

Cardiff School of Sport
DISSERTATION ASSESSMENT PROFORMA:
 Empirical ²

Student name:	<input type="text" value="Elliot James Lowe"/>	Student ID:	<input type="text" value="St10001497"/>
Programme:	<input type="text" value="SES"/>		
Dissertation title:	<input type="text" value="Which mental toughness characteristics are most effective in aiding the injury rehabilitation process in cricketers?"/>		
Supervisor:	<input type="text" value="Dr Declan Connaughton"/>		
Comments	Section		
	Title and Abstract Title to include: A concise indication of the research question/problem. Abstract to include: A concise summary of the empirical study undertaken.		
	Introduction and literature review To include: outline of context (theoretical/conceptual/applied) for the question; analysis of findings of previous related research including gaps in the literature and relevant contributions; logical flow to, and clear presentation of the research problem/ question; an indication of any research expectations, (i.e., hypotheses if applicable).		
	Methods and Research Design To include: details of the research design and justification for the methods applied; participant details; comprehensive replicable protocol.		
	Results and Analysis ² To include: description and justification of data treatment/ data analysis procedures; appropriate presentation of analysed data within text and in tables or figures; description of critical findings		
	Discussion and Conclusions ¹ To include: collation of information and ideas and evaluation of those ideas relative to the extant literature/concept/theory and research question/problem; adoption of a personal position on the study by linking and combining different elements of the data reported; discussion of the real-life impact of your research findings for coaches and/or practitioners (i.e. practical implications); discussion of the limitations and a critical reflection of the approach/process adopted; and indication of potential improvements and future developments building on the study; and a conclusion which summarises the relationship between the research question and the major findings.		
	Presentation To include: academic writing style; depth, scope and accuracy of referencing in the text and final reference list; clarity in organisation, formatting and visual presentation		

¹ There is scope within qualitative dissertations for the RESULTS and DISCUSSION sections to be presented as a combined section followed by an appropriate CONCLUSION. The mark distribution and criteria across these two sections should be aggregated in those circumstances.

² This form should be used for both quantitative and qualitative dissertations. The descriptors associated with both quantitative and qualitative dissertations should be referred to by both students and markers.

CARDIFF METROPOLITAN UNIVERSITY

Prifysgol Fetropolitan Caerdydd

CARDIFF SCHOOL OF SPORT

DEGREE OF BACHELOR OF SCIENCE (HONOURS)

SPORT AND EXERCISE SCIENCE

**Which mental toughness characteristics are most effective
in aiding the injury rehabilitation process in cricketers?**

**(Dissertation submitted under the discipline of
_____Psychology_____)**

Elliot James Lowe

St10001497

ELLIOT JAMES LOWE

ST10001497

CARDIFF SCHOOL OF SPORT

CARDIFF METROPOLITAN UNIVERSITY

WHICH MENTAL TOUGHNESS CHARACTERISTICS ARE MOST EFFECTIVE IN AIDING THE INJURY REHABILITATION PROCESS IN CRICKETERS?

Cardiff Metropolitan University
Prifysgol Fetropolitan Caerdydd

Certificate of student

By submitting this document, I certify that the whole of this work is the result of my individual effort, that all quotations from books and journals have been acknowledged, and that the word count given below is a true and accurate record of the words contained (omitting contents pages, acknowledgements, indices, tables, figures, plates, reference list and appendices).

Word count: 11,922

Date: 21/03/2013

Certificate of Dissertation Supervisor responsible

I am satisfied that this work is the result of the student's own effort.

I have received a dissertation verification file from this student

Name: _____

Date: _____

Notes:

The University owns the right to reprint all or part of this document.

Table of contents:

Acknowledgement:	i
Abstract:	ii
<u>1.0 Introduction:</u>	<u>1</u>
1.1 Importance of mental toughness in sport performance	2
1.2 The injury rehabilitation process	3
1.3 Purpose of study	3
<u>2.0 Literature review:</u>	<u>4</u>
2.1 Introduction	5
2.2 Defining mental toughness	6
2.3 Review of mental toughness characteristics	9
2.4 Can mental toughness facilitate the rehabilitation process?	20
2.4.1 Emotional response immediately after injury	20
2.4.2 Adherence to rehabilitation	21
2.4.3 Returning to sport	22
2.5 Development of research question	24
<u>3.0 Method:</u>	<u>25</u>
3.1 Introduction	26
3.2 Participants	26
3.2.1 Study A criteria	26
3.2.2 Study A participants	26
3.2.3 Study B criteria	27
3.2.4 Study B participants	27
3.3 Measures/Instrumentation	27
3.3.1 Informed consent forms	27
3.3.2 Development of Ranking Scale	27
3.3.3 Interview guide	28
3.4 Procedures	31
3.4.1 Study A	31
3.4.2 Study B	32
3.5 Data analysis	32
3.5.1 Study A	32
3.5.2 Study B	33
3.6 Reliability and Validity	34
3.7 Overview of method	35
<u>4.0 Results:</u>	<u>36</u>
4.1 Introduction	37
4.2 Data Analysis	38
4.2.1 Study A	38

4.2.2	Study B	39
4.2.2.1	Causal stream 1: Accompanying text	40
4.2.2.2	Causal stream 2: Accompanying text	40
4.2.2.3	Causal stream 3: Accompanying text	43
4.2.2.4	Causal stream 4: Accompanying text	43
4.2.2.5	Causal stream 5: Accompanying text	46
4.2.2.6	Causal stream 6: Accompanying text	46
4.2.2.7	Causal stream 7: Accompanying text	49
4.2.2.8	Causal stream 8: Accompanying text	49
4.2.2.9	Causal stream 9: Accompanying text	52
4.2.2.10	Causal stream 10: Accompanying text	52
5.0	<u>Discussion:</u>	<u>54</u>
5.1	Introduction	55
5.2	Main findings	55
5.2.1	Study A	55
5.2.2	Study B	58
5.2.2.1	Emotional response immediately after injury	58
5.2.2.2	Adherence to rehabilitation	59
5.2.2.3	Returning to sport	61
5.3	Practical implications	62
5.4	Strengths and weaknesses	63
5.5	Directions for future research	64
5.6	Conclusion of discussion	64
6.0	<u>Conclusion:</u>	<u>66</u>
6.1	Concluding study	67
7.0	<u>References:</u>	<u>68</u>
8.0	<u>Appendices</u>	<u>74</u>
	Appendix A: Informed consent form	75
	Appendix B: Ranking Scale	77
	Appendix C: Interview Guide	82

List of tables:

Table 1: *Selection of early mental toughness definition (prior 2002) presented in Connaughton & Hanton's (2009) research.* (Page 6)

Table 2: *Twelve mental toughness characteristics identified by Jones et al. (2002).* (Page 9)

Table 3: *Ten mental toughness attributes identified in a sample of soccer players (Thelwell et al, 2005).* (Page 10)

Table 4: *Jones et al's. (2007) 30 mental toughness characteristics.* (Page 14)

Table 5: *Gucciardi et al. (2008) mental toughness characteristics and descriptions.* (Page 17)

Table 6: *Coulter et al's. (2010) mental toughness characteristics and description.* (Page 19)

Table 7: *Summary of how the 'core' categories influence the three stages of the rehabilitation process.* (Page 23)

Table 8: *Example of similarity of characteristics between studies.* (Page 28)

Table 9: *Ten most effective characteristics which emerged from the ranking scale plus their sporting example.* (Page 31)

Table 10: *Actions taken to ensure reliability and validity.* (Page 34)

Table 11: *Ten mental toughness characteristics which emerged from the thirty-seven completed ranking scales.* (Page 38)

List of figures:

Figure 1: *Bull et al. (2005) mental toughness pyramid. (Page 11)*

Figure 2: *Bull et al. (2005) mental toughness framework. (Page 12)*

Figure 3: *Jones et al. (2007) framework on mental toughness. (Page 14)*

Figure 4: *Gucciardi et al's (2008) model of mental toughness in Australian football. (Page 16)*

Figure 5: *Overview of interview guide. (Page 30)*

Figure 6: *Illustration of causal networks presented in the results. (Page 33)*

Figure 7: *Overview of method. (Page 35)*

Figure 8: *Illustration and key for causal networks presented in results. (Page 37)*

Figure 9: *Causal stream 1&2. (Page 39)*

Figure 10: *Causal stream 3&4. (Page 42)*

Figure 11: *Causal stream 5&6. (Page 45)*

Figure 12: *Causal stream 7&8. (Page 48)*

Figure 13: *Causal stream 9&10. (Page 51)*

Acknowledgements

Firstly, I would like to thank Declan Connaughton for his constant support throughout this process. His assistance and guidance was key to the completion of this study and was appreciated.

I would also like to thank all forty-two subjects for giving up their time to participate in this study. The data collected from them was crucial to the study and was appreciated.

Finally, I would like to thank family and friends for the support they gave me throughout the experience, providing me with determination to complete this study to the best of my ability.

Abstract

Current mental toughness literature built on Jones et al. (2002) study by constructing definitions (Thelwell et al., 2005; Gucciardi et al., 2008) and identifying attributes essential to a mentally tough performer (Thelwell et al., 2005; Jones et al., 2007; Gucciardi et al., 2008; Coulter et al., 2010). However, research into which attributes are the most effective in injury rehabilitation has not been completed. The purpose of this study was to: a) Identify which mental toughness characteristics are most effective in aiding male cricketer's rehabilitation and b) determine how these characteristics aided their recovery. Thirty-seven cricketer's (33 club/4university: 23.54 ± 8.26) completed a Ranking scale, which incorporated all mental toughness characteristics which were related to recovery allowing the most effective characteristics to emerge. With these characteristics plus relevant literature an interview guide was developed helping to establish how these specific characteristics had aided five cricketers (1 university/4 high-level club: 20.6 ± 0.55). Results highlighted that many of the characteristics essential to injury rehabilitation came from similar 'core' categories crucial to performance excellence; however some key differences in the order of importance were evident (for example, Jones et al., 2002 concluded 'self-belief' as the most important characteristic leading performance excellence while this study concluded 'maintaining a positive attitude' as most important when rehabilitating from injury). There were key findings in how the most effective characteristics aided all three stages (emotional response to injury, adherence to rehabilitation, returning to sport) of recovery for cricketers which should lead to tailored environments and psychological skills training being created to develop or enhance the most effective characteristics, so athlete's acquire them before injury occurs. This provides the athlete with the skills to best overcome an injury before suffering one. Future research directions were identified in elite/super-elite participants, in other sports and in female athletes as it is identified in the literature that mental toughness characteristics can differ among these populations.

1.0 Introduction

1.1 Importance of mental toughness in sport performance

Throughout sport the term mental toughness is used in many situations, whether it be a commentator describing an athlete performing a skill under great pressure, or a sport psychologist attempting to further scientific knowledge. With the phrase being adopted by so many, some confusion has surfaced around mental toughness and its meaning. This notion is evident in Jones et al. (2002), who stated that mental toughness is one of the most used but least understood terms in applied sport psychology.

However it should be highlighted that mental toughness may be a crucial psychological attribute to the development of an athlete, and to whether they succeed to elite level. Gould et al. (1987) highlights it as one of the most important psychological characteristics in achieving performance excellence.

The increase in scientific research completed within mental toughness in more modern times also illustrates the need to understand the term and have knowledge on how it manifests itself within sport performers. It is clear from the research within mental toughness that mentally tough performers will be more successful at achieving excellence and increasing their performance throughout all aspects of their sport.

A key aspect in all athletes is their ability to recover successfully from injury. Rehabilitating can be one of the most challenging and drawn out processes an athlete goes through in his/her career. If not done properly then it may do more damage to the athlete physiologically, psychologically and socially.

1.2 The Injury rehabilitation process

The injury rehabilitation process is defined by Meichenbaum and Turk (1987) as an:

'Active, voluntary collaborative involvement of the patient in a mutually acceptable course of behaviour to produce a desired preventative or therapeutic effect.'

An example where this process was not as effective as it may have been was the case of Graham Onions (English cricketer). He needed surgery due to a stress fracture in his back which started a 29-month journey of recovery. Onions' rehabilitation should not have been this long but the timing of the injury and negative thoughts, such as 'my career is over,' throughout the recovery process made the process more drawn out. This example illustrates how the rehabilitation process is not only physiological, but also psychological.

Graham Onions' situation helps illustrate that the process of recovering from injury is massively dependant on not only the physiotherapy and aid one gets physically, but also one's psychological 'make-up' and the support received. It is the combination of both that determines how successful a rehabilitation process is and so the length of time an athlete is away from his/her sport.

1.3 Purpose of study

It is evident from Onions' situation that an athlete's psychological characteristics are key to the completion of their rehabilitation programmes. His negative thoughts, such as 'my career is over,' hampered his progress and made the overall process longer. However an athlete with a more assured psychological well-being would have handled the process better, thus shortening the process. With psychological characteristics being crucial to the rehabilitation process and mental toughness highlighted by Gould et al. (1987) as one of the most important psychological characteristic, it would suggest that mental toughness may be influential in aiding an athlete's rehabilitation process. This study looks into whether mental toughness may be utilised in the injury rehabilitation process and which components best facilitate it.

2.0 Literature Review

2.1 Introduction:

Research into mental toughness has developed over the past twenty five years. Initial studies by Gould et al. (1987) and Orlick & Partington (1988) looked at the mental aspects of excellence whilst, more recently, Jones et al. (2002) sought to determine both what mental toughness is and the characteristics of a mentally tough performer. Both qualitative and quantitative studies have built on Jones et al's. (2002) research by identifying characteristics which are seen as fundamental to those deemed to be mentally tough. More recently Gucciardi et al. (2009) studied mental toughness as a psychological attribute that could be developed, considering how this could be achieved.

The attribute of mental toughness, as described in the literature, is likely to be of great significance for the successful rehabilitation of a sports injury. This review will discuss the relevant work that has identified the key areas of mental toughness and how that may be of use to the recovering athlete.

2.2 Defining mental toughness:

Early research in mental toughness led to confusion around the area rather than improving scientific knowledge. A very diverse range of definitions and explanations were proposed; however, no clear or broadly accepted definition emerged. This could be due to these definitions being based on the researcher's views rather than scientific precision making it more a subjective account of what someone believed mental toughness to be, rather than a precise definition. This is illustrated in table 1 which highlights some early mental toughness definitions prior to 2002. Other psychological characteristics, such as coping skills, have also been incorrectly branded as mental toughness due to the lack of an accepted, clear definition (Connaughton & Hanton, 2009).

Table 1: Selection of early mental toughness definitions (prior 2002), presented in Connaughton & Hanton's (2009) research

	Definition	Reference
1	The ability of an athlete to withstand strong criticism and to avoid becoming upset when losing or performing poorly.	<i>Tutko & Richards, 1971, p. 46</i>
2	The degree of insensitivity the individual has to criticism, playing badly or losing.	<i>Alderman, 1974, p.149</i>
3	A constellation of mental skills, all of which are learned, that are characteristics of mentally tough competitors.	<i>Loehr, 1982, p. 11</i>
4	Mental toughness is really another name for desire. Given talent and luck, desire overcomes just about anything.	<i>Williams, 1988, p. 60</i>
5	Achieving consistency is the ultimate measure of MT.	<i>Graham, 1990, p. 47</i>
6	Mental toughness is the ability to stand tall in the face of adversity. It's a psychic resilience that allows you to rebound from setbacks and failures time and time again.	<i>Goldberg, 1998, p. 219</i>
7	Mental toughness is the ability to keep picking yourself up no matter what life hits you with – to keep marching steadily forward to achieve the specific victories you have made up your mind you are going to make happen.	<i>Teitelbaum, 1998, p. 2</i>

Since 2002 a number of qualitative studies have been completed to try and conceptualise mental toughness. A variety of qualitative skills were applied in an attempt to produce rich data, so that athlete's responses may be explored in detail, producing empirical data on the subject (Connaughton & Hanton, 2009). These procedures, such as focus groups or one-to-one interviews (Jones et al. 2002), were deemed the most suitable form of data collection to produce a precise definition of mental toughness and determine the fundamental characteristics of a mentally tough performer.

Jones et al. (2002) and Thelwell et al. (2005) used qualitative methods to define mental toughness. Jones et al. (2002) focused on both 'what mental toughness is?' and 'what are the essential attributes required to be a mentally tough performer by completing a focus group, individual interviews and individual rankings of definition and ranking of mental toughness with ten international performers. Jones et al. (2002) defined mental toughness as:

'Mental toughness is having the natural or developed psychological edge that enables you to:

- *Generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer.*
- *Specifically, be more consistent and better than your opponents in remaining determined, focused, confident and in control under pressure.'*

The range and number of sports used within Jones et al. (2002) was seen as a limitation. From this Thelwell et al. (2005) researched, as Jones et al. (2002) did, 'defining mental toughness' as well as 'examining the characteristics of a mentally tough performer,' in a specific sport: Soccer. Six participants, who had international playing experience, were interviewed. The interview process allowed the participants to define mental toughness and these were compared to Jones et al's. (2002) definition which allowed the researchers to collectively agree upon a definition of mental toughness (see below).

'Having the natural or developed psychological edge that enables you to:

- *Always cope better than your opponents with the many demands (competition, training, lifestyle) that soccer places on the performer.*
- *Specifically, be more consistent and better than your opponents in remaining determined, focused, confident and in control under pressure.'*

The definitions are similar, but Thelwell et al's. (2005) has one main difference. This is that soccer players 'always cope better with the many demands' placed on them, rather than 'generally.'

Jones et al. (2002) research allowed mental toughness to be seen as an objective psychological construct and provided a basis from which the concept could be explored, which Thelwell et al. (2005) did by investigating in a single sport. The similar definitions emerged not only support a meaning of mental toughness which is irrespective of sport but portrays a psychological construct built on information rich data, rather than opinions or anecdotal accounts.

Gucciardi et al. (2008), like Thelwell et al. (2005) looked into understanding mental toughness within an individual sport: Australian football. Eleven male coaches, who had considerable playing and coaching experience at elite level, were interviewed to identify the 'key mental toughness characteristics' and to 'define mental toughness.' The participants had been at the top of their game for a period of time and continued through coaching, suggesting they have a broad idea of what makes a mentally tough Australian football player. Similarities and variations from the interviews were identified (Gucciardi et al., 2008) leading to the emergence of a definition.

Mental toughness in Australian football is a collection of values, attitudes, behaviours, and emotions that enable you 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 your goals.'

Gucciardi et al. (2008) captures the multidimensional nature of the construct by incorporating 'emotions,' as well as human characteristics, which both Jones et al. (2002) and Thelwell et al. (2005) did not. It also suggests that mental toughness aids as a barrier against adversity as well as a set of factors that sustain adaptation to positive situations (Gucciardi et al. 2008) whereas the earlier definitions focus only on overcoming adversity.

