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Do Individual Differences in Emotion Regulation Mediate the Relationship Between Mental Toughness and Symptoms of Depression?

Julian Mutz

King's College London

Peter Clough

Manchester Metropolitan University

Kostas A. Papageorgiou

Queen's University Belfast

Author Note

Julian Mutz, Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience, King's College London, United Kingdom; Peter Clough, Department of Psychology, Manchester Metropolitan University; Kostas A. Papageorgiou, School of Psychology, Queen's University Belfast.

Correspondence concerning this article should be addressed to Julian Mutz; Email: julian.mutz@gmail.com; Phone: +44(0)7519262936

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Abstract

Mental Toughness (MT) provides crucial psychological capacities for achievement in sports, education, and work settings. Previous research examined the role of MT in the domain of mental health and showed that MT is negatively associated with and predictive of fewer depressive symptoms in non-clinical populations. The present study aimed at 1) investigating to what extent mentally tough individuals use two emotion regulation strategies: cognitive reappraisal and expressive suppression; 2) exploring whether individual differences in emotion regulation strategy use mediate the relationship between MT and depressive symptoms. Three hundred sixty-four participants (M = 24.31 years, SD = 9.16) provided self-reports of their levels of MT, depressive symptoms, and their habitual use of cognitive reappraisal and expressive suppression. The results showed a statistically significant correlation between MT and two commonly used measures of depressive symptoms. A small statistically significant positive correlation between MT and the habitual use of cognitive reappraisal was also observed. The correlation between MT and the habitual use of expressive suppression was statistically significant, but the size of the effect was small. A statistical mediation model indicated that individual differences in the habitual use of expressive suppression mediate the relationship between MT and depressive symptoms. No such effect was found for the habitual use of cognitive reappraisal. Implications of these findings and possible avenues for future research are discussed.

Keywords: mental toughness, depression, emotion regulation, cognitive reappraisal, expressive suppression

Do Individual Differences in Emotion Regulation Mediate the Relationship Between Mental Toughness and Symptoms of Depression?

Previous research showed that individual differences in Mental Toughness (MT) negatively correlate with depressive symptoms (e.g., Brand et al., 2014b). Furthermore, the habitual use of certain emotion regulation strategies is associated with individual variation in depressive symptoms (e.g., Haga, Kraft, & Corby, 2009). The present study investigates whether individual differences in the habitual use of two emotion regulation strategies — cognitive reappraisal and expressive suppression — mediate the relationship between MT and depressive symptoms.

Research on resilience has shown that several factors may have a protective function on individuals experiencing adversity (Luthar & Zelazo, 2003). These range from having caring and supportive relationships (e.g., Crosnoe & Elder, 2004) to personal characteristics such as hardiness (Kobasa, 1979). A construct that has recently been explored in relation to mental health outcomes — such as depressive symptoms — is MT.

Mental Toughness

MT refers to a broad array of positive characteristics, such as having a high sense of self-belief, which aid coping with difficult situations (Hardy, Imose, & Day, 2014). A possible advantage of MT over other resilience traits is that it does not only reflect an effective coping mechanism for stressors; but it enables individuals to proactively seek out opportunities for personal growth (e.g., St Clair-Thompson et al., 2015). Another possible advantage of MT is that it can be developed partially through positive youth experiences (Gould, Griffes, & Carson, 2011). These may include a particular motivational climate (e.g., enjoyment, challenge, and mastery experiences), external assets such as social support networks, and certain developmental experiences (e.g., critical incidents, competitive rivalry, vicarious experiences, and demonstration of ability; Connaughton, Hanton, & Jones, 2010;

Connaughton, Wadey, Hanton, & Jones, 2008). For example, a study by (Jones & Parker, 2013) showed that positive youth experiences were associated with higher levels of MT in young athletes. Specifically, initiative experiences were associated with high levels of MT and may therefore be worth promoting.

