A Behavioural Approach to Mental Toughness Development

in Australian Football

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Master of Applied Psychology (Sport and Exercise)

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Declaration

I, David Robert Anthony, certify that:

This thesis has been compiled in accordance with The University of Western Australia Graduate Research School (GRS) guidelines to submit this thesis as a series of manuscripts. As a result, there is some degree of redundancy between the chapters, however, consistent with the GRS guidelines, the manuscripts have been amended for presentation and, where possible, some of the redundancy has been removed so as to not disrupt the flow of the thesis. Chapter 1, as the general introduction, provides explanations for the links between the manuscripts. Additionally, although the present thesis is my work, active voice is used (e.g., “we” and “our”, instead of “I” and “my”), in accordance with scientific guidelines, and in recognition of the collaboration with co-authors that have contributed both to the published work and the work prepared for publication.

This thesis has been substantially accomplished during enrolment in the degree. This thesis does not contain material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution. No part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of The University of Western Australia and where applicable, any partner institution responsible for the joint-award of this degree. This thesis does not contain any material previously published or written by another person, except where due reference has been made in the text. The work(s) are not in any way a violation or infringement of any copyright, trademark, patent, or other rights whatsoever of any person. The research involving human data reported in this thesis was assessed and approved by The University of Western Australia Human Research Ethics Committee (Approval #RA/4/1/6646). Written participant consent has been received and archived for the research involving participant data reported in this thesis.

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Date: 9 Dec, 2016
Abstract

The purpose of this thesis was to extend the empirical evidence in the area of mental toughness (MT) development and intervention programs, specifically in the context of Australian football (AF), and with a focus on behavioural dimensions. The specific aims of this PhD project were fourfold; first, to explore observable mentally tough behaviours (MTb) from the perspective of experienced informants and athletes in an elite AF environment; second, identify a means of evaluating and rating these MTb; third, evaluate the association between MTb and performance; and finally, test the effectiveness of a season long coach education program that aimed to increase the frequency of athletes’ displays of these MTb across training, competition, and development contexts.

Following a general introduction in Chapter 1, I conduct a systematic review and synthesis of extant qualitative literature pertaining to MT development using a meta-study approach, and integrate the key themes with existing theory to propose a Bioecological Model of MT Development. This model provides an opportunity to shift the focus of development to identifying what it is a mentally tough athlete does more consistently when compared to an athlete considered less mentally tough, regardless of context or time. Chapter 3 reports on a qualitative approach to explore the display of MTb within an AF environment, with the aim being to generate insight into those observable behaviours more frequently displayed by mentally tough athletes when compared to athletes considered less mentally tough across different contexts (e.g., training, competition, and development settings). Noting that MTb may be better conceptualised as a unique concept that transmits the influence of MT into high performance, a working definition and five main themes relating to MTb are identified. In extending our understanding of MTb across different contexts, these findings provide preliminary support for the proposition that there exists a collection of MTb that are displayed more frequently by athletes considered mentally tough.
Using the collection of MTb from Chapter 3, we describe the development of the Mentally Tough Behaviour Scale (MTbS) to allow for the measurement of MTb across different contexts in an AF environment in Chapter 4. The results provide initial support for the MTbS as a useful measure of MTb in an AF environment, with a relationship between MTb and consistency of performance identified. Chapter 5 draws on these aforementioned foundations and other formative fields in psychology to report on the development, application, and evaluation of a behavioural coaching approach to MT development. Using Whitmore’s (2002) GROW behavioural coaching model and a single-case research design, the primary aim of the program is to increase the frequency of coach-observed MTb in a group of elite AF athletes across a football season, with secondary aims to explore the effects on MT and performance. The results showed some changes in the frequency of MTb, MT, and performance across the season. In the final chapter, the information presented in the earlier chapters is reviewed, including the limitations and implications of this work, as well as suggestions for future research.

This thesis consists of an analysis of data collected from participants engaged in elite and sub-elite AF environments across three separate studies using a range of empirical methods. It extends our understanding of a behavioural approach to MT development in a number of ways, and offers a novel approach to measure and enhance sporting performance in athletes from a psychological perspective. It is proposed that these strategies can be adapted and applied across a range of sports and levels of competition to better develop MT, with the continued exploration necessary to further our understanding of the concept.
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Authorship Declaration

This thesis contains work that has been accepted and published, currently under review, as well as prepared for submission.

**Details of the work:**

**Peer-reviewed manuscript accepted and published** in the International Review of Sport and Exercise Psychology:


**Location in thesis:**

Chapter 2: Literature Review.

**Student contribution to work:**

Initial literature review, meta-study processes, articulation of the conceptual and theoretical development of the proposed framework, identification of future research directions, manuscript write-up.

**Co-author signatures and dates:**

8 Dec, 2016 8 Dec, 2016 7 Dec, 2016

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**Location in thesis:**

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**Student contribution to work:**

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Chapter 5: *The Implementation and Evaluation of a Mental Toughness Development program in Australian Football*.

**Student contribution to work:**

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**Coordinating supervisor signature:**

Date: 8 Dec, 2016
Conference Proceedings Arising from this Thesis


Chapter 1: Introduction
1.0 Background

The development of mental toughness (MT) is regarded as a necessary requirement for performers across many achievement settings (e.g., Bell, Hardy, & Beattie, 2013; Cowden, 2016; Drees & Mack, 2012; Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015). Subsequently, attempts to better understand what constitutes MT, or what collection of attributes a mentally tough performer possesses continue. Australian football (AF; see Appendix 1 for additional information) is widely considered a very challenging game on a number of levels, with the team captains from the highest tier of competition highlighting that there are increasing physical and mental demands every year (Pierik, 2013).

It is accepted that developing talent and improving performance is a complex process requiring a multidisciplinary approach across the areas of physiology, biomechanics, motor learning and psychology (Gulbin, Croser, Morley, & Weissensteiner, 2013; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). A question that can be asked is what makes a good AF athlete, and what characteristics will allow them to perform and continue to improve in the dynamic, physical, all-consuming, and intrusive modern world of professional football? Within both AF and other sport environments, MT is one such characteristic often discussed by coaches, administrators, athletes and the media as one pre-requisite for success.

In May 2013, Brad Scott, the Head Coach of the North Melbourne Australian Football League (AFL) Club, reported that it was his team’s lack of MT that lost them their fourth close game of the season: “We will put them through tough situations repeatedly and see who stands up. Those who get dropped will drop themselves, those who retain their positions will retain their positions” (Bowen, 2013). What can be interpreted as a desire to either identify and/or develop MT in his players, Scott intimated that doing so will positively affect performance. Interestingly, exposing players to ‘tough situations’ may be associated with MT development (e.g., Bell et al., 2013), but what a suitably ‘tough situation’ is in practice, may vary across coaching staff, or even among players with different levels of playing experience.
Furthermore, what constitutes ‘standing up’, or what it looks like, may be different depending on who you talk to, with little empirical consensus to date on how such behaviours are related to MT (cf. Andersen, 2011). Notably, identifying exactly what constitutes desirable and observable mentally tough behaviours (MTb) in a performance environment, how they can be developed, and their effect on objective performance remains largely unexplored.

1.1 Statement of the Problem

At the commencement of this project in June 2013, there were less than five published examinations of the effectiveness of MT intervention or development programs (Connaughton, Thelwell, & Hanton, 2011). Since this time, there have been relatively few empirical articles reporting on MT development interventions with varied success (e.g., Mahoney, Ntoumanis, Gucciardi, Mallett, & Stebbings, 2016), as well as some additional research that has sought to explore how MT might be developed (e.g., Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014; Weinberg, Freysinger, Mellano, & Brookhouse, 2016). Even in light of this recent information, there remains limitations in our conceptual understanding of what it is stakeholders such as athletes, coaches, sport psychologists, and/or sports administrators should actually do to develop MT or, more specifically, when they should do it. Therefore, as a necessary first step, enhanced clarity regarding both the developmental factors (e.g., who, when, and where) and processes (e.g., what and how) of MT has the potential to lead to increased confidence and receptiveness to interventions among these stakeholders (e.g., Campbell et al., 2000). It may be that MTb is a distinct concept, and exploring the relationship between performance, MTb, and MT from alternative perspectives offers an opportunity for increased clarity. Subsequently, exploring the utility of developmental models previously shown to positively affect performance, such as behavioural coaching, and the strategies to evaluate these programs through applied research is important to further our conceptual understanding of MT development.
1.2 Thesis Aims

The general aim of this thesis was to extend the empirical evidence in the area of MT development and intervention programs, specifically in the context of an AF environment and with a focus on behavioural dimensions. Following this general introductory chapter, Chapter 2 discusses a systematic review of the existing research on MT development programs using a meta-study approach. Four key themes were identified: personal characteristics, interactions with environment, progressive development, and breadth of experience. Drawing from established psychological theories, we propose a Bioecological Model of MT Development that encompasses interdependent interactions among the person, proximal processes, context, and time. This model offers a summary for the current state of affairs in MT development. It also highlights that there is benefit in shifting the focus of MT development research to identifying what a mentally tough athlete does more consistently when compared to an athlete considered less mentally tough, regardless of context or time.

Building on the empirical understanding of MT development, three original investigations follow this literature review, which address three novel research questions in the area of MT development. We first seek to identify the behavioural dimensions of MT through A Qualitative Exploration of Mentally Tough Behaviour in a High Performance Environment (Chapter 3). Two qualitative studies report on the displays of MTb across different contexts (e.g., training, development, and competition settings) within an AF environment. The aim of these studies was to generate insight into those observable behaviours more frequently displayed by mentally tough athletes across a variety of performance contexts. We also sought to identify a working definition of MTb, proposing that it is best conceptualised as a distinct concept that transmits the influence of MT into high performance. The first study involved experienced full-time football operations staff (coaches, sport scientists, and administrators), and explored their perceptions of athletes’ displays of MTb. Five main themes relating to MTb were identified: Adaptive development,
consistent training conduct, composed performance actions, responsible and accountable, and team supportive. The second study utilised the perceptions of experienced athletes’ identified as mentally tough, and their reflections of the lived experiences of enacting these MTb to extend our understanding of these desirable behaviours across the different contexts. The findings provide preliminary support for the proposition that there exists a collection of MTb that are displayed more frequently by AF athletes considered mentally tough when compared to athletes considered less mentally tough. Additionally, incorporating the findings from these studies, we propose a working definition of MTb; A purposeful yet adaptable verbal or physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals. We also identify a number of necessary and sufficient qualities that can assist in the future identification of MTb in other environments.

In an attempt to identify a means by which to evaluate the frequency of MTb and its relationship with performance, Chapter 4 describes The Development of the Mentally Tough Behaviour Scale. The aim was to extend the collective understanding of MT development by developing a systematic observation checklist that can assist with the behavioural analysis of MTb. The Mentally Tough Behaviour Scale (MTbS) was developed to allow for measurement of the frequency of MTb across the different contexts (e.g., competitive matches, training, and development) in a high performance environment. The MTb identified and discussed in the third chapter were used as the foundation for this systematic observation checklist. A multi-study approach was adopted: Experienced academics were used to assess the adequacy of our sampling of the content domain of MTb; AF coaches and athletes to test the reliability and factorial validity of the scale scores; and a smaller sample of AF coaches and athletes to assess the stability of the MTbS and its relationship with performance. The results provided initial support for the MTbS as a useful measure of MTb in an AF environment.
Drawing together the information provided in Chapter’s 2 to 4, as well as research from formative fields in psychology (e.g., behaviourism) and other performance-related environments (e.g., organisational settings), Chapter 5 reports on *The Implementation and Evaluation of a Mental Toughness Development Program in Australian Football*. The primary aim of this program was to increase the frequency of coach-observed MTb in a group of elite AF athletes across a football season, with secondary aims to improve both coach and self-rated MT, as well as overall athlete performance in competitive matches. A non-experimental A-B-A single-case research design (SCD) was used, identified as valuable when exploring new research areas and working with unique populations such as elite athletes (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013). Incorporating Whitmore’s (2002) GROW behavioural coaching model as the framework for a coach-targeted development program, we explored the effects of perceptions of MTb, as well as MT and performance.

There are four main parts to this chapter; first, the theoretical background and application of the framework for the MTb program is discussed, with a focus on a description of the processes involved in applying this intervention within an AF environment; second, the results relating to the effectiveness of this intervention program are reported using a SCD with a sample that includes AF coaches and athletes; third, a reflective account of the implementation of the MTb program in an elite sport environment is provided; and finally, due to the limitations often encountered when conducting research in an elite sporting environment (Barker, McCarthy, & Jones, 2011; Bell, Hardy & Beattie, 2013), a sample of case comparisons are offered to provide an individualised perspective on the effectiveness of the intervention on improving performance. The results showed changes in the frequency of MTb, as well as ratings of MT and performance across the season. Strengths, limitations and future directions are described.

Finally, Chapter 6 offers a summary and a number of conclusions from the findings of this thesis. We propose some practical implications for developing MT in an AF environment,
Ch. 1: Introduction

as well as the opportunities for transferability to other sport environments and recommendations for future research.

1.3 Contributions of this Research

The avenues for competitive advantage in elite sport are constantly narrowing as sport science continues to grow. One area left under-developed relates to evolving psychological skills programs to improve and maintain consistency of performance at the higher levels (e.g., Barker et al., 2013). This thesis extends our empirical understanding in the under-developed area of MT development or intervention programs in a number of ways, including MTb as a unique concept. It furthers our knowledge through the identification of a number of frequently reported behaviours observed in athletes considered mentally tough across training, development, and performance contexts in an AF environment. It also offers a novel approach to enhancing sporting performance through the utility of established behavioural coaching models as one of the frameworks that can increase the frequency of desirable behaviours, or MTb in athletes. Noting that the strategies for development were evaluated in an elite AF environment, it is proposed that these strategies can be adapted and applied across a range of sports and levels of competition to better develop MT. It is expected that the continued exploration of how, when, where, and with whom we can best target the development and evaluation of MTb is important from both a theoretical and applied perspective, for the betterment of athlete and consultant psychologist performance.
1.4 References


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soccergacademy. *Qualitative Research in Sport, Exercise and Health, 6*, 329-347. doi: 10.1080/2159676X.2013.857708


Appendix 1A: A Brief Description of Australian Football

Australian football (AF) is a competition played between two teams of 22 athletes, with a maximum of 18 athletes from each team on the grass, oval-shaped field (see Figure 1.1) at any one time. The dimensions of the field are usually between 135-185m long and 110-155m wide, consisting of a 40m x 40m centre square, a curved “fifty metre” line (e.g., the red and blue lines in Figure 1.1) which is 50m away from the goal line. There is also a 10m x 6m (approx) goal “square” and four scoring posts, each approximately 6.4m apart, at either end of the field.

Figure 1.1: An Australian football playing field.

The objective of an AF competitive match is to have scored more points than your opponent after 120 minutes of playing time, broken into four quarters of approximately 30 minutes each. The athletes score points by moving an AF-specific spheroid ball between the posts at their team’s assigned end of the field. Six points are scored when an athlete kicks the ball through the two middle posts, whereas only one point is scored when the ball passes between a middle post and an outer post, or when the ball is either touched by an athlete after being kicked, or “rushed through” the middle posts by the opposition. The ball is allowed to travel in any direction by kicking, tapping, or hand passing the ball (using one hand to hold
the ball and the other to fist it). When an athlete catches the ball on the full from a kick, he/she is awarded a “mark”. Although not mandatory, the athlete can stop where he/she “marked” the ball, and take up to 10 seconds to decide on the best course of action before moving the ball on, ideally to a teammate. Otherwise, if receiving a hand pass or tap, the athlete is required to continue moving the ball by kicking or hand-passing, or alternatively by running with the ball in hand, during which he/she must bounce the ball on the ground every 15m, or have a penalty free-kick awarded to the other team.

Defensively, athletes are allowed to impede or stop an opponent carrying the ball by either tackling the athlete with the ball below the shoulders and above the knees, or side-bumping the opponent using their hip in a contest for the ball. Contact in contests must never involve contact to the head, otherwise the athlete who experiences the contact will be awarded a penalty free-kick. When the ball is kicked out of play on the full, or deliberately moved across the boundary line by an athlete, the opposition side receive a penalty free-kick from the position it crossed the boundary line, otherwise the ball is thrown back in by an umpire monitoring the boundaries.

Up to three field umpires, four boundary umpires, and two goal umpires officiate over general play, with their role to keep the match fair and within the rules. The field umpires start play at the beginning of each quarter and following a goal being scored by bouncing the ball in the middle of the centre square. They blow a whistle to stop play when the ball is in dispute in a scrimmage, intentionally or unintentionally crosses the boundary line or goal line, when an athlete “marks” the ball, or to allocate a free-kick to athletes for a number of rule indiscretions (e.g., throwing as opposed to hand-passing the ball, incorrect tackle, tripping an opponent).
Chapter 2: A Meta-Study of Qualitative Research on Mental Toughness Development (Literature Review)

This chapter is based on the peer-reviewed paper accepted and published in the International Review of Sport and Exercise Psychology:

2.0 Abstract

Mental Toughness (MT) is considered a necessary ingredient for high level performance. Unsurprisingly, scholarly interest in the development of mental toughness has increased over the past decade, with much of this work informed by qualitative designs. No study to date has systematically reviewed and integrated this body of qualitative research on MT development. The primary purpose of this study was to create an integrated theoretical framework that incorporates extant MT development research in sport and performance settings. Three subsequent aims were to (i) systematically review and evaluate the qualitative literature regarding key developmental factors and processes for MT; (ii) synthesise knowledge of key developmental factors and processes for MT; and (iii) generate an integrated framework that can inform future research and advancement in theory with regard to MT development.

Following a systematic search of online journals, search engines, and databases, 10 papers met the criteria for inclusion and were retained. These studies served as the primary data for meta-data, meta-method, and meta-theory analyses, which were integrated using a meta-synthesis approach. Four key themes were identified from the existing qualitative evidence: personal characteristics, interactions with environment, progressive development, and breadth of experience. These unique themes were integrated with existing theory to propose a Bioecological Model of MT Development that encompasses interdependent interactions among the person, proximal processes, context, and time. We describe how this model can be used as a heuristic for research and practice, and underscore the importance of methodological diversity for future work on the development of MT.
2.1 Introduction

It is widely recognised that the development of talent is a complex process that requires multidisciplinary contributions from key areas of sport science, such as physiology, biomechanics, motor learning and psychology (Gulbin, Croser, Morley, & Weissensteiner, 2013; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). Over the past decade, researchers interested in the psychological factors associated with the attainment and sustainment of peak performance have approached this task through the lens of mental toughness (MT). Recently defined as “a personal capacity to deliver high performance on a regular basis despite varying degrees of situational demands” (Gucciardi & Hanton, 2016, p. 442), MT is considered by many to be central to sport performance (e.g., Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015; Hardy, Bell, & Beattie, 2014). Unsurprisingly, there have been concerted efforts towards delineating an understanding of the sources of influence and key mechanisms of MT development within sport. Whether these efforts have involved qualitative or quantitative research, key conclusions from past work suggest that MT development is a complex endeavour that involves multiple mechanisms (e.g., exposure to challenging or tough situations) and sources of influence (e.g., coaches, teammates) (Connaughton, Thelwell, & Hanton, 2011).

There are several published narrative reviews of the MT literature that have focused on conceptual features (e.g., Connaughton, Hanton, Jones, & Wadey, 2008; Crust, 2007), measurement considerations (e.g., Gucciardi, Mallett, Hancohan, & Gordon, 2011) or its development (e.g., Connaughton et al., 2011). Although narrative reviews can be informative and cover a broad range of important issues within a topic because they are often conducted by experts in the field (Collins & Fauser, 2005), they typically involve informal and unsystematic approaches to the identification and integration of primary data, producing mainly descriptive summaries of bodies of work (Noblit & Hare, 1988). In contrast, systematic approaches that involve detailed plans of methodological procedures (e.g., search
strategy, inclusion/exclusion criteria) can reduce potential bias by producing a comprehensive integration, appraisal and synthesis of all key studies on a specific topic (Paterson, Thorne, Canam, & Jillings, 2001) and therefore enhanced transparency in the research process.

The ongoing preference in both MT and MT development research has been to employ similar processes to those of previous research, such as the same theoretical bases (e.g., Kelly’s (1955/1991) personal construct psychology), or research designs (e.g., retrospective semi-structured interviews with experienced informants). The common result is support for what was already known with limited advancements in the conceptual understanding of what it is stakeholders such as athletes, coaches, and/or sports administrators should actually do to develop MT or, more specifically, when they should do it. Therefore, as a necessary first step, enhanced clarity regarding both the developmental factors (e.g., who, when, and where) and processes (e.g., what and how) of MT through systematic integration has the potential to lead to increased confidence and receptiveness to interventions among these stakeholders (e.g., Campbell et al., 2000). Currently, there are only two published controlled intervention studies (i.e., Bell, Hardy, & Beattie, 2013; Gucciardi, Gordon, & Dimmock, 2009), and another intervention study with no control group (i.e., Sheard & Golby, 2006). With the exception of Bell et al. (2013), whose work was grounded in reinforcement sensitivity theory (Gray & McNaughton, 2000), intervention research to date has been atheoretical; thus, there is a need for theory to guide future intervention work (e.g., Mahoney, Gucciardi, Mallett, & Ntoumanis, 2014).

With much of the available research on MT development informed by qualitative methods (Connaughton et al., 2011), there is a need to synthesise the findings of this body of work. One approach is through a systematic integration of the knowledge regarding the antecedents and developmental themes of MT, which may also provide clarity as to what MT is and what it is not, as well as those key features evident in mentally tough athletes and performers (henceforth referred to as performers). A meta-study (Paterson et al., 2001) is one
such process that enables the synthesis of qualitative research, which includes a systematic approach to the collation of studies, a critique of methodological approaches, and a synthesis of findings. Subsequently, a synthesis of qualitative research appears warranted as a means by which to clarify substantive considerations of key sources of influence or developmental processes, inform the development and evaluation of future intervention programs, and increase stakeholders’ desire to invest resources into these programs.

To our knowledge, there has been no systematic review of qualitative research on MT development. The primary purpose of this study was to create an integrated theoretical framework that incorporates extant qualitative MT development research. Using a meta-study approach to achieve this goal, the three aims were to (i) systematically review and evaluate the qualitative literature regarding key developmental factors and processes for MT in sport and performance settings; (ii) synthesise knowledge of key developmental factors and processes for MT in sport and performance settings; and (iii) generate an integrated framework that can inform future research and advancement in theory with regard to MT development in sport and performance settings.

2.2 Methods

A meta-study “involves a systematic approach to collecting and analysing qualitative research findings” (Tamminen & Holt, 2010, p. 1564) using interpretation rather than reduction of data (Sandelowski & Barroso, 2003). This systematic approach consists of four components (Paterson et al., 2001): meta-method analysis, meta-data analysis, meta-theory analysis, and meta-synthesis. The first three components (method, data, and theory analysis) often take place concurrently; the meta-synthesis is presented as the outcome of a meta-study. Two primary objectives of a meta-study are to identify unanimity, and explore inconsistencies in existing literature, which together contribute to the qualification of research for concept development. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses
(PRISMA) checklist (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) was also completed for this review (see Appendix 2A).

2.2.1 Search Methods

A search was conducted of online journals, search engines and databases to retrieve relevant articles. The search protocol in each case was set to search titles, abstracts, and keywords using the terms “mental toughness” and “mentally tough”, with no limitations in terms of the date range, with the final search conducted December 2014. The search platforms used were Web of Science, Scopus, Sport Discus, OvidSP, and Google Scholar. Articles were not retained for further analysis during this process if they were identified as non-scholarly periodicals (e.g., popular press or newspaper articles), or duplicates of articles that had already been collected. Both backward (i.e., scanning reference lists of included articles) and forward search strategies (i.e., work that has cited included articles) were then conducted to check that all articles fitting the criteria were collected. A male librarian with more than 10 years’ experience using search databases was also consulted during the early stages to ensure that all articles that met the criteria were identified.

2.2.1.1 Exclusion and inclusion criteria. Based on guidelines for the synthesis of qualitative data (Sandelowski, Docherty, & Emden, 1997), articles were excluded if one of the following criteria was evident: (i) Participants took part in an intervention and asked to report their perspectives of the content of the program, rather than their broader views of MT development; (ii) the study involved only quantitative methods (i.e., numbers were the focus of the analysis, with no exploration of peoples’ perceptions of MT development); (iii) the study drew from a non-sport/performance setting; (iv) the study involved analysis of historical/archival data (or review articles); (v) the study was not published in a peer-reviewed journal (i.e., conference presentation or book chapter); and (vi) the study identified MT development as an important consideration in the findings, rather than being specified a priori as a research aim. Articles were included if they employed research methods that allowed for
the exploration of participants’ perceptions of MT development (i.e., one-on-one interviews, focus groups, open-ended surveys, or case study observations). This step was an important part of this review in an attempt to challenge the ongoing conjecture regarding what constitutes MT in the field, and look at the “raw data” provided by qualitative research, as opposed to the modified categories offered by quantitative research. A flow diagram of the search and retrieval strategies is depicted in Figure 2.1.

2.2.2 Data Abstraction and Management

Following meta-study guidelines (e.g., Paterson et al., 2001), key features of research articles that were retained were entered into a spreadsheet (e.g., sample characteristics, data analysis). This template was constructed by reviewing each article in its entirety during which the relevant information was entered into the corresponding columns (see Tables 2.1 and 2.2 for abbreviated forms, with an example of the full data extraction template included as Appendix 2B).

2.2.3 Meta-Method Analysis

A meta-method analysis involves a review and evaluation of the research designs of each primary study to identify how the specific research methodologies have been applied, and the effects they have on the findings and outcomes, as well as an assessment of the collective methodological patterns across the retained MT development literature (Paterson et al., 2001). Two steps formed the basis of this meta-method analysis: (i) a review of each of the retained article’s theoretical basis, sampling methods, and sample characteristics, as well as methods for data collection and data analysis; and (ii) an evaluation against a 10-item Qualitative Research (Critical Appraisal Skills Programme [CASP], 2014), which is a tool used to assist with systematic appraisal of qualitative research in terms of the validity (e.g., Is there a clear statement of the research aims?), whether the results are important (e.g., Were participants recruited appropriately?), and how useful it is to the field (e.g., Are the findings
clearly stated?). The findings from these analyses are reported in Tables 2.1 and 2.3, with further detail provided in the results section.

**Figure 2.1: Flow diagram of search and retrieval strategies.**
2.2.4 Meta-Data Analysis

A meta-data analysis involves an examination of the findings from each primary research report (Paterson et al., 2001) to provide insight into the common concept being studied across a group of reports (Tamminen & Holt, 2010). Therefore, themes from each article were compared and contrasted against others in an attempt to synthesise existing knowledge. We used an adaptation of Noblit and Hare’s (1988) seven-step meta-ethnography: (i) getting started; (ii) deciding what is relevant to the initial interest; (iii) reading the studies; (iv) determining how the studies are related; (v) translating the studies into one another; (vi) synthesising translations; and (vii) expressing the synthesis. Although our synthesis did not focus specifically on metaphors, this method can be applied when reviewing related themes and concepts among a collection of similar qualitative research (Britten et al., 2002; Paterson et al., 2001).

Steps 1-3 of the meta-ethnography were applied as a part of the literature search and selection process. Subsequently, the findings from each of the retained studies, which were treated as raw data in the analysis, were reviewed to identify the relations between them (step 4). These findings were then coded and grouped according to their similarities (e.g., participant roles, sport-specific versus sport-general samples). As a result, the raw data was initially collated according to the participant role, with a sub-theme being the performance context (see Table 2.2). The information in these categories was then compared and contrasted against the others to explore the degree of dis/similarity in the data when collated in this way.

The next step was to review the studies to see how they might translate into one another (Step 5; Noblit & Hare, 1988). There were a number of similarities identified when comparing key phrases, themes and concepts within primary studies against the same factors across each of the other reports. For example, phrases such as “enhancing psychological skills” (Butt, Weinberg, & Culp, 2010) and “psychological skills training” (Thelwell, Such,
Weston, Such, & Greenlees, 2010) relate to the development of personal characteristics, subsequently offering an opportunity to synthesise these translations (Step 6). For the final synthesis (Step 7), these factors were collapsed into descriptive thematic categories, such as “personal characteristics”. This process was used to combine and analyse other similar concepts within the retained MT development literature.

2.2.5 Meta-Theory Analysis

A meta-theory analysis refers to the critical analysis of extant theory to develop a unified theoretical understanding of the phenomenon (Paterson et al., 2001). Theoretically informed studies are important for science since they can inform a priori expectations regarding results, provide guidance in terms of data collection methods, and offer an organising framework for data interpretation and synthesis. Central to this aspect of a meta-study is an examination of whether, and in what way, such theoretical underpinnings influence a body of work (Paterson et al., 2001). According to Ritzer (1992), there are three reasons for meta-theorizing: (i) to attain a greater understanding of the underlying structure of existing theory; (ii) as a precursor to the development of new theory; and (iii) to provide a comprehensive framework that helps explain some or all of the existing theories. The majority of the research retained for the current synthesis is based on Jones, Hanton, and Connaughton’s (2002) seminal framework of key personal attributes of MT individuals, which was guided by Kelly’s (1955/1991) personal construct psychology. Subsequently, the primary focus during this stage was to compare the current theoretical basis of MT development with other existing theories of development to progress our understanding.

2.2.6 Meta-Synthesis

The final stage involves a meta-synthesis of the data, methods and theories from research reports that have explored similar constructs in an attempt to generate an integrative theory or framework of an area of research (Paterson et al., 2001). Therefore, the specific purpose of the current meta-synthesis was to develop an explanatory theory or model that
might explain the findings of a collection of qualitative studies (Walsh & Downe, 2005), with a view to provide a foundation for future research. Described as “a dynamic and iterative process of thinking, interpreting, creating, theorising, and reflecting” (Paterson et al., 2001, p. 112), an inductive approach was adopted initially that provided an opportunity to identify common themes from the retained research. This process was conducted by the first author, and regularly discussed, revised, and refined through consultations with the second and third authors.

2.3 Results

The results from the search strategy are shown in Figure 2.1. Following the removal of duplicates, the search resulted in 206 peer-reviewed publications, which was reduced to 10 articles once the exclusion criteria were applied. A summary of the key features of the primary research reports is detailed in Table 2.1. Several studies were conducted in specific countries, including North America (n=3), United Kingdom (n=2), and Australia (n=2). The remaining studies involved a mix of between two and four countries (n=2), with one study’s location not identified. Sample sizes ranged from 7 to 18, with participants recruited predominantly via purposive sampling, that is, selected because they have the potential to advance our understanding of MT development (e.g., length of time working with elite performers, exposure to elite level competition, level of success etc.). The qualitative data from the 10 studies represents a total of 115 participants, which includes performers (n=69), coaching staff (n=39), and support staff (n=7). Age range (when reported) and levels of experience varied from high school ‘top’ performers (aged 13-17 years), to athletes (from 15 years of age), support staff and coaches (from 25 years old) with international level success.
### Table 2.1: Key features of primary research reports.

<table>
<thead>
<tr>
<th>Study</th>
<th>Theoretical basis</th>
<th>Sampling method</th>
<th>Sample characteristics</th>
<th>Data collection</th>
<th>Data analysis</th>
</tr>
</thead>
</table>
| Bull, Shambrook, James, and Brooks (2005). | - Existing background MT research by research team.  
- Jones et al. (2002) definition of MT.  
- Gould, Dieffenbach, and Moffett’s (2002) research. | Participants identified by 101 cricket coaches when asked to identify the “mentally toughest” performers from 1980s and 1990s; Cultural consensus sample. | 12 male cricket players; Age range not specified; All played at international level for England; Ethnicity not stated. | - 1-1 qualitative semi-structured interviews.  
- Interview setting not specified apart from “... interviewed at a time and location convenient to them [participant]”.  
- Interview preceded by a general information package on reasons for interview, but no specific information relating to conceptualisation of MT. | - Analysis guided primarily through the presentation and discussion of direct quotations from transcripts by two members of the research team.  
- Focus group to “interrogate” 10 categories and emerging themes. |
- Psychological characteristics of successful athletes, and psychology of excellence (e.g., Gilbert & Trudel, 2004; Gould et al., 2002). | Participants identified by their coaches as having “mental toughness qualities” with minimum of one year experience at NCAA Division 1 competition; Purposive sample. | 15 collegiate NCAA Division 1 athletes (9 males, 6 females); Age M=20.0 (SD=0.91); Sample drawn from a range of sports in USA; Ethnicity not stated. | - 1-1 qualitative semi-structured interviews.  
- All interviews conducted face-to-face by the same individual.  
- Preceded by a brief discussion via phone about MT: Athletes asked if they considered themselves MT, and in what situations they demonstrated it. | - Content analysis by three investigators, with analyst triangulation. |
- Bloom’s (1985) and Cote, Baker, and Abernethy’s (2003) three career phases of talent and expertise development. | Participants classified as “Super elite”; Performers averaged 7 years’ experience at international level; Coaches/sport psychologists involved at the same level between 7-20 years; Purposive sample (from previous study). | 11 respondents (4 male and 3 female performers, 2 male coaches, 2 male sport psychologists) from a range of sports; Aged 25-62 years; International experience at Olympics or commonwealth games for either Australia, England, Canada, or Wales; Ethnicity not stated. | - 1-1 qualitative semi-structured interviews.  
- Interviews conducted face-to-face.  
- For performers only, a quantitative “involvement progression questionnaire” adapted from Bloom’s (1985) and Cote et al.’s (2003) three career phases of talent and expertise development.  
- Interview guides distributed to participants two weeks prior to interview. | - Coded into framework dimensions and subcomponents using a seven step process by the research team.  
- Coding involved deductively analysing the transcripts; peer debriefing, and member-checking. |
<table>
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<tr>
<th>Study</th>
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<th>Sampling method</th>
<th>Sample characteristics</th>
<th>Data collection</th>
<th>Data analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connaughton, Wadey, Hanton, and Jones (2008).</td>
<td>• Jones et al. (2002) MT attributes. • Bloom's (1985) career phases of development.</td>
<td>Participants classified as &quot;Super elite&quot;; Average of 7 years' experience at international level; Purposive sample (from previous study).</td>
<td>Seven athletes (5 males, 2 females) from a range of sports; Age M=33 (SD=5.3); International experience at Olympics or World championships; Nationality and Ethnicity not stated.</td>
<td>• 1-1 qualitative semi-structured interviews. • Interviewed either face to face or via phone. • Participants provided with a preparation booklet one week prior to interview.</td>
<td>• Deductive analysis, including triangulation, peer-debriefing, referential adequacy, member checking, thick description, and stepwise replication.</td>
</tr>
<tr>
<td>Cook, Crust, Littlewood, Nesti, and Allen-Collinson (2014)</td>
<td>• Draws on MT research findings and recommendations from previous studies (Bull et al. 2005; Connaughton et al. 2008; Thelwell, Weston, &amp; Greenlees, 2005) alongside authors' own theoretical interests.</td>
<td>Participants classified as &quot;highly experienced&quot; with 18 years (range 6-27) of employment at the professional level; Purposive sample.</td>
<td>Eight coaching (n=3) and support staff (n=5); Age and gender not specified; Professional level (English premier league soccer academy); Nationality and Ethnicity not stated.</td>
<td>• 1-1 qualitative semi-structured interviews. • Interviews face-to-face in participant's office. • No record of whether pre-reading was provided to participants.</td>
<td>• Thematic content analysis by members of the research team. Subsequently, themes were considered and reviewed by two other researchers (members of the research team) independently.</td>
</tr>
<tr>
<td>Driska, Kamphoff, and Armentrout (2012).</td>
<td>• Jones et al.'s (2007) four dimensional MT framework.</td>
<td>Participants must have trained national level athletes as a minimum; coaching experience (M=31.7 years, SD=8.9); Purposive sample into snowball method (initial participants recommended other &quot;suitable&quot; participants).</td>
<td>13 swimming coaches (9 males, 4 females); age M=61.2 (SD=10.0); Trained athletes that have succeeded at national level in USA; Ethnicity not stated.</td>
<td>• 1-1 qualitative semi-structured interviews via phone. • Participant's instructed at least one day before the interview to recall one or two mentally tough athletes they had coached within the past five years.</td>
<td>• Deductive (MT attributes) then inductive (MT development) analysis, with a system of peer-debriefing and analyst triangulation.</td>
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<tr>
<td>Gucciardi, Gordon, and Dimmock (2009).</td>
<td>• Gucciardi et al.'s (2008) conceptualisation of MT in Australian Football. • Tranckle and Cushion's (2006) research into factors that facilitate and impede development.</td>
<td>Participants had previous experience as either head coach or assistant coach of elite Australian football team, with state level coaching experience (M=105,SD=19.5) and national level coaching experience (M=107, SD=25.2); Purposive sample (from Gucciardi et al.'s (2008) study).</td>
<td>11 male Australian football coaches; age M=42 (SD=9.62); Currently coaching state level or national level in Australia; Ethnicity not stated.</td>
<td>• 1-1 qualitative semi-structured interviews. • Delivered face to face. • Both the interview schedule and Gucciardi et al.'s (2008) conceptualisation of MT in Australian Football provided a minimum of three days prior to the interview.</td>
<td>• Grounded theory methodology to move from description, through conceptual categorizing, to relationship building and theorizing. • &quot;Constant Comparative Analysis&quot;.</td>
</tr>
<tr>
<td>Study</td>
<td>Theoretical basis</td>
<td>Sampling method</td>
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<td>Mahoney, Gucciardi, et al. (2014).</td>
<td>• MT framework adapted from previous MT definitions (Coulter, Mallett, &amp; Gucciardi, 2010; Gucciardi et al., 2008; Jones et al., 2007). • Bronfenbrenner’s (2001) Bioecological Model.</td>
<td>Participants identified by faculty deans at high performing independent schools; Purposive sample.</td>
<td>18 adolescent performers (9 males, 9 females); aged 13-17 years (M=15.6); Have performed either the highest or second highest teams or ensembles for sport and music respectively, or within the top 20% of the state cohort for academia in Australia; Ethnicity not stated.</td>
<td>• Two focus groups; brief worksheet in line with PCP used initially, followed by group discussions using a semi-structured interview guide. • Followed up by 1-1 qualitative semi-structured interviews, with questions devised from the focus group responses. • All interviews conducted face-to-face. • No additional information provided to participants prior to interviews.</td>
<td>• Initial coding using four-stage interpretative phenomenological procedure by three analysts. • Subsequently, factors thought to contribute to MT development were analysed alongside the four properties of the Bioecological Model (PPCT; Bronfenbrenner, 2001).</td>
</tr>
<tr>
<td>Thelwell, Such, Weston, Such, and Greenlees (2010).</td>
<td>• Definition and key attributes of MT adopted from Jones et al. (2002).</td>
<td>Participants accessed through coaches, with the athletes required to have &quot;achieved full international honours&quot;; Convenience sample.</td>
<td>10 female gymnasts; aged 15-22; International level competitors from United States and England (n from each country not stated); Ethnicity not stated.</td>
<td>• 1-1 qualitative semi-structured interviews. • Interviews conducted face to face. • Participants provided with a definition of MT and key attributes prior to interview.</td>
<td>• Inductive analysis initially by two researchers independently to allow themes to emerge from interviews, then deductive in later stages to ensure appropriate placement into higher order themes. • Followed by seeking consensus between the first two and a third researcher.</td>
</tr>
<tr>
<td>Weinberg, Butt, and Culp (2011).</td>
<td>• Existing MT literature (no further detail). • &quot;...explore MT during a time-frame that is considered critical to an athlete’s career (i.e., varsity sport at the collegiate level) in the US&quot; (p.159).</td>
<td>Participants required to have at least 10 years coaching experience at Division 1 level (Range 10-22 years; M=11.9, SD=3.66); Purposive sample.</td>
<td>10 coaches (5 males, 5 females) from a range of sports; Age not specified; NCAA Division 1 experience of 10 years minimum in USA; White ethnicity.</td>
<td>• 1-1 qualitative semi-structured interviews. • Interviews conducted face to face. • No record of whether pre-reading was provided to participants.</td>
<td>• Inductive content analysis performed by each of the three investigators independently identifying raw data themes for each question.</td>
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</tbody>
</table>

Note: MT = mental toughness; PPCT = process–person–context–time.
### Table 2.2: Main findings from primary research reports.