Although the definitions have not been entirely generic, the similarity between them suggests that the qualitative method since 2002 has helped to develop an empirical understanding of mental toughness. Gucciardi et als. (2008) provided a more detailed definition which highlighted mental toughness's multidimensional aspect in both positive and negative situations, suggesting it more relevant to the injury rehabilitation process than the two earlier definitions.

However for a more in-depth understanding of which parts of mental toughness may facilitate the rehabilitation process, a review of the characteristics which have emerged from the literature, building on Jones et al's. (2002) will be completed.

2.3 Review of mental toughness characteristics:

Eight studies have looked into mental toughness characteristics (Jones et al., 2002; Golby & Sheard, 2004; Thellwell et al., 2005; Bull et al., 2005; Jones et al., 2007; Gucciardi et al., 2008; Coulter et al., 2010; Sheard, 2010). This research focused on gaining knowledge on mental toughness and identifying the selection of characteristics which, when combined, make an athlete mentally tough. The qualitative studies provide detailed characteristics compared with the quantitative studies, so this review will focus on the qualitative research completed.

Jones et al's., (2002) research also acknowledged twelve attributes/characteristics. The attributes were identified through both a focus group as well as individual interviews based on the content which emerged from the focus group. After each interview the research team discussed the key themes covered in the previous interview, allowing them to develop a more 'complete profile of the ideal mentally tough performer' (Jones et al., 2002). See table 2 for Jones et al's. (2002) twelve mental toughness characteristics.

Table 2: Twelve mental toughness characteristics identified by Jones et al. (2002)

Rank	Characteristic
1.	Having an unshakable self-belief in your ability to achieve your competition goals.
2.	Having an unshakable self-belief that you possess unique qualities and abilities that make you better than your opponents.
3.	Having an insatiable desire and internalized motives to succeed.
4.	Bouncing back from performance set-backs as a result of increased determination to succeed.
5.	Thriving on the pressure of competition.
6.	Accepting that competition anxiety is inevitable and knowing you can cope with it.
7.	Not being adversely affected by others good and bad performances.
8.	Remaining fully-focused in the face of personal life distractions.
9.	Switching a sport focus on and off as required.
10.	Remaining fully-focused on the task at hand in the face of competition-specific distractions.
11.	Pushing back the boundaries of physical and emotional pain, while maintaining technique and effort under distress (in training and competition).
12.	Regaining psychological control following unexpected, uncontrollable events (competition specific).

Jones et al. (2002) was the first look at what mental toughness is, and then the dimensions within it without discriminating between the two. Participants felt that factors related to stress of competition were key to a mentally tough performer with a mentally tough athlete thriving on the externally-derived pressure of competition by coping with an internally-derived anxiety response (Jones et al., 2002). Five of the characteristics were linked to focus, making it a crucial aspect to a mentally tough performer.

The attributes perceived as most important were self-belief and motivation. Self-belief had two dimensions: belief in one’s own ability in achieving goals and that you are better than your opponents. The importance of these two attributes led Jones et al. (2002) to suggest future research among elite athletes.

Thelwell et al. (2005) and Bull et al. (2005) studies were sport specific and focused on elite sport in an attempt to expand on Jones et al’s. (2002) research. It was highlighted that characteristics of specific-sports may differ, providing sport-specific information (Thelwell et al., 2005). Thelwell et al’s. (2005) interviewed soccer players regarding mental toughness attribute in relation to that specific sport, rather than mixed sports. Ten attributes were identified (see table 3).

Table 3: Ten mental toughness attributes identified in a sample of soccer players (Thelwell et al., 2005)

Rank	Characteristic
1.	Having total self-belief at all times that you will achieve success.
2.	Wanting the ball at all times.
3.	Having the ability to react to situations positively.
4.	Having the ability to hang on and be calm under pressure.
5.	Knowing what it takes to grind yourself out of trouble.
6.	Having the ability to ignore distractions and remain focused.
7.	Controlling emotions throughout performance.
8.	Having a presence that affects opponents.
9.	Having everything outside of the game in control.
10.	Enjoying the pressure associated with performance.

Despite ‘having a presence that effects opponents’ all of these characteristics closely replicate Jones et al’s. (2002) research. They highlight the importance for soccer players to be resilient, have self-belief and to remain focused. This supports the notion that mental toughness characteristics may not be sport-specific but certain elements of it

being 'core' to any performer. Evidence of this is self-belief being ranked top in both Jones et al's. (2002) and Thelwell et al's. (2005) research.

Bull et al's. (2005) research focused on 'developing a greater understanding of what mental toughness is within cricket.' Ten English cricketers, who were perceived to be mentally tough, were interviewed on issues such around 'personal views about the "winning mind" and mental toughness.' After discussing the findings in a focus group the researchers created a hierarchical model to portray the development of mental toughness (see figure 1).

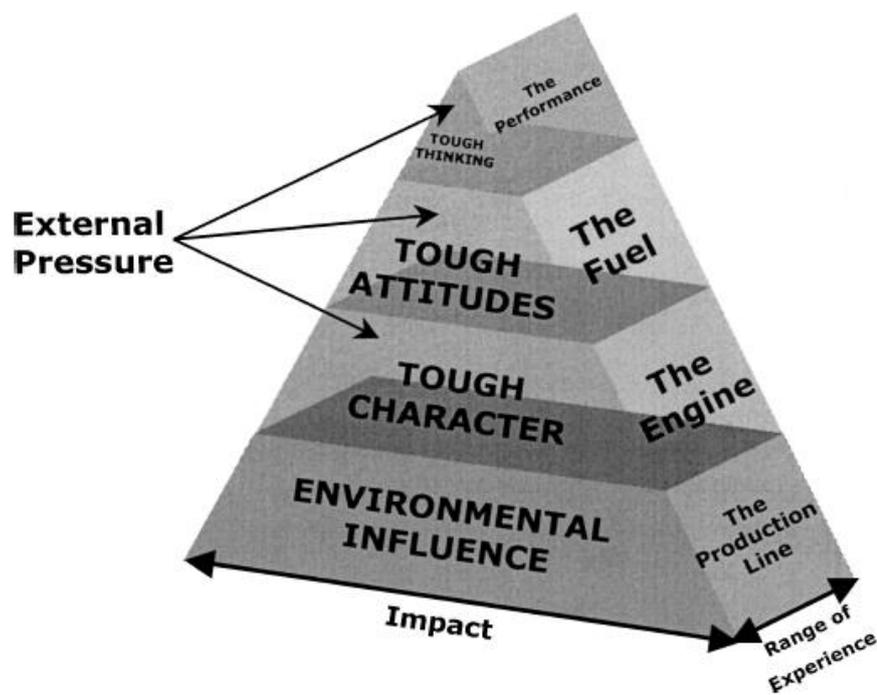


Figure 1: Bull et al. (2005) mental toughness pyramid.

General dimensions which expanded into global themes (see figure 2) were placed within one of the four sections of 'the mental toughness pyramid' (figure 1). Neither the general dimensions nor global themes are newly identified themes. However those being presented in this organized constructed framework are, allowing relationships to be seen between individual items (Bull et al., 2005).

The global themes appear similar to Jones et al's. (2002) attributes of 'self-belief, desire/ motivation, dealing with pressure and anxiety, focus and pain and hardship' (Bull et al., 2005). However the Bull et al. (2005) focuses also on the development of mental

toughness through the ‘environmental influence’ section within the structural pyramid, which enters into areas that earlier research (Jones et al., 2002; Thewell et al., 2005) and this current study does not focus on.

General Dimensions, Global Themes and Structural Categories Resulting From the Analysis of the Mental Toughness-Focused Interviews

General dimension	Global theme	Structural category location
Developmental factors	• Parental influence	Environmental Influence
	• Childhood background	
Personal responsibility	• Exposure to foreign cricket	Environmental influence
	• Independence	Tough character
	• Self-reflection	
• Competitiveness with self as well as others		
Dedication and commitment	• Exploit learning opportunities	Tough attitudes
	• Belief in quality preparation	
	• Self-set challenging targets	
	• Opportunities to survive early setbacks	Environmental influence
	• Needing to “earn” success	
	• “Never say die” mindset	Tough attitudes
• “Go the extra mile” mindset		
• Determination to make the most of ability		
Belief	• Resilient confidence	Tough character
	• Belief in making the difference	Tough attitudes
	• Robust self-confidence	Tough thinking
	○ Overcoming self-doubts	
○ Feeding off physical condition		
○ Maintain self-focus		
Coping with pressure	• Thrive on competition	Tough attitudes
	• Willing to take risks	
	• Thinking clearly	Tough thinking
	○ Good decision-making	
○ Keeping perspective ○ Honest self-appraisal		

Figure 2: Bull et al. (2005) mental toughness framework.

Jones et al. (2007) conducted the same investigation as five years previous using a sample of athletes who had achieved ultimate success as he had suggested that some slight, but crucial differences may be apparent between very good performers and the world's best (Jones et al., 2002).

A framework of mental toughness was created which split into various subcategories (see figure 3) in which specific mental toughness characteristics have been identified. This framework builds on Bull et al's. (2005) research and allows the construct to be deconstructed, allowing further understanding of the certain elements within mental toughness. This aids psychologists and coaches in assessing and highlighting perceived strengths and weaknesses of their athletes, meaning appropriate training could be performed on the weaknesses and further enhancement on the strengths (Jones et al., 2007).

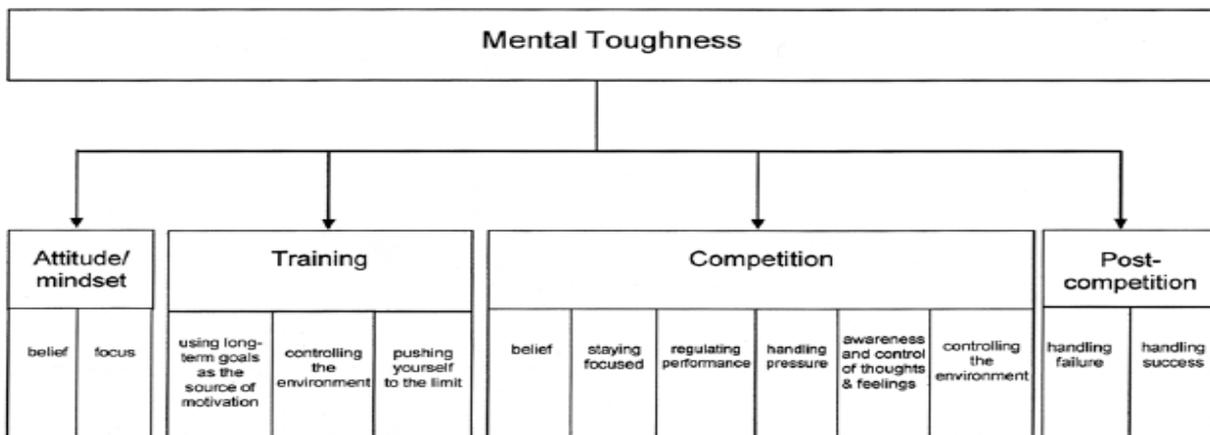


Figure 3: Jones et al. (2007) framework of mental toughness.

Jones et al. (2007) identified thirty mental toughness attributes (see table 4) in contrast to the twelve highlighted by the elite group in Jones et al's. (2002) research. However all the attributes highlighted in the earlier research were repeated within the later study, highlighting that the super-elite group may have a greater understanding of the 'make-up' of mentally tough individuals than the elite group (Jones et al., 2007).

Table 4: Jones et al's. (2007) 30 mental toughness characteristics (numbers in left column represent the dimensions: 1=Attitude/mindset, 2=training, 3=Competition, 4=Postcompetition. And numbers in right column relate to their ranking within the dimension

Sub-category	Rank and characteristic
1. Belief	<ul style="list-style-type: none"> 2. Having an unshakable self-belief as a result of total awareness of how you got to where you are now. 3. Having an inner arrogance that makes you believe you can achieve anything you set your mind to. 4. Having the belief that you can punch through any obstacle people put in your way. 5. Believing that your desire or hunger will ultimately result in your fulfilling your potential.
1. Focus	<ul style="list-style-type: none"> 6. Refusing to be swayed by short term gains (financial, performance) that will jeopardize the achievement of long term goals. 7. Ensuring that achievement of your sport's goal is the number one priority in your life. 8. Recognizing the importance of knowing when to switch on and off your sport.
2. Using long-term goals as a source of motivation	<ul style="list-style-type: none"> 1. When training gets tough (physically and mentally) because things are not going your way, keeping yourself going by reminding yourself of your goals and aspirations and why your putting yourself through it. 2. Having the patience, discipline and self-control with the required training for each specific developmental stage to allow you to reach your full potential.
2. Controlling the environment	<ul style="list-style-type: none"> 3. Remaining in control and not controlled. 4. Using all aspects of a very difficult training environment to your advantage.
2. Pushing yourself to the limit	<ul style="list-style-type: none"> 5. Loving the bits of training that hurt. 6. Thriving on opportunities to beat other people in training.
3. Handling pressure	<ul style="list-style-type: none"> 1. Loving the pressure of competition. 3. Adapting to and coping with any changes/distraction/threat under pressure 5. Making the correct decision and choosing the right options that secure optimal performance under conditions of extreme pressure and ambiguity. 8. Coping with and channelling anxiety in pressure situations.
3. Belief	<ul style="list-style-type: none"> 2. Total commitment to your performance goal until every possible opportunity of success has passed. 4. Not being fazed by making mistakes and then coming back from them.
3. Regulating performance	<ul style="list-style-type: none"> 6. Having a killer instinct to capitalize on the moment you know you can win. 7. Raising your performance 'up a gear' when it matters most.

3. Staying focused	<ul style="list-style-type: none"> 9. Totally focusing on the job at hand in the face of distraction. 11. Remaining committed to a self-absorbed focus despite external distractions. 12. In certain performances, remaining focused on processes and not solely outcomes.
3. Awareness and control of thoughts and feelings	<ul style="list-style-type: none"> 10. Being acutely aware of any inappropriate thoughts and feelings and changing them to help perform optimally.
3. Controlling the environment	<ul style="list-style-type: none"> 12. Using all aspects of a very difficult competition environment to your advantage.
4. Handling failure	<ul style="list-style-type: none"> 1. Recognizing and rationalising failure and picking out the learning points to take forward. 2. Using failure to drive yourself to further success.
4. Handling success	<ul style="list-style-type: none"> 3. Knowing when to celebrate success and then stop and focus on the next challenge. 4. Knowing how to rationally handle success.

This more detailed list of characteristics builds on all past research by identifying the attributes and systematically constructing them into a framework. It illustrates the idea an athlete needs to have the appropriate attitude/mindset, maintenance of their belief and focus through tough times as well as mastering time-specific dimensions to be a mentally tough performer. However, as in their previous study, this study was completed with athletes from varying sports. This meant that attributes may differ or fluctuate between sport types and more notably in individual or team sports (Jones et al., 2007).

Gucciardi et al. (2008) also developed a model (see figure 4) which went further than both Bull et al's (2005) and Jones et al's. (2007) frameworks as it incorporated not only the characteristics but behavioural and situational aspects of mental toughness. The overlapping nature of the model highlights that the characteristics will interact with both behavioural and situational aspects. Both 'recovering well from injury' (behaviours) and 'injury & rehab' (situations) are apparent suggesting that mental toughness characteristics may be beneficial to a rehabilitating athlete.

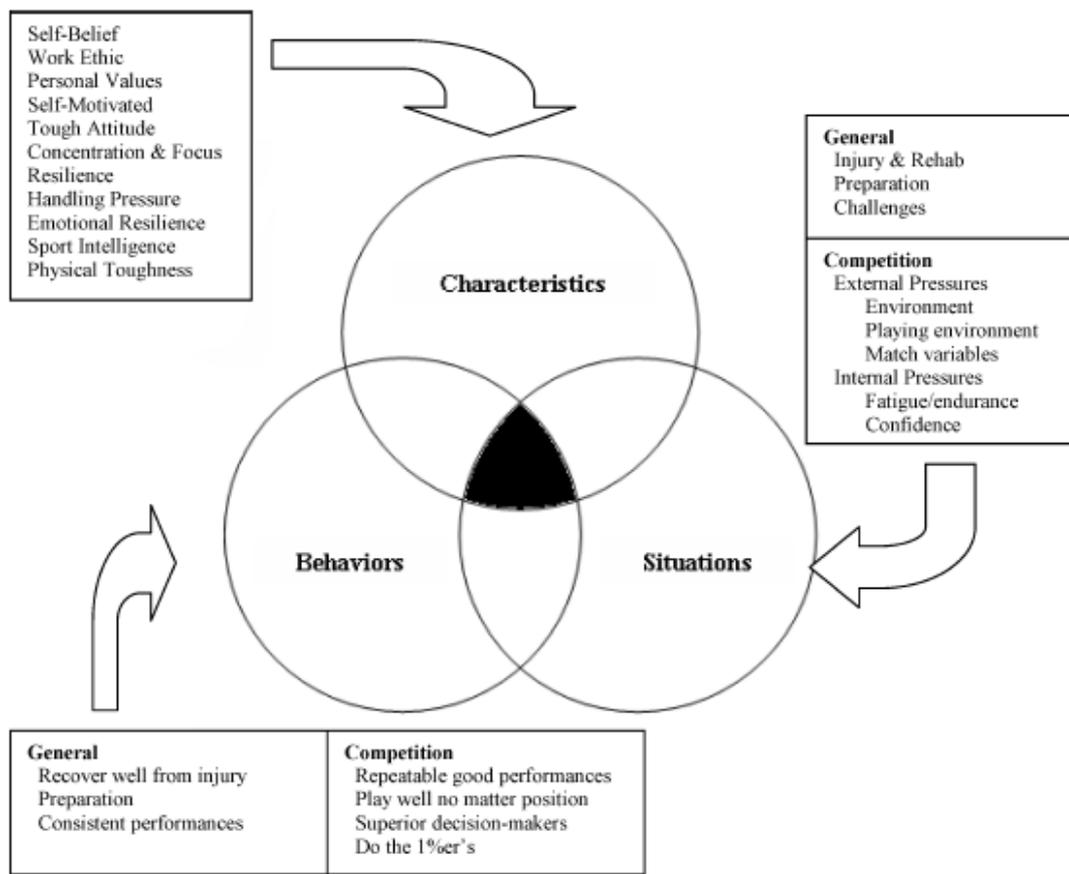


Figure 4: Gucciardi et al's. (2008) model of mental toughness in Australian football.

Many of these characteristics (see table 5 for description of characteristic) mirrored past research, however some are unique to this study. These include personal values, emotional intelligence, sport intelligence and physical toughness (Gucciardi et al., 2008). Emotional intelligence is interesting as only in sport specific research (Thelwell et al., 2005) in mental toughness is the component 'emotion' highlighted as an attribute. This suggests that although there are several global characteristics common across sport, there are also attributes unique to individual sports (Gucciardi et al., 2008).

