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**Mental Toughness, Mental Well-being, and Performance within a British Army Recruit  
Training Environment.**

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### Abstract

The purpose of the current exploratory study was to examine the relationship between mental toughness (MT), mental well-being (MWB) and individual performance within a British military phase -1 training establishment. A cohort of military recruits were recruited ( $n = 268$ ) of which 212 (79.1%) were male and 56 (20.9%) female. Both self-report and observer-rated measures were administered over a 12 month period at weeks 4 and 13 of the 14 week training course. Results revealed no significant positive relationship between MT and individual performance, and no significant increase in MT as a result of phase 1 military training. However, a significant relationship was revealed between MWB at week 13 and performance (including when controlling for values at week 4), and there was an increase in levels of MWB between weeks 4 and 13. Furthermore, follow up analyses revealed that both dimensions of MWB (eudaimonic, hedonic) contributed to the significant increase in individual performance at the end of Phase-1 training at week 13. In summary, the current study reveals that MWB is a significant positive predictor of performance within a Phase - 1 military training environment. However, for MWB and performance to be positively developed, the current study highlights that both the eudaimonic and hedonic dimensions of the construct must be experienced and supported.

## **Mental Toughness, Mental Well-being, and Performance within a British Army Recruit Training Environment**

### **Introduction**

Over thirty years ago, Gould, Hodge, Peterson, and Petlichkoff (1987) found that 82% of wrestling coaches highlighted that mental toughness (MT) was one of the most important psychological characteristics in determining success. Since then, researchers have suggested that MT is one of the most important psychological constructs in relation to performance excellence in a variety of settings (e.g. Connaughton, Wadey, Hanton, & Jones, 2008; Coulter, Mallet, & Gucciardi, 2010; Jones, Hanton, & Connaughton, 2002; Weinberg, Butt, & Culp, 2011). Further, there is a general consensus that MT is a multidimensional construct that allows individuals to deal with obstacles, distractions, pressures and adversity from a wide range of stressors (cf. Clough & Strycharczyk, 2012; Gucciardi & Gordon, 2011; Jones, Hanton, & Connaughton, 2002).

However, the aforementioned construct has been dominated by qualitative methods with several quantitative measures being developed which have not gone without criticism. For example, it could be argued that there has been an overuse of qualitative methods (e.g. Anderson, 2011) with a notable limitation to their use, suggesting they lack the ability to differentiate between the processes, outcomes, causes and other behaviours that are likely to be related to the construct (Hardy, Bell, & Beattie, 2013). In addition, with the quantitative measures assisting in developing a further understanding of the literature, Hardy et al., (2013) argue that although the measures capture a plethora of attributes (cognitions, affect, values & attitudes) that may influence or be related to the construct, they fail to capture or allow for the presence of mentally tough behaviours to be present or observed. Moreover, other criticisms of the construct highlight long winded and at times confusing definitions (Anderson, 2010), encouragement for researchers to develop reliable measures of MT (e.g., Sheard, Golby, & van Wersch, 2009) a lack of valid measurement tools (Gucciardi, Hanton, & Mallett, 2012) and limited experimental studies that focus on the development of mental toughness (Gucciardi, Gordon, & Dimmock, 2009).

Moreover, with much of MT research focusing on the relationship between performance and performance-related variables (e.g., Bull, Shambrook, James, & Brooks, 2005; Crust & Clough, 2005; Clough, Earle, & Sewell, 2002; Connaughton, Wadey, Hanton, & Jones, 2008; Jones et al., 2007), there appears a relative paucity of MT research in relation to mental well-being (MWB). Consequently, the purpose of the current research is to study the relationship between MT and MWB within a British military training context, and effects upon performance. Thus, the current MPhil study will be presented in two distinct parts. The first section will provide a review of the extant MT literature in respect to four key elements: definitions,

measurement, qualitative research, and quantitative research. The second section will explicitly introduce and describe the current purpose of the study regarding the relationship between MT and MWB, and effects upon performance.

### **Defining Mental Toughness**

There has been little consensus with regards to a finite definition of MT, with a variety of definitions having been presented in the literature, (e.g. Bull et al., 2005; Clough et al., 2002; Clough, & Strycharczyk, 2012; Coulter et al., 2010; Cowden et al., 2016; Gucciardi et al., 2008, 2015, 2017; Hardy et al., 2014; Jones et al., 2002, 2007; Middleton et al., 2011; Sorensen, Schofield, & Jarden, 2016; Thelwell et al., 2005). Considered as a fundamental starting point in conceptualising the construct, Jones et al., (2002, 2007) proposed one of the original definitions of MT, involving elite and super elite wrestling athletes (i.e. Olympic gold medallists and world champions). This study identified over 30 specific characteristics attributable to MT. In this study the authors defined MT as:

“MT is having the natural or psychological edge that enables you to: Generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer. Specifically, be more consistent and better than your opponents in remaining determined, focused, confident and in control under pressure” (Jones et al., 2002, p. 209).

Further to this early definition, Clough et al. (2002) proposed a definition of MT based on the four Cs model (control, commitment, challenge, confidence), underpinned by Kobasa’s (1979) model of hardiness. According to the 4Cs model, individuals with high levels of MT: (a) possess emotional control and the ability to regulate anxiety and emotional responses, (b) possess the ability to perceive challenges as opportunities rather than threats, (c) possess high levels of confidence and self-belief to overcome challenging situations, and (d) are more likely to remain persistent and committed towards achieving goals whilst exposed to challenging situations.

Clough et al. (2002) defined MT as:

“Mentally tough individuals tend to be more sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they can control their own destiny, these individuals can remain relatively unaffected by competition or adversity” (Clough et al., 2002, p. 38).

Gucciardi et al. (2008) offered a further sport specific (-) definition of MT as:

“A collection of values, attitudes, behaviours and emotions that enable you to persevere and overcome any obstacle, adversity or pressure experienced, but also to maintain concentration and motivation when things are going well to consistently achieve your

goals” (Gucciardi et al., 2008, p. 278).

Similar to the Gucciardi and colleagues’ (2008) definition, Coulter et al. (2010) also examined the construct of MT within a sport specific setting (Australian soccer) using several different sources in their research that included parents, coaches and players and adopted a personal construct psychology (PCP) framework to their investigation. Semi-structured interviews were conducted to draw out participants’ perspectives on the main characteristics of MT, situations that demand MT, displayed behaviours, and the cognitions used by mentally tough soccer players. The authors from this study claimed that they were able to differentiate between MT and other psychological constructs, such as hardiness (Kobasa, 1979; Maddi, 2006, 2007). Furthermore, several specific qualities and key attributes of mentally tough soccer players were identified such as; desire, physical toughness, a sense of self-belief, resilience, work ethic/motivation, and a winning mentality. This resulted in the authors defining MT as:

“The presence of some or the entire collection of experientially developed and inherent values, attitudes, emotions, cognitions, and behaviours that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals” (Coulter et al., 2010, p. 715).

In an attempt to reduce the confusion surrounding the contextualization of MT, a more recent working definition has been forwarded by Gucciardi, Gordon and Hanton (2015), “a personal capacity to produce consistently high levels of subjective (e.g., personal growth or thriving) or objective performance (e.g., sales, race times, GPA) despite everyday challenges and stressors as well as significant adversities”. In contrast to other definitions within sport, this working definition was developed by integrating a series of interviews from individuals outside of a sporting context (e.g. business, education, medicine, military), and also combined contemporary literature of MT (e.g., Gucciardi & Gordan, 2011). Furthermore, the definition is proposed as broad in nature, allowing enhancements and extension to the concept over time as new findings are identified and revealed from incessant future research.