<table>
<thead>
<tr>
<th>Participant role</th>
<th>Study</th>
<th>Important findings, <em>How to develop MT.</em></th>
<th>Relationship with previous research</th>
</tr>
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</table>
| Performers (cricket) | Bull et al. (2005). | • MT is developed through environmental influence, tough character, tough attitudes, and tough thinking.  
• These factors interact with the general MT dimensions of ‘Developmental factors’, ‘Personal responsibility’, ‘Dedication and commitment’, ‘Belief’, and ‘Coping with pressure’.  
• MT development viewed as a multidimensional construct. | The global themes can readily be compared to Jones et al.’s MT attributes. |
| Performers (gymnastics) | Thelwell et al. (2010). | • Four general dimensions that contributed to gymnast development of MT: sporting personnel, non-sporting personnel, and environmental influences.  
• Athletes and practitioners must be aware that psychological skills training is just one mechanism for developing MT.  
• MT development viewed as a unidimensional construct. | Support provided for previous research findings that MT development is a complex phenomenon. |
| Performers (multiple sports) | Butt et al. (2010). | • Three higher order themes in strategies to build MT: Positive but tough practice environment, enhancing psych skills, and teaching MT.  
• Creating a positive but tough practice environment emerged as a dominant theme to build MT.  
• Coaches (i.e., coaches’ support, coaches’ attributes, coaches’ practices), then parents and teammates respectively were identified as having a role in developing MT.  
• MT development viewed as a unidimensional construct. | Findings were fairly consistent with previous investigations (e.g., Bull et al., 2005; Jones et al., 2002; Jones et al., 2007; Thelwell et al., 2005). |
| Performers (multiple sports) | Connaughton et al. (2008). | • MT development is a long-term process that encompasses a multitude of underlying mechanisms, which operate collectively, including: 1. A motivational climate that is challenging, rewarding, and enjoyable; 2. Encouragement from significant others who also act as a resource of knowledge and inspiration; and 3. The experience of critical incidents (e.g. setbacks, anxiety).  
• MT development viewed as a unidimensional construct.  
• Highlighted the relationship between life skills and MT in sport. | Support for previous conceptualisations of MT attributes (i.e., Jones et al., 2002), with support for different development processes involved across three career phases (i.e., Bloom, 1985; early, middle, and later years), as well as specific processes necessary to maintain one’s MT. |
| Performers (multiple environments) | Mahoney, Gucciardi, et al. (2014). | • MT development was predicated on four higher order themes: Significant others, supportive social processes, critical incidents, and curiosity.  
• MT conceptualized by nine personal characteristics: Four personal forces (i.e., persistence, drive, high self-expectations, and support seeking), and five personal resources (i.e., forethought, social intelligence, heightened awareness, self-belief, and optimistic thinking).  
• The development of personal characteristics that comprise MT appear to share consistencies across performance contexts.  
• MT development viewed as a multidimensional construct. | Whilst similar across performance contexts, some difference between previous MT definitions and the current study existed. Furthermore, the nine MT characteristics identified aligned with those reported in Connaughton et al.’s (2011) review, although ‘control’ and ‘physical toughness’ did not emerge in the current study. |
| Coaches (swimmers) | Driska et al. (2012). | • In terms of MT development, there were two dimensions: 1. Actions of coaches: a) The coach was challenging and demanding and had high expectations; b) The coach’s approach to training and workout planning developed MT; and c) The coach developed a motivational climate that fostered MT.  
2. Actions of swimmers: a) The swimmer prepared methodically and rigorously; b) The swimmer used psychological skills and cognitive strategies; and c) The swimmer had experienced and overcame hardship in the sport.  
• MT development viewed as a unidimensional construct. | While confirming eleven of thirteen subcomponents of MT previously identified by Jones et al. (2007), the participants identified (a) “coachability”, and (b) “retaining psychological control on poor training days” as previously unidentified subcomponents of MT. |
### Participant role | Study | Important findings. How to develop MT. | Relationship with previous research |
|----------------|-----------|---------------------------------|----------------------------------|
| Coaches (Australian football) | Gucciardi, Gordon, and Dimmock (2009). | - Five categories central to coach development of MT in Australian football: Four categories to facilitate the process (i.e., coach–athlete relationship, coaching philosophy, training environments, and specific strategies); and One to impede the process (i.e., negative experiences and influences).  
- Participants recognized the crucial role that parents play in fostering childhood experiences in which a “generalized form” of MT can be developed and transformed into a “sport-specific form” of MT through coaching methods in the football context.  
- MT development viewed as a multidimensional construct. | The majority of strategies and mechanisms reported (e.g., encouragement, modelling, and motivational climate) are consistent with previous MT (e.g., Connaughton et al., 2008) and talent development research (e.g., Martindale, Collins, & Daubney, 2005). |
| Coaches (multiple sports) | Weinberg et al. (2011). | - Strategies to develop MT themes: tough physical practice environment, positive mental environment, providing MT learning opportunities.  
- General view that MT can be developed, but coaches still sought to recruit athletes that showed some MT already  
- Higher-order MT attribute themes: Psychological skills, motivation to succeed, and resilience.  
- MT development viewed as a unidimensional construct. | Themes tended to overlap with existing literature, indicating a good deal of similarity between athletes and coaches on what constitutes MT.  
Supports existing literature that highlighted coaches play an important role in athletes’ psychological development (e.g., Gould et al., 2002). |
| Performers, Coaches, and Support staff (multiple sports) | Connaughton et al. (2010). | - MT development and maintenance occurs over four distinct career phases: three developmental phases, and one maintenance phase.  
- Factors included: skill mastery, competitiveness, successes (training and competition), international competitive experience, education and advice, the use of psychological skills, access to an understanding social support network, and reflective practice.  
- Positive and negative critical incidents were perceived by participants to act as catalysts in initiating or enhancing specific components of MT.  
- MT development viewed as a multidimensional construct. | Investigated the development and maintenance of MT in relation to Jones et al.’s (2007) four dimensions and 13 subcomponents. |
| Coaches and Support staff (soccer) | Cook et al. (2014). | - While participants had clear ideas about what constitutes MT, they were less aware of how it might be systematically developed.  
- To enhance MT, coaches sought to foster in the young players two key characteristics: independence and resourcefulness, via a challenging but supportive learning environment.  
- MT development viewed as a multidimensional construct. | Many of the key themes that emerged closely resemble those found in other recent work on perceptions of MT (Clough et al. 2002; Driska et al. 2012; Jones et al. 2007; Weinberg et al. 2011), that MT represents a collection of positive psychological variables. |

### 2.3.1 Evaluation of the Methods and Methodological Themes

A summary of the methods of each study is provided in Table 2.1. The assessment of each study against the CASP checklist is provided in Table 2.3. All articles were clear in their research aims and the selection of a qualitative methodology in each instance appeared appropriate. Nevertheless, two studies (i.e., Cook et al., 2014; Weinberg et al., 2011) provided limited information regarding their choice of methods and research design, thereby limiting the opportunities for the studies to be replicated by other researchers. Specific detail regarding these factors, as well as other inconsistencies across the retained studies is provided in the subsequent sections.
Table 2.3: Assessment of retained studies against CASP (2014) Qualitative Research Checklist.

<table>
<thead>
<tr>
<th>Study</th>
<th>RA</th>
<th>QM</th>
<th>RD</th>
<th>RS</th>
<th>DC</th>
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<tbody>
<tr>
<td>Bull et al. (2005)</td>
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<td>Cook et al. (2014)</td>
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<td>Driska et al. (2012)</td>
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<td>Gucciardi, Gordon, and Dimmock (2009)</td>
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<tr>
<td>Mahoney, Gucciardi, et al. (2014)</td>
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<td>Thelwell et al. (2010)</td>
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<td>Weinberg et al. (2011)</td>
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<td>X</td>
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</table>

Note: ✓ = appropriate; ? = can’t tell; X = inappropriate. RA = Research aims; QM = Qualitative methodology; RD = Research design; RS = Recruitment strategy; DC = Data collection; Rel = Relationships; EC = Ethical considerations; DA = Data Analysis; CF = Clear findings; RV = Research value; Ret = Retained.
2.3.1.1 Data collection. Although semi-structured interviews were the common approach, there appeared to be little consistency regarding the information that was provided to the participants prior to, or during the interview. For example, in their research with gymnasts, Thelwell et al. (2010) provided Jones and colleagues’ (2002) definition of MT and the key attributes to each participant prior to the interview. In contrast, Butt et al. (2010) contacted participants via phone prior to the interview to briefly discuss MT, asking whether the participant considered themselves MT and in what situations they demonstrated it. The participants were then engaged in a face-to-face interview, with no information regarding whether additional information on MT was provided during these discussions. Bull, Shambrook, James, and Brooks (2005) provided participants with a general information package on reasons for the interview, but did not include any specific information relating to the conceptualisation of MT. In some cases, it was not clear whether or not additional information was provided to participants prior to interviews (e.g., Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014; Weinberg, Butt, & Culp, 2011).

2.3.1.2 Sampling method and characteristics. Although eight of the ten studies utilised a purposive sample (see Table 2.1), the experience levels of participants across the studies varied. Specifically, there were inconsistencies regarding the identification of who is mentally tough, what level of performance must be reached, and how many years’ experience is required for a participant to be considered a valid source of information on MT development. In their research with coaches, for example, Weinberg et al. (2011) specified a minimum of 10 years coaching experience at National Collegiate Athletic Association (NCAA) Division 1 level, whereas Gucciardi, Gordon, Dimmock, and Mallett’s (2009) sample had a minimum level of experience either as a head coach or as an assistant coach at the elite level, with no specific time period identified. Other examples refer to “full international honours” (Thelwell et al., 2010) or a minimum of one year of competition experience at NCAA Division 1 level (Butt et al., 2010). There were a number of other
similarities regarding the methods employed across the retained studies. For example, participants who shared their perspectives on what MT is were re-interviewed to provide their perceptions on its development (e.g., Connaughton, Hanton, & Jones, 2010; Connaughton, Wadey, Hanton, & Jones, 2008; Gucciardi, Gordon, Dimmock, et al., 2009).

2.3.1.3 Data Analysis. There was a preference for content analysis (inductive and deductive) with analyst triangulation involving two or more authors (e.g., Butt et al., 2010; Connaughton, Wadey, et al., 2008; Thelwell et al., 2010). Such an approach is regularly identified as appropriate when dealing with qualitative data in the concept formulation stage (Miles & Huberman, 1994; Patton, 2002).

2.3.2 Evaluation of the Theoretical Underpinnings

Jones and colleagues’ (2002) were among the first to identify and explore performers’ perceptions of MT, using Kelly’s (1955/1991) personal construct psychology (PCP) as a guiding framework. From a PCP perspective, people are considered active agents in the construction of knowledge through their interpretations of reality. Although not explicitly mentioned in the primary studies, this constructivist perspective was an inherent feature of the retained articles in this meta-study, with the researchers exploring MT development using participants that were believed to have lived it (Gergen, 2009). The definition of MT and key attributes proposed by Jones and colleagues’ (2002; 2007) was the predominant theoretical framework cited as the starting point across the majority of the retained studies. However, in some cases, the level of detail was not explicit; for example, Cook et al. (2014) reported that they drew on previous MT research findings and recommendations, as well as their own theoretical interests, whereas Weinberg et al. (2011) cited existing MT literature for their framework with little detail on guiding features of this knowledge base.

2.3.3 Similarities and Differences in Primary Research Findings

A summary of the main themes from each study and their relations with existing research is detailed in Table 2.2. MT development was described in six of the 10 studies as a
multidimensional process where unique attributes or subcomponents are developed using different strategies (Bull et al., 2005; Connaughton et al., 2010; Connaughton, Wadey, et al., 2008; Cook et al., 2014; Gucciardi, Gordon, Dimmock, et al., 2009; Mahoney, Gucciardi, et al., 2014). The remaining four studies focussed on MT development as a unidimensional construct, reporting concepts that may develop MT generally, as opposed to methods to develop any specific component or attribute of MT. Another key similarity across the extant research into MT development was the notion that it is an almost lifelong process beginning in early adolescence. Connaughton et al. (2010) proposed that there are three distinct career phases regarding the developmental process, as well as a maintenance phase; Gucciardi, Gordon, Dimmock, et al. (2009) identified that experienced coaches viewed parental influences in early adolescence as important in developing a ‘generalised form’ of MT; and Weinberg et al. (2011) reported that effective MT development in college athletes required some level of MT that had been developed during adolescence.

The primary theme to be drawn from relevant MT development research is that it is considered a multidimensional process consisting of a number of inter-related mechanisms (cf. Connaughton et al., 2011), providing an opportunity to group similar concepts together during the meta-data analysis. As a result, four key categories were identified across the retained studies: (i) personal characteristics; (ii) interactions within environment; (iii) progressive development; and (iv) breadth of experience.

**2.3.3.1 Personal characteristics.** This category encompasses malleable personal skills or resources that an individual might implement at a given time across a range of different contexts, often a result of learning from previous experiences. Relevant factors from the retained studies included “tough character, tough attitudes and tough thinking” (Bull et al., 2005), “heightened awareness” (Mahoney, Gucciardi, et al., 2014), “cognitive strategies” (Driska, Kamphoff, & Armentrout, 2012), and “reflective practice” (Connaughton et al., 2010). Considering the influence of significant others on one’s skill development,
particularly during adolescence, it is important to also include factors such as the development of “resourcefulness, via a challenging but supportive learning environment” (Cook et al., 2014). This finding highlights the importance of the association between the adaptive development of one’s personal characteristics and the type of support available, such as a supportive learning environment.

**2.3.3.2 Interactions within environment.** This second category relates to how the interactions between performers and various stakeholders within the environment might affect their ability to develop. This category differs from personal characteristics in that it is not about the specific skills or resources that performers could employ, such as reflective practice or tough thinking, but more about how different environmental factors may facilitate or impede MT development. One of the most pertinent examples from previous research was given by Connaughton, Wadey, et al. (2008), identifying that “encouragement from significant others who also act as a resource of knowledge and inspiration” is important for MT development. This factor not only highlights that the interactions between the performer and significant others within the performer’s environment are important, but also identifies that these stakeholders should also be a resource of knowledge and inspiration within the performer’s environment. Other factors such as the “coach-athlete relationship” (Gucciardi, Gordon, Dimmock, et al., 2009), “[relationships with] coaches, parents, and teammates respectively” (Butt et al., 2010), and “access to an understanding social support network” (Connaughton et al., 2010) are examples of the importance of the person-environment interaction identified in previous research. Similarly, a performer exposed to a supportive training and family environment (e.g., Thelwell et al., 2010), or an environment where “the coach developed a motivational climate that fostered mental toughness” (Driska et al., 2012) emphasises the importance of how relationships within environments contribute to MT development.
2.3.3.3 Progressive development. Less about specific skills and the person-environment interactions, the third category relates to the importance of ongoing opportunities for growth or development within the environment throughout one’s career. Often we read about athletes changing coaches or teams after a long-term coach-athlete relationship for a fresh start, or as a result of a moving into a new stage of life, and these events can be attributed to factors relating to this theme. For ongoing performance improvement, contextual factors such as “[a] positive but tough practice environment” (Butt et al., 2010), “a motivational climate that is challenging” (Connaughton, Wadey, et al., 2008), a facilitative coaching philosophy and training environment (Gucciardi, Gordon, Dimmock, et al., 2009), and opportunities for skill mastery, success in training, and international competitive experience (Connaughton et al., 2010) are necessary to facilitate such growth. Furthermore, personal factors such as “independence, via a challenging but supportive learning environment” (Cook et al., 2014) highlights the importance of not only a level of autonomy (via independence), but a learning environment that fosters independence while providing the necessary support.

2.3.3.4 Breadth of experience. The fourth theme is used to categorise those significant events, or critical incidents, that occur throughout one’s career that are necessary for MT development, as well as the importance of diverse experiences over time to facilitate adaptive and positive growth. Importantly, these events are considered most beneficial when a performer is operating within a supportive environment (e.g., adaptive relationship with coach/family), has developed the necessary characteristics (e.g., can employ psychological skills such as reflective practice), and has the requisite level of preparation (e.g., from a positive but tough practice environment). Factors such as “coping with pressure” (Bull et al., 2005), critical incidents (e.g., Connaughton et al., 2010; Connaughton, Wadey, et al., 2008; Mahoney, Gucciardi, et al., 2014), and “overcame hardship in the sport” (Driska et al., 2012), can be applied to this fourth theme due to the emphasis on a performer not just experiencing,
but also adapting following significant events. Another factor that is relevant to this category was “negative experiences and influences (to impede the process)” (Gucciardi, Gordon, Dimmock, et al., 2009), which related to situations or environments where there are limited opportunities for adaptive and positive growth. Although these factors might initially promote thoughts of adversity as being central to growth, it is important to highlight that examples of more positive events were also given, such as “international competitive experience” (Connaughton et al., 2010), and a “rewarding and enjoyable climate” (Connaughton, Wadey, et al., 2008).

2.3.4 An Integrated Framework of MT Development

Individually, each of the aforementioned four key themes represents a new interpretation of the shared findings from the existing body of qualitative evidence on MT development. Revisiting these core themes in conjunction with the demographic, historical and sociocultural factors identified in the analyses of the methods and guiding theory in this past work facilitated the proposal of an integrative conceptual framework of MT development. As Mahoney, Gucciardi, et al. (2014) initially identified in their MT development research, there are similarities between the properties of Bronfenbrenner and Morris’s (2006) Bioecological Model of Human Development and the processes identified as important to MT development. This model encompasses four components of process-person-context-time (PPCT; Bronfenbrenner & Morris, 2006) that resemble the themes identified in our meta-data analysis. Thus, this model offers a well-developed and empirically supported framework that can be used to synthesise past work on MT development, and extends on Mahoney and colleagues’ work by taking a systematic approach to reviewing all past qualitative MT development research. The proposed Bioecological Model of Mental Toughness Development is illustrated in Figure 2.2.
Ch. 2: Literature Review

**Contexts**

The physical and social environments that surround developing individuals that consists of four systems (micro, meso, exo, and macro). Applying these systems to research by Thelwell et al. (2010), a gymnast’s MT development can be affected by:
- The immediate social environment (microsystem);
- The interaction between the family and club environment (mesosystem);
- The indirect effects of a coach’s home environment on the training environment (exosystem); and
- The societal/cultural expectations (macrosystem).

**Time**

Individual development is influenced not only by the actual events, but also when the events occur:
- Challenging, rewarding, and enjoyable [motivational] climate (Connaughton et al., 2008); and
- Coaching philosophy (Gucciardi, Gordon, & Dimmock, 2009).

**Proximal Processes**

Progressively more complex interactions between the athlete and environment that leads to MT development:
- Positive but tough practice environment (Butt et al., 2010); and
- Coach was challenging and demanding and had high expectations (Driska et al., 2010).

**Person (characteristics/attributes)**

Athletes are producers as well as products of their own development, which is partially determined by the three personal characteristics of forces, resources, and demands:
- Forces: Persistence and drive (Mahoney, Gucciardi, et al., 2014);
- Resources: Forethought and optimistic thinking (Mahoney, Gucciardi, et al., 2014); and
- Demands: Competitiveness (Connaughton et al., 2010).

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Figure 2.2: The Bioecological model of Mental Toughness Development.
The Bioecological model represents a broad, robust theoretical foundation where development is defined as “the phenomenon of continuity and change in the biopsychological characteristics of human beings” (Bronfenbrenner & Morris, 2006, p. 793). A synthesis of the current findings according to the four components of the model, being process, person, context, and time, is detailed in Table 2.4. The first of these components, aligning with the progressive development category identified earlier, serves as a foundation for explaining development and is labelled proximal processes; that is, the continually evolving performer-environment exchanges that offer ongoing opportunities for development (Bronfenbrenner & Morris, 2006). Whether functional or dysfunctional, repeated encounters with different experiences continue to challenge learning, understanding, and ability, thereby resulting in developmental changes (Mahoney, Gucciardi, et al., 2014). Examples of proximal processes in the retained studies include “tough physical practice environments” (Weinberg et al., 2011), a “motivational climate that is challenging” (Connaughton, Wadey, et al., 2008), and “a challenging but supportive learning environment” (Cook et al., 2014).

Bronfenbrenner and Morris (2006) contextualised person as relating to performers being the producers as well as the products of their own development. The three process-relevant characteristics that partially determine this component include: (i) forces, which refers to the temperaments and motivations of individuals that promote both the degree and endurance of emotional and behavioural control; (ii) resources, which refers to the past experiences, skills, and different types of intelligence of developing individuals; and (iii) demands, which refers to the social expectations caused by the stimuli and information immediately available to others (e.g., gender, age, physical strength) when encountering a developing individual. These three characteristics are regularly being developed, revised, and refined as performers interact with their environment, emphasising the importance of viewing the development of this component as an ongoing process. Sharing similarities with the personal characteristics category identified in the primary research findings, further
consideration allows us to identify examples of the three process-relevant characteristics: *forces* includes attributes such as “tough character, tough attitudes, and tough thinking” (Bull et al., 2005); *resources* include factors such as “psychological skills training” (Thelwell et al., 2010) or “reflective practice” (Connaughton et al., 2010); and *demands* include features such as “skill mastery” and “competitiveness” (Connaughton et al., 2010).

The third component of the model, known as *contexts*, incorporates the different physical and social environments that can influence a performer’s development (Bronfenbrenner & Morris, 2006), and aligns with the interactions within environment category. Contexts are said to comprise four systems: (i) *microsystem*: how a significant other (e.g., wife, husband) interacts with the performer; (ii) *mesosystem*: the relations between the family/domestic environment and other environments, such as a sporting club or workplace; (iii) *exosystem*: how the home role of a coach, or work role of a significant other (e.g., wife, husband) may influence the amount of time spent with the performer; and (iv) *macrosystem*: the effects from unique features of the performer’s society, culture or community. Examples of ecological contexts in this meta-study include “coach-athlete relationship” (Gucciardi, Gordon, Dimmock, et al., 2009), interactions between “coaches, then parents, and teammates respectively” (Butt et al., 2010), and “sporting personnel, non-sporting personnel, [and] environmental influences” (Thelwell et al., 2010). Looking specifically at the prevalence of each of the four systems across the retained studies, more overt *microsystems*, such as coach-performer or parent-performer relationships were evident, and less so *macrosystems*, such as cultural influences. There were no direct references made to the *mesosystem* and *exosystem*, which were considered by Bronfenbrenner and Morris as continuing to influence development over the lifespan. It is noted that the relation between the home and training environment was considered as influencing a performer’s early MT development (e.g., Gucciardi, Gordon, Dimmock, et al., 2009), but such factors were not identified as an important consideration during the later developmental stages.
The fourth component is time, in that a performer’s development is influenced not just by what happens, but when it occurred during the lifespan (Bronfenbrenner & Morris, 2006). The dimensions of this component include: (i) microtime: what happens during a single day of related activity; (ii) mesotime: what happens during a sequence of days of related activities; and (iii) macrotime: what happens during the life-span (or career) of those related activities. Aligning with the category identified earlier as breadth of experience, examples from the retained research include “providing learning opportunities” (Weinberg et al., 2011), “the coach’s approach to workout planning” (Driska et al., 2012), as well as “successes (training and competition)” and “international competitive experience” (Connaughton et al., 2010). Although it would be useful to discuss which of these dimensions of time were considered most important for MT development, this interpretation cannot be offered as the most commonly reported finding was that MT develops over an extended period. There was also regular reference to the importance of significant events (or critical incidents) and a level of structure in training to facilitate MT development. However, limited detail was provided as to when these events were believed to be more or less effective during the developmental process, or specifically what these structured training programs should consist of and whether there were more or less effective periods for development. In light of this limited specificity among the findings in previous research, there is alignment with the time component through the identification that critical incidents throughout a performer’s career are necessary for MT development (Connaughton et al., 2010; Connaughton, Wadey, et al., 2008; Driska et al., 2012; Gucciardi, Gordon, Dimmock, et al., 2009; Mahoney, Gucciardi, et al., 2014).

The application of the Bioecological framework to an example such as a critical incident presents an opportunity to clarify our understanding of the complex nature of the MT development process. It appears insufficient to focus on one specific component, such as exposing a performer to a critical incident, with the expectation that it will develop MT without consideration of the three other components. Therefore, the interdependent
association between each of the four components is fundamental: without the appropriate proximal processes (e.g., challenging but supportive learning environment; Cook et al., 2014), person [characteristics/attributes] (e.g., reflective practice; Connaughton et al., 2010), and context (e.g., effective coach-athlete relationship; Gucciardi, Gordon, Dimmock, et al., 2009) in place during a critical incident, performers’ responses may have an adverse effect on their MT development. Drawing the synthesis of extant qualitative MT development research into the PPCT framework (Bronfenbrenner & Morris, 2006), the Bioecological Model of Mental Toughness Development is proposed as illustrated in Figure 2.2. The model provides a synthesis of previous MT development research and a theoretical framework to guide future research and theory advancement in the area of MT development.

2.4 Discussion

The primary purpose of this study was to create an integrated theoretical framework that incorporated extant MT development research and can serve to guide future work in this area. Three specific aims were addressed in this regard. First, our systematic review and evaluation of extant qualitative research resulted in the identification of a collection of key developmental factors and processes associated with MT development. Second, our synthesis of the existing knowledge resulted in its reinterpretation into four key categories that encompassed those factors highlighted as necessary for MT development: personal characteristics, interactions within environment, progressive development, and breadth of experience. Third, we generated an integrated framework (Figure 2.2) that explained the complexity of MT development, as well as offering an opportunity to inform and advance MT development research into the future.
Table 2.4: Themes from primary research reports according to according to Process-Person-Context-Time constructs (Bronfenbrenner & Morris, 2006).

<table>
<thead>
<tr>
<th>Theme</th>
<th>Study</th>
<th>Developing MT</th>
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<tr>
<td></td>
<td>Butt et al. (2010).</td>
<td>Positive but tough practice environment.</td>
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<tr>
<td></td>
<td>Thelwell et al. (2010).</td>
<td>Sport process (training, competition, club), Environmental influences (training environment, family environment).</td>
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<td></td>
<td>Connaughton et al. (2008).</td>
<td>A motivational climate that is challenging.</td>
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<tr>
<td></td>
<td>Driska et al. (2012).</td>
<td>The coach was challenging and demanding and had high expectations, The coach’s approach to training and workout planning developed MT.</td>
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<td></td>
<td>Gucciardi, Gordon, and Dimmock (2009).</td>
<td>Coaching philosophy, training environments (to facilitate the process).</td>
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<tr>
<td></td>
<td>Connaughton et al. (2010).</td>
<td>[Opportunities for] skill mastery, success (training), international competitive experience, education and advice, access to an understanding social support network.</td>
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<tr>
<td></td>
<td>Cook et al. (2014).</td>
<td>Independence, via a challenging but supportive learning environment.</td>
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<tr>
<td></td>
<td>Butt et al. (2010).</td>
<td>Enhancing psych skills.</td>
</tr>
<tr>
<td></td>
<td>Thelwell et al. (2010).</td>
<td>Psychological skills training.</td>
</tr>
<tr>
<td></td>
<td>Connaughton et al. (2008).</td>
<td>[Skills learnt from] the experience of critical incidents (e.g. [overcoming] setbacks, anxiety).</td>
</tr>
<tr>
<td></td>
<td>Driska et al. (2012).</td>
<td>The swimmer prepared methodically and rigorously, The swimmer used psychological skills and cognitive strategies, The swimmer had experienced and overcame hardship in the sport.</td>
</tr>
<tr>
<td></td>
<td>Gucciardi, Gordon, and Dimmock (2009).</td>
<td>Negative experiences and influences (to impede the process).</td>
</tr>
<tr>
<td></td>
<td>Connaughton et al. (2010).</td>
<td>Skill mastery, competitiveness, the use of psychological skills, and reflective practice. (Note: positive and negative critical incidents were perceived by participants to act as catalysts in initiating or enhancing specific components of MT.).</td>
</tr>
<tr>
<td></td>
<td>Cook et al. (2014).</td>
<td>Resourcefulness, via a challenging but supportive learning environment.</td>
</tr>
</tbody>
</table>
Four main conclusions about the state of knowledge regarding MT development can be gleaned from our systematic evaluation and synthesis of qualitative research on this topic. First, the importance of understanding how individuals interact with their environment is key. It is difficult to understand one component (e.g., time) without considering how the other components may affect or be affected by it (e.g., the context of a performer’s social...
Although an individual’s constructs or descriptions are often unique, they include shared meanings according to one’s environmental domain at any given time (Bronfenbrenner & Morris, 2006; Kelly 1955/1991). Therefore, the findings underscore the importance of a multi-systems or environment-dependent approach to MT development, regardless of age or career phase. Developing MT is complex and ongoing, involving a dynamic and reciprocal interplay between the person, processes, context, and time. In this sense, interactionism can involve transactions between performers and their dynamic environmental context, whereby performers can be shaped by, as well as influence their contexts (i.e., mutual dependency).

Second, performers are the authors and therefore active agents in their MT development. Bandura (2001) described agentic action as the process of an individual creating the most appropriate behaviour that will best promote the likelihood of his/her desired outcome. Therefore, as an agent of change, performers must play an active role to progress development across different areas, and maintain awareness that these different areas will also affect their future development. Further work is required to clarify our understanding of the strategies that might enable performers to play an agentic role in MT development over time (e.g., see Mahoney, Ntoumanis, Mallett, & Gucciardi, 2014). Previous research has provided mostly a unidimensional approach to MT development (e.g., a coach providing MT learning opportunities, or training planning that developed MT, see Driska et al., 2012; Weinberg et al., 2011), with limited insight into the performer’s necessary role in this process. It may be assumed that performers have to be willing to learn, but it is necessary to consider how a proactive approach might allow individuals to better facilitate their development as the primary agent of change (see Bindl, Parker, Totterdell, & Hagger-Johnson, 2012).

Third, minimal attention has been paid to differences in the developmental processes that may foster or hinder MT development. The interdependent relations between the four
components of the model highlight the effects that aspects of the context, time, and/or performers’ skills (characteristics/attributes) will likely have on their ability to develop. However, there has been limited investigation into how social contexts (e.g., coaching, practice, or team environments) at different developmental stages can either foster or hinder MT development, with a tendency to target more static contexts for investigation (e.g., once a performer has achieved full international honours, or once a coach has successfully trained elite performers). These methods do not allow for sufficient insight into how development is maintained long-term, whether it be prior to achieving success, following setbacks, or after success has been achieved. There remains limited understanding regarding the most conducive contexts that can maintain performers’ motivation for continued development as a precursor to success, following setbacks, and once they have been successful.

The fourth key conclusion pertains to the traitness of MT. Although some scholars have suggested the concept is trait-like (e.g., Crust, 2007), recent evidence indicated that there is considerable intra-individual variability in MT (56%), that is, one’s MT levels fluctuate over time as a result of internal or external demands (Gucciardi, Hanton, et al., 2015). As Kenny and Zautra (2001) asserted, most psychological constructs exist on a continuum of stability, but vary over time and place. The findings of this meta-study support this assertion, and suggest that the degree of stability in one’s MT levels may offer a unique approach to clarifying the importance of developmental processes. For example, athletes whose MT is unstable and fragile may be more vulnerable to the adverse effects of a critical incident, being less likely to identify potentialities and thus experience opportunities for growth and development. Indeed, subscribing to the view that MT is state-like and malleable appears to have important implications for cognitive, motivational and behavioural factors that could contribute to its development (Gucciardi, Jackson, Hodge, Anthony, & Brooke, 2015).
2.4.1 Methods, Methodologies and Theoretical Underpinnings

This meta-study identified several important methodological and theoretical considerations for the study of MT development. First, when considering the applicability of the results to various performance domains, conjecture exists in the literature as to whether MT is a general or domain specific construct (Connaughton et al., 2011). In their research into MT development across the performance contexts of sport, academia, and music, Mahoney, Gucciardi, et al. (2014) identified consistencies across different performance contexts (cf. Butt et al., 2010). Another comparison between research conducted in individual performance domains, such as swimming (Driska et al., 2012), and multiple performance domains, such as Division 1 collegiate sports in the United States (Weinberg et al., 2011) did not highlight any major differences between the requirements for developing MT. However, Thelwell et al. (2010) reported some differences in perceptions of MT development between United States and United Kingdom gymnasts in their sample, attributing it to cultural factors such as the perceptions of increased national belief and support in the United States due to a greater interest in the sport.

To summarise, although there was consistency in the perceptions of MT development across the retained studies regardless of the performance domain (e.g., cricket vs swimming, single sport vs multiple sports), a minor point of difference was the cultural influences as a result of different nationalities. The influences of culture on sport are well-documented (see Jarvie, 2012 for a review), and there has been recent research that has started to consider the interplay between culture and MT in sport (e.g., Andersen, 2011; Caddick & Ryall, 2012). What is unclear is whether or not MT development processes differ between a swimmer in the USA and a swimmer in China, with more detailed research necessary into how broader cultural differences might influence the MT development process. Such a consideration highlights the value of using the Bioecological model as a framework for future research design to ensure the broader macrosystems are addressed alongside consideration of other
systems operating within contexts. Given the complex hierarchy of ecological contexts, and the interactions that go along with these settings, there is a need for methodological diversity. An example might be to employ an ethnographic design (Krane & Baird, 2005) in an attempt to provide clarity with regard to the lived experience of MT development, as well as case studies (Mahoney, Anderson, Miles, & Robinson, 2002) to capture in-depth perspectives of the multiple aspects of MT development.

Second, there remains a reliance on the retrospective accounts of performers and coaches, which has also been a criticism of previous MT research (Connaughton et al., 2011). Given that MT development appears to involve a complex interaction between the person, processes, contexts, and time, it is necessary to consider diverse data collection methods in future research (e.g., observation, dialogic or confrontational interviews, daily diaries for enhanced momentary recall). Such methodological diversity will also provide an opportunity for comprehensive data to be collected by capturing MT development as it progressively occurs, minimising the limitations associated with retrospective reporting, such as recall bias (Ross, 1989). With the notion of time central to the core findings of this meta-study, MT development research requires longitudinal studies to gather detailed information on the changes in processes over time (e.g., interviewing people multiple times over the course of a competitive season).

Third, the sample sizes ranged between seven and 18 participants across the MT development research. Although sample size in qualitative research is not as important if other conditions are met (e.g., saturation), there were some concerns identified as a result of the type of sampling methods. The prevailing approach in the retained studies was to draw on a purposive sample, yet there was often limited information regarding the determination of sizes (e.g., Connaughton et al., 2010; Cook et al., 2014; Weinberg et al., 2011), with sample size seemingly most related to whomever consented to being involved in the research. As Guetterman (2015) highlighted, the procedural details of sampling practices are necessary to
allow for the progression of qualitative research. Furthermore, O'Reilly and Parker (2013) identified that continuing qualitative research until saturation is reached allows for a comprehensive reflection of the depth and breadth of the topic of interest. It is noted that these concerns are regularly cited as being difficult to avoid in qualitative research (Braun & Clarke, 2006), but it should remain a consideration when designing qualitative research and interpreting such data.

There were also inconsistencies across the research regarding the identification of who is considered mentally tough, what level of performance must be reached, and how many years of experience is required for a participant to be a valid source of information on MT development. Connaughton et al. (2010) identified ‘international competitive experience’ as one factor necessary to develop MT, yet there are performance environments (i.e., academia, indigenous sports such as Australian football or American football/Gridiron) that may not have legitimate variations of the Olympics or world championships. If such a prerequisite was applied to the retained research, at least five of the samples fall short of this standard. Furthermore, in their research into what constitutes high performance across most domains, Ericsson, Krampe, and Tesch-Römer (1993) identified that the best performers of their expert sample had accumulated an average of 10,000 hours of deliberate practice at age 20. More recently, Ericsson (2013) clarified that for an individual to achieve elite adult performance in an area, there is a requirement to engage in regular deliberate practice from a young age. Applying this theory to the studies involving coaches or support staff, it is unclear whether any of the five samples have engaged in sufficient professional development, or deliberate practice, in the area of developing MT to provide valid insight into what is required to coach or develop MT. Additionally, if the recently proposed taxonomy of what constitutes sport expertise by Swann, Moran, and Piggott (2015) was applied, additional concerns regarding some of the samples not having sufficient expertise to provide insight into developing MT are highlighted. Key here is that scholars clearly justify the inclusion of their sample based on
the philosophical underpinnings of the theoretical or methodological approach, and the specific objectives of their study.

Fourth, a range of approaches were identified in terms of preparing participants for the interview. For example, in their research with gymnasts, Thelwell et al. (2010) reported that they provided Jones and colleagues’ (2002) definition of MT and the key attributes to each participant prior to the interview. These approaches may increase the likelihood of priming participants to answer in ways that suit the authors’ prescribed theory (Moss & Lawrence, 1997), and thereby influence the participants’ unique perspectives of what they view as important for MT development from their own experiences. Three other studies drew their sample from previous MT research participants (e.g., Connaughton et al., 2010; Connaughton, Wadey, et al., 2008; Gucciardi, Gordon, Dimmock, et al., 2009), which may have allowed for increased quality of the data; that is, the participants had previous opportunity to explore in-depth their own perspectives of the concept of MT, which would likely result in an enhanced familiarity with the researchers and the topic under investigation. Alternatively, some studies contained limited details regarding their specific interview procedures (e.g., Weinberg et al., 2011). As a result, questions can be raised about both the trustworthiness and credibility of research findings (Paterson et al., 2001), due to the difficulties in making comparisons with other similar studies, or replicating the research. Concerns regarding replication are a contemporaneous issue for psychological research (Pashler & Wagenmakers, 2012), so the provision of sufficient information for replication and expansion of research would seem to be crucially important.

2.4.2 Future Directions

The results of this meta-study can serve as a foundation for future research on MT development. We acknowledge that there are other models, such as Mahoney, Ntoumanis, et al.’s (2014) suggestion for Self-Determination Theory (SDT; Deci & Ryan, 2000), which may have some utility for this purpose, yet offer Bronfenbrenner and Morris’s (2006)
Bioecological Model of Human Development as a viable option. Regardless of the theoretical model, attempts to improve the methods and methodologies using the suggestions herein will allow valuable progression in our understanding of MT development. The interdependent relationships between the person and context(s) appear central to an enhanced understanding of MT development. If the definition of MT used in this article is revisited, “a personal capacity to deliver high performance on a regular basis despite varying degrees of situational demands” (Gucciardi & Hanton, 2016, p. 442), then the development of MT requires an approach that addresses the interactions between one’s personal capacity (i.e., person), and accounts for those varying degrees of situational demands (i.e., contexts). Even in Jones et al.’s (2002) seminal MT definition, phrases such as “coping better” or “being more consistent” seem to highlight the importance of this person-context approach. If performers are to develop their MT, they must develop the ability to first interpret and then respond appropriately (e.g., cope better, or be more consistent) across a range of situations, which emphasises the importance of considering this interdependent association.

Previous research on MT development has focused on identifying key cognitions (e.g., optimistic thinking) and attributes (e.g., self-belief), with limited exploration of the necessary behaviours or, more specifically, what a performer is required to do to facilitate MT development. Hardy et al. (2014) recently proposed that MT can be defined as “The ability to achieve personal goals in the face of pressure from a wide range of different stressors” (p.70). Their definition also provided an overt connection to behaviourism, in that mentally tough behaviour is required to achieve personal goals in any given situation, regardless of the cognitions, attitudes, and emotions at play (see also Bell et al., 2013; Gucciardi, Peeling, Ducker, & Dawson, 2016). As a formative field in psychology, behaviourism focuses on how someone behaves and what can be observed, as opposed to the internal influences that cannot be seen (Bargh & Ferguson, 2000). Research in this field has provided a foundation for the scientific development of psychological models that have been applied across many situations.
and environments (Eldridge & Dembkowski, 2012). Behavioural information remains an under-studied aspect of MT development, yet offers an opportunity to explore more concrete factors that may assist in furthering our understanding. Behavioural data also offers an opportunity to draw on the behaviourism literature that may allow enhanced conceptual understanding.

2.4.3 Conclusion

To our knowledge, the application of the meta-study approach in the current paper is the first systematic review to synthesise the qualitative MT development literature. It has resulted in what we believe is an enhanced understanding of the MT development literature, and subsequently provided qualification of extant research for future concept development. The Bioecological Model of Mental Toughness Development, which integrates past work on MT development with established theory of human development, offers a summary of the current state of affairs as well as a heuristic for future work in this area. The model can be used to guide research into MT program development, highlighting the various competing demands faced by an elite performer at any given stage during their career. Although a comprehensive intervention that adequately addresses each of the four factors may be unachievable, this model identifies those inter-related areas that can be targeted to develop MT (e.g., evolving proximal processes to foster the development of a performer’s characteristics/attributes over time). Subsequently, the model offers enhanced clarity regarding both the developmental factors (e.g., who, when, and where) and processes (e.g., what and how) of MT via the inter-related components of PPCT (e.g., proximal processes, performer characteristics/attributes, contexts, and time). The model also emphasises the importance of the ongoing multi-layered interactions that occur between the performer, coach, and organisation, as well as external forces such as family, social, and cultural environments. Overall, the model allows an opportunity to shift the focus for the next iteration of MT development research using a well-supported developmental model, providing an emphasis on
the interdependent process-person-context-time components, herein identified as important aspects of MT development.
2.5 References

Note: (*) indicates references that were retained for analysis as a part of this meta-study.