Table 5: Gucciardi et al. (2008) mental toughness characteristics and descriptions

Characteristic	Description
Self belief	<ul style="list-style-type: none"> - Self-belief in your mental and physical ability under pressure, and in your ability to persevere and overcome any obstacle and/or challenge that you may face during your football career.
Work ethic	<ul style="list-style-type: none"> - A philosophy characterized by always working hard and pushing yourself to through (physically and mentally) demanding situations in competition, training and preparation to achieve your goals and vision. <ul style="list-style-type: none"> o An unbelievable determination to succeed, never give up and endeavouring to be the best you can be. o The ability to persevere when faced with adversities and challenges both on and off the field to achieve your goals. o Identifying your goals, what needs to be done to achieve those goals, and adjusting those goals when faced with an obstacle or adversity. o Doing everything in your preparation and leaving no stone unturned to ensure that you are prepared mentally and physically. o Managing your time efficiently to balance the many demands associated with elite football to get the very best out of yourself. o Having the ability to let your actions speak louder than words and inspire your teammates.
Personal values	<ul style="list-style-type: none"> - Placing great importance and significance on personal values relevant to one becoming a better person and athlete. <ul style="list-style-type: none"> o Taking an honest stance when self-appraising your own performances and not making excuses when you do perform poorly. o Personal pride in your preparation, and training and competitive performances. o Taking ownership and responsibility for your behaviour and not making excuses for poor performances.
Self-motivated	<ul style="list-style-type: none"> - An internal motivation and desire for competitive challenges and team success, and also having the desire to put the necessary things into practice to achieve your vision of success. <ul style="list-style-type: none"> o Having that competitive desire and looking forward to the challenge of testing your skills against the best. o Having the desire to be part of a successful team and putting the team's objectives before individual goals, knowing that you have to do certain things, which you may not enjoy if you are to help your team achieve success. o The desire to have an accurate vision of what it takes to succeed, what it takes to achieve that, and the desire to put that into practice.
Tough attitude	<ul style="list-style-type: none"> - An unshakable, tough attitude directed towards becoming a champion of the game. <ul style="list-style-type: none"> o An enduring discipline of the mind in all situations to do everything in your life that needs to be done to achieve your goals. o Having an enduring physical and mental commitment to doing over and above what is required to set yourself apart from the rest. o Maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened. o Having a professional attitude in every sense of the word – in particular, towards your diet, training, leadership, rehabilitation and competition. o Acknowledge that sacrifices are inevitable if you want to achieve

		both individual and team success and understand what the potential sacrifices you might have to make.
Concentration and focus	-	Having that single-mindedness to focus and concentrate on the job at hand and what you want to achieve despite internal or external pressures, obstacles or adversities.
Resilience	-	The ability to overcome adversities with an exceptional work ethic and persevering determination to showcase your mental and physical ability.
Handling pressure	-	Being able to execute skills and procedures under pressure and stress, and accepting these pressures as challenges to test yourself against. <ul style="list-style-type: none"> ○ The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state.
Emotional intelligence	-	An honest and accurate self-awareness and understanding of your emotions when under pressure or facing an obstacle, and the ability to manage emotions to enhance performance across all situations. <ul style="list-style-type: none"> ○ Being able to recognise and understand the obstacles, challenges and pressures involved and accurately self-assessing your individual performances.
Sport intelligence	-	Having the ability to perceive and understand both the training and competitive environment, and having the self-awareness to identify and understand your role within the team and any potential adversities that you may face. <ul style="list-style-type: none"> ○ Understanding and accepting responsibility for your role in the team, which entails putting team success before individual success. ○ Understanding and knowing every asset of the game and the responsibilities of every player on the ground and off the field.
Physical toughness	-	Playing to the best of your ability whilst carrying an injury, consciously making the decision to attack the ball in a physically threatening situation and pushing your body through extreme fatigue experienced during competition and training.

Coulter et al. (2010) study also supported the notion that there seem to be global mental toughness characteristics but also those unique to specific sports. Coulter et al. (2010) interviewed coaches, players and parents to discuss perspectives on key aspects of mental toughness focusing on ‘behaviours displayed and cognitions employed by mentally tough soccer players.’ Fourteen attributes emerged (see table 6), thirteen of which were similar to past research with one exception, ‘having a winning mentality and desire.’ This provides evidence there is a ‘core constellation’ of characteristics as well as sport-specific ones, however having only one sport-specific attribute may support moving away from the notion characteristics can vary dramatically from sport to sport.

Table 6: Coulter et al's. (2010) mental toughness characteristics and description

Characteristic	Description
Winning mentality and desire	Having a winning desire that drives you to overcome challenge and adversity both on the pitch and off to succeed.
Self-belief	Possessing self-belief in physical and mental ability under pressure to overcome all challenging situations.
Physical toughness	Pushing through the pain barrier to remain focused on the game, and maintaining a high level of performance while carrying an injury, fatigued or hurting.
Work ethic	Hard work and pushing yourself (physically and mentally) to achieve your goals in all areas of the game.
Resilience	Persevering through adversity both in and out of soccer with "bullet proof" determination to stay focused and to maintain consistently high level of performance.
Personal values	Placing meaning on personal values and living by personal standards to being a better person and player.
Concentration and focus	Having a single-mindedness to focus on the job at hand in face of internal or external pressures, obstacles or adversity.
Performance awareness	Having the ability to accurately self-assess your performance.
Sport intelligence	Having an ability to read the game, having strong tactical awareness, and understanding your role on the pitch to execute decisions at critical moments.
Tough attitude	Having an incessant mind-set focused on being the best you can be.
Coping under pressure	Maintaining a high level of performance under pressure and viewing obstacles as challenges.
Competitive effort	Sustaining a high level of competitiveness on the pitch regardless of the situation.
Risk taker	A willingness to take risks both on the pitch and in one's life/career to increase opportunity of success.
Emotional intelligence	Possessing self-awareness when facing challenges to control and manage your emotions.

Since Jones et al's. (2002) research one-hundred and twenty-four attributes were identified as crucial to a mentally tough individual. In these studies many of the characteristics are acknowledged throughout the research. These characteristics can be categorized under seven core categories: 'self-belief and confidence, attentional control (concentration and focus), motivation, commitment and determination, positive and tough attitude, resilience, enjoying and handling pressure and quality preparation' (Gucciardi et al., 2008).

These categories have been identified as key to a mentally tough performer in increasing their performance in sport. The next section will focus on the effect the mental toughness categories may have on aiding the rehabilitation of athletes.

2.4 Can mental toughness facilitate the rehabilitation process?

In the last forty years, an empirical literature on psychological aspects of sport injury has developed (Brewer, 2007) and within this many of the core categories, which were highlighted in the last section, have been identified as a crucial component to successful rehabilitation. The recovery process is defined by Evans et al. (2006):

'A dynamic, interactive process in which cognition, emotions and behaviour are explained within a cyclical cognitive framework.'

This section will look at the three stages of the recovery process and how mental toughness may aid them: The emotional responses immediately after injury (Chan & Grossman, 1988), adhering effectively to the rehabilitation (Daly et al., 1995) and returning to sport (Anderson, 2001).

2.4.1 Emotional response immediately after injury

Early research into emotional responses to injury suggests that athletes experience a selection of negative emotions (Gordon & Lindgren, 1990; Leddy et al., 1994; Pearson & Jones, 1992). These can include tension, depression, anger, confusion and a sense of loss. Later qualitative research identified other emotional responses such as shock, anxiety and frustration which are seen to be temporal (Bianco et al., 1999; Granito, 2001). However Wiese-Bjornstal et al. (1998) believed that both personal and situational factors may alter the impacts placed on the injured individuals responses. Motivation is highlighted as a personal variable and is also one of the 'core' categories within mental toughness, which would suggest that those who have higher motivation may be more efficient at mitigating their responses immediately after injury. A mentally tough performer may also be better equipped at mediating and countering these emotions due to them having higher attentional control, specifically being able to 'override and block out negative thoughts and self-doubts concerning your mental and physical state' (Gucciardi et al., 2008).

2.4.2 Adherence to rehabilitation

The emotional response immediately after injury may lead to stressors which may lead to frustration within the recovery period. This is evident in Evans et al's. (2012) research in which athletes who had been injured in training or in competition, resulting in losing competitive sporting time. These athletes were interviewed about the stressors that they experienced. It was found that a lack of rehabilitation progress, loss of fitness, physical appearance and rehabilitation setbacks were the major stressors within the medical/physical demands and that social comparison and alienation within the social dimension. These stressors may lead to depression or anger if they are not addressed.

Mental toughness has been tested as a psychological skill to influence stressors. Geber et al. (2012) research concluded that mental toughness was negatively correlated with perceived stress and depressive symptoms and that mental toughness moderates the relationship between perceived stress and depressive symptoms. Both these findings provide evidence that mental toughness may facilitate injury rehabilitation.

Research has been performed that focused on interventions that may aid athletes in their rehabilitation programmes. Evidence of this is the research that has been completed on the aid of visualisation as a stress reduction technique, which helps to initiate a 'variety of psycho-physiological responses' (Morris, 1998, p.65) or the extensive exploration into facilitating adherence in the recovery process.

A commonly used intervention used by injured athletes is goal-setting. Goal setting facilitates performance by focusing and guiding the attention of the subject (Theodorakis, et al., 1996). This is crucial to a successful completion of any programme. Short term goals help by providing individuals with indicators of success or performance accomplishments. These performance accomplishments will also increase self-efficacy. This increase in self-efficacy will increase motivation, as it has been shown to be a substantial predictor of motivation, and also aids athletic performance (Milne, et al., 2005). More evidence to this notion comes from Theodorakis et al. (1996) study which

concluded that subjects with higher levels of self-efficacy have greater levels of performance' in the completion of their goals.

Within the mental toughness characteristics, identified in the literature, creating and completing goals is highlighted. Gucciardi et al. (2008) characteristic is evidence of this: 'Identifying your goals, what needs to be done to achieve those goals and adjusting these goals when faced with an obstacle or adversity.' A mentally tough performer also has higher levels of 'resilience' and is both more 'committed and determined' (Gucciardi et al., 2008) than an individual who is not, providing the athlete with more chance in completing their goals.

2.4.3 Returning to sport

Anecdotal and clinical reports found that rehabilitated individuals fear re-injury (Rotella, 1985), playing to the same ability pre-injury (Crossman, 1997). More recent qualitative studies have echoed these findings. Pressure to return to sport may also lead to a decrease in confidence and performance (Williams & Roepke, 1993). An example of the pressure to returning to sport comes from Bianco (2001) study which used Canadian national team skiers. The participants stated they had returned to competition to prevent losing a place on the team and felt pressured to prove their ability to the coach. Many of the participants had suffered further injuries, which were related to the hasty return.

However, a key attribute of a mentally tough performer is having a 'positive and tough attitude.' This tough attitude may aid in mitigating these pressure's which force athletes to return to sport prematurely. 'Resilience' also may aid in allowing the athlete to fully complete their rehabilitation so that they are ready for competitive challenges, which the Canadian skiers weren't. A characteristic which highlight this resilience comes from Gucciardi et al. (2008) study: 'Doing everything in your preparation and leaving no stone unturned to ensure that you are prepared mentally and physically.'

This section has focused on which of the core categories that emerged from the mental toughness research aid in the recovery process and how they might do this. See table 7 for an overview of this section.

Table 7: Summary of how the 'core' categories influence the three stages of the rehabilitation process

Immediate response	emotional	Adherence to rehabilitation	Returning to sport
<ul style="list-style-type: none"> - Higher attentional control to aid in the blocking out of negative thoughts and feelings. - Higher motivation to mitigate the emotional responses initially felt after injury. 		<ul style="list-style-type: none"> - Mental toughness is negatively correlated with perceived stressors and depressive symptoms which may have been caused from stressors. - Goals are perceived as crucial to the recovery process, and higher resilience and increases commitment and determination aids in the successful completion of goals. 	<ul style="list-style-type: none"> - Positive and tough attitude to mitigate the negative thoughts on returning to sport as well as pressures which may cause athletes to return to sport prematurely. - Higher resilience may aid the athlete in completing their rehabilitation fully, before returning to competitive challenges.

2.5 Development of a research question

It is evident from this literature review that mental toughness is active in facilitating the injury rehabilitation process. However what is not evident is which elements of mental toughness are the most influential within this process. Mental toughness has grown into a broad construct with many attributes. These attributes fall under categories which are prominent in the injury rehabilitation process. However no research has been completed on the specific characteristics within these categories which may be utilised to optimise the rehabilitation process.

This study looks to investigate the impact of individual characteristics on the recovery process by attempting, firstly to identify the most effective mental toughness characteristics in relation to the rehabilitation process and then how these attributes aid an athlete's recovery. The study will be completed among cricketers, which builds on both sport-specific and Bull et al's. (2005) research. The research question for this study is:

'Which mental toughness characteristics are most effective in aiding the injury rehabilitation process in cricketers?'

3.0 Method

3.1 Introduction:

This study consisted of two parts. Study A focused on identifying the most effective mental toughness attributes in relation to rehabilitation while study B focused how these attributes aided cricketers in their recovery.

Study A involved creating a Ranking scale from all the mental toughness attributes. Only characteristics which were relevant to injury were used in the scale. Researchers worked together to identify characteristics which were crucial to the recovery process, while other attributes were deleted from the scale. It was then completed by cricketers and the most effective characteristics were used to create an interview guide which was used in study B.

Study B utilised a semi-structured interview guide allowing the interviewee to expand on points of interests and create in depth answers (Denscombe, 1998). The interviews focused on how the characteristics from the Ranking scale aided the individual's rehabilitation.

3.2 Participants:

3.2.1 Study A: Criteria

Participants had to play regular cricket at club, university, or county level. In addition, they had to have an injury which caused them to miss a week of sport-time (either competitive or training) providing them with a sense-of-loss. They also had to be male as the results may differ between genders.

3.2.2 Study A: Participants

Thirty-seven (mean age: 23.54±8.26) completed the Ranking Scale. Thirty-three were club cricketers and four played university cricket

3.2.3 Study B: Criteria

Participants had to be male university or high-level club players. In addition, they had to have suffered an injury in which the rehabilitation took a month or longer to complete. This rehabilitation must have been active (involved rehabilitation sessions and recovery techniques) as this suggests they utilised some of the attributes within their recovery process.

3.2.4 Study B: Participants

Qualitative research use small samples, purposefully choosing participants (Patton, 2002) due to their knowledge of their environment, allowing an in-depth examination of the subject (Miles & Huberman, 1994). Five male participants (one university and four high-level club cricketers; mean age 20.6 ± 0.55) were used. The injuries varied with overuse injuries in the shoulder but also traumatic injuries, such as a dislocated hip and a ruptured Anterior Cruciate Ligament.

3.3 Measures/Instrumentation:

3.3.1 Informed consent forms

All participants completed an informed consent (see appendix A) form before The informed consent form remained the same for those completing the Ranking Scale and those being interviewed. A total of forty-two forms were completed.

3.3.2 Development of Ranking Scale

All mental toughness characteristics (one-hundred and twenty-four) evident in the literature (Jones et al., 2002; Golby & Sheard, 2004; Thellwell et al., 2005; Bull et al., 2005; Jones et al., 2007; Gucciardi et al., 2008; Coulter et al., 2010; Sheard, 2010) were identified so a valid list of mental toughness attributes related to rehabilitation could be developed.

Many of these attributes were not related to rehabilitation and these were not used in the Ranking scale, but deleted from it. Only those identified by both researchers as key elements to the recovery process were included in the scale.

Many of the attributes had the same meaning due to them coming from different studies and there being ‘core’ categories within mental toughness, so characteristics may have four very similar versions from four studies (see table 8).

Table 8: Example of similarity of characteristics between studies

Characteristic	Study
Having an unshakable self-belief in your ability to achieve your competition goals.	Jones et al. (2002)
Having an inner arrogance that makes you believe you can achieve anything you set your mind to.	Jones et al. (2007)
Self-belief in your mental and physical ability under pressure, and in your ability to persevere and overcome any obstacle and/or challenge that you may face during your career.	Gucciardi et al. (2008)
Possessing self-belief in physical and mental ability under pressure to overcome all challenging situations.	Coulter et al. (2010)

The characteristic phrased best in relation to injury rehabilitation was used while the rest were deleted. The final Ranking scale (see appendix B) consisted of forty-eight attributes, their description in a sporting context, the study it was identified in and the ranking box.

3.3.3 Interview Guide

A semi-structured interview guide (see appendix C) was developed from the data collected from study A and relevant literature. The guide enabled a planned and reliable method of questioning, helping the interview to flow in a structured way. A pilot study aided the researcher in familiarising himself with the interview guide, increasing his experience and fluency of the interview process.

The guide consisted of four sections. Firstly, the researcher highlighted background information on the study and how the data collected within the study will be

used. Participant's rights were established, with reference to their identity being kept safe and anything they say being kept as confidential. This section was not recorded.

Participant was then asked some introductory questions to get the interview process flowing. Questions focused on the participants cricketing career and the rehabilitation completed. The interview was recorded from this section onwards.

Section three focused on the most effective characteristics which emerged from study A (Ranking scale). Questions and probes helped to determine how the individual attributes had aided the participant's rehabilitation. Specific examples from the participant were encouraged to produce rich data for each attribute.

An advice section concluded the interview, allowing the participant to suggest advice they would give individuals about to embark on the rehabilitation they experienced. A validity section helped to determine 'how the interview went?' and whether the participant could 'tell the whole story of their rehabilitation? throughout the interview (see figure 5 for overview).

