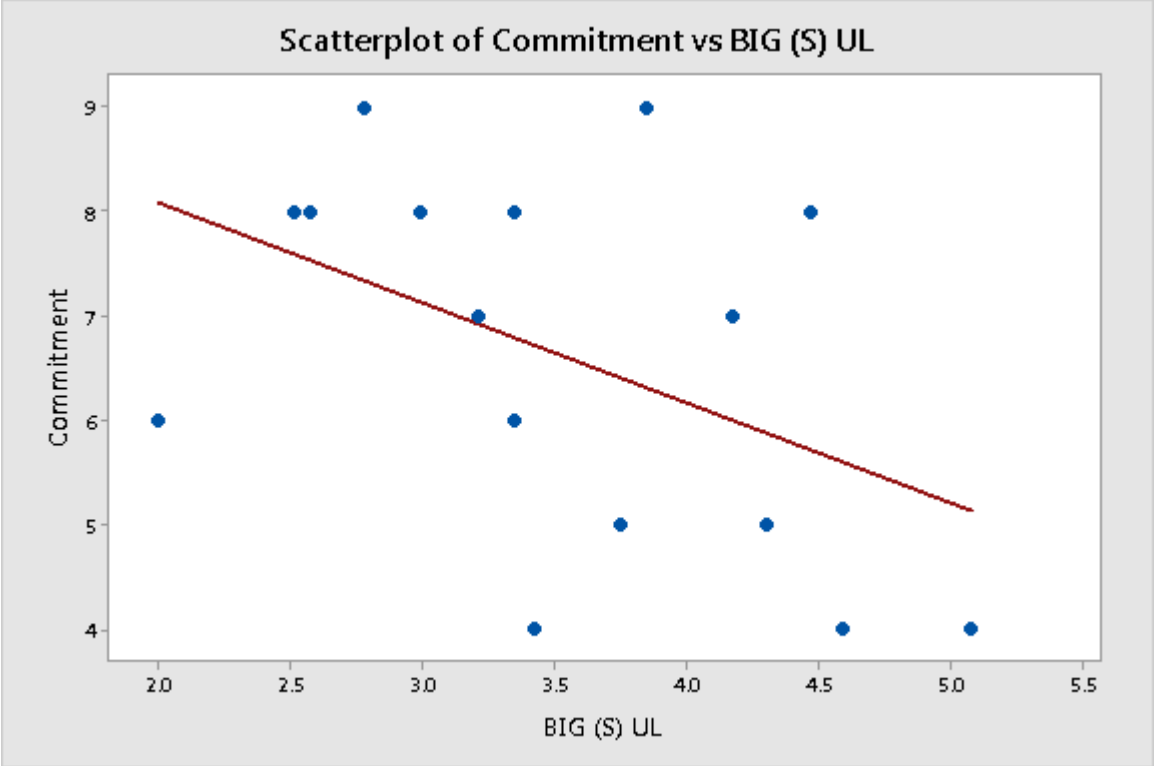
Appendix Figure 14. Scatterplot of Life Control and BIG time (s) and average game time for each subject in all the games analysed. A line of best fit shown in red illustrates the slight inverse relationship between life control score and BIG time.