Mentally tough individuals approach, react to, and appraise pressure, challenge, and adversity as opportunities for self-development. Consequentially, they persist in reaching their goals (Gucciardi, Gordon, & Dimmock, 2009a). Although MT was initially predominantly applied in the sport arena (Crust & Keegan, 2010), it is now being researched in other performance environments such as the workplace (Godlewski & Kline, 2012; Marchant et al., 2009) and education (McGeown, St Clair-Thompson, & Clough, 2016; St Clair-Thompson et al., 2015).

The most widely used conceptual basis of MT is the 4C's model of MT (Clough, Earle, & Sewell, 2002). According to Clough et al. (2002), mentally tough individuals (1) perceive themselves as being in **control** of life situations (i.e., feel and act as if they were influential), (2) show **commitment** to their actions (i.e., involve themselves rather than experience alienation from an encounter), (3) view **challenge** as an opportunity rather than a threat (i.e., holding the view that life is changeable and that this can lead to self-development), and (4) have high levels of **confidence** (i.e., a high sense of self-belief and faith in having the ability to achieve success).

Previous studies, which employed the 4C's model of MT, showed that individual variation in MT is associated with a number of positive outcomes. These include higher academic attainment and attendance, less counterproductive classroom behavior, greater social inclusion (St Clair-Thompson et al., 2015), better sleep quality (Brand et al., 2014a; Brand et al., 2014b), higher levels of psychological wellbeing (e.g., Stamp et al., 2015), more engagement with physical activity (Gerber et al., 2012), and better memory performance

(Delaney, Goldman, King, & Nelson-Gray, 2015; Dewhurst, Anderson, Cotter, Crust, & Clough, 2012). Clough and Strycharczyk (2015) coined the term 'the mental toughness advantage' to describe this cluster of positive characteristics.

A review by McGeown et al. (2016) discussed MT in terms of the extent to which it aligns with other non-cognitive attributes, including resilience (e.g., Putwain, Nicholson, Connors, & Woods, 2013), buoyancy (e.g., A. J. Martin & Marsh, 2008), self-efficacy (e.g., Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011; Stankov & Lee, 2014), confidence (e.g., Stankov & Lee, 2014), and motivation (e.g., Lepper, Corpus, & Iyengar, 2005). They proposed that the main advantage of MT appears to be its multidimensionality, which offers the opportunity to consolidate a number of other concepts, such as resilience, and to investigate them beneath a single umbrella. Moreover, its use of multiple subcomponents may allow for the development of more targeted and flexible interventions compared to a unidimensional construct.

While the 4C's model of MT shares some conceptual foundation with hardiness, it differs in its additional emphasis on confidence in one's abilities and interpersonal relations. Hardiness was described by Kobasa (1979) as a personality disposition that provides resistance to stress. Mentally tough individuals are not only able to remain committed when confronting with stress, they are also confident about successfully completing their tasks and are assertive in social situations. MT is also distinct from grit, described by Duckworth, Peterson, Matthews, and Kelly (2007) as perseverance and passion for long-term goals. While individuals who score high on grit may work strenuously toward goals despite self-doubt, individuals who score high on MT believe they are truly worthwhile people and maintain the self-confidence to achieve their goals. Another distinction is that MT not only places an emphasis on action, but also on affect, namely, emotional control. Mentally tough

individuals are able to control their emotions effectively in the face of setbacks and challenges.

Mental Toughness and Emotion Regulation

When individuals experience emotions, these typically promote behavioral response tendencies that are relevant to the emotion-eliciting event (Gross, 2015). Such response tendencies can either be helpful (e.g., when they enhance social interaction) or harmful (e.g., when they bias cognition and behavior in a maladaptive way; Gross & Jazaieri, 2014). When emotions are unhelpful or even harmful, individuals typically draw on emotion regulation. There are numerous emotion regulation strategies that exert variable influences on cognition, emotion, and behavior (Gross, 2001). Cognitive reappraisal involves reinterpreting the subjective meaning of emotion-eliciting stimuli to alter the emotional response, and it is regarded as an effective emotion regulation strategy in many contexts (Ochsner & Gross, 2005). On the other hand, expressive suppression is characterized by ongoing efforts to inhibit emotion-expressive behavior and is frequently regarded as a less adaptive emotion regulation strategy (Moore, Zoellner, & Mollenholt, 2008). However, it is worth noting that the consequences of different emotion regulation strategies may be context-dependent: for instance, cognitive reappraisal might be less adaptive when applied to stressors that can be controlled (Troy, Shallcross, & Mauss, 2013).