As the discussion above has shown, the term MT has been associated with many different definitions and characteristics. Indeed, 15 different definitions of MT have appeared in the literature that have included a plethora of distinct psychological characteristics (e.g. Anderson, 2011, list over 70) that have formed part of the construct of MT. Whilst the definitions possess elements that are unique they also share commonalities. For example, self-belief, dedication, coping with pressure, personal responsibility and commitment, all appear in several definitions, with self-belief identified as one of the most repetitive characteristics of MT (Jones et al., 2007; Gucciardi et al., 2008). Thus, an element of caution is required when using the term MT because there is uncertainty and confusion as to what MT is, and is not, with the

majority of definitions within the literature describing the construct as a constellation of different characteristics and attributes. However, Hardy, Bell, and Beattie (2014) took a different approach towards its conceptualisation. Namely, they adopted a behavioural perspective and defined MT as a behavioural construct; “the ability to achieve personal goals in the face of pressure from a wide range of different stressors” (Hardy et al., 2014, p. 70). Moreover, Hardy et al. (2014) underpinned their construct of MT with Gray and McNaughton’s (2000) revised Reward Sensitivity Theory (rRST). Hardy et al., argued that their behavioural approach to defining and operationalising MT offered an alternative perspective that moved away from the reliance on a constellation of different psychological characteristics and attributes. Rather they identified behaviours that are associated with MT which in turn are underpinned by rRST.

rRST is a neuroscientific approach to examining personality that highlights three significant neuropsychological structures, namely, the behavioural activation system (BAS), behavioural inhibition system (BIS), and the fight, flight freeze system (FFFS). These systems are suggested to be responsible for the regulation of reward and punishment stimuli. The behavioural activation system is triggered in response to positive stimuli (signals of reward, positive emotions) experienced within the environment and all goal focused approached behaviours. When this system is activated, individuals seek excitement, become strongly persistent and experience senses of elation on the receiving of rewards. However, punishment sensitivity is regulated by the combination of the BIS and FFFS. Moreover, it is suggested that the FFFS detects against all types of unpleasant events (aversive stimuli) conditioned and unconditioned that are intended to avoid or escape the aversive stimuli (e.g., threats, punishment, anxiety, fear and panic). Subsequently, the BIS resolves goal conflict between the BAS and FFFS; for example, a soccer player may be motivated to score a winning penalty and win the game or be fearful of missing the penalty and letting the team down. Therefore, when the BIS system is activated, influential responses are inhibited, and a series of avoidance behavioural responses are initiated that relate to physiological arousal, avoidance and anxiety resulting in the assessment of risk and long-term memory scanning to assist in resolving the goal conflict.

Utilising rRST, Hardy et al. (2014) investigated the relationship between reinforcement sensitivities and mentally tough behaviours. They found that the relationship is relatively complex and involves an interaction between reward and punishment sensitivity such that the highest levels of MT were evidenced when punishment sensitivity is high, and reward sensitivity is low. Moreover, early threat detection was connected to punishment stimuli, suggesting that individuals’ sensitive to punishment are more inclined to detect potential threats early within perceived pressurised situations allowing individuals time to put effective responses in place.

Whilst the construct of MT has been extensively explored within sport, many researchers also agree that the construct is important across different performance and achievement settings

(e.g. business, education and specifically the military), where a plethora of performance related psychological challenges appear comparable to each other. Indeed, several researchers have discussed and implemented applied concepts from sports psychology within a military context (e.g., Arthur, Fitzwater, Roberts, Hardy, & Arthur, 2017; DeWiggins, Hite, & Alston, 2010; Fiore & Salas, 2008; Goodwin, 2008; Gucciardi et al., 2015; Hammermeister et al., 2010; Janelle & Hatfield, 2008). It is thus not surprising that the concept of MT has been transferred from the sport context to the military. For example, utilising Hardy et al.'s (2014) definition, Arthur et al. (2015) developed a military training measure of MT that they labeled the Military Training MT Inventory (MTMTI). The measure was designed to measure the mentally tough behaviour of military recruits and their ability to maintain optimum performance whilst experiencing a range of different stressors during initial basic training. Findings highlighted that the measure demonstrated sound psychometric properties, structural validity, and good test–retest reliability and that the measure predicted performance in two separate military training environments. In another study, Fitzwater et al. (2017) examined the effects of a psychological skills training programme (PST) on MT and subsequent performance in elite British army recruits. Overall results revealed significant differences in performance between the experimental and control groups, with relaxation and imagery being shown to have a significant positive correlation with performance.

### **Measurement of Mental Toughness**

Alongside the many definitions of MT, there are a wide range of measures available, of varying degrees of validity that purport to measure MT. With the Psychological Performance Inventory recognised as the first measure of MT (PPI; Loehr, 1986) and later refined by Golby et al., 2007. Although self-report is by far the most frequent approach to measuring MT, the more frequent use of observer-rated measures has started to emerge (e.g., Arthur et al, 2015; Bell et al., 2013; Fitzwater et al., 2017; Gucciardi et al., 2015; 2016). Other measures include the MT Inventory (MTI; Middleton, Marsh, Martin, Richards, & Perry, 2004, 2005); The Sport Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009); The Mental Toughness Questionnaire – 48 (MTQ-48; Clough, Earle, & Sewell 2002); The Cricket Mental Toughness Inventory (CMTI; Gucciardi & Gordon, 2009); The Australian Football Mental Toughness Inventory (AfMTI; Gucciardi et al., 2009b); The Mental Toughness Inventory (MTI; Hardy, Bell, & Beattie, 2014) and the Military Training Mental Toughness Inventory (MTMTI; Arthur, Fitzwater, Hardy, Bell & Beattie, 2015).

#### **The Psychological Performance Inventory**

The PPI was developed to assess an athlete's mental strengths and weaknesses. The measure consisted of 42-items which are divided into seven distinct subscales (self-confidence, attention control, negative energy, motivation, attitude control, positive energy, visual and imagery control) that Loehr believed to be the most essential components of MT. However,

subsequent research examining the construct validity of the PPI revealed that the measure was supported by limited rigorous research and offered little or no psychometric support (Golby et al., 2007; Middleton et al., 2004; Gucciardi, 2012). For example, Golby et al.'s. (2007) attempt to utilise the PPI using a sample drawn from a variety of sports generated a reduced four factor model that included just 14 of the items, and this was referred to as the PPI-A. Using confirmatory factor analysis (CFA), the authors reported a good model fit, satisfactory psychometric properties and preliminary support for factorial validity. However, they urged that further investigation of the measurement's stability was required. Gucciardi's (2012) examination of the PPI and PPI-A also revealed a more encouraging model fit for the PPI-A; however, Gucciardi also identified inadequate levels of consistency and conceptual and methodological concerns.

### **The Mental Toughness Inventory**

In a single study, Middleton et al. (2004) proposed the MT inventory (MTI), a 65-item, 12-factor measure. Although the MTI appears to be supported by a sound theoretical rationale and produced reasonable indices of model fit using CFA, further testing is suggested to determine the robustness of the psychometric properties. Furthermore, the use of only young elite athletes was suggested as a limitation of the measure (Sheard et al., 2009).

### **The Sports Mental Toughness Questionnaire**

Using data from previous qualitative studies on MT, Sheard et al. (2009) proposed the Sport Mental Toughness Questionnaire (SMTQ). The SMTQ is a multi-dimensional, 14-item measure with three sub-scales of confidence, constancy and a global measure of MT. Sheard et al. (2009) conducted two studies involving 1142 participants (758 males, 384 females) from a variety of sports, which supported the model and demonstrated satisfactory psychometric properties, adequate reliability, divergent validity and discriminant validity. The authors did, however, recommend further testing of the measure over time. Despite the encouraging results of the Sheard et al., study, this measure has only received relatively limited use in the extant literature of MT (e.g. Arthur et al., 2015; Crust & Swann, 2011; Meggs, Ditzfeld & Golby, 2013).