Mental toughness in sport: Developments in theory and research (pp. 136-162).
Abingdon, Oxon: Routledge.


Ch. 2: Literature Review


## Appendix 2A: PRISMA checklist

<table>
<thead>
<tr>
<th>Section/topic</th>
<th>#</th>
<th>Checklist item</th>
<th>Reported on page #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TITLE</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Title</td>
<td>1</td>
<td>Identify the report as a systematic review, meta-analysis/meta-study, or both.</td>
<td>Page 13.</td>
</tr>
<tr>
<td><strong>ABSTRACT</strong></td>
<td></td>
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</tr>
<tr>
<td>Structured summary</td>
<td>2</td>
<td>Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.</td>
<td>Page 14.</td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rationale</td>
<td>3</td>
<td>Describe the rationale for the review in the context of what is already known.</td>
<td>Page 15-18.</td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
<td>Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).</td>
<td>N/A; aims are stated on page 18.</td>
</tr>
<tr>
<td><strong>METHODS</strong></td>
<td></td>
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<tr>
<td>Protocol and registration</td>
<td>5</td>
<td>Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.</td>
<td>Not registered, but meta-study process detailed p.18-22.</td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td>6</td>
<td>Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.</td>
<td>Page 18-19.</td>
</tr>
<tr>
<td>Information sources</td>
<td>7</td>
<td>Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.</td>
<td>Page 18.</td>
</tr>
<tr>
<td>Search</td>
<td>8</td>
<td>Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.</td>
<td>Page 18.</td>
</tr>
<tr>
<td>Study selection</td>
<td>9</td>
<td>State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).</td>
<td>Page 18-19.</td>
</tr>
<tr>
<td>Category</td>
<td>Item</td>
<td>Description</td>
<td>Page/Ref</td>
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<td>--------------------------------------</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Data collection process</td>
<td>10</td>
<td>Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.</td>
<td>Page 19.</td>
</tr>
<tr>
<td>Data items</td>
<td>11</td>
<td>List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.</td>
<td>Table 2.1, p. 24-26; &amp; Appendix 2A.</td>
</tr>
<tr>
<td>Risk of bias in individual studies</td>
<td>12</td>
<td>Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.</td>
<td>Page 19-20; Table 2.3, p. 29.</td>
</tr>
<tr>
<td>Summary measures</td>
<td>13</td>
<td>State the principal summary measures (e.g., risk ratio, difference in means).</td>
<td>N/A</td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>14</td>
<td>Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I²) for each meta-analysis.</td>
<td>Page 21-22.</td>
</tr>
<tr>
<td>Risk of bias across studies</td>
<td>15</td>
<td>Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).</td>
<td>Page 19-20; Table 2.3, p. 29.</td>
</tr>
<tr>
<td>Additional analyses</td>
<td>16</td>
<td>Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**RESULTS**

<table>
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<tr>
<th>Category</th>
<th>Item</th>
<th>Description</th>
<th>Page/Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study selection</td>
<td>17</td>
<td>Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.</td>
<td>Figure 2.1, p. 20.</td>
</tr>
<tr>
<td>Study characteristics</td>
<td>18</td>
<td>For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.</td>
<td>Page 23.</td>
</tr>
<tr>
<td>Risk of bias within studies</td>
<td>19</td>
<td>Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).</td>
<td>Page 28-31.</td>
</tr>
<tr>
<td>Results of individual studies</td>
<td>20</td>
<td>For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.</td>
<td>Table 2.2, p. 27-28.</td>
</tr>
<tr>
<td>Synthesis of results</td>
<td>21</td>
<td>Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency in accordance with the text in the Explanation and Elaboration document.</td>
<td>Page 31-35.</td>
</tr>
<tr>
<td>Additional analysis</td>
<td>23</td>
<td>Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).</td>
<td>Page 35-40; Figure 2.2, p. 36; Table</td>
</tr>
</tbody>
</table>
## DISCUSSION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
<th>Description</th>
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<tbody>
<tr>
<td>Summary of evidence</td>
<td>24</td>
<td>Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).</td>
</tr>
<tr>
<td>Limitations</td>
<td>25</td>
<td>Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).</td>
</tr>
<tr>
<td>Conclusions</td>
<td>26</td>
<td>Provide a general interpretation of the results in the context of other evidence, and implications for future research.</td>
</tr>
</tbody>
</table>

## FUNDING

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Funding</td>
<td>27</td>
<td>Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.</td>
</tr>
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</table>
### Appendix 2B: Example of data extraction template

<table>
<thead>
<tr>
<th>Authors</th>
<th>year</th>
<th>Article Title</th>
<th>Journal/Year</th>
<th>Aims</th>
<th>Data collection methodology</th>
<th>Data collection summary (Table 1)</th>
<th>Methods</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones, G., Hanton, S., &amp; Culp, B., Butt, J., Weinberg, S. J., &amp; Bull, S. J.</td>
<td>2010</td>
<td>Towards an understanding of mental toughness in elite English cricketers</td>
<td>Journal of Applied Sport Psychology</td>
<td>1) Develop a gender understanding of what MT is within cricket; 2) Identify how existing mentally tough English cricketers developed their MT</td>
<td>one-on-one qualitative semi-structured interviews; interview guide developed in a focus group setting in which the existing background MT research by the lead researcher was combined with overall applied and research knowledge of the research team.</td>
<td>* Analysis in line with overall procedures recommended by Miles &amp; Huberman (1994). * Subsequent analysis occurred in line with the approach by Jones et al. (2002), analysis guided primarily through the presentation and discussion of direct quotations from transcripts by two members of the research team. * Focus group to “interrogate” 10 categories &amp; emerging themes. * Theme axialities were also emphasized throughout the whole data collection and analysis period as the involvement of the research team in acquiring and transcribing the interviews.</td>
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<tr>
<td>Butt, J., Weinkamp, B., &amp; Lopy, B.</td>
<td>2010</td>
<td>Exploring Mental Toughness in NCAA Athletes</td>
<td>Journal of Intercollegiate Sport</td>
<td>Explore NCAA Div 1 athletes’ perceptions of MT, focusing on the James of MT attributes for the role of significant others in developing MT, and to strategies that athletes had been exposed to as a way to build MT</td>
<td>one-on-one qualitative semi-structured interviews; interview guide with elaboration probes (Patton, 2002) was based on MT literature, psych characteristics of successful athletes, &amp; a purpose of excellence (e.g., Gilbert &amp; Trudel, 2004; Gould et al., 2002, Jones et al., 2002)</td>
<td>* One-on-one qualitative semi-structured interviews; interview guide developed in a focus group setting in which the existing background MT research by the lead researcher was combined with overall applied and research knowledge of the research team.</td>
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<td>Connaughton, D., Hanton, S., &amp; Jones, G.</td>
<td>2010</td>
<td>The development and maintenance of mental toughness in the world’s best performers</td>
<td>Sport Psychology</td>
<td>Scantily the development and maintenance of MT, with insights from performers, coaches, &amp; sport psychologists</td>
<td>one-on-one qualitative semi-structured interviews; interview guide developed in a focus group setting in which the existing background MT research by the lead researcher was combined with overall applied and research knowledge of the research team.</td>
<td>* Analysis guided primarily through the presentation and discussion of direct quotations from transcripts by two members of the research team. * Focus group to “interrogate” 10 categories &amp; emerging themes.</td>
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<tr>
<td>Authors</td>
<td>year</td>
<td>Article Title</td>
<td>theoretical basis (MT/other)</td>
<td>Sample</td>
<td>age range</td>
<td>size, gender, type</td>
<td>ethnicity</td>
<td>location (country)</td>
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<td>Bull, S. J., Shambrook, C. J., Jones, W., &amp; Brooks, J. E.</td>
<td>2005</td>
<td>Towards an understanding of mental toughness in elite English cricketers</td>
<td>* Existing background MT research by research team (p. 234). * Jones et al. (2002) definition of MT; * Gould et al.’s (2002) research</td>
<td></td>
<td>not specified</td>
<td>12 male, cultural consensus sample</td>
<td>not specified</td>
<td>England</td>
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<tr>
<td>Butt, J., Weinberg, R., &amp; Culp, B.</td>
<td>2010</td>
<td>Exploring Mental Toughness in NCAA athletes</td>
<td>* Jones et al. (2002) MT definition * Psychological characteristics of successful athletes, &amp; psychology of excellence (e.g., Gilbert &amp; Trudek, 2004; Gould et al., 2002)</td>
<td></td>
<td>20.0, 0.91</td>
<td>15: 9 male &amp; 6 female, purposive sample</td>
<td>not specified</td>
<td>United States</td>
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<tr>
<td>Connaughton, D., Hartshor, S., &amp; Jones, G.</td>
<td>2010</td>
<td>The development and maintenance of mental toughness in the world’s best performers</td>
<td>* Jones et al. (2005) MT framework (4 dimensions &amp; 13 subcomponents) * Bloom’s (1985) &amp; Cote et al.’s (2003) 3 career phases of talent &amp; expertise development</td>
<td></td>
<td>25-48</td>
<td>8 male &amp; 6 female performers, 2 male coaches, 2 male spt staff, not specified (from prev study)</td>
<td>not specified</td>
<td>Australia, England, Wales</td>
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<td>Authors</td>
<td>Year</td>
<td>Article Title</td>
<td>Sample characteristics summary (Table 1)</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable.</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable.</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable.</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable.</td>
<td>Identified global themes compared to some of Jones et al.'s (2002) MT attributes but broad identification of participants as MT by a large panel of coaches, with no reported description of what &quot;MT&quot; means prior.</td>
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<td>Bult, S. J., Hamboussi, C. J., Jones, W., &amp; Brooks, J. E.</td>
<td>2005</td>
<td>Towards an understanding of mental toughness in elite English cricketers</td>
<td>12 male cricket players; age range not specified; All played at international level for England; Ethnicity not stated</td>
<td>MT is developed through environmental influence, tough character, tough attitudes, &amp; tough-thinking. These factors interact with the general MT dimensions of Developmental factors, &quot;Personal responsibility&quot;, Determination and commitment&quot;, &quot;Belief&quot; and &quot;Coping with pressure&quot;. Through a range of global themes MT development viewed as a multidimensional construct.</td>
<td>The global themes can readily be compared to Jones et al.'s attributes of self-belief, desire/motivation, dealing with pressure &amp; anxiety, focus (performance related and lifestyle related), and pain/hardship.</td>
<td>Interviewer's pre-existing relationship &amp; knowledge of the majority of participants may have adversely influenced qualitative processes. Single sport focus.</td>
<td>Identified global themes compared to some of Jones et al.'s (2002) MT attributes but broad identification of participants as MT by a large panel of coaches, with no reported description of what &quot;MT&quot; means prior.</td>
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<td>Bull, J., Weinberg, R., &amp; Clybi, B.</td>
<td>2003</td>
<td>Exploring Mental Toughness in NCAA Athletes</td>
<td>15 collegiate NCAA Division 1 athletes (males, females); Age Mean=20 (SD=3); from a range of sports (e.g., USA. Ethnicity not stated</td>
<td>MT development viewed as a multidimensional construct.</td>
<td>Findings were fairly consistent with previous investigations (e.g., Bult et al., 2005; Jones et al., 2002; Jones et al., 2007; Thelwell et al., 2005) reiterating that MT is made up of attributes such as the ability to cope with pressure, staying motivated and persisting despite obstacles, positive mindset, staying focused despite distractions, and working hard to achieve goals. All athletes referred to coaches as being critical in developing MT.</td>
<td>Creating a positive but tough practice environment emerged as a dominant theme to build MT. MT is malleable.</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable. Providing athletes with a definition as a starting point in discussions during the interviews may have influenced the findings.</td>
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<td>Connaghton, D., Hanton, S., &amp; James, G.</td>
<td>2003</td>
<td>The development and maintenance of mental toughness in the world’s best performers</td>
<td>11 respondents: 4 male &amp; 3 female performers, 2 male coaches, 2 male sport psychologists; from a range of sports: aged 25-42 years; International experience at Olympics or Commonwealth games for either Australia, England, Canada, or Wales. Same participants as Jones et al. (2001) but later. Ethnicity not stated.</td>
<td>MT development &amp; maintenance occurred over four distinct career phases: three developmental phases, and one maintenance phase. Factors included: skill mastery, competitiveness, circumstances, international competitive experiences, education, and advice, the use of psychological skills, access to an understanding social support network, and reflective practice. Positive and negative critical incidents were perceived by participants as either catalysts in initiating or enhancing specific components of MT. MT development viewed as a multidimensional construct.</td>
<td>Investigated the development and maintenance of MT in relation to Jones et al.'s (2007) four dimensions and 12 subcomponents. Highlights the importance of learning basic and advanced psychological skills to enhance the development and maintenance of MT. Sample both coaches &amp; performers with similar findings.</td>
<td>Identified global themes compared to some of Jones et al.'s (2002) MT attributes but broad identification of participants as MT by a large panel of coaches, with no reported description of what &quot;MT&quot; means prior.</td>
<td>Sample drawn from specific population (college athletes) or makes results less generalisable. Providing athletes with a definition as a starting point in discussions during the interviews may have influenced the findings.</td>
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Chapter 3: A Qualitative Exploration of Mentally Tough Behaviour in a High Performance Environment

This chapter is based on the manuscript currently under review with Sport, Exercise, and Performance Psychology:

3.0 Abstract

The primary aim of this research was to generate insight into observable behaviours displayed by mentally tough athletes, or mentally tough behaviour (MTb), across different contexts (e.g., training and competition) in an Australian football (AF) environment. A secondary aim of this research was to explore the utility of MTb as a distinct concept, and identify common behavioural qualities associated with MTb that separate it from other similar constructs. Two qualitative studies were conducted to explore observations and experiences of football department staff, and the lived experiences of athletes in an elite high performance AF environment. In Study 1, ten experienced full-time football operations staff were interviewed using a semi-structured interview guide, with inductive thematic analysis employed to analyse the data. Five main themes relating to MTb were identified: adaptive development, consistent training conduct, composed performance actions, responsible and accountable, and team supportive. In Study 2, five elite athletes were interviewed using a semi-structured interview guide developed from Study 1, with deductive thematic analysis employed to analyse the data. The findings expanded the knowledge base by clarifying and refining our understanding of these desirable behaviours across different contexts within an AF environment. Overall, the findings of the research provided preliminary support for the proposition that there exists a collection of MTb that are displayed more frequently by athletes considered mentally tough, compared to athletes considered less mentally tough. A collection of necessary and sufficient behavioural qualities, and a working definition of MTb is proposed to further our understanding of potential strategies to develop MT.
3.1 Introduction

Despite advancements in theory and research over the past 15 years, the collective knowledge base of mental toughness (MT) has been described as “theoretically murky” (Gucciardi & Hanton, 2016, p. 441). If we consider the circumstances in which the term “mental toughness” is applied by coaches, media and administrators alike, it is often when athletes have displayed an act or series of acts that is reflective of high performance, or failed to do what they were expected to do. Such anecdotal reports depict the centrality of behaviour for discussions regarding the conceptualisation of MT, yet little work has been devoted to clarifying these behavioural features. As a result, there remains a need for work that provides clarity regarding these observable displays, actions, or lack thereof, to refine conceptualisations of MT.

Researchers have adopted a range of approaches in their efforts to define MT within and across environments (Weinberg, Freysinger, Mellano, & Brookhouse, 2016), with several publications offering support for these different approaches (for a review see, Gucciardi & Hanton, 2016). Acknowledging this diversity in attempts to conceptualise MT, Gucciardi (in press) proposed an updated definition that incorporates aspects that are considered both fundamental and common across the literature, and which drew from recommendations for the specification of clear concept definitions (Podsakoff, MacKenzie, & Podsakoff, 2016). Specifically, MT can be defined as “…a state-like psychological resource that is purposeful, flexible, and efficient in nature for the enactment and maintenance of goal-directed pursuits” (Gucciardi, in press, p. X). This updated definition of MT represents an important expansion of past efforts because it clarifies the necessary and sufficient conditions of the concept. First, the overarching property is one that encapsulates a psychological resource. Second, as a psychological resource, MT can be distinguished from related concepts because it is a state-like, unidimensional concept that encompasses common psychological dimensions that incorporate purpose, adaptability, and efficiency.
With the development of MT being an attractive and necessary requirement for performers across many achievement settings (Bell, Hardy, & Beattie, 2013; Cowden, 2016; Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015), attempts to better understand what constitutes MT, or what collection of attributes a mentally tough performer possesses, remains an important agenda. The modus operandi of early MT research was to explore the perspectives of athletes (Bull, Shambrook, James, & Brooks, 2005), coaches (Driska, Kamphoff, & Armentrout, 2012), or a combination of these stakeholders (e.g., Connaughton, Hanton, & Jones, 2010). This methodological approach is also apparent in recent work that has sampled referees (Slack, Butt, Maynard, & Olusoga, 2014) and sport psychologists (Weinberg et al., 2016). However, there has been a topical shift in recent years to consider other factors that may add conceptual breadth to understanding MT, such as socio-cultural perspectives (Tibbert, Andersen, & Morris, 2015), or the application of organisational culture frameworks (Coulter, Mallett, & Singer, 2016). This research provides a different perspective of MT based on cultural factors, suggesting that earlier perspectives of MT reinforced a masculine ideal that allows organisations to push individuals without due consideration of their personal health and well-being (Tibbert et al., 2015).

As with any formative concept, advancements in the literature are a necessary process to refine our understanding of MT. However, it is important to acknowledge that, regardless of the context, individuals are required to integrate and display the shared values, beliefs, expectations, and desired behaviours of their environment, as a means to achieve success (Cruickshank & Collins, 2012). This perspective is supported by research in organisational environments (e.g., Kristof-Brown, Seong, Degeest, Park, & Hong, 2014), and from frameworks such as Bandura’s (2001) social cognitive theory in which athlete satisfaction (and performance) is tied to behaving in ways that are appreciated by the sporting organisation, to the benefit of both the athlete and the organisation (Aoyagi, Cox, & McGuire, 2008; Fletcher & Streeter, 2016; Wagstaff, Fletcher, & Hanton, 2012). Therefore, regardless
of how certain behaviours may be perceived by those external to the environment, an accurate understanding of what one is required or expected to do to facilitate and maintain high performance, in certain environments, warrants further exploration. Subsequently, preliminary research (e.g., Bell et al., 2013; Diment, 2014) and theoretical discussions (e.g., Gucciardi & Hanton, 2016; Mahoney, Gucciardi, Mallett, & Ntoumanis, 2014) have offered insight into the potential value of clarifying our understanding of mentally tough behaviour (MTb) for the conceptual evolution of MT.

3.1.1 Reconceptualising Mentally Tough Behaviour

Revisiting the definition of MT provided earlier, specifically “…a state-like psychological resource…” (Gucciardi, in press, p. X), our understanding of the strategies to observe this concept in athlete behaviour is currently limited. We propose a conceptualisation of MTb as a distinct concept, one that transmits the influence of this psychological resource (MT) into high performance (see Figure 3.1). Therefore, as a distinct concept, it is important to first consider how MTb can be defined in an attempt to clarify our understanding. The key criticism of scholarly work on MT to date is the lack of a clear concept definition (Andersen, 2011; Caddick & Ryall, 2012), thus, an essential step for scientific progress (Podsakoff et al., 2016) is to clearly define MTb. Although preliminary research has started the process of exploration into what represents MTb, little work has been directed towards specifying a concept definition that summarises current thinking and evidence. Specifically, it has been suggested that MTb can be assessed through “actual goal achievement in the face of pressure or adversity” (Hardy, Bell, & Beattie, 2014, p. 70), or “the consistent demonstration of salient behaviours across various situations or time points” (Gucciardi, Jackson, Hanton, & Reid, 2015, p. 68). However, these statements provide little clarification regarding the conceptual nature of MTb (e.g., necessary and sufficient attributes).
Guided by recommendations for creating clear construct definitions (Podsakoff et al., 2016), we consider several factors that are essential for the conceptualisation of MTb. First, as the core feature of MTb, behaviour can be defined as “the way in which an animal or person behaves in response to a particular situation or stimulus” (Behavior, 2016), or a specific action that can be qualified or specified through being seen, heard, or quantified (Gucciardi & Hanton, 2016; Kahng, Ingvarsson, Quigg, Seckinger, & Teichman, 2011). The emphasis is placed on the behavioural response; the things that someone does, or those observable displays, when responding to an external (e.g., performance feedback) or internal (e.g., planning process) stimulus. In performance contexts, the necessary behaviours would be those responses that maximise the likelihood of achieving one’s desired level of performance. In training or development contexts, the necessary behaviours would be those that allow for continued skill development to achieve, maintain and/or progress one’s desired level of performance. Second, past work on MTb includes links with goal achievement (Hardy et al., 2014), subjective or objective indicators of performance (Gucciardi & Hanton, 2016), high standards/effort (Coulter et al., 2016), as well as consistency and salience (Gucciardi, Jackson, et al., 2015). This information provides a useful starting point for a working definition of MTb pertaining to behaviour that is most likely consistently displayed,
maintains high personal standards and has an effect on subjective and/or objective goal achievement, as well as performance. However, clear conceptualisation requires preliminary research with subject matter experts to clarify the core set of attributes, or what qualities a behaviour must have, that will differentiate MTb from other concepts (MacKenzie, Podsakoff, & Podsakoff, 2011).

Further exploration of a behavioural approach offers the opportunity to investigate these qualities via the ‘signature’ behaviours of athletes considered mentally tough. Diment (2014) developed a systematic observation checklist of MTb by viewing competitive soccer matches that included Danish female athletes playing in either the under-18 national and senior national teams, and Danish male athletes playing in either the national or European (UEFA) competition. In total, 28 behaviour categories (e.g., ‘quick recovery after an error’), category descriptions (e.g., “quick and productive reaction immediately after an error or loss of possession”), and behaviour descriptions (e.g., “chasing ball; making a 2nd effort or getting quickly into position after an error, being tackled, fouling or losing the ball…”) were identified and subsequently rated by a group of coaches and sport psychologists as to what degree they represented MT. As Diment (2014) acknowledged, this study likely encompassed observations of players with varying degrees of MT, as there was no direct assessment of the players’ levels of MT. The checklist may therefore be limited in the extent to which it provides a reflection of signature behaviours displayed by mentally tough athletes. Furthermore, there was a focus on behaviours in a competitive match environments, and other contexts such as training were not discussed. The inclusion of varied contexts could provide a more complete perspective on MTb.

In their research with cricketers, Hardy et al. (2014) identified that their inventory was narrowly conceptualised on the premise that MT related primarily to maintaining a high level of performance during competition. The items of their informant-rated tool were structured to assess how regularly an athlete was able to maintain a high level of performance under certain
conditions (e.g., aggressive tactics by the opposition, a close match), as opposed to what an athlete is observed to do to achieve a high level of performance (e.g., maintain a high run rate regardless of playing conditions). As high performance is determined by the complex interaction of psychological, physical, technical, and tactical skills, equating one’s capacity to achieve a “high level of personal performance in competitive matches” (Hardy et al., 2014, p. 71) to their MT is problematic because it does not clarify the necessary and sufficient attributes of the concept. As such, their tool is also limited to an overall snapshot of performance in competitive situations, with no evaluation of the desirable behaviours in other contexts that may provide more useful information for the development of MTb.

Although previous research has provided valuable contributions to our understanding of MTb, there has been minimal discussion regarding the different contexts (e.g., training, competition) that afford athletes the opportunity to develop and display these behaviours. This discussion has the potential to shed more light on the necessary and sufficient qualities of MTb. For example, behaviours displayed by mentally tough athletes outside of competition, such as during training (e.g., time spent on specific skill development), or more generally (e.g., seeking performance reviews with a coach), represent an opportunity to advance our understanding of the concept, and the developmental processes that contribute to those “on-field” displays. The importance of such person-context interactions is central to conceptual frameworks of human development (Bronfenbrenner & Morris, 2006) and is consistent with past qualitative work on the development of MT (Anthony, Gucciardi, & Gordon, 2016). That is, each individual’s personal capacity to display certain behaviours is influenced by a range of interdependent person-context factors over time. In most achievement-oriented environments, it is likely that the behaviours a performer wants to develop and frequently display across contexts, are those desirable behaviours that lead to

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1 Importantly, when discussing contexts in this research, we use Bronfenbrenner and Morris’s (2006) conceptualisation, which focuses on the effects of the different physical and social situations occurring within the one environment that can influence one’s development.
goal attainment. Initial research has supported a link between goal attainment and MTb, regardless of the cognitions, emotions, and attitudes an individual may be experiencing (Hardy et al., 2014). As a result, seeking to identify and define behavioural representations associated with MT, or what MTb looks like, how and when they are developed, and in the contexts where they are displayed represents an important next step for the conceptual evolution of MT.

3.1.2 Overview of the Present Research

The primary aim of this research was to generate insight into observable behaviours, or MTb, displayed by mentally tough athletes across training and competition contexts in an Australian football (AF) environment. An AF environment was chosen as a result of a professional club’s interest in exploring MT development as a means to improve individual and team performance. To achieve this goal, we conducted two studies that were designed to enhance both the breadth and depth of information pertaining to MTb, drawing on recommendations to include perspectives of a range of roles (i.e., sport scientists, administrators, coaches, and players) within a sporting organisation (e.g., Cook, Crust, Littlewood, Nesti, & Allen-Collinson, 2014; Coulter et al., 2016). A qualitative approach was adopted to explore experienced informants’ observations of elite athletes within high performance environments, as well as the ‘lived experiences’ of athletes. We aimed to target only what can be seen, not inferred, to identify those behaviours displayed by performers considered to have a high degree of MT. We employed semi-structured interviews, with the interview guides based on Kelly’s (1955/1991) Personal Construct Theory, which has informed past work on MT (Anthony et al., 2016). Using this theoretical foundation, our methodological approach provided participants with the opportunity to identify and define, in their own terms, the behaviours they consider to be important to MT (or what MTb looks like), as well as the behaviours considered unimportant to MT.
3.2 Study 1 – Experienced Informants’ Perspectives on MTb

The primary aim of this study was to explore experienced informants’ perceptions of MTb within an AF environment, with due consideration to behaviours demonstrated in training and competitive contexts. This sample encompassed individuals engaged in professional AF for an extended period, and the interview targeted their observations and experiences at the professional AF level.

3.2.1 Method

3.2.1.1 Sampling and participants

Participants were purposefully sampled using criterion-based procedures such that they: (i) were aged 18 years and above; (ii) had at least 10 years of full-time experience in high performance settings as a coach, sport scientist, or sports administrator; and (iii) observed and interacted frequently with athletes before, during, and after training sessions and games (Freeman, 2014). These criteria were guided by the notion of information power (Malterud, Siersma, & Guassora, 2015), in which an adequate sample for qualitative research is informed by the relevance of participants for the study (e.g., aims, quality of dialogue). Additionally, guided by concepts regarding data saturation (O’Reilly & Parker, 2013), the decision to cease interviews was made when little new information arose in terms of breadth or specificity of existing themes. In total, 10 male experienced informants ($M_{age} = 45.4$, $SD = 7.77$) participated, each with a minimum of 15 years of full-time experience at the elite AF level ($M_{exp} = 19.9$, $SD = 6.12$). At the time of involvement, participants were employed by a professional AF club in football operations related roles, including coaching ($n = 4$), sport science ($n = 3$), and football administration ($n = 3$).

3.2.1.2 Data collection

Following institutional ethical approval, the club’s High Performance Manager was provided with details of the participant inclusion criteria, and he identified a list of 11 candidates considered suitable in light of these criteria and the aims of the study. The first
author contacted each prospective participant via phone, email, or face-to-face. Ten candidates agreed to participate, with all interviews conducted face-to-face and audio recorded by the lead author in either the participant’s office or a club meeting room.

Participants were provided with a verbal brief of the research project, an information sheet and consent form, as well as a MTb workbook that was used as a framework to guide the interview process (see Appendix B, with instructions to participants included). A semi-structured format was used to promote flexibility and convenience in gathering information (Patton, 2002). Questions were framed to be open-ended (e.g., “What do you see athlete X doing during training sessions that makes you think he is mentally tough?”), with a range of probing techniques (i.e., clarification, elaboration, and contrasting; e.g., “How do the actions of athlete X differ from athlete Y following a mistake during a game?”) in an attempt to elicit detailed and rich information regarding MTb. The interviews lasted between 23 and 37 minutes ($M = 31$ minutes, $SD = 3.86$ minutes), with the audio recordings transcribed verbatim to yield 111 pages of single spaced text.

### 3.2.1.3 Data analysis

Interview data were analysed using inductive thematic analysis, drawing on Braun and Clarke’s (2006) six-phase process as a means by which to identify, analyse, and report patterns within a qualitative data set. This analytical approach was preferred, given the limited research into MTb, and the desire to identify themes in terms of observable behaviours in athletes considered mentally tough. The first author familiarised himself with the data through the transcription process, listened to the audio recordings to check accuracy of the transcripts, and then reviewed the transcripts a second time. The second phase involved a first review of the transcripts to identify provisional labels, including interesting features and

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2 The MTb workbook was developed through pilot work with 42 undergraduate students in an exercise and sport science cohort to maximise comprehension and ensure the data gathered was contextually relevant.
quotes within the data, which were progressively compiled in an excel spreadsheet. Third, the
data was collated into broad themes using an iterative process amongst the three collaborating
authors. Adhering to a type of consensual generation of themes (e.g., Marcus, Westra, Angus,
& Kertes, 2011), the first author interpreted and reported themes, with feedback and further
refinement of ideas sought from the collaborating authors. This interactive approach was
used to facilitate the development and challenging of ideas as opposed to a more structured
process (e.g., authors’ coding chunks of text independently, then assessing inter-rater
reliability). The fourth phase involved checks of the themes against the coded extracts and
the whole data set, with ongoing discussion and refinement amongst the collaborating authors
allowing for the generation of a provisional thematic map. Fifth, in a similar iterative fashion
amongst the three analysts, the themes were defined and labelled in an attempt to best
represent the data. The sixth phase involved the selection of representative extracts for each
of the themes to relate the analysis back to the research question.

3.2.1.4 Methodological rigour

As a key factor when evaluating the rigor of qualitative research (Rubin & Babbie,
2008), the quality of this project was augmented through the adoption of several strategies to
achieve sensitivity to context, transparency and coherence, commitment and rigour, and
impact and importance (Yardley, 2000). Prior to undertaking data collection, the MTb
workbook was piloted to confirm that it was appropriate for the purposes of the study, and to
ensure the data gathered would be contextually relevant, rich, and useful (Tracy, 2010). To
foster transparency and coherence, we employed (i) three analysts during the latter phases of
the analysis to consider different perspectives on how themes could be collated and defined,
(ii) regular discourse, debate, and collaboration during research meetings, and (iii) open
discussions about individual thoughts, biases, and reactions to the data during meetings. In
terms of sensitivity to context, (i) interviewer consistency, (ii) pilot interviewing, and (iii) the
interviewer’s immersion within the club for a six month period fostered rapport building and
Commitment and rigour were addressed through purposive sampling and consideration of information power regarding the sample size. Finally, in the discussion we place the results of this study within the context of past research and theory, elaborate on important socio-cultural considerations, and identify key practical implications.

3.2 Key Findings

Following are the five main themes that were identified with regard to observable behaviours in athletes considered mentally tough. In line with Personal Construct Psychology (PCP; Kelly, 1955/1991), the themes included descriptions of what MTb looks like, or those behavioural qualities frequently displayed by athletes considered mentally tough, as well as contrasting descriptions of behavioural qualities that were displayed by athletes considered less mentally tough. Descriptions, behavioural qualities, and representative quotations of each of these themes are detailed in Table 3.1, with supporting information provided in the following sections.

3.2.2.1 Adaptive development

Participants described a range of observations that related to athletes facilitating ongoing progression and development of skills, and the adaptability to sustain growth. The behaviours identified relate primarily to the processing of experiences through language and engagement with others, which provided the foundations for change in on-field actions. For example, one administrator discussed the importance of being able to effectively process information for development. He identified how an athlete considered mentally tough would work through a learning situation: first identify, then discuss the learning points, and subsequently implement those learning points as a part of his future behaviour:

You can see the players that do it well; they will make a mistake – say give away a serious penalty when defending due to poor position – and seek out the information from other players and coaches to avoid doing it again, and you rarely see that same mistake twice. You will see that good player working on it at training without prompting, he will enlist the help of coaches. But those players that don’t do it well, you watch them give away those same penalties in defence multiple times. And these players require continued encouragement at training to work on it, to get it right.
Another example, when describing an athlete’s adaptive approach to adversity, one coach identified how a mentally tough athlete is able to perform well consistently, acknowledging that he can do what is required in light of setbacks. The athlete used positive language to orient himself to performing to his best, whereas the other player considered less mentally tough had a tendency to communicate with a more negative orientation:

He used to say: "Well if I'm running out I'm playing to the best of my ability." He can perform at his peak when he’s not maybe 100%, because he’s returning from injury. He had the ability to perform his role, even when he’s not playing at 100% of his capacity.

That other player needs significant support to get over that hurdle to feel like they're capable of playing and even when you get them over that hurdle they're almost playing with a sticker on their back going, "I'm coming back from injury. Don't expect me to do great things today."

3.2.2.2 Consistent training conduct

Participants provided a range of different examples that captured the importance of athletes demonstrating effort and energy during training in a consistent manner, regardless of recent individual or team results. On the demonstration of effort, one sport scientist described the apparent differences in application between an athlete considered mentally tough and one he considered less mentally tough following poor performances:

That mentally tough player, regardless of what happened on the weekend, he’d come to training prepared, ready, seemingly with a single-minded purpose to be better than he was. You’d see him pushing himself in each drill, out the front in fitness sessions, there at every optional session, loud and constructive voice, on the training track, in the weights room, in team meetings. The other bloke, when the going gets tough he’d almost stop. He’d roll up later, miss optional sessions that he needed. He was good when his performance was up, and did the same things the mentally tough player did, but he’d go into his shell, and he’d be out the back in running drills, not talking, in the weights room he’d be last in and first to leave.

Another example provided by a sport scientist related closely to the motivation process and the resultant maintenance of energy during training, that is, how a mentally tough athlete set goals and challenged himself:

You’d see him enjoying the challenge almost all the time… Seemed to genuinely enjoy, if there was a challenge between him and anyone else in a training drill, like a marking contest, or even a loose ball, he’d throw himself into it to try and show that he was better at it than someone else. The less mentally tough player, well his application to training would drop off when he was up against someone better, and he’d get
beaten; it’s as if he was saying: “I’ve been challenged here, he’s a better player, so I’m not going to worry about it.”

3.2.2.3 Composed performance actions

Participants identified the importance of athletes’ ability to perform under pressure, with examples provided relating to players considered mentally tough displaying composure under pressure on a more regular basis than other performers. Behavioural qualities focussed on greater consistency in skill execution in performance situations. One administrator referred to observations of a collection of players whom he believed were mentally tough, as well as contrasting observations:

These guys perform under all sorts of circumstances … consistently execute what they needed to do when it was necessary; the appropriate skills for that situation. Not get distracted, not blow up, not let self-doubts affect their performance… The opposite, well you see them get bedazzled [stunned] or panicked, they lacked consistency of performance when under pressure – they would fumble and take longer to dispose of the football, not follow the game plan.

A description by a coach highlights the importance of relying on well developed, or “base” skills to display composure when under pressure:

No matter what the situation, I don’t think you ever see them get angry, or show any outward frustration. Even when things are turning to shit, so to speak, it’s, “OK. Back to my starting point. Go over my base skills again. Put in the same level of effort as I did just then.” It shows that they’re going to maintain their effort. They’re going to maintain performance.

The contrasting observations of a less mentally tough athlete provided a different perspective, with one mistake regularly leading to more: “They drop their bundle altogether, and the next time the ball comes down, it’s [the mistake] just all going to happen again.”

3.2.2.4 Responsible and accountable

Participants identified the tendency for athletes considered mentally tough to communicate in ways that indicated they accepted responsibility for their performances, and that they had the capacity to make changes. The language they use and the actions they choose on and off-field represent their acceptance of personal responsibility, maturity, and
assertiveness. On language highlighting an athlete’s acceptance of personal responsibility, one coach described his interactions with a footballer following a poor performance:

He would come into his reviews and say: "I had a bad game, and it’s not like me. I’ll turn it around. My best and worst is not what I’m showing. My best is here. My worst is there. I’m currently here. I’ve got a lot of upside" It wasn’t arrogant, or inaccurate, just his positive self-talk.

When asked for an example of a contrasting athlete, the coach identified:

The other bloke, well you could hear it in his chat, he’d doubt himself: “Well that’s me. I regularly drop those sorts of marks. I always miss shots on goal from that pocket [field position]."

A number of participants identified that athletes considered mentally tough would conduct themselves in a mature and assertive manner during difficult conversations. On discussing athletes who demonstrate this behaviour well and those who do not, one coach highlighted:

They [the mentally tough players] would enquire why and they would still reason through, they would still maybe put their point of view but, at the end of the day, say, “Well OK, I’m going back to [the reserve team] and I’m going to do the best I can." The other guys, they voice their disapproval [about being relegated] and say "Oh, bugger this", and play poorly in [the reserve team].

Another type of behaviour pertaining to this theme relates to the importance of acting responsibly during on-field decision making, specifically with regard to considering individual strengths and limitations in skill execution. On describing examples of a player displaying responsible actions, and the contrasting example, one sport scientist stated:

He’s not a great long kick, but what he can do, and he knows he can do, is hit those 20-30 metre [targets with his] kicks every time. But if you ask him “why didn’t you kick it 40 metres over a bloke’s head to one of our guys who is clear?” , he’ll say “that was outside the [team guidelines], and I didn’t take the kick initially because I know my limitations and that was too high risk”. Instead he’ll look for other options that play to his strengths first. The other player, he’ll take that high risk option – blaze away and then blame someone else when it doesn’t come off – “It's someone else's fault. It's not my fault. It’s … the coaches for not working with me enough".

3.2.2.5 Team supportive

A number of examples of actions that suggested athletes considered mentally tough place the team needs before their individual needs in an AF environment were provided. Both the way they communicate and their actions across contexts in this environment portray a
selfless approach that represents the espoused organisational values. One example conveyed by a coach, relating to performance specific team needs, was as follows:

Straight after a game he wants to know, "What have we got to improve on?" His focus is on the team and his teammates before he’ll worry about himself. The selfish guy, he’s purely worried about his own game; no consideration for anyone else but himself. This guy will sit there in the game reviews and not engage, not offer opinions or ask questions, especially when he may have played well, regardless of team performance.

When discussing organisational values-related behaviours, there was regular discourse about those athletes considered mentally tough being able to adapt more quickly to cultural change.

On explaining behaviour that represented alignment with changing team values and the contrasting behaviour, one administrator highlighted:

He wasn't afraid to speak up and say, "This is now what is expected of us. This is now what we should be doing. This is now how we should behave." Once he understood the change, he could easily explain to others what was needed, as well as do those things himself. He’d be the one saying "Come on let's go. It's time to hit the sack [go to bed]". The opposite, well that player is focused on himself. When he’s asked to sacrifice something for the good of the team, he’ll rarely do it. He knows what the team standard is, but he’s got other mates going, “Oh, you don't need to do that. You know, you’re OK as it is – you never used to have to do that”, and he does what he wants, what he’s always done.

A sport scientist also provided support for the contrasting perspective:

They don’t buy into the club culture; the values and everything that the players had set up. “My mate said come out for a beer so I’ll go for a beer” when they know they’ve got training the next day.
### Table 3.1: Mentally tough behaviour categories, descriptions, and behavioural qualities, with representative and contrasting quotes from Study 1.