There is currently no research that explored the type of emotion regulation strategies that mentally tough individuals use. It seems reasonable to suggest that MT would be closely linked to emotional regulation, and there are three main reasons to expect this: firstly, the 4C's model of MT has emotional control as one of its core dimensions. The validity of this inclusion has been supported by a number of authors (e.g., Crust & Swann, 2011; Perry, Clough, Crust, Earle, & Nicholls, 2013; St Clair-Thompson et al., 2015), although there has been some criticism of the validity of the model (e.g., Gucciardi, Hanton, and Mallett (2012)

found no support for the psychometric properties of the Mental Toughness Questionnaire 48, a self-report questionnaire widely used in MT research and based on the 4C's model). The emotional control dimension of the 4C's model includes items with aspects of both cognitive reappraisal and expressive suppression. Secondly, Nicholls et al. (2015) have shown that MT is closely link to self-regulation in a wider context, allowing tougher individuals to prosper in adverse circumstances. Finally, Nicholls, Polman, Levy, and Backhouse (2008) showed that MT was associated with more problem-focused or approach coping strategies (i.e., reducing or eliminating the stressor) such as mental imagery, effort expenditure, thought control, and logical analysis. At the same time, mentally tough individuals used avoidance coping strategies such as distancing, mental distraction or resignation less frequently. Kaiseler, Polman, and Nicholls (2009) also reported that, in the context of a self-selected stressor, MT was associated with more problem-focused coping strategies. Hence it could be argued that mentally tough individuals more readily adapt problem-focused strategies because of their ability to regulate their emotions.

Pertinently, Aldwin (2007) has suggested that the use of cognitive reappraisal may facilitate problem-focused coping. For example, a student who feels distressed because she received a poor grade on a very important exam might positively reappraise her situation as an additional opportunity to revisit the course content before the re-sit. As a result, she may feel less distressed about her current situation (due to cognitive reappraisal) and studies the course content in greater depth, eventually passing the final exam (due to problem-solving). At first glance, this might seem in contrast with Troy et al. (2013) who suggested that cognitive reappraisal may be less adaptive when applied to controllable situations (e.g., individuals who decrease their negative emotions through cognitive reappraisal may lose motivation to take action in situations in which action is needed, eventually leading to worse outcomes). However, we suggest that cognitive reappraisal might in some instances still be

adaptive when applied to a controllable stressor: if it is used to alter the emotional impact of a stressor *and* promotes problem-solving. Individuals who score high on MT may use cognitive reappraisal more often than other emotion regulation strategies (e.g., expressive suppression) to enhance problem-focused coping strategies.

The habitual use of cognitive reappraisal has been shown to benefit affective functioning, social interactions, and well-being (Gross & John, 2003), whereas the habitual use of expressive suppression is associated with decreased positive emotions, self-esteem, and psychological adjustment (Nezlek & Kuppens, 2008). In fact, previous studies demonstrated that the habitual use of cognitive reappraisal is negatively associated with depressive symptoms, whereas the habitual use of expressive suppression shows a positive relationship with depressive symptoms (Haga et al., 2009).