### **The MTQ 48**

By far the most popular and most widely used measure of MT to date is the MTQ-48 (Clough, Earl, & Sewell, 2002). Known more colloquially as the 4Cs model of MT, the MTQ-48 is a 48-item, four-factor model [challenge, commitment, control (emotional and life), and confidence (in abilities and interpersonal)]. Clough and Swann (2011) argue that, having been used in numerous studies to date (e.g., Crust & Clough, 2005; Nicholls et al., 2008; Horsburgh, Schermer, Veselka, & Vernon, 2009; Crust & Keegan, 2010), there is substantial evidence to support the validity and reliability of the measure. Yet despite the popularity and apparent validity of the measure, critics have highlighted the need for further psychometric testing, with



doubts over the conceptualisation that underpins the measure and the lack of independent scrutiny of the factor structure (e.g., Gucciardi, Gordon, & Mallet, 2012). Furthermore, Andersen (2011) suggests that the MTQ-48 appears to be merely the constructs of hardiness and resilience ‘repackaged’ into something new (i.e., MT). Consequently, Gucciardi and colleagues have argued that the MTQ-48 lacks factorial validity.

Therefore, to further explore the validity of the MTQ-48, Gucciardi et al. (2012) examined the factorial validity of the MTQ-48 using CFA and ESEM. Both analyses indicated that the model did not fit the data in both samples. This led them to make the following statement: The MTQ-48 in its current form seems not to be fit as a valid measure of MT, which it intends to capture.

### **The Australian Football Mental Toughness Inventory and Cricket Mental Toughness Inventory**

Underpinned by personal construct psychology (Kelly, 1955) and based on their earlier qualitative study (Gucciardi, et al., 2008), Gucciardi et al. (2009) developed a sport specific MT measure for Australian football (AfMTI). They conducted EFA and CFA to develop a 24-item, four-factor questionnaire (thrive through challenge, sport awareness, tough attitude, & desire success). Correlations with flow, resilience and social desirability were examined which were found to be moderate to low respectively. Individuals completed self-report questionnaires and were also rated by parents and coaches. Analysis of variance suggested agreement between raters; however, when a correlational analysis was employed, multi-source ratings were shown to differ. Although preliminary data on the factor structure, internal reliability and construct validity proved encouraging, the authors suggested that the results should be verified through further psychometric analysis before the measure could be considered a useful tool. In a further attempt to develop a sport specific measure for MT, Gucciardi and Gordon (2009) attempted to develop a measure to determine MT in cricket (CMTI). Based on interviews with sixteen current and former cricketers to determine their perceptions of MT in cricket, a 15-item, five-factor measure (affective intelligence, attentional control, resilience, self-belief, and the desire to achieve) was developed. The study provided preliminary support for the measure’s factor and internal structure, and internal reliability. Alongside this the authors also corroborated the participants’ self-assessments with ratings of significant others to further add validity of this measure. Further replication and extension of both measures is required.

#### **Mental Toughness Inventory**

More recently, Hardy, Bell, and Beattie (2014) employed an alternative approach to the conceptualisation and measurement of MT. For use in a study with elite youth English cricketers, the authors sought to construct an informant rated measurement of MT (e.g., a coach)

which could be employed to identify mentally tough behaviours in high level performers; rather than the cognitions, attitudes and affect associated with MT. The justification for avoiding the use of an existing self-report measure was due to issues the authors highlighted in regards to social desirability and self-preservation. Similarly, objective measures of achievement were avoided because the authors felt that this would be confounded by a range of other variables associated with high achievement.

Across two independent samples involving active male and female participants representing various sports, the authors developed a single-factor, 8-item MT inventory (MTI; Hardy et al., 2014). Items were developed around typical pressures and stressors that performers would normally be exposed to during competition. For example, player X is able to maintain a high level of personal performance in competitive matches, “when the conditions are difficult”, or, “when the opposition are using aggressive tactics.” All three studies demonstrated sound psychometric properties, revealing good fit statistics and strong test-retest reliability.

### **Qualitative Research**

Researchers have employed several qualitative studies towards examining MT (e.g. Bull, Shambrook, James, & Brooks, 2005; Connaughton, Hanton, & Jones, 2010; Connaughton, Wadey, Hanton, & Jones, 2008; Gucciardi, Gordon, & Dimmock, 2008; Jones, Hanton, & Connaughton, 2002; Jones, Hanton, & Connaughton, 2007). During the exploratory stage of research programmes, it is not uncommon to use qualitative methods to identify key characteristics of a construct. Indeed, one of the original and most cited MT studies utilized a qualitative design (Jones et al., 2002). In this study, Jones et al. (2002) focused on elite athletes, (i.e. Olympic medallists and World champions) from a variety of sports, including the utilisation of sports psychologists and coaches in an attempt elucidate the construct of MT. Utilising the framework of Kelly’s personal construct theory (1955), Jones and colleagues endeavoured to define what MT is and to identify the attributes associated with mentally tough performers. Conducting a three-stage procedure, involving a series of focus groups, one to one interviews and follow up interviews, the study identified 12 characteristics attributable to MT that encompassed self-belief, desire/motivation, and focus (performance related and lifestyle related). However, whilst Jones et al. (2002) went some way in alleviating the theoretical flaws of former studies such as Loehr (1982, 1995), criticisms remain. For example, Crust (2007) highlighted that small numbers were used as part of the concentrated group stage (3 members). It is recommended by researchers that between 6 and 8 individuals are used in concentrated group research (e.g., Bloor, Frankland, Thomas and Robson, 2001). Nevertheless, the study conducted

by Jones et al. (2002) provided a strong starting point for future research. Moreover, Gucciardi et al. (2008) employed a personal construct psychology framework (PCP; Kelly, 1955/1991) to underpin their research into MT. They used semi-structured interviews on a sample of eleven experienced Australian football coaches. The results identified three independent components integral to MT within Australian football (characteristics, behaviours, and situations) and a further eleven specific attributes and their opposites that are categorised within each component. For example, characteristics such as (self-belief vs self-doubt, work ethic vs lazy), situations (external and internal situations that require MT) and behaviours (behaviours that are displayed in situations requiring MT). Therefore, the three independent categories identified within this study propose the development for a preliminary sport-specific MT model that would assist in the measurement and future development of MT. In addition, the use of the PCP framework also assists in the understanding of how the key attributes related to mentally tough footballers influenced how they viewed their own individual performances, how they considered their approach to specific perceived situations, and how they became aware of what behaviours were being displayed within those situations.

In an attempt to consolidate the qualitative research on the MT literature, Anthony, Gucciardi and Gordon (2016) conducted a systematic review (meta-study). Findings highlighted four specific groupings that encompassed the key factors suggested as necessary for MT development, enhancing our understanding of the construct (personal characteristics, interactions with environment, progressive development and breadth of experience). Further, an integrated framework was developed which articulated the complexities of MT, offering a potential self-learning platform and providing guidance towards the development of MT programmes that highlight the competitive pressures athletes may experience during their career. Whilst the qualitative approaches have furthered our understanding of MT, some researchers have suggested that qualitative research has been used too frequently within the MT literature (e.g., Andersen, 2011; Hardy et al., 2014). The major criticism suggests that qualitative research cannot differentiate between the constructs causes, processes, and outcomes. However, over the last decade the literature has seen a significant increase in quantitative research that has assisted in achieving a more even balance towards the suggested overuse and dependence of qualitative research.