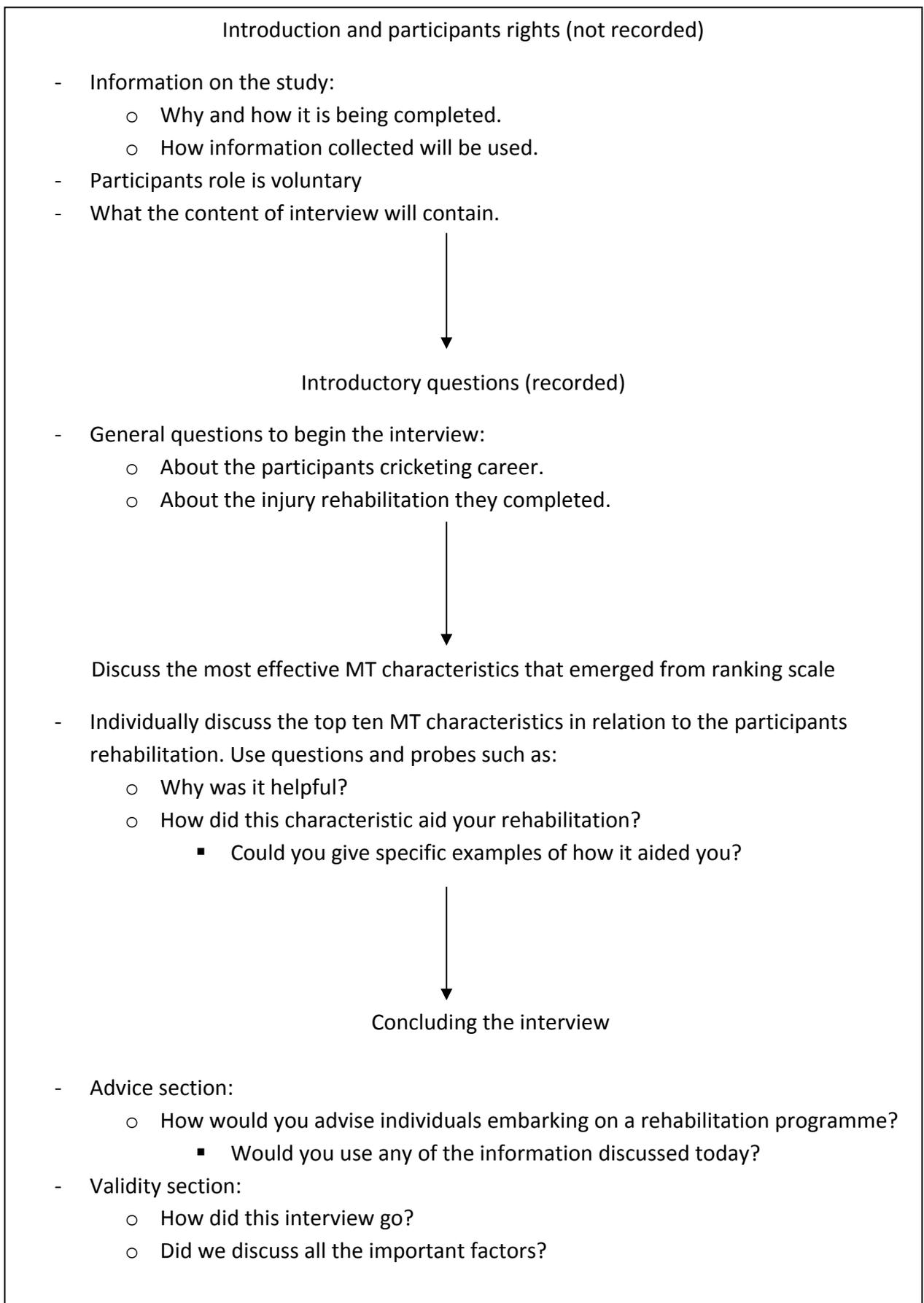


Figure 5: Overview of interview guide.

3.4 Procedures:

3.4.1 Study A

Sixty cricketers were contacted, sent an informed consent form and a Ranking scale. Thirty-seven completed the informed consent form and Ranking scale. Participants ranked what they perceived to be the top ten most effective mental toughness characteristics in relation to their rehabilitation (1 being the most effective...10 being tenth most effective) and returned the scale to the researcher. All thirty-seven were analysed and the top ten characteristics emerged (see table 9) and would be used in study B.

Table 9: Ten most effective characteristics which emerged from the ranking scale plus their sporting example

Characteristic	Sporting example
Maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened.	Allowing yourself to keep moving forward with your rehabilitation rather than becoming stuck in one place when something doesn't go according to plan.
Self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face.	Knowing that you have the physical and mental capacity to progress through your rehab effectively, even with obstacles occurring.
Visualisation.	The ability to use mental imagery/visualisation to help motivation. For example visualising yourself as playing sport again may motivate you to increase intensity in your rehab sessions.
Using failure to drive success.	Learning from any mistakes made and using it as a form of motivation in your rehab.
Having an inner arrogance that makes you believe that you can achieve anything you set your mind to.	Believing you are able to rehabilitate effectively for a certain date even when others doubt or are sceptical that you can.
An internal motivation and desire for competitive challenges and team success, and also having the desire to put the necessary things into practice to achieve your vision of success.	Taking motivation from within you to apply the necessary changes so as to achieve rehabilitation for both yourself and the teams benefit.
Believing that your desire or hunger will ultimately result in fulfilling your potential.	Knowing that you will come through this injury rehab.
Awareness and control of thoughts and feelings.	Not becoming emotional or stressed with the regime but being aware of these issues and channelling them
The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state.	Not allowing yourself to dwell on negative thoughts at any stage in the programme which may hinder your progress.
Having a winning desire which drives you to overcome challenge and adversity both on and off the pitch to succeed/win.	Attempting to complete your rehabilitation as quickly and effectively as you can so that you can overcome that challenge and also get back to playing.

3.4.2 Study B

Five cricketers were contacted, completed an informed consent form and an interview was scheduled at a mutually beneficial time for researcher and participant. An interview guide was sent to participants one week before the interview so they could familiarise themselves with the content of the interview. The guide highlighted the ten most effective characteristics and also the type of questions which would be asked, helping to make the process more reliable as the participants had time to think about their personal rehabilitation and make notes before discussing it with the researcher. The first interview was performed as a pilot interview, with the intention of using the data if the guide was clear and the direction of questions was both fluid and relevant. If not the guide would have been modified and the interview re-done. The guide was judged effective in collecting the data needed to answer the research question, so the pilot interview data was used in the study.

The remaining four interviews were completed. The locations varied as some participants could not meet face-to-face. In these cases the interview was completed over the medium of Skype. The interviews lasted around twenty minutes, were recorded and then transcribed verbatim allowing the data to be analysed in the most effective manner.

3.5 Data analysis:

3.5.1 Study A

Every time a characteristic was nominated in the Ranking scale it was noted down. It was also noted which number (1-10) was placed in each box when nominated. This allowed both the amount of times a characteristic was nominated as well as the overall amount, which comes from adding the rank numbers (1-10) of individual attributes, to be calculated. Both statistics allowed the average rank to be calculated. All attributes which received more than ten nominations were perceived as most effective to rehabilitation. The averages were only used when two or more characteristics had the same amount of nominations. In this case the attribute with the lower average was seen as more

effective, as it had a lower average rank, meaning it had been ranked with lower numbers in the scale. Through this deductive approach ten mental toughness characteristics were identified.

3.5.2 Study B

The interview transcripts were printed out; read and relevant information for each individual and each of the ten characteristics were highlighted. Causal networks were then created for each characteristic which featured all the relevant information from all participants, portraying a cross-case analysis. This cross-case analysis allowed key themes to emerge condensing the large causal network to one that highlighted the key information for each characteristic. The final causal networks were presented (Nash, 2006) beginning with the initial variable (characteristic) which flowed to the key informant data from the interviews (why characteristics aided their rehabilitation), ending with how it had aided them (see figure 6).

These networks/models plus associated text and quotations from the interviews permitted the data to be clearly presented in an attempt to answer the research question.

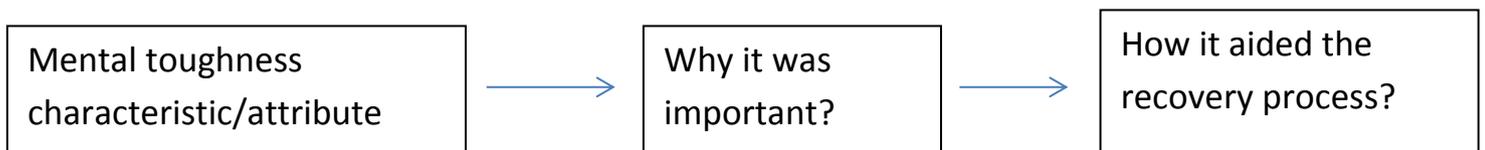


Figure 6: Illustration of the causal networks that will be presented in the results.

3.6 Reliability and validity:

When completing any research the validity and reliability of the data is essential to the reliability and validity of the findings. The creditability of the results are directly related to the reliability and validity of the data collection methods and the analysis techniques used within the research (Gray, 2004). See Table 10 for the actions taken to make sure the research completed was both reliable and valid.

Table 10: Actions taken to ensure reliability and validity

Number	Factor for a valid and reliable study
1.	An interview guide was developed which enabled a structured and logical flow to the interview for all participants. It was developed so all participants had an idea of the content and a full understanding of the interview process, however if a participant did not understand a question, they were encouraged to ask questions for clarity.
2.	The same interviewer was used in all the interviews so that it was kept neutral and participants were not influenced. A question was used at the end of the interview asking whether the participant felt he had been led by the interviewer in his responses. All participants said that they hadn't been.
3.	A pilot study was performed allowing the researcher to become familiar with the interview guide and also providing feedback about the questions and structure of the interview. It was determined that the questions were clear and the structure was relevant to the research question.
4.	The interview transcripts were sent back to the relevant participant who read it and confirmed what they had discussed was correct. All participants confirmed the accuracy of the transcript.
5.	There was a conscious effort from all researchers to remained un-bias throughout the whole process, whether this be in the interview process or when analysing the data.
6.	A causal network was sent to all of the five interviewee's so they could confirm that it was correct in illustrating the key themes that had been discussed.

3.7 Overview of method:

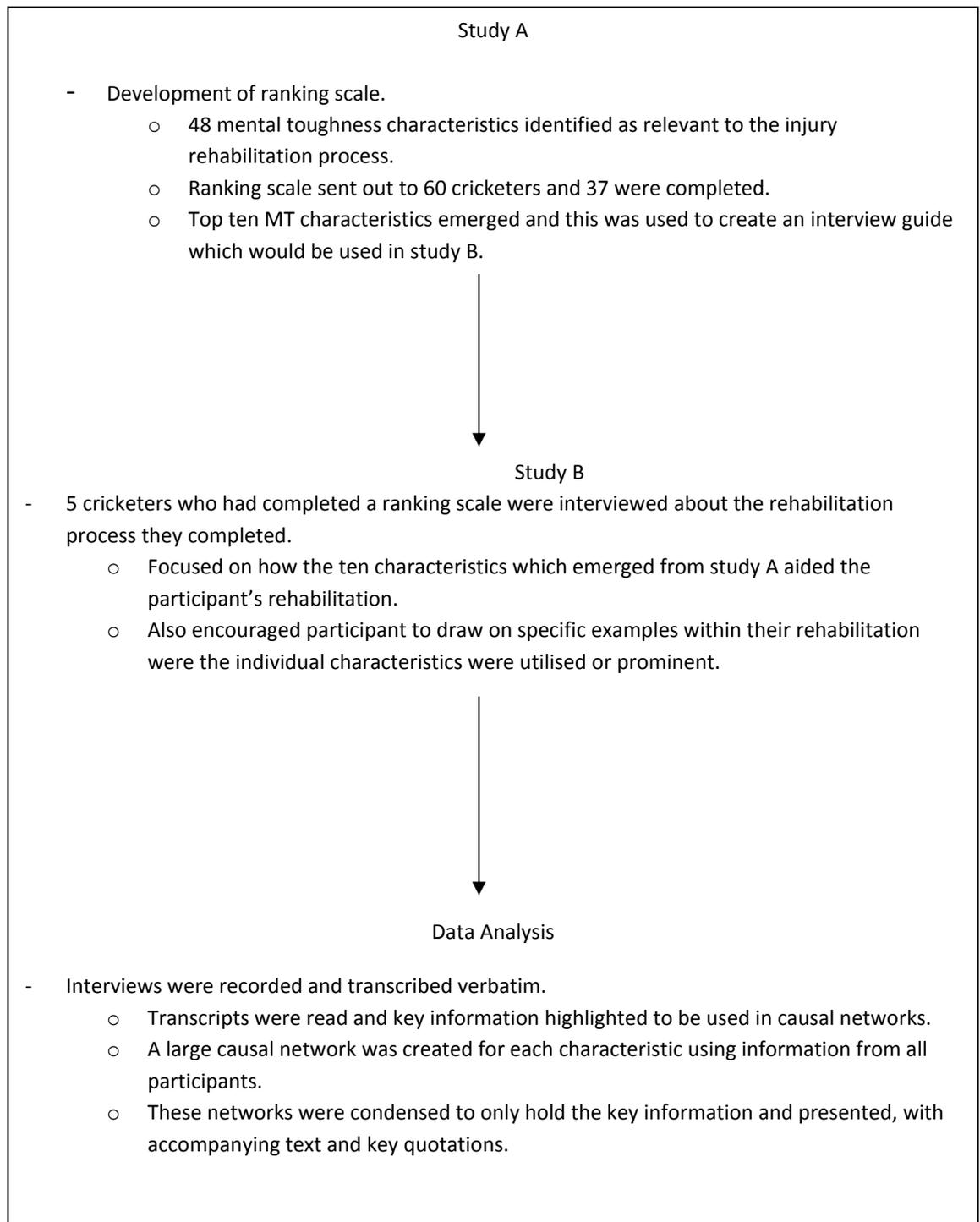


Figure 7: Overview of method.

4.0 Results

4.1 Introduction:

To address the research question the top ten mental toughness characteristics, which emerged from the thirty-seven completed Ranking Scales, have been presented (in order of importance). The results from study A are presented in a table format while causal networks illustrate the key themes (see figure 8 for key) collected in study B. This allowed the data to illustrate not only the perceived top ten mental toughness characteristics, but also why and how it aided individuals in their recovery process, through a cross-case analysis. Percentages illustrated how many of the participants shared that perspective. Each causal stream was accompanied by narrative text to highlight the key themes, and quotations from the interviews.

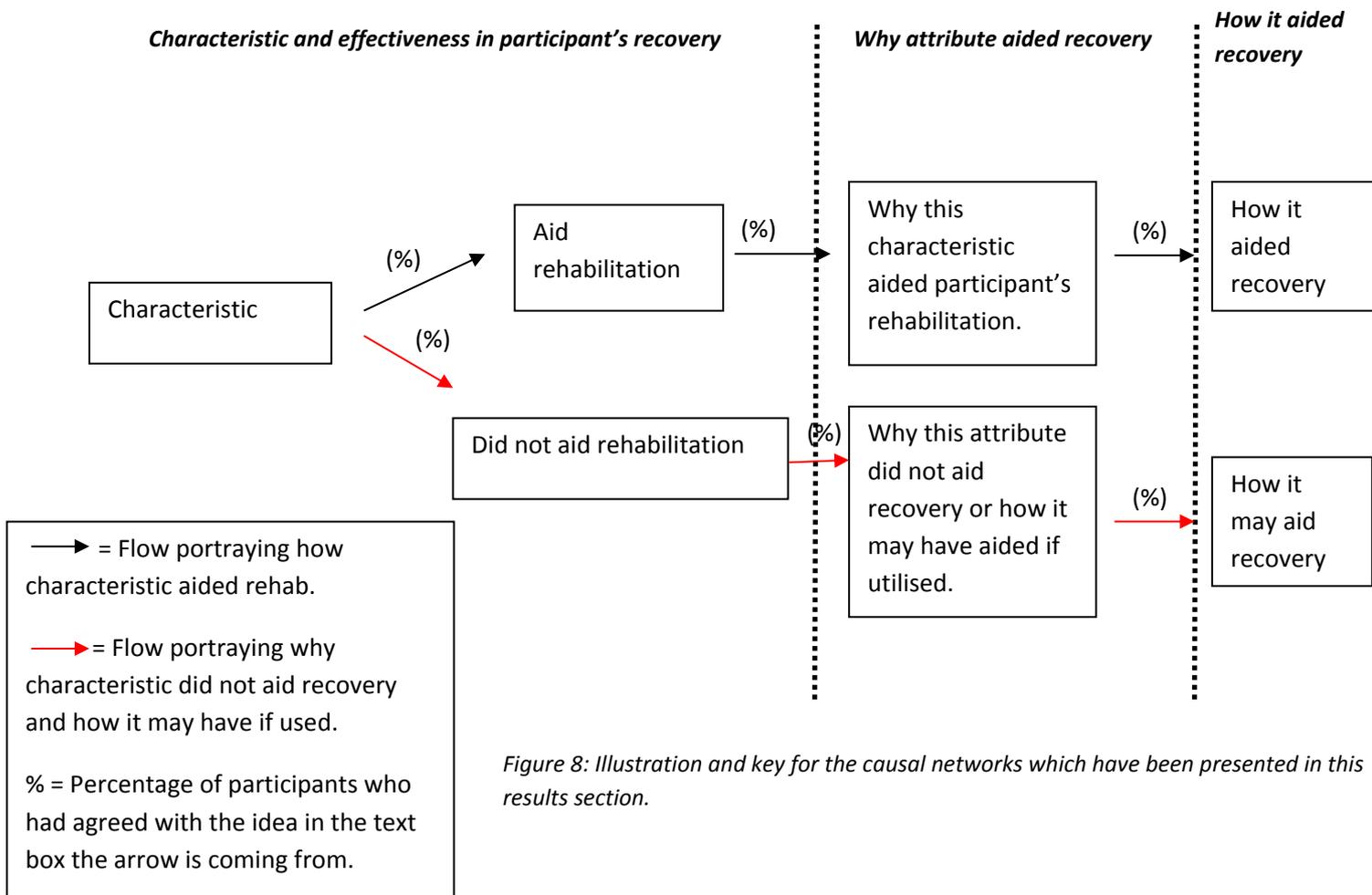


Figure 8: Illustration and key for the causal networks which have been presented in this results section.