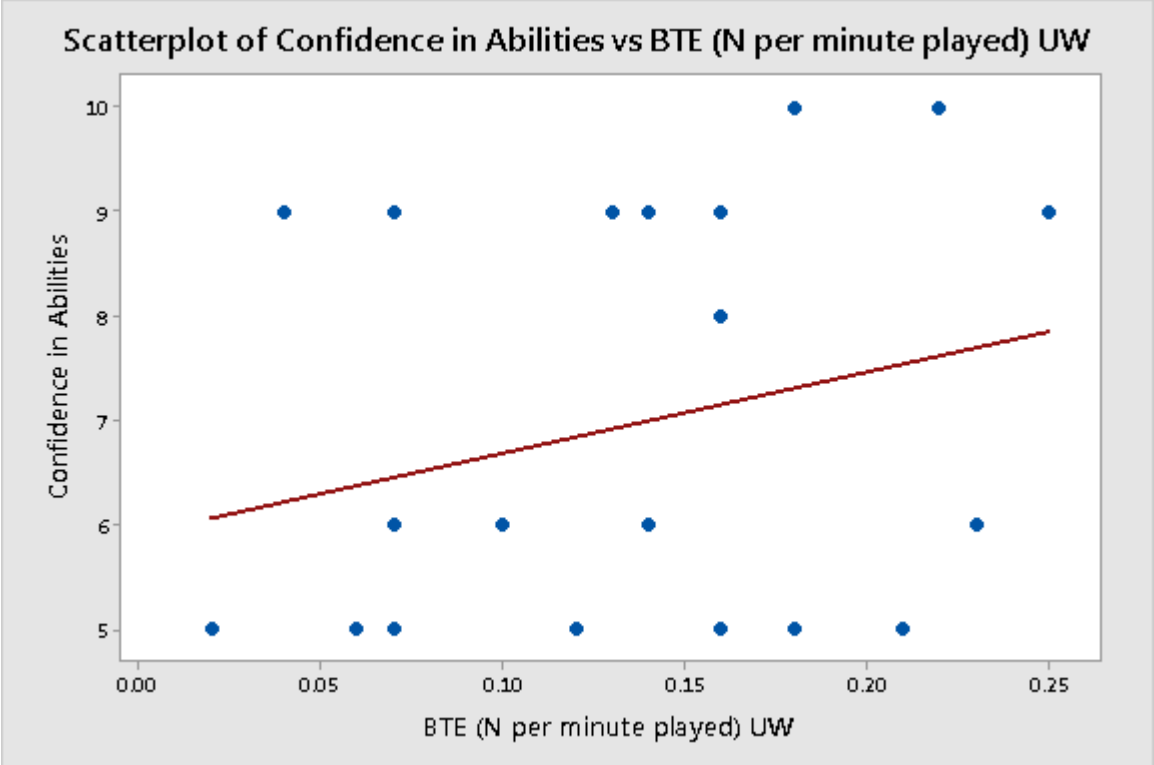
Appendix Figure 15. Scatterplot of Commitment and BTE (N per minute played) for each subject in all the balanced losses analysed. A line of best fit shown in red illustrates the higher the BTE count in game time.



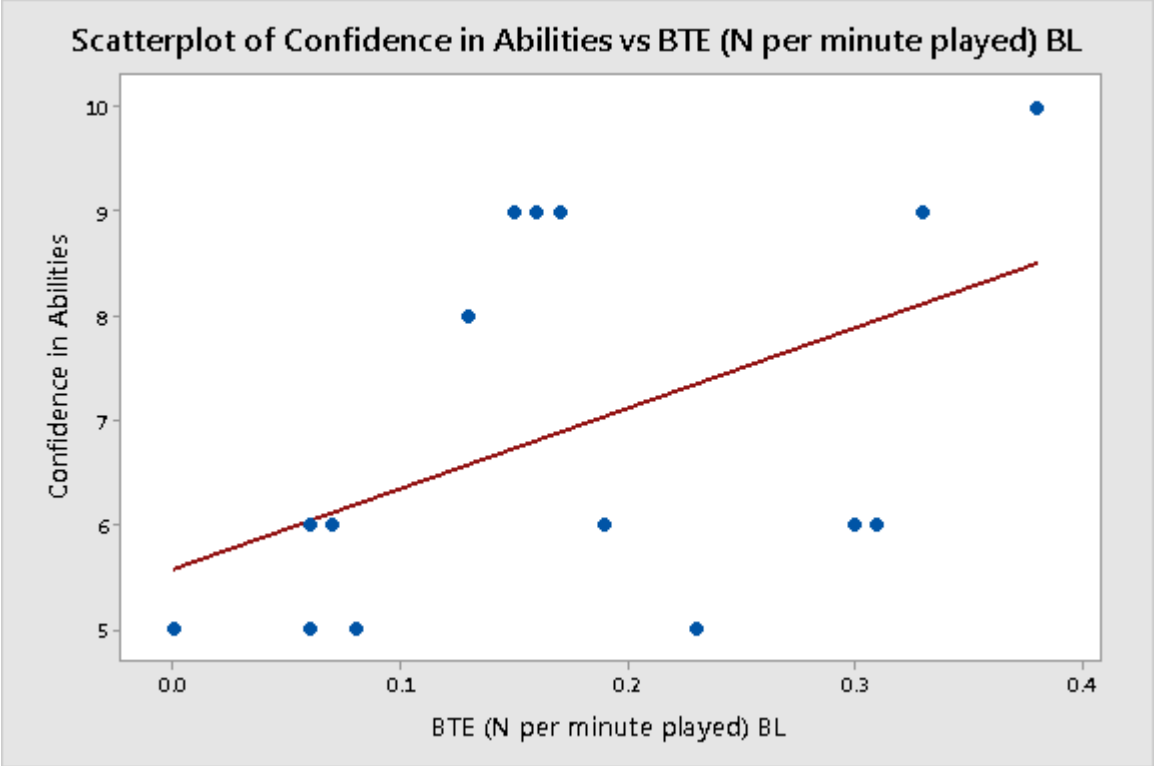
Appendix Figure 16. Scatterplot of Commitment and BIG time (s) for each subject in all the matches resulting in an unbalanced loss. A line of best fit shown in red illustrates that lower scores in commitment relate to higher BIG (s).