### **Quantitative Research**

Quantitative research continues to be widely utilised in the MT literature (e.g., Clough et al., 2002; Crust & Clough, 2005; Crust et al., 2008; Golby & Sheard, 2004; Gucciardi, Gordan &

Dimmock, 2007; Gucciardi & Gordon, 2009; Hardy et al., 2014; Sheard & Golby, 2006). This research has examined affective, perceptual, cognitive and behavioural differences of athletes with various levels of MT and has primarily focused on two areas, namely, antecedents and consequences of MT. For example, research that has examined the antecedents of MT has identified that psychological skills have been related to higher levels of MT in both sport (Bell, Hardy, & Beattie, 2015; Gucciardi, Gordon & Dimmock, 2009) and military contexts (Fitzwater et al., 2017).

From a psychoneurological perspective Hardy et al. (2014) identified reward sensitivity as being an antecedent of MT. Further, Gucciardi et al. (2009) identified motivation as an antecedent of the construct based on Deci and Ryan's self-determination theory suggesting that social and coaching environments that support autonomy, competence and belonging (referred to as autonomy-supportive environments) share characteristics with the development of MT (Connaughton, Wadey, Hanton, & Jones 2008; Gucciardi, Gordon, Dimmock, Mallett, 2009). However, the majority of the research that has examined MT has examined it in relation to its consequences.

Research has revealed that MT has been related to performance and numerous performance related variables within various performance related settings (e.g. sport, work, education and military) For example, a winning mentality, desire, self-belief, resilience, increased race times and the ability to remain focused and competitive during training and competition (to name but a few) are all identified as positive consequences of MT within the sporting domain (Beattie, Alqallaf, Hardy, 2016; Gucciardi et al., 2010; Gucciardi et al., 2015). Moreover, Marchant et al. (2009) and Gucciardi et al. (2015) highlighted that high levels of MT are positively associated to more senior managerial positions and supervisor-rated work performance within the work place. Within education, students that passed and achieved higher academic grades and results reported higher MT than those students that failed (Gucciardi et al., 2015a). Furthermore, higher levels of MT are identified to correlate with lower perceived levels of depressive symptoms, stress and life satisfaction. (Gerber, 2013b; Jin & Wang, 2016). Military recruit training also highlights the positive consequences of the construct, from higher performance grades, final course grades, completion success and overall military course performance (Arthur et al., 2015; Fitzwater et al., 2017; Gucciardi et al., 2015a). Godlewski and Kline (2012) also reported evidence for the association of strong commitment to high levels of MT among 459 Canadian Forces recruits, resulting in lower intentions and behaviours towards not completing recruit training.

In conducting this review, it has become clear that whilst the research on MT has revealed that MT is related to performance and performance related variables there is a dearth of research that has examined MT in relation to mental health outcomes, specifically MWB. Thus, given the importance of MWB, especially in high pressured environments such as the military, the current research will examine the relationship between MT, MWB and effects upon performance within a British Army Phase-1 recruit training environment.

### **Mental Well-Being**

MWB is generally considered a multidimensional construct (Ryff, 1989; 1995) that is integral towards achieving positive life outcomes in various fields such as relationships, work, and education (Chow, 2007; Daniels & Harris, 2000; Pickett – Scheck et al., 2006). The research on MWB has spanned more than six decades (Jahoda, 1958; Maslow, 1968, 1971; Shastrom, 1973). There are two main approaches to the study of MWB. The first approach views MWB as being about mental problems, psychological dysfunction and an absence of illness. The second approach views positive MWB is not just the *absence of illness* but more the presence of *something positive* (WHO 1948; Ryff & Singer, 1998), which is represented as; “the achievement of one’s full potential” (Carr, 2004, P. 36) and defined as, “How people feel and function on a personal and social level and how they view their life as a whole” (Michaelson et al., 2012, p. 6). The current focus for this study will specifically be on MWB as defined by the combination of two dimensions: the hedonic dimension (subjective experiences of happiness, pleasure attainment, pain avoidance and life satisfaction) and the eudaimonic dimension (positive psychological functioning, autonomy, competence, self-realisation and positive relations with others), (Ryan & Deci, 2000; 2001; Ryff, 1989; 1995). When both dimensions of MWB are positively experienced, supported and maintained, it is proposed that a potential freedom from the exposure of various negative stressors (distress) and forms of psychological symptomatology (e.g. anxiety, depression etc.) are experienced and a positive sense of MWB is developed. This could be suggested as integral within environments and jobs considered as stressful (e.g. businesses, performing arts, public services, education and explicitly the military).

Considered as integral for success and developing life outcomes, MWB has been examined across different contexts including, although not limited to, education (e.g., Chow, 2007), sport (e.g., Gucciardi & Jones, 2012), work (e.g., Daniels & Harris, 2000), interpersonal relationships (e.g., Pickett-Schenk et al., 2006) and the military (e.g., Sundin et al., 2010; Williams et al., 2016). The issue of MWB within a military context is an important one, indeed, it has been suggested that the military is considered to be one of the most stressful and

demanding professions to be undertaken (www.careercast.com, 2017, 2018). From robust military training environments to hostile operational environments (Northern Ireland, Bosnia, Iraq & Afghanistan) negative stressors such as; pressure to perform well, under achieving, injury avoidance, fear of failure, long periods of physical and mental fatigue, leaving loved ones for long periods of time, and worse case life changing injuries or fatality are all factors of serving within the military, that potentially develop into negative stressors. For example, increases in mental disorders (19.7%) and alcohol abuse (13.7%) have been associated with combat deployments among UK forces (Fear et al., 2013). Further, the Joint Mental Health Advisory Team (J-MHAT 7, 2011) reported that 19.8% of US soldiers have experienced various degrees of psychological problems in combat, due to a combination of stress and acute trauma. Thus, the importance to have or to develop an ability to maintain a positive psychological sense of well-being whilst exposed to various negative stressors is of utmost importance in the military context. As described earlier, MT is often described and studied in relation to performance related outcomes with far less attention on the relationship between MT and MWB. This may be suggested as surprising, given the importance of attaining positive MWB, especially in high pressured environments such as the military.

### **Mental Toughness and Mental Well-Being.**

The notion of MT and mental wellbeing as co-existing constructs has only very recently been raised in the literature (e.g., Bauman, 2016; Gucciardi, Hanton, & Fleming, 2016). Bauman (2016) argued that MT and MWB are contradictory concepts. However, Gucciardi et al. (2016) suggested that MT and MWB are far from being contradictory notions, with MT actually considered a positive indicator of MWB. Bauman's (2016) rationale for why MT would be negatively related to MWB is based on stigma related concepts. Stigma is defined as; "a sign of disgrace or discredit which sets a person apart from others" (Byrne, 2000, p. 65) which is considered the most significant barrier among young elite athletes to seek help (Gulliver, Griffiths, & Christensen, 2012). Bauman suggested that athletes who exhibit higher levels of MT are less likely to seek professional help when they need it because of a perception of being branded as 'mentally weak'. In contrast, however, Gucciardi et al. (2016) presented a review based on an accumulation of cross sectional and longitudinal studies involving sports, education and the military (Bell, Hardy, & Beattie, 2013; Gucciardi & Gordan, 2015; Mahoney, Gucciardi, & Ntoumanis, 2014) in support of the idea that MT is a positive indicator of MWB.

In conclusion, from the accumulated reviewed studies, Gucciardi et al. (2016) posit the following: (1) MT fosters high performance, therefore, reducing any potential increases in MWB

issues, (2) regarding academic achievement, high MT is related to high levels of positive indices (e.g. positive emotions, thriving) and reduced negative symptoms of MWB (e.g., depression, anxiety, stress), (3) MT enhances goal directed behaviour and, (4) MT is positively related to objective performance and positive symptoms of MWB. Therefore, this line of thinking, suggesting that MT and MWB are opposing ideas may seem a little too early to presume. Nevertheless, much debate clearly exists based on the notions of MT and MWB, therefore, a need for empirical testing of these concepts is warranted.