<table>
<thead>
<tr>
<th>Category label</th>
<th>Description</th>
<th>Behavioural Qualities</th>
<th>Representative quotes</th>
<th>Contrasting quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adaptive Development</strong></td>
<td>Displays ongoing progression in the maintenance of strengths and refinement of development areas, and adapts to changing situations to sustain growth and performance.</td>
<td>Exhibited in training contexts (e.g., growth). Exhibited in competition contexts (e.g., performance). Valued by individual, teammates, and organisation. Voluntary and observable.</td>
<td>Coach: They will say, “no give me more…” without being silly about it. They know themselves well enough to be able to say, “give me more”, or “I need more”, or “it’s time – I’ve got to stop”.</td>
<td>They don’t follow the best advice that’s been given to them. They consistently do what they want and not what others advise them to do with the expertise.</td>
</tr>
<tr>
<td><strong>Consistent Training Conduct</strong></td>
<td>Effort and energy levels, and valued behaviours during training remain consistent regardless of situation.</td>
<td>Exhibited in training and rehab contexts. Valued by individual, teammates, and organisation. Voluntary and observable. Enhances likelihood of individual goal achievement.</td>
<td>Coach: It's about training to a standard, and not the standard of the training you're at, but the standard that you set yourself, that standard expected by the coaches.</td>
<td>Will do the training and tick the box and go, &quot;Yeah, I ran three 1 kr's [1km time trial].&quot; All right, &quot;Did you run them in three minutes 30 like we're supposed to?&quot; &quot;Oh, nearly.&quot;</td>
</tr>
<tr>
<td><strong>Composed Performance Actions</strong></td>
<td>Displays and/or verbalises positive behaviours, and acts decisively in pressure situations.</td>
<td>Valued by individual, teammates, and organisation. Exhibited in competition contexts. Can be quantified by observer. Enhances likelihood of individual goal achievement. Enhances the likelihood of collective goal achievement.</td>
<td>Coach: These blokes will work hard to get a kick. These blokes will work just as hard to stop someone getting a kick, regardless of the scoreboard. They apply their skills consistently, when most things are thrown at them, they can cope with it and still maintain their performance.</td>
<td>When the opposition's got the ball and he's jogging back to defend and he looks absolutely rooted. We mark it and then he's off like the clappers so within a space like that the intensity goes from here to here because now we've got the ball.</td>
</tr>
<tr>
<td><strong>Responsible and Accountable</strong></td>
<td>Acknowledges role in mistakes and performance, and asks questions to understand what needs to change.</td>
<td>Voluntary and observable. Can be quantified by observer. Valued by individual, teammates, and organisation. Exhibited during reviews, meetings, and lectures. Enhances likelihood of individual goal achievement.</td>
<td>Administrator: Don’t look for excuses: sometimes you just met a better opponent, sometimes you played poorly, or sometimes you had an off day. That happens.</td>
<td>Not being able to admit that he stuffed that up; always someone else's fault, or there's a laying of blame. They make up excuses, the way they speak. When it's a hot day it'll be that, or &quot;My toe is sore&quot;.</td>
</tr>
<tr>
<td><strong>Team Supportive</strong></td>
<td>Acts in ways that benefit the team, asks questions to ensure he can best perform his role to benefit the team, and takes collective approach to performance.</td>
<td>Valued by individual, teammates and organisation. Exhibited during training, reviews, meetings, and lectures. Enhances the likelihood of collective goal achievement.</td>
<td>Sport Scientist: If he feels that the outcome is based around what the group colludes together to do, he'll fit into the group to get that outcome even at the expense of himself.</td>
<td>Opting out or complaining. So they will voice their displeasure at being put in a particular group or position. They might feign injury, illness, whatever to avoid the participation and/or just moan and complain.</td>
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</tbody>
</table>
3.2.3 Discussion

The findings of this initial study indicated that, collectively, the administrators, sport scientists, and coaches discussed similar desirable behaviours in athletes they considered mentally tough, and common less desirable behaviours in athletes they considered less mentally tough. As previously suggested (e.g., Caddick & Ryall, 2012; Coulter et al., 2016; Tibbert et al., 2015), the results of the study must be considered in light of the socio-cultural influences that this particular AF environment may have on the participants’ observations and experiences. Notably, in light of these cultural considerations, there was also a tendency for coaches to use ‘all-or-nothing’ language when referring to what it was that mentally tough athletes actually do (e.g., “He *always* trains harder than his teammates”, or “He’d *never* get beaten in a contest.”), which has been cited as an ongoing problem with the conceptualisation of MT (e.g., Andersen, 2011). As a result, there was a consistent requirement to probe participants for further information; to qualify and specify the actions demonstrated by the athlete when he is training harder than his teammates (e.g., “What actions did they display to make you think they trained harder than his teammates?”), as opposed to their subjective interpretations.

These findings also draw attention to the limited specificity regarding the conceptualisation of MT by experienced stakeholders. In their research with experienced AF coaches, Gucciardi, Gordon, and Dimmock (2008) identified that mentally tough athletes were often seen as exemplars of doing *everything* right. Several years later, it appears this all or nothing perception of MT remains in a similar cohort, which is supported by recent research in an AF environment (Coulter et al., 2016). As an alternative view to MT as a culture-specific construct that is less changeable due to broad historical or cultural influences (acknowledging that culture has an influence on what might be considered valuable; i.e., ‘team-supportive’), it may be that we are yet to commit the time to understand adequately what MT looks like and how it can be developed in elite environments. Elite athletes will
adopt different physical skill training programs for different reasons (i.e., according to career stage) compared with their closest rival, yet both types of athletes can achieve success (Halson, 2014; Kraemer, Duncan, & Volek, 1998). These differences suggest that physical skills and high performance are not developed solely by doing *everything* right. If this is the case for physical skill development, it is antiquated to consider the process of psychological skill development as different. Practitioners have highlighted the importance of tailoring psychological skills training programs to suit individual needs and career stage (e.g., Gould & Maynard, 2009). Therefore, discouraging this categorical perspective by promoting discussion about what we observe mentally tough athletes do and when, allows an opportunity to deconstruct MT, and makes the prospect of understanding and developing this resource and other psychological skills a more achievable process in the eyes of stakeholders.

Overall, the findings from Study 1 offer an opportunity to progress our understanding of MTb from the perspective of experienced stakeholders. Although there was an initial trend to discuss the concept in categorical language, the commonality in the information provided by participants suggests there are similar behavioural qualities observed in mentally tough athletes within this environment. The results provided an opportunity to understand broad categories of MTb, yet there was limited opportunity to identify the specific behaviours more or less important to each category, and whether they aligned with everyday experiences of high performing athletes. Therefore, it was deemed necessary to explore whether these categories were relevant to the “lived experiences” of high performing athletes, and how these athletes viewed both their own behaviours and those of high performing teammates.

### 3.3 Study 2 – The Lived Experience of MTb

Building on our understanding generated from informants’ perspectives, Study 2 explored the perspectives of high performing athletes through their “lived experiences” of MTb and the related behavioural qualities. The primary aim was to clarify and refine the
details of observable AF behaviours relating to the MTb categories, according to the lived experiences of those athletes considered mentally tough.

3.3.1 Method

3.3.1.1 Participants

Drawing on purposive sampling, the High Performance Manager was asked to identify athletes (i) considered mentally tough by the coaching group, and (ii) able to articulate their perspectives of the “lived experience” of these MTb categories and related behaviours. Participants were five male footballers ($M_{age} = 27.60, SD = 3.1$) currently contracted to a professional AF club. On average, participants had been involved at their current professional level for 10 years ($SD = 3.1$), and played between 120 and 270 games at the elite level ($M_{games} = 157, SD = 57.77$). To contextualize these statistics, the average playing career in the AFL is 4.7 years ($SD = 3.8; Mdn = 3$ years), with the average number of AFL games played at approximately 56 ($SD = 70.9, Mdn = 25$ games) (AFLPA, 2012).

3.3.1.2 Data collection and analysis

The first author contacted each footballer to identify a suitable location and time to conduct the interview. All interviews were conducted face-to-face and audio recorded by the lead author in the club meeting room. The format of the interview was semi-structured to allow for flexibility and convenience in gathering information (Patton, 2002). On the day prior to the interview, each participant was emailed a brief outline of the project, information regarding the MTb categories identified in Study 1, and a list of questions to allow them an opportunity to consider their responses, which they were requested to print out and make notes on prior to the interview. Prior to the interview, participants were provided a verbal brief of the outline of the research project and reviewed the information relating to the behavioural categories, prior to distributing a participant information sheet and consent form. Once the participants had read through the information sheet and signed the consent form, they were then provided with a verbal brief of the interview process prior to beginning the
audio recording. All questions were developed using the data collected in Study 1, and were framed to be open-ended (e.g., “What do you see athletes doing at training to put themselves outside of their comfort zone?”), with a range of probing techniques (i.e., clarification, elaboration, and contrasting) employed during the interview in an attempt to elicit more detailed and rich information. The interviews lasted between 23 and 62 minutes ($M = 50$ minutes, $SD = 16.42$ minutes), with the audio recordings transcribed verbatim to yield 64 pages of single spaced text. Using deductive thematic analysis and guided by Braun and Clarke’s (2006) six-phase process, participants’ interviews were analysed, described and organised in accordance with the MTb categories presented in Study 1. Methodological rigour was maintained by using the same data analysis strategies reported in Study 1.

3.3.2 Key Findings

Following are the responses grouped according to the five main themes identified in Study 1, with an emphasis on drawing out examples of observable behaviours for each theme. There remained an initial tendency for participants to revert to non-observable factors when seeking to describe MTb (e.g., On how a player improved kicking accuracy to be more composed in games: “It’s just about giving confidence… everyone backing him”), but the use of accepted probing techniques (e.g., “What are the things you observed him doing in training that assisted in developing his confidence”) often elicited more detailed information:

Well, he grabbed a coach and a couple of the guys who also have trouble with kicking accuracy like he did, and they work through [kicking drill x] once a week after training. He doesn’t have to do it as much as he used to, but he knows continuing to do it will develop and maintain his confidence in his kicking accuracy, and having the other guys there will improve their confidence in games.

There was a level of agreement in responses across participants, but some contrasting explanations of the themes when compared to the findings from Study 1. A summary of the findings by categories is detailed in Table 3.2, with other important factors that portray the actions of athletes considered mentally tough described hereafter.
Table 3.2: Mentally tough behaviour categories, components, and example behaviours.

<table>
<thead>
<tr>
<th>MTb Category</th>
<th>Component</th>
<th>Contrasting Component</th>
<th>Example behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adaptive Development</strong></td>
<td>Maintains high performance following either setbacks or success.</td>
<td>Performance adversely affected by difficult situations or events.</td>
<td>Communicate situation changes during drills and adjust accordingly.</td>
</tr>
<tr>
<td></td>
<td>Expects and seeks challenges but focuses behaviour on controllable aspects.</td>
<td>Less likely to seek challenges or adapt following mistakes.</td>
<td>Works on identified skill weaknesses as well as specific strengths that mitigate them.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Seeks out and implements honest feedback.</td>
</tr>
<tr>
<td><strong>Consistent Training Conduct</strong></td>
<td>No noticeable change in effort at training when losing or winning, preparing for “big games” versus practice matches.</td>
<td>Effort changes with success; one error leads to more and form slumps are larger/longer.</td>
<td>Physically prepared and ready for training, meetings, and club commitments.</td>
</tr>
<tr>
<td></td>
<td>Displays an understanding of own body (ideal preparation and maintenance) and skills.</td>
<td>Less application at training during tough periods for team and/or individual.</td>
<td>Adheres to routine (recovery, hydration, diet).</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Goes for hard options at training such as competing/testing self against better teammates.</td>
</tr>
<tr>
<td><strong>Composed Performance Actions</strong></td>
<td>Acts decisively and confidently in pressure situations (e.g., “takes charge”/“leads”).</td>
<td>Noticeable change in behaviour between success and failure.</td>
<td>Displays strong individual skills (uses own strengths).</td>
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<tr>
<td></td>
<td>Regularly displays/models correct behaviours in games (e.g., team values).</td>
<td>Indecisive, easily distracted and slow to respond in pressure situations.</td>
<td>Composed execution of skills under pressure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Appears less affected by unexpected situations.</td>
</tr>
<tr>
<td><strong>Responsible and Accountable</strong></td>
<td>Acknowledges role in mistakes and poor performance, and explores/seeks to understand what needs to change.</td>
<td>Will not admit to faults/mistakes; gives excuses and blames others.</td>
<td>Talks in a way that shows ownership of personal performance.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Displays awareness of own strategies necessary for personal development.</td>
</tr>
<tr>
<td><strong>Team Supportive</strong></td>
<td>Acts in ways that benefit the team (structures and culture); open with, honest and supportive of teammates and coaching staff.</td>
<td>Makes selfish decisions that do not align with team culture/values.</td>
<td>Encourages others and provides positive/constructive feedback in communications.</td>
</tr>
<tr>
<td></td>
<td>Asks questions to understand own place in team and takes collective approach to performance.</td>
<td>Limited consideration for how/where they best fit in the team.</td>
<td>Sticks to team structures and own role in team.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Actions reflect team rules/values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Develops knowledge of multiple roles to support team.</td>
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</tbody>
</table>
3.3.2.1 Adaptive development

This category included MTb that encapsulated the importance of ongoing development throughout one’s career, as well as the flexibility to identify and incorporate the development opportunities regardless of the situation. Mentally tough athletes were described as utilising multiple information sources to facilitate their development. The following quote illustrates this common theme reported by many of the athletes:

They constantly look for opportunities to develop their skills, but they are also smart about it – more is not always better. We have access to a range of feedback from all our coaches, support staff, and our teammates, and we need to be proactive within these feedback loops to improve and adapt, not wait for the feedback to come to us. Those mentally tough players are the ones that you see asking lots of good questions of different people at the club – using that feedback loop to improve their football and adapt when things change.

Athletes also discussed strategies that allowed them to manage difficult situations, which was achieved through a process of engaging in a type of reflective practice, both individually and with others. It was viewed by one player as being exposed to unfamiliar situations at training, but also taking the time to understand what worked and what did not:

Those players keep looking for something unfamiliar. You see them trying new things in training, but then after you will see them talk through it with another player or coach to see if it worked. They keep aware of what’s going on and what’s happening, and asking all those sort of questions to themselves and those around them. Then in a game they know what works, what to do, and just keep doing it.

3.3.2.2 Consistent training conduct

This category relates to the importance of maintaining high effort and energy levels at training, regardless of recent performances or the significance of upcoming matches. The focus of this category is more on training and preparation, with athletes considered mentally tough working to develop an accurate understanding of what they need to do to achieve and maintain high performance, and include these behaviours as a part of their routine. When discussing what he had learnt from a mentally tough teammate, one footballer reported:

He was aware of the environment that suits him to perform well. You’d see him trying different things prior to training, sort of like he was trying things out, but he’d always make sure he had time to go through his normal routine, both prior to training and games. He’d get out on the track [for training] and perform at a very high level from
the first drill … and he looked like he enjoyed it all. His body language rarely changed.

In terms of developing confidence, themes related to athletes regularly seeking out more experienced or more skilled players during training. On his observations of one of his mentors, one footballer recounted:

> Whether it was before training or after training, every training session he’d try and do body work with the bigger guys…particularly when he was younger he would grab player A, now he grabs player B; these guys are like the guys he’s going to play on and he would practice playing on those guys. Work out little ways to beat them, effectively preparing himself and building his confidence.

Importantly, there was an emphasis on continually developing competence on a range of skills during training, but also continuing to work on these skills to ensure the athlete was comfortable and confident in being able to display them under pressure, regardless of the situation. One player described his approach:

> It’s about just continual learning, and each situation that we’re in, if it’s not learning something it’s reinforcing something and just pushing that as much as I can – how good I can get at actually doing it. So when the time comes [in a game] I’m just doing it instinctively. I feel as though I will do it confidently and properly.

### 3.3.2.3 Composed performance actions

This category pertains to the ability to maintain composure during performances, and display the necessary behaviours for a given situation when under pressure. Although it is likely that one’s ability to maintain composure is developed through consistency in training and preparation (vis-a-vis consistent training conduct), it is important to differentiate between the two categories due to the different contexts. Athletes considered mentally tough were often said to have the requisite confidence in their ability to perform the necessary skill regardless of how much pressure is on them, to act decisively, with their often consistent body language providing support for this belief. When reflecting on how he identified the importance of keeping his composure and relying on his defensive skills during games, one footballer highlighted that his coach suggested he spend time observing footage of a club.
legend. His recount of those observations, which he had subsequently implemented into his own actions to refocus himself after a contest, was as follows:

If he lost one [defensive] contest and was under pressure, it didn’t mean he lost the next contest. Each time he would revert back to his basic defensive skills: arm in front of opponent, inside position ... You knew exactly what actions you’re going to get [from him], and when you’re going to get it.

Another important factor for this category is that the behaviours are visible to others during a range of performance situations. A footballer, when describing who he modelled his composed behaviour on during games, stated:

Irrespective of whether the game was tied, a big discrepancy, whether we were winning by 100 points or losing by 100 points, they were consistent in how they undertook their [assigned] role, down to each contest during a game. One example was how [player D] would communicate to us; the majority of the time he spoke clearly and pretty calmly, and what he said was in line with the coach’s messages, regardless of the scoreboard.

3.3.2.4 Responsible and accountable

The focus of this category is about taking responsibility and being accountable for one’s own actions, both positive and negative, acknowledging that mistakes and poor performances sometimes occur. Importantly, such events offer an opportunity for growth when an athlete accepts personal responsibility and seeks the information to change. On describing what language is heard when players do not assume responsibility for their actions, one footballer reported:

Players sometimes don’t admit to a mistake, say every kick they made they would go, “Oh, he should have led there” and they never took ownership, you know? If you think you never make a mistake you never learn … I think understanding that mistakes are important, that they’re important to improving, that you take ownership of them.

Another factor in this category relates to athletes considered mentally tough building their self-awareness of personal strengths and weaknesses, and personal strategies that allow them to overcome a mistake. This self-awareness is important during training and performance contexts to facilitate longer term development. In looking for explanations why something did not work or how to do it better, links with individual learning preferences were identified:
Players need to be really aware of how they learn, on how they can get better, on how they’ve developed their own strengths and weaknesses. So for player X, for him to improve his defensive side of the game, he has to ask to play defence. Learn from his mistakes, and commit to it … reflect on it, and get feedback … take ownership [for what he does]… If players are encouraged to think about how and why they’ve got to where they’ve got to then they can start building some self-awareness…

3.3.2.5 Team supportive

This category relates to taking a collective approach to improving performance.

Although it may seem that there is less emphasis on personal goals, this category underscores the importance of person-environment interactions for development. Specifically, if an athlete performs their role within the team, and actively promotes the values of the team through their behaviours, then it is expected that the environment will provide increased opportunity for their own development. When discussing one of his teammates who exemplifies this category, one footballer stated:

He’s [player C] really professional at his own football approach but then he’ll be in here on his day off doing extras with another player that has to do additional sessions because his skin folds are up too high. He [player C] doesn’t need to do extras, but he knows it’s important to the team and that player; he’s doing the right thing for the group, and it’ll probably help him too.

The process of providing constructive feedback to benefit the team and individual, with a team-first focus, described by one player as “a balance between science and art,” was a behaviour that was regularly displayed by mentally tough athletes:

Those guys that are really good at the art of giving feedback, they can de-personalize what it is. They never use feedback as a mechanism to raise a personal vendetta against somebody or to have a crack at somebody’s personal character it’s always about making the team better and making the individual fit better into the team.

3.3.3 Discussion

The purpose of Study 2 was to explore the perspectives of athletes considered mentally tough through their “lived experiences” of the MTb categories identified in Study 1. As in Study 1, the athletes had difficulty at times elaborating on the specifics of MTb, with the tendency to revert to non-observable factors when seeking to describe those behaviours they associated with mentally tough athletes. Although there was agreement in terms of the
five broad categories and the behavioural qualities in Table 3.1, there were some minor differences in the descriptions when compared those of the experienced informants. Generally, the athletes provided a more balanced perspective of the behaviours associated with the categories, which often allowed for clarity of the relevant behaviours that deviated from the “all-or-nothing” language to describe what MTb looks like. One example is provided relating to consistent training conduct, where an informant in Study 1 described MTb as being “a single-minded purpose to be better… pushing himself in each drill… there at every optional session…”. Alternatively, the description in Study 2 described a similar quality in a more useful way; “It’s about just continual learning, and each situation that we’re in, if it’s not learning something it’s reinforcing something … how good I can get at actually doing it”. Similarly, when describing how a mentally tough athlete might challenge himself at training, an informant in Study 1 stated: “…if there was a challenge between him and anyone else in a training drill, like a marking contest, or even a loose ball, he’d throw himself into it to try and show that he was better at it than someone else.” The quote from Study 2 provides a different perspective, based on consistent actions that challenge a player to improve; “…every training session he’d try and do body work with the bigger guys…these guys are like the guys he’s going to play on and he would practice…on those guys”.

The findings of this study that relate to the performance context are consistent with past work that has explored MTb in other sports. In Diment’s (2014) behavioural analysis of soccer during competition, two of the 10 most important behaviour categories included “playing with ‘confidence’”, which aligns with composed performance actions, and “motivation communication – team”, which aligns with team supportive behaviours. In research by Gucciardi, Jackson, et al. (2015), behavioural qualities such as “…refuses to give up when things get tough”, and “…keeps performing well when challenged.” (p. 69), align with composed performance actions in the current study. Likewise, in Hardy and colleagues’ (2014) research, the focus on maintaining “a high level of personal performance in
competitive matches” (p. 71) aligns with composed performance actions. However, by comparison, the current findings provide additional detail about what athletes do to maintain high performance, and how they might go about doing so (e.g., adaptive development and consistent training conduct). Therefore, the current study extends the knowledge base relating to desirable behaviours across different contexts, such as training environments, meetings, development, or video review sessions, and outside of formal club activities, that often form an important part of athlete development, regardless of the sport. If we look to other developmental models as a guide, such as the Bioecological Model of Human Development (Bronfenbrenner & Morris, 2006), it is important remain mindful of the role that these multiple contexts play in either impeding or promoting behaviours that lead to high performance.

### 3.4 General Discussion

The purpose of this research was to explore MTb within an AF environment. Five broad categories of MTb were identified to form a collection of MTb across different contexts within this environment. Although previous MT research has referenced the importance of exploring behaviours to refine our understanding of MT (e.g., Diment, 2014; Gucciardi, Jackson, et al., 2015; Hardy et al., 2014), no studies to date have employed qualitative methods to identify those observable behaviours across training and competition contexts within the one environment that are believed to influence an athlete’s ability to perform. The findings provide support for the proposition that athletes considered mentally tough display certain desirable behaviours more frequently than athletes considered less mentally tough.

We proposed that MTb pertains to behaviour that is likely consistently displayed, maintains high personal standards, has an effect on subjective and/or objective goal achievement, and performance. Incorporating the findings of the current research with recommendations for clear concept definitions (MacKenzie et al., 2011; Podsakoff et al., 2016), we propose a working definition of MTb as a purposeful yet adaptable verbal or
physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals. As another important step in concept development, the qualities that are necessary to describe the concept of MTb (i.e., conceptual themes; Podsakoff et al., 2016), should be considered to identify whether or not a behaviour is an exemplar of MTb. As a result, we propose several necessary and sufficient qualities of MTb, which were derived from the content in Study 1, and refined during Study 2 (see Table 3.3). For example, a footballer who cognitively plans a strategy to deal with a specific stressor in a match (e.g., use controlled breathing to manage arousal when taking a set shot for goal when under time pressure) would not be displaying an exemplar of MTb (perhaps MT as a psychological resource) because it is a thought; there is no evidence of voluntary behaviour (A1), and it cannot be seen or quantified by an observer (A2/A3). Instead, it is the enactment of that plan through overt behaviour that would reflect MTb, which meets the minimum requirements of A1 to A7 listed in Table 3.3; for example, testing and adjusting the controlled breathing strategy in practice, as well as perhaps working with coaches and/or support staff to refine it, until a positive effect on performance is achieved.

It is important to consider two important conclusions that can be gleaned from this research. First, the analysis and identification of MTb has the potential to shed light on the mechanisms by which MT influences goal strivings and performance. Although previous research has identified a link between MT and performance in sport (e.g., Bell et al., 2013), there has been limited clarity on how we operationalise the what, how, and when of MT that contributed to high performance (Gucciardi & Hanton, 2016). We believe that the behaviours identified in these studies, the working concept definition, and necessary and sufficient qualities of MTb provide an important first step in clarifying the behaviours displayed by mentally tough athletes. These athletes are considered mentally tough because they are more consistently (though not always) doing what is required (e.g., stopping their direct opponent scoring), how it is required (e.g., by playing tight defence, arm in contact with opponent’s
body, and attempting to spoil his opponent in each contest), and when it is required (e.g., each
time play enters their zone in the next five minutes of a match). It is expected that the display
or execution of MTb on a regular basis provides the foundation for an athlete’s ability to
achieve and maintain a high level of performance; this hypothesis requires testing in future
research.

Table 3.3: A comparison of necessary and sufficient qualities for mentally tough behaviour
(MTb) and mental toughness (MT).

<table>
<thead>
<tr>
<th>Qualities (Attributes)</th>
<th>MTb</th>
<th>MT</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Voluntary behaviour</td>
<td>Present</td>
<td>Absent</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A2: Can be seen or heard by an observer</td>
<td>Present</td>
<td>Absent</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A3: Can be quantified by observer (e.g., frequency, intensity, duration)</td>
<td>Present</td>
<td>Absent</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A4: Valued by the individual</td>
<td>Present</td>
<td>Present</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A5: Enhances likelihood of individual goal achievement</td>
<td>Present</td>
<td>Present</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A6: Valued by colleagues/ teammates</td>
<td>Present</td>
<td>Present</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A7: Valued by the organisation</td>
<td>Present</td>
<td>Present</td>
<td>Necessary but not sufficient</td>
</tr>
<tr>
<td>A8: Goal-directed behaviour exhibited during training contexts</td>
<td>Present</td>
<td>Absent</td>
<td>Sufficient but not necessary</td>
</tr>
<tr>
<td>A9: Goal-directed behaviour exhibited during other development contexts (e.g., reviews, meetings, lectures)</td>
<td>Present</td>
<td>Absent</td>
<td>Sufficient but not necessary</td>
</tr>
<tr>
<td>A10: Goal-directed behaviour exhibited in competition context</td>
<td>Present</td>
<td>Absent</td>
<td>Sufficient but not necessary</td>
</tr>
<tr>
<td>A11: Behaviour exhibited during injury rehabilitation</td>
<td>Present</td>
<td>Absent</td>
<td>Sufficient but not necessary</td>
</tr>
<tr>
<td>A12: Enhances the likelihood of collective goal achievement</td>
<td>Present</td>
<td>Present</td>
<td>Sufficient but not necessary</td>
</tr>
<tr>
<td>A13: A1 to A7</td>
<td>Present</td>
<td>Absent</td>
<td>Necessary and jointly sufficient</td>
</tr>
</tbody>
</table>
Second, the five categories of MTb offer an alternative understanding of potential targets for the development of MT, and suggest that there are opportunities to incrementally target and develop specific behaviours associated with MT at different times and across multiple contexts. These categories encompass the range of inter-related contexts (e.g., performing, training, reviews, and meetings) that athletes experience within modern day sporting environments. Similarly, these MTb categories do not exist in isolation, with some overlap and interdependence evident (e.g., composed performance actions may follow consistent training conduct). The importance of these inter-related contexts can be highlighted in other settings, such as, education, with high performance on exams, or composure under pressure, often a result of regularly applying oneself in class, and/or regular preparation.

3.4.1 Limitations and Future Directions

There are limitations of the current study that warrant further discussion. First, although the opportunity to conduct the research in an elite AF environment offered unique insights in a professional setting, the sample was drawn from one AF environment, with most (though not all) participants having been associated with few other AF environments. Therefore, the generalisability of these results to other environments is unknown. Future studies could involve more than one club environment, and/or a more diverse sample including earlier career players and female athletes. In light of recent research into the socio-cultural factors of MT in AF (Coulter et al., 2016), and the potential “dark-side” of MT (Caddick & Ryall, 2012), we acknowledge that some of the findings relating to MTb in the current paper could be coded in a different manner. However, we endeavoured to focus on identifying those positive and desirable behaviours that aligned with the characteristics of our definition, being beneficial to the individual within the environment (e.g., contributes positively to an individual’s performance, aids in the attainment and progression of self-referenced objectives). Nevertheless, noting that there were some similarities in identified
behaviours between our findings and research in other performance environments (e.g., Diment, 2014), additional research is required to explore these similarities and/or differences across environments, as well as the socio-cultural influences.

Second, although we asked our participants to draw on observations of athletes they considered mentally tough, the information is nevertheless retrospective and may be subject to recall bias that is considered problematic in retrospective reporting (Ross, 1989). It is important to use this information to assist in developing alternative methods to minimise the subjective nature of previous scales. This foundation can be used to develop and validate a systematic observation checklist that can assist with the behavioural analysis of MT, and compare it against other previously validated measures of MT, as well as objective performance measures. Doing so will aid in the progression of our understanding of MT and how it is developed, as well as enhance measurement and utility in performance environments.

The findings of the current study provide a starting point for furthering our understanding regarding how the concept of MT can be developed by considering a behavioural approach. One direction for future research could involve the identification of strategies that can be used to develop the MTb that have the most influence over performance. This process could be achieved through further qualitative or observational research in training and development settings, developing and piloting interventions that target either specific MTb categories, or MTb as a whole, as a means to identify those approaches that may be most effective. Notably, previous research into MT development has employed established psychological models to assess their utility. Mahoney, Ntoumanis, Gucciardi, Mallett, and Stebbings (2016) developed a program using self-determination theory (SDT, Deci & Ryan, 1985), and Bell et al. (2013) based their program on the tenets of revised reinforcement sensitivity theory (rRST, Gray & McNaughton, 2000). Although results were
varied, the application of established psychological models (e.g., behaviourism) may offer pathways to developing those specific MTb described herein.

3.4.2 Conclusion

This research is among the first to explicitly define and explore MTb across different contexts within a particular environment. It has resulted in preliminary support for our proposition that there exists a collection of MTb that are more frequently displayed by athletes considered mentally tough compared to athletes considered less mentally tough, and that there are a number of necessary and sufficient qualities of MTb. It has also provided an opportunity to consider an alternative perspective for the MT development process, although there is value in further investigating how we develop certain MTb from an interdependent person-context perspective. Continuing to explore the identified MTb herein – those behaviours that can be implemented, increased, or moderated across different contexts over time – has the potential to further the collective understanding of the concept of MT, its development, and potentially remove some of the ‘theoretical murkiness’ in the existing knowledge base. It also provides increased opportunities to create a substantive link between MT and performance by exploring those factors that may mediate this effect via the measurement of those desirable and observable behaviours. As a result, there is potential to align what can be considered an incremental MT development process with other physical skill development processes (e.g., refining kicking technique, increasing leg strength, or improving defending skills). It is hoped that these advancements can lead to clarification of what MT means for stakeholders in performance environments, which may also equate to increased applied opportunities to refine our understanding on how it is best developed.
3.5 References


Ch. 3: QL exploration of MTb

(Eds.), *Handbook of applied behavior analysis* (pp. 113-131). New York: Guilford Publications.


Chapter 4: The Development of the Mentally Tough Behaviour Scale
4.0 Abstract

The purpose of this study was to extend the collective understanding of mental toughness (MT) development by developing a systematic observation checklist that can assist with the behavioural analysis of mentally tough behaviours (MTb). A Mentally Tough Behaviour Scale (MTbS) was developed using the findings from the qualitative research into MTb, in an attempt to allow for the measurement of the frequency of MTb across different contexts (e.g., competitive matches, training, and development) in a high performance environment. A multi-study approach was adopted. Study 1 was conducted in two stages, with participants in Stage 1 consisting of academics experienced in scale development (N = 6). Stage 2 consisted of Australian football (AF) coaches (N = 35) and athletes (N = 235). The results supported the retention of a nine-item MTbS. There was consensus among the academics regarding the adequacy of the content domain, and factor analysis indicated a unidimensional model was a good fit, with excellent latent factor reliability of test scores. The unidimensional structure adequately represented AF coach ratings of AF athletes. Study 2 was conducted using a sample of six development coaches, who provided ratings on the MTbS developed in Study 1 for 30 elite early career AF athletes, with objective competitive performance ratings calculated by a commercial-in-confidence algorithm. The results from Study 2 indicated that test scores with a nine-item MTbS achieved excellent internal reliability evidence. Results also indicated a positive association between MTbS scores and consistency of objective competitive performance ratings, although not immediately. Implications for the applied use of the MTbS and future research applications are proposed.
4.1 Introduction

Conceptual perspectives (e.g., Gucciardi & Hanton, 2016; Jones, Hanton, & Connaughton, 2007) and empirical evidence (e.g., Bell, Hardy, & Beattie, 2013; Cowden, 2016) support a positive association between mental toughness (MT) and performance. To help advance our understanding of the nature of this association, there is a need to clarify details regarding the what, how, and when of MT (Gucciardi & Hanton, 2016). Of particular interest are variables that transmit the influence of MT to performance – referred to as mediators – because they provide insight into potential intervention targets that may optimise this effect (Muller, Judd, & Yzerbyt, 2005). Conceptualised as a core mediator variable in the aforementioned relationship, mentally tough behaviour (MTb) is defined as a purposeful yet adaptable verbal or physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals. In order to test this theoretical expectation, it is important to explore methods that allow us to measure the frequency of MTb and its association with performance. This exploration may also offer an opportunity to evaluate the degree of one’s MT in the future, due to the proposed relationship between MT, MTb, and performance.

In our systematic review of qualitative research into MT development (Chapter 2), we identified that behavioural information offers an alternative pathway for understanding the processes of developing MT. We also emphasised the value of drawing on a formative field in psychology, such as behaviourism, which focuses on what can be observed and is the foundation for a range of psychological models employed across environments and situations (Eldridge & Dembkowski, 2012). A behaviour-based approach follows on from assertions by Hardy, Bell, and Beattie (2014), who suggested that understanding what a mentally tough athlete does more frequently, or what MTb an athlete regularly displays, will provide clarity on how one might increase incidences of MT. Importantly, it is expected that by increasing the frequency of these behavioural displays of MT, a more concrete opportunity exists to elicit
behavioural change and performance improvement. Although there may be an existing or developed tendency for an individual to behave or respond to a situation a certain way, such behaviours or responses can be modified through targeted coaching or psycho-behavioural interventions (e.g., Eldridge & Dembkowski, 2012; Luiselli, 2012; Skinner, 1953). Therefore, identifying the observable MTb that are most important across contexts in a performance environment will allow for a targeted developmental approach that has an increased likelihood of modification (i.e., behaviour change).

In Chapter 3, we attempted to further explore the utility of MTb to better understand MT development: We targeted observations of mentally tough athletes by experienced informants, as well as the lived experiences of athletes in a high performance environment. As an important part of extending our understanding of the concept of MTb, we attempted to identify what an athlete considered mentally tough was regularly observed doing more broadly (e.g., across competition, training, and development contexts). This approach was identified as important, with these contexts also having an effect on an athlete’s performance (Kraemer, Duncan, & Volek, 1998; Manzi, Iellamo, Impellizzeri, D'Ottavio, & Castagna, 2009). First, our findings provided preliminary support for the existence of a collection of MTb that are more frequently displayed by mentally tough athletes when compared to less mentally tough athletes. Second, the findings allowed for the thematic categorisation of certain behaviours as specific to training (i.e., consistent training conduct), development (i.e., adaptive development), team contexts (i.e., team supportive), personal responsibility for actions (i.e., responsible and accountable), and others specific to performance in matches (i.e., composed performance actions). Third, although the behaviours were categorised into different themes, we highlighted that these categories are inter-related and encompass the different contexts of a high performance environment.

The dimensionality of MT is an ongoing debate in the literature (Weinberg, Freysinger, Mellano, & Brookhouse, 2016). Thus, it is important to consider whether MTb is
best conceptualised as a unidimensional or multidimensional construct. Taking a unidimensional approach to MTb, Hardy and colleagues’ (2014) scale displayed good psychometric properties across different samples. Considering their scale centred on evaluating MTb through the maintenance of a high level of personal performance in competitive matches, it is expected that a unidimensional scale would achieve a sound fit, due to their focus on performance in competition. Although we identified a number of MTb themes in Chapter 3, the inter-related nature of the categories across contexts make it difficult to provide insight into the dimensionality of MTb at this time.

These inter-related themes and MTb identified in Chapter 3 are also reflective of our working definition of MTb, regardless of context: Incorporating purposeful yet adaptable verbal and physical acts, based on what athletes can do to attain or progress self-referenced objectives or goals, while contributing positively to performance. As another important step in the concept development process, it is recommended that the conceptual themes, or necessary and sufficient qualities, are considered as a means to identify whether a behaviour is an exemplar of the concept in question (Podsakoff, MacKenzie, & Podsakoff, 2016). In an attempt to accurately describe the concept of MTb, a number of necessary and sufficient qualities were identified in Chapter 3 (see Table 3.3). These qualities were used as the guidelines for ensuring the behaviour descriptions developed as a part of this research were exemplars of MTb. For example, as a part of the responsible and accountable (RA) category, one item, labelled RA1; “

Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change)” possesses the necessary qualities in Table 3.3 and, in practice, would be represented by an athlete approaching a coach to discuss match performance each week as a means to identify areas to focus on during that training cycle. This behaviour would likely result in performance improvements in a match. Similarly, as a part of team supportive (TS), item TS4; “Makes decisions that are beneficial to teammates (e.g. provides a shepherd, or assists teammates in a contest)” also meets the necessary
qualities, and would be represented by an athlete being observed providing support to
teammates around the contested area (where the ball is located) in a match to protect and/or
assist his teammates in disposing of the ball to his team’s advantage. The additional MTb
description items are listed in Table 4.1. These descriptions form the foundation of the
current study’s attempt to identify how to best measure the frequency of MTb.