Mental Toughness and Depression

A small number of studies have explored the degree to which MT is associated with individual differences in symptoms of psychopathology, for instance depression. It has been shown that MT is predictive of fewer depressive symptoms 10 months later in a sample of vocational students (Gerber, Brand, et al., 2013) and that MT is negatively associated with depressive symptoms in high school students, undergraduates (Gerber, Kalak, et al., 2013), and adolescents (Brand et al., 2014b). A possible explanation for the reported association between MT and depressive symptoms is that individuals scoring high on MT are less affected by emotion-provoking stimuli. However, MT and affect intensity/emotional reactivity (i.e., the tendency to react strongly to emotion-eliciting events) were unrelated in a sample of sport performers (Crust, 2009). As such, the idea that mentally tough individuals remain unaffected by competition or adversity due to experience of less intense emotions was not supported. Although this finding requires replication before one can make any firm conclusions, a conceivable implication of this study is that emotion regulation plays an

important role in understanding the relationship between MT and depressive symptoms. Perhaps, mentally tough individuals cope with their emotions differently and resort on more adaptive emotion regulation strategies, such as a more frequent use of cognitive reappraisal. To date, no studies that have explored the role of emotion regulation strategies in explaining the negative correlation between MT and depressive symptoms. This seems to be an important area of investigation because understanding potential mediator variables could be useful in developing more targeted interventions to counteract depressive symptoms.

The Present Study

Most previous studies on MT and depressive symptoms involved participants in highly stressful environments, potentially at high risk for maladjustment (Wynaden, Wichmann, & Murray, 2013). In order to test whether these findings can be generalized to a broader range of people, the present study aims to extend previous research by investigating how MT relates to depressive symptoms in a sample taken from the general population. This is an important issue to address in order to determine whether or not MT is a useful concept in the domain of mental health beyond groups of individuals in stressful environments. In line with previous research, we hypothesized that: 1) MT is negatively correlated with depressive symptoms; 2) individual differences in cognitive reappraisal are negatively correlated with depressive symptoms; 3) individual differences in expressive suppression are positively correlated with depressive symptoms. Since mentally tough individuals showed fewer depressive symptoms in previous studies, we hypothesized that they differ in terms of the strategies that they use to regulate their emotions. More specifically, we hypothesized that: 4) MT is positively correlated with the habitual use of cognitive reappraisal; 5) MT is negatively correlated with the habitual use of expressive suppression. Lastly, we tested a statistical mediation model, which explores whether the relationship between MT and

depressive symptoms is mediated by individual differences in the habitual use of cognitive reappraisal and expressive suppression.

Method

Participants

Participants (N = 364) were recruited online through advertisements on social networks (e.g., Facebook) as well as through word of mouth. Our sample comprised individuals of 43 different nationalities, with Singaporean and British participants constituting the two largest groups (24.5% and 23.6%, respectively). A majority of 50.3% of the participants were native English speakers. The mean age was 24.31 years (SD = 9.16, range 18-79) and 56.9% of the participants were female. Informed consent was obtained from all participants after they had received detailed information about the purpose of the study. London Metropolitan University's ethics committee granted approval for this project.

Measures

Mental toughness. The Mental Toughness Questionnaire 48 (MTQ48) is the most frequently used measure of MT as conceptualized by Clough et al. (2002). It has an average completion time of 10 minutes, and responses to its 48 items are given on a 5-point Likert scale anchored at 1 = *strongly disagree* and 5 = *strongly agree*. Twenty-two items are reverse coded; scores of the four main scales (challenge, commitment, confidence, and control) as well as four additional subscales (confidence in own abilities, interpersonal confidence, life control, and emotional control) can be obtained by calculating the mean of the scores that were reported for the items of each scale. An overall MT score can be obtained by calculating an overall mean score. Example items include "I can usually adapt myself to challenges that come my way" (challenge) and "I don't usually give up under pressure" (commitment). The MTQ48 has generally shown good reliability, and the MTQ48

has received support for its factor structure through confirmatory factor analyses and exploratory structural equation modelling (Horsburgh, Schermer, Veselka, & Vernon, 2009).