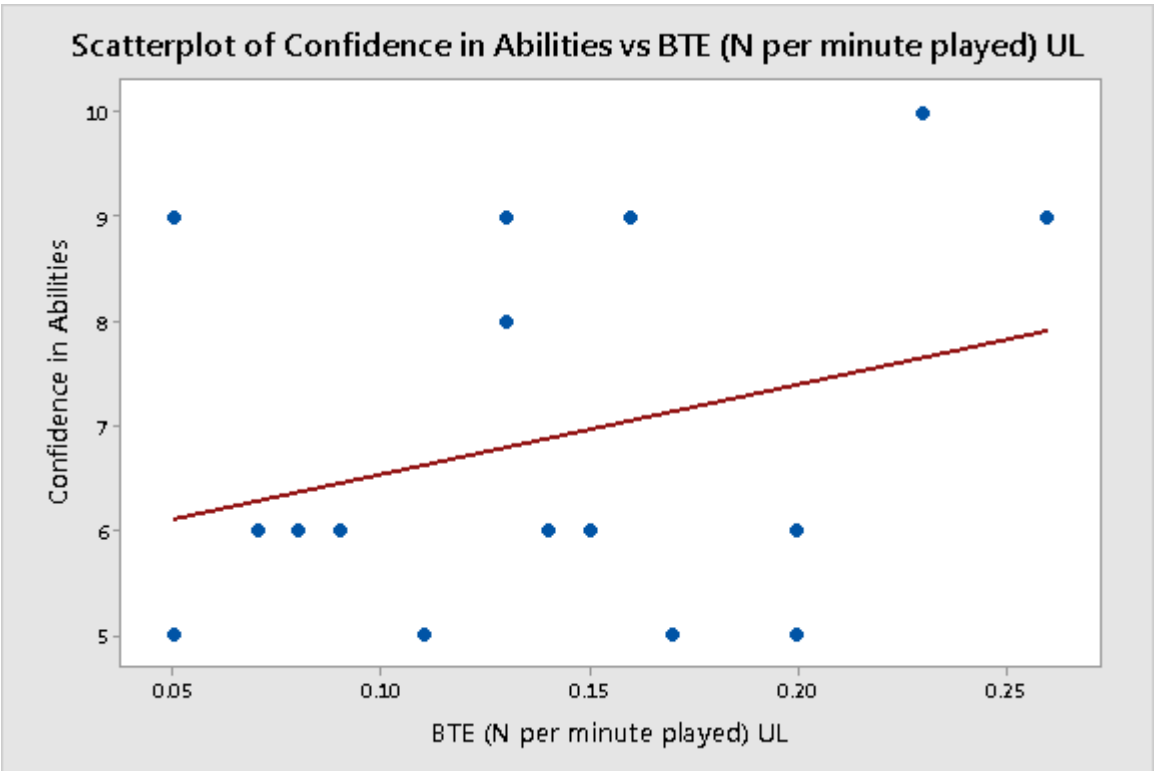
Appendix Figure 17. Scatterplot of Confidence in Abilities and BTE (N per minute played) for each subject in all the matches resulting in an unbalanced win.