4.2 Data analysis:

4.2.1 Study A

Table 11: Ten mental toughness characteristics which emerged from the 37 completed the ranking scales

Mental toughness characteristic	Amount of times ranked in top 10	Average rank
Maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened.	19	5.42
Self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face.	15	3.47
Visualisation.	15	5.87
Using failure to drive success.	13	5.23
Having an inner arrogance that makes you believe that you can achieve anything you set your mind to.	13	6.08
An internal motivation and desire for competitive challenges and team success, and also having the desire to put the necessary things into practice to achieve your vision of success.	13	6.85
Believing that your desire or hunger will ultimately result in fulfilling your potential.	12	4
Awareness and control of thoughts and feelings.	12	5.08
The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state.	11	3.82
Having a winning desire which drives you to overcome challenge and adversity both on and off the pitch to succeed/win.	11	4.82

4.2.2 Study B

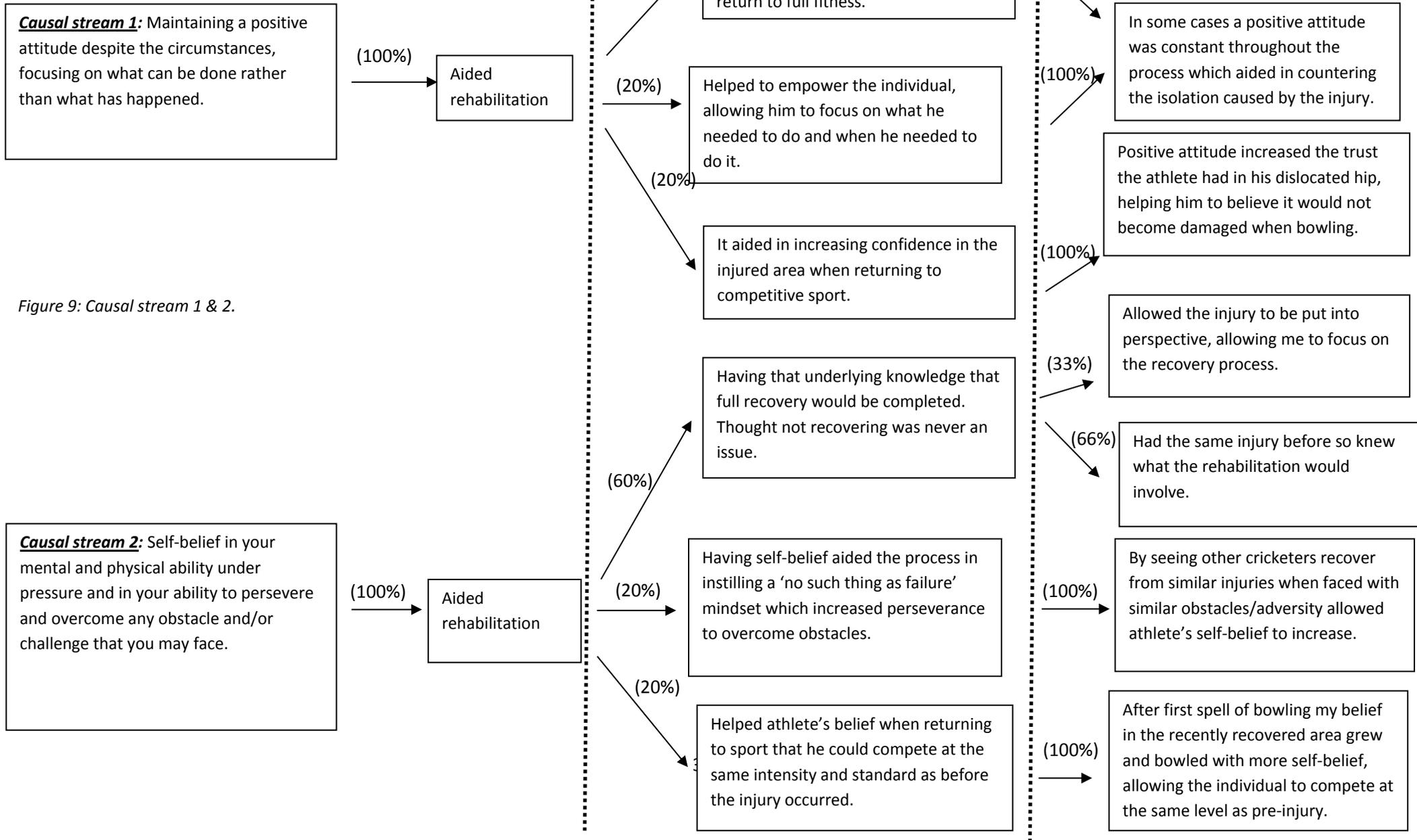


Figure 9: Causal stream 1 & 2.

4.2.2.1 Causal stream 1: *Maintaining a positive attitude despite the circumstances, focusing on what can be done rather than what has happened.*

This mental toughness characteristic was perceived vital in the recovery process. It was suggested by all five participants that it aided their own rehabilitation process. Four participants (80%) believed that this characteristic helped to focus on returning to full fitness. Personal goals aided in maintaining a positive attitude and provided the individual with direction which helped the athlete to focus on the end result (recovery). They also provided increased motivation in the programme. A quotation from subject D illustrates this theme:

“Obviously initially you think it’s a negative being injured, but then being positive and focusing on an end result getting back to fitness, getting back out there. If you are not positive about it you are just going to hinder it.”

One of the participants felt that maintaining a positive attitude empowered him which allowed him to focus on what he needed to do and when. This provided him with an element of control throughout the process, allowing him to stay on track. Another found that it aided in increasing confidence in the injured body part when returning to sport (bowling). A quotation taken from subject E’s interview transcript illustrates this:

“Helped when getting back into sport, I am quite a big guy and as a fast bowler I had to keep positive as a lot of weight goes through my dislocated hip when I bowl, so having confidence in the injured body part was crucial.”

4.2.2.2 Causal stream 2: *Self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face.*

This characteristic also was perceived crucial as all five participants thought it aided their recovery. Three subject’s (60%) believed that having self belief in your mental and physical ability under pressure provided the underlying belief that recovery was possible and would be completed. Two of the subjects who thought this believed it was down to having been through similar injuries before, so knowing what to expect, while

the other thought it allowed him to put the injury into perspective. A quotation from subject A's interview highlights this:

"Yeah just put it into perspective you know, when you get injured you always feel down, you just need a bit of time to think about it, digest it. But you have to believe that you are going to get through the injury, lying down and saying I am not going to get back will not help."

Like the results from Causal stream 1 this characteristic was seen as key when returning to sport, by providing the individual with the confidence that he can play at the same level as before the injury. It also helped one participant in instilling the mindset, there is no such thing as failure aiding him in his perseverance to overcome obstacles.

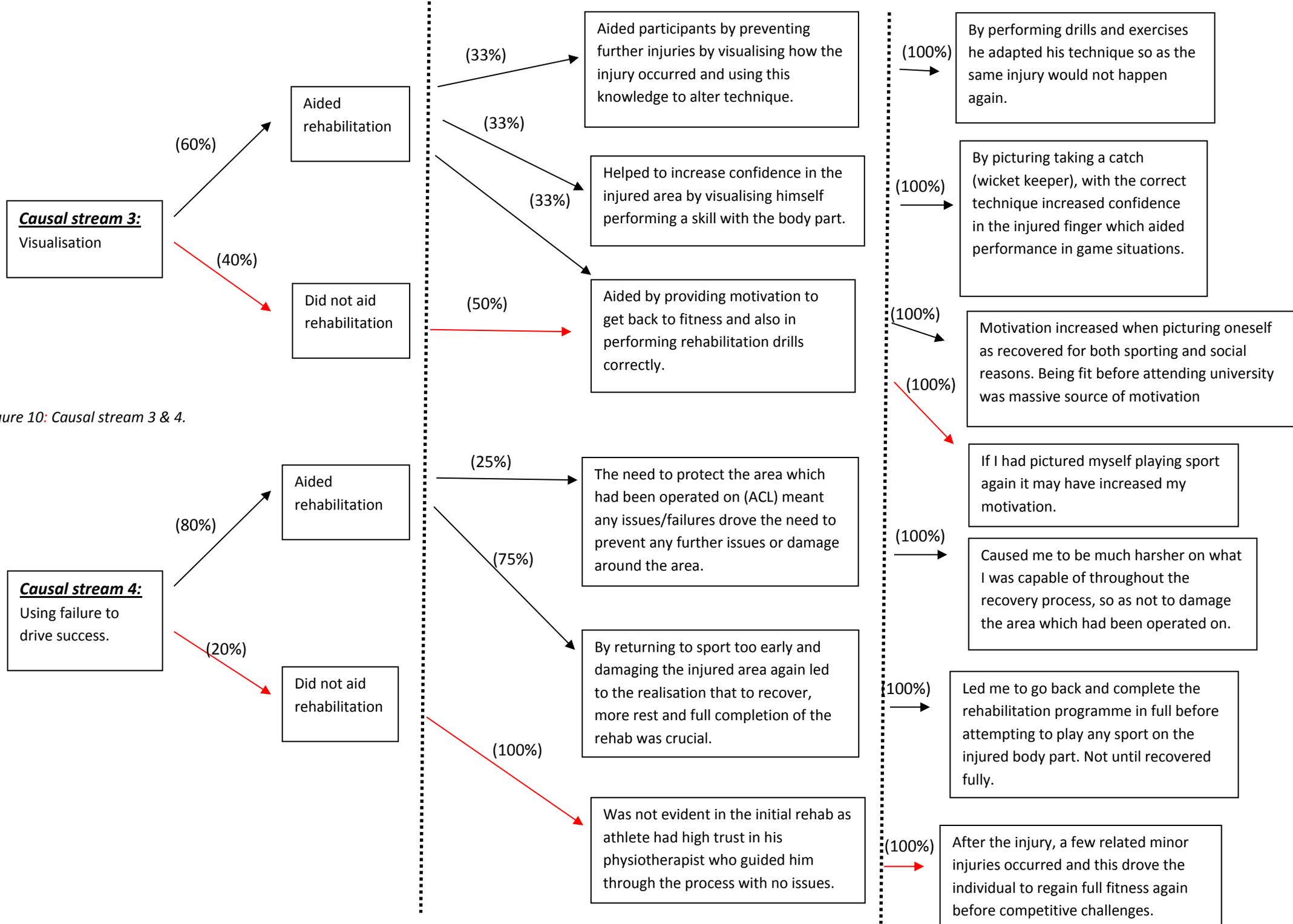


Figure 10: Causal stream 3 & 4.

4.2.2.3 Causal stream 3: **Visualisation.**

Three participants (60%) utilised visualisation to aid their rehabilitation while the other two (40%) did not feel it aided their recovery. Of those who stated it had aided them differing reasons were given. One used visualisation to picture how the injury had occurred, focusing on any technical faults so as to adapt his technique to prevent further injury. Another individual visualised performing skills successfully with the injured body part to both increase confidence in the body part and as a form of motivation to get fully fit. This is portrayed in a quotation from subject D's transcript:

"Picturing myself taking a catch or doing something positive to motivate myself to get fit in that sense."

The most common use of visualisation was to picture oneself playing sport again as a source of motivation. This use of imagery drove the athlete to complete their rehab and retain full fitness. One individual who had not used visualisation as an aid in his recovery thought that utilising this psychological skill would have aided his rehabilitation if used and would use it in any future recovery programmes.

4.2.2.4 Causal stream 4: **Using failure to drive success.**

Four participants (80%) saw this characteristic as an aid in recovering. Three of these participants came back to sport too early and damaged the injury again. This failure drove these individuals to go back and finish their rehabilitation properly, driving them to recover fully (success). Subject D's quotation illustrates this:

"I came back a bit early because I wanted to play the game, a big game, I thought I had had a few nets and stuff so was alright, but that was in practice, not in a match, and the match intensity is much higher. So the next day it deteriorated and went the other way, so I had to realise that if I wanted to make it better then I had to give it it's proper rest and not cheat the rehab."

One participant stated that this characteristic was not relevant in his rehabilitation due to his trust in his physiotherapist. He performed everything that the

specialist told him to and at the right time and did not encounter any failures. However he did say that he had a few minor injuries recently after returning to sport, in which this characteristic was utilised.

Causal stream 5: Having an inner arrogance that makes you believe that you can achieve anything you can set your mind to.

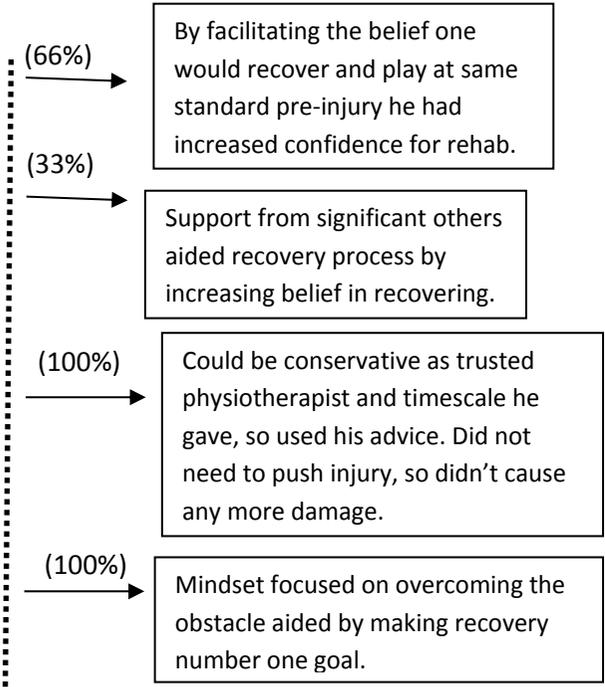
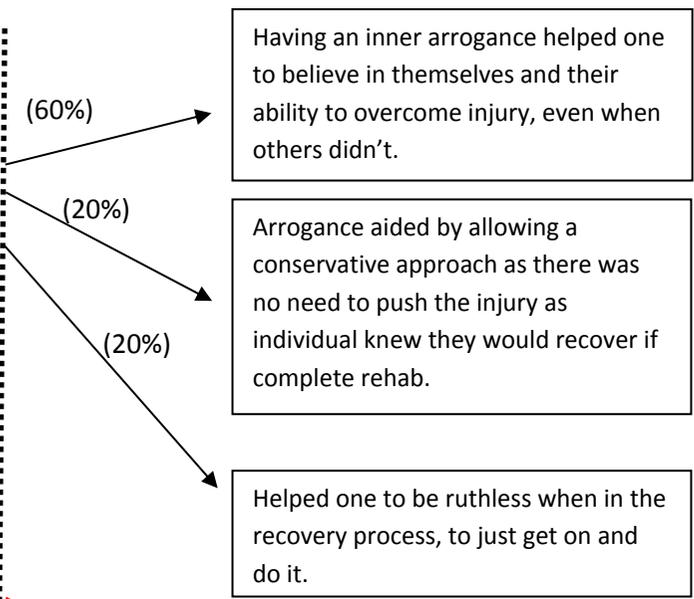
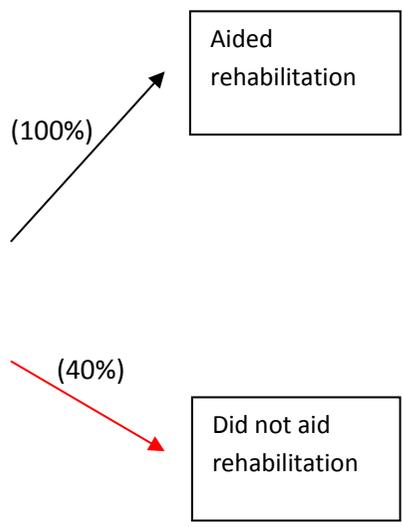
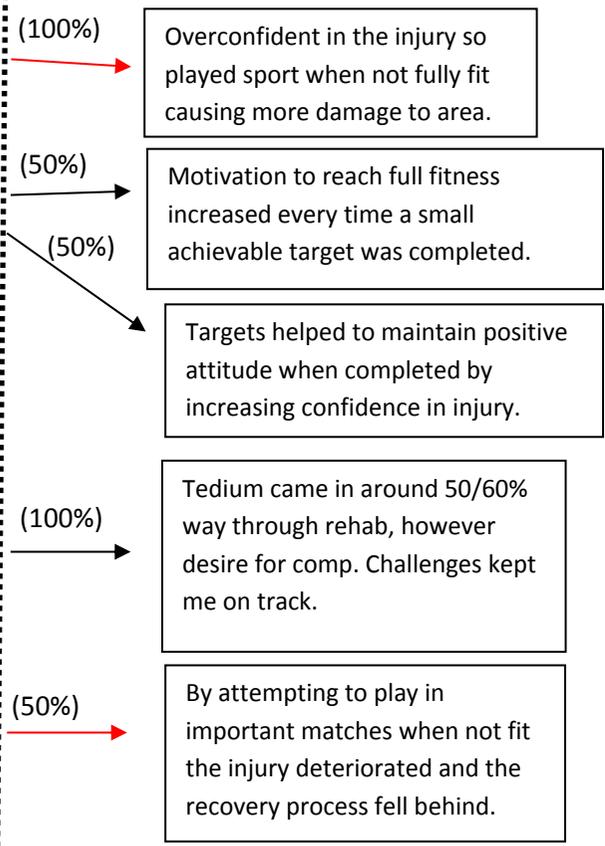
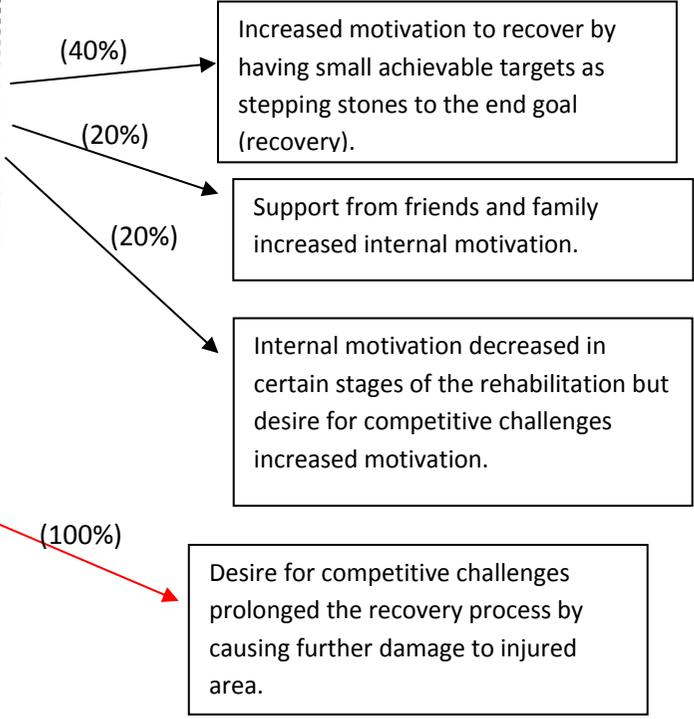
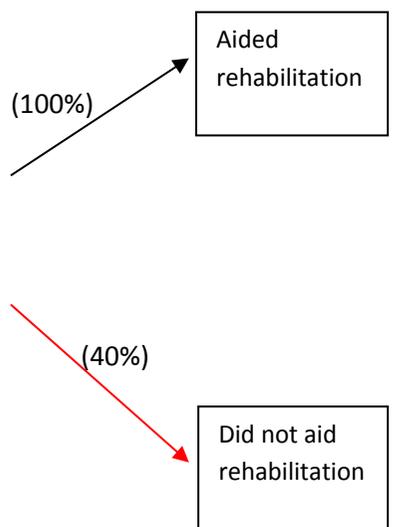


Figure 11: Causal stream 5 & 6.

Causal stream 6: An internal motivation and desire for competitive challenges and success and also putting the necessary changes in place to achieve your vision of success.



4.2.2.5 Causal stream 5: Having an inner arrogance that makes you believe you can achieve anything you can set your mind to.

All five athletes' thought this characteristic had aided their rehabilitation. Three participants (60%) thought having arrogance was a good thing in helping to increase their belief in themselves and of overcoming the injury, even when others didn't. Support from significant others, such as friend and family, was perceived to increase the belief that you can achieve anything you set your mind to. Having that belief you would overcome the injury also allowed a more conservative approach as you knew you would recover and didn't have to push the injury, which may cause more damage.