4.1.1 Overview of the Present Research

Using the foundations outlined above, the current study sought to extend the collective
understanding of MT development by developing a systematic observation checklist that can
assist with the behavioural analysis of MTb. The reliability and validity evidence of test
scores obtained using this instrument was also evaluated. A multi-study approach was
adopted for these purposes, with the initial collection of MTb identified in Chapter 3 (refer to
Table 4.1) providing the conceptual foundation upon which to develop indicators of an
informant-rated Mentally Tough Behaviour Scale (MTbS). These items were initially
developed to be relevant to the targeted population of AF, yet broad enough so that others can
test the degree to which these overarching themes generalize to other sporting contexts. As a
part of the development of a new scale, it is important that construct indicators are first
assessed by a panel of experts to ensure the content sampling is relevant to the construct of
interest (DeVellis, 2017). This aim was addressed in stage one of Study 1. In stage two of
Study 1, we took a first look at the reliability and validity of test scores obtained using an
initial pool of construct indicators through coaches’ (n = 35) ratings of athletes (n = 218). In
Study 2, we then sought to examine the conceptual development process, that is, to assess the
stability of MTb and its effect on performance, using a sample of elite coaches (n = 6) and
athletes (n = 30), with multiple ratings over a four week period.
<table>
<thead>
<tr>
<th>Item</th>
<th>Original Item Definition</th>
<th>Action Taken</th>
<th>Retained Item Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD₁</td>
<td>Performance adversely affected by difficult situations or events (e.g. increased skill error rate, poor decision-making).</td>
<td>Modified and retained</td>
<td>Performance is not adversely affected by difficult personal situations or events (e.g. no increase in skill error rate, maintains appropriate behaviour).</td>
</tr>
<tr>
<td>AD₂</td>
<td>Doesn’t implement constructive feedback from others (e.g. makes similar mistakes, repeated skill errors).</td>
<td>Modified and retained</td>
<td>Effectively implements constructive feedback from others (e.g. does not make repeated similar mistakes).</td>
</tr>
<tr>
<td>AD₃</td>
<td>Adapts to changing situations (e.g. displays ‘game changing’ actions, communicates situations/solutions to teammates).</td>
<td>Retained</td>
<td>Adapts to changing situations (e.g. displays ‘match changing’ actions, communicates situations/solutions to teammates).</td>
</tr>
<tr>
<td>CTC₁</td>
<td>Effort levels during training remain consistent regardless of whether preparing for a normal or high pressure game (e.g. qualifying fixtures versus finals).</td>
<td>Modified and retained</td>
<td>Effort levels during training remain consistently high, whether preparing for a normal or high pressure match (e.g. qualifying fixtures vs finals, selection vs deselection).</td>
</tr>
<tr>
<td>CTC₄</td>
<td>Deterioration in communication when performing poorly (e.g. lashes out verbally at opponent/teammate, or goes quiet).</td>
<td>Modified and retained</td>
<td>Communication does not deteriorate when training poorly (e.g. does not verbally attack teammate, continues to provide constructive feedback).</td>
</tr>
<tr>
<td>CPA₁</td>
<td>Acts decisively in pressure situations (e.g. controlled and accurate disposal, sticks to assigned role).</td>
<td>Modified and retained</td>
<td>Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal).</td>
</tr>
<tr>
<td>CPA₃</td>
<td>Positive body language, regardless of personal/team success/failure (e.g. head up &amp; shoulders back).</td>
<td>Modified and retained</td>
<td>Exhibits positive body language following a personal or team mistake (e.g. head up &amp; shoulders back).</td>
</tr>
<tr>
<td>RA₁</td>
<td>Takes responsibility for improving his performance (e.g. asks questions to identify what needs to change).</td>
<td>Retained</td>
<td>Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change).</td>
</tr>
<tr>
<td>RA₂</td>
<td>Self-educates to optimise recovery (e.g. diet, hydration, rehab, recovery).</td>
<td>Modified and retained</td>
<td>Employs expert information to optimise recovery (e.g. adheres to set maintenance and/or rehabilitation program).</td>
</tr>
<tr>
<td>Item</td>
<td>Original Item Definition</td>
<td>Action Taken</td>
<td>Retained Item Definition</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>AD₁</td>
<td>Sustains high performance through progressive development (e.g. maintains above average performance rating).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>AD₄</td>
<td>Displays skills that are his identified strengths in games (e.g. actions are in line with what he does well).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>AD₆</td>
<td>Works on identified weaknesses at training (e.g. disposal skills, one-on-one contests).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CTC₂</td>
<td>Displays/models valued behaviours in training (e.g. on-time, prepared, maintains high work rate).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CTC₃</td>
<td>Does not provide constructive/useful criticism during team meetings/discussions.</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CTC₅</td>
<td>Inconsistency between player’s own behaviour and what he asks his teammates to do (e.g. create options in attack).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CTC₆</td>
<td>Challenges self at training (e.g. pairs up with more skilled player to develop in the area a specific drill focuses on).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CPA₂</td>
<td>Behaves in a way that shows an understanding of his own body (e.g. ideal preparation, rehab, recovery).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CPA₄</td>
<td>Displays/models valued behaviours in competitive games (e.g. discipline, team values, team game plans).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>CPA₅</td>
<td>Application or effort deteriorates in games following a mistake (e.g. one error leads to increased frequency of errors).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>Item</td>
<td>Original Item Definition</td>
<td>Action Taken</td>
<td>Retained Item Definition</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>RA$_1$</td>
<td>Won’t admit to faults/mistakes; gives excuses &amp; blames others (e.g. “umpires had it in for me”).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>RA$_2$</td>
<td>Training work-rate below the expected team standard (e.g. requires encouragement from coaches).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>RA$_3$</td>
<td>Avoids or does not fully engage in opportunities for self-education (e.g. specialist presentations).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>TS$_1$</td>
<td>Acts in ways that benefit the team (e.g. sticks to team game plans &amp; own assigned role).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>TS$_2$</td>
<td>Looks for opportunities to develop knowledge of other team positions (e.g. Defender asks about attack-specific game plan)</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>TS$_3$</td>
<td>Asks questions to understand his place in the team (e.g. how to play in a way that benefits team performance).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>TS$_4$</td>
<td>Makes selfish decisions that are detrimental to teammates (e.g. won’t provide support for teammates when defending).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
<tr>
<td>TS$_5$</td>
<td>Develops knowledge of position-specific teammate strengths &amp; weaknesses (e.g. Full-forward of other forward line players).</td>
<td>Deleted</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note: AD = Adaptive Development; CTC = Consistent Training Conduct; CPA = Composed Performance Actions; RA = Responsible and Accountable; and TS = Team Supportive.
4.2 Study 1: Development of a Mentally Tough Behaviour Ratings Scale

The specific aims of Study 1 were to: (i) develop construct indicators that can be used to identify how frequently an athlete displays certain behaviours of interest, or MTb; (ii) assess the adequacy of the sampling of the content domain; and (iii) test the reliability and factorial validity of test scores obtained with this scale.

4.2.1 Methods

4.2.1.1 Participants

**Stage 1: experienced academics.** Using Davis’s (1992) recommendations that judges should include a collection of experts (e.g., academics) in test construction, and Lynn’s (1986) advice regarding sample size, 10 independent experienced academics were invited to assess the adequacy of our sampling of the content domain of MTb. To be considered experienced for the purpose of this study, academics were required to have (i) published at least 10 peer-reviewed manuscripts on related topics (e.g., stressors, resilience, questionnaire development) and (ii) been involved in the development of at least 1 published psychological tool. In total, 6 academics ($N_{males} = 4$) completed the study protocol (response rate of 60%), with academic experience ranging from two to 28 years ($M_{acad} = 13.29, SD = 10.03$), and number of publications from 10 to 65 ($M_{pub} = 43.57, SD = 24.25$).

**Stage 2: AF coaches and AF athletes.** A total of 35 male football coaches aged 30 to 58 years ($M_{age} = 40.19, SD = 8.37$) took part in this study. At the time of participation, participants were coaching a team within the Western Australian Football League, which is one of the seven state or territory leagues positioned under the national competition (Australian Football League). Coaches were invited to rate AF athletes with whom they work directly (e.g., a forward line coach rated AF athletes who play in offensive positions). In total, 218 AF athletes aged 18 to 32 years ($M_{age} = 21.38, SD = 3.12$) were assessed by coaches, such that coaches rated between 1 and 13 athletes each.
4.2.1.2 Instruments

For stage one, a booklet was developed that included the proposed preliminary pool of 27 items of the MTbS. It contained a brief summary of the research, including information on the participants and the data analysis employed to develop the MTb categories, definitions, and subsequent scale items. The first section prompted participants to provide relevant demographic information. The second section included a number of tasks. Participants were asked to: (i) provide their opinion on the period of time that those informants completing the MTbS should be asked to refer to (i.e., ‘an average week’ / ‘over the past week/two weeks/month’); (ii) evaluate the clarity of each of the five categories conceptual definitions; and (iii) rate the clarity and relevance of each of the 27 items. Participants were asked to assess clarity of the definition or statement by responding with a ‘yes/no/unsure’, and the relevance of each item using a five-point Likert response scale (0 = very poor, 2 = average, 4 = very good). The participants were also encouraged to provide comments or suggestions for improvement for each item (an excerpt of the data collection workbook for Section 2 is included at Appendix 4A, with the complete workbook included as a part of Appendix B).

For stage two, an online version of the amended MTbS from Stage 1 was distributed to coaches through a secure survey (Qualtrics). Coaches were asked to indicate how frequently they observed the player in question display each of the behaviours when the opportunity arose over the past four-weeks using an 8-point rating scale, including an option to indicate that a specific behaviour was not observed during the past month (1 = never, 4 = half of the time, 7 = always, N = not observed).

4.2.1.3 Procedure

The study protocol was approved by the university’s human research ethics committee in accordance with the National Health and Medical Research Council’s statement on ethical conduct in human research (National Health and Medical Research Council, 2007).
Stage 1: Adequacy of content domain sampling. After being invited to participate by the first author via email, the sample of experienced academics were emailed an electronic copy of the booklet and asked to complete it within two weeks. If a reply had not been received by the due date, a reminder email was sent requesting a response within one week. If no response was received by this second date, it was assumed that the participant was unable to participate. Participants returned the booklet to the first author via email. At that time, feedback was collated on the participants’ opinions about the task and the scale, each of the categories and items, and other specific comments or suggestions for improvement.

Stage 2: Internal reliability and factorial validity evidence. Access to several football clubs was facilitated through the Talent Manager at the state football commission. The lead author then contacted interested clubs to discuss the project and recruit a sample of coaches across a number of teams playing in the state level competition. Survey administration occurred no earlier than one month into the competitive season\(^3\), thus ensuring each coach had interacted with and observed players for at least one month and therefore had sufficient opportunity to observe the players they were asked to rate. Coaches were emailed a link to the secure online survey site, with additional instructions regarding informed consent, confidentiality of responses, and survey completion with the specification of a one-week completion period, and the contact details of the lead researcher. If survey results had not been received within one week, the coaches were sent a follow-up email.

4.2.1.4 Data analysis

In stage 1, the data collected from each of the six experienced academics was compiled by the first author in excel spreadsheets for analysis. Each participant’s individual responses for the clarity of the category definitions, and clarity and relevance of each item

\(^3\) The standard Australian football season is generally made up of three main parts: Pre-season period runs from November – March, Competitive Season continues from April – August and consists of an average of 22 matches mostly on a once weekly basis, and the Finals period runs for 3-4 weeks and up to four matches in September – October.
was recorded. As an essential part of scale development, it is important to determine the degree to which items and the scale itself is representative of the construct of interest (Haynes, Richard, & Kubany, 1995). We examined the degree of agreement between experts with regard to their perceptions of the relevance of each item for the assessment of MTb using $r_{wg}$ (James, Demaree, & Wolf, 1984). We used IBM SPSS 21 to examine two types of null distributions in which there was an expectation of a uniform ($\sigma_E^2 = 2$) or slightly skewed ($\sigma_E^2 = 1.5$) distribution (Lebreton & Senter, 2008). Items were considered for retention when $r_{wg} > .80$ and the average rating score was $> 3$. Alongside these quantitative ratings, we also considered qualitative observations from judges regarding alternative wording or suggestions for improvement (Delgado Rico, Carretero Dios, & Ruch, 2012). As a result, the transcribed comments and suggestions for improvements from the academics for each retained item were reviewed by the lead researcher as a means to familiarise himself with the content. Using an iterative process, the first author then reread the comments to initially identify consistent themes across the sample, making notes against each of the retained scale items in an attempt to incorporate the relevant comments. The data was then provided to the research team to conduct a similar process to ensure a type of consensual generation of themes from the sample (Marcus, Westra, Angus, & Kertes, 2011; Oleson, Droes, Hatton, Chico, & Schatzman, 1994). To maintain an interactive approach, the research team then met to discuss the themes of the data and their notes against the retained items of the scale, before collectively deciding on how to modify the items to incorporate these consistent themes.

In Stage 2, we tested the factorial structure and internal reliability ($\omega$; McDonald, 1970) evidence of the MTb scale within a confirmatory factor analysis framework using a robust maximum likelihood estimator (MLR). As athletes are nested within coaches, the TYPE = COMPLEX function was employed to adjust the standard errors and minimise the influence of the non-independence in the data. Model-data fit was assessed using multiple indices and typical interpretation guidelines for acceptable or adequate fit, namely the $\chi^2$
goodness-of-fit index, comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA), with evidence of adequate fit indicated by CFI/TLI ≥ .90 and RMSEA ≤ .08 (Marsh, Hau, & Grayson, 2005; Tabachnick, 2007). With regard to the strength of factor loadings, we utilised Comrey and Lee’s (1992) recommendations (i.e., > .71 = excellent; > .63 = very good; > .55 = good; > .45 = fair; < .32 = poor). All analyses in stage 2 were performed within Mplus 7.4 (Muthén & Muthén, 1998-2015).

4.2.2 Results and Discussion

4.2.2.1 Adequacy of content domain

Of the original 27 items, the experienced academics indicated that nine of these items were relevant for the content domain of MTb ($r_{wg} \geq .80$, $M_{ratings} \geq 3.33$). Minor grammatical modifications were made to seven of the retained items to incorporate the academics’ feedback. As an example, one consistent theme from judges related to items that were originally of a negative orientation (i.e., reverse-scored), with suggestions to reword these items to reflect a positive orientation. This suggestion is supported by DeVellis (2017), in that reversals in item polarity can be confusing for respondents and can potentially diminish scale reliability (see also, Gehlbach & Brinkworth, 2011). As an example, item AD3 was initially negatively worded: “Doesn’t implement constructive feedback from others (e.g. makes similar mistakes, repeated skill errors)”’. Following discussion amongst the collaborating authors, the item was reworded to align with the majority of other items: “Effectively implements constructive feedback from others (e.g. does not make repeated similar mistakes)”’. Both the original and modified definitions of the retained MTbS items are provided in Table 4.1. Although the mean ratings for the remaining 18 items were good ($M_{ratings} \geq 2.83$), there was meaningful variability in the degree of agreement between the experienced academics with regard to their perceptions of the relevance of each item for the assessment of MTb ($r_{wg} \leq .60$). As such, we retained the 9-items for which there was consensus among the experienced academics regarding the adequacy of these items for the
content domain of MTb. In terms of the operationalisation of MTb, the content of these retained indicators is consistent with our proposed definition of MTb as a purposeful yet adaptable verbal or physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals. For example, item RA1; “Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change)”, represents a purposeful physical act, through proactively asking questions of others, that will potentially contribute positively to performance improvement by identifying strategies to develop a necessary skill area, which represents the progression of a self-referenced objective.

4.2.2.2 Psychometric properties of the MTbS

Item level descriptive statistics of the nine MTb indicators are detailed in Table 4.2. The skewness and kurtosis values support an approximate normal distribution for each item. Factor analyses indicated that the 9-item unidimensional model was a good fit with the data, $\chi^2(27) = 63.93, p < .001$, CFI = .962, TLI = .949, RMSEA = .079 (90% CI = .054 to .104) and the latent factor reliability estimate was excellent ($\omega = .93$). Factor loadings were excellent or very good (see Table 4.2). Consistent with recent work on the operationalisation of MTb (e.g., Gucciardi, Jackson, Hanton, & Reid, 2015; Hardy et al., 2014) and our expectations, these results indicated that a unidimensional structure represented coaches’ ratings of AF players adequately. As an initial look into construct validity evidence, the results of stages one and two provided preliminary support for the operationalisation of MTb within an AF environment through this 9-item informant-rated measure. However, these findings are limited to assessments of content sampling and reliability and validity evidence of the internal aspects of this operationalisation. Therefore, these findings do not provide insight into the degree to which test scores obtained with the MTbS relate with external criteria in ways that are reflective of the conceptual definition of MTb (e.g., associations with performance).
Table 4.2: Item-level descriptive statistics, standardised factor loadings ($\lambda$) and residual variances ($\theta$) for indicators of mentally tough behaviour.

<table>
<thead>
<tr>
<th>Item</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>$\lambda$</th>
<th>$\theta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance is not adversely affected by difficult personal situations or events (e.g. no increase in skill error rate, maintains appropriate behaviour).</td>
<td>4.64</td>
<td>1.47</td>
<td>-.48</td>
<td>-.45</td>
<td>.80</td>
<td>.37</td>
</tr>
<tr>
<td>Effectively implements constructive feedback from others (e.g. does not make repeated similar mistakes).</td>
<td>4.93</td>
<td>1.25</td>
<td>-.48</td>
<td>-.01</td>
<td>.81</td>
<td>.34</td>
</tr>
<tr>
<td>Adapts to changing situations (e.g. displays ‘match changing’ actions, communicates situations/solutions to teammates).</td>
<td>4.79</td>
<td>1.24</td>
<td>-.34</td>
<td>-.30</td>
<td>.82</td>
<td>.33</td>
</tr>
<tr>
<td>Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal).</td>
<td>4.77</td>
<td>1.23</td>
<td>-.54</td>
<td>.00</td>
<td>.66</td>
<td>.56</td>
</tr>
<tr>
<td>Exhibits positive body language following a personal or team mistake (e.g. head up &amp; shoulders back).</td>
<td>4.52</td>
<td>1.41</td>
<td>-.25</td>
<td>-.59</td>
<td>.84</td>
<td>.29</td>
</tr>
<tr>
<td>Effort levels during training remain consistently high, whether preparing for a normal or high pressure match (e.g. qualifying fixtures vs finals, selection vs deselection).</td>
<td>5.02</td>
<td>1.39</td>
<td>-.52</td>
<td>-.35</td>
<td>.83</td>
<td>.32</td>
</tr>
<tr>
<td>Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change).</td>
<td>5.02</td>
<td>1.41</td>
<td>-.55</td>
<td>-.14</td>
<td>.78</td>
<td>.39</td>
</tr>
<tr>
<td>Employs expert information to optimise recovery (e.g. adheres to set rehabilitation and/or maintenance program).</td>
<td>5.03</td>
<td>1.39</td>
<td>-.84</td>
<td>.43</td>
<td>.68</td>
<td>.54</td>
</tr>
<tr>
<td>Communication does not deteriorate when training poorly (e.g. does not verbally attack teammate, continues to provide constructive feedback).</td>
<td>4.84</td>
<td>1.45</td>
<td>-.79</td>
<td>.16</td>
<td>.76</td>
<td>.43</td>
</tr>
</tbody>
</table>
4.3 Study 2: The Stability of Mentally Tough Behaviour and its Relationship with Performance

With the overarching focus on validity evidence based on relations with external variables that are central to the definition of MTb, the aims of Study 2 were to assess the stability of MTb and its association with performance. Of particular interest was performance variation over a four week period, rather than mean level assessments of performance, because the consistency of behaviour is central to most conceptualisations of MT (e.g., Crust, 2008; Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015; Hardy et al., 2014).

Acknowledging that behaviour and MT are influenced by both genetic and learned factors (Deci & Ryan, 2000; Weinberg et al., 2016), it was also considered important to explore the stability of MTb in the current environment. A four week period early in the season was chosen to ensure that coaches were able to observe multiple training and competitive performances of an athlete, factoring in the likelihood of modified training loads or omission from a competitive match due to illness, injury, or fatigue. With regard to injury incidences, for examples, epidemiological data indicates over 40 injuries per club each year, resulting in an average of four matches missed for each injury between the 2000-2012 competition seasons (Orchard, Seward, & Orchard, 2013).

4.3.1 Methods

4.3.1.1 Participants and procedure

A total of 30 elite early career AF athletes ($M_{age} = 19.97$, $SD = 1.22$) were rated at two points over a four week interval using the 9-item MTb scale developed in Study 1. Six development coaches aged 31 to 43 years ($M_{age} = 33.83$, $SD = 4.62$) completed these ratings. This sample size provided 80% power to detect an effect size of $r = .50$, at $p < .05^4$. These assessments were taken during the first month of the competitive football season, namely

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4 Hardy and colleagues (2014) reported a 3-week test-retest correlation of .96 with their informant-rated measure of mental toughness ($N = 59$). As we examined a 4-week temporal period in the current study, we took a conservative approach to the effect size estimate for the a priori power analysis.
March (time 1) and April (time 2). Recruitment and survey completion procedures mirrored details reported in Study 1, although coaches were asked not to record items of the MTbS during time 1 to minimise possible bias during the ratings at time 2. Competitive overall match performance scores for each athlete, or ‘Player Ranks’, for the months of April and May were collected each week. Considered a “scientifically derived, objective measure weighted in favour of effective ball use and winning the disputed ball” (Sullivan et al., 2014, p. 563), a ‘Player Rank’ for each match is calculated by a commercial-in-confidence algorithm (Champion Data Holdings, Victoria, Australia). Ratings are allocated to each time a skill is executed; positive for an effective skill execution, and negative for an ineffective skill execution. At the completion of the match, a summative figure is calculated to capture the influence of an athlete on the match, or overall performance for that particular match.

Previous research has employed the player rank to evaluate AF athlete performance across matches (e.g., Hiscock, Dawson, Heasman, & Peeling, 2012; Sullivan et al., 2014), with the rank divided by the minutes of match time that was played by the athlete of interest. The time an athlete spends involved in competition varies from match to match for a number of reasons (e.g., interchange rotation requirements, injuries). Therefore, this method accounts for only the time an athlete spent involved in the competition, allowing for a more accurate comparison of an athlete’s objective match to match performance (Hiscock et al., 2012).

Two scores were created to capture an athlete’s “consistency” in performance for the months of April (time 2) and May (time 3); specifically, this score represented the variance of performance scores across the 4 matches within each month, such that lower scores reflect greater consistency in an athlete’s player rank. A schematic overview of the statistical model is depicted in Figure 4.1. Owing to injuries, 2 AF athletes missed all matches during the 8 week period, 3 AF athletes missed two or more matches during April, and 4 AF athletes missed two or more matches during May; thus, we had useable performance data for 21 of the 30 athletes who were assessed by their coach on MTb.
4.3.1.2 Data analysis

First, we examined the correlation between MTb scores at times 1 and 2. Second, we used latent growth modeling (LGM) to assess the amount of intra-individual change in MTb between the two time points (Voelkle, 2007). LGM can overcome assumptions inherent in ANOVA (e.g., homogeneity of error variances across repeated-measurements) and has enhanced power to detect meaningful effects, but not at the cost of Type I error (Voelkle, 2007). LGM encompasses participants’ starting point (intercept) and change between assessment points (slope) for each individual, thereby permitting an examination of intra-individual change over time as well as determinants or outcomes of such intra-individual change. Third, we examined the influence of AF players’ MTb at time 1 (intercept) and their intra-individual change between times 1 and 2 (slope) on performance consistency during the months of April (time 2) and May (time 3). All analyses were performed within Mplus 7.4 (Muthén & Muthén, 1998-2015) using a Bayesian estimator and the default non-informative priors. The posterior predictive p value (PPP) provided an indication of model fit, with values greater than .05 considered acceptable and those that approach .50 reflective of excellent fit (Muthén & Asparouhov, 2012). Interested readers are referred elsewhere for user-friendly overviews (Stenling, Lindwall, Johnson, & Ivarsson, 2015; Van de Schoot et al., 2014; Zyphur & Oswald, 2013), pedagogical demonstrations (Gucciardi & Zyphur, 2016), and a
systematic review of the Bayesian estimation literature (Van de Schoot, Winter, Ryan, Zondervan-Zwijnenburg, & Depaoli, in press).

4.3.2 Results and Discussion

Internal reliability evidence for informant-rated test scores of MT at time 1 ($\alpha = .92$) and time 2 ($\alpha = .91$) were excellent. The analyses identified that the probability of the test-retest correlation model, given the data, was acceptable (PPP = .432, $\Delta$ observed and replicated $\chi^2$ 95% CI [-9.24, 11.70]). The four-week test-retest correlation of coach-rated MT was .78 (95% CI = .56, .89), which indicates a moderate-to-large degree of agreement between assessments. The probability of the LGM of MT, given the data, was acceptable (PPP = .427, $\Delta$ observed and replicated $\chi^2$ 95% CI [-9.13, 11.37]). With regard to the LGM, the mean of the latent intercept factor ($\tau = 4.66$ [95% CI = 4.20, 5.19]) indicated that players, on average, demonstrated MT approximately half of the time during the four-week period prior to the assessment at time 1. The latent slope factor ($\tau = .53$ [95% CI = .25, .82]) indicated intra-individual increases, on average, in MT over a four-week period. The probability of the LGM of MT as a determinant of performance consistency, given the data, was acceptable (PPP = .343, $\Delta$ observed and replicated $\chi^2$ 95% CI [-14.30, 22.74]). Higher MT scores at time 1 were associated with greater performance consistency at time 3 ($B = -.062$, 95% CI = -.01, -.11) but not time 2 ($B = -.01$, 95% CI = -.08, .05). Increases in MT between times 1 and 2 were associated with greater performance consistency at time 3 ($B = -.11$, 95% CI = -.03, -.18) but not time 2 ($B = -.04$, 95% CI = .06, -.14).

Overall, the results from Study 2 provide initial insight into the temporal stability of the MTBs. The test-retest reliability data and the increase in the frequency of MT over the four-week period support a state-like conceptualisation, in that some aspects are stable across situations and time, yet other components are open to social and contextual information. Consistent with past research (for a review see, Anthony, Gucciardi, & Gordon, 2016), these findings suggest that MT are amenable to personal, social and contextual influences. The
results also provide support for a positive association between MTb and performance consistency. However, our findings indicated that the positive effect of changes in MTb on performance consistency was not immediate, that is, there was a delay between the coaches reporting the increased frequency of MTb in AF players and objective performance improvements. One explanation may be that the earlier behavioural changes observed by coaches are due to increased exposure to AF players in multiple contexts, yet AF players take time to become competent in effectively translating the change from training to competitive situations. Support for this explanation can be provided by existing skill acquisition and behaviourism theories (e.g., Eldridge & Dembkowski, 2012; Hodges & Williams, 2012).

### 4.4 General Discussion

The primary aims of these studies were to develop an informant-rated tool that can assist with the analysis of MTb in a high performance environment, as well as evaluate the reliability and validity evidence of test scores obtained with this tool in relation to the internal structure and relations with external variables. Three important contributions are offered from this research. First, the results of Study 1 highlight that there is consistency between the necessary behavioural qualities of MTb identified in Chapter 3, and the perspectives of experienced academics. Although the academic experts disagreed on the adequacy of 18 (66%) of the original 27 items for the content domain of MTb, each of the nine retained items prescribes to the necessary qualities in Table 3.3. Podsakoff et al. (2016) highlighted that consistency of understanding across stakeholders increases the likelihood of alignment between a concept and tools designed to measure it, thus making it easier to identify both related and unrelated concepts. Importantly, these similarities between the nine retained items and the necessary behavioural qualities supports our assertion that, for a behaviour to be labelled as reflective of a MTb, it should possess each of these necessary qualities. Therefore, this conceptual framework can be used in the future to identify other MTb that may have been omitted due to our focus on one high performance environment.
Table 4.3: Mentally Tough Behaviour Scale (MTbS) item comparisons with existing MTb scales.

<table>
<thead>
<tr>
<th>MTbS</th>
<th>Mental Toughness Inventory (Hardy et al., 2014)</th>
<th>MTb category description (Diment, 2014)</th>
<th>Informant measure of MTb (Gucciardi, Jackson et al., 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the scale provided, please indicate how frequently you observed the player in question visibly display the following behaviours/skills/actions when the opportunity arose over the past month, with responses on a 7-point Likert scale (1 = never, 4 = half of the time, 7 = always, or N = Not observed).</td>
<td>Player X is able to maintain a high level of personal performance in competitive matches, with responses on a 7-point Likert scale (1 = rarely, 4 = sometimes, 7 = regularly).</td>
<td>Video analysis: Score the frequency for how many times each behaviour was displayed. If two different behaviours were displayed at the same time, then both behaviours were scored.</td>
<td>Informants asked to respond using a 7-point Likert scale (1 = false 100% of the time to 7 = true 100% of the time).</td>
</tr>
<tr>
<td>Performance is not adversely affected by difficult personal situations or events (e.g. no increase in skill error rate, maintains appropriate behaviour).</td>
<td>1. When people are relying on him to perform well. 8. When his preparation has not gone to plan.</td>
<td>1. My daughter/son consistently bounces back from setbacks. 2. My daughter/son works hard no matter what setbacks s/he encounters.</td>
<td>1. My daughter/son consistently bounces back from setbacks. 2. My daughter/son works hard no matter what setbacks s/he encounters.</td>
</tr>
<tr>
<td>Adapts to changing situations (e.g. displays ‘game changing’ actions, communicates situations/solutions to teammates).</td>
<td>1. When people are relying on him to perform well. 6. When the opposition are using aggressive tactics.</td>
<td>3. Verbal and non-verbal communication directed at teammates to encourage, or motivate, in order to influence the motivation level in the game. 5. Verbal and non-verbal communication directed at teammates to improve or enhance the tactical coordination or</td>
<td>5. My daughter/son does what s/he needs to do to perform well. 7. My daughter/son responds well to challenges.</td>
</tr>
<tr>
<td>MTbS</td>
<td>Mental Toughness Inventory (Hardy et al., 2014)</td>
<td>MTb category description (Diment, 2014)</td>
<td>Informant measure of MTb (Gucciardi, Jackson et al., 2015)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal). | 2. When the conditions are difficult.  
3. When he has to perform at a high level all day.  
4. When it’s a very important game in the season.  
5. When the match is particularly tight. | effectiveness of the team whilst the ball is in play.  
8. Verbal and non-verbal communication directed at teammates to improve or enhance the tactical coordination or effectiveness of the team during breaks in play. | 9. When things don’t go to plan, my daughter/son is good at changing the way s/he plays. |
| Exibits positive body language following a personal or team mistake (e.g. head up & shoulders back). | 1. A quick and productive reaction immediately after an error or loss of possession. | 4. My daughter/son keeps performing well when challenged.  
7. My daughter/son responds well to challenges.  
8. My daughter/son is good at fighting for every point. |  |
Second, as one of the first studies to compare informant ratings of MTb and objective performance, the positive association between MTb and performance consistency suggests that these behaviours offer an important developmental consideration when seeking to improve performance. These results are encouraging in light of the informant-rated approach and objective measures that were used when compared to previous studies that have relied on self-report measures (e.g., Drees & Mack, 2012; Gucciardi, Hanton, et al., 2015). Specifically, the informant-rated approach is a useful strategy to alleviate concerns regarding common-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), and is highlighted by Hardy et al. (2014) as a means to reduce the likelihood that the ratings will be confounded by variables such as skill, talent and practice when compared to self-report approaches (see also, Gucciardi, Jackson, et al., 2015). Although there is still potential for coach bias towards athletes, it is expected that the effect would have been minimised by specifying that the coaches respond by considering how frequently they had observed a player display the specific MTb, as opposed to ratings based on a more subjective outcome, such as ‘when things get tough’ (e.g., “My daughter/son refuses to give up when things get tough”; Gucciardi, Jackson, et al., 2015, p. 69).

Third, with four of the five behavioural categories represented, the retained items encompass more than just performance in competition contexts, subsequently offering a diverse understanding relative to previous research into MTb (e.g., Diment, 2014; Hardy et al., 2014), and offering potential focus points for the development of MTb in training contexts. Importantly, there are some similarities with items in previous MTb measures when considering competitive contexts, suggesting conceptual overlap across multiple environments (refer to Table 4.3 for an overview). For example, Hardy et al. (2014) identified that it was important to maintain high performance when the match was particularly tight; Diment (2014) acknowledged that playing in a way that gives time and composure on the ball was a necessary characteristic; and Gucciardi, Jackson, et al. (2015) recognised that
having the strategies to perform well when challenged was also important. Each of these three items share a focus on acting in ways that maintains performance under pressure, which targets similar behaviours as “Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal)”.

Additionally, our initial approach of separating MTb into five categories in Chapter 3 may be too convoluted when applied to more diverse populations with less investment in the initial conceptualisation process. As Gucciardi, Hanton, et al. (2015) identified, the subtle differentiations made by scholars may not be readily made by others. There is greater utility and more appeal for a brief measure in high performance environments that include a range of competing demands for time, and shorter scales are becoming more common (Gucciardi, Hanton, et al., 2015; Schulenberg, Schnetzer, & Buchanan, 2011; West, Dyrbye, Satele, Sloan, & Shanafelt, 2012).

4.4.1 Limitations and Future Research

Although there are some important contributions described previously, this research should be considered in light of its methodological limitations. First, with the items of the scale developed from qualitative research in an AF environment, the extent to which these indicators generalise to other sporting and performance environments is unknown.

Nevertheless, the majority of the experienced academics were unfamiliar with the sport of Australian football, so their assessment of the clarity and relevance of the items bodes well for incorporation into other sporting and performance environments. Future research should seek to apply the MTbS more broadly, make use of the criteria to identify additional MTb (as per Table 3.3) in different environments, and explore associations with other measures of performance.

There is also value in making comparisons both with established MT scales, and constructs previously shown to relate with MT (i.e., grit, hardiness, resilience) to provide empirical support for the differentiation between MT and MTb. As Messick (1995) identified, a new scale should be evaluated against existing scales where possible to ensure it
measures a distinct construct. Additionally, although we adopted an informant-rated approach of MTb that alleviates some of the concerns regarding common methods bias (Podsakoff et al., 2003), the results would be strengthened by a multiple-ratings approach (e.g., more than one coach, peer, support staff) for each athlete, with the possibility that some subjectiveness still exists as a result of the relationship between the one coach and an athlete. Kahng, Ingvarsson, Quigg, Seckinger, and Teichman (2011) identified that one of the three important aspects of adequate behavioural measurements was the extent to which two of more people agree on the display of a behaviour. Therefore, the comparison between multiple ratings of the one athlete would strengthen the utility of the MTbS.

4.4.2 Conclusion

Overall, the current study introduced a new measure of MTb within the context of AF, and provided preliminary support for the reliability and validity of test scores obtained with this scale. With this renewed understanding of the measurement of the what, how, and when of MT through observable MTb, an important next step is to explore how these findings can be applied to increase the frequency of an athlete’s MTb and consistency of performance in sporting environments. Drawing attention to the extensive behaviourism literature, and application of development programs in other performance environments, such as organisational settings (e.g., Eldridge & Dembkowski, 2012), an opportunity exists to explore alternative approaches to development of MT through MTb, with one option being established behavioural coaching frameworks.
4.5 References


Appendix 4A: Excerpt from experienced academics’ data collection workbook

SECTION 2

Please provide your ratings, with respect to how representative each item is of the intended mentally tough behaviour category definition in red, using the response scale presented following (0 = Very Poor, to 4 = Very Good), and whether the definition or item statement is easily understood by you (Yes/No/Unsure).

<table>
<thead>
<tr>
<th>Category definition</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composed Performance Actions: Displays (e.g., body language) and/or verbalises (e.g., inferred confidence in behaviour from coach or teammates) positive behaviours, and acts decisively in pressure situations.</td>
<td>Is the definition easily understood?</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Comments/Suggestions for improvement:

<table>
<thead>
<tr>
<th>Category item</th>
<th>Relevance</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA1. Acts decisively in pressure situations (e.g. controlled and accurate disposal, sticks to assigned role).</td>
<td>0 1 2 3 4</td>
<td>Is the statement easily understood?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA2. Behaves in a way that shows an understanding of his own body (e.g. ideal preparation, rehab, recovery).</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA3. Positive body language, regardless of personal/team success/failure (e.g. head up &amp; shoulders back).</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA4. Displays/models valued behaviours in competitive matches (e.g. discipline, team values, team game plans).</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA5. Application or effort deteriorates in games following a mistake (e.g. one error leads to increased frequency of errors).</td>
<td>0 1 2 3 4</td>
<td>Yes</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Chapter 5: The Implementation and Evaluation of a Mental Toughness Development Program in Australian Football

This chapter is based on the manuscript currently in press with the Journal of Sport Psychology in Action:

5.0 Abstract

Mental toughness (MT) development is an important consideration when seeking to increase and maintain high levels of performance in sport, with limited research on effective development approaches to date. The purpose of this study was to extend our understanding of MT development programs, incorporating a behavioural approach shown to have a positive effect on performance in other settings. The primary aims were to increase the frequency of coach-observed mentally tough behaviour (MTb) in a group of elite AF athletes across a football season, with secondary aims to improve both coach and self-rated MT, as well as overall athlete performance in competitive matches, using Whitmore’s (2002) GROW behavioural coaching framework. The research employed a non-experimental A-B-A single-case research design (SCD), identified as valuable when exploring new research areas and working with unique populations such as elite athletes (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013). The results showed some changes in the frequency of MTb, as well as ratings of MT and performance across the season. Strengths, limitations, learning points for applied practitioners, and future directions are described.
5.1 Introduction

The interest in developing mental toughness (MT) in sport has resulted in increased empirical work across different sporting environments (e.g., Bell, Hardy, & Beattie, 2013; Mahoney, Ntoumanis, Gucciardi, Mallett, & Stebbings, 2016). Often considered fundamental for high level sporting performance (e.g., Hardy, Bell, & Beattie, 2014; Jones, Hanton, & Connaughton, 2007), MT can be defined as “a personal capacity to deliver high performance on a regular basis despite varying degrees of situational demands” (Gucciardi & Hanton, 2016, p. 442). It is therefore understandable that stakeholders such as coaches, athletes, and/or administrators are interested in efforts that can develop MT.

In our synthesis of qualitative MT development research in Chapter 2, we identified that there have been few advancements in understanding what these stakeholders could be doing to elicit MT development. Accordingly, there is a need to explore frameworks from established domains of psychological practice that might provide opportunities for advancing our current understanding of the field (see also Mahoney, Ntoumanis, Mallett, & Gucciardi, 2014). Frameworks such as Bandura’s (2001) social cognitive theory emphasise the value of athletes developing an accurate understanding of the behavioural expectations within their environments as a means to facilitate individual and organisational performance and satisfaction.

Given recent work on mentally tough behaviour (MTb; e.g., Diment, 2014; Gucciardi, Jackson, Hanton, & Reid, 2015; Hardy et al., 2014) and the overarching aim within this thesis to advance the conceptualisation of MTb, we believe a behavioural coaching framework has the potential to shed light on understanding those behavioural expectations and processes that may foster the development of MT. Importantly, with MTb best conceptualised as a distinct concept that transmits the influence of MT into performance (refer to Figure 3.1), a focus on working with observable behaviours can complement the traditional focus on targeting unobservable psychological resources that underpin MT. Therefore, the purpose of this
The chapter is to introduce and evaluate a coach targeted education program aimed at increasing the frequency of MTb in athletes, as well as improving MT and performance, using an established behavioural coaching model as the guiding framework.

### 5.1.1 Theoretical Foundations of Behavioural Coaching

Behavioural coaching originated from the field of behaviourism (Passmore, 2007a), which is considered one of the formative fields in psychology. Behaviourism focuses on the actions people display that enhance the likelihood of bringing about desired outcomes in certain contexts (Bandura, 1969; Skinner, 1953), in contrast to the internal influences that cannot be seen. Scholarly interest in behaviourism dates back to Pavlov’s experiments on conditioned responses early in the 20th century (Wolpe & Plaud, 1997). His proposition was that dogs (and potentially humans) could be trained to respond reflexively, without conscious thought to certain stimuli, spawning research into the associations between behaviour and punishment or reward. Skinner’s (1953) classical and operant conditioning research extended this foundational work. He distinguished between respondent behaviour, which followed on from Pavlov’s model where an individual learns to respond a certain way to an existing event, and operant behaviour, whereby an individual actively attempts a new behaviour that is reinforced by a successful outcome (Passmore, 2007a). This work was followed up by Bandura’s (1969) argument that early behaviourism theories did not account sufficiently for the human capacity for abstract thinking, and the influence of beliefs, values, and memories on one’s behaviour. He explained this capacity through social learning theory, whereby an individual learns from observing others’ behaviours and the associated outcomes, and the concept of self-efficacy, which is based on individuals’ perception of their ability to perform a certain task. More recently, Hayes, Strosahl, and Wilson (1999) offered a different perspective on the links between thoughts, emotions and behaviour, whereby the avoidance of internal processes may result in problematic behaviours. They proposed the Acceptance and Commitment Therapy (or ACT) framework as a more unified model for behaviour change.
Research guided by behaviourism has provided a foundation to assist in the scientific development of psychological models and techniques (Michie, Richardson, et al., 2013) that have been applied across many situations and environments (Eldridge & Dembkowski, 2012). Thus, behaviourism is deeply entrenched within the psychological sciences.

We have seen the development of different behavioural coaching models to assist in improving performance and well-being, with increasing applications in organisational and leadership development settings (Lai & McDowall, 2014). Behavioural coaching is defined as “a structured, process-driven relationship between a trained professional coach and an individual or team … to help coaches develop competencies and remove blocks to achieve valuable and sustainable changes in their professional and personal lives” (Skiffington & Zeus, 2003, p. 6). The key concepts underpinning the process include reinforcement, modelling, stimulus control, rehearsal, and goal-setting (Eldridge & Dembkowski, 2012), which shares some similarities with more traditional counselling approaches across different domains of psychology (e.g., clinical, sport). Depending on one’s preferred model of practice, there are varying degrees of overlap when we consider the goal of behaviour change, such as the importance of the therapeutic alliance (Bluckert, 2005; Whitmore, 2009). Poczwardowski, Sherman, and Ravizza (2004) highlighted the similarities between sport psychology approaches and the integration of cognitivism and behaviourism, or more traditional counselling, although did not provide detail about how such theories could be applied in sport settings. Acknowledging these similarities, one of the major differences is that behavioural coaching approaches are focused on the actions that can be seen or heard by others, as opposed to the focus on those unobservable cognitions that underpin behaviour in counselling approaches (e.g., cognitive behavioural therapy). An overview of other key differences between coaching and counselling approaches is detailed in Table 5.1.
Table 5.1: Coaching versus counselling approaches to behaviour change (Bluckert, 2005).

