



# Does mental toughness predict happiness over and above resilience, self-efficacy and grit?

Helen St Clair-Thompson<sup>\*</sup>, Jessica London

Newcastle University, UK

## ARTICLE INFO

### Keywords:

Mental toughness  
Resilience  
Self-efficacy  
Grit

## ABSTRACT

There is conceptual overlap between mental toughness and resilience, self-efficacy, and grit, although few studies have empirically examined the overlap between them. In addition, little research has examined the extent to which there is an empirical advantage of using the mental toughness framework to predict outcomes of interest. The current study therefore explored the predictive validity of mental toughness, specifically in terms of the extent to which it predicts happiness over and above the cognate constructs of resilience, self-efficacy, and grit. Three hundred and sixty-seven participants completed measures of mental toughness, resilience, self-efficacy, grit, and happiness. The correlations between the variables were explored, and a hierarchical regression analysis was conducted to examine the extent to which mental toughness predicted happiness over and above resilience, self-efficacy, and grit. There were significant correlations between mental toughness, resilience, self-efficacy, and grit. When resilience, self-efficacy and grit were entered into the regression each of them was a significant predictor of happiness, but when mental toughness was added they were no longer significant predictors, with the commitment, control of emotion, control of life, confidence in abilities, and interpersonal confidence components of mental toughness being significant predictors. Therefore, despite conceptual overlap, if the aim of research or practice is to identify individuals at risk of poor wellbeing, then this aim is better met when using the construct of mental toughness. The role of mental toughness in happiness also suggests value in examining the impact of mental toughness interventions in the domain of wellbeing.

## 1. Introduction

The term mental toughness describes a set of psychological resources that are important for dealing with stress and pressure. Research into mental toughness originated within sports psychology, with mental toughness being considered an important attribute for allowing athletes to deal with the pressure of intensive training and competition (e.g., Connaughton et al., 2008; Jones et al., 2007). More recently, mental toughness has been researched in other domains, including education (e.g., McGeown et al., 2016; St Clair-Thompson & McGeown, 2019), the workplace (e.g., Lee & Kim, 2023), and mental health and wellbeing (e.g., Haghghi & Gerber, 2019). There are numerous conceptual approaches and measurements of wellbeing (e.g., Linton et al., 2016; Svane et al., 2019). However, it is commonly accepted that wellbeing is an overarching concept comprising multiple domains, for example affective and evaluative wellbeing (Diener et al., 1999), and mental, social, physical, and spiritual wellbeing along with state of functioning and personal circumstances (Linton et al., 2016). Something else that is

viewed as a component of wellbeing is happiness, often defined as a mental experience of quality (e.g., Lomas & VanderWeele, 2023). This is conceptually similar to mental wellbeing but focused specifically on subjective experience (Lomas & VanderWeele, 2023). Mental toughness is known to be a useful predictor of perceived stress, anxiety, depression, burnout (e.g., Haghghi & Gerber, 2019), wellbeing (e.g., Stamp et al., 2015), mental illness recovery (Ramshaw & St Clair-Thompson, 2021), and happiness (Ruparel et al., 2022). However, mental toughness is a relatively new concept within this domain, and therefore further research is needed to understand its role and its uniqueness.

Although there are other theories of mental toughness, the most used theory (sometimes referred to as the four 'Cs' theory) suggests that mental toughness is comprised of four broad components: challenge, commitment, control, and confidence (Clough et al., 2002). Those high in challenge see difficult tasks as an opportunity for learning and self-development, and those high in commitment persevere to reach their goals. Control includes both control of life and emotional control, with those high in control of life viewing outcomes as dependent on their

<sup>\*</sup> Corresponding author. Dame Margaret Barbour Building, Wallace Street, Newcastle upon Tyne, NE2 4DR, UK.  
E-mail address: [helen.st-clair-thompson@newcastle.ac.uk](mailto:helen.st-clair-thompson@newcastle.ac.uk) (H. St Clair-Thompson).

own efforts, and those high in emotional control being able to regulate their feelings. Confidence comprises confidence in abilities and interpersonal confidence, with people who are confident feeling more able to attempt new or difficult tasks, and more assured when interacting and working with others. Using this approach, the common measure of mental toughness is the Mental Toughness Questionnaire 48 (MTQ48, Clough et al., 2002), which has established reliability and validity (e.g., Perry et al., 2021).

It is important to note that there is conceptual overlap between mental toughness and other positive psychological attributes. The four 'Cs' theory was developed from the notion of hardiness, a personality disposition that is a resistance resource when confronting stress (e.g., Kobasa, 1979). Hardiness comprises control, commitment, and challenge. Mental toughness may also overlap with resilience, self-efficacy, grit, confidence, and motivation (for a review see St Clair-Thompson & McGeown, 2019). It has been proposed that there are several advantages of using the mental toughness framework, for example, it allows the investigation of several psychological variables simultaneously, and it uses a less academic terminology that may make it easier to discuss with young people than some other psychological characteristics (e.g., McGeown et al., 2016). However, little research has examined the extent to which there is an empirical advantage of using the mental toughness framework, in terms of predictive validity. Given that measures of mental toughness could be used to identify at-risk individuals, or to identify targets for intervention (e.g., Stamp et al., 2015), it is important to further establish the utility of the construct. The current study therefore examined the extent to which mental toughness can predict happiness (as a proxy for wellbeing) over and above the cognate constructs of resilience, self-efficacy, and grit.