However two participants (40%) stated that this characteristic also hindered their rehabilitation programme. They thought their arrogance and the mindset you can achieve anything you set your mind to be the reasons that they returned to sport too early. They were overconfident in both the injury and their rehabilitation process, so returned to sport and caused more damage. This quotation from subject C's interview illustrates this:

"The inner arrogance made me believe that I could play sport when I was not fully fit, which pushed back the rehabilitation programme."

4.2.2.6 Causal stream 6: An internal motivation and desire for competitive challenges and success and also putting the necessary changes in place to achieve your vision of success.

All participants found this characteristic to aid their recovery process. A common theme was that internal motivation was always evident however at certain stages of the rehabilitation process it dropped. Two participants (40%) used small achievable targets/goals to increase their internal motivation as a way of reaching their end goal (full fitness). These goals, if completed, also helped to maintain a positive attitude around the injury which helped to increase confidence in the programme. Also support from friends and families helped to increase internal motivation. This is portrayed in subject D's quotation:

“A lot of support comes from my dad and brother, they are probably the closest to me, and they would support me saying you are going to be alright? You are going to get back? giving me motivation.”

However like the results from causal stream 5 two participants (40%) thought that their desire for competitive challenges made them return to sport too early, when not fully fit, perhaps to play in a big game. This prolonged their recovery in the long term as they damaged the injure area further and had to return to an earlier stage of the rehabilitation.

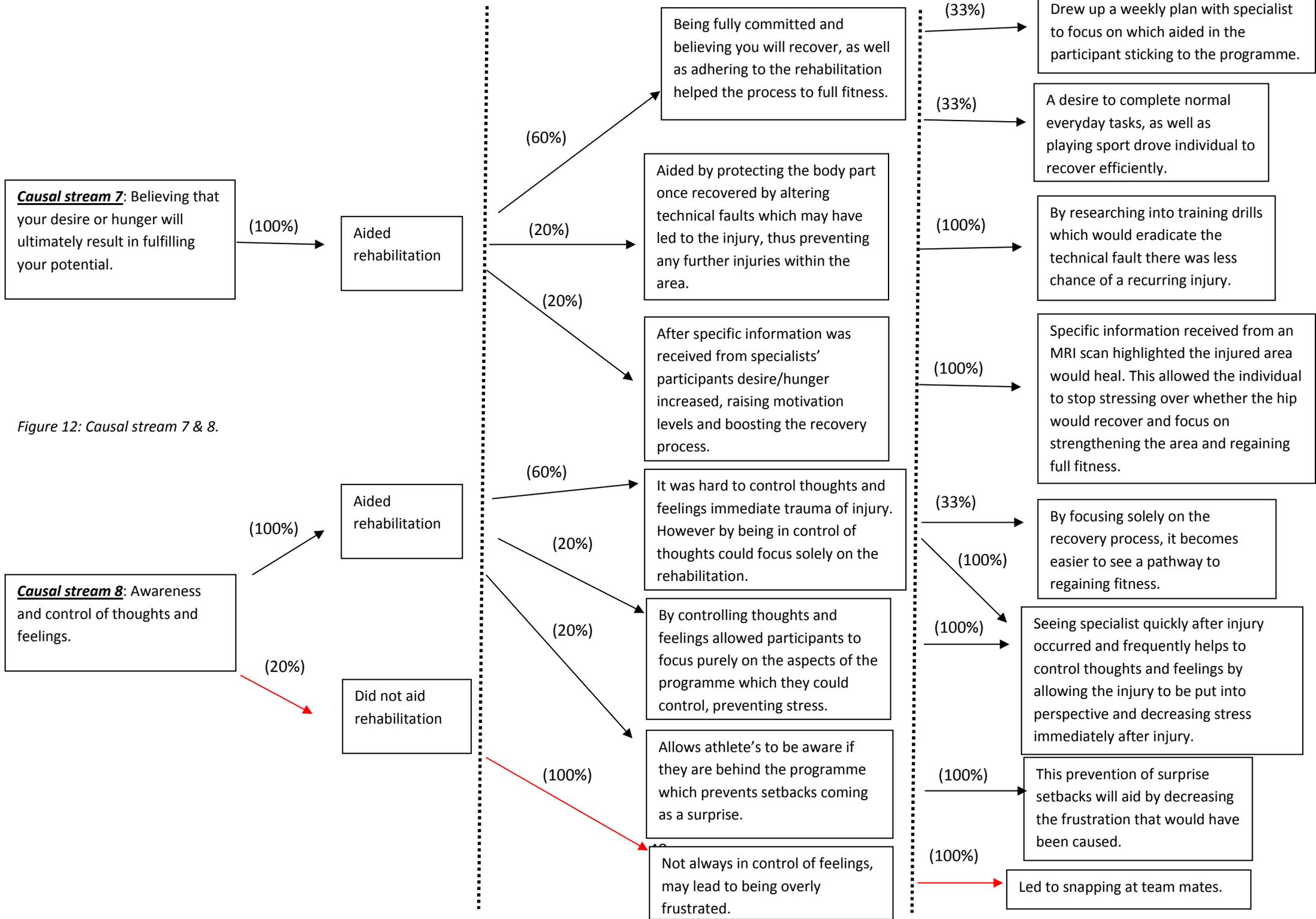


Figure 12: Causal stream 7 & 8.

4.2.2.7 Causal stream 7: *Believing that your desire or hunger will ultimately result in fulfilling your potential.*

All participants stated that this characteristic aided their rehabilitation. Three of the individuals (60%) thought it increased their commitment to the programme, facilitating their adherence to the rehabilitation. This was due to their desire to get back to sport and also, in some cases, to perform normal everyday tasks (such as having a bath on their own) and from a general health aspect (as illustrated in quotation from subject B below). Commitment also came from working with a specialist allowing the athlete to focus on certain, specific aspects of the injury to overcome it.

“Yeah I think to get back to sport is the main one, but also getting back to doing what you perceive to be normal things like kicking a football around or going for a run. And I also think as a general health aspect in so far as if you cannot do as much exercise as your used to you can lose fitness but also notice physical changes which may not be desirable.”

Your desire/hunger was perceived to increase after certain information was given from specialists. This helped to increase motivation as the athlete was made aware that his recovery was now fundamentally down to him completing his rehabilitation programme. This informational support provided some participants with a ‘boost in their rehabilitation,’ like in subject E’s case:

“When I had a MRI scan in the second month of the rehabilitation showing the dislocated hip was ok and just needed to be strengthened, that’s when I started to believe I would recover, which lifted me and increased my belief in the programme.”

4.2.2.8 Causal stream 8: *Awareness and control of thoughts and feelings.*

All participants believed this characteristic aided their rehabilitation. Three participants (60%) however thought that immediately after the injury thoughts and feelings were harder to control. All these individuals highlighted seeing a specialist quickly after the injury and receiving information about the injury helped to control thoughts and feelings as it decreased stress which came from the trauma of the injury and the emotional responses immediately after the injury occurred.

One individual stated that being in control of his thoughts and feelings allowed him to focus on the aspects of the programme which he could control. And prevented him from thinking about things he couldn't control. He thought the reason for his ability to do this was having a specialist who he trusted, helping him to stay in control and on top of any stressors.

One individual thought that the injury and rehabilitation prevented him from controlling his feelings at some points. It would make him frustrated and he would 'snap' at team mates and other friends.

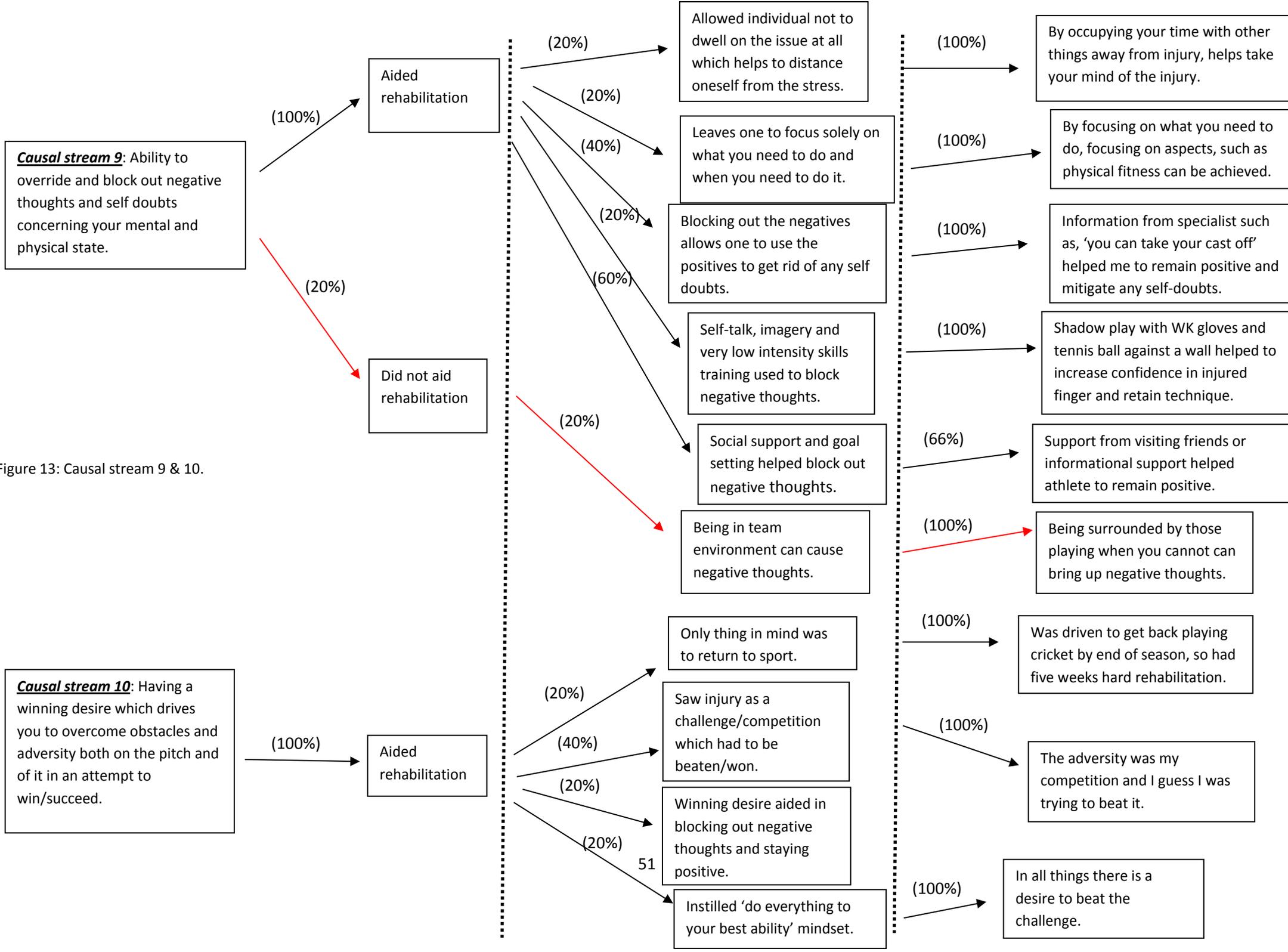


Figure 13: Causal stream 9 & 10.

4.2.2.9 Causal stream 9: Ability to override and block out negative thoughts and self-doubts concerning your mental and physical state.

All participants found this characteristic had aided their rehabilitation. It was perceived to aid in focusing on what you need to do and when you need to do it. It also allowed the athletes to dwell more on the positives, to help override the negatives. Three participants (60%) believed that social support and goal setting helped to block out negative thoughts while others thought that psychological skills, such as self-talk and imagery, aided in blocking out the negative thoughts, as illustrated by subject D:

“Use mental skills such as self-talk, imagery and do shadow play with gloves and tennis ball and with the bat to block out negative thoughts and increase confidence.”

One individual found that being around your teammates caused negative thoughts and feelings. This was due to being asked questions such ‘are you still injured?’ or ‘when are you back?’ which brought back negative thoughts and feelings around the injury.

Another key theme was the importance to occupy yourself with other things while performing your rehabilitation away from the injury which prevent any thoughts, either positive or negative, around the injury. This is stated well by subject B:

“Find alternatives which also allow to put aside time for your rehabilitation so as to not dwell on the stressors that come with the injury.”

4.2.2.10 Causal stream 10: Having a winning desire which drives you to overcome obstacles and adversity both on the pitch and of it in an attempt to win/succeed.

This characteristic was perceived as crucial to the rehabilitation process. All participants utilised it with two of the cricketers (40%) viewing the injury as a competition/challenge which had to be beaten. Subject B highlights this well:

“The adversity (injury) was my competition and I guess I was trying to beat it, which related it more to a sporting context rather than the negative aspects of injury.”

This characteristic also aided participants by blocking out negative thoughts and staying positive as well as instilling a mindset specifically set upon getting back to sport. One individual highlighted this mindset as one in which you have to 'do everything to your best ability,' so in this case recover as effectively as possible.

5.0 Discussion

5.1 Introduction:

The purpose of this study was to identify the most effective mental toughness attributes in relation to the rehabilitation process and to research how these particular attributes aided cricketers in their rehabilitation programmes, allowing a cross-case analysis to be completed from which common themes emerged. This discussion is divided into four sections. The first section focuses on the main findings from study A and study B. The next two sections discuss the applied implications, and the strengths and weaknesses of the study. The discussion will conclude with future research directions.

5.2 Main Findings:

5.2.1 Study A

Within the mental toughness literature it is widely considered that self-belief is the most important element to a mentally tough individual (Jones et al., 2002; Thelwell et al., 2005; Jones et al., 2007; Gucciardi et al., 2008). Indeed, it emerged from the literature as one of the seven core categories of mental toughness. From the research completed to identify the ten most effective characteristics in relation to the injury rehabilitation of cricketers Gucciardi et al's. (2008) attribute ('self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face') emerged as the second most effective attribute. This provides support that the characteristics that are ranked as most effective to an athlete when performing may be similar to those utilised when rehabilitating from injury.

However the top ranked attribute from this study was 'maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened' (Gucciardi et al., 2008). This attribute is one that is only identified by Gucciardi et al. (2008) and not among the other studies. In other studies the idea of 'focusing on what can be done' is widely acknowledged (Jones et al., 2002; Thelwell et al., 2005; Jones et al., 2007; Coulter et al., 2010) and having a 'tough attitude' is seen as crucial (Bull et al., 2005; Jones et al., 2007; Coulter et al., 2010) but

only Gucciardi et al. (2008) focuses on specifically having a 'positive attitude.' In terms of performance this attribute is not ranked highly in the mental toughness literature (8/12 in Jones et al., 2002; 6/10 in Thelwell et al., 2005), however from this research it is key in aiding injury rehabilitation. Support for this notion is also provided in the injury research. Both Brewer et al. (2000a) study focused on ACL tears and concluded that a decrease in psychological distress led to an increase in functional performance, increasing the rehabilitations effectiveness. Furthermore, Roy-Byrne et al. (2008) suggested that anxiety disorders may precede the onset of pain. From this research it is evident that by remaining positive and not becoming too distressed or anxious functional acts, such as rehabilitation exercises, can be performed more successfully and pain, which comes with an injury, may be regulated to a certain extent.

Motivation ('having an insatiable desire and internalised motives to succeed') (Jones et al., 2002) was deemed to be the second ranked component needed by a mentally tough performer. However from this research motivation ('An internal motivation and desire for competitive challenges and team success, and also having the desire to put necessary things into practice to achieve your version of success' (Gucciardi et al., 2008) was ranked as the sixth most effective. However 'visualisation' was ranked as the third most effective attribute. Visualisation is a psychological skill used to increase both motivation and confidence. It can increase motivation through picturing participation in sport again. Evidence of visualisations use within injury recovery is illustrated by Levleva & Orlick (1991) who suggested that an increased use of healing/recovery imagery as a form of motivation led to a decrease in recovery time. Its ability to increase motivation provides a reason for why it is ranked third and suggests that motivation is perceived more important than first believed from the results. The athlete's satisfaction with the rehabilitation process may also increase when effective imagery is used (Law et al., 2006) which is essential to any recovery process.

Commitment and determination were another core category. Two out of the ten attributes fell under this category ('having an inner arrogance that makes you believe that you can achieve anything you set your mind to' and 'Believing your desire and hunger will ultimately result in fulfilling your potential') suggesting it to be crucial in the recovery process as with increased levels of both commitment and determination

the chances of overcoming obstacles, such as those within the injury process, increase.

'The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state' (Gucciardi et al., 2008) in an attempt to 'control thoughts and feelings' (Jones et al., 2007) about the injury was seen as important to a successful recovery. These characteristics fall under having a tough attitude and although are ranked eighth and ninth suggest that by managing the thoughts and feelings one feels has a beneficial effect on rehabilitation by negating negative thoughts/self-doubts which may be detrimental to the recovery process. For example, depressed individuals are more likely to develop musculoskeletal pain than those who are not depressed (Magni et al., 1994; Larson et al., 2004). By having the ability to 'block-out' negative thoughts which may lead to depression athletes are decreasing their chance of developing more pain from their injury.

There was also focus put on being resilient through 'using failure to drive success' (Jones et al., 2007) which was ranked fourth. This corresponds with Jones et al's. (2002) fourth ranked attribute which was 'bouncing back from performance set-backs as a result of increased determination to succeed.' And also 'having a winning desire which drives you to overcome challenge and adversity both on and off the pitch to succeed and win.' Not only does this fall under resilience but also quality preparation, which was seen as key to 'beating'/overcoming the injury.

The results from study A illustrate that the attributes which facilitated the rehabilitation process have come from most of the core categories suggesting that the key attributes aiding a mentally tough athlete in competitive performances are similar to those that are needed for an effective recovery. However, although some are ranked in similar positions (self-belief and resilience) there are differences evident in the importance of the attributes (motivation) when being utilised to aid rehabilitation rather than to increase performance. This may be due to the differing nature of rehabilitation. It is not the normal environment to be in for an athlete which may suggest reasons for the differing importance: it is not what they are used to.

5.2.2 Study B

The literature review highlighted how the core categories influenced the three stages; Immediate emotional response (Chan & Grossman, 1988); adherence to rehabilitation (Daly et al., 1995); and returning to sport (Anderson, 2001) of injury. This section will focus on the key themes that emerged from study B for the three stages individually.

5.2.2.1 Emotional response immediately after injury

The literature review highlighted certain negative emotions (anger, confusion, shock) which can be felt by athletes immediately after becoming injured. A common theme which emerged from this research was that it was hard to control their thoughts immediately after the trauma of injury. However, after this trauma lifted (perhaps a few days or receiving information from a specialist) it became easier to control these thoughts and feelings. It was suggested that this ability to control both thoughts and feelings aided participants in their injury rehabilitation by allowing them to focus solely on the recovery process and what they needed to do. This made the pathway to regaining fitness more evident as by being in control of their thoughts and feelings, any negative thoughts or feelings could be ignored. Being aware of negative thoughts also aided the rehabilitation as it decreased frustration by allowing the individual to understand what he was feeling, so negative feelings did not appear suddenly/abruptly, which would lead to increased frustration. The emotions anger and frustration have been reported to eventually be replaced by anticipation and increased confidence (Bianco, 2001) which suggests that by regulating both anger and frustration an increase in anticipation and confidence may develop sooner.