Emotion regulation strategy use. The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) was used to assess individual differences in the habitual use of cognitive reappraisal and expressive suppression as emotion regulation strategies. The questionnaire has an average completion time of less than 2 minutes, and responses to its 10 items are given on a 7-point Likert scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Scores of the two subscales of the ERQ can be calculated by summing up the scores that were reported for individual items of the scales. Higher scores indicate more frequent use of the respective emotion regulation strategy. Example items include "I control my emotions by changing the way I think about the situation I'm in" (cognitive reappraisal) and "I control my emotions by not expressing them" (expression suppression). Confirmatory factor analyses have supported the factor structure of the instrument (Melka, Lancaster, Bryant, & Rodriguez, 2011).

Symptoms of depression. The Clinically Useful Depression Outcome Scale (CUDOS; Zimmerman, Chelminski, McGlinchey, & Posternak, 2008) was used to assess the DSM-IV symptoms of major depressive disorder. It has an average completion time of less than 3 minutes, and responses to its 16 items are given on a 5-point Likert scale indicating how well the particular item describes the respondent during the past week (0 = *not at all true*, 1 = *rarely true*, 2 = *sometimes true*, 3 = *often true*, and 4 = *almost always true*). An overall score can be calculated by summing up the scores that were reported for individual items of the questionnaire; higher scores indicate more depressive symptoms. Example items include "I felt sad or depressed" and "I had more difficulties making decisions than usual". The CUDOS was shown to demonstrate high internal consistency, test-retest reliability as well as convergent and discriminant validity (Zimmerman et al., 2014).

The Patient Health Questionnaire 9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001) was used as an alternative instrument to measure the DSM-IV symptoms of major depressive disorder, since – to the best of our knowledge – no studies have assessed the construct and criterion validity of the CUDOS in the general population. It has an average completion time of less than 2 minutes and assesses how often the respondent has experienced symptoms of depression over the past two weeks. Responses to its nine items are given by assigning values of 0 to 3 points (0 = *not at all*, 1 = *several days*, 2 = *more than half of the days*, and 3 = *nearly every day*). An overall score can be calculated by summing up the scores that were reported for individual items of the questionnaire; higher scores indicate more symptoms of depression. Example items include "Feeling down, depressed, or hopeless" and "Feeling tired or having little energy". The PHQ-9 not only recognizes clinical depression but also subthreshold levels of depressive symptoms in the general population (A. Martin, Rief, Klaiberg, & Braehler, 2006). High internal consistency, test-retest reliability as well as construct and criterion validity were demonstrated in a study by Bian, Li, Duan, and Wu (2011).

Procedure

All questionnaires were combined to form a single document and made available online via SurveyMonkey (www.surveymonkey.com). Each participant received a message containing a link to the online questionnaire and password access as well as a unique participant code. After they agreed to take part in our study, participants were asked for demographic variables (age, gender, level of education, language, nationality and religion) and contact details. Questionnaire completion was self-paced, and participants could only proceed to the subsequent page once they had answered all items. Upon completion of the study, participants were given an online written debrief.

Statistical Analysis

Demographics and questionnaire data were examined using SPSS (Version 20.0). Since the scores of the PHQ-9 were positively skewed and peaked relative to the normal distribution, we applied a square root transformation of the data before undertaking further statistical analyses. Separate analyses with the untransformed PHQ-9 data yielded similar results (not reported here). The scores of the remaining variables were approximately normally distributed (see Table 1 for details). No observations were eliminated from the analyses reported hereafter. The internal consistency of the questionnaires was estimated by McDonald's (1999) *Omega* statistic using the MBESS package (Kelley & Lai, 2012) for RStudio (Version 0.98.932). Omega is a more sensible index of internal consistency than Cronbach's alpha due to less risk for over-/underestimation of reliability (Dunn, Baguley, & Brunsden, 2014). Since previous research indicated that MT increases with age (Marchant et al., 2009), we included age as a covariate in all analyses. Separate analyses without age as a covariate were performed and yielded similar results (not reported here). We also tested whether language, nationality, gender or religion had an effect on MT. However, none of these variables significantly influenced MT and were thus not controlled for in further analyses.