Resilience has been defined in many ways. It is sometimes considered as a trait, but sometimes as a process, and sometimes as an outcome experienced after adversity (e.g., Fletcher & Sarkar, 2013; Windle, 2011). It can also apply to a range of systems such as individuals, groups, organizations, and economies (e.g., Gucciardi, 2017). However, the most used definitions view resilience as a process by which an individual 'bounces back' from adversity or stressful situations (Fletcher & Sarkar, 2013; Windle, 2011). It is well established that resilience is a significant predictor of wellbeing and mental health (e.g., Tomy & Weinberg, 2018). However, although mental toughness and resilience are alike, resilience is largely a reactive concept, emphasizing adversity and adaptation (Fletcher & Sarkar, 2013), while mental toughness is thought to have proactive elements, describing how people seek out or approach challenging situations (e.g., Clough et al., 2002; Gucciardi, 2017). Empirically, there is also evidence for a distinction between these concepts. For example, Cowden et al. (2016) assessed mental toughness in sports alongside resilience and stress. Resilience and mental toughness were positively correlated, and they collectively predicted stress, with each construct individually predicting variance in stress beyond that of the other construct. This suggests that they play distinct roles in stress management in the context of sport.

In addition to intersecting with resilience, mental toughness also shares some similarities with self-efficacy. Self-efficacy describes an individual's belief in their competence to perform difficult or novel tasks (Bandura, 2006), and has been related to the ability to persevere in the face of difficulties (e.g., Caprara et al., 2011). Bédard-Thom et al., (2021) reviewed a range of theories of mental toughness and named self-efficacy as a component of mental toughness alongside stressors, goals, and self-control. Research has also shown that self-efficacy is a significant predictor of wellbeing (e.g., Mascia et al., 2023). This may be, at least in part, because those with higher self-efficacy are more likely to use effective coping strategies, such as using problem focused rather than task avoidance strategies (e.g., Karademas & Kalantzi-Azizi, 2004). Although mental toughness and self-efficacy are closely related (e.g., Denovan et al., 2022; Nicholls et al., 2015), there are, however, some distinctions between them. For example, self-efficacy appears to be akin to the confidence in abilities subcomponent of mental toughness (e.

g., St Clair-Thompson & McGeown, 2019), but of course mental toughness also comprises challenge, commitment, control of life and emotions, and interpersonal confidence. Empirically, there is also evidence for distinctions between these concepts. St Clair-Thompson et al. (2017) revealed that children's mental toughness predicted their concerns over moving to a new school over and above self-esteem.

Mental toughness may also overlap somewhat with the concept of grit, defined as perseverance and passion for long-term goals (Duckworth et al., 2007). Grit is sometimes conceived to have two factors: persistence of interest, the tendency to continue activities over a long period, and commitment of effort, an inclination to overcome challenges and persevere until success is achieved. There is a growing body of literature demonstrating relationships between grit and well-being and mental health outcomes (e.g., Jin & Kim, 2017). Some researchers, however, have suggested distinctions between mental toughness and grit. For example, grit is viewed as a stable personality construct (e.g., Postigo Gutiérrez et al., 2021), whereas some view mental toughness as a mindset or a trait which is malleable, for example via psychological skills training (e.g., Dagnall et al., 2021). Empirically, studies within sport have also revealed only low or moderate correlations between these constructs. For example, Joseph (2009) reported that mental toughness accounted for only 18% of the variance in grit (see also Denovan et al., 2022).

There are therefore similarities, but also differences between mental toughness and the cognate constructs of resilience, self-efficacy, and grit. Denovan et al. (2022) found moderate to large correlations between mental toughness, self-efficacy, grit and ego-resiliency (the capacity to flexibly modify responses in accordance with changing situational demands, particularly during emotionally challenging conditions, e.g., Wang et al., 2019), except for the consistency of interest subcomponent of grit. They therefore proposed a general factor underlying mental toughness, resilience and self-efficacy. However, Denovan et al. (2022) used an abbreviated mental toughness questionnaire, which produces a single score. They did not consider the components of mental toughness, which could allow for a more nuanced understanding of the overlap between mental toughness and cognate constructs. In addition, they focused only on the constructs themselves. Given the theoretical overlap between the constructs, arguably it is inevitable that scores on measures of the constructs will be significantly related. A different issue that they did not consider in their study is the ability of the constructs to predict wellbeing or mental health outcomes. Such examination may shed further light on the overlap between the constructs of mental toughness, resilience, self-efficacy, and grit, but importantly, may also inform researchers of the most suitable construct(s) to use in future research. Exploring the predictive validity of mental toughness when measured alongside resilience, self-efficacy and grit could therefore inform future research and practice.

In the current study, participants therefore completed measures of mental toughness, resilience, self-efficacy, grit, and happiness. It was hypothesised that there would be significant correlations between scores on all the measures, but an in-depth examination of measurement item overlap and uniqueness was beyond the scope of this study. Instead, the main aim was to establish whether mental toughness predicts happiness over and above resilience, self-efficacy and grit. Given that the construct of mental toughness allows the investigation of several psychological variables simultaneously (e.g., McGeown et al., 2016), and has both reactive and proactive components (e.g., Clough et al., 2002; Gucciardi, 2017), it was hypothesised that mental toughness would predict happiness over and above resilience, self-efficacy and grit.