‘The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state’ (Gucciardi et al., 2008) also was perceived to aid by decreasing the emotional response felt. The ability to override and block out negative thoughts and self doubts helped the athlete to focus solely on what they needed to do and when they needed to do it. This not only allowed the athlete to

focus on certain aspects of the rehabilitation rather than dwelling on the negative thoughts or self-doubts which come with an injury.

Finally having a 'winning desire which drives you to overcome obstacles and adversity both on and off the pitch and of it in an attempt to win/succeed' (Coulter et al., 2010) was perceived to be key through this stage of the recovery process as it allowed the athlete to think about one thing: Returning to sport. This winning desire aided by challenging the athlete to 'beat the injury.' This in itself also aided in blocking out any negative thoughts and self-doubts.

5.2.2.2 Adherence to rehabilitation

Within this stage of the rehabilitation process stressors which impact on an athlete can lead to increased frustration and anger. Evans et al. (2012) highlighted major stressors such as, a lack of rehabilitation progress, loss of fitness, physical appearance, rehabilitation setbacks and alienation. It was concluded that these stressors may lead to depression if not addressed and were detrimental to the recovery process.

'Having an inner arrogance that makes you believe that you can achieve anything you can set your mind to' (Jones et al., 2007) was explained as helping athletes to believe in themselves and in their ability to overcome the injury. This negated a lack of progress within their rehabilitation as the individual had the underlying knowledge that they would recover. 'Self-belief in their mental and physical ability under pressure and in their ability to persevere and overcome any obstacle and/or challenge they may face' (Gucciardi et al., 2008) also helped to instil this underlying knowledge that the athlete would overcome the challenges that the injuries had caused. By possessing 'a winning desire which drives you to overcome obstacles both on the pitch and of it in an attempt to win/succeed' aided by allowing the athlete to perceive the injury as a challenge/competition which they needed to beat. By contextualising an injury into a competitive challenge, the lack of rehabilitation progress was seen as an obstacle which needed to be overcome rather than just a negative that dragged the recovery behind schedule. This attribute was also thought by participants to be developed within them from a number of years playing sport (particularly team

sports) and led to a mindset of 'doing everything to your best ability,' which was perceived to aid in the overall process of rehabilitation.

Loss of fitness was highlighted in Evans et al. (2012) as a major stressor. 'Maintaining a positive attitude despite the circumstances, focusing on what can be done rather than what has happened' (Gucciardi et al., 2008) was seen to aid the athlete by increasing his motivation by allowing him to focus on the end result (full recovery). This attribute empowered the individual and centred his thoughts on 'what can be done, rather than what has happened,' providing him with the element of control over his rehabilitation. This prevented dwelling on issues, such as his loss of fitness, but provided with motivation to alter aspects of the injury which he had control over. For example one participant felt a loss of fitness after an operation, but a positive attitude allowed him to focus on protecting the recently operated area and then when it was stronger building the fitness back up, rather than just dwelling on the loss of fitness. This prevented any further damages which may have occurred if he has tried to build up his fitness too soon after the operation. Again Gucciardi et al's. (2008) attribute on self-belief provided athletes with an underlying knowledge they would recover which allowed them to put the injury into perspective. Issues such as 'loss of fitness' were also put into perspective and were seen as an issue that would pass with the injury if the rehabilitation was completed effectively.

Rehabilitation setbacks are perceived to be a major stressor to injured athletes (Evans et al., 2012). However 'having a winning desire which drives you to overcome obstacles and adversity both on the pitch and of it in an attempt to win/succeed' (Coulter et al., 2010) was seen to mitigate this stressor. It allowed the athlete to overcome injury, by making full recovery the only thing on their mind. This prevented them from dwelling on negative thoughts which may result from setbacks. A winning desire also aided by blocking out negative thoughts and self doubts. Jones et al's. (2007) attribute, 'using failure to drive success' was also prominent in overcoming any rehabilitation setbacks. Failures were seen as issues that needed to be overcome rather than just setbacks. With this mindset the negative thoughts and feelings which come from setbacks were more easily overcome.

However, although all of the attributes were perceived to aid the recovery process, some aspects of certain attributes prolonged rehabilitation. Both 'having an inner arrogance that makes you believe you can achieve anything you can set your mind to' (Jones et al., 2007) and 'an internal motivation and desire for competitive challenges and success and also putting the necessary change in place to achieve your vision of success' (Gucciardi et al., 2008) caused athletes to return to sport prematurely due to them being over-confident in their injury. This caused more damage in the injured area and forced the athlete to complete his rehabilitation fully, which due to the further damage took a longer period of time. It was however other attributes ('using failure to drive success') which triggered the realisation that they would need to complete the rehabilitation in full before playing competitively again.

5.2.2.3 Returning to sport

When returning to sport athlete's may fear re-injury (Rotella, 1985), playing to the same ability pre-injury (Crossman, 1997) and have decreased confidence in their ability (Williams & Roepke, 1993).

It was perceived that 'believing that your desire or hunger will ultimately result in fulfilling your potential' (Jones et al., 2007) also aided in protecting the body part once recovered and returning to sport. This was done by eradicating any technical faults which led to the injury, so as to prevent any further injuries caused in the same way. This altering/testing of technique was seen as a desire/hunger to stay fit and develop as an athlete to fulfil one's potential. Visualisation (Sheard, 2010) was utilised as a psychological skill to prevent these further injuries. By picturing how the injury occurred it became easier to alter the technique as the cause of injury was known. This only was used with injuries where the cause of injury was clearly apparent, such as landing on the side of the foot when bowling, causing an injury to the ankle. Both Cox (2002) and Johnston and Carroll (1998) supported this idea that testing the damaged area was crucial to overcoming the fear of re-injury.

Having 'self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face' (Gucciardi et al., 2008) aids athletes when returning to sport by giving them belief

that they can still compete at the same intensity and standard as before the injury occurred. This belief negates the stress and pressure that comes with returning to sport providing the athlete with the ability to focus on the physical act of bowling.

Decreased confidence in both ability and the injured area (Williams & Roepke, 1993) is a common issue among injured athletes. However 'maintaining a positive attitude despite the circumstances, focusing on what can be done rather than what has happened' (Gucciardi et al., 2008) is perceived to increase confidence in the injured area when returning to competitive sport. This confidence comes from increased trust in the injured area which allowed the individual to believe the area would not become re-injured when competing. Visualisation (Sheard, 2010) again aided in increasing both the trust and confidence in the injured area as by picturing oneself completing a skill successfully with the injured body part. This allowed the athlete to return to sport successfully as gaining confidence in the damaged area is crucial to an effective re-entry to sport (Evans et al., 2000).

5.3 Practical Implications:

Both studies have practical implications. With mental toughness being highlighted as one of the most important psychological characteristics in achieving performance excellence (Gould et al., 1987) these results are of high interest to athletes, coaches, parents and sport psychologists. Especially considering mental toughness can be developed (Connaughton et al., 2008). Knowing which characteristics are most effective in rehabilitation allows coaches to create environments both within and outside of sport, by using others to assist, facilitating the development of certain attributes. This allows the effective attributes to be developed, perhaps throughout youth sport, providing athletes with the attribute before injury occurs, so it can be utilised if needed.

By identifying the most effective characteristics and presenting them in a hierarchical manner allows sport psychologists to focus on the most important sub-components of mental toughness in relation to rehabilitation. This provides them with specific areas to work on with clients to provide support.

Understanding how the attribute aids rehabilitation provides specialists with information that may increase the effectiveness of any recovery process. With this information psychological skills training could be created to develop specific attributes seen as essential. Again this training could be utilised in individuals who are not injured, perhaps in youth sport, preparing individuals for injuries which may occur later in their career, providing them with the skills to overcome the injury in a more effective manner.

5.4 Strengths and weaknesses of study:

There were a couple of strengths to this study. Firstly it was the first time anyone had researched mental toughness characteristics in relation to injury rehabilitation qualitatively. The studies design was unique as it utilised the Ranking scales results to create an interview guide which provided rich data. Through this two-pronged process empirical knowledge was gained in how the most effective characteristics aid injury rehabilitation. The cross-case analysis of the qualitative research allowed common themes to emerge.

However, there were also limitations to the study. For one the small sample size employed in the interview process (five), however the researcher felt that the data generated coupled with the data that was used to create the interview guide (Ranking scale) was adequate as the data was specific and also rich in content. Within mental toughness literature there is also evidence of small sample sizes which did not negatively affect the results. An example is the six used in Thelwell et al. (2005) study.

Mental toughness is predominately researched among elite/super-elite athletes (Jones et al., 2002; Thelwell et al., 2005; Jones et al., 2007) due to the perception that they have the highest level of mental toughness. However this research was completed with athletes of lower ability due to the difficulty in contacting athlete of such standard. Also participant's mental toughness level was not tested, so their level of mental toughness was not known. However, participants were provided with key information around mental toughness, helping them to grow to understand the concept.

5.5 Directions for future research:

As this is the initial qualitative research to investigate mental toughness in rehabilitation there are a number future research directions. For one, this study could be performed with elite/super-elite participants to determine any differences. Earlier mental toughness research would suggest that some differences may be evident between abilities, but it would provide greater understanding of the key characteristics needed within injury rehabilitation. It has also been highlighted that characteristics differ between genders. This study could be completed with female participants to determine similarities and differences.

Although the 'core' categories are more prominent it has been documented in the literature that attributes differ between sports. Future research in other sports may determine those which are unique to sport-specific populations' rehabilitation or those which are perceived as 'core' characteristics.

Research should utilise the findings of this study to develop psychological skills training which should enhance the key characteristics of mental toughness needed for effective rehabilitation. This will create a more effective rehabilitation pathway for cricketers.

Finally this study found certain attributes prolonged rehabilitation as they caused participants to return to sport prematurely. Research into why they caused this and what can be done to prevent it should be completed.

5.6 Conclusion:

It is evident that the most effective mental toughness characteristics in relation to the recovery process come from a number of the core categories. This supports the notion that the core mental toughness characteristics can cover both performance and recovery. However there were some key differences in rank of the characteristics, suggesting that the most effective characteristics for rehabilitation differ from those crucial to performance.

Study B highlighted key areas where the characteristics aided athletes in their own rehabilitation. Key themes emerged in all three of the rehabilitation stages (Emotional response after injury, adherence to rehabilitation and returning to sport) which had increased the effectiveness of their rehabilitation process. However there were also characteristics which although did aid rehabilitation processes, also hindered them by prolonging the recovery duration through over-confidence in the injured area.

From this study a number of future research directions emerged which may increase the understanding around the area, which after the results acquired here is crucial.

6.0 Conclusion:

6.1 Concluding study:

To conclude, the present study was completed to identify the most effective mental toughness characteristics in relation to cricketer's injury rehabilitation and also how these attributes aided in their rehabilitation. The study highlighted ten characteristics perceived to be the most effective in ranked order. Many of these are similar to the characteristics which are perceived to be essential to performance excellence however there are some key differences in the order of importance (rank) of those perceived essential to performance and those essential to injury rehabilitation.

A greater understanding of how the most effective attributes aided cricketer's rehabilitation was developed through qualitative methods providing results which illustrate how the characteristics specifically aid the three stages of injury rehabilitation. The results from this study should be used to create environments and psychological training skill programmes to develop and enhance the key mental toughness elements which will allow them to embark on a more effective rehabilitation pathway after suffering an injury.

7.0 References:

- Anderson, M. B. (2001). Returning to action and prevention of future injury. In J. Crossman (Ed.), *Coping with sports injuries: Psychological strategies for rehabilitation* (pp. 162-173). New York: Oxford University Press.
- Alderman, R. B. (1974). *Psychological behaviour in sport*. Toronto: W. B. Saunders Company.
- Bianco, T. (2001). Social support and recovery from sport injury: Elite skiers share their experiences. *Research quarterly for exercise and sport*, 72, 376-388
- Bianco, T., Malo, S., and Orlick, T. (1999). Sport injury and illness: Elite skiers describe their experiences. *Research quarterly for exercise and sport*, 70, 157-169.
- Brewer, B. W. (2007). Psychology of sport injury rehabilitation. In G. S. Tennenbaum & R. C. Ecklund (Eds.) *Handbook of sport psychology* (3rd edition) (pp. 404-424). Hoboken, NJ: John Wiley & Sons.
- Brewer, B. W., Cornelius, A. E., Van Raalte, J. L., Petitpas, A. J., Sklar, J. H., Pohlman, M. H., Krushell, R. J., et al. (2000a). Attributions for recovery and adherence to rehabilitation following anterior cruciate ligament reconstruction: A prospective analysis. *Psychology & Health*, 15, 283-291.
- Bull, S. J., Shambrook, C. J., James, W. and Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of applied sport psychology*, 17, 209-227.
- Chan, C. S., and Grossman, H. Y. (1988). Psychological effects of running loss on consistent runners. *Perceptual and Motor skills*, 66, 875-993.
- Connaughton D. and Hanton S. (2009) *Mental toughness in sport: Conceptual and practical issues*. Routledge research. P. 317.
- Coulter, T. J., Mallett, C. J. and Gucciardi, D. F. (2010). Understanding mental toughness in Australian soccer: perceptions of players, parents and coaches. *Journal of sports sciences*, 28(7), 699-716.
- Cox, R. (2002). The psychological rehabilitation of a severely injured rugby player. In I. Cockerill (Ed.), *Solutions in sport psychology*. (pp 159-172). London: Thomson.
- Crossman, J. (1997). Psychological rehabilitation from sports injuries. *Sports medicine*, 23, 333-339.
- Daly, J. M., Brewer, B. W., Van Raalte, J. L., Petitpas, A. J., and Sklar, J. H. (1995). Cognitive appraisal, emotional adjustment, and adherence to rehabilitation following knee surgery. *Journal of sport rehabilitation*, 4, 23-30.

- Denscombe, M. (1998). *The good research guide*. Philadelphia, USA: Open University Press.
- Evans, L., Wadey, R., Hanton, S., and Mitchell, I. (2012). Stressors experienced by athletes. *Journal of sport sciences*, 30(9), 917-927.
- Evans, L., Mitchell, I. and Jones, S. (2006). Psychological responses to sport injury: A review of current research. *Literature review in sport psychology*.
- Evans, H., Hardy, L. and Fleming, S. (2000). Intervention strategies with injured athletes: An action research study. *The sport psychologist*, 14, 186-206.
- Gerber, M., Kalak, N., Lemola, S., Clough, P. J., Perry, J. L., Pühse, U., Elliot, C., Holsboer-Trachsler, E. and Brand, S. (2012), Are Adolescents With High Mental Toughness Levels More Resilient Against Stress?. *Stress and health*, 5, 35-42.
- Golby, J. and Sheard, M. (2004). Mental toughness and hardiness at different levels of rugby league. *Personality and individual differences*, 37, 933-942.
- Goldberg, A. S. (1998). *Sports slump busting: 10 steps to mental toughness and peak performance*. Champaign, IL: Human Kinetics.
- Gordon, S., and Lindgren, S. (1990). Psycho-physical rehabilitation from a serious sport injury: Case study of an elite fast bowler. *Australian journal of science and medicine in sport*, 22, 71-76.
- Gould, D., Hodge, K., Peterson, K. and Petlichkoff, L. (1987). Psychological foundations of coaching: Similarities and differences among intercollegiate wrestling coaches. *The sport psychologist*, 1, 293-398.
- Graham, D. and Yocon, G. (1990). *Mental toughness training for golf*. Lexington, MA: The Stephen Greene Press/Pelham Books.
- Granito, V. J. (2001). Athletic injury experience: A qualitative focus group approach. *Journal of sport behaviour*, 24, 63-82.
- Gray, D. E. (2004). *Doing research in the real world*. London: Sage.
- Gucciardi, D. F., Gordon, S. and Dimmock, J. A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of applied sport psychology*, 20, 261-281.
- Gucciardi, D. F., Gordon, S., Dimmock, J. A. and Mallett, C. J. (2009). Understanding the coach's role in the development of mental toughness

- perspectives of elite Australian football coaches. *Journal of sport sciences*, 27(13), 1483-1496.
- leveva, L. & Orlick, T. (1991). Mental links to enhanced healing: an exploratory study. *The sport psychologist*, 5(1), 25-40.
 - Johnson, L. H., and Carroll, D. (1998). The context of emotional responses to athletic injury: A qualitative analysis. *Journal of sport rehabilitation*, 7, 206-220.
 - Jones, G., Hanton, S, and Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The sport psychologist*, 21, 243-264.
 - Jones, G., Hanton, S. and Connaughton, D. (2002). What is this thing called mental toughness? An investigation with elite performers. *Journal of applied sport psychology*, 14, 211-224.
 - Larson, S. L., Clark, M. R., and Eaton, W. W. (2004). Depressive disorder as a long-term antecedent risk factor for incident back pain: A 13-year follow-up study from the Baltimore Epidemiological Catchment Area Sample. *Psychol. Med.* 34, 211-219.
 - Law, B., Driediger, M., Hall, C., and Forwell, K. (2006). Imagery use, perceived pain, limb functioning, and satisfaction in athletic injury rehabilitation. *NZ journal of physiotherapy*, 34, 10-16.
 - Leddy, M. H., Lambert, M. J., and Ogles, B. M. (1994). Psychological consequences of athletic injury among high-level competitors. *Research quarterly for exercise and sport*, 65, 347-354.
 - Loehr, J. E. (1982). *Athletic excellence: mental toughness training for sports*. New York: Plume.
 - Magni, G., Moreschi, C., Rigatti-Luchini, S., Merskey, H. (1994). Prospective study on the relationship between depressive symptoms and chronic musculoskeletal pain. *Pain*, 56, 289-297.
 - Meichenbaum D. and Turk D. C. (1987) *Facilitating treatment adherence*. New York. Plenum: p. 20.
 - Milne, M., Hall, C. R. and Forwell, L. (2002). Self-efficacy, imagery use, and adherence to rehabilitation by injured athletes. *Journal of sport rehabilitation*. 14(2), 150-167.
 - Miles, M. B., and Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd edition). Thousand Oaks, CA: Sage.