Mediation Analysis. To test the hypothesis that individual differences in the habitual use of cognitive reappraisal and expressive suppression mediate the relationship between MT and symptoms of depression, we performed hierarchical regression analyses using the PROCESS macro for SPSS (Version 2.13; (Hayes, 2012). PROCESS utilizes an ordinary least squares path analytical framework to estimate direct, indirect, and total effects of mediation models. The direct effect provides an estimate of the effect of the independent variable (IV) on the dependent variable (DV). The indirect effect of the IV on the DV via a potential mediator (M) can be estimated from bias-corrected bootstrap 95% confidence intervals. Confidence intervals that do not contain zero give an indication of a significant

mediation effect (Hayes, 2013). The total effect provides an estimate of the combined direct and indirect effects. In the present study we used 5000 bootstrap resamples as suggested by Preacher and Hayes (2008). The bootstrapping approach to estimating indirect effects is advantageous over traditional procedures, as it does not rely on assumptions about the distribution of the indirect effect.

Results

Descriptive statistics of the MTQ48, CUDOS, PHQ-9 as well as the cognitive reappraisal and expressive suppression scales of the ERQ are presented in Table 1.

[Insert Table 1]

Table 2 presents partial correlations between the main study variables and reliability estimates. As expected, the MTQ48 total index was negatively associated with both measures of depressive symptoms (CUDOS $r = -.53$, $p < .001$, 95% CI [-.60, -.44] and PHQ-9 $r = -.49$, $p < .001$, 95% CI [-.56, -.40]). Cognitive reappraisal was negatively associated with both the CUDOS and the PHQ-9 ($r = -.18$, $p < .001$, 95% CI [-.29, -.06] and $r = -.19$, $p < .001$, 95% CI [-.30, -.08], respectively), whereas expressive suppression showed a positive correlation with both measures of depressive symptoms (CUDOS $r = .18$, $p < .001$, 95% CI [.07, .29] and PHQ-9 $r = .19$, $p < .001$, 95% CI [.08, .30]). In line with our hypotheses, we also found a positive correlation between MT and the use of cognitive reappraisal ($r = .26$, $p < .001$, 95% CI [.15, .36]) and a negative correlation between MT and the use of expressive suppression ($r = -.19$, $p < .001$, 95% CI [-.29, -.09]).

[Insert Table 2]

Mediation Analysis

Figure 1 illustrates our proposed mediation model. Table 3 and Table 4 provide detailed statistics for our mediation analyses. In line with our hypotheses, the indirect effects of MT on depressive symptoms, through individual differences in expressive suppression, were statistically significant (PHQ-9: indirect effect = -0.05, *SE* = 0.03, 95% CI [-0.131, -0.007]; CUDOS: indirect effect = -0.44, *SE* = 0.27, 95% CI [-1.108, -0.020]). However, we failed to obtain evidence that individual differences in cognitive reappraisal mediate the relationship between MT and depressive symptoms (PHQ-9: indirect effect = -0.05, *SE* = 0.04, 95% CI [-0.137, 0.019]; CUDOS: indirect effect = -0.29, *SE* = 0.37, 95% CI [-1.123, 0.355]). To test whether an alternative mediation model with emotion regulation strategy use as the IV, MT as the mediator, and depressive symptoms as the DV might be more appropriate in accounting for the relationship between MT, depressive symptoms, and emotion regulation strategy use, we ran post-hoc exploratory analyses. The total effect sizes for such alternative model were all smaller than .04, hence this seems less supported by the data compared with our initial proposal (data not reported here).

[Insert Figure 1]

[Insert Table 3]

[Insert Table 4]

Discussion

The present study explored the degree to which individual variation in MT is associated with individual differences in depressive symptoms. Previous research showed

that the habitual use of cognitive reappraisal was negatively associated with depressive symptoms, whereas the opposite applied to the habitual use of expressive suppression (Haga et al., 2009). We examined the relationship between these variables in our sample and investigated how individual variation in MT relates to the habitual use of cognitive reappraisal and expressive suppression. Lastly, we tested a statistical mediation model that explored whether individual differences in the habitual use of cognitive reappraisal and expressive suppression mediate the relationship between MT and depressive symptoms.