## 2. Method

### 2.1. Participants

There were 367 participants with a mean age of 19 years and 10 months (*SD* 5 months). Of these participants, 70 identified as male, 291

as female, and 3 as non-binary. The remaining 3 participants did not wish to report their gender. At the time of participation, all participants were studying at higher education institutions in the UK. They were recruited through a university research participation scheme, through which students collect credits for participating in research, and in turn can recruit participants for their own research, and through social media platforms, including Facebook and Instagram.

## 2.2. Materials and procedure

Mental toughness was assessed using the MTQ48 (Clough et al., 2002). This comprises 48 statements related to the subscales of challenge, commitment, control of emotion, control of life, confidence in abilities, and interpersonal confidence (example item: *Challenges usually bring out the best in me*). Participants rate the extent to which they agree with each statement on a scale of 1 (strongly disagree) to 5 (strongly agree), and then mean scores are computed for each of the 6 sub-components (e.g., Perry et al., 2013, 2021). The MTQ48 is a widely used measure, and previous research has established the reliability and factor structure of the MTQ48 (e.g., Dagnall et al., 2019; Perry et al., 2013; 2021).

Resilience was measured using the Brief Resilience Scale (Smith et al., 2008). The scale was developed based on a unidimensional concept of resilience, concerned with the ability to bounce back or recover from stress (example item: *I tend to bounce back quickly after hard times*). Participants respond to each item on a scale of 1 (strongly disagree) to 5 (strongly agree), and mean scores are calculated. This is a popular 6-item questionnaire with established reliability, and research has revealed that a single factor model provides a good account of data (e.g., Fung, 2020; McKay et al., 2021; Ye et al., 2022).

As a measure of self-efficacy, participants completed the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995). This is a 10-item measure of general perceived self-efficacy (example item: *When I am confronted with a problem, I can usually find several solutions*). Participants respond on a 4-point scale from 1 (Not at all) to 4 (Exactly true), and a mean self-efficacy score is calculated. The scale is widely used, has been translated into at least 28 languages, and it has well established reliability and validity (e.g., Luszczynska et al., 2005; Schwarzer & Jerusalem, 1995). Research has also provided support for a single-factor structure across 25 nations (Scholz et al., 2002; Wu, 2009).

Grit was assessed using the Short Grit Scale (Duckworth & Quinn, 2009). This is an 8-item measure adapted from the original 12-item Grit Scale (Duckworth et al., 2007) to improve the psychometric properties. Participants respond to a series of statements (e.g., *I finish whatever I begin*) on a 5-point Likert scale ranging from 1 (Not like me at all) to 5 (Very much like me) and following some reverse scoring a mean grit score is calculated. The operational definition of grit comprises two factors; consistency of interest (the ability to maintain goals over time) and perseverance of effort (the ability to keep working towards goals). However, research has revealed that the Short Grit Scale is a unidimensional measure and that a single score should be reported (Gonzalez, Canning, Smyth, & MacKinnon, 2019; Postigo et al., 2023).

Finally, participants completed the Oxford Happiness Questionnaire (Hills & Argyle, 2002). This is a widely used measure of subjective well-being with suitable reliability (e.g., Barattucci et al., 2023; Hills & Argyle, 2002). It comprises 29 items (e.g., *I feel that life is very rewarding, and I am very happy*) and participants respond as to the extent to which they agree with each item on a scale of 1 (strongly disagree) to 6 (strongly agree). The scale is reported to measure seven domains: self-concept, aesthetic feeling, self-efficacy, emotional readiness, life satisfaction, hopefulness, and spiritual intelligence (e.g., Hatamnejad et al., 2023), however, researchers commonly compute a single happiness score (e.g., Hills & Argyle, 2002; Robbins et al., 2010; Shin & Park, 2022). Therefore, in the current study a mean happiness score was calculated.

To take part in the study, participants clicked on a link to an online

questionnaire. After reading an information sheet and providing informed consent, participants provided demographic information (age and gender) and completed the questionnaires in the order presented above. Participants were then provided with a debriefing. Completion of the study took 10–15 min. The study was performed in accordance with required ethical principles and had received ethical approval from the local ethics committee.

## 3. Results

Table 1 shows the descriptive statistics for mental toughness, resilience, self-efficacy, grit and happiness. Previous research has revealed relatively low reliability of the control of emotion subscale of the MTQ48 (e.g., St Clair-Thompson et al., 2015) and has suggested the removal of two questionnaire items, questions 26 and 34. The Cronbach's  $\alpha$  reported here is the reliability after these items were removed.

Table 2 shows the correlations between the subcomponents of mental toughness, resilience, self-efficacy, grit, and happiness. There were significant correlations between scores on all measures.

A hierarchical regression analysis was then conducted to examine the extent to which mental toughness predicted happiness over and above resilience, self-efficacy and grit. Resilience, self-efficacy and grit were entered in step 1, and the subcomponents of mental toughness were added in step 2. The outcome of the regression analysis is shown in Table 3. In model 1, resilience, self-efficacy and grit were each significant predictors of happiness. In model 2, resilience, self-efficacy and grit were no longer significant predictors, but all subcomponents of mental toughness with the exception of challenge were significant predictors. This model explained 65% of the variance in happiness,  $R^2 = 0.65$ ,  $F(9, 366) = 72.23$ ,  $p < 0.001$ .