- Morris, C. M. (1998). *Sports injuries: Diagnosis and management*. Woburn: Reed education and professional publishing.
- Nash, R. (2006). Causal Network methodology: tourism research application. *Annals of tourism research*, 33, 918-938.
- Orlick, T. and Partington, J. (1988). Mental links to excellence. *The sport psychologist*, 2, 105-130.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd edition). Newbury Park, CA: Sage Publications.
- Pearson, L., and Jones, G. (1992). Emotional effects of sports injuries: Implications for physiotherapists. *Physiotherapy*, 78, 762-770.
- Rotella, R. J. (1985). The psychological care of the injured athlete. In L. Bunker, R. Rotella, and A. Reilly (Eds), *Sport psychology: psychological considerations in maximising sport performance* (pp. 173-187). Ann Arbor, MI: Mcnaughton & Gunn.
- Roy-Byrne, P. P., Davidson, K. W., Kessler, R. C., Asmundson, G. J., Goodwin, R. D., Kubzansky, L., Lydiard, R. B., Massie, M. J., Katon, W., Laden, S. K., and Stein, M. B. (2008). Anxiety disorders and comorbid medical illness. *Gen. Hosp. Psychiatry*, 30, 208-225.
- Sheard, M. (2010). A cross-national analysis of mental toughness and hardiness in elite university rugby league teams. *Perceptual and motor skills*, 109, 213-22.
- Teitelbaum, D. (1998). *The ultimate guide to mental toughness: how to raise your motivation, focus and confidence like pushing a button*. Kensington, MD. Demblin Communications, Inc.
- Theodorakis, Y., Malliou, P., Papaioannou, A., Beneca, A. and Filactakidou, A. (1996). The effect of personal goals, self-efficacy and self-satisfaction on injury rehabilitation. *Journal of sport rehabilitation*, 5, 214-223.
- Thelwell, R., Weston, N. and Greenlees, I. (2005). Defining and understanding mental toughness in soccer. *Journal of applied sport psychology*, 17, 326-332.
- Tutko, T. A. and Richards, J. W. (1971). *Psychology of coaching*. Boston, MA: Allyn and Bacon, Inc.

- Wiese-Bjornstal, D. M., Smith, A. M., Shaffer, S. M., and Morrey, M. A. (1998). An integrated model of response to sport injury: psychological and sociological dynamics. *Journal of applied sport psychology, 10*, 46-69.
- Williams, J. M., and Roepke, M. (1993). Psychology of injury and injury rehabilitation. In R. N. Singer, M. Murphy and K. Tennant (Ed.), *Handbook of research on sport psychology* (pp. 815-839). New York: Macmillan.
- Williams, R. M. (1988). The U.S. open character test: good strokes help. But the most individualistic of sports is ultimately a mental game. *Psychology today, 22*, 60-62.

8.0 Appendices

Appendix A: Informed consent form

CARDIFF METROPOLITAN UNIVERSITY

INFORMED CONSENT FORM

CSS Reference No:

Title of Project: Which Mental toughness characteristics are most effective in aiding the injury rehabilitation in cricketers?

Name of Researcher: Elliot Lowe

Participant to complete this section: Please initial each box.

1. I confirm that I have read and understand the information sheet dated 01/05/2012 for this evaluation study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that it is possible to stop taking part at any time, without giving a reason.
3. I also understand that if this happens, our relationships with the Cardiff Metropolitan University, or our legal rights will not be affected.
4. I understand that information from the study may be used for reporting purposes, but I will not be identified.
5. I agree to take part in this study on mental toughness of elite cricketers in relation to injury rehabilitation?

Name of Participant:

Name of person taking consent:

Date:

Signature of person taking consent:

Appendix B: Ranking Scale

Ranking Scale

This study investigates the most effective mental toughness characteristics for injury rehabilitation in cricketers which would allow them to recover from injury in the quickest and most effective manner. There are 124 mental toughness characteristics but this has been cut to 48 (those which are related to injury rehabilitation).

Below is a table which contains the 48 mental toughness characteristics/attributes (taken out of the relevant literature) and a description of the characteristics/attributes related to injury rehabilitation in cricketers.

It would be appreciated if anyone who plays cricket and has had an injury (which caused missing sport for a minimum of a week) could complete this tick sheet. To complete it rank the ten most effective attributes in relation to your rehabilitation (1 being the most effective...10 being the tenth most effective).

Attribute	Example (if needed)	Researcher	Rating scale
Remaining fully focused in face of personal life distractions.	Sticking with your rehab programme even with serious family issues going on.	Jones et al., (2002)	
Pushing back the boundaries of physical and emotional pain, while still maintaining technique and effort under stress.	Being able to complete drills and stretches to optimal effectiveness through serious pain.	Jones et al., (2002)	
Having an inner arrogance that makes you believe that you can achieve anything you set your mind to.	Believing you are able to rehabilitate effectively for a certain date even when others doubt or are sceptical that you can.	Jones et al., (2007)	
Believing that your desire or hunger will ultimately result in fulfilling your potential.	Knowing that you will come through this injury rehab.	Jones et al., (2007)	
Ensuring that achievement of your sport's goal is the number one priority in your life.	Rehabilitating effectively is the most important thing at the present time.	Jones et al., (2007)	
Recognizing the importance of knowing when to switch on and off from your sport.	Knowing the times you need to be fully engaged with your rehab and when no to be.	Jones et al., (2007)	
Having the patience, discipline and self control within the required training for each specific developmental stage to allow you to reach your full potential.	Being aware of the training you are doing to return to full fitness and knowing when to alter and develop this training. Having ownership of your rehab programme, not just being told what to do and when	Jones et al., (2007)	
Remaining in control and not controlled.	Making sure that the rehab you are going through is controlled by you and not others who may be pushing you too hard, or not enough	Jones et al., (2007)	
Using all aspects of a very difficult training environment to your advantage and pushing yourself to the limit.	Making sure you are using all that is available to you to rehabilitate effectively and as quickly as possible.	Jones et al., (2007)	
Loving the bits of training that hurt.	Training hard through the pain to optimise rehab stretches and strength building.	Jones et al., (2007)	
Having a killer instinct to capitalise on the moment when you know you can win.	Being aware of the correct time to begin/end stages of rehab and begin others.	Jones et al., (2007)	
In certain performances, remaining focused on	Make sure that the focus in rehab is performing	Jones et al.,	

processes and not solely outcomes.	stretches effectively and appropriately rather than, for example, looking to lift heavier weight, which may be damaging.	(2007)	
Awareness and control of thoughts and feelings.	Not becoming emotional or stressed with the regime but being aware of these issues and channelling them.	Jones et al., (2007)	
Recognising and rationalising failure and picking out learning points to take forward.	Being aware when something has not worked and learning from this so it does not happen again.	Jones et al., (2007)	
Using failure to drive success.	Learning from any mistakes made and using it as a form of motivation in your rehab.	Jones et al., (2007)	
Knowing when to celebrate success and then stop and focus on the next challenge.	Remaining grounded in your rehab, knowing that work always still has to be done until you are playing sport again.	Jones et al., (2007)	
Self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face.	Knowing that you have the physical and mental capacity to progress through your rehab effectively, even with obstacles occurring.	Gucciardi et al., (2008)	
A philosophy characterised by always working hard and pushing yourself through demanding situations in competition, training and preparation to achieve your goals and vision.	To keep going through challenging circumstances in your rehab due to your innate attitude towards achieving your goal.	Gucciardi et al., (2008)	
Identifying your goals, what needs to be done to achieve those goals and adjusting these goals when faced with an obstacle or adversity.	Knowing what you need to do and when to alter these needs in order to rehabilitate most effectively.	Gucciardi et al., (2008)	
Doing everything in your preparation and leaving no stone unturned to ensure that you are prepared mentally and physically.	Making sure that before returning to sport after injury that you have done everything within your power to cope with the demands of returning to the game	Gucciardi et al., (2008)	
Managing your time efficiently to balance the many demands associated with injury rehab to get the very best out of yourself.	Having effective time keeping making the rehab programme as effective as possible. Have timescales for certain stages of the rehab.	Gucciardi et al., (2008)	
Placing great importance and significance on personal values relevant to becoming a better person and athlete.	Personal values that drive you to rehabilitating effectively due to it being important to yourself.	Gucciardi et al., (2008)	
Taking an honest stance when self appraising your own performances and not making excuses when you perform poorly.	Being truthful to yourself on how a rehab session has gone and not making excuses but taking motivation from it for next session.	Gucciardi et al., (2008)	
Personal pride in your preparation, and training and competitive performances.	Taking ownership of your programme and being proud in what you are attempting to achieve and how.	Gucciardi et al., (2008)	
Taking ownership and responsibility for your behaviour and not making excuses for poor performances.	Taking ownership of your programme and being honest with yourself when you have performed poorly.	Gucciardi et al., (2008)	
An internal motivation and desire for competitive challenges and team success, and also having the desire to put the necessary things into practice to achieve your vision of success.	Taking motivation from within you to apply the necessary changes so as to achieve rehabilitation for both yourself and the teams benefit.	Gucciardi et al., (2008)	
Having the competitive desire and looking forward to the challenge of testing your skills against the best.	Having the drive to get back to full fitness so as to test your skills against others in competition.	Gucciardi et al., (2008)	
An unshakable, tough attitude directed towards becoming a champion of the game.	Knowing what you need to do to achieve effective rehabilitation and doing it.	Gucciardi et al., (2008)	
An enduring discipline of the mind in all situations to do everything in your life that needs to be done to achieve your goals.	A mental capacity to overcome any situation that comes up to achieve recovery from injury.	Gucciardi et al., (2008)	
Maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened.	Allowing yourself to keep moving forward with your rehabilitation rather than becoming stuck in one place when something doesn't go according to plan.	Gucciardi et al., (2008)	
Having a professional attitude in every sense of the word – in particular, towards your diet, training,	Being driven to succeed in whatever aspect of the sport. Not just performing but at the aspects which	Gucciardi et al., (2008)	

leadership, rehabilitation and competition.	combine to improve performance.		
Acknowledge that sacrifices are inevitable if you want to achieve both individual and team success and understand what the potential sacrifices you might have to make are.	Be aware of what is good for team success as well as for your own success.	Gucciardi et al., (2008)	
Having that single mindedness to focus and concentrate on the job at hand and what you want to achieve despite internal or external pressures, obstacles or adversities.	Being driven and become blinkered to any other obstacles that might be on your pathway. You have one goal, which is to get fit to play sport again.	Gucciardi et al., (2008)	
The ability to overcome adversities with an exceptional work ethic and persevering determination to showcase your mental and physical ability.	With working hard you are able to get a rehab programme back on track, even after a decrease in the effectiveness of the programme. This is due to your drive to show others your physical and mental capacity.	Gucciardi et al., (2008)	
Being able to execute skills and procedures under pressure and stress, and accepting these pressures as challenges to test yourself against.	Coping with the programme when under various pressures and feeding of these pressures to bring the best out of yourself.	Gucciardi et al., (2008)	
The ability to override and block out negative thoughts and self doubts concerning your mental and physical state.	Not allowing yourself to dwell on negative thoughts at any stage in the programme which may hinder your progress.	Gucciardi et al., (2008)	
An honest and accurate self awareness and understanding of your emotions when under pressure or facing an obstacle, and the ability to manage emotions to enhance performance across all situations.	Understanding what your emotions tell you in your rehab process, especially when you are under pressure. And learn to manage and mitigate these emotions to produce the best performance	Gucciardi et al., (2008)	
Being able to recognise and understand the obstacles, challenges and pressures involved and accurately self assessing your individual performance.	The ability to adapt in the face of any obstacle so that you can combat the issue with the most efficiency to your recovery process.	Gucciardi et al., (2008)	
Having the ability to perceive and understand both the training and competitive environment, and having self awareness to identify and understand your role within the team and any potential adversities you may face.	Knowing your capabilities within your programme. For example when to return to sport or not. This will have an impact on both you and your team mates.	Gucciardi et al., (2008)	
Understanding and accepting responsibility for your role in the team, which entails putting team success before individual success.	Knowing your importance to the team and so realising the need for you to play and so how quickly the injury must be recovered from.	Gucciardi et al., (2008)	
Having a winning desire which drives you to overcome challenge and adversity both on and off the pitch to succeed/win.	Attempting to complete your rehabilitation as quickly and effectively as you can so that you can overcome that challenge and also get back to playing.	Coulter et al., (2010)	
Persevering through adversity both in and out of your rehabilitation with 'bullet proof' determination to stay focused and to maintain a consistency high level of performance.	Always approaching rehab sessions with a focused mind to sustain a consistence high level. This will take huge amounts of determination but will make the programme more effective.	Coulter et al., (2010)	
Having an ability to read the situation, having strong tactical awareness, and understanding your role on the pitch to execute decisions or critical moments.	Being aware of the situations that you are in within your rehabilitation programme and knowing what to do at the right moments. Linked to changing intensity of sessions or returning to sport.	Coulter et al., (2010)	
A willingness to take risks both on the pitch and in one's life/career to increase the opportunity of success.	Having the capacity to take risks within sessions and also in you rehab programme to increase the opportunity of success. The ability to judge if it will be a successful risk is also crucial.	Coulter et al., (2010)	
Visualisation	The ability to use mental imagery/visualisation to help motivation. For example visualising yourself as playing sport again may motivate you to increase intensity in your rehab sessions.	Sheard, (2010)	

Independence	Taking ownership for your recovery programme, performing sessions on your own, not only when with physio/rehab manager etc.	Bull et al., (2005)	
'Never say die' mindset	NA	Bull et al., (2005)	
'Go the extra mile' mindset	NA	Bull et al., (2005)	

This information will be used to create an interview guide to allow more information on this topic to be gained.

If your injury caused you to have to rehabilitate for a **month** or over (by rehabilitating I mean actively completing sessions with a physiotherapist etc) and you are happy to be interviewed about this rehabilitation please leave a contact email/number underneath.

Thank you for taking time to fill in this sheet. It is extremely helpful.

Appendix C: Interview guide

Interview guide

Which mental toughness characteristics are most effective in aiding injury rehabilitation in cricketers?

Name:

Subject:

Age:

Standard currently playing:

Injury and rehabilitation duration:

Tel no:

Interview date:

Start time:

Finish time:

Section 1:

Introduction (not recorded)

Hello, I'm Elliot Lowe, an undergraduate student from the school of sport, Cardiff Metropolitan University. Thank you for agreeing to participate in this interview study. This research focuses on which mental toughness characteristics are most effective in aiding injury rehabilitation among cricketers. It will also look into how these mental toughness characteristics aid the recovery process and why. This project will hopefully build on both mental toughness and the psychology of injury research in an attempt to make athletes more efficient in recovering from injury.

The information in this study will be used in two ways: First, the information will be used for my undergraduate dissertation and secondly, the results will be available and explained to all those who were interviewed for this study. This may enable them to enhance future rehabilitation programmes by utilising the findings of this study.

All your interview information will remain completely confidential. I may use selected quotes from the interviews in order to emphasise important concepts but these will remain anonymous, making sure your identity is protected at all times. A recording device will be used for the interview to get accurate information, and make the interview

process more efficient and reliable. The recording will also be used to make a typed transcript for future reference.

Participant's rights (not recorded)

As a participant within this study you have several definite rights. For one, your participation in this interview is entirely voluntary, you can decline to answer any questions or stop the interview at any time. There are no right or wrong answers to the questions you will be asked, however if there are any questions you do not feel comfortable answering it would be more beneficial to the study if you declined to comment rather than tell me what you think others might think. If this is the case simply state 'no comment' to the question and we will move on to the next question. If you have any questions as we go please feel free to stop and ask them. Finally if you feel that any of the questions bring back any of the feelings or emotions you had when injured or rehabilitating, let me know and the interview will be stopped.

In the interview I will be discussing the top ten mental toughness characteristics (see table in section 3) that emerged from the rating scale (which you completed) individually. This will involve you thinking back to your rehabilitation and focusing on how these characteristics aided you in your recovery process. If you felt that certain characteristics did not help you, then state this.

Section 2:

Introduction (recorded)

We will begin the interview with a few general questions to get you into the flow of the interview. They will focus on your cricketing career, the injury you experienced and the rehabilitation you completed.

- When did you start playing cricket?
- What club/university/county do you play for now?
- How was your last season?
- What is your greatest achievement to date?
- When did the injury occur?
- How did you feel the rehabilitation process went?
- What types of rehabilitation did you go through?

Section 3:

Most effective mental toughness characteristics to aid injury rehabilitation

The ten characteristics below emerged from the rating scale that you completed. It was completed by a number of other cricketers and the data was analysed, identifying

these as the ten most effective to aiding the recovery process. This interview will help to determine these characteristics reliability and validity as the most effective aid to cricketers.

	Characteristic:	Example:
1	Maintaining a positive attitude despite the circumstances and focusing on what can be done rather than what has happened.	Allowing yourself to keep moving forward with your rehabilitation rather than becoming stuck in one place when something doesn't go according to plan.
2	Self-belief in your mental and physical ability under pressure and in your ability to persevere and overcome any obstacle and/or challenge that you may face.	Knowing that you have the physical and mental capacity to progress through your rehab effectively, even with obstacles occurring.
3	Visualisation.	The ability to use mental imagery/visualisation to help motivation. For example visualising yourself as playing sport again may motivate you to increase intensity in your rehab sessions.
4	Using failure to drive success.	Learning from any mistakes made and using it as a form of motivation in your rehab.
5	Having an inner arrogance that makes you believe that you can achieve anything you set your mind to.	Believing you are able to rehabilitate effectively for a certain date even when others doubt or are sceptical that you can.
6	An internal motivation and desire for competitive challenges and team success, and also having the desire to put the necessary things into practice to achieve your vision of success.	Taking motivation from within you to apply the necessary changes so as to achieve rehabilitation for both yourself and the teams benefit.
7	Believing that your desire or hunger will ultimately result in fulfilling your potential.	Knowing that you will come through this injury rehab.
8	Awareness and control of thoughts and feelings.	Not becoming emotional or stressed with the regime but being aware of these issues and channelling them.
9	The ability to override and block out negative thoughts and self-doubts concerning your mental and physical state.	Not allowing yourself to dwell on negative thoughts at any stage in the programme which may hinder your progress.
10	Having a winning desire which drives you to overcome challenge and adversity both on and off the pitch to succeed/win.	Driven to complete your rehabilitation as quickly and effectively as you can so that you can overcome that challenge and also get back to playing.

Questions and probes

- Did this characteristic aid you in your rehabilitation?

- If so why was this? And how did it aid you?
 - Could you give specific examples on how it aided you?
- If not, how do you think this attribute would assist in recovery?
 - Why do you think this?

Section 4: Conclusion

Advice section

- What advice would you give to an individual who had just been injured and was about to embark on a rehab programme?
 - Would you use the information highlighted within this interview?
- In the future, if injured again (hopefully does not happen), would you use this information to facilitate your rehabilitation?

Validity section

- How did you think this interview went?
- Did you feel you could tell the whole story of your rehabilitation programme?
- Do you feel we failed to discuss any important factors (such as certain characteristics from the rating scale)?
- Do you have any questions or suggestions about the interview itself?

Thank you for participating in this stage of the study!