In line with previous studies (Brand et al., 2014b; Gerber, Brand, et al., 2013; Gerber, Kalak, et al., 2013), we showed that there is a significant and moderately strong inverse relationship between MT and two measures of depressive symptoms. We extend prior research by demonstrating that this finding does not only apply to selective populations, such as adolescents or university students, but also to a more inclusive sample taken from the general population. As such, MT seems to be a useful concept in the domain of mental health, beyond groups of individuals in potentially highly stressful environments. Studying MT in relation to individual differences in depressive symptoms is important, given that there is a close relationship between psychological resources and psychopathological symptoms (Lee & Hankin, 2009). Furthermore, MT has been linked to educational achievement (St Clair-Thompson et al., 2015), and psychopathological symptoms have been shown to associate with decreased performance in educational (Andrews & Wilding, 2004) and occupational (Wang et al., 2014) settings. Hence, exploring whether MT is linked to depressive symptoms can have significant implications for understanding educational and work performance. Finally, given that MT is at least to some extent amenable to development through targeted interventions (Crust & Clough, 2011; Gucciardi, Gordon, & Dimmock, 2009b; Sheard & Golby, 2006) MT training might appeal to those individuals who are skeptical about the meaning and usefulness of more conventional health interventions

(Gerber, Kalak, et al., 2013). As such, MT constitutes an important concept in the domain of mental health, and fostering MT might be a valuable intervention to counteract depressive symptoms.

We also showed that the habitual use of cognitive reappraisal is negatively associated with depressive symptoms, while the habitual use of expressive suppression showed the reverse pattern. This finding is in line with much of the emotion regulation literature (Gross, Richards, & John, 2006; John & Gross, 2004) and provides some additional support for the common view that cognitive reappraisal is — in most contexts — a more adaptive emotion regulation strategy than expressive suppression (Haga et al., 2009). It needs to be noted that although these associations are statistically highly significant, the effect sizes are relatively small. This is perhaps not surprising, given the plethora of factors precipitating and perpetuating depressive symptoms. The size of this effect is similar to that obtained through a meta-analysis by Aldao, Nolen-Hoeksema, and Schweizer (2010), which looked at the association between cognitive reappraisal and depressive symptoms based on the data of seven studies.

The present study adds to the current literature on MT in that it is the first study that investigated how mentally tough individuals regulate their emotions, despite the centrality of emotional control in most models of MT. We showed that individuals scoring high on MT more frequently use cognitive reappraisal to regulate their emotions, although the size of this effect is comparatively small. They resort to the use of expressive suppression less frequently; but given the marginal size of this effect, this finding is less conclusive. We could only partially support our hypothesis that the relationship between MT and symptoms of depression is mediated by individual differences in emotion regulation strategy use. The analyses showed that individual differences in the habitual use of expressive suppression appear to mediate the relationship between MT and depressive symptoms. However, we did

not obtain supporting evidence for our hypothesis that individual differences in the habitual use of cognitive reappraisal mediate the relationship between MT and symptoms of depression. Since cognitive reappraisal tends to be less adaptive when applied to controllable situations (Troy et al., 2013), which individuals scoring high on MT, conceptually, perceive more often, the boundary conditions of reappraisal effectiveness might explain the lack of a significant mediation effect. However, whether individuals scoring high on MT actually experience controllable situations more often has not been directly tested and would open up possible avenues for future research.

There are several alternative explanations for the association between MT and depressive symptoms. It might be that the dysfunctional thoughts and maladaptive tendencies that are characteristic of depressive symptoms are incompatible with current conceptualizations of MT. Whereas mentally tough individuals have a strong tendency to view their personal environment as controllable, perceive themselves as capable and influential, and stay committed under adverse circumstances, individuals experiencing depressive symptoms typically manifest the reverse pattern. Another finding that could partially explain why mentally tough individuals show fewer depressive symptoms is that individuals with high levels of MT more frequently rely on problem-oriented coping (i.e., strategies used to minimize distress by reducing or eliminating the stressor) rather than emotion-focused (i.e., regulate emotional arousal and distress) or avoidance coping (i.e., behavioral or psychological efforts to disengage from a stressful situation; (Nicholls, Polman, Levy, & Backhouse, 2009). Individuals suffering from depression frequently use avoidance coping strategies (Cribb, Moulds, & Carter, 2006), which tend to be less effective in reducing the negative consequences associated with experiencing adversity. Accordingly, individuals with low levels of MT may not effectively cope with stress factors, possibly causing an increase in depressive symptoms.