## 4. Discussion

The aim of the current study was to examine the extent to which mental toughness can predict happiness over and above the cognate constructs of resilience, self-efficacy, and grit. The findings revealed significant correlations between each component of mental toughness, resilience, self-efficacy, and grit, but that mental toughness (specifically commitment, control of emotions, control of life, confidence in abilities, and interpersonal confidence) was the best predictor of happiness. When mental toughness was entered as a predictor of happiness, resilience, self-efficacy and grit were no longer significant predictors of happiness.

The findings of significant correlations between mental toughness, resilience, self-efficacy, and grit were consistent with previous suggestions of conceptual overlap between these constructs (e.g., St Clair-Thompson & McGeown, 2019), as well as studies exploring their empirical overlap (Denovan et al., 2022). The main area of similarity between the constructs is of course that they all describe the ability to deal with and overcome stressful situations, and therefore all the constructs were also significantly related to happiness (e.g., Mascia et al., 2023; Stamp et al., 2015). It is worthy of note, however, that the correlations of grit with mental toughness, resilience, and self-efficacy

**Table 1**  
Descriptive statistics.

	Mean	SD	Cronbach's $\alpha$
Challenge	3.24	0.51	0.68
Commitment	3.04	0.50	0.73
Control of Emotion	2.60	0.63	0.59
Control of Life	3.10	0.54	0.66
Confidence in Abilities	2.91	0.61	0.80
Interpersonal Confidence	3.26	0.71	0.77
Resilience	2.97	0.71	0.83
Self-Efficacy	2.83	0.37	0.81
Grit	2.96	0.60	0.77
Happiness	3.77	0.66	0.91

**Table 2**  
Correlations between mental toughness, resilience, self-efficacy, grit and happiness.

	2	3	4	5	6	7	8	9	10
1.Challenge	0.48**	0.60**	0.51**	0.55**	0.46**	0.50**	0.63**	0.26**	0.53**
2.Commitment		0.52**	0.53**	0.49**	0.22**	0.44**	0.54**	0.64**	0.60**
3.Control of emotion			0.53**	0.59**	0.34**	0.55**	0.49**	0.24**	0.48**
4.Control of life				0.69**	0.42**	0.48**	0.48**	0.36**	0.64**
5.Confidence in abilities					0.34**	0.56**	0.50**	0.30**	0.73**
6.Interpersonal confidence						0.33**	0.46**	0.15**	0.39**
7.Resilience							0.53**	0.22**	0.52**
8.Self-efficacy								0.35**	0.49**
9.Grit									0.40**
10.Happiness									

Note: \*\*p < 0.01.

**Table 3**  
Regression analysis predicting happiness.

	B	SE B	$\beta$	t	p
<i>Model 1</i>					
Constant	2.51	0.30		8.28	<0.001
Resilience	0.32	0.05	0.34	4.49	<0.001
Self-Efficacy	0.40	0.09	0.23	-0.87	<0.001
Grit	0.27	0.05	0.25	5.66	<0.001
<i>Model 2</i>					
Constant	0.50	0.30		1.67	0.10
Resilience	0.07	0.04	0.08	1.84	0.07
Self-Efficacy	-0.07	0.08	-0.04	-0.87	0.39
Grit	-0.03	0.05	-0.03	-0.74	0.46
Challenge	0.10	0.06	0.07	1.57	0.12
Commitment	0.36	0.07	0.28	5.51	<0.001
Control of Emotion	0.12	0.05	0.11	2.46	0.02
Control of Life	0.15	0.06	0.12	2.50	0.01
Confidence in Abilities	0.51	0.05	0.47	9.64	<0.001
Interpersonal Confidence	0.10	0.04	0.11	2.79	0.01

Note: B = unstandardised coefficient, SE B = std. error and  $\beta$  = standardised coefficient. For Model 1,  $R^2 = 0.39$ ,  $F(3, 366) = 79.07$ ,  $p < 0.001$ . For Model 2,  $R^2 = 0.65$ ,  $F(9, 366) = 72.23$ ,  $p < 0.001$ . Multicollinearity was also not a concern ( $VIF < 3$  in each case).

(which ranged from 0.15 to 0.36, except for the correlation with commitment) were not as strong as those between mental toughness, resilience, and self-efficacy (which ranged from 0.33 to 0.63). This is consistent with Denovan et al. (2022), who found that grit (particularly the consistency of interest component) was not as closely correlated with their other variables of mental toughness, self-efficacy and ego-resiliency. This suggests a greater distinctiveness of grit. This could be because of measurement issues (Denovan et al., 2022), or because of conceptual distinctiveness. For example, grit is a stable personality construct (e.g., Postigo Gutiérrez et al., 2021), whereas mental toughness, resilience, and self-efficacy may be more state-like (e.g., St Clair-Thompson & McGeown, 2019).