### **The Current Study**

The current research will conduct an empirical test of the relationship between MT and MWB within a British military training environment, and effects upon performance. Whilst the relationship between MT and MWB is yet to be empirically examined, related research has been conducted that can be drawn on to formulate speculative hypotheses. Specifically, Hardy et al. (2014) underpinned their conceptualisation of MT within reward sensitivity theory (rRST; Gray and McNaughton, 2000), where they found that high levels of MT was evident when high levels of punishment sensitivity are combined with low levels of reward sensitivity. Moreover, Harnett, Loxton, and Jackson (2012) looked to develop an understanding between psychopathology and well-being utilising rRST where they found that the functioning of the Fight, Flight, Freeze System (FFFS) and the behavioural inhibition system (BIS) were highlighted as significant predictors of anxiety and stress, with depression associated with the behavioural inhibition system only when the behavioural activation system (BAS) was low. Furthermore, the BAS and the FFFS (specifically the freeze system) were significantly associated with most indices of positive well-being (except social well-being) and the BAS was significantly correlated with lower levels of depression. Therefore, with goal focused behaviours relating to the BAS (Hardy et al., 2014), it could be suggested that higher levels of BAS activity allow individuals to identify and pursue goals resulting in a greater sense of life satisfaction and overall positive well-being. Nonetheless, the findings also support the hypothesis that the higher activity of the FFFS/BIS (high levels of punishment sensitivity) the chances of avoidance behaviours increase due to the sensitivity of threat stimuli. Thus, individuals may be less likely to consider or take risks in identifying and approaching life satisfaction goals especially if the negative stimuli cannot be avoided, therefore depleting their own sense of well-being.

However, it is also proposed that MT increases levels of positive MWB and reduces negative symptoms of MWB (e.g. depression, anxiety etc.) Moreover, we understand that MT allows personal goals to be achieved and maintained whilst exposed to various stressors, thus, potentially reducing the potential trigger and effects of the BIS/FFFS. Furthermore, individuals sensitive to punishment stimuli, evidence high levels of MT and are suggested to be predisposed

with the ability to detect potential threats early, allowing effective responses to be put in place, which subsequently allows goal focused behaviours to be maintained whilst exposed to various stressful stimuli (Hardy et al., 2014). Therefore, given the evidence from Hardy et al. (2014) and Harnett et al. (2012), it may be plausible to suggest that if an individual can overcome stress and still achieve their personal goals then that individual should experience a greater sense of mental well-being and overall life satisfaction, suggesting that MT should positively relate to MWB.

Although the current study is exploratory in nature, five hypotheses were suggested: (1) MT at weeks 4 and 13 would have positive relationships with performance, (2) MWB at weeks 4 and 13 would have positive relationships with performance, (3) there would be a significant increase in MT from week 4 to week 13 as a consequence of Phase -1 military training and, (4) that there would be a significant increase in MWB from week 4 to week 13 as a result of Phase -1 military training, and (5) that MWB would mediate effects of MT on performance.

## METHOD

### Participants

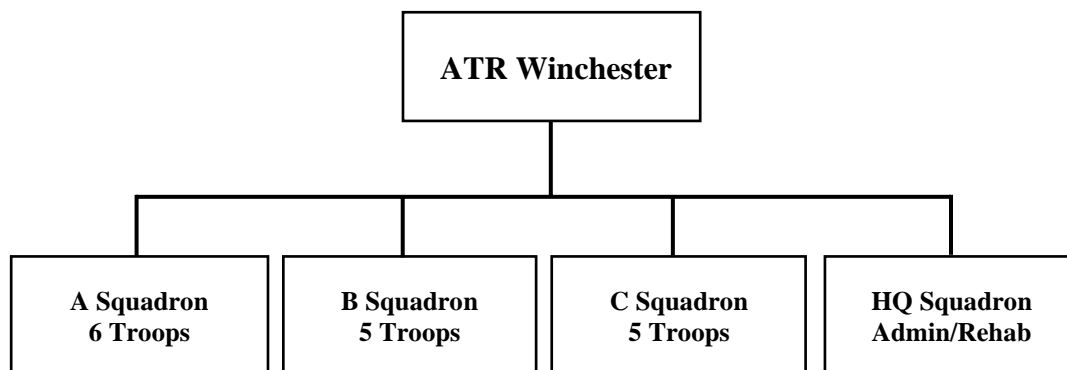
A total of 268 Phase-1 British Army recruits consented to participate in the study ( $M_{age} = 21.22$ ,  $SD = 3.28$  yrs). There were 212 males (79.1%) and 56 females (20.9%). The sample was predominately British ( $n = 261$ ). The small proportion of non-British participants included; Nepalese (2) and Australian, Barbadian, Grenadian, Pakistani and Indian (1 of each). Of the 268 that started the course, 233 were matched at time 2 with usable data giving a total sample size of 233. The 35 (13.05%) that did not complete the full course dropped out for the following reasons; discharge as of right (a soldier's right to be able to leave military training within the first 6 weeks) = 15 (5.6%), back squad (returned to an earlier period in training until the required standard is achieved) = 7 (2.6%), injury/rehab (sent to a specific rehabilitation platoon to heal injuries until fit enough to return to military training) = 10 (3.7%), and unfit for army service (UFAS) = 1 (0.4%). All of the recruits involved in the study were trained by military training instructors (permanent staff), ( $n = 32$ ,  $M_{age} = 27.58$ ,  $SD = 1.87$  yrs) of which 29 (90.63%) were male and 3 (9.37%) were female. The training instructors are responsible for the training, assessment, and reporting of the Phase-1 recruits. All instructors had served an average of 9.21yrs ( $SD = 1.83$ yrs) within the British Army, with an average of 7.8months ( $SD = 0.49$ ) spent as instructors at the training establishment where the study was conducted.

### Study Context

With the capacity to hold up to 240 members of permanent staff and train up to approximately 600 military recruits at any one time, ATR (W) is one of two training regiments that is responsible for training (non-Infantry) standard entry adult recruits aged between 17.5yrs and 32yrs of age. Divided into four training squadrons (A, B, C & HQ) it is A, B, and C



squadron that are the main squadrons responsible for training the recruits, with HQ (Headquarters) squadron as an administration and rehabilitation squadron.



*Figure 1.* Organisational structure of the training squadrons within ATR Winchester.

Each squadron comprises approximately five to six training troops with a maximum capacity of 40 military recruits in each troop at any one time. A rank structure of six training staff are responsible for the overall training, management and leadership of each platoon, consisting of a Troop Commander, (Lieutenant or Captain), Troop Sergeant (normally the most senior member of the team, due to time served within the Army) and four section commanders (Corporals) who predominantly conduct much of the everyday training and are specifically responsible for approximately 8-12 recruits. However, before attending any military training establishment, every instructor must attend a mandatory external two-week course at the Army Staff and Leadership School (ASLS). The ASLS delivers “train the trainer” training to all ranks of the British Army, the course focuses on developing leadership, coaching techniques, instructional training and excellence, through evidenced and values-based learning.

Standard entry (SE) Phase -1 military training is a 14-week course that is designed to provide physical and mentally demanding challenges, to develop fundamental military skills and knowledge that subsequently will prepare soldiers for any difficult, stressful or hostile environment. All civilians (both male and female) that aspire to become military personal (except for officers) must go through and complete the Phase -1 training course prior to moving onto their respective Phase -2 and Phase -3 training where recruits learn specific trades, integral to each corps they choose to join (e.g. Artillery, Logistics, Medical, Engineering, Electrical & Mechanical). Initially and purposely, the first six weeks of basic training is specifically tailored

to assist the recruits' transition into army life. Exposed to certain restrictions and privileges, for example, the use of mobile phones, TVs, stereos, laptops, i-pads, are all regulated during this important time of transition. However, towards the end of the initial six weeks of training the aforementioned restrictions and privileges are often lifted.