Limitations

A number of limitations in the present study need to be acknowledged. Even though online data collection has some advantages, such as spending less economic resources or reaching large and diverse samples (Gosling & Mason, 2015), there is less control over the actual completion of the questions (e.g., alone or in the company of others), which might affect responses. As we exclusively relied on self-reported data, we cannot rule out the possibility that the responses were influenced by social desirability and common-method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Furthermore, the cross sectional design of our study did not allow for determining a causal explanation of our data. It remains unclear whether the habitual use of expressive suppression is unfavorable regarding depressive symptoms or depressive symptoms lead to a suppression of emotions. Future research should address these issues by employing longitudinal designs or randomized controlled trials to obtain causal evidence and to test whether or not we can alleviate depressive symptoms by strengthening the MT of an individual or by reducing the habitual use of expressive suppression. Indeed, it would be worthwhile to investigate in future studies whether bolstering levels of MT or reinforcing the use of more adaptive emotion regulation strategies is a more effective strategy to counteract depressive symptoms. Furthermore, exploring physiological parameters might shed light on the relationship between MT and depressive symptoms. A number of studies evinced that there is an association between physical activity and mental health (Deslandes et al., 2009; Fuchs, Hahn, & Schwarzer, 1994). Ekkekakis and Acevedo (2006), for instance, showed that participants reported improved mood after exercising, and Azar, Ball, Salmon, and Cleland (2008) have shown an inverse relationship between physical activity and depression. Since mentally tough individuals show higher engagement with physical activity (Gerber et al., 2012), this relationship might constitute another pathway through which MT exerts its effects on

depressive symptoms. It has also been shown that MT relates to better sleep quality, including fewer awakenings after sleep onset, less light sleep and more deep sleep (Brand et al., 2014a; Brand et al., 2014b). Since sleep disturbance is a common characteristic of depression and is predictive of recurrent depression (Roberts, Shema, Kaplan, & Strawbridge, 2014). As such, future research could explore whether mentally tough individuals show less depressive symptoms due to better sleep quality.

In accordance with much recent research, we looked at the two emotion regulation strategies that fulfill the two most frequently reported objectives of emotion regulation: altering emotional experience and expression (Gross et al., 2006). However, it is not clear to what extent a global self-report measure of emotion regulation captures what emotion regulation strategies are used in everyday life; it also does not provide information on the effects of these strategies. Since the effectiveness of emotion regulation is to some extent context-dependent, future investigations should incorporate assessment of contextual factors in which emotion regulation is imbedded (e.g., whether or not the stressor is controllable). It may also be important to assess the effectiveness of emotion regulation strategy implementation in future studies: perhaps mentally tough individuals use the same emotion regulation strategies as others but implement them more effectively. Difficulties in emotion regulation may arise from a number of sources: 1) the identification of the need to regulate emotions; 2) the selection among available regulatory options; 3) implementation of a selected regulatory tactic; 4) monitoring of the implemented emotion regulation strategy over time (for an extensive review see Sheppes, Suri, and Gross (2015)). The present study only assessed emotion regulation strategy implementation. Moreover, because there are numerous other emotion regulation strategies available, future research might provide more insights on how mentally tough individuals regulate their emotions by examining different strategies, and

examine how effectively mentally tough individuals alter the intensity, duration, frequency, and category of emotional responses; and how flexible they are in using different strategies.

Conflict of interest

The entire study was conducted without external funding. All authors declare no conflicts of interest.

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