The approach taken in the current study, of examining the components of mental toughness rather than total mental toughness, also allows for a more nuanced examination of the relationships between mental toughness, resilience, self-efficacy, and grit. The component of challenge was particularly closely related to self-efficacy, suggesting that a greater willingness to undertake challenging tasks is related to a greater belief in the chance of being successful (see also McGeown et al., 2017). Unsurprisingly, commitment was particularly closely associated with grit, with both relating to perseverance in the pursuit of goals (Clough et al., 2002; Duckworth et al., 2007). Control of emotion, control of life, and confidence in abilities were all closely related to resilience and self-efficacy (but less so to grit). It is likely that this is because individuals feel more able to deal with setbacks and stressful events (resilience) when they feel more in control of their life and emotions and have greater belief in their ability to do so (confidence in abilities and self-efficacy). This is consistent with previous findings of relationships between locus of control and self-efficacy (e.g., Judge

et al., 2002) and resilience and self-efficacy (e.g., Etherton et al., 2022). Finally, interpersonal confidence was particularly related to self-efficacy. This is not surprising, as arguably confidence in interpersonal interactions can be considered to be part of a domain general confidence or self-efficacy construct (e.g., Bandura, 2006).

The primary aim of the current study, though, was to examine the extent to which mental toughness predicts happiness over and above resilience, self-efficacy and grit. The regression analysis revealed that in the absence of mental toughness, each of the resilience, self-efficacy and grit measures were significant predictors of happiness. This finding is consistent with previous research that has revealed a role for these constructs in mental health and wellbeing (e.g., Jin & Kim, 2017; Mascia et al., 2023; Tomy & Weinberg, 2018). However, the addition of mental toughness as a predictor of happiness significantly improved the regression model, and in the presence of mental toughness, resilience, self-efficacy and grit were no longer significant predictors of happiness. This finding highlights the utility of the mental toughness construct.

The findings are consistent with previous research that has evidenced a role for mental toughness in wellbeing and mental health (e.g., Haghghi & Gerber, 2019; Ramshaw & St Clair-Thompson, 2021; Stamp et al., 2015). For example, Haghghi and Gerber (2019) found that mental toughness was associated with lower perceived stress, lower anxiety and burnout, fewer depressive symptoms and fewer sleep difficulties. Clough et al. (2002) interpreted the relationships between mental toughness and such outcomes in terms of cognitive-transactional stress theory (e.g., Lazarus & Folkman, 1984). This theory views stress as resulting from a disparity between internal and external demands and the personal or social resources that can be accessed, therefore suggesting that mentally tough people are protected against stress and poor wellbeing due to viewing their lives as controllable, themselves as capable, and being able to stay committed. It is worthy of note that in the current study the component of challenge was not a significant predictor of happiness when considered alongside the other components of mental toughness, suggesting less of a role for challenge in happiness as conceptualised in the current study. Challenge could however, play a role in other aspects of wellbeing such as personal growth (e.g., Stamp et al., 2015). Importantly, the current study adds to the existing literature by demonstrating that mental toughness is also a better predictor of happiness than the cognate constructs of resilience, self-efficacy and grit. Thus, although there is conceptual overlap between mental toughness, resilience, self-efficacy and grit, if the aim of research or practice is to identify individuals at risk of poor wellbeing (e.g., Stamp et al., 2015) then this aim is better met when using the construct of mental toughness.

The predictive ability of mental toughness in the current study points to the potential of using the mental toughness construct to provide pathways to intervention that may enhance wellbeing. Mental toughness has indeed been described as a mind-set that can be enhanced through psychological skills training (e.g., Crust, 2008; Gucciardi et al., 2015). Although work examining mental toughness interventions in this context is still in its infancy, research in the domains of sport and

education has suggested that mental toughness can be increased, given the right environment and support. Strycharczyk and Clough (2014) suggested that mental toughness interventions fall into five broad categories: positive thinking, goal setting, visualization, anxiety control and attentional control (see also Connaughton et al., 2008; Juan & Lopez, 2015). These approaches have indeed been used to enhance some of the constructs with which mental toughness overlaps (e.g., St Clair-Thompson & McGeown, 2019). Future research should examine the impact of specific mental toughness interventions on happiness, and other aspects of wellbeing and mental health.

It is, however, important to note some limitations with the current study. There are numerous conceptual approaches and measurements of wellbeing (e.g., Linton et al., 2016). It is outside the scope of this study to interrogate these approaches, but of course, the relationships between mental toughness, resilience, self-efficacy, grit and wellbeing may differ depending on the conceptualisation and how wellbeing is assessed. Therefore, further research should explore whether mental toughness predicts wellbeing to a greater degree than resilience, self-efficacy and grit using alternative wellbeing measures. Mental toughness is a concept that has been used across several domains, including sport (e.g., Connaughton et al., 2008; Jones et al., 2007), education (e.g., McGeown et al., 2016; St Clair-Thompson & McGeown, 2019), and the workplace (e.g., Lee & Kim, 2023). Therefore, future research should also examine the extent to which mental toughness can predict outcomes alongside resilience, self-efficacy and grit in these other domains. There would also be value in considering other overlapping constructs, such as motivation and buoyancy (e.g., St Clair-Thompson & McGeown, 2019). It is also important to note that in the current study the measures were administered concurrently. This allows for the possibility that the correlations between constructs were inflated due to common method effects (e.g., Podsakoff et al., 2003). This may have actually provided a stringent test of the uniqueness of the constructs, although of course the current study still revealed some uniqueness, particularly in terms of the prediction of happiness. It is also important to note that the current study was cross-sectional, and that the sample was restricted to a young adult population. In order to make more reliable conclusions about the predictive validity of mental toughness longitudinal research is needed, and research needs to be conducted with other populations to ensure generalizability.