<table>
<thead>
<tr>
<th>Coaching Approach</th>
<th>Counselling Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution-focussed to achieve present and future work-related behaviour change.</td>
<td>Emotion-focussed to explore problematic emotional states, personal history and the effect these factors may have on functioning.</td>
</tr>
<tr>
<td>Initial aim is to improve performance through behaviour change.</td>
<td>Initial aim to modify problematic thoughts.</td>
</tr>
<tr>
<td>More frequently conducted with a higher functioning client group.</td>
<td>Client group is more often the clinical and sub-clinical pathological population.</td>
</tr>
<tr>
<td>Utilises performance feedback from a range of stakeholders (e.g., supervisor, peers, and/or customers).</td>
<td>Draws primarily on client’s experiences and self-reports.</td>
</tr>
<tr>
<td>Less frequent sessions, and less concern regarding confidentiality allows for various locations for sessions.</td>
<td>Often 50-60 minute sessions once weekly initially, with increased confidentiality requiring that sessions occur in the therapists consulting room.</td>
</tr>
</tbody>
</table>

Further consideration of these key differences highlights the value of behavioural coaching in environments where performance improvement is key, particularly when the goal is to improve interaction and coaching skills of those involved to elicit behaviour change in others. Previous research supports this assertion, with coaching approaches resulting in visible increases in desirable skills or behaviours in groups of coachees (Stokes, Luiselli, & Reed, 2010; Theeboom, Beersma, & van Vianen, 2014). Coaching also aids in the promotion of shared language and understanding amongst organisations and employees (Eldridge & Dembkowski, 2012), with the likely result being effective behaviour change across different organisational groups with different coaches. Subsequently, there is evidence to suggest that individuals also respond more positively to coaches who are clear regarding the most critical desirable behaviours (Cumming, Smoll, Smith, & Grossbard, 2007). Such a finding lends weight to the importance of maintaining well-defined organisational values that are tied to behaviours and incorporated into the coaching process. Importantly, behavioural coaching
has been attributed to improvements in well-being (Grant, Green, & Rynsaardt, 2010), coping (Moen & Skaalvik, 2009), and motivation (Spence & Grant, 2007) in coachees; factors that are considered important for maintaining performance in high pressure environments such as elite sport (Gould, Dieffenbach, & Moffett, 2002).

As with any approach to psychological practice, there are both strengths and weaknesses to behavioural coaching that can influence its effectiveness across different situations. It would be remiss to expect that such an approach would be appropriate for all situations, as there will likely be times in a professional sporting environment where an individual’s behaviour is periodically affected by a mental health concern, or an episode of mental illness (Gulliver, Griffiths, Mackinnon, Batterham, & Stanimirovic, 2015). In these situations, one would expect a more traditional clinical approach by a trained professional to be implemented to support and assist individuals to improve their well-being before undertaking or continuing with performance related behavioural coaching. An overview of the other key advantages and disadvantages of behavioural coaching are detailed in Table 5.2.

Table 5.2: Advantages and disadvantages of behavioural coaching (Adams, 2016; Bluckert, 2005; Spence & Grant, 2007; Whitmore, 2002).

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides a structured approach to the intervention process, often with guidelines for application.</td>
<td>Requirement to evaluate own capabilities as a coach in new situations.</td>
</tr>
<tr>
<td>Solution-focussed approach enhances more targeted coaching skills when limited interaction opportunities exist (e.g., time poor high performance environments).</td>
<td>Solution-focussed approach sometimes not appropriate for mental health difficulties or mental illness, which requires referral to a clinical expert before coaching can proceed.</td>
</tr>
<tr>
<td>Increased opportunities to promote the collective understanding of organisational values amongst employees.</td>
<td>Conflict between a coachee’s and organisational values results in low likelihood of success and lasting change.</td>
</tr>
<tr>
<td>Increased insight into desirable organisational behaviours, and how to better align coachee behaviours.</td>
<td>Inaccurate understanding of the organisational behaviours will result in difficulty operationalising desirable behaviours with a coachee.</td>
</tr>
<tr>
<td>As external to the organisation, coach has separation from any emotional ties and a more objective view of situation.</td>
<td>Inaccurate assessment of situation as an external provider will prevent ‘buy-in’ from coachee and decrease likelihood of success.</td>
</tr>
<tr>
<td>Includes formal evaluation of the coaching process, providing an opportunity to tie coaching effectiveness to performance measures.</td>
<td></td>
</tr>
</tbody>
</table>


Although interest in the area of behavioural coaching has increased over the last two decades (Theeboom et al., 2014), there is currently limited research available that evaluates the effectiveness of the different models; organisational coaching is still considered an emerging profession that is practice over research driven (Grant et al., 2010). A meta-analysis conducted by de Haas (2008) concluded that there were no significant differences in outcomes between the different coaching approaches. Subsequently, in their recent systematic review, Lai and McDowall (2014) identified that increased interest has resulted in more empirical research and evidence to support the effectiveness of behavioural coaching, with Eldridge and Dembkowski (2012) identifying Whitmore’s (2002) GROW model (refer to Table 5.3 for an overview) as the most widely used behavioural coaching model.

5.1.2 Behavioural Coaching and Improving Performance

The integration of behaviourism and cognitivism is a common therapeutic approach adopted by sport psychologists (Poczwardowski, Sherman, & Ravizza, 2004), yet there is currently limited research regarding the use of established behavioural coaching frameworks in sport settings. The extant research in more traditional coaching domains (e.g., leadership development) provides insight into the relationship between behavioural coaching and performance. In their meta-analysis into the effectiveness of coaching on individual outcomes in an organisational context, Theeboom et al. (2014) identified a significant positive effect on performance/skills improvement. Although the authors looked more broadly at executive coaching as opposed to behavioural coaching, their findings highlight an opportunity to foster a positive effect on performance in organisational settings using a coaching approach. Similarly, in Grant et al.’s (2010) developmental coaching program for high school teachers, participants reported increased goal attainment and resilience, as well as reduced stress when compared to the control group. Although the self-reported increases in achievement and goal attainment suggests the coaching achieved positive results, no objective performance measures were reported in support of these self-reports.
Table 5.3: The four stages of the GROW coaching model (Whitmore, 2002), and examples from the current study.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description/Task</th>
<th>Example Questions</th>
<th>Structured workshop example</th>
<th>One-on-one review example</th>
</tr>
</thead>
</table>
| Goal   | Setting goals for the session or, more specifically, identifying what the desired outcome is for the coaching session. | • What would you like to walk away from this session with?  
• What would you like to have achieved at the conclusion of this session? | Strategies to increase the frequency of athletes using their strengths in games                  | Increasing an athlete’s speed of ball disposal during contests with opposition athletes (previously identified as an ongoing area for development by coaching staff). |
| Reality| To explore the current situation for the coachee, or reality checking. The aim is to identify what the start point is in terms of changing behaviour. | • How has your behaviour changed since our last session/review?  
• What has been problematic?  
• How would you rate your current level of performance in this area on a scale of 1 to 5?  
• What is one thing that has been good about the change? What is one thing that could be better? | Average level of performance on a five point Likert scale to identify the reality.           | Athlete had difficulty gaining possession of the ball cleanly (i.e., picking it up on his first attempt) when under pressure, which subsequently slowed how quickly he was able to pass it to a teammate. |
| Options| Identify and explore the various strategies or courses of action, or what can someone do, or how can they take steps towards the desired change. | • Considering what could be better, how do you think you could improve your behaviour?  
• What have you done in the past that has worked well?  
• What have you observed others doing that has influenced their performance? How could you apply what you’ve observed to your own situation? | A two-step process:  
1) Identification & discussion of senior athletes that were considered an exemplar or role model for regularly displaying strengths.  
2) Identification and discussion of what these senior athletes were observed doing around the club, during training and meetings, or outside of formal sessions that attributed to their ability to display their strengths more regularly in games. | Athlete identified that he was not committing the necessary time to these developmental training drills due to a lack of understanding how it would benefit him. |

Note: This two-step process allowed the coaches an opportunity to draw on their collective knowledge to identify and operationalise the behaviour of interest from a developmental perspective.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Description/Task</th>
<th>Example Questions</th>
<th>Structured workshop example</th>
<th>One-on-one review example</th>
</tr>
</thead>
</table>
| Way Forward | “What is to be done, When, by Whom, and the Will to do it” (Whitmore, 2009, p.55), or identification of the way forward; the practical take-away points that one can implement to build on and achieve the desired goal. | - What exactly will you do? When will you do it? With whom?  
- What makes this change important to you?  
- What might get in the way (such as personal barriers, events and other people)? | Identification of the agreed focus areas to increase the frequency of athletes displaying their respective strengths. Each coach (Whom) would continue to schedule and facilitate the specialist training drills (What) following training sessions a minimum of once weekly (When) that targeted each of their athletes’ individual strengths. Coach Will to undertake these tasks was inherent in their role, but enhanced by their acknowledgement of the value of playing to strengths for developing athletes. | Athlete & coach collaboratively identify the Way forward. This process included discussing and agreeing on When the athlete will be able to work on this behaviour (e.g., specific parts of the training sessions), What will be involved (e.g., specific developmental drill), with Whom (e.g., which coach will facilitate it, and which teammate they must work with), and the likely outcome of the athlete’s application (e.g., “working on this skill during this training drill should increase the effectiveness of your decision making under pressure during games”) to further increase Will. |
It is noted that there are similarities in the underlying components across these more traditional coaching domains and sporting environments, with the implementation strategies for a behavioural coaching approach also sharing some similarities with other sport psychology approaches (e.g., Arnold & Sarkar, 2015; Poczwardowski et al., 2004). The psychological skills often considered the foundation of behavioural coaching (e.g., rehearsal, stimulus control, and goal-setting; Luiselli, 2012) are also identified as best practice for improving and maintaining high levels of athletic performance, such as visualisation, arousal management, and goal-setting (e.g., Brown & Fletcher, 2016; Macnamara & Collins, 2013). It would therefore be expected that a behavioural coaching approach found to have a positive effect on performance in organisational and leadership development settings (e.g., Lai & McDowall, 2014) could also be modified for use to improve performance in sport settings (e.g., Wagstaff, Fletcher, & Hanton, 2012).

Although behaviourism can encompass a broad range of factors relating to sport performance from a psychological perspective, of particular interest is how it relates to the concept of MT development in high performance settings. Further consideration of goal attainment provides a link to recent research in sport, specifically targeting both performance and MT. In their paper exploring MTb, Hardy et al. (2014) proposed that MT can be defined as an “ability to achieve personal goals in the face of pressure from a wide range of different stressors” (p. 70). Their definition provides an overt connection to behaviourism, in that MTb is required to achieve personal goals in competitive performance situation, regardless of the cognitions, attitudes, and emotions at play. Applying the same conceptual foundation in their research with elite youth cricketers, Bell et al. (2013) found that defining, discussing, and agreeing on the most desirable behaviours with coaches and athletes resulted in an increase in both MT and competitive performance statistics when compared to a control group.
5.1.3 Coach vs Athlete-focussed Interventions for Performance Improvement

With one of the advantages of behavioural coaching being the development of skills in individuals to increase performance and promote behaviour change in larger groups (e.g., Theeboom et al., 2014), exploring coach development in a sporting environment would be a logical approach. Although the more traditional approach might be for a sport psychologist to work with the athletes to change their behaviour, there are sometimes limited opportunities to spend sufficient time with athletes in some professional environments (Arnold & Sarkar, 2015). Furthermore, compared to an athlete targeted model that may equate to a consultant spending one hour weekly with an athlete, coaches have significantly greater opportunity to influence behaviour change because they often spend a large amount of time interacting with athletes. It is therefore important to consider alternative delivery options that promote the development of psychological concepts such as MT in sporting environments. In their recent study in this area, Weinberg, Freysinger, Mellano, and Brookhouse (2016) purported that coaches play a central role in the development of MT in athletes, highlighting that a sport psychologist working collaboratively with a coach is a more effective approach. Consistent with this claim, meta-analytic data on the effects of psychological interventions on sport performance showed that coach-delivered interventions achieved greater effects than athlete-centred programs (Brown & Fletcher, 2016).

5.1.4 Overview of the Present Research

Aligned with these theoretical and empirical considerations, we applied a behavioural coaching framework as a part of coach development initiative to assist in developing MT in athletes in a professional AF environment. The primary aim was to improve the frequency of MTb in AF athletes, according to the nine-items of the MTbS detailed in Chapter 4, which were also aligned with the team’s ‘core values’ (refer to Table 5.4). Noting that these values had been previously identified by the team as important, and already used to help guide athlete behaviour, the alignment of MTb with these values was viewed as a means to increase
relevance. Secondary aims were to improve coach and self-rated MT, and overall athlete performance in competitive matches.

Whitmore’s (2002) GROW model has been identified as the most widely used behavioural coaching model (Eldridge & Dembkowski, 2012); an overview of the four stages of the GROW coaching model is provided in Table 5.3. The GROW model is based on the premise that the coachee is an active participant in, and responsible for influencing the behaviour of others to improve collective performance (Whitmore, 2009), highlighting its value for coaches in team sport environments. Importantly, from a translational standpoint, the uncomplicated nature of the GROW model makes it suitable for coachees with limited psychological training (Passmore, 2007b) who operate in an environment involving a number of competing demands and limited time for reflection.

In light of the difficulties associated with applying controlled experimental research designs in elite sporting environments (Barker, McCarthy, & Jones, 2011), a single-case research design (SCD) was chosen as the most appropriate for the current study. Importantly, SCDs are identified as valuable when exploring new research areas and working with unique populations such as elite athletes, as these designs allow for “the detection of positive effects for individuals who would otherwise have their success masked in a non-significant group design” (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013, p. 6). Such a consideration is also important in light of the likely smaller effects due to professional athletes already performing at a higher level than the general population. Primarily as a result of these factors, it was decided that applying the GROW behavioural coaching model as a part of a SCD would be the most appropriate methodological approach for our application.
Table 5.4: Examples of targeted mentally tough behaviours by category.

<table>
<thead>
<tr>
<th>Category (Core Value)</th>
<th>Example behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Adapts to changing situations.</td>
</tr>
<tr>
<td></td>
<td>• Exhibits positive body language following a personal or team mistake.</td>
</tr>
<tr>
<td></td>
<td>• Displays decisive actions in pressure situations that are effective.</td>
</tr>
<tr>
<td>2</td>
<td>• Effort levels during training remain consistently high, whether preparing for a normal or high pressure game.</td>
</tr>
<tr>
<td></td>
<td>• Takes responsibility for improving own performance.</td>
</tr>
<tr>
<td></td>
<td>• Communication does not deteriorate when training poorly.</td>
</tr>
<tr>
<td>3</td>
<td>• Performance is not adversely affected by difficult personal situations or events.</td>
</tr>
<tr>
<td></td>
<td>• Employs expert information to optimise recovery.</td>
</tr>
<tr>
<td></td>
<td>• Effectively implements constructive feedback from others.</td>
</tr>
</tbody>
</table>

Note: The three core team values were those identified as important and agreed upon by the team at the beginning of the season, with category labels omitted at the organisation’s request.

5.2 Method

5.2.1 Participants

The participants included three male AF coaches aged between 31 and 33 years, with coaching experience at the professional level ranging from two to five years. Their formal coaching qualifications included the Level 3 High Performance Coaching certification, which is currently the highest coaching training available in the AF field. An additional 15 male professional AF athletes were included in the study, with ages ranging from 18 to 23 years ($M = 19.73, SD = 1.28$), all of whom were coached by the three coaches. All participants were contracted to the national level team who play in both the national and state level competitions (depending on weekly team selections). The decision to test the program on three coaches was informed by pragmatic reasons (e.g., number of coaches within the club, willingness of the club to engage coaches in this program) and recommendations regarding the minimum number of cases per study (Kratochwill et al., 2010; see also, Shadish & Sullivan, 2011).
5.2.2 Measures

5.2.2.1 Mentally Tough Behaviour Scale (MTbS). Developed for the purposes of this research project (see Chapter 4), the nine-item MTbS requires informants (e.g., direct coach) to rate the frequency with which an athlete displays certain behaviours. The informants are required to respond to each item using an 8-point scale (1 = never, 4 = half the time, 7 = always, and N = not observed), by indicating how frequently they observed the athlete of interest display each behaviour/skill/action when the opportunity arose over the past month. Initial investigations revealed that the measure achieved excellent internal reliability evidence, and a positive association between MTbS scores and consistency of objective competitive performance ratings, providing preliminary support for the MTbS as a useful measure of MTb in an AF environment.

5.2.2.2 Mental toughness index (MTi). The MTi (Gucciardi, Hanton, Gordon, Mallett, & Temby, 2015) is an eight-item measure of MT that requires participants to respond to each item using a 7-point scale (1 = false, 100% of the time and 7 = true, 100% of the time). Originally developed as a self-report measure (e.g., “I am able to use my emotions to perform the way I want to”), an informant MTi was also employed in the current study to allow for a coach to rate an athlete of interest (e.g., “He [athlete X] is able to use his emotions to perform the way he wants to”). Initial investigations across education, workplace and sporting contexts provided reliability and validity evidence for the MTi and its associations with the concepts of performance, stress, and psychological health (Gucciardi, Hanton, et al., 2015).

5.2.2.3 Overall competitive match performance statistics. Known as ‘Champion Data Player Rank’, an overall performance score for each match is calculated by a commercial-in-confidence algorithm (Champion Data Holdings, Victoria, Australia) that is considered a “scientifically derived, objective measure weighted in favour of effective ball use and winning the disputed ball” (Sullivan et al., 2014, p. 563). A positive rating is allocated to each effective skill execution, and a negative rating is allocated to each
ineffective skill execution, with the summative figure representing the impact of an athlete on the match, or overall performance for that match. Drawing on previous research that has employed the athlete rank to evaluate performance amongst playing groups (e.g., Hiscock, Dawson, Heasman, & Peeling, 2012; Sullivan et al., 2014), the rank was divided by the minutes of match time that was played by the athlete of interest. With the time an AF athlete spends involved in the competition varying across each match for a number of reasons (e.g., interchange rotation requirements, injuries), this method allows for a more accurate comparison of an athlete’s objective performance from match to match (Hiscock et al., 2012). Subsequently, in an attempt to compare performance against coach MTb ratings and account for possible variability across weekly performances, we calculated average performance scores for each four week block.

5.2.2.4 Social validation questionnaire. Developed for the purposes of the present study to provide insight into the coaches’ perceived effectiveness of the intervention, the 11-item social validation questionnaire (see Appendix B) was completed following the conclusion of the study. The coaches were asked about their experiences with the behavioural coaching program using a 7-point scale (1 = strongly disagree, 4 = neutral, 7 = strongly agree). The coaches were also asked to provide comments on what aspects of the program they thought were most and least useful, and suggestions on how to improve the program. This information was incorporated with feedback the coaches were asked to provide throughout the program.

5.2.3 Design

The present study adopted a non-randomised, intervention-only single-subject A-B-A design conducted over the course of an AF competitive season (November-September). The study protocol was approved by a human research ethics committee in accordance with the National Health and Medical Research Council’s statement on ethical conduct in human research (NHMRC, 2007). Following approval from the sporting organisation, an
information session was conducted for coaches and athletes in February to provide them with an outline of the project. During this session, participants reported their demographics, provided written consent, and completed the first round of baseline measures collected prior to the beginning of the program, with participants required to provide ratings of their observations over the preceding four weeks. A second round of baseline data collection was conducted approximately four weeks later. Due to the coaching structure of the organisation, each coach was allocated to a different group of athletes (or “lines”) according to the athlete’s primary position (i.e., defence, attack, or midfield). Each coach rated only the athletes in his “line” to minimise the coaches’ survey time commitments at the request of the organisation. The MTbS and the MTi took approximately five minutes per athlete to complete. Coaches were required to rate their “line” athletes via an online survey site at monthly intervals throughout the program period (February – July) to evaluate the effects of the program. Following the completion of the program, two more ratings at similar time points (August and September) were conducted to explore maintenance effects. Coaches were advised of the rating period and due date for ratings both verbally and via email one week prior to the due date of each time point. Overall competitive performance statistics and total minutes played for each athlete were collected following each game. Athletes also completed an 8-item MTi as an additional social validation check, administered by the lead researcher in the club lecture theatre at three time points: pre-intervention (February), immediately following the conclusion of the intervention (early July), and at the end of the regular competition season (early September).

5.2.4 Program Format

The GROW coaching model by Whitmore (2002) was used as the foundation of the program, offering a framework to guide the behavioural coaching dialogue. The primary aim was to improve the frequency of MTb in AF athletes, with secondary aims to improve MT and athlete performance. It was structured to employ a collaborative approach between the
lead researcher and the coaches to include aspects of reinforcement, modelling, stimulus control, rehearsal and goal-setting; factors identified as key behavioural coaching concepts by Eldridge and Dembkowski (2012). Following the collection of baseline data, the program involved two phases over a five month period from late pre-season (February) to just after the mid-point of the competition season (early July). Activities included an initial information session, four-weekly structured coaching group workshops with the coaches, and observation of various events that formed part of the regular athlete training and development program in four-week blocks. The typical structure of each block is detailed in Table 5.5.

5.2.4.1 Phase 1: Developing an understanding of the environment, the coaches, and the athletes. Phase 1 began with an initial workshop with the coaches to provide an overview of the project and the program (see Table 5.6 for an overview of the workshop content). The first four-week block involved observation of the coaches operating across the different settings within the organisation, engagement in informal discussions to draw on their level of knowledge, and general questioning of coaches and support staff to better understand the organisational factors and the operational constraints that may influence program delivery. The primary goals were to: a) become familiar with the athletes and coaches involved, specifically each coach’s interpersonal style (Gray, 2006), experience, insight into, and knowledge of behavioural frameworks (Peterson, 2006) to develop an understanding of how to tailor individual interactions to suit the coach (Arnold & Sarkar, 2015); b) develop rapport and positive working relationships (Giges, Petitpas, & Vernacchia, 2004), including a mutually beneficial working alliance (Bordin, 1994); and c) increase both coach and athlete perception of the lead researcher as a member of the organisation (Sharp & Hodge, 2013), often achieved by consistent presence in sessions, at training, and around the club (Birrer, Wetzel, Schmid, & Morgan, 2012). Although these goals were relevant throughout the program, Phase 1 concluded with the second coaching group workshop (refer to Table 5.6 for an overview).
Table 5.5: Typical four-week block of the behavioural coaching program.

<table>
<thead>
<tr>
<th>Week</th>
<th>Event</th>
<th>Activities</th>
<th>Process/Outcome</th>
</tr>
</thead>
</table>
| 1    | Structured coaching group workshop. | • 60 minute session.  
• Brief review of previous four week block.  
• Completion of two page GROW workbook (see supplementary material). | • Identification of focus points for the group of athletes for the next four weeks.  
• Modelling the GROW framework to highlight the utility of the model for coach-athlete interactions. |
| 2    | Coach A observation. | • Observation of one-on-one (coach-athlete) game reviews and game preparation meetings, training drills, training review sessions, athlete development sessions, early career group meetings, and team meetings.  
• Information collected from interactions and observations to use as examples in the formal four-weekly workshops. | • Provision of verbal “in the moment” feedback when possible, verbal feedback at the completion of a session, as well as written feedback in the form of a summary regarding the observations and learning points at the conclusion of each week of observation.  
• Modelling the skills they were encouraged to use with the athletes during interactions (e.g., asking coaches to reflect on their own performance using the “good, better, and how” framework.).  
• Use of context-relevant applied examples from observations to ensure discussion points were relevant to the coaches, and to increase coach ‘buy-in’ to process. |
| 3    | Coach B observation. | As per Week 2. | As per Week 2. |
| 4    | Coach C observation. | As per Week 2. | As per Week 2. |
### Table 5.6: Structured coaching group workshop outlines, with associated phases identified.

<table>
<thead>
<tr>
<th>Phase / Workshop</th>
<th>Content</th>
<th>Processes &amp; Tools</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 / 1</td>
<td>- Overview of the structure of the behavioural coaching program:</td>
<td>- Open two-way dialogue.</td>
<td>- Introduce self.</td>
</tr>
<tr>
<td></td>
<td>a) Behaviour focus aligned with team values;</td>
<td>- Prompting discussion on how to best maintain communication between facilitator and coaches throughout project.</td>
<td>- Emphasise value of this type of program for coach and athlete development.</td>
</tr>
<tr>
<td></td>
<td>b) Those parties involved;</td>
<td>- Summary handout for coaches.</td>
<td>- Provide opportunities to increase perceived choice.</td>
</tr>
<tr>
<td></td>
<td>c) Facilitator (lead researcher) role, including most desirable sessions to attend;</td>
<td></td>
<td>- Increase likelihood of coaches ‘buying-in’ to program.</td>
</tr>
<tr>
<td></td>
<td>d) Coaches’ role;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>e) Athletes' role;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>f) Anticipated outcome of increased consistency and level of athlete performance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>g) Evaluation and feedback.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 / 2</td>
<td>- Overview of the GROW framework and its relationship with performance.</td>
<td>- Open two-way dialogue.</td>
<td>- Increase coach familiarity with GROW model and utility across different settings.</td>
</tr>
<tr>
<td></td>
<td>- Overview of how the framework will be facilitated, including practical examples across each prescribed activity (e.g., coaching group workshops, one-on-one game reviews etc).</td>
<td>- Structure workshop to follow GROW model (e.g., Goals of today’s workshop, What is the Reality in terms of where we are at in the program currently, discussion of the Options for different parts of the program, and what is the Way Forward from this workshop.)</td>
<td>- Highlight value of the framework to help guide interactions and provide tangible take away focus points for athletes.</td>
</tr>
<tr>
<td></td>
<td>- Ideas for the type of feedback that coaches could expect (e.g., verbal and written) and when to expect it.</td>
<td>- Encouraging suggestions on how the coaches can best receive feedback.</td>
<td>- Continue to look for opportunities to promote coach choice and increase buy in.</td>
</tr>
<tr>
<td></td>
<td>- Coach role in the process – importance of feedback to facilitator to improve product.</td>
<td>- Review of two page GROW workbook (available online as supplementary material) that will be used in future workshops.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Summary handout for coaches, maintaining GROW format.</td>
<td></td>
</tr>
<tr>
<td>Phase / Workshop</td>
<td>Content</td>
<td>Processes &amp; Tools</td>
<td>Goals</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
</tbody>
</table>
| 2 / 3-5          | • Brief overview of GROW framework and specific MTb target area (Category 1, 2, or 3, as per Table 4).  
• Work through two page GROW workbook. | • Open two-way dialogue.  
• Structure of workshop to follow GROW model.  
• Two page GROW workbook.  
• Facilitate discussion and draw on coaches’ varying knowledge and experience (i.e., different positional focus of defence, attack or midfield for each coach) to complete workbook, using their answers to promote discussion.  
• Summary handout for coaches, maintaining GROW format. | • Focus on application over theory.  
• Increase opportunities for coach self-reflection, and increased professional development as a result of vicarious learning (cf. Werthner & Trudel, 2006).  
• Provide opportunities for coaches to collaborate on which MTb’s will be targeted following workshops, to increase their likelihood of action (cf. Michie, West, & Spring, 2013).  
• Clear, actionable, and realistic focus points for the subsequent four week block. |
5.2.4.2 Phase 2: Applying the behavioural coaching framework. This phase included subsequent four-week blocks that targeted a different subset of MTb that aligned with one of the three team core values previously assigned by the playing squad. The focus was on developing the coaches’ ability to understand and apply the behavioural coaching framework. It involved two parts: a) three structured coaching group workshops targeting a subset of MTb; and b) ‘on-the-job’ behavioural coaching with each coach.

Phase 2a: Structured coaching group workshops. Workshops three to five followed a similar interactive structure consistent with the 4-steps of Whitmore’s (2002) GROW model, which aimed to increase awareness and responsibility in coaches. The Phase 2 workshops were designed to employ the GROW model to target a subset of MTb, with the subset nominated by the club’s head of development (refer to Table 5.6 for additional detail of the workshop content). It was envisaged that the practice of using the GROW model and a two page workbook (included at Appendix B) would create a transformational aspect by role-modelling the process-driven approach to behaviour change that coaches were encouraged to use when framing their interactions with athletes. An example of the application of the GROW model from a workshop is provided in Table 5.3.

Phase 2b: ‘On-the-job’ behavioural coaching and other activities. This part of Phase 2 included observation of one-on-one (coach-athlete) game reviews and game preparation meetings, as well as training drills, training review sessions, athlete development sessions, early career group meetings, and team meetings that were facilitated by the coaches involved in the program. Working alongside the coach, interactions and feedback from the lead researcher were structured to align with the GROW model and key behavioural coaching concepts identified previously, with the process designed to draw attention to the pertinent information that had been discussed during the group workshops. Part of the feedback process following these activities involved prompting the coaches to engage in self-reflection
(Weinberg et al., 2016), to better develop their own processes (Hay, 2007), and to rehearse the strategies they were encouraged to employ with athletes.

One method of applying the GROW model is provided within the context of one-on-one game reviews. In this activity, coaches were encouraged to utilise stages of the model as a framework to promote questioning and collectively agree on the short-term development opportunities for specific behaviours with the athlete of interest. Noting that this process did not use the GROW model in its entirety on some occasions, the coaching process can be employed to progress a task that has been discussed before, and as such, a session can begin at any stage (Whitmore, 2009). In the midst of the competition season in a modern day professional team sport environment, it is rare that athletes are unaware of their individualised development goals, and what the reality of their level of performance was during the most recent game. As a result, the observed reviews usually started with an overview of the strengths and areas for improvement from the game (Reality). However, for consistency of application, an example from the athlete reviews that included all four stages of the GROW model is provided in Table 5.3. It should be noted that this process can be compared to aspects of other developmental theories, such as self-determination theory (SDT; for a review see, Deci & Ryan, 2000), specifically when promoting the athletes’ perceived competence in their ability to improve.

Coaches were adept at identifying what needed to change, or what an athlete needed to work on to improve certain areas throughout the program. What was often missing, likely due to perceived time constraints, was the process of coaches working with an athlete to identify and clarify one or two specific focus points to work on over the coming week. From an SDT perspective (Deci & Ryan, 2000), the athlete therefore lacked clarity, choice and ownership on how he was going to improve in the desired area, with the coaches’ initial tendency being to adopt more controlling coach behaviours, such as telling the athlete what he was required to do (Bartholomew, Ntoumanis, Ryan, & Thogersen-Ntoumani, 2011).
Previous research has highlighted the importance of autonomy-supportive coaching behaviours (e.g., perceived choice) to increase the likelihood of positive behaviour change in athletes (Su & Reeve, 2011). Research by Bell et al. (2013) identified that the likelihood of desirable behaviour change is increased when athletes and coaches spend time collaborating on a way forward (for a comparison in organisational settings, see also, Bluckert, 2005; Whitmore, 2009). As a result, one of the real-time goals of the intervention related to encouraging coaches’ dialogue to move from telling (or controlling), to a more regular process throughout the week that increased the perceptions of athlete choice during conversations to expedite behaviour change.

There was also a tendency for the coach to not follow up with an athlete during the week to enquire on his progress with the agreed weekly focus points, check understanding, or to remind him of an upcoming opportunity to work on the identified areas during training sessions (i.e., reinforcement). Whitmore (2009) highlighted that the process of regularly revisiting and reflecting on behavioural coaching goals with an individual, both formally and informally is important. This process will increase an individual’s level of awareness and responsibility towards that behaviour change, and subsequently increase the likelihood of occurrence. Additionally, the reinforcement of this strategy with the coaches was seen as important in this environment due to large amounts of information the athletes received on a daily basis, and the possibility that the focus points discussed in the one-on-one reviews might be lost amongst other information. It was therefore expected that increasing the occasions that the coaches engaged in brief interactions with athletes at regular intervals to “check-in” on their progress would not only highlight that the focus points were important (Whitmore, 2009), but also remind the athlete of the previously identified opportunities to improve.

When observing the coaches’ interactions with the athletes during training or specific developmental drills, the practitioner’s primary aim was to again help the coach move the conversations from controlling (i.e., telling athletes) to more autonomy-supportive strategies.
where possible. The coaches were encouraged to use reflective questioning with athletes, such as “what was one thing you did in that drill that was done well?” or “what was one thing that you could improve on, and how would you improve?” Aligning with the concepts of modelling and reinforcement, this process replicated the strategies they were asked to use to reflect on their one-on-one sessions (e.g., the “good, better, and how” approach). Hay (2007) identified that using such prompts as a means to reflect enhances an individual’s capability to change and respond more effectively to similar situations in the future, and to promote critical thinking and autonomy in changing behaviour. There were two supplementary aims: first, to promote brief and effective follow-up of the athlete’s focus points from the one-on-one review for that week; and second, to draw on real-time learning opportunities with each coach to reinforce his competence with the process (e.g., unmediated learning situations, Werthner & Trudel, 2006). This strategy was also important in the context of stimulus control, using the opportunity for the coach to relate the stimulus to his or the athlete’s behaviour in real time, and make a change, as opposed to advising the coach of it at a later time when the learning opportunity might be less evident.

5.2.5 Data Analysis

We first conducted a visual analysis of the entire data pattern for each participant (Parker, Cryer, & Byrns, 2006) to examine the degree to which there were improvements in the primary and secondary outcomes during the intervention and the maintenance of changes during the post-intervention phases. As it is problematic to rely solely on visual analysis for single-subject designs, it is important that researchers utilise statistical techniques to enhance the interpretability of naked-eye impressions (Maggin, Briesch, & Chafouleas, 2013). First, we used standard deviation bands from baseline assessments to provide a ‘visual aid’ for the assessment of the effectiveness of the intervention (Callahan & Barisa, 2005; Pfadt & Wheeler, 1995). Using only those footballers who were rated by their coach at both baseline occasions, we captured baseline variability with a 2 standard deviation band and examined the
proportion of data points in the intervention and post-intervention phases above the projected expectation. Second, the percentage of non-overlapping data points (PND) was calculated to provide an indication of the proportion of data points in the intervention and post-intervention phases that exceed the highest point observed during the baseline period (Scruggs & Mastropieri, 2013; Scruggs, Mastropieri, & Casto, 1987). Interpretational guidelines for the PND are as follows: effective interventions (>70%), questionable effectiveness (50% to 70%), and no observed effects (<50%) (Scruggs & Mastropieri, 1998). Third, the non-overlap of all pairs (NAP) utilises all pairwise comparisons across two phases (e.g., A with B) to provide an indication of the “percentage of data which improves across phases” (Parker, Vannest, & Davis, 2011, p. 312). Interpretational guidelines for the NAP are as follows: large effect (>93%), medium effect (66% to 92%), and a weak effect (50% to 65%) (Parker & Vannest, 2009). With regard to visual analyses and their enhanced interpretability with statistical procedures, evidence credibility is maximised when the effect is replicated across at least three cases (Kratochwill & Levin, 2010).

We were also interested in the degree to which the effects of the coaching intervention can be generalised across cases. To do so, we used latent growth modelling (LGM) with a Bayesian estimator in Mplus 7.4 (Muthén & Muthén, 1998-2015) to estimate latent variables that capture each individual’s starting point (intercept) and average rate of change over time (slope). To assess model-data fit, we relied on posterior predictive checking in which the posterior distribution generated by the mixing of prior beliefs and new data is compared with the observed data (Muthén & Asparouhov, 2012). The posterior predictive p value (PPP) is provided in Mplus, with values greater than .05 considered reasonable (Asparouhov & Muthén, 2010) and those around .50 reflective of a well-fitting model (Muthén & Asparouhov, 2012; Zyphur & Oswald, 2013). Owing to the unavailability of prior knowledge regarding the expected magnitude and precision of parameter estimates, we used non-informative priors for all analyses.
5.3 Results

5.3.1 Visual Analyses

Descriptive statistics, internal reliability estimates (α), and bivariate correlations among study variables are detailed in Table 5.7. Coach ratings of MTb and MTi, as well as self-reports of MTi achieved excellent internal reliability evidence. A graphical representation of the overall trend of change and missing values patterns of coach rated MTb and MTi respectively are provided in Figures 5.1 and 5.2; raw data are presented in Table 5.8. The visual and raw data indicate that both coach rated MTb and MTi increased throughout the first half of the study period, at which point they plateaued. Graphical representations of the 2 standard deviation bands superimposed on the MTb data for each AF athlete are provided in Appendix 5A, and for MTi data in Appendix 5B. Values for MTb and MTi PND and NAP are detailed in Table 5.8.

5.3.1.1 Mentally Tough Behaviour Scale (MTbS) scores. As a result of athlete illness or injury, coaches were unable to provide sufficient ratings of MTb on four of the 15 athletes (Participant’s 2, 7, 9, & 12) and their data were subsequently omitted from visual analysis. Of the 11 athletes, with regard to 2 standard deviation bands, examination of the graphical representations at the end of the intervention period indicates five athletes (Participant’s 1, 5, 6, 10, and 14) surpass what can be expected by projecting individual baseline mean and variability. According to PND values for MTb, the coaching program was found to be effective at the end of the intervention phase for six athletes (Participant’s 3, 5, 10, 11, 14, and 15), questionable for three athletes (Participant’s 1, 6, and 13), and had no observed effect for the remaining two participants. NAP values mirrored this categorisation between baseline and intervention phases, with data for six athletes (Participant’s 3, 5, 10, 11, 14, and 15) displaying a large magnitude, three athletes (Participant’s 1, 8, and 13) with medium magnitude, and two athletes (Participant’s 4 and 6) with weak magnitude.
At the conclusion of the post-intervention period, with regard to 2 standard deviation bands, examination of the graphical representations indicates that five athletes (Participant’s 1, 3, 6, 13, and 14) MTb ratings at the end of the post-intervention period surpass what can be expected by projecting individual baseline mean and variability. According to PND values for MTb, the coaching program was found to be effective for seven athletes (Participant’s 1, 3, 4, 6, 8, 10, and 11), and questionable for three athletes (Participant’s 5, 13, & 14). NAP values deviated between intervention and post-intervention phases, with data for two athletes (Participant’s 4 and 6) displaying a large magnitude, three athletes (Participant’s 8, 10, and 11) with medium magnitude, and three athletes (Participant’s 1, 3, and 13) with weak magnitude. Overall, these data indicate that the intervention effects were meaningful for four athletes (Participant’s 1, 6, 13, & 14), thereby providing evidence credibility (Kratochwill & Levin, 2010).

5.3.1.2 Mental toughness inventory (MTi) scores. The coaches were able to rate all athletes on MT at all time points throughout the intervention, as the MTi does not require coaches to rate based on observable behaviours. With regard to 2 standard deviation bands for MT, examination of the graphical representations at the end of the intervention period indicates four of the 15 athletes (Participant’s 1, 5, 13, and 14) surpass what can be expected by projecting individual baseline mean and variability. According to PND values for MT at the end of the intervention phase, the coaching program was found to be effective for five athletes (Participant’s 3, 5, 11, 14, and 15), questionable for three athletes (Participant’s 1, 4, and 13), and had no observed effect for the remaining seven athletes. NAP values differed between baseline and intervention phases; data for the same five athletes (Participant’s 3, 5, 11, 14, and 15) displayed a large magnitude, whereas data for nine athletes (Participant’s 1, 2, 4, 6, 7, 9, 10, 12, and 13) displayed a medium magnitude.

At the conclusion of the post-intervention period, with regard to 2 standard deviation bands, examination of the graphical representations indicates that the MT ratings of six
athletes (Participant’s 1, 5, 10, 11, 13, and 14) at the end of the post-intervention period surpass what can be expected by projecting individual baseline mean and variability. According to PND values for MT, the coaching program was found to be effective for 12 of the 15 athletes (Participant’s 1 to 6, 8, 10, 11, and 13 to 15), and questionable for one athlete (Participant 12). NAP values for MT between intervention and post-intervention phases displayed a large magnitude for two athletes (Participant’s 4 and 6), a medium magnitude for five athletes (Participant’s 2, 8, 10, 11, and 13), and a weak magnitude for two athletes (Participant’s 1 and 12). Overall, in terms of MT, these data indicate that the intervention effects were meaningful for four athletes (Participant’s 1, 5, 13, and 14), thereby providing evidence credibility (Kratochwill & Levin, 2010). Generally, the MT data supports the intervention effects as being meaningful at the conclusion of the study period for three of the four athletes identified from the MTb data (Participant’s 1, 13, & 14).

5.3.2 Latent Growth Modelling

An inspection of the graphical representations of the overall trend of change depicted in Figures 5.1 and 5.2 supported the exploration of both linear and non-linear trajectories of coach-rated MTb and MTi. As such, we executed a piecewise growth model in which we examined two linear slopes (Bollen & Curran, 2006); one to capture change from pre-intervention through until the end of intervention period (t1-t5), and a second to capture change from the end of the intervention period to post-intervention (t5-t7). In so doing, we examined the initial effects of the intervention and the degree to which such changes were maintained once the intervention had been removed.

With regard to the LGM of MTb, the probability of the model, given the data, was excellent ($PPP = .364, \Delta$ observed and replicated $\chi^2 95\% \text{ CI } [-24.96, 35.43]$). The intercept indicated that, on average, coaches rated footballers’ MTb of 4.46 (95% CI: 3.69, 5.23) at the first assessment point. The average rate of change in MTb from the first time point (t1) through to the end of the intervention period (t5) was substantively important and indicated
that, on average, MTb scores increased .20 units (95% CI: .04, .37) between each assessment point. Upon completion of the intervention, the average rate of change in MTb from the end of the intervention period (t5) through to the end of the competitive season (t7) was small and not significantly different from zero; specifically, on average, MTb scores decreased -.12 units (95% CI: -.44, .19) between each assessment point. The negative covariance between the intercept and the slope for the intervention (-.09, 95% CI: -.70, .16) and post-intervention periods (-.21, 95% CI: -1.36, .38) was not meaningful, nor was the covariance between the two slope factors (-.02, 95% CI: -.26, .09). The $R^2$ values ranged from .66 to .96, which indicates that the proportion of the observed variability in MTb can be explained by the underlying growth factors.