Structured and regulated by a common military training syllabus for recruits' (CMS-R) the training course provides instruction of core military skills such as: drill, (marching in unison and reacting to specific words of command), skill at arms (learning weapon systems, safe weapon handling and their usage), marksmanship (developing the recruits ability to shoot accurately and effectively), physical fitness (developing muscle endurance, strength, stamina and aerobic power) basic land navigation (effectively using a compass, travelling on compass bearings and relating maps to the ground), and low level field craft and tactics (understand basic camouflage and concealment, moving tactically across various terrain, maintaining the ability to operate whilst exposed to the elements and inclement weather conditions). Moreover, the importance of team cohesion is progressively developed throughout the recruit's 14-week course. From being taught and learning to share accommodation with between 8 and 12 other recruits, participating in physical and mental team tasks, to specifically learning how to become an effective member of a section, team-work is consistently observed and assessed by the military instructors. Furthermore, the recruits receive a series of six workshops which are delivered by the regiment's padre (army chaplain) that introduce the six core values of the British Army. Designed as moral principles that standardise and guide appropriate behaviour they also contribute to the British Armies operational effectiveness and ethos. Each core value is defined and discussed in detail during each workshop through the use of identified examples from past to present conflicts (WW1, WW2, Northern Ireland, Bosnia/Kosovo, Iraq & Afghanistan). Nearing the end of the course (week 10-13) the aforementioned core skills are then confirmed over a series of summative tests and confirmatory field exercises that determines the success of the candidate. Each recruit that successfully achieves the required standard continues onto the final week conducting a foot and weapons drill format towards their final day of graduation.

### **Measures**

**Military Training Mental Toughness Inventory.** The MTMTI (Arthur, et al., 2015) is a six-item scale that is designed to assess military personnel's MT. The MTMTI is designed to evaluate a recruit's capacity to maintain high levels of performance whilst exposed to various difficult and stressful conditions (e.g. test conditions that may result in course failure, reprimands or punishments experienced for various reasons). Instructors were invited to assess their perception of their recruit's normal behaviours within stressful training situations using an

observer-rated questionnaire. The stem of the scale is: “He/she is able to maintain a high level of personal performance in training, even when . . .”. Response options are provided on a 7-point Likert scale ranging from 1 (never) to 7 (always) with a mid-point of 4 (sometimes). Research has provided good psychometric properties for the MTMTI, including evidence of predicting performance in four separate studies (i.e. Arthur et al., 2015; Fitzwater et al., 2017).

**The Warwick-Edinburgh Mental Well-being Scale (WEMWBS).** The WEMWBS is a 14-item, single-factor scale which includes both hedonic (positive affect; mainly feelings of optimism, cheerfulness, and relaxation) and eudaimonic (autonomy, self-acceptance, environmental mastery, positive relations with others, personal growth and purpose in life) perspectives. The response format is rated on a 5-point Likert scale anchored at 1 (none of the time) to 5 (all of the time), with the stem being “below are some statements about feelings and thoughts you have felt over the last two weeks.” WEMWBS is scored by summing responses to items, giving a minimum score of 14 and a maximum score of 70. The higher the score, the better an individual’s rating of MWB. The measure has been demonstrated to have sound construct validity, internal consistency and is generally considered a psychometrically sound tool for measuring MWB in adult populations (e.g., Tennant, Hiller, Fishwick et al., 2006, 2007). The measure has been used in a range of population studies worldwide (e.g., the Scottish Health Education Population Survey (HEPS), 2006, Health Survey for England, 2010; 2011; 2012; Population Survey Catalonia, Spain, 2013; Authenticity, Social Context, and Well-Being in the United States, England, and Russia 2012). Moreover, MWB can be conceptualised as a unidimensional or multidimensional construct. In the current study, I began by exploring a unidimensional construct.

**Performance.** Performance was measured by the recruits’ end of course final grades based on their weekly reports and grades throughout the 14-week course. This grade is awarded after discussion between the Troop commander (Lieutenant or Captain), Troop sergeant and the section commanders (corporals) based on the recruits’ bi-weekly progress/performance reports throughout the standard entry (SE) Phase -1 training programme. Grades ranged from 0 (fail) to 6 (A grade). Overall the following final performance grades were achieved. A grade = 12 5.2%, B grade = 65 27.9%, C+ grade = 42 18%, C grade = 70 30%, C- grade = 38 16.3%, D grade = 6 2.6%.

## **Procedure**

After receiving ethical approval, all participants were verbally informed of all the procedures and processes required for the study. This included the purpose of the study, all data

collected would be held in complete confidence, and that any individual involved could withdraw from the study at any time. On completion, informed consent was obtained from all those who volunteered (recruits and permanent staff instructors) to participate in the study. Both the MTMI and WEMWBS were administered at two-time points, week 4 and week 13. The reason for this is that: (1) week 4 provides enough time for the section commanders to get to know the recruits, and the MTMTI has shown to predict performance as early as week 4 (e.g., Arthur, Fitzwater et al., 2015); and (2) week 13 is the penultimate training week and, therefore, signifies the end of the Phase -1 training period. All questionnaires were administered by the author within a quiet conference room with no other military personnel present. Upon completion, the questionnaires were placed in self-sealed envelopes. Furthermore, no time limit was allocated to the completion of the questionnaires, allowing clarification of any misunderstood questions.

### **Statistical Analyses**

Confirmatory factor analyses were undertaken to confirm the factor structure of the two measures used within the study. The aim of the data analysis was fivefold: (1) to examine the relationship between MT and individual performance at weeks 4 and 13, (2) examine the relationship between MWB and individual performance at weeks 4 and 13, (3) to examine whether there was a significant increase in MT between weeks 4 and 13 as a consequence of Phase -1 military training, (4) to examine whether there was a significant increase in MWB between weeks 4 and 13 as a consequence of Phase -1 military training, and (5) to examine if the effects of MT on individual performance were mediated by MWB.

Bivariate correlation analysis was conducted to examine whether there was a significant relationship between MT at week 4 and individual performance and MT at week 13 and individual performance. Bivariate correlation was conducted to explore the relationship between MWB at week 4 and individual performance and MWB at week 13 and individual performance. Paired sample t-tests were conducted to examine whether there was any increase in MT or MWB between weeks 4 and 13. And mediation follow up analysis to be conducted, if appropriate, to determine if MWB mediated the effects of MT on individual performance. All data analyses were conducted using IBM SPSS statistics for Microsoft, Version 23.0 (IBM Corp, 2015).

## **RESULTS**

### **Preliminary Analysis: Confirmatory Factor Analysis**

While the MTMTI has been found to possess sound psychometric properties and structural validity with previous military sample populations (Arthur et al., 2015; Fitzwater et al., 2017), all

participants in previous samples were male infantry. Further, while the WEMWBS has proved to possess good factor structure (e.g., Tennant, Hiller, Fishwick et al., 2006, 2007), it has not previously been employed in a military context. Consequently, all CFA analysis was conducted with week 4 data to confirm the factor structure of both measures using *Mplus 7.3* (Muthen & Muthen, 2012), using the following fit indices: Satorra-Bentler scaled chi square (S-B $\chi^2$ : Satorra & Bentler, 1994); Root Mean Square Error of Approximation (RMSEA: Steiger & Lind, 1980); Standardized Root Mean Square Residual (SRMR: Bentler, 1995); Comparative Fit Index (CFI: Bentler & Bonett, 1980); and Tucker-Lewis Index (TLI: Tucker & Lewis, 1973). In line with recommendations by Hu and Bentler (1999), the recommended values of  $\leq .06$  for RMSEA;  $< .08$  for SRMR;  $\geq .95$  for CFI; and  $\geq .95$  for TLI were adopted. A low chi-square is desired, generating a non-significant result and indicating a good fit. However, it is accepted that the result is sensitive to sample size (i.e., large sample sizes produce larger  $\chi^2$  and, therefore, more likely to produce a type I error; while smaller sample sizes may be likely to produce a type II error), and model size (more variables produce higher  $\chi^2$ ) (Brown, 2006). This appears somewhat paradoxical, for although a minimum sample size of 200 observations is recommended to obtain stable results, models with sample sizes larger than 200 observations will generally reveal significant differences, therefore, the chi-square statistic should be used with caution (Marsh, Balla, & McDonald, 1988). The remaining indices are less affected by sample size.