In conclusion, the current study aimed to explore the extent to which mental toughness can predict happiness over and above the cognate constructs of resilience, self-efficacy and grit. There were significant correlations between each component of mental toughness, resilience, self-efficacy, and grit, but happiness was best predicted by the commitment, control and confidence subcomponents of mental toughness. Therefore, despite conceptual overlap, if the aim of research or practice is to identify individuals at risk of poor wellbeing, then this aim is better met when using the construct of mental toughness. The role of mental toughness in wellbeing also suggests value in examining the impact of mental toughness interventions in the domain of wellbeing.

### Statements and declarations

The authors have no relevant financial or non-financial interests to disclose.

### Ethics approval

The methodology and materials used for this study were approved by the Faculty of Medical Sciences Research Ethics Committee, Newcastle University (Ethics approval number 19887-2022).

### Informed consent

Informed consent was gained from all individual participants included in the study. Participants also provided consent regarding

publishing their anonymous data.

### CRedit authorship contribution statement

**Helen St Clair-Thompson:** Conceptualization, Formal analysis, Writing – original draft, Writing – review & editing. **Jessica London:** Data curation.

### Data availability

Data will be made available on request.

### References

- Bandura, A. (2006). *Self-efficacy beliefs of Adolescents*. Information Age Publishing.
- Barattucci, M., Brugnera, A., Ramaci, T., Kuvacić, G., & De Giorgio, A. (2023). An 8-item scale for the measurement of happiness: Validation and application of the Oxford happiness questionnaire in an Italian sample. *Current Psychology*, 1–10. <https://doi.org/10.1007/s12144-023-05201-z>
- Bédard Thom, C., Guay, F., & Trotter, C. (2021). Mental toughness in sport: The Goal-Expectancy-Self-Control (GES) model. *Journal of Applied Sport Psychology*, 33(6), 627–643. <https://doi.org/10.1080/10413200.2020.1808736>
- Caprara, G. V., Vecchione, M., Alessandri, G., Gerbino, M., & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic achievement: A longitudinal study. *British Journal of Educational Psychology*, 81(1), 78–96. <https://doi.org/10.1348/2044-8279.002004>
- Clough, P. J., Earle, K., & Sewell, D. (2002). *Mental toughness: The concept and its measurement*. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32–43). Thomson Publishing.
- Connaughton, D., Wade, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sports Sciences*, 26(1), 83–95. <https://doi.org/10.1080/02640410701310958>
- Cowden, R. G., Meyer-Weitz, A., & Oppong Asante, K. (2016). Mental toughness in competitive tennis: Relationships with resilience and stress. *Frontiers in Psychology*, 7, 320. <https://doi.org/10.3389/fpsyg.2016.00320>
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45(7), 576–583. <https://doi.org/10.1016/j.paid.2008.07.005>
- Dagnall, N., Denovan, A., Papageorgiou, K. A., Clough, P. J., Parker, A., & Drinkwater, K. G. (2019). Psychometric assessment of shortened mental toughness questionnaires (MTQ): Factor structure of the MTQ-18 and the MTQ-10. *Frontiers in Psychology*, 10, 1933. <https://doi.org/10.3389/fpsyg.2019.01933>
- Dagnall, N., Drinkwater, K. G., Denovan, A., & Walsh, R. S. (2021). The potential benefits of non-skills training (mental toughness) for elite athletes: Coping with the negative psychological effects of the COVID-19 pandemic. *Frontiers in Sports and Active Living*, 3, Article 581431. <https://doi.org/10.3389/fspor.2021.581431>
- Denovan, A., Dagnall, N., & Drinkwater, K. (2022). Examining what Mental Toughness, Ego Resiliency, Self-efficacy, and Grit measure: An exploratory structural equation modelling bifactor approach. *Current Psychology*, 1–16. <https://doi.org/10.1007/s12144-022-03314-5>
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302. <https://doi.org/10.1037/0033-2909.125.2.276>
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101. <https://doi.org/10.1037/0022-3514.92.6.1087>
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short grit scale (GRIT-S). *Journal of Personality Assessment*, 91(2), 166–174. <https://doi.org/10.1080/00223890802634290>
- Etherton, K., Steele-Johnson, D., Salvano, K., & Kovacs, N. (2022). Resilience effects on student performance and well-being: The role of self-efficacy, self-set goals, and anxiety. *The Journal of General Psychology*, 149(3), 279–298. <https://doi.org/10.1080/00221309.2020.1835800>
- Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts, and theory. *European Psychologist*, 18(1), 12–23. <https://doi.org/10.1027/1016-9040/a000124>
- Fung, S. F. (2020). Validity of the brief resilience scale and brief resilient coping scale in a Chinese sample. *International Journal of Environmental Research and Public Health*, 17(4), 1265. <https://doi.org/10.3390/ijerph17041265>
- Gonzalez, O., Canning, J. R., Smyth, H., & MacKinnon, D. P. (2019). A psychometric evaluation of the Short grit scale. *European Journal of Psychological Assessment*, 36(4), 646–657. <https://doi.org/10.1027/1015-5759/a000535>
- Gucciardi, D. F. (2017). Mental toughness: Progress and prospects. *Current Opinion in Psychology*, 16, 17–23. <https://doi.org/10.1016/j.copsyc.2017.03.010>
- Gucciardi, D. F., Hanton, S., Gordon, S., Mallett, C. J., & Temby, P. (2015). The concept of mental toughness: Tests of dimensionality, nomological network, and traitness. *Journal of Personality*, 83(1), 26–44. <https://doi.org/10.1111/jopy.12079>
- Haghighi, M., & Gerber, M. (2019). Does mental toughness buffer the relationship between perceived stress, depression, burnout, anxiety, and sleep? *International Journal of Stress Management*, 26(3), 297–305. <https://doi.org/10.1037/str0000106>
- Hatamnejad, M. R., Hosseinpour, M., Shitati, S., Seifae, A., Sayari, M., Seyyedi, F., Lankarani, K. B., & Ghahramani, S. (2023). Emotional intelligence and happiness in