With regard to the LGM of MTi, the probability of the model, given the data, was reasonable ($PPP = .061, \Delta$ observed and replicated $\chi^2$ 95% CI [-6.31, 50.31]). The intercept indicated that, on average, coaches rated athletes’ MTi of 4.52 (95% CI: 3.78, 5.22) at the first assessment point. The average rate of change in MTi from the first time point (t1) through to the end of the intervention period (t5) was substantively important and indicated that, on average, MTi scores increased .25 units (95% CI: .10, .40) between each assessment point. Upon completion of the intervention, the average rate of change in MTi from the end of the intervention period (t5) through to the end of the competitive season (t7) was small and not significantly different from zero; specifically, on average, MTi scores decreased -.15 units (95% CI: -.53, .24) between each assessment point. The negative covariance between the intercept and the slope for the intervention (-.07, 95% CI: -.62, .17) and post-intervention periods (-.18, 95% CI: -1.34, .59) was not meaningful, nor was the covariance between the two slope factors (-.04, 95% CI: -.34, .11). The $R^2$ values ranged from .72 to .93, which indicates that the proportion of the observed variability in MTi can be explained by the underlying growth factors.
Figure 5.1: Spaghetti plot of coach-rated mentally tough behaviour (MTb).

Figure 5.2: Spaghetti plot of coach-rated mental toughness (MTi).
Table 5.7: Descriptive statistics, internal reliability estimates and bivariate correlations among study variables ($N_{coach} = 3$; $N_{athlete} = 15$).

|       | M     | SD    |       |       |       |       |       |       |       | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9    | 10    | 11    | 12    | 13    | 14    | 15    | 16    | 17    |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 1     | MTb1  | 4.08  | 1.04  | (.92) |       |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 2     | MTb2  | 4.67  | .85   | .71*  | (.85) |       |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 3     | MTb3  | 4.96  | .75   | .48   | .85** | (.87) |       |       |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 4     | MTb4  | 5.13  | .93   | .54   | .74** | .87** | (.94) |       |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 5     | MTb5  | 5.25  | .86   | .55   | .82** | .86** | .73** | (.93) |       |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 6     | MTb6  | 5.05  | .85   | .63*  | .78** | .77** | .61*  | .91** | (.91) |       |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 7     | MTb7  | 5.04  | .67   | .52   | .52   | .69** | .37   | .66*  | .71*  | (.77) |       |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 8     | MT1   | 4.32  | 1.18  | .93** | .81** | .64*  | .80** | .61*  | .51   | .32   | (.97) |       |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 9     | MT2   | 4.82  | .76   | .72** | .97** | .82** | .73** | .77** | .74** | .55   | .79** | (.90) |       |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |
| 10    | MT3   | 5.04  | .97   | .63*  | .90** | .94** | .87** | .79** | .64*  | .53   | .75** | .86** | (.93) |       |       |       |       |      |       |       |       |       |       |       |       |       |       |       |
| 11    | MT4   | 5.20  | .93   | .53   | .78** | .80** | .93** | .77** | .56   | .37   | .80** | .77** | .87** | (.96) |       |       |       |      |       |       |       |       |       |       |       |       |       |       |
| 12    | MT5   | 5.54  | .90   | .42   | .82** | .83** | .78** | .89** | .76** | .50   | .55   | .80** | .85** | .82** | (.96) |       |       |      |       |       |       |       |       |       |       |       |       |       |
| 13    | MT6   | 5.29  | .94   | .58   | .86** | .82** | .56   | .86** | .94** | .63   | .56   | .86** | .75** | .63** | .79** | (.94) |      |       |       |       |       |       |       |       |       |       |       |       |
| 14    | MT7   | 5.29  | .90   | .54   | .78** | .75** | .49   | .86** | .92** | .76** | .10   | .55   | .38   | .18   | .57** | .65** | (.95) |      |       |       |       |       |       |       |       |       |       |       |       |
| 15    | MTself1| 4.23  | .51   | .50   | .38   | .25   | .76** | .27   | .00   | .03   | .63*  | .40   | .50   | .61*  | .24   | .15   | -.02  | (.74) |      |       |       |       |       |       |       |       |       |       |       |       |
| 16    | MTself5| 5.15  | .58   | .29   | .50   | .15   | .70*  | .53*  | .46   | .14   | .34   | .45   | .48   | .54*  | .55*  | .41   | .46   | .50   | (.72) |      |       |       |       |       |       |       |       |       |       |       |
| 17    | MTself7| 5.29  | .67   | .08   | .30   | .23   | .02   | .51   | .62*  | .61*  | -.01  | .26   | .17   | .07   | .31   | .48   | .67** | -.34  | .35   | (.84) |      |       |       |       |       |       |       |       |       |       |

Note: *p < .05, **p < .01.
Table 5.8: Coach rated mentally tough behaviour (MTb) and mental toughness (MTi) for each footballer at each measurement, percentage of nonoverlapping data points (PND), and nonoverlap of all pairs (NAP).

<table>
<thead>
<tr>
<th>Participant ID</th>
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<th>2</th>
<th>3</th>
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<th>5</th>
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<tr>
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<tr>
<td>PND (int)</td>
<td>66.67%</td>
<td>33.33%</td>
<td>100.00%</td>
<td>66.67%</td>
<td>100.00%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>33.33%</td>
<td>100.00%</td>
<td>66.67%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>PND (post)</td>
<td>100.00%</td>
<td>50.00%</td>
<td>100.00%</td>
<td>50.00%</td>
<td>100.00%</td>
<td>50.00%</td>
<td>100.00%</td>
<td>n/a</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>n/a</td>
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</tr>
<tr>
<td>NAP (pre-int)</td>
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<td>100.00%</td>
<td>50.00%</td>
<td>100.00%</td>
<td>50.00%</td>
<td>25.00%</td>
<td>66.67%</td>
<td>n/a</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
| NAP (int-post)| 50.00%| 50.00%| 58.33%| 100.00%| 50.00%| 100.00%| 50.00%| 66.67%| n/a | 75.00%| 83.33%| n/a | 50.00%| 8.33%| 0.00%| 0.00%

Note: (i) A blank space represents a missing data point; n/a = statistical index unavailable due to missing responses; (ii) Participants 2, 7, 9, and 12 (red text) omitted from MTb visual analysis due to limited coach ratings; (iii) For PND: Green (Effective Intervention) > 70%; Yellow (Questionable effectiveness) = 50-70%; and Red (no observed effect) < 50% (Scruggs & Mastropieri, 1998); (iv) For NAP: Green (Large effect) > 93%; Yellow (Medium effect) = 66-92%; and Blue (weak effect) = 50-65% (Parker & Vannest, 2009).
5.3.3 Case Comparisons between MTb and performance

Typical organisational stressors for earlier career professional AF athletes, such as playing across different competition levels (state vs national competition), injury, and positional changes (e.g., moving from the defence line group to attack), meant it was difficult to collect consistent and comparable competitive match performance statistics for a number of athletes. However, four athletes (Participant’s 1, 4, 5, and 10) played the majority of the season in the same competition level, with no major positional changes, and minimal injury occurrences, thus offering an opportunity to review their performance data against coach-reported MTb. Graphical representations of average performance ratings and MTb ratings are provided in Appendix 5C. The graphs highlight similar directional trends between the MTb and performance data in three cases (e.g., Participant’s 1, 5, and 11), whereas Participant 4’s performance data contrasted with his coach-reported MTb.

5.3.4 Social Validation and Treatment Integrity

The social validation data collected from the coaches’ post-intervention suggested the intervention was viewed positively, with average scores ranging between 5 and 6 out of 7. When providing feedback on the program, Coach A stated: “…[the BC model was] great to work with…. it has definitely assisted me in becoming a much improved coach.” Another comment from Coach B regarding the workshop aspect highlighted one of the benefits: “[part of the] learning we find is coming from conversations amongst one another’s experiences, and how we apply that in the future using the ‘good, better, how’ approach.” On the topic of applying the model during his reviews, Coach C identified: “The concept of summarizing ‘how’ we are going to develop the key areas out of their [the athlete’s] review has been beneficial.” Other comments from coaches regarding the improvement of the program were based on lessening focus on content in workshops and promoting more applied discussion, and more logistical factors relating to the provision of feedback following observations of sessions (e.g., “…[consider need to] provide direct feedback immediately post review...
meetings when we are time poor. If there is no time to give feedback to development coach then an email will suffice, [and he] will seek out further discussion if needed.”). Generally, despite the varied findings of the program itself, the comments highlighted some of the more useful aspects of the program from the coaches’ perspectives, and areas to advance the effectiveness of the program in the future.

When exploring social validity, Barker et al. (2011) recommended including the views of as many consumers of the intervention as possible. As a result, we also endeavoured to explore the athletes’ perceptions of the effects of the program through their own MT. These self-reported MTi scores, taken at three time-points during the study period, as well as the individual differences between each time point, are shown in Table 5.9. Collectively, these results suggest that all of the athletes involved perceived their own MT to increase almost one point ($M = .92, SD = .55$) during the program period (February–July), yet this increase was not sustained across the group following the withdrawal of the intervention. Comparing these self-ratings with the visual analyses, four of the athletes (Participant’s 1, 6, 13, & 14) who recorded meaningful intervention effects at the conclusion of the study period (September), across coach-rated MTb and/or MT, all reported continued increases in MT across the season. Thus, the information suggests that the coaches’ positive perceptions regarding the skills developed and utilised during the MTb program may have also had a positive effect on footballers’ self-perceived MT.

As identified by Barker et al. (2011), treatment integrity refers to the responsibility of a researcher to report all of the necessary details that allows for future replication of an intervention. In the reporting of this study, we believe that we have provided the necessary detail in the program format section that would allow for the delivery of the same program with other samples. Perepletchikova and Kazdin (2005) also highlighted that treatment integrity includes aspects of adherence, or the utilisation of the proposed procedures; competence, or the requisite skill and judgement of the researcher delivering the treatment;
and differentiation, or the application of a treatment that differs from other approaches. In the current study, adherence was addressed by identifying and remaining consistent with framework of the GROW behavioural coaching model throughout the program, while competence was addressed via two strategies; first, the lead researcher’s previous experience as a consultant (see consultant philosophy at Appendix 5D); and second, through regularly requesting feedback from both the coaches involved and the head of development to ensure the program was being delivered in the most beneficial way, within the constraints of the program design (refer to comments under “learning points and future directions”). Differentiation, as the third aspect, was addressed through the provision of the GROW model, which is a model that was previously unused in this setting, and unfamiliar to the coaching and development staff involved.

Table 5.9: Athlete self-rated mental toughness (MTi / 7) at three time-points: Pre-intervention, at the end of the intervention, and two months following the intervention, including individual differences between each time point.

<table>
<thead>
<tr>
<th>Participant ID</th>
<th>MTi-self Feb (pre-int)</th>
<th>MTi-self Jul (end int)</th>
<th>MTi-self Sep (post-int)</th>
<th>Diff pre-int to end-int</th>
<th>Diff end-int to post-int</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.75</td>
<td>5.88</td>
<td>6.13</td>
<td>2.13</td>
<td>0.25</td>
</tr>
<tr>
<td>2</td>
<td>4.38</td>
<td>5.75</td>
<td>5.50</td>
<td>1.37</td>
<td>-0.25</td>
</tr>
<tr>
<td>3</td>
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<td>5.13</td>
<td>5.38</td>
<td>1.13</td>
<td>0.25</td>
</tr>
<tr>
<td>4</td>
<td>3.50</td>
<td>5.25</td>
<td>5.88</td>
<td>1.75</td>
<td>0.63</td>
</tr>
<tr>
<td>5</td>
<td>4.50</td>
<td>5.00</td>
<td>3.75</td>
<td>0.50</td>
<td>-1.25</td>
</tr>
<tr>
<td>6</td>
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<td>3.75</td>
<td>5.25</td>
<td>0.50</td>
<td>1.50</td>
</tr>
<tr>
<td>7</td>
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<td>4.63</td>
<td>4.50</td>
<td>0.25</td>
<td>-0.13</td>
</tr>
<tr>
<td>8</td>
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<td>-0.75</td>
</tr>
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</table>
5.4 Discussion

The primary aim of this study was to determine whether the application of the GROW behavioural coaching model with AF coaches could improve the frequency of MTb in AF athletes, with secondary aims to improve MT and performance over the course of an AF competitive season. The results indicated that the program was effective in improving the frequency of MTb during the program period (Feb-Jul) for between five and six of the 11 athletes (with questionable effectiveness in three other athletes), with these improvements maintained for the remainder of the competitive season for between five and seven athletes. The results for the coach reported MT suggested that the program was effective for between four and five athletes at the end of the program period, with improvements shown for up to 12 of the 15 athletes at the conclusion of the season. Furthermore, the majority of athletes who were identified as achieving improvements by their coach, also self-reported increases in their MT. Therefore, due to the replication of an effect across more than three cases, evidence for the credibility of the intervention is provided (Kratochwill & Levin, 2010). Specifically, the findings of the present study offer preliminary support for previous assertions that a behavioural coaching framework can be used to increase the frequency of desirable behaviours (e.g., Theeboom et al., 2014). In the current study, with MTb being the desirable behaviours, the findings offer insight into a previously unreported means by which to develop MT using a behavioural coaching framework. Although only drawing on a small sample size, these findings also offer support for previous research indicating a link between MTb and performance in competitive sport environments (e.g., Bell et al., 2013).

5.4.1 Learning Points and Future Directions for Applied Practitioners

There were three primary learning points that were identified during the program that can provide valuable information for applied practitioners. The first related to developing a level of flexibility as a result of the regularly changing schedules, and relying on the coaches to keep the lead researcher informed of these changes. It was observed that these coaches, as
the most junior coaches in the organisation, were often at the mercy of most aspects of the
team program, and regularly had to revise or reschedule sessions and reviews to fit with
changes made by more senior members of the organisation. After arriving at the organisation
in the early stages expecting a specific activity and finding that it had been rescheduled, or
was no longer occurring, the value of open and regular communication with the coaches was
emphasised. To the coaches’ credit, when this concern was raised by the lead researcher, the
coaches were proactive in maintaining regular contact and providing frequent updates on
timing changes to ensure the lead researcher had every opportunity to attend the prescribed
sessions.

Second, it would be remiss to give the impression that coaches implemented the
framework from the very start of the program. Although the coaches maintained a
willingness to learn and an interest in the program itself, they were, like the athletes, operating
in an environment where they would also receive large amounts of information from a
number of stakeholders (e.g., senior coaches, sport scientists, analysts). With the challenges
in changing coach communication strategies (e.g., from telling to promoting athlete choice)
and interpersonal style having been reported elsewhere (e.g., Mahoney et al., 2016), it was
important to look for additional opportunities to reinforce the process. Therefore, the
education process for coaches to incorporate this framework required both verbal and written
feedback from the lead researcher following the activities, but also seeking opportunities to
prompt the coaches to engage in reflective practice when time allowed, in an attempt to
expedite their understanding and application. Notably, the observations towards the end of
the intervention indicated that the coaches were able to apply the model more efficiently
across different situations, with less guidance and prompting required by the lead researcher
following the observed activities.

The third learning point related to the inclusion of regular feedback for some formal
evaluation of the process, and to maintain the integrity of the program. Regular feedback was
sought from the coaches following the structured coaching group workshops and other activities throughout the program. The goal was to elicit engagement and further develop working relationships (following on from Phase 1), as well as model and reinforce those strategies, such as the “good, better, and how” approach. One example where the coaches were encouraged to provide suggestions regarding the effectiveness of the process was the most appropriate time to provide individual feedback due to the high tempo nature of the environment. The lead researcher suspected that initial attempts to keep it informal in the coaches’ open-plan office did not allow some of the coaches an opportunity to engage due to a range of distractions. Upon raising the issue, the coaches and lead researcher openly discussed options for a way forward. Subsequently, the identification of less distracting locations (e.g., meeting room, off-site cafe) would allow for increased engagement in the process. Importantly for the lead researcher, in this and other situations, maintaining a receptive and collaborative approach allowed for opportunities to progressively increase the effectiveness of the intervention for those involved. It also offered an opportunity to model those behaviours being asked of the coaches (e.g., the GROW model).

In considering our application of a behavioural coaching approach to MT development, there are some additional factors that warrant further discussion for future research. First, we must acknowledge that our methodology may appear to deviate from the traditional use of a behavioural coaching model in which the coach (i.e., the lead researcher) works with a coachee (i.e., team coaching staff) to change their behaviour. Although our goal was to increase the frequency of MTb in the athletes via the development coaches, we believe that our application of the model fits the definition of behavioural coaching, namely “a structured, process-driven relationship between a trained professional coach and an individual or team … to help coaches develop competencies and remove blocks to achieve valuable and sustainable changes in their professional and personal lives” (Skiffington & Zeus, 2003, p. 6). We endeavoured to retain the structure of GROW in our interactions with the coaches, with
the education program designed to teach the coaches to use the GROW model to adapt their coaching behaviour (e.g., “…develop competencies and achieve change…”) to achieve our goal of behaviour change in athletes. Although this approach may be a novel interpretation of how to use behavioural coaching, we believe that it offers increased opportunity for development of coaches and athletes alike in professional sport environments.

Consistent with acceptance based behavioural therapies (ABBT; Gardner & Moore, 2010; Hayes et al., 2012), the benefit of encouraging an individual to ‘just do’ something, or perform a desired action/behaviour/skill, regardless of the thoughts that may be occurring, can provide a novel way to approach MT development in fast paced and information rich professional environments. In these situations the focus shifts from what might require significant time and expertise to combat negative or problematic thoughts that may adversely affect performance, to something more realistic in a pressure situation. If athletes know and understand how to display the behaviours that have been identified, promoted, and reinforced as important to both their own and their team performance, it provides an opportunity to free them up to display those desirable behaviours. Therefore, developing awareness in athletes to behave in certain ways in response to certain stimuli, coupled with coaches working closely with athletes during training, competition, and elsewhere to clarify such behaviour holds promise in the area of MT development. It also provides support for behaviour based programs (e.g., Bell et al., 2013) being more effective than focussing on the development of MT attributes, which have traditionally been the emphasis of MT development research (Anthony, Gucciardi, & Gordon, 2016; Connaughton, Thelwell, & Hanton, 2011).

We acknowledge that exclusively goal-directed behavioural approaches, such as those that reduce complex behaviour to mechanistic stimulus-response chains are unlikely to succeed (Peterson, 2006) when attempting to achieve sustained behavioural change. Human behaviour flows from a combination of events (e.g., affective, cognitive, behavioural, and spiritual; Peterson, 2006), and the whole person must be addressed in the process of
prolonged behavioural change. We are therefore not attempting to dismiss the importance of foundational approaches in psychology, such as the ABC (Activating event – Belief – Consequences) model of Cognitive Behavioural Therapy, but suspect that a behavioural intervention will in turn affect an individual’s cognitions and feelings, just not in the traditional linear manner.

5.4.2 Strengths and Limitations

This study was strengthened by a number of factors that warrant further attention. First, the use of the GROW behavioural coaching model allowed the lead researcher an opportunity to draw on an established framework that is easy to explain, understand, and recall (e.g., Passmore, 2007b), making it useful in an environment where there are a number of competing demands. Its utility was strengthened by the lead researcher modelling stages of the framework across the various activities within the program, following the recommendations provided by Whitmore (2009) and others (e.g., Arnold & Sarkar, 2015; Brown & Fletcher, 2016; Pain & Harwood, 2009) when implementing psychological or psychosocial interventions in a performance environment. Second, we provided additional insight into previously understudied population (e.g., Barker et al., 2013), being coaches and athletes in a high performance environment, with the results showing promise for a behavioural approach to MT development. Third, the inclusion of social validation and treatment integrity (e.g., Perepletchikova & Kazdin, 2005), such as detailed presentation of program structure, the materials used throughout the program, and our adherence to the SCD critical thinking questions (Barker et al., 2011), provides the opportunity for others to understand and replicate this research.

Nonetheless, there are also some limitations of this study that require discussion. First, the difficulties of conducting research in an elite sport environment have been documented elsewhere (e.g., Barker et al., 2013; Bell et al., 2013). Aside from the difficulties in collecting consistent performance data discussed previously, we were unable to collect the
encouraged three baseline ratings (e.g., Barlow & Hersen, 1984) prior to starting the program. Doing so may have lessened the lack of stability across at least four (i.e., Participant’s 3, 4, 11, & 15) of the athletes’ MTb baseline ratings. Additionally, while subjective coach ratings of performance may have offered further insight into the program, they were unable to be used due to the club employing different ratings criteria across the different competitive levels. Furthermore, we were unable to collect procedural reliability data at the end of the program due to seasonal time constraints and limited access to the sample. Second, as is the danger in SCD research, we were unable to control for other confounding variables, such as conflicting messages from other members of the coaching staff, injury, illness, and maturation effects. Third, considering the sample comprised male AF athletes in the early stages of a professional career, the effects of this program on more experienced professional athletes, females, and across other sports is unknown.

5.4.3 Conclusion

The behavioural coaching approach to MT development discussed in this chapter offers an alternative framework to previous attempts focused on any range of MT attributes. As Hardy et al. (2014) identified, MTb needs to occur before we consider the influence of cognitions, attitudes and emotions. In professional sporting environments where the execution of those desirable skills/behaviours (or MTb) are most important, with limited time available to invest in changing antecedent factors (e.g., cognitions), focusing on what can be seen, trained, and evaluated may be a more logical approach when looking to enhance performance and improve consistency. Previous research has provided support for the utility and effectiveness of behavioural coaching (e.g., Lai & McDowall, 2014; Theeboom et al., 2014), which can identify, define and target those desirable behaviours observed regularly in high performers, and increase their frequency across a larger group. The findings of the current study provide preliminary support for similar outcomes when using a behavioural coaching framework with a sample of coaches and athletes. Overall, when seeking to make
positive change in sporting organisations that have a number of stakeholders and limited opportunities, we encourage the decision makers to consider the behavioural coaching approach as a viable option.
5.5 References


Appendix 5A: Graphical representations of the 2 standard deviation band superimposed on MTb data for each AF athlete (Note: ‘Pre’ = pre-intervention; ‘Int’ = intervention; ‘Post’ = post-intervention; ‘MTb_c’ = coach-rated mentally tough behaviour; and ‘SD band’ = +/- 2 standard deviation bands.).

Participant’s 1 (top), 3 (middle), and 4 (bottom) coach-rated MTb (/7), with 2SD bands.
Participant’s 5 (top), 6 (middle), and 8 (bottom) coach-rated MTb (/7), with 2SD bands.
Participant’s 10 (top), 11 (middle), and 13 (bottom) coach-rated MTb (/7), with 2SD bands.
Participant’s 14 (top), and 15 (bottom) coach-rated MTb (/7), with 2SD bands.
Appendix 5B: Graphical representations of the 2 standard deviation band superimposed on MTi data for each AF athlete
(Note: ‘Pre’ = pre-intervention; ‘Int’ = intervention; ‘Post’ = post-intervention; ‘MTb_c’ = coach-rated mentally tough behaviour; and ‘SD band’ = +/- 2 standard deviation bands.).

Participant’s 1 (top), 2 (middle), and 3 (bottom) coach-rated MTi (/7), with 2SD bands.
Participant’s 4 (top), 5 (middle), and 6 (bottom) coach-rated MTi (7/7), with 2SD bands.
Participant’s 7 (top), 8 (middle), and 9 (bottom) coach-rated MTi (/7), with 2SD bands.
Participant’s 10 (top), 11 (middle), and 12 (bottom) coach-rated MTi (/7), with 2SD bands.
Participant's 13 (top), 14 (middle), and 15 (bottom) coach-rated MTi (7), with 2SD bands.
Appendix 5C: Case comparisons of objective performance data and coach-rated MTb
(Note: ‘Pre’ = pre-intervention; ‘Int’ = intervention; ‘Post’ = post-intervention; ‘Pfce rating (CD/min)’ = Average of athlete’s previous four week’s Champion Data player performance ranks divided by minutes played; ‘MTb_c’ = coach-rated mentally tough behaviour; and ‘SD band’ = +/- 2 standard deviation bands.).

Participant 1 performance (CD/min) and coach-rated MTb (/7).
Participant 4 performance (CD/min) and coach-rated MTb (/7).
Participant 5 performance (CD/min) and coach-rated MTb (7).
Participant 11 performance (CD/min) and coach-rated MTb (7/7).
Appendix 5D: Consultant philosophy

At the time of delivering this program, the lead researcher was a registered psychologist working towards his endorsement in sport and exercise psychology and his doctorate of philosophy (PhD) in Australia, having accrued 10 years’ applied experience as a psychologist across organisational, sporting, and clinical domains. The lead researcher’s coaching philosophy towards the development, improvement, and maintenance of high performance draws upon strength-based approaches (e.g., Linley & Joseph, 2004), with an emphasis on understanding and operationalising positive observable behaviours that best represent psychological skills, and how they can be adapted across multiple contexts.
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Chapter 6: Summary and Conclusion
6.0 Summary

The purpose of the research presented within this thesis was to extend the empirical evidence in the area of mental toughness (MT) development programs, specifically in the context of an AF environment and with a focus on behavioural dimensions. Following a general introductory chapter, we presented a systematic review of the existing research on MT development using a meta-study approach (Chapter 2) as a means to advance our understanding of the concept of MT. With the identification of four key themes in the extant literature (i.e., personal characteristics, interactions with environment, progressive development, and breadth of experience), we proposed a Bioecological Model of MT Development. This model was drawn from established psychological theory (e.g., Bronfenbrenner & Morris, 2006), and encompassed interdependent interactions among the person (e.g., persistence and drive, Mahoney, Gucciardi, Mallett, & Ntoumanis, 2014), proximal processes (e.g., positive but tough practice environment, Bull, Shambrook, James, & Brooks, 2005), context (e.g., [team] social environment, Thelwell, Such, Weston, Such, & Greenlees, 2010), and time (e.g., challenging, rewarding, and enjoyable [motivational] climate, Connaughton, Wadey, Hanton, & Jones, 2008). This model also offered a summary of the current state of affairs in MT development, and highlighted the benefit in shifting the focus of MT development research to identifying what it is a mentally tough athlete does more frequently, across both contexts and time.

Building upon the findings of Chapter 2, we sought to identify the behavioural dimensions of MT across contexts in an Australian football (AF) environment (Chapter 3). Two qualitative studies were conducted to examine coaches’ and athletes’ perceptions of the displays of mentally tough behaviour (MTb) across different contexts (e.g., training, development, and competitive matches). Five main themes relating to MTb were identified: Adaptive development, consistent training conduct, composed performance actions, responsible and accountable, and team supportive. These themes included a collection of
observable behaviours more frequently displayed by athletes considered mentally tough when compared to athletes considered less mentally tough. We also proposed a conceptualisation of MTb as a distinct concept that transmits the influence of MT into high performance. In so doing, MTb was defined as a purposeful yet adaptable verbal or physical act that contributes positively to performance through the attainment and progression of self-referenced objectives or goals. Acknowledging the limitations associated with our focus on a single sport environment, and the importance of continued research across other demographics, we subsequently provided a number of necessary and sufficient qualities that can assist in the future identification of MTb in other environments.

The focus of Chapter 4 was to develop an observation checklist that could assist with the behavioural analysis of MTb, and explore its relationship with performance. Incorporating the findings from Chapter 3, the Mentally Tough Behaviour Scale (MTbS) was developed to facilitate the measurement of the frequency of MTb across the different contexts (e.g., competitive matches, training, and development) in an AF environment. The findings indicated that the MTbS adequately reflected the domain of MTb, with validity and reliability evidence supporting a nine-item, unidimensional model. Subsequent analyses revealed a positive association between MTb scores and consistency of objective performance ratings. Overall, the results provided initial support for the MTbS as a useful measure of MTb in an AF environment.

In Chapter 5, the findings from Chapter’s 2 through 4, as well as research from formative fields in psychology (e.g., behaviourism) and other performance-related environments (e.g., organisational settings), were incorporated to develop a coach-targeted MT development program. The primary aim was to increase the frequency of MTb in athletes in an elite AF environment over the course of a competition season. The secondary aims were to improve both coach and self-rated MT, as well as athlete performance in competitive matches. The four parts to this chapter offered a novel and comprehensive review of the
delivery of the program, including the learning opportunities from conducting research in an elite sports environment. Overall, the results indicated that there were positive changes in the frequency of MTb, both coach and self-rated MT, as well as performance across the season for several of the athletes. Acknowledging the small sample size, the findings offered support for the previously identified link between MTb and performance, and preliminary evidence for the utility of Whitmore’s (2002) GROW behavioural coaching framework for MT development in an AF environment.

6.1 Implications

The identification of a collection of desirable behaviours associated with MT, the development of a scale to measure these behaviours, and the application of a previously untested behavioural coaching framework for the development of MT in high performance sport has important conceptual and practical implications. In this section, we draw on the findings of Chapter’s 2 through 5 to elaborate on several of these implications.

6.1.1 Conceptual Implications

Although previous MT research has sought to establish a conceptual framework to guide our understanding of the concept, there remains ambiguity regarding an accepted conceptual definition (e.g., Weinberg, Freysinger, Mellano, & Brookhouse, 2016). As a result, previous attempts to investigate what constitutes MT development has suffered similar ambiguity. Drawing on a well-established framework to propose a Bioecological Model of Mental Toughness Development (Chapter 2) promotes the importance of understanding the interdependent relationships between the person and context to clarify what an individual is required to do to develop and when. Thus, the process of MT development is better conceptualised as an approach that addresses one’s personal capacity, or ways of behaving, with different behaviours likely for different contexts at different times. Therefore, adopting a behavioural approach across contexts provides a novel way to understand what performers are required to do in these different contexts to facilitate their MT development.
As a part of our decision to adopt a behavioural approach to MT development, extending recent work into MTb (e.g., Bell, Hardy, & Beattie, 2013; Diment, 2014; Gucciardi, Jackson, Hanton, & Reid, 2015), we identified that this process would be strengthened by inclusion of a working definition of MTb in Chapter 3. Proposing that MTb is a distinct concept that transmits the influence of MT into performance, we adhered to recommendations for creating clear concept definitions (e.g., Podsakoff, MacKenzie, & Podsakoff, 2016), and provided additional guidelines by way of the necessary and sufficient characteristics of MTb. This extension of the existing conceptual framework will allow others to identify and expand on the desirable behaviours discussed in this thesis as further exploration of MTb occurs across other performance environments. It is therefore expected that this process will alleviate previous criticisms of MT research (e.g., Andersen, 2011), and serve to progress the understanding of the concept of MTb and the development of MT.

Recent research has drawn attention to the “dark-side” of MT (e.g., Caddick & Ryall, 2012; Tibbert, Andersen, & Morris, 2015) in an attempt to add conceptual breadth, and we acknowledge that such extensions are an important part of concept development. However, we believe that these perspectives are manifested due to limited understanding of MT amongst experienced stakeholders, and previous difficulties in describing what these unseen attributes look like. The focus herein was not on those unseen attributes of MT, but the positive and desirable behaviours displayed by mentally tough athletes that aligned with the characteristics of our definition, being beneficial to the individual and the organisation. For a concept that has sometimes been incorrectly categorised as a warrior like, all-or-nothing ideal (e.g., Andersen, 2011; Coulter, Mallett, & Singer, 2016), our focus promotes a more adaptive and healthy perspective of MT by emphasising those positive and desirable behaviours that benefit the individual. In the current climate where athlete well-being and high performance are seen as mutually beneficial (Fletcher & Streeter, 2016; Pink, Saunders, & Stynes, 2015; Wagstaff, Fletcher, & Hanton, 2012), it is hoped that the conceptual clarification offered here
will stimulate further interest and commitment to research across a range of environments to improve our understanding.

6.1.2 Practical Implications

The findings presented in this thesis indicate that a behavioural coaching approach, as a previously unreported means of performance enhancement in elite sport settings, can have an effect on coaches’ abilities to positively influence athlete performance. Meta-analytic research supports the importance of coach-targeted interventions (e.g., Brown & Fletcher, 2016). Sport psychologists also place great value on the centrality of coach involvement in MT program development (Weinberg et al., 2016). Consistent with this work, the findings presented in this thesis provide additional support for a continued focus on coach-centred programs as a means by which to develop MT and other psychological skills in athletes. The integration of these behaviour-based approaches with psychological skills development has the potential to promote alignment with physical skill development (e.g., improving defensive technique), reinforcing the importance of ongoing psychological development programs. This behavioural approach also provides an opportunity to align areas that have traditionally been difficult to evaluate with other more objective measures of performance.

The initial findings relating to the utility of the MTbS for informants to evaluate MTb in athletes, and the positive association between MTb and performance data, suggests that these behaviours offer an important developmental consideration when seeking to improve performance. It also provides an important resource in evaluating future strategies to develop MT in light of MTb acting as a conduit between MT and performance. Previous research has resulted in the development of scales relating to MTb, but they have been limited by their focus on competitive match situations (e.g., Hardy, Bell, & Beattie, 2014), or ratings based on a more subjective outcome, such as ‘when things get tough’ (Gucciardi et al., 2015). The MTbS alleviates such concerns with its focus on different contexts and clarity regarding the defining features of MTb.
An informant-rated approach is a useful strategy that can alleviate some concerns regarding common-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). It is also highlighted by Hardy et al. (2014) as a means to reduce the likelihood that the ratings will be confounded by variables such as skill, talent and practice when compared to self-report approaches (see also, Gucciardi et al., 2015). Although there is still potential for coach bias towards athletes, it is expected that the effect would have been decreased by specifying that the coaches respond by considering how frequently they had observed a player display the specific MTb. Incorporating multiple-raters (e.g., coaches and support staff, internal and external informants) for each athlete when using the MTbS in the future – akin to a 360 degree assessment approach (e.g., Lepsinger, 2009) – will minimise these concerns regarding subjective bias as much as possible.

6.2 Limitations

As a result of our decision to adopt a unique approach towards MT development, a number of important questions remain unexplored. In particular, further consideration could be given to three broad limitations; a research focus predominantly on one elite sport environment, construct validity evidence of the MTbS, and the use of a single-case research design (SCD).

6.2.1 Generalisability

Although the opportunity to conduct the majority of the research for this thesis in the one elite AF environment offers unique insights into professional settings, the generalisability across other AF and sport environments remains unknown. In their research in one AF environment, Coulter et al. (2016) identified that socio-cultural factors can influence the perceptions of MT. It is therefore possible that our focus on participants that had limited experience in other professional environments may have minimised the breadth of the findings. As such, it could be argued that the positive and desirable behaviours identified herein are important only in this particular AF environment. In light of this concern, the
conceptual overlap of competition-related MTb with other research (e.g., Bell et al., 2013; Diment, 2014), may suggest otherwise. Nevertheless, additional research with diverse samples, such as females, different competitive levels, and other sports will provide the requisite insight into the generalisability of our findings.

6.2.2 Construct Validity Evidence of the MTbS

Sharing some similarities with the previous section by way of the reasons for this limitation (e.g., narrow participant experience), it is important to consider specific factors in the development of the MTbS. First, the scale development procedure was limited by reviewers providing feedback on the original 27 items from the findings of Chapter 3. Although the revised nine-item MTbS was drawn from these original 27 items, and incorporated the feedback of the experienced reviewers to strengthen individual item content, further analysis of the nine-item scale content by a panel external to the research team would have been beneficial (e.g., Polit & Beck, 2006). Second, a new scale should be evaluated against existing scales where possible (Messick, 1995) to ensure it is measuring a distinct concept. Our proposition that MTb is best viewed as a distinct concept requires further evaluation through comparisons with constructs previously shown to relate with MT, as well as other measures of MT (e.g., incremental validity evidence). Third, investigation of the association between MTb and performance in the current study was limited by a range of factors (e.g., inconsistent competitive level, athletes’ changing field positions). Looking for other means to evaluate objective performance, such as through controlled skill testing, or the development of an algorithm that accurately weights different competitive levels and positions may lessen the limitations associated with objective performance evaluations. Noting that these initial investigations provided preliminary support for the MTbS as a useful measure of MTb, scale development and construct validation is an iterative process (e.g., Messick, 1995), and further exploration of construct validity evidence of the MTbS is required.
6.2.3 Single-Case Research Design

The main criticisms of SCD’s are the absence of comparison or control groups and small sample sizes (e.g., Jones, 1996). We acknowledge that the addition of a control group or a larger sample size would have been beneficial, noting that we endeavoured to account for these limitations during the development of the thesis proposal. However, as we approached the implementation of the program, additional constraints were identified that required us to revise the structure of the program. Importantly, as identified by Barker, McCarthy, and Jones (2011), a SCD can provide valuable insights into previously understudied frameworks, such as the GROW behavioural coaching model, and populations, such as elite coaches and athletes. With our research offering positive findings using a different perspective to develop MT over the course of a competitive season, there is support for considering a SCD as a viable option when conducting research in unique environments.

6.3 Future Research

Although this thesis provides new insight into how programs targeting specific psychological skills (e.g., MT) affect consistency and maintenance of performance in a high performance environment, this area requires continued research (e.g., Barker et al., 2013). The benefits of a renewed understanding of the behaviours associated with MT, those more concrete factors that can be seen and compared to performance, provides clarity when looking to develop MT. Thus, this research provides initial insight into both the developmental factors (e.g., who, when, and where) and the processes (e.g., what and how) of MT development. With limited research into the utility of established behavioural coaching frameworks such as Whitmore’s (2002) GROW model in sport environments, it is hoped that this thesis will encourage further exploration of these approaches as a means to develop MT and/or improve performance.

Our findings relating to the identification of consistently reported MTb across contexts (e.g., training and competition) provide support for the importance of continued research into
other approaches for MT development. Alongside the suggestions offered in previous sections (e.g., other sport settings, athlete levels), the area would benefit from additional research comparing the application of behavioural coaching frameworks with other models previously applied to MT development (e.g., self-determination theory, Deci & Ryan, 1985; revised reinforcement sensitivity theory, Gray & McNaughton, 2000) within the one environment. Similarly, conducting additional observational research, such as a comprehensive applied behaviour analysis (e.g., Kahng, Ingvarsson, Quigg, Seckinger, & Teichman, 2011) of the identified MTb herein would serve to extend our conceptual understanding. As identified in a recent meta-analysis into the effectiveness of psychological interventions in sport (Brown & Fletcher, 2016), future research into MT development should look to incorporate a combination of coach and athlete-targeted approaches as a means to facilitate ongoing performance enhancement.

6.4 Future Applications

Considering the future application of these findings, it is important to first revisit a statement we offered in Chapter 5. We must reiterate that our behaviour-based approach does not dismiss foundational approaches in psychology, such as the ABC (Activating event – Belief – Consequences) model of Cognitive Behavioural Therapy. Instead, highlighting the multidirectional nature of the ABC model, we believe that a continued focus on helping athletes to better understand those desirable behaviours, as well as how, when, and where to display them across different contexts, offers a different way to influence cognitions and beliefs positively, and subsequently the behavioural response to similar situations in the future. Consistent with acceptance-based behavioural therapies (e.g., Gardner & Moore, 2010), this approach can be especially useful in high-tempo environments where there is limited opportunity to take the time necessary for exploring one’s thoughts.

The findings of this thesis also indicate that there is value in continuing with a behavioural approach to MT development. As an extension of previous work into MTb and
its relationship with performance (e.g., Bell et al., 2013), we demonstrated the value of considering those behaviours associated with MT that facilitate performance outside of competition settings (e.g., training contexts). Aside from those studies exploring MTb, the current research also differs from the majority of previous MT development research that has focused on those unseen attributes (e.g., self-belief, attentional control, Gucciardi & Gordon, 2009) that may be explained, defined, or expressed in a multitude of ways. By minimising the theoretical murkiness associated with MT development research, one key application of this thesis is increased clarity amongst stakeholders in performance environments, which could extend to increased applied opportunities.

This research was conducted in a high performance AF environment, so it is anticipated that the applications of this thesis would transfer to similar settings. Alternatively, the behavioural coaching model implemented with AF coaches and early career athletes in Chapter 5 could be incorporated into other high performance and pathways programs as a means to increase the frequency of MTb in the next generation of professional AF athletes. With the coaches in these programs often looking to progress to higher levels of sport, the implementation of a behavioural coaching program has the potential to improve their understanding and coaching of psychological skills. Importantly, increasing the understanding of MT at these pre-elite levels also provides an opportunity to change the misconceptions of MT (e.g., the all-or-nothing perspective, Andersen, 2011) that still exist amongst stakeholders in some settings.