*MTMTI*. The fit statistics for the 6-item MTMTI at week 4 and 13 were similar, although less than desirable ( $\chi^2 (9) = 41.40, p = 0.00, RMSEA = .12, CFI = .96, TLI = .93, SRMR = .04$ ). A closer inspection of the residual variances and modification indices revealed item 1 to be problematic. Consequently, the analysis was re-run with item 1 removed. The fit statistics for the 5-item model were very good ( $\chi^2 (5) = 10.99, p = .052, RMSEA = .07, CFI = .99, TLI = .97, SRMR = .02$ ), with an internal consistency (Cronbach's alpha) of .85 and a composite reliability of .87. Standardized factor loadings ranged from .61 to .89.

*WEMBWS*. The fit statistics for the 14 item WEMBWS were of an adequate fit. (S-B $\chi^2 (77) = 168.70, p = .00; RMSEA = 0.07 SRMR = < .01 CFI = .91; TLI = .89, SRMR = .05$ ) with factor loadings ranging from .37 to .77.

However, a shortened version of the WEMBWS (SWEMBWS) has also been designed and used by researchers (Stewart-Brown, Tennant, Parkinson et al., 2009) compatible with the Rasch model (Rasch, 1960) suggesting a more robust interpretation for internal consistency of the 7 items.

*SWEMBWS*. The fit statistics for the shortened 7 item scale proved to be an excellent fit (S-B $\chi^2 (9) = 0.12, p = .18; RMSEA = 0.04 SRMR = < .01 CFI = .99; TLI = .99, SRMR = .02$ ) with

factor loadings ranging from .57 to .80 and a composite reliability of .83. Only one factor loading was slightly below the generally accepted .60 value (Corey & Lee, 1992; Tabachnick & Fidell, 2007). This was not deemed problematic, given that .57 is only slightly below .60 and that all other factor loading for the scale were above .60.

### Main Data Analysis

Descriptive data for the study outcome variables are displayed in Table 1.

Table 1. Means, standard deviations, correlations and alpha co-efficients for all study variables.

	Mean	SD	Perf	MT Wk4	MT Wk13	MWB Wk4	MWB Wk 13
Performance	3.67	1.25					
MT Wk4	3.83	1.06	-0.03	(0.87)			
MT Wk13	3.93	1.23	-0.04	0.13	(0.91)		
MWB Wk4	3.53	0.47	0.13	0.10	0.03	(0.85)	
MWB Wk13	3.69	0.50	.21**	-0.01	-0.02	.57**	(0.89)

\*\* . Correlation is significant at the 0.01 level.

**Mental Toughness.** Bivariate correlation analysis revealed a non-significant relationship between MT at week 4 and individual performance ( $r = -0.03$ ,  $p > .05$ ) and MT at week 13 and individual performance ( $r = -0.04$ ,  $p > .05$ ). Furthermore, a paired sample t-test also revealed no significant difference between MT at week 4 and MT at week 13 ( $t(232) = -0.928$ ,  $p > .05$ ). Additionally, a linear regression analysis revealed no significant relationship between MT and individual performance at week 13, when controlling for the effect of MT at week 4.

**Mental Well-being.** Bivariate correlation analysis revealed a non-significant relationship between MWB at week 4 and individual performance ( $r = -.082$ ,  $p > .05$ ). However, a significant relationship was revealed between MWB at week 13 and individual performance ( $r = .208$ ,  $p < .01$ ). Furthermore, a paired sample t-test revealed a significant increase between MWB at weeks 4 and 13 ( $t(232) = -5.583$ ,  $p < .001$ ). Additionally, when controlling for MWB at week 4, MWB at week 13 significantly predicted performance ( $\beta = 0.59$ ,  $t = 3.052$ ,  $p < .01$ ). This suggests that the change in MWB between the two-time periods (week 4 and week 13) of 9 weeks, significantly predicted performance attainment.

No mediation analyses were conducted because there were no significant relationships between MT and performance, and between MT and MWB.

### **Additional Posthoc Analyses**

Follow up analyses were conducted to explore the supporting effect of MWB on individual performance, through separating MWB into eudaimonic and hedonic (MWB dimensions). A forced entry linear regression analysis was conducted to explore the simultaneous effects of week 13 eudaimonic and hedonic dimensions of MWB on individual performance, whilst controlling for values at week 4. Results revealed that both eudaimonic and hedonic dimensions of MWB significantly contributed to individual performance at week 13 (eudaimonic;  $\beta = 0.58$ ,  $t = 3.085$ ,  $p < .01$ ; hedonic  $\beta = 0.45$ ,  $t = 2.659$ ,  $p < .01$ ).

### **Discussion**

The purpose of the study was to examine the relationships between MT, MWB and individual performance within a Phase -1 military training establishment. It was hypothesised that both MT and MWB would have significant positive relationships with individual performance, and that there would be a significant increase in MT and MWB as a consequence of Phase -1 military training. Finally, it was hypothesised that MWB would mediate effects of MT on performance. The results, however, revealed no significant positive relationship between MT and performance, and no significant increase in MT as a result of phase 1 military training. However, a significant relationship was revealed between MWB at week 13 and performance (including when controlling for values at week 4), and there was an increase in levels of MWB between weeks 4 and 13. However, the decision to run no mediation analyses was decided. The rationale for this decision was based on the suggested guidance that significant positive correlations are required between the predictor variable (MT) and outcome variable (performance) and the predictor variable and the mediator variable (MWB) (Baron and Kelly, 1986). However, the results of the current study do not support these conditions necessary to establish mediation.

The results for MT could be considered surprising, based on evidence from a range of previous studies (Gucciardi et al., 2015a; Gucciardi et al., 2017; Hardy et al., 2014; Marchant et al., 2009), which include studies conducted in two different military training environments (Arthur et al., 2015; Fitzwater et al., 2017). These studies collectively demonstrate MT as a significant positive predictor of performance and that high levels of MT are positively related to various performance-related outcomes.

In an attempt to rationalise the results observed for MT in the current study, it could be argued that for MT to be present, an individual must experience various types of stressors as

referred to by Hardy et al's (2014) definition of MT: "the ability to achieve personal goals in the face of pressure from a wide range of different stressors" (p. 70). It could be argued that the particular Phase-1 military training environment used in the current study, although to a degree robust and arduous, may not be physically and mentally demanding to the point where various levels of stressors were experienced and, therefore, MT required. For example, the very nature of Phase-1 training is designed to transform a civilian into a trained soldier, through a progressive set of achievable individual and team skills, knowledge and experiences (explained previously within the current study). This should provide a platform for each military recruit to transition smoothly onto their own specific phase-2 and phase-3 military training establishments. This is where the recruits will learn their specific trades within the Armed forces, holistically known as combat support arms (i.e. IT logistics, engineering, electrical, mechanical, health care, and communications). Further, according to the British Army (2018), each recruit is required to hold academic qualifications between GCSE grades A to D as a prerequisite prior to joining one of the units within the combat support arms. Therefore, due to a higher level of intellect, recruits may not perceive written tests/assessments and the retention of information as very stressful where MT is required. Moreover, on completion and collection of both measures at the end of week 13 of Phase -1 training, the recruits were asked for anecdotal feedback on how they found the training they had experienced. Approximately seven to 10 recruits, both male and female (approximately 20%) from each troop said that they didn't find the training challenging and, in some cases, easier than first anticipated.