- clinical medical students: A cross-sectional multicenter study. *Health Science Reports*, 6(12), Article e1745. <https://doi.org/10.1002/hsr2.1745>
- Hills, P., & Argyle, M. (2002). The Oxford happiness questionnaire: A compact scale for the measurement of psychological well-being. *Personality and Individual Differences*, 33(7), 1071–1082. [https://doi.org/10.1016/S0191-8869\(01\)00213-6](https://doi.org/10.1016/S0191-8869(01)00213-6)
- Jin, B., & Kim, J. (2017). Grit, basic needs satisfaction, and subjective well-being. *Journal of Individual Differences*, 38(1), 29–35. <https://doi.org/10.1027/1614-0001/a000219>
- Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21(2), 243–264. <https://doi.org/10.1123/tsp.21.2.243>
- Joseph, A. I. (2009). *The role of grit in predicting performance in collegiate athletes* (Publication No. 3379578) [Doctoral dissertation]. Capella University. ProQuest Dissertations and Theses Global.
- Juan, M. V. T., & Lopez, A. V. (2015). Mental toughness of scholar athletes. *Journal of Arts, Science & Commerce*, 6(3), 22–31.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, 83(3), 693–710. <https://doi.org/10.1037/0022-3514.83.3.693>
- Karademas, E. C., & Kalantzi-Azizi, A. (2004). The stress process, self-efficacy expectations, and psychological health. *Personality and Individual Differences*, 37(5), 1033–1043. <https://doi.org/10.1016/j.paid.2003.11.012>
- Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardness. *Journal of Personality and Social Psychology*, 37(1), 1–11. <https://doi.org/10.1037/0022-3514.37.1.1>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Lee, M., & Kim, B. (2023). Effect of the employees' mental toughness on organizational commitment and job satisfaction: Mediating psychological well-being. *Administrative Sciences*, 13(5), 133. <https://doi.org/10.3390/admsci13050133>
- Linton, M. J., Dieppe, P., & Medina-Lara, A. (2016). Review of 99 self-report measures for assessing well-being in adults: Exploring dimensions of well-being and developments over time. *BMJ Open*, 6(7), Article e010641. <https://doi.org/10.1136/bmjopen-2015-010641>
- Lomas, T., & VanderWeele, T. J. (2023). Toward an expanded taxonomy of happiness: A conceptual analysis of 16 distinct forms of mental wellbeing. *Journal of Humanistic Psychology*. <https://doi.org/10.1177/00221678231155512>
- Luszczynska, A., Gutiérrez-Doña, B., & Schwarzer, R. (2005). General self-efficacy in various domains of human functioning: Evidence from five countries. *International Journal of Psychology*, 40(2), 80–89. <https://doi.org/10.1080/002075904440000041>
- Mascia, M. L., Agus, M., Cabras, C., Bellini, D., Renati, R., & Penna, M. P. (2023). Present and future undergraduate students' well-being: Role of time perspective, self-efficacy, self-regulation and intention to drop-out. *Education Sciences*, 13(2), 202. <https://doi.org/10.3390/educsci13020202>
- McGeown, S. P., Putwain, D., St Clair-Thompson, H., & Clough, P. (2017). Understanding and supporting adolescents' mental toughness in an educational context. *Psychology in the Schools*, 54(2), 196–209. <https://doi.org/10.1002/pits.21986>
- McGeown, S. P., St Clair-Thompson, H., & Clough, P. (2016). The study of non-cognitive attributes in education: Proposing the mental toughness framework. *Educational Review*, 68(1), 96–113. <https://doi.org/10.1080/00131911.2015.1008408>
- McKay, S., Skues, J. L., & Williams, B. J. (2021). Does the brief resilience scale actually measure resilience and succumbing? Comparing artefactual and substantive models. *Advances in Mental Health*, 19(2), 192–201. <https://doi.org/10.1080/18387357.2019.1688667>
- Nicholls, A. R., Perry, J., Jones, L., Sanctuary, C., Carson, F., & Clough, P. J. (2015). The mediating role of mental toughness in sport. *The Journal of Sports Medicine and Physical Fitness*, 55(7–8), 824–834.
- Perry, J. L., Clough, P. J., Crust, L., Earle, K., & Nicholls, A. R. (2013). Factorial validity of the mental toughness questionnaire-48. *Personality and Individual Differences*, 54, 587–592. <https://doi.org/10.1016/j.paid.2012.11.020>
- Perry, J. L., Strycharczyk, D., Dagnall, N., Denovan, A., Papageorgiou, K. A., & Clough, P. J. (2021). Dimensionality of the mental toughness questionnaire (MTQ48). *Frontiers in Psychology*, 12, Article 654836. <https://doi.org/10.3389/fpsyg.2021.654836>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879.
- Postigo, Á., García-Fernández, J., Cuesta, M., González-Nuevo, C., Menéndez-Aller, Á., & García-Cueto, E. (2023). The bidimensionality of grit: Conceptual dissociation or methodological artifact? *European Journal of Psychological Assessment*. <https://doi.org/10.1027/1015-5759/a000766>. Advance online publication.