The applications may not be limited to just AF environments. Considering the MTbS was developed using a sample made up of predominantly overseas reviewers with little knowledge of AF, the identified behaviours may be appropriate for describing MT in other team sports, and potentially individual sports, with minor modifications to the scale. However, it is recommended that further exploration of the similarities and differences in these other sport environments be conducted, as well as a type of needs analysis with the
coaches and athletes prior to applying the program as it is detailed in Chapter 5. As identified by Weinberg et al. (2016) in their research into building MT, working with coaches to identify and address the needs of athletes will increase the likelihood of a better outcome for all stakeholders.

6.5 Conclusion

This thesis extends our understanding in the under-developed area of MT development or intervention programs in a number of ways. The initial literature review provided a summary of MT development, and identified the value in pursuing a behavioural approach. It furthers our knowledge through the identification of a number of frequently reported behaviours, or MTb, observed in athletes considered mentally tough across training, development, and performance contexts. We conceptualised MTb as a unique concept and the conduit through which MT can influence performance, proposed a working definition, and a number of necessary and sufficient characteristics. This information is offered to provide clarity of the concept and promote further exploration of MTb across a range of environments.

The research also offers a novel approach to enhancing sporting performance through the utility of an established behavioural coaching model as one of the frameworks that can increase the frequency of desirable behaviours, or MTb in athletes. Noting that the strategies for development were evaluated in an elite AF environment, it is proposed that these strategies can be adapted and applied across a range of sports and levels of competition to better develop MT. Overall, it is expected that the continued exploration of how, when, where, and with whom we can best target the development and evaluation of MTb is important from both a theoretical and applied perspective for the betterment of athlete and consultant psychologist performance.
6.6 References


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Appendices
Appendix A: *Participant information sheets and consent forms*

**Chapter 3**

Participant Information Sheet – Study 1
Participant Consent Form – Study 1
Participant Information – Study 1

**Chapter 4**

Coach and Player Participant Information Sheet – Study 2
Participant Consent Form – Study 2
Participant information form – Study 2

**Chapter 5**

Participant (Coach) Information Sheet – Study 3
Participant (Player) Information Sheet – Study 3
Participant Consent Form – Study 3
Participant information form – Study 3
Participant Information Sheet – Study 1

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<td>Researcher</td>
<td>Mr David Anthony</td>
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Introduction

- You are invited to participate in this study due to your involvement in Australian Football.
- Taking part in this research project is optional. Your position in the football club and your relationship with the coaching staff, support staff and other players will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with anyone you like before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he can get you some assistance.
- This study is being conducted by researchers from the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). This study is being conducted as a student project, in partial fulfilment of a PhD from UWA.
- Funding for this research to compensate staff for the required materials and associated costs will be provided by UWA.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.
Purpose

- The aim of the study is to explore peoples’ perspectives of mental toughness in Australian Football. This research will allow the identification of a pool of behaviours associated with mental toughness and on-field performance. Subsequently, this process will allow us to create an education program for coaches that allow the development of these mentally tough behaviours in players. We expect that this education program will be beneficial for the attainment and sustainment of mental toughness and high performance in players.

Procedures

- As a participant, you will be asked in a one-on-one interview setting to respond to questions from the researcher and complete a workbook, which includes questions about your thoughts and perspectives relating to mental toughness in Australian Football.
- The most important thing for us is that you are completely honest when answering all questions.
- It is expected that the completion of the interview and workbook will take no longer than 60 minutes.
- The interview will be audio-recorded to ensure all important information is captured, and you will be given an opportunity to review and verify a transcript of the interview once it has been transcribed.
- Your verbal responses during the interview and written responses on the workbook will not be shared with others at any time, which includes any football club directors, support staff, coaches and/or players.
- Your responses will not affect your position in the football club and your relationship with the coaching staff, support staff and players.
- A report based on information gained from this study will be made available to you upon completion of the research. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual.

Risks

- There are no anticipated risks associated with taking part in the study.
- All information will be viewed only by the researchers. You and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Completing this process will give you the opportunity to consider your thoughts and perspectives relating to mental toughness in Australian Football. For example, you may gain additional insight into how to better develop skills or behaviours associated with improved performance in players.
Confidentiality

- All information will remain strictly confidential.
- Your responses will not be visible to your football club directors, support staff, coaches and/or players.
- All experimental data will be recorded either in hard copy, scanned and saved to a password protected laptop computer, or using security encrypted online data management when using online surveys. The hardcopy datasheets and electronic audio files on usb devices will be stored in a locked cabinet at the School of Sport Science, Exercise and Health at UWA. All hard copies of questionnaires and electronic data will be stored for seven years after the date of submission of the PhD or publication (whichever is later), before being destroyed.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not affect your position in the football club in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher present.

Further information regarding this study may be obtained from the researcher and principal investigator (their contact details are provided on the first page of this document).

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Mental toughness development in AFL players

-- Participant Consent Form – Study 1 --

I, ___________________________________________ (please write your name in BLOCK CAPITALS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Am aware that my football club directors, support staff, coaches and/or other players will not be made aware of my responses at any time
- Understand that my participation in this research will not influence my standing in this football club in any way
- Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed: __________________________________________________________________________

Date (day/month/year): ________ / ________ / ________

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Thank you for taking part in this research. For your answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to anyone outside of the UWA research team. If you have any questions, please feel free to discuss these with the researcher present.

Your name: _____________________________  Your age: ________ years

Which team are you currently signed with/employed by? _____________________________
(State Team if U18)

What is your current position/job role? _____________________________

How long have you been involved at the elite/sub-elite level of AFL? ________ years

How long have you been involved at your current club? ________ years
Coach and Player Participant Information Sheet – Study 2

Full title
Mental toughness development in Australian Football players
(Conducted in partial fulfilment of a Doctor of Philosophy awarded by the University of Western Australia).

Research Institution
School of Sport Science, Exercise and Health,
The University of Western Australia

Research location
Perth

Principal Investigator
Prof. Sandy Gordon

Researcher
Mr David Anthony

Contact Number
(08) 6488 2375

Introduction

- You are invited to participate in this study due to your involvement in Australian Football.
- Taking part in this research project is optional. Your position in the football club and your relationship with the coaching staff, support staff and other players will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with anyone you like before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he/she can get you some assistance.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). This study is being conducted as a student project, in partial fulfilment of a PhD from UWA.
- Funding for this research to compensate staff for the required materials and associated costs will be provided by UWA.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.
Purpose

- The aim of the study is to explore peoples’ perspectives of mental toughness in Australian Football. This research will allow the identification of a pool of behaviours associated with mental toughness and on-field performance. Subsequently, this process will allow us to create an education program for coaches that allow the development of these mentally tough behaviours in players. We expect that this education program will be beneficial for the attainment and sustainment of mental toughness and high performance in players.

Procedures

- As a participant, you will be asked to complete a multi-section survey exploring psychological concepts such as mental toughness. This survey aims to explore your thoughts and behaviours regarding your Australian Football performance and the construct of mental toughness in Australian Football.
- The most important thing for us is that you are completely honest when answering all questions.
- It is expected that the completion of the survey will take no longer than 30 minutes.
- Your responses to the survey will not be shared with others at any time, which includes any football club directors, support staff, coaches and/or players.
- Your responses will not affect your position in the football club/team and your relationship with the coaching staff, support staff and players.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual.

Risks

- There are no anticipated risks associated with taking part in the study.
- All information will be viewed only by the researchers. You and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Completing this survey will give you the opportunity to consider your thoughts and perspectives relating to mental toughness in Australian Football. For example, you may gain a better understanding about what constitutes mental toughness and its relationship with other psychological constructs.
Confidentiality

- All information will remain strictly confidential.
- Your responses will not be visible to your football club directors, support staff, coaches and/or players.
- All experimental data will be recorded either in hard copy, scanned and saved to a password protected laptop computer, or using security encrypted online data management when using online surveys. The hardcopy datasheets and electronic audio files on usb devices will be stored in a locked cabinet at the School of Sport Science, Exercise and Health at UWA. All hard copies of questionnaires and electronic data will be stored for seven years after the date of submission of the PhD or publication (whichever is later), before being destroyed.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not affect your position in the football club/team in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
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- If you have any questions concerning the research at any time please feel free to ask the researcher present.

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Mental toughness development in Australian Football players

-- Participant Consent Form – Study 2 --

I, ___________________________________________ (please write your name in BLOCK CAPITALS)

- Have read the information provided, and any questions I have asked have been answered to my satisfaction
- Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice
- Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law
- Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research
- Am aware that my football club directors, support staff, coaches and/or other players will not be made aware of my responses at any time
- Understand that my participation in this research will not influence my standing in this football club in any way
- Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed: ______________________________

Date (day/month/year): _______ / _______ / _______

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.
Participant information – Study 2

Thank you for taking part in this research. For your answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to anyone outside of the UWA research team. If you have any questions, please feel free to discuss these with the researcher present.

Your name: _______________________________  Your age: _______ years

Which team are you currently signed with/employed by? ________________________________

What is your current position/job role? ________________________________

How long have you been employed in your current position/job role? ________________ years

How long have you been involved at the elite/sub-elite level of AFL? ________ years

How long have you been involved at your current club? ________ years
Introduction

- You are invited to participate in this study due to your involvement in Australian Football.
- Taking part in this research project is optional. Your position in the football club and your relationship with the other coaching staff, support staff and other players will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with anyone you like before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he can get you some assistance.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). This study is being conducted as a student project, in partial fulfilment of a PhD from UWA.
- Funding for this research to compensate staff for the required materials and associated costs will be provided by UWA.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the study is to explore peoples’ perspectives of mental toughness in Australian Football. This research will allow the identification of a pool of behaviours associated with mental toughness and on-field performance. Subsequently, this process will allow us to create an education program for coaches that allow the development of these mentally tough behaviours in players. We expect that this education program will be beneficial for the attainment and sustainment of mental toughness and high performance in players.
**Procedures**

- As a participant, you will be asked to participate in a development program with other coaches from the club’s coaching group.
- These workshops will occur once monthly from February to July and focus on developing and implementing skills to increase the frequency of mentally tough behaviours and mental toughness in the players you coach, with the other purpose being to improve and maintain performance.
- The most important thing for us is that you are completely honest when participating, and that you provide open and honest feedback on the effectiveness of the strategies.
- These once monthly workshops have the approval of the football department, and it is expected that they will take no longer than 60 minutes on each occasion.
- Some workshops may be recorded to ensure all important information is captured, and you will be advised when this will occur prior to the workshop starting. You will also be given an opportunity to review and verify a transcript of the information once it has been transcribed.
- The information you provide in the workshop will not be shared with others outside of the workshop at any time, which includes any football club directors, support staff, coaches and/or players.
- Your responses will not affect your position in the football club and your relationship with the coaching staff, support staff and players.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual.

**Risks**

- There are no anticipated risks associated with taking part in the study.
- All information will be viewed only by the researchers. You and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

**Benefits**

- Completing this series of workshops will give you an opportunity to not only consider your thoughts and perspectives relating to mental toughness in Australian Football, but also develop strategies to improve the mental toughness and performance of your players. For example, you may gain additional insight into how to better develop skills or behaviours associated with improved performance.
Confidentiality

- All information will remain strictly confidential.
- The information you provide will not be visible to your football club directors, support staff, coaches not included in the study and/or players.
- All experimental data will be recorded either in hard copy, scanned and saved to a password protected laptop computer, or using security encrypted online data management when using online surveys. The hardcopy datasheets and electronic audio files on usb devices will be stored in a locked cabinet at the School of Sport Science, Exercise and Health at UWA. All hard copies of questionnaires and electronic data will be stored for seven years after the date of submission of the PhD or publication (whichever is later), before being destroyed.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

- Participation in this research is voluntary and you are free to withdraw from the study at any time.
- Your decision to participate or not to participate will not affect your position in the football club in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
- If you have any questions concerning the research at any time please feel free to ask the researcher present.

Further information regarding this study may be obtained from the researcher and principal investigator (their contact details are provided on the first page of this document).

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Introduction

- You are invited to participate in this study due to your involvement in Australian Football.
- Taking part in this research project is optional. Your position in the football club and your relationship with the coaching staff, support staff and other players will not be affected in any way by your choice about participation.
- Please read this information carefully, as it will tell you all about the research, procedures, risks and benefits. If you are unsure about anything, feel free to talk with anyone you like before you make a decision, and feel free to ask the researcher present if you have any questions at all.
- If you need help reading, or English is not your first language, please tell the researcher present so he can get you some assistance.
- This study is being conducted by the School of Sport Science, Exercise and Health (SSEH) of The University of Western Australia (UWA). This study is being conducted as a student project, in partial fulfilment of a PhD from UWA.
- Funding for this research to compensate staff for the required materials and associated costs will be provided by UWA.
- This study has been reviewed by The University of Western Australia Human Research Ethics Committee, whose primary concerns are the safety, welfare and rights of participants in this research. The ethics committee members are independent of the study team.

Purpose

- The aim of the research is to explore peoples’ perspectives of mental toughness development in Australian Football. This research will allow the identification of a pool of behaviours associated with mental toughness and on-field performance. Subsequently, this process will allow us to create an education program for coaches that allows for the development of these mentally tough behaviours in players. We expect that this education program will be beneficial for the attainment and sustainment of mental toughness and high performance in players.
Procedures

- The coaches will be completing once-monthly workshops from February to July that focus on developing and implementing strategies during reviews, meetings, and training sessions aimed at increasing the frequency of identified mentally tough behaviours and mental toughness in players, with the other purpose being to improve and maintain performance.
- As a player participant, you will be asked to complete a brief survey involving two questionnaires on three occasions throughout the season designed to explore your perception of your mental toughness and observations of your line coach’s behaviours.
- Readily available performance statistics from Champion Data Holdings will also be collected following each game to use as a part of the program evaluation.
- The most important thing for us is that you are completely honest when completing the questionnaire, which will take no longer than 5 minutes to complete on each occasion.
- Following the implementation of the coach education program, it is expected that some training sessions may be recorded to observe coaching skills in practice. You will be advised when this recording will occur prior to training starting, & will be given the option to raise any concerns or not participate in that training session.
- The information during the training session will not be shared with others outside of the session or the research team at any time, which includes any football club directors, support staff, coaches and/or other players.
- Your involvement/non-involvement will not affect your position in the football club and your relationship with the coaching staff, support staff and players.
- A report based on information gained from this study will be made. Information may also be used for publication in an academic journal or conference presentation. In any material that is produced, we will not include any information that will make it possible to identify you as an individual.

Risks

- There are no anticipated risks associated with taking part in the study.
- All information will be viewed only by the researchers. You and your responses will not be identified at any time, and the questions asked are not of a sensitive nature.

Benefits

- Participating in this research will give you an opportunity to not only consider your thoughts and perspectives relating to mental toughness in Australian Football, but also engage in the development of strategies to improve the mental toughness and performance of yourself and other players. For example, you may gain additional insight into how to better develop skills or behaviours associated with improved performance.
Confidentiality

- All information will remain strictly confidential.
- The information you provide will not be visible to your football club directors, support staff, coaches not included in the study and/or players.
- All experimental data will be recorded either in hard copy, scanned and saved to a password protected laptop computer, or using security encrypted online data management when using online surveys. The hardcopy datasheets and electronic audio files on usb devices will be stored in a locked cabinet at the School of Sport Science, Exercise and Health at UWA. All hard copies of questionnaires and electronic data will be stored for seven years after the date of submission of the PhD or publication (whichever is later), before being destroyed.
- Any information you provide will be visible only to the researchers named above, and will not be accessed by any other parties unless required by law.

Participant Rights

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- Your decision to participate or not to participate will not affect your position in the football club in any way.
- You can withdraw for any reason and you do not need to justify your decision. If you decide to withdraw all data collected from you will be destroyed.
- Your participation in this study does not prejudice any right to compensation that you may have under statute of common law.
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Mental toughness development in AFL players

-- Participant Consent Form – Study 3 --

I, ________________________________ (please write your name in BLOCK CAPITALS)

• Have read the information provided, and any questions I have asked have been answered to my satisfaction

• Agree to participate in this study, realising that I may withdraw at any time without reason and without prejudice

• Understand that all information provided is treated as strictly confidential and will not be released by the investigator unless required by law

• Have been advised as to what data are being collected, what the purpose is, and what will be done with the data upon completion of the research

• Am aware that my football club directors, support staff, coaches and/or other players will not be made aware of my responses at any time

• Understand that my participation in this research will not influence my standing in this football club in any way

• Agree that the research data gathered from the study may be published, provided my name or other identifying information is not used

Signed: ________________________________

Date (day/month/year): ________ / ________ / ________

Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at The University of Western Australia on (08) 6488 3703 or by emailing to hreo-research@uwa.edu.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.
Thank you for taking part in this research. For your answers to be useful, please be totally honest with your responses. All information is strictly confidential, and at no point will any of your answers be made available to anyone outside of the UWA research team. If you have any questions, please feel free to discuss these with the researcher present.

Your name: ____________________________                     Your age: _______ years

What is your current position/job role? ____________________________

How long have you held this position/job role? _______ years

How long have you been involved at the elite level of AFL? _______ years

How long have you been involved at your current club? _______ years
Appendix B: *Questionnaires used for data collection*

**Chapter 3**

Mentally Tough Behaviour Workbook – Study 1

**Chapter 4**

Experienced Academics – Study 2

Coach rating questionnaire of athlete MTb – Study 2

**Chapter 5**

Coach rating questionnaire of athlete MTI (Q1-8) and MTb (Q9-17) – Study 3

Two page GROW Workbook for MTb development sessions – Study 3

Social Validation questionnaire – Study 3
Section 1 – INSTRUCTIONS: On the next page, you will find a blank worksheet containing different sections. Some example responses from another profiling activity are provided for your reference (i.e. Behaviours important to studying for exams). Your task is to complete the worksheet in the following manner:

1. There are three lines at the top left of the page with the heading “Mentally Tough Athlete/s”. Write down at least one athlete you consider fits the “working definitions of Mental Toughness” provided, and their primary sport. Feel free to list additional athletes, preferably from the same sport, which may make the process easier as you proceed. If you can identify athletes you don’t believe fit the definitions, write them at the top right of the page.

2. Starting at the top of the table in the “Behaviour (MTb)” column second from the left, provide a short label for what you consider to be an observable Mentally Tough Behaviour displayed by your identified athlete that relates to high performance.

3. After you have labelled a mentally tough behaviour for your athlete/s, please provide a short description of what you might observe the athlete doing or look for to identify such behaviour under the “What do you observe?” column.

4. Repeat Steps 2 & 3 until you cannot think of any more observable Mentally Tough Behaviours your athlete exhibits. Don’t worry if you can’t identify 10 observable behaviours, the aim is to describe as many as possible.

5. Your next task is to identify the opposites of each of your listed Mentally Tough Behaviours under the “Opposite behaviour” column. It may be helpful to consider the following question in eliciting this contrast pole: “Someone who does not display [MTb] would display behaviour such as…?”

6. After you have labelled the Opposite Behaviours of the Mentally Tough Behaviour for your athlete/s, please provide a short description of what observable actions might indicate that an athlete is displaying this opposite behaviour under the “What do you observe (i.e. what do you see the athlete doing)?” column to the right of the Opposite Behaviour column.

7. Repeat Steps 5 & 6 to identify the Opposite Behaviour for all of your listed Mentally Tough Behaviours.

8. After developing your list of observable Mentally Tough Behaviours and Opposite Behaviours, your next task is to provide an indication of which behaviours you consider to be the most important for the athlete/s high performance in their sport. Under the “Order of Importance” column on the far left of the worksheet, assign a 1 to what you believe the most important Mentally Tough Behaviour for performance, through to 10 (or however many you identified) for the least important behaviour for high performance.

9. The final step is to list the importance of these Mentally Tough Behaviours across sport performance more generally. Under the “Importance to Sport Performance Generally” column on the far right of the worksheet, provide a ranking by considering the following question for each of the behaviours you identified: “How important is each of these behaviours to mental toughness in sport more generally on a scale of 1 (not important at all) to 10 (of crucial importance).”

*Section 1 is completed once you have progressed through Steps 1 to 9 described above.*
<table>
<thead>
<tr>
<th>Mentally Tough Athlete/s</th>
<th>Sport</th>
<th>Less Mentally Tough Athlete/s</th>
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<th>Order of Importance</th>
<th>Behaviour (MTb)</th>
<th>What do you observe (i.e. what do you see the athlete doing)?</th>
<th>Opposite Behaviour</th>
<th>“Someone who does not display [MTb] would display behaviour such as…”</th>
<th>What do you observe (i.e. what do you see the athlete doing)?</th>
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</table>

Note: Rank order of importance includes 1 = most important and 10 = least important; General importance to sport performance ratings include 1 = not important at all and 10 = of crucial importance.
Section 2 – INSTRUCTIONS: On the next page, you will find a blank worksheet containing different sections. Your task is to complete the worksheet in the following manner:

1. Using your response sheet from Section 1, please enter each of your “Behaviour (MTb)” and “Opposite Behaviour” constructs in the boxes provided on the outer borders of the page (above the label “[Behaviour (MTb)] vs [Opposite Behaviour]”).

2. Your second task is to generate a list of situations/circumstances/events that you believe demand some degree of mentally tough behaviour. These situations may demand one, some or many mentally tough behaviours. Please identify as many situations – both during and outside of a game or competition – and record each of them into a separate box in the table in the centre of the page. You may or may not fill the entire Table – don’t worry if you don’t but please try to jot down at least 7 situations.

3. Starting with one of your bipolar constructs, draw a connecting line between this behaviour and all the situations you believe the behaviour is useful in dealing with. Note that the behaviours may be useful for more than one of situations you have listed. Once you have connected this first bipolar construct with those situations it is considered useful for, repeat this same step with each of your remaining bipolar constructs.

*Section 2 is completed once you have progressed through Steps 1 to 3 described above.*
<table>
<thead>
<tr>
<th>Behaviour (MTb) vs</th>
<th>Opposite Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
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</table>
- Experienced Academics’ Data Collection workbook – Study 2 -

**Research Summary**

Mental toughness (MT) has most recently been defined as “a personal capacity to deliver high performance on a regular basis despite varying degrees of situational demands” (Gucciardi & Hanton, 2015, p. 442). There is currently minimal evidence available to support the effectiveness of MT development programs for improved performance (Andersen, 2011). A focus on mentally tough behaviours (MTb) has recently been offered as an alternative approach to understanding and developing MT (Hardy, Bell, & Beattie, 2013). As a result, the purpose of the current research is to create a list of observable MTb’s for Australian Football (AF) that can be used to evaluate the effectiveness of MT development programs, in combination with personal and coach ratings (e.g., resilience, buoyancy, athletic identity), as well as other objective performance measures (i.e., Champion data game statistics).

**Pilot Study**

**Objectives**

The primary aims were to explore key stakeholders’ perceptions of the behaviours displayed by mentally tough athletes, and generate a pool of observable behaviours across a variety of situations using a qualitative approach. This pool of MTb’s was developed using Kelly’s (1991) Personal Construct Theory as a framework, an approach cited as offering a richer understanding of a construct during the conceptual stage of research (Gucciardi, Gordon, & Dimmock, 2008). The theory allows us to develop an understanding of what qualities or skills (or personal constructs) an individual views as critical for success, as opposed to some pre-established desirable constructs imposed by traditional questionnaires (Gucciardi & Gordon, 2009). It also involves an individual providing their own definitions of those qualities or skills they see as critical to success.

Another important tenet of Personal Construct Theory is that we can better understand what a specific construct is when we identify its contrasting pole, or what it is not (Gucciardi et al., 2008). We view this process as important for developing the pool of MTb because it provided an opportunity for participants to identify and define, in their own terms, what behaviours they consider to be important to MT (or what MTb looks like), and the behaviours that are not important to MT.
Participants

Three independent groups of participants were sampled in an attempt to enhance both the breadth and depth of information pertaining to MTb, with a sub-sample from Sample C to elicit further context and clarification of the information gathered from the earlier stages. These four samples were as follows:

A. Forty-two tertiary students enrolled in an undergraduate degree in sport and exercise science;
B. Ten experienced informants (more than 10 years’ experience) currently employed by a professional AF club in roles including coaching, sport science, and football department staff;
C. Forty-three AF players currently contracted to a professional AF club with a range of experience (1-14 seasons) at the elite level; and
D. From Sample C, five AF players currently contracted to the same professional AF club with a minimum of 10 years’ experience at the elite level.

Data Analyses

Participant worksheets derived from interviews were reviewed, transcribed verbatim and processed using both Nvivo software for one-on-one interviews and Microsoft excel for larger focus groups before being collated. Audio recordings of interviews were transcribed into word documents (Samples B & D); and thematic content analysis was performed. Analysis of descriptive statistics will occur for the data generated in this final stage.

Proposed MTb Categories

There were five categories (or factors) of MTb’s identified from the initial analyses, with the pilot items (beginning p.4) designed to capture these five categories.

1. Composed Performance Actions (CA): Displays (e.g., body language) and/or verbalises (e.g., inferred confidence in behaviour from coach or teammates) positive behaviours, and acts decisively in pressure situations.
2. Consistent Training Conduct (CC): Displays valued behaviours in training and games (e.g., discipline, application, communication, team values, team game plans), and effort levels during training and games remain consistent regardless of situation (e.g., losing vs winning, offence or defence, qualifying fixtures versus finals).
3. Responsible & Accountable (RA): Acknowledges role in mistakes and/or poor performance, and asks questions to understand what needs to change. Educates oneself to
optimise training & recovery (e.g., diet, hydration, recovery, rehabilitation) and challenges self at training (e.g., continued curiosity in self-development).

4. **Adaptive Development (AD):** Displays ongoing progression in both strong and weak skills (e.g., learns from success and mistakes, implements constructive feedback), and can adapt to changing situations to sustain high performance.

5. **Team Supportive (TS):** Acts in ways that benefit the team (e.g., adheres to team game plans & values), asks questions to ensure he can best perform his role to benefit the team, and takes collective approach to performance (displays knowledge of other position requirements as well as individual players).

**Your Feedback.**

The ratings document has two subsequent sections:

*Section 1:* Your demographic information (identifying information will be held in confidence).

*Section 2:* Please indicate your opinion of each item that follows, with respect to how representative it is of the intended mentally tough behaviour category, using the response format provided below. Please also provide your perspective on what timeframe we should be asking the raters to use as a part of the instructions in italics below (by changing the text to bold). Should you wish, please feel free to note any qualitative feedback on any items in relation to ambiguity, understanding, overlap, representativeness, and jargon.

Example instructions for the measure to be completed by the AF coach most familiar with the player being rated are as follows:

> “Using the scale provided, ['in an average week' / 'over the past week/ two weeks/ month'] please indicate how frequently you observed the player in question visibly display the following behaviours/skills/actions when the opportunity arose.”

If you are happy to participate, please complete and return this document to david.anthony@research.uwa.edu.au by **Monday 25th August, 2014.** Alternatively, if you cannot complete the process by the given date but would still like to be involved, please contact David Anthony as lead researcher via the email above, or phone (+61412 044 737) to negotiate a later date. Furthermore, if you have any other questions, please don’t hesitate to contact David at any time.
SECTION 1

Please complete only the parts appropriate to you

Age: ____________  Gender:  Male  Female

Nationality: ________________

Highest qualification (circle/bold one as appropriate):

- BPsych
- MPsych
- BSc
- MSc
- MPhil
- PhD

Research background (academics)

Length of time working in academia: _______ years

Primary areas of research/interest: ____________________________________________________

Approximate number of publications in peer reviewed journals: ____________

Applied practice background

Length of time providing sport psychology support: _______ years

Primary theoretical models used in practice: ___________________________________________

Main sports you work with: ________________________________________________________

________________________________________________________________________________
**SECTION 2**

Please provide your ratings, with respect to how representative each item is of the intended mentally tough behaviour category definition in red, using the response scale presented following (0 = Very Poor, to 4 = Very Good), and whether the definition or item statement is easily understood by you (Yes/No/Unsure).

<table>
<thead>
<tr>
<th>Category definition</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Is the definition easily understood?</td>
</tr>
<tr>
<td>Composed Performance Actions: Displays (e.g., body language) and/or verbalises (e.g., inferred confidence in behaviour from coach or teammates) positive behaviours, and acts decisively in pressure situations.</td>
<td>Yes No Unsure</td>
</tr>
</tbody>
</table>

Comments/Suggestions for improvement:

<table>
<thead>
<tr>
<th>Category item</th>
<th>Relevance</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Poor</td>
<td>Average</td>
</tr>
<tr>
<td>CA1. Acts decisively in pressure situations (e.g. controlled and accurate disposal, sticks to assigned role).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
</tr>
</tbody>
</table>

Comments:

CA2. Behaves in a way that shows an understanding of his own body (e.g. ideal preparation, rehab, recovery). | 0 1 2 3 4 | Yes No Unsure |

Comments:

CA3. Positive body language, regardless of personal/team success/failure (e.g. head up & shoulders back). | 0 1 2 3 4 | Yes No Unsure |

Comments:

CA4. Displays/models valued behaviours in competitive matches (e.g. discipline, team values, team game plans). | 0 1 2 3 4 | Yes No Unsure |

Comments:

CA5. Application or effort deteriorates in games following a mistake (e.g. one error leads to increased frequency of errors). | 0 1 2 3 4 | Yes No Unsure |

Comments:
**Category definition**

*Consistent Training Conduct:* Displays valued behaviours in training and games (e.g., discipline, application, communication, team values, team game plans), and effort levels during training and games remain consistent regardless of situation (e.g., losing vs winning, offence or defence, qualifying fixtures versus finals).

**Clarity**

<table>
<thead>
<tr>
<th>Is the definition easily understood?</th>
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<tr>
<td>Yes</td>
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</table>

Comments/Suggestions for improvement:

<table>
<thead>
<tr>
<th>Category item</th>
<th>Relevance</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Poor</td>
<td>Average</td>
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<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Category item**

**Relevance**

- CC1. Effort levels during training remain consistent regardless of whether preparing for a normal or high pressure game (e.g. qualifying fixtures versus finals).

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tr>
<td>Yes</td>
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</table>

Comments:

**Category item**

**Relevance**

- CC2. Displays/models valued behaviours in training (e.g. on-time, prepared, maintains high work rate).

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tr>
<td>Yes</td>
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</table>

Comments:

**Category item**

**Relevance**

- CC3. Does not provide constructive/useful criticism during team meetings/discussions.

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tbody>
<tr>
<td>Yes</td>
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</tbody>
</table>

Comments:

**Category item**

**Relevance**

- CC4. Deterioration in communication when performing poorly (e.g. lashes out verbally at opponent/teammate, or goes quiet).

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tbody>
<tr>
<td>Yes</td>
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</tbody>
</table>

Comments:

**Category item**

**Relevance**

- CC5. Inconsistency between player’s own behaviour and what he asks his teammates to do (e.g. create options in attack).

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tr>
<td>Yes</td>
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</table>

Comments:

**Category item**

**Relevance**

- CC6. Challenges self at training (e.g. pairs up with more skilled player to develop in the area a specific drill focuses on).

**Clarity**

<table>
<thead>
<tr>
<th>Is the statement easily understood?</th>
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<tr>
<td>Yes</td>
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</table>

Comments:
### Responsible & Accountable

**Category definition**

Acknowledges role in mistakes and/or poor performance, and asks questions to understand what needs to change. Educates oneself to optimise training & recovery (e.g., diet, hydration, recovery, rehabilitation) and challenges self at training (e.g., continued curiosity in self-development).

#### Comments/Suggestions for improvement:

<table>
<thead>
<tr>
<th>Category item</th>
<th>Relevance</th>
<th>Clarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA1. Takes responsibility for improving his performance (e.g. asks questions to identify what needs to change).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RA2. Self-educates to optimise recovery (e.g. diet, hydration, rehab, recovery).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
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<tr>
<td>RA3. Won’t admit to faults/mistakes; gives excuses &amp; blames others (e.g. “umpires had it in for me”).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
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<tr>
<td>RA4. Training work-rate below the expected team standard (e.g. requires encouragement from coaches).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
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<tr>
<td>RA5. Avoids or does not fully engage in opportunities for self-education (e.g. specialist presentations).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
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<tr>
<td>Comments:</td>
<td></td>
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<tr>
<td>Category definition</td>
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<tr>
<td><strong>Adaptive Development:</strong> Displays ongoing progression in both strong and weak skills (e.g., learns from success and mistakes, implements constructive feedback), and can adapt to changing situations to sustain high performance.</td>
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<table>
<thead>
<tr>
<th>Comments/Suggestions for improvement:</th>
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</thead>
<tbody>
<tr>
<td><strong>AD1. Sustains high performance through progressive development</strong> (e.g. maintains above average performance rating).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td><strong>AD2. Performance adversely affected by difficult situations or events</strong> (e.g. increased skill error rate, poor decision-making).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td><strong>AD3. Doesn’t implement constructive feedback from others</strong> (e.g. makes similar mistakes, repeated skill errors).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td><strong>AD4. Displays skills that are his identified strengths in games</strong> (e.g. actions are in line with what he does well).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td><strong>AD5. Adapts to changing situations</strong> (e.g. displays ‘game changing’ actions, communicates situations/solutions to teammates).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
<tr>
<td><strong>AD6. Works on identified weaknesses at training</strong> (e.g. disposal skills, one-on-one contests).</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
</tr>
<tr>
<td>Very Poor</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>Comments:</td>
</tr>
</tbody>
</table>
**Team Supportive:** Acts in ways that benefit the team (e.g., adheres to team game plans & values), asks questions to ensure he can best perform his role to benefit the team, and takes collective approach to performance (displays knowledge of other position requirements as well as individual players).

**Category definition:**

<table>
<thead>
<tr>
<th>Category item</th>
<th>Relevance</th>
<th>Clarity</th>
<th>Is the statement easily understood?</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS1. Acts in ways that benefit the team (e.g. sticks to team game plans &amp; own assigned role).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
<td></td>
</tr>
<tr>
<td>TS2. Looks for opportunities to develop knowledge of other team positions (e.g. Defender asks about attack-specific game plan)</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
<td></td>
</tr>
<tr>
<td>TS3. Asks questions to understand his place in the team (e.g. how to play in a way that benefits team performance).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
<td></td>
</tr>
<tr>
<td>TS4. Makes selfish decisions that are detrimental to team-mates (e.g. won’t provide support for teammates when defending).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
<td></td>
</tr>
<tr>
<td>TS5. Develops knowledge of position-specific teammate strengths &amp; weaknesses (e.g. Full-forward of other forward line players).</td>
<td>0 1 2 3 4</td>
<td>Yes No Unsure</td>
<td></td>
</tr>
</tbody>
</table>

**Comments/Suggestions for improvement:**
- Coach Rating Questionnaire of Athlete MTb – Study 2 -

**PLAYER: ________________________________  COACH: ________________________________**

**INSTRUCTIONS:** Using the scale below, please indicate *how frequently you observed* the player in question visibly display the following behaviours/skills/actions *when the opportunity arose over the past month.*

<table>
<thead>
<tr>
<th>INTRICATE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Half the time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Always</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1. Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal).

2. Effort levels during training remain consistently high, whether preparing for a normal or high pressure game (e.g. qualifying fixtures vs finals, selection vs deselection).

3. Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change).

4. Employs expert information to optimise recovery (e.g. adheres to set maintenance and/or rehabilitation program).

5. Performance is not adversely affected by difficult personal situations or events (e.g. no increase in skill error rate, maintains appropriate behaviour).

6. Exhibits positive body language following a personal or team mistake (e.g. head up & shoulders back).

7. Effectively implements constructive feedback from others (e.g. does not make repeated similar mistakes).

8. Communication does not deteriorate when training poorly (e.g. does not verbally attack teammate, continues to provide constructive feedback).

9. Adapts to changing situations (e.g. displays ‘game changing’ actions, communicates situations/solutions to teammates).
- Coach Rating Questionnaire of Athlete MTI (Q1-8), and MTb (Q9-17) – Study 3-

PLAYER: ________________________________  COACH: ____________________________

INSTRUCTIONS: Using the scale below, please identify how true each of the following statements is an indication of how the player in question typically thinks, feels, and behaves as a football player – there are no right or wrong answers so be as honest as possible.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>False, 100% of the time</td>
<td>True/False 50% of the time</td>
<td>True, 100% of the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. He believes in his ability to achieve his goals.  
2. He is able to regulate his focus when performing tasks.  
3. He is able to use his emotions to perform the way he wants to.  
4. He strives for continued success.  
5. He effectively executes his knowledge of what is required to achieve his goals.  
6. He consistently overcomes adversity.  
7. He is able to execute appropriate skills or knowledge when challenged.  
8. He can find a positive in most situations.

INSTRUCTIONS: Using the scale below, please indicate how frequently you observed the player in question visibly display the following behaviours/skills/actions when the opportunity arose over the past month.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>Half the time</td>
<td>Always</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Displays decisive actions in pressure situations that are effective (e.g. composed and accurate disposal).  
10. Effort levels during training remain consistently high, whether preparing for a normal or high pressure game (e.g. qualifying fixtures vs finals, selection vs deselection).  
11. Takes responsibility for improving own performance (e.g. asks questions to identify what needs to change).  
12. Employs expert information to optimise recovery (e.g. adheres to set maintenance and/or rehabilitation program).  
13. Performance is not adversely affected by difficult personal situations or events (e.g. no increase in skill error rate, maintains appropriate behaviour).  
14. Exhibits positive body language following a personal or team mistake (e.g. head up & shoulders back).  
15. Effectively implements constructive feedback from others (e.g. does not make repeated similar mistakes).  
16. Communication does not deteriorate when training poorly (e.g. does not verbally attack teammate, continues to provide constructive feedback).  
17. Adapts to changing situations (e.g. displays ‘game changing’ actions, communicates situations/solutions to teammates).
1. **REALITY:** In the table below, identify how often you observe your athletes displaying the following mentally tough behaviours (MTb) when they should (1 = Never, 3 = Half the time, 5 = Always).

<table>
<thead>
<tr>
<th>Rating (/5)</th>
<th>(MTb #1)</th>
<th>(MTb #2)</th>
<th>(MTb #3)</th>
</tr>
</thead>
</table>

2. **OPTIONS:** Who is a good senior role model for each of these MTb’s?
   - What are one or two of the **actions/activities/training drills that this athlete does well** to develop and display these behaviours?

<table>
<thead>
<tr>
<th>Role Model</th>
<th>(MTb #1)</th>
<th>(MTb #2)</th>
<th>(MTb #3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. action 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. action 2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NB: Consider the specific actions/activities/training drills that you have observed that you could show & explain to your athletes & encourage them to do more regularly*
3. **OPTIONS:** For each of these MTb’s, identify one activity/drill/strategy that:
   - Has been *GOOD*/working?
   - You could do *BETTER*/improve on?
   - *HOW* could you do it better?

<table>
<thead>
<tr>
<th></th>
<th>(MTb #1)</th>
<th>(MTb #2)</th>
<th>(MTb #3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOOD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BETTER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HOW</strong></td>
<td></td>
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</tr>
</tbody>
</table>

4. **WAY FORWARD:** What are our agreed focus areas for the next four weeks for each of these MTb’s?
   - What is one strategy we will *continue to do*, & one strategy we will aim to *do better* to increase the frequency of these mentally tough behaviours in your athletes?

<table>
<thead>
<tr>
<th></th>
<th>(MTb #1)</th>
<th>(MTb #2)</th>
<th>(MTb #3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>continue to do</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>do better</em></td>
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</tbody>
</table>
# Coach Social Validation Questionnaire – Study 3

**Coach:** _________________________________  **Date:** _______________________________

**INSTRUCTIONS:** Using the scale below, please indicate the extent to which you agree with the following statements about the behavioural coaching program you were involved in by circling the appropriate response.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
<td>Neutral</td>
<td>Strongly agree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>The training was useful for me.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td>The training was beneficial for my players.</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>I enjoyed the training.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Based on this training, I feel confident to use the new strategies I have developed during this training in practice.</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Based on this training, I feel sufficiently prepared to implement the strategies I have developed during this training in practice.</td>
<td></td>
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<tr>
<td>6</td>
<td>I intend to use the training following the end of the program.</td>
<td></td>
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<tr>
<td>7</td>
<td>I would recommend this training to other coaches.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>8</td>
<td>I believe that I valued the theories used and the structure of the program.</td>
<td></td>
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<tr>
<td>9</td>
<td>Describe the aspects of the program which you found most useful (please elaborate as needed):</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10</td>
<td>Describe the aspects of the program which you found most useful (please elaborate as needed):</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Other suggestions to improve the training?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Thank you for your time.*