In contrast, frontline infantry training is 26 -28 weeks long, (almost twice as long as Phase -1 training), which is conducted at the Infantry training centre (ITC) Catterick with no prior academic qualifications required. It is physically and mentally demanding and purposely designed to create high levels of stress, due to its very nature to train military recruits to engage in close combat with an enemy in various hostile environments. As such, each recruit has to display high levels of MT throughout the course. Finally, on successful completion of training each recruit then adopts a position within an operational infantry unit preparing to deploy on future operations. As a case example, it was within this environment that the Military Training MT Inventory (MTMTI) (Arthur et al., 2015) was developed. In sum, based on the very nature of Phase -1 training, its purpose and design, there may be no need for such high levels of arduous, challenging and stressful training to be conducted to the point where high levels of MT are required.

In contrast, it could be argued that the Phase-1 military training environment used within the current study provides a training environment which allows military recruits to experience



both dimensions of MWB, resulting in positive development and attainment of MWB and performance. To explain further, the results revealed a positive significant relationship between MWB at week 13 and individual performance and MWB at weeks 4 and 13, revealing a 4.7% increase in MWB over a nine-week period. Further, when controlling for MWB at week 4, MWB at week 13 significantly predicted individual performance. This suggests that the change in MWB between the two-time periods (9 weeks) significantly predicted performance attainment. Additionally, follow up analysis focused on both dimensions of MWB to see if all the attributes that contribute to both the hedonic and eudaimonic dimensions were all responsible for the positive significant relation to individual performance or a specific few. Follow up analyses revealed that all the attributes of both dimensions of MWB contributed to the significant increase in individual performance at the end of Phase-1 training (week 13).

The current study highlights that MWB and individual performance are positively developed and enhanced when the dimensions of MWB are positively experienced, supported and maintained and also allowing a potential freedom from negative stressors. Further, each attribute which encompass the dimensions represent positive indices, which may suggest the activation of the BAS in response to the positive stimuli experienced by the recruits (rRST; Gray & McNaughton, 2000). Once activated, the BAS provides the ability for an individual to maintain goal focused behaviours, pursue and remain persistent in the achievement of their goals, resulting in overall positive performance being achieved for all those recruits that successfully completed Phase – 1 training. Moreover, MWB is identified to be integral for the development of positive life outcomes and success in various performing contexts including, for example, business, education, sport and the military (Chow, 2007; Daniel & Harris, 2000; Gucciardi & Jones, 2012; Sundin et al., 2010; Williams et al., 2016). Thus, as a consequence, it may be plausible to suggest that both dimensions of MWB have been positively supported, experienced and attained by the military recruits. To support this proposal, examples of both dimensions of MWB are provided within a military context.

Eudaimonic experiences such as positive psychological functioning, autonomy, competence, self-realisation and positive relations with others (belonging) are experienced from the onset of training. For example, positive relations with others is experienced through the encouragement of team-work, from sharing accommodation to conducting physical and mental team tasks with each other. Self-realisation is experienced through each military recruit fulfilling and maximising their own potential by achieving beyond their own expectations academically and physically. Environmental mastery/competence is experienced through new learning environments, with new skills and information being taught; thus, enhancing the recruits competence and ability to manage the everyday challenges and tasks within their new environment. Autonomy is experienced as military training supports opportunity for recruits to

use their own initiatives, thoughts and ideas, generating a sense of choice. From various problem-solving tasks and exercises (command tasks) to receiving positive feedback, recruits have the choice to effectively set goals towards personal development. As a consequence, a supportive autonomous environment is developed. Moreover, according to Ryan and Deci (2000) autonomy along with belonging and competence (environmental mastery) are identified as three significant psychological human needs, that when positively experienced enhances intrinsic motivation and develops self-determined behaviours.

Furthermore, it is suggested that specific stages of military training also support hedonic experiences such as happiness, pleasure attainment, pain avoidance and life satisfaction. For example, military recruit's completing or passing specific stages of training (combat fitness test, swimming test, drill test, weapons test) would suggest positively enhancing subjective happiness and pleasure attainment. Additionally, the ability to avoid injury or various types of punishment due to lack of discipline results in pain avoidance. Further, on successful completion of the 14-week course a culmination of various demanding challenges will have been successfully achieved. Thus, military recruits will then be in a position to graduate. Therefore, it could be suggested that each successful military recruit in all they have achieved, may experience a greater sense of achievement and overall positive sense of life satisfaction.

Some limitations are acknowledged in this study. For example, the administering of the measures could not be delivered until early evening, as the recruits could not be interrupted whilst training during the day. Therefore, with a full days training and onset of fatigue, it could be argued that a potential lack of interest and attention may have been paid to the correct completion of the measures by the recruits. Further, I was in a position of senior authority at the training establishment, although all precautions were taken to prevent any type of military influence. Due to my presence (even though dressed in civilian attire and explaining the purpose of the study), questions may have been answered by the recruits with slight military influence. Further, a quantitative method and block design was adopted, this was decided due to the structure and how Phase – 1 military training is constructed (see fig 1 diagram for example) and conducted with no possibility of interfering with recruits for interviews or focus groups etc. Furthermore, out of three Phase – 1 training establishments that deliver the same 14- week training curriculum, the study was conducted in only one of the three potentially available. Using all three could have potentially reinforced and supported the current studies results. Despite the limitations of this study, there are some key strengths. For example, both self-report (WEMWBS) and informant rated measures (MTMTI) were used whilst military recruits were exposed to real time pressures with success and failure as real consequences of performance. Moreover, the study was conducted as an exploratory field based longitudinal study, conducted within a live Phase -1 military training environment. The selected approach allowed for changes

to be observed between the two specific time periods of week 4 and 13.

Possible suggestions for future research and interventions would suggest replicating the current study within the further two Phase -1 training establishments and within a basic infantry training centre, which may reinforce the current study findings. Further, as we know stress is a key factor for MT to be activated. Thus, an added study to measure stress would firstly, evidence at what level stress is experienced within the Phase – 1 training environments and secondly, provide rationale as to why surprisingly MT was not significantly present within the current study. Additionally, a new intervention of leadership development and performance psychology workshops was being delivered to all the training instructors whilst the study was being conducted. It may be of interest if the current study results were influenced by this separate intervention.

Suggested implications would focus on introducing a MWB intervention of delivered workshops, not only within the British military training environments but other various performing environments, from developing an understanding of what MWB is to focusing on the dimensions of the construct. Also, learning how the dimensions can be experienced, supported and maintained which subsequently not only achieves greater positive MWB but also individual performance whilst exposed to arduous and stressful conditions.

In conclusion the current study has examined and revealed MWB to be a significant positive predictor of performance within a Phase - 1 military training environment and supportive of previous literature. For example, MWB is suggested as integral for the development of positive life outcomes and success in various performing contexts (e.g. business, education, sport and the military; Chow, 2007; Daniel & Harris, 2000; Gucciardi & Jones, 2012; Sundin et al., 2010; Williams et al., 2016). In comparison, recruits achieving completion of training suggests positive life outcomes and success being experienced. Moreover, with the military considered as one of the most stressful professions ([www.careercast.com](http://www.careercast.com), 2017, 2018) the current study suggests a reduction to various stressors was experienced by the recruits due to the attainment of positive MWB. However, of importance to note for MWB and performance to be positively developed and maintained, the current study highlights that both the eudaimonic and hedonic dimensions of the construct must be experienced and supported.

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