Appendix Figure 18. Scatterplot of Confidence in Abilities and BTE (N per minute played) for each subject in all the matches resulting in a balanced loss. A line of best fit shows relationship between higher number of BTEs with greater scores for Confidence in Abilities.



Appendix Figure 19. Scatterplot of Confidence in Abilities and BTE (N per minute played) for each subject in all the matches resulting in an unbalanced loss. A line of best fit shows relationship between higher number of BTEs with greater scores for Confidence in Abilities.



9.5 Chapter 5

Appendix Figure 20. Summary of the MAC sessions delivered

Session	Content
1	Participants are provided with the rationale for the MAC approach and the role of self-regulated attention in rugby performance, and related the information to the participant's personal athletic experience as well as professional player's experiences taken from previous research. The paradoxical effect of attempting to control negative internal events during competition was discussed, and participants are asked to consider how their performance may be impacted by simply allowing internal experiences to exist as temporary events in the mind that do not have to affect their performance. A brief centering exercise is completed at the end of the module to teach participants how to engage in mindful self-awareness. Participants are asked to practice this exercise before the next session.
2	Brief centering exercise and a discussion of homework and the participants' thoughts about the previous session. The rationale and importance of mindfulness will be introduced, and a mindfulness exercise is assigned for homework. The goal of this session was to promote the idea of present-moment attention and simple, nonjudgmental acceptance of any thoughts or emotions that may arise. The recognition that these internal events are temporary and not absolute truths will be discussed, and the concept of cognitive defusion will be introduced.
3	The discussion of mindful awareness is expanded upon by introducing the idea of values-driven versus emotion-driven behavior. This discussion will be informed by values previously identified from qualitative investigations of mental toughness in Scottish Rugby Union. Commitment towards behaving in a manner congruent with a client's values even in the presence of temporary discomfort is discussed and contrasted with the experiential avoidance, or the avoidance of situations that are undesirable in an effort to prevent negative thoughts or emotions. Examples specific to rugby will be discussed. Several other mindfulness exercises will be introduced, and participants are reminded of the importance of frequently engaging in the practice of mindfulness to develop their self-awareness.
4	The focus of the fourth meeting is to discuss acceptance in detail. The ability to accept negative internal states while engaging in values-driven behavior is compared to the alternative method of avoiding uncomfortable thoughts and emotions. Examples of uncomfortable thoughts will be discussed, and the main goal of this session is to help participants develop and maintain poise and commitment while experiencing undesirable negative internal states.
5	The fifth module of the MAC approach is designed to enhance commitment by outlining the relationship between values, goals, behaviours and rugby performance. Rugby specific behaviors that will allow a participant' to reach their personal performance goals will be discussed, and then the achievement associated with these goals will be discussed, as a reflection and reason for engaging in values-driven behavior will be explored.
6	The sixth MAC session will begin with several mindfulness exercises and culminates in the creation of exposure-based activities designed to enhance poise. These will be ecologically valid and relevant exposure based activities. Participants will be encouraged to identify difficult performance-related situations and group them into a hierarchy. Participants will be then asked to engage in one of these difficult situations in the following week while keeping in mind the ideas of present-moment awareness, acceptance of negative internal states, and commitment to values-driven behavior.
7	The final module will include a review of the entire MAC approach and the main principles of mindfulness, acceptance, and commitment. Plans will be made for the participants to continue to engage in future practice of self-regulation of attention after the program is completed.

9.6 Chapter 6

No associated appendices.