- Postigo Gutiérrez, Á., Cuesta Izquierdo, M., Fernández Alonzo, R., García Cueto, E., & Muñiz, J. (2021). Temporal stability of grit and school performance in adolescents: A longitudinal perspective. *Psicología Educativa*, 27(1), 77–84. <https://doi.org/10.5093/PSUED2021A4>
- Ramshaw, G., & St Clair-Thompson, H. (2021). The relationship between mental toughness and subjective mental illness recovery. *New Ideas in Psychology*, 63, Article 100881. <https://doi.org/10.1016/j.newideapsych.2021.100881>
- Robbins, M., Francis, L. J., & Edwards, B. (2010). Happiness as stable extraversion: Internal consistency reliability and construct validity of the Oxford Happiness Questionnaire among undergraduate students. *Current Psychology*, 29, 89–94. <https://doi.org/10.1007/s12144-010-9076-8>
- Ruparel, N., Choubisa, R., & Seth, H. (2022). Imagining positive workplaces: Extrapolating relationships between job crafting, mental toughness and authentic happiness in millennial employees. *Management Research Review*, 45(5), 599–618. <https://doi.org/10.1108/MRR-01-2021-0083>
- Scholz, U., Gutiérrez Doza, B., Sud, S., & Schwarzer, R. (2002). Is general self-efficacy a universal construct? Psychometric findings from 25 countries. *European Journal of Psychological Assessment*, 18, 242–251. <https://doi.org/10.1027/1015-5759.18.3.242>
- Schwarzer, R., & Jerusalem, M. (1995). Generalized self-efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio. Causal and control beliefs* (pp. 35–37). Nfer-Nelson.
- Shin, H., & Park, C. (2022). Social support and psychological well-being in younger and older adults: The mediating effects of basic psychological need satisfaction. *Frontiers in Psychology*, 13, Article 1051968. <https://doi.org/10.3389/fpsyg.2022.1051968>
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*, 15, 194–200. <https://doi.org/10.1080/10705500802229272>
- St Clair-Thompson, H., Bugler, M., Robinson, J., Clough, P., McGeown, S. P., & Perry, J. (2015). Mental toughness in education: Exploring relationships with attainment, attendance, behaviour and peer relationships. *Educational Psychology*, 35(7), 886–907. <https://doi.org/10.1080/01443410.2014.895294>
- St Clair-Thompson, H., Giles, R., McGeown, S. P., Putwain, D., Clough, P., & Perry, J. (2017). Mental toughness and transitions to high school and to undergraduate study. *Educational Psychology*, 37(7), 792–809. <https://doi.org/10.1080/01443410.2016.1184746>
- St Clair-Thompson, H., & McGeown, S. (2019). *Mental toughness in education*. Oxford Research Encyclopedia of Education. <https://doi.org/10.1093/acrefore/9780190264093.013.888>
- Stamp, E., Crust, L., Swann, C., Perry, J., Clough, P., & Marchant, D. (2015). Relationships between mental toughness and psychological wellbeing in undergraduate students. *Personality and Individual Differences*, 75, 170–174. <https://doi.org/10.1016/j.paid.2014.11.038>
- Strycharczyk, D., & Clough, P. (Eds.). (2014). *Developing mental toughness in young people: Approaches to achievement, well-being, employability, and positive behaviour*. London: Karnac Books.
- Swane, D., Evans, N., & Carter, M. A. (2019). Wicked wellbeing: Examining the disconnect between the rhetoric and reality of wellbeing interventions in schools. *Australian Journal of Education*, 63(2), 209–231. <https://doi.org/10.1177/0004944119843144>
- Tomyan, A. J., & Weinberg, M. K. (2018). Resilience and subjective wellbeing: A psychometric evaluation in young Australian adults. *Australian Psychologist*, 53(1), 68–76. <https://doi.org/10.1111/ap.12251>
- Wang, F. L., Eisenberg, N., & Spinrad, T. L. (2019). Bifactor model of effortful control and impulsivity and their prospective prediction of ego resiliency. *Journal of Personality*, 87(5), 919–933. <https://doi.org/10.1111/jopy.12444>
- Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, 21(2), 152–169. <https://doi.org/10.1017/S0959259810000420>
- Wu, C. H. (2009). Factor analysis of the general self-efficacy scale and its relationship with individualism/collectivism among twenty-five countries: Application of multilevel confirmatory factor analysis. *Personality and Individual Differences*, 46(7), 699–703. <https://doi.org/10.1016/j.paid.2009.01.025>
- Ye, Y.-C., Wu, C.-H., Huang, T.-Y., & Yang, C.-T. (2022). The difference between the Connor-Davidson resilience scale and the brief resilience scale when assessing resilience: Confirmatory factor analysis and predictive effects. *Global Mental Health*, 9, 339–346. <https://doi.org/10.1017/gmh.